

CHAPTER 3 RESEARCH METHODOLOGY

Sampling

Research Site

This private university was specifically chosen for the case study as it naturally offered the learning environment required for the said study. The corporate mission of the establishment embodies the aim to be a Learning Organization (Senge, 1990). All staff are expected to learn their job-roles on-the-job, and continue to learn more roles and responsibilities through time.

Its working environment is saturated with technology, ranging from computers, to high-tech peripherals, electronic office equipment and of course, hand phones. All staff are expected to learn how to use these technologies for efficient work output. The establishment has over 250 staff, of which most own hand phones. It has in recent years, adopted an unwritten rule that hand phone accessibility is expected of all staff, especially those in management or coordination posts.

Research Subjects

The main player in this study was myself. As the proposed research required absolute immersion in order to study the phenomena in its natural context, it was most suitable (and necessary) for the researcher to be a native in the environment. Having been employed at the establishment for over 10 years, and

having established interpersonal work relationships with many other employees in the establishment, my role as the prime researcher was justifiable.

The other participants, however, although familiar with my presence as a fellow employee, were completely unaware of my documentation for the purpose of this research. Operating under covert-immersion, I intentionally indulged in:

Complete participation - where the researcher participates in all activities and goes on to actively influence the direction of the group.
(O'Conner, 2002)

I included all staff with direct hand phone communications to myself as part of the sample group. It was through incidental natural selection that the group comprised participants of various hierarchical levels. This evenly distributed stratified sampling occurred naturally as work communication required staff from various levels to work together to perform any job task.

At beginning of the study duration, the sample group only comprised a core membership of under 10 participants with consistent daily communication. However, as the study progressed and the "SMS work-culture" expanded, the sample group had an extended membership of approximately 50 participants for situational per-task basis. Given the nature of the exploratory study, the actual number of participants fluctuated at any one time, dependent on the situation. However, as the study was qualitative in nature, there was no effort to limit the sampling. All SMS communication data, regardless of source, was recorded for analysis as and when it occurred within the targeted research time frame.

Research Method

Type of Research

Recently, Hannafin and Kim advised contemporary researchers in Instructional Technology to avoid comparison studies altogether, as such research “reveal precious little” of strategies in teaching and learning (Hannafin & Kim, 2003, pg 347). In the same month, Reigeluth advocated that researchers in the field should proactively pursue “design-based research” that may shape the direction of the future in educational technology and instructional science (Reigeluth, 2003, pg 345). And even as far back as eight years ago, Reeves made a strong point that all research should have social relevance to “make a difference” (Reeves, 1995, pg.1).

I would like to believe that my research study rose to this challenge. The objective of my research was to identify patterns of interpersonal communication via SMS that result in learning, both planned (Instructional Learning - IL), as well as incidental (Osmosis Learning - OL).

From there, I applied the menu of identified patterns as a basis for intervention. I attempted to duplicate or repeat patterns that resulted in positive outcome, and consciously avoided patterns that had brought about negative results. Thus, my study was in fact a quasi-experiment in “Action Research”.

The study of a social situation, involving the participants themselves as researchers, with a view to improving the quality of action within it

Bridget Somekh (in Mc Bride, 1989)

SMS based on-job learning is, in itself, an alternative type of research. As it is naturally confounding, with integrated components of technology, application use, and built-in elements of instructional design, this type of inductive research study violates all assumptions built into the traditional experimental design model. Thus, the decision to carry out “action research”, which is equally “alternative” in nature, was envisioned to be able to solve the limitations of traditional experimental approach (Kozma, 2000).

Action research requires something to be done to improve or change the system or method. The “something” in this particular research, for the most part, involved radical covert solicitation of SMS interaction. Although the existing context already promulgates extensive use of SMS technology for work-based communication, the explicit and specific target of studying the two topics of task-execution and self-reflection required active prompting.

In the process of solicitation, it was sometimes necessary to evoke extreme or abnormal SMS dialog in order to explore discourse in difficult topics such as self-reflection. Thus, the instructor had to play the role of instigator, actively producing SMS prompts of daring and sometimes provocative nature. For the most part, participants of senior hierarchy played this role towards lower ranking participants. However, in instances of Reverse-Osmosis Learning, a lower ranking staff was sometimes placed in a situation where he was able to turn the tables on his superiors. These efforts in role-playing are sometimes known as “Dramaturgical-Interviewing”:

Technique of doing research by role-playing own biases in symbolic interaction or social performance.

Erving Goffman (1960)

Some of the intentional Dramaturgical-Interviewing prompts involved giving direct orders. In structuring these orders, Follett's principles of "Organization Theory" (Follett, 1941) were used:

- A conscious attitude – fully aware of engaging in the act of prompting an SMS response
- A responsible attitude – observation of ethical boundaries and consequences when SMS-ing
- An experimental attitude – exploration of all possibilities and opportunities via SMS
- Documentation – systematic transcript record of all SMS transactions

Research Time Frame

The time frame for data collection in the field was limited to a finite duration of six months between June to December 2003. Coding and analysis of the collected data was carried out as an ongoing activity throughout. Compilation and presentation of research findings was carried out from January 1 to February 10, 2004.

Definition of Terms

The following table (Table 3 - 0) lists the legend of terms and definitions used in this study:

P	Participant	<i>Staff</i>	Subjects studied in this research project
PL	Lower Rank	<i>Subordinates</i>	Relative ranking of job post – junior position
PH	Higher Rank	<i>Superiors</i>	Relative ranking of job post – senior position
PS	Same Rank	<i>Colleagues</i>	Relative ranking of job post – same position
PR	Researcher	<i>Self</i>	Participant-observer in covert immersion
IL	Main Activity	<i>Instructional Learning</i>	Participants engage in instruction/learning for specific job-tasks via SMS media
OL	Side Effect	<i>Osmosis Learning</i>	Participants experience Maslow-type meta-cognitive learning

Table 3 - 0: Definition of Terms

Research Design

The following diagrams (Figure 3 - 1) outline the interventions and observations carried out:

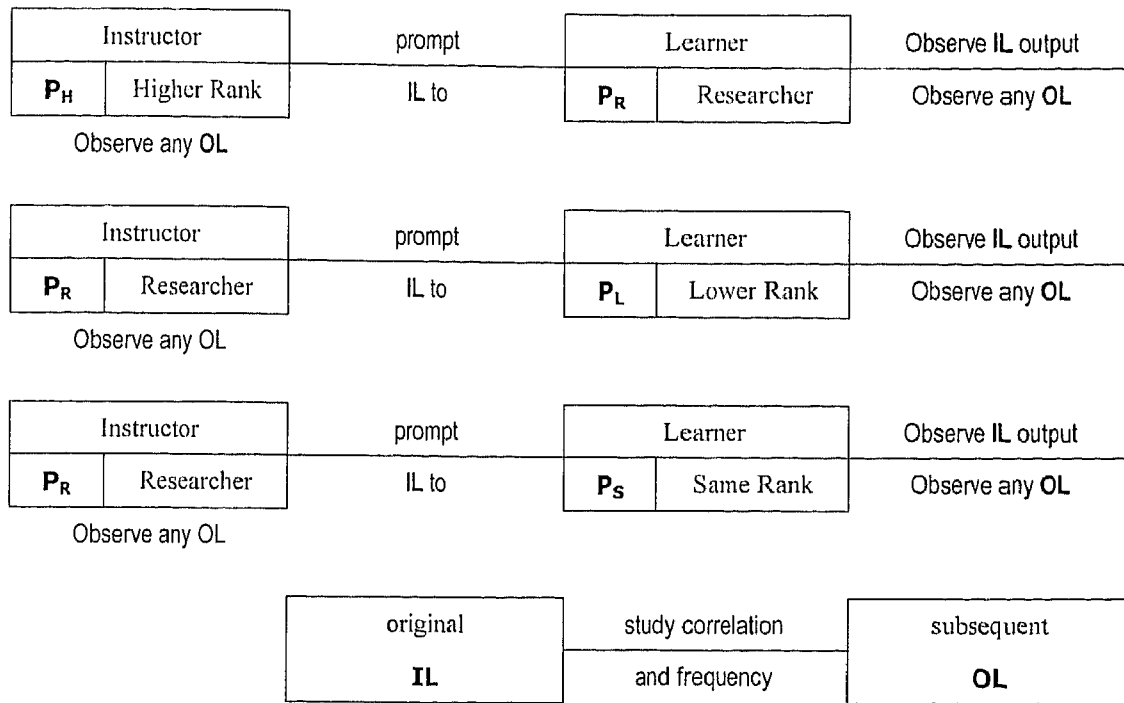


Figure 3 - 1: Sequence of Interventions and Observations in Study

Evaluation and Remediation

Based on preliminary pilot data collected during the novelty effect period, several unexpected permutations were observed and subsequently added to the list of data to be collected (Figure 3 - 2).

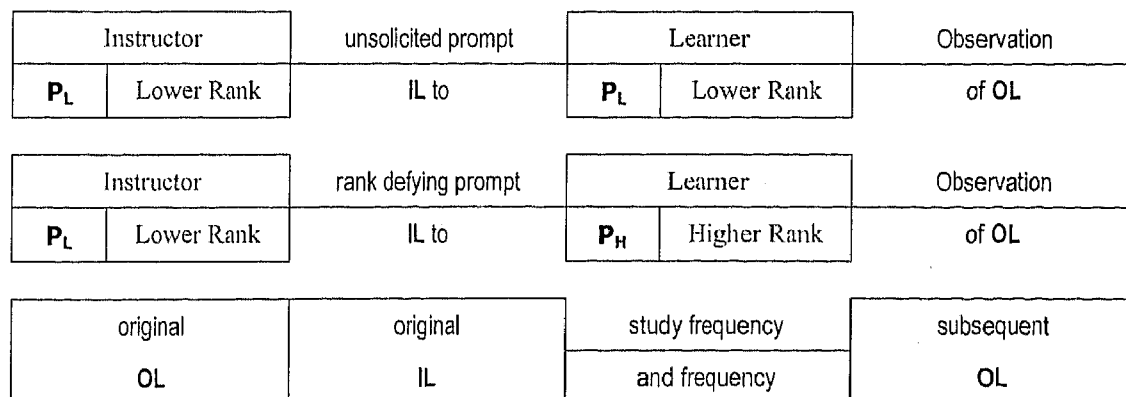


Figure 3 - 2: Sequence of Remediated Interventions and Observations in Study

Bias Controls

As a preliminary strategy, it was planned that triangulation be carried out from several different aspects (refer Chapter 4 subsection on summary analysis of bias controls for details of outcome):

- Medium: Comparison study of SMS-medium to memo and email mediums as a form of comparative cross-referencing to confirm phenomena and data interpretation.
- Interview: Cross check through selective interviews with sample subjects of study.
- Peer Debriefing: Solicitation of confirmation on data interpretation from a neutral observer to provide self-correction.
- Member Checking: Solicitation of confirmation on data interpretation from a fellow participant to avoid self-deception.
- Audit Trail: All SMS transactions recorded verbatim in its original code system for accurate referencing during coding and analysis.
- Persistent Observation: Long term consistent observation to ensure any novelty effects of initial establishment of interpersonal SMS communication have worn off.
- Prolonged Engagement on Site: The duration of immersion and

data collection was planned for a minimum of half a year (six months), substantial enough in time to witness both micro and macro changes in the workplace (growth in the Learning Organization).

Instrumentation

As this research combined ethnographic and action research, for the most part, the instruments for data collection were my own data observations, written records of these observations, and interpretations of these records (refer Chapter 4 subsection on documentation and presentation for details of formats).

Data Coding

The first step was to separate the SMS transactions that involved Instructional Learning (IL) from those that imply Osmosis Learning (OL). Then, the second step was to group the segregated raw SMS transcripts into units of “complete dialogues”. A “dialogue” was defined as a series of SMS transactions that culminates in the completion of a task instruction or learning outcome. Lastly, each dialogue was analysed against a checklist of data content criteria and filed according to category of its content for further analysis.

Data Content Criteria

The following unique aspects and effects of the SMS transactions were studied:

- speed of the transaction: time lapse between one SMS transaction to another
- length of transaction: number of characters in one SMS transaction
- length of dialogue: number of SMS transactions to complete one instruction or reflection
- structure of linguistics used: patterns of short-form, symbolic representations, colloquialism
- mode of confidentiality: categorization of SMS as one-to-one, forwarding to or from third party, duplication to multiple recipients
- absolute freedom of time and space: categorization of SMS transaction time as during office hours, after office hours but within socially acceptable hours, or totally personal private time
- communication mode: categorization of dialogue as “pure-SMS” or “hybrid-SMS” with follow-up or supplementary communication (SMS+email, SMS+phone, SMS+face-to-face)

- dialogue intent: categorization of SMS transaction as to provide instruction (overt influencing), to implant or imply information (covert influencing), to provide reminder (enforce pacing), to provide advice (scaffolding and advanced organizers), to provoke reflection (Socratic questioning), to establish rapport (formalities, small-talk or other non-related content).

Data Collection Techniques

Raw data in the form of SMS transcripts were manually written in a physical logbook in chronological order. This text was later typed and processed using a database or spreadsheet program.

The management of transcripts was planned to be in the form of a database of descriptors. Classification of data content criteria was programmed into a database for easy retrieval and multiple variable referencing. The transcripts were then grouped as dialogues and filed by category, not chronology. These were analysed later as variables relative to the objectives of the study. Patterns of correlation were identified and listed for further formative application, and then, the whole process was repeated throughout the duration of the study.

However, as there has yet to be any known similar research for SMS technology, there were no precedence studies for this project. The database of raw data and its subsequent tabulated analysis was envisioned as an original experimental effort.

Data Analysis

The preliminary data collected between June to September 2003 reached over 3000 individual SMS transactions. While some dialogues are as short as two SMS transactions, others were complex metacognitive discussions that spanned days of ongoing SMS-relays. This preliminary data was collected and analysed (Figure 3 - 3). The analysis revealed some very interesting patterns of social-interpersonal "growth", which in turn, was reflective of the "learning" taking place (in terms of work performance).

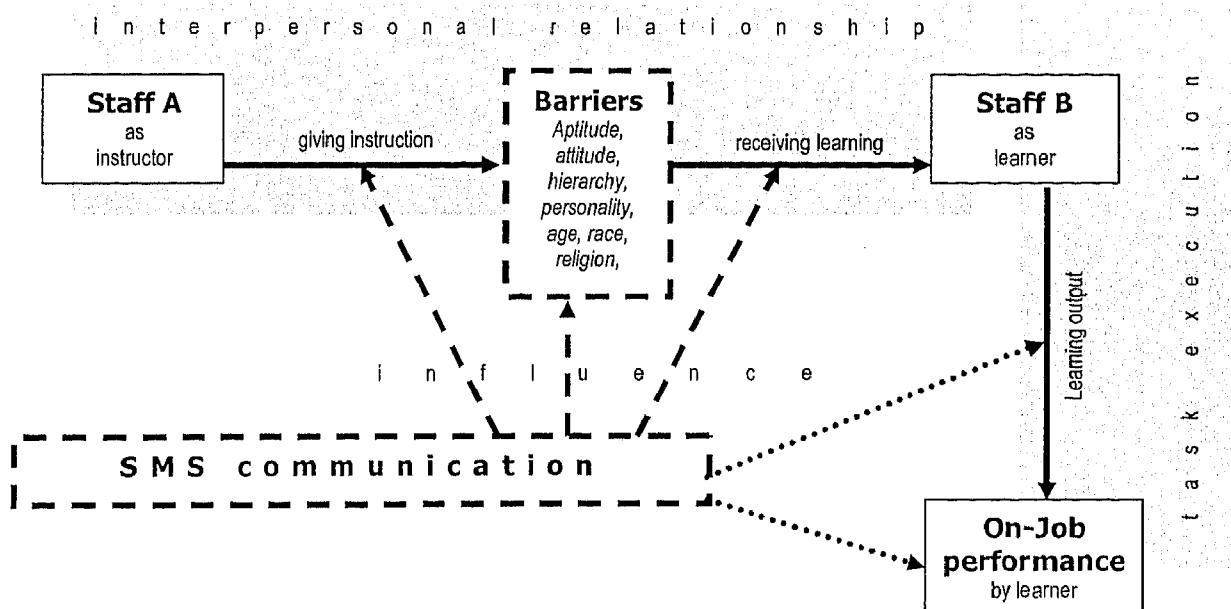


Figure 3 - 3: Schematic Diagram of Research Questions (RQ)

Through formative evaluation of this preliminary data, a rubric comprising measurable observations was devised:

- Depth of interpersonal relationships
- Frequency of reflective thinking
- Hierarchical boundaries broken
- Quality of work produced
- Tolerance towards outcome

The ongoing analysis continued to serve as formative evaluation for the overall duration of the study (Figure 3 - 4). This included the need to analyse the SMS situational outcome (result of phenomenon), and not the medium itself. As proven by Schramm (1977) change is caused by instructional reform enabled by a new medium, and not by the introduction of the medium per se. Thus, the prime area of investigation in my research was the analysis of the learning output (dependent variable). Introspection of personality and SMS attributes (independent variables) provided secondary data.

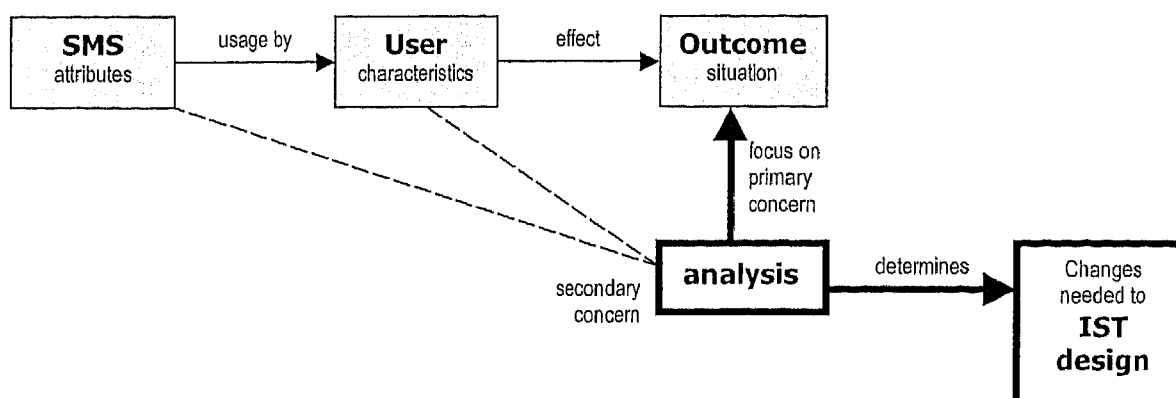


Figure 3 - 4: Formative Evaluation of Situational Outcome

Another area analysed was that of the SMS syntax, language and symbols used during the transactions (Figure 3 - 5). According to the Theory of Symbol Systems (Goodman, 1968) a symbol is “anything that can be used in a referential way and that can be organized into systems” (Gardner, Howard, and Perkins, 1974). SMS attributes, or data content criteria, were analysed to identify language patterns. These patterns were then measured against the outcome of the situation. The correlating results then formed the “grounded theory” (Glaser & Strauss, 1967) for the overall study.

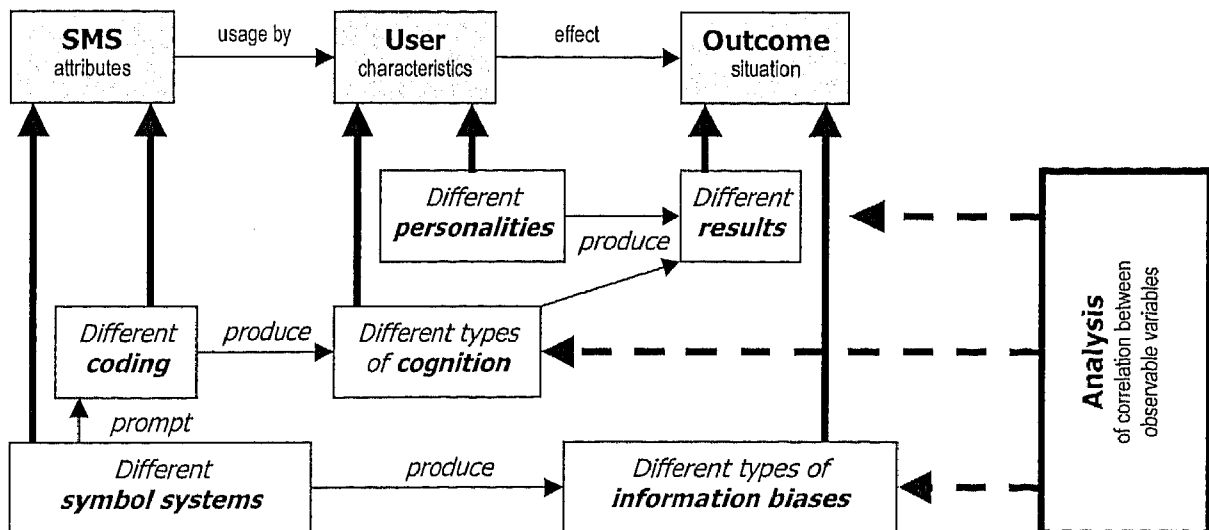


Figure 3 - 5: Analysis of SMS syntax, language and symbols

According to Salomon's media attributes theory (1979), media symbols are influenced by cognition symbols (Figure 3 - 6). These symbols can either be internalised by the learner in pictorial or conceptual form. But in both cases, it is the construct meaning that determines the contextual application of the symbols.

The analysed data, organized into a menu of media symbols, or SMS-lingo, was correlated against instructional content. However, rather than plotting simplistic equations between the two variables, a more qualitative approach was taken. It is not the actual SMS-lingo or content (what) that is important, but instead, it is the intent behind its application (why) that is more important.

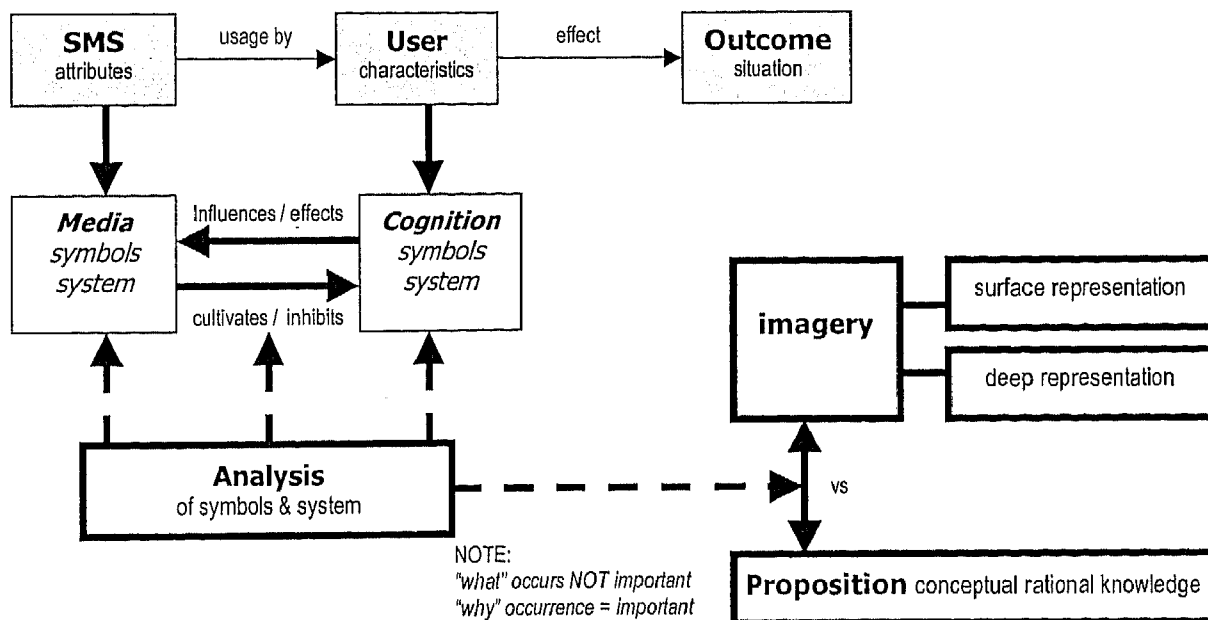


Figure 3 - 6: Symbols Systems in SMS based Instruction

The Theory of Instructional Means (Olson, 1976) explains that the introduction of technologies and techniques is accompanied by the development of

relevant cognitive skills (Bruner, 1964). Analysis of SMS data included an investigation of the learner cognitive processes involved (Figure 3 - 7). As this portion of the research required more than just document analysis, confirmation through “interviews” with the learner, as well as with the learner’s colleagues, provided additional validity to the interpretation of observations (refer Chapter 4 subsection on Analysis of Bias Controls for details).

Also, the learner’s prior knowledge and character preferences were evaluated to ascertain any correlation to his apparent cognition. How much a learner thinks about something, is dependent on how much he understands about it, which is dependent on how much he perceives from it, which is dependent on his personal biases. A learner who is a veteran SMS-user would probably go through a different thought process than that of a novice SMS-user. The former would already have in-built SMS-lingo and technology-application in his schema, thus allowing him heuristics that the latter would probably not have.

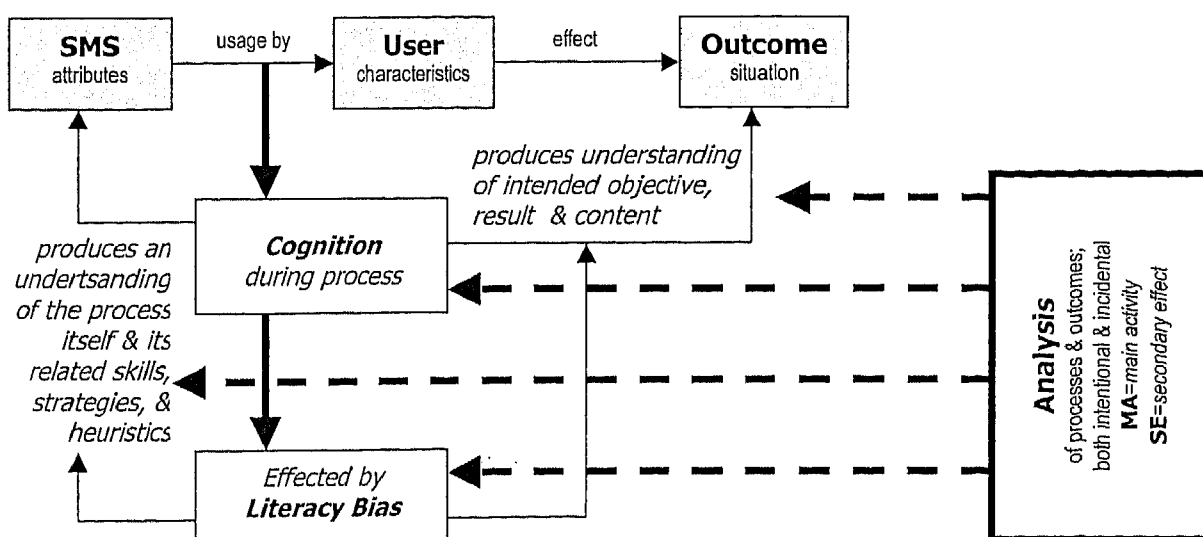


Figure 3 - 7: Cognitive Processes involved in SMS based Instruction

This issue of perception was carried one step further (Figure 3 - 8). What a learner perceives is a manifestation of what his attitude is. The learner's attitude towards SMS-usage for instructional communication, as well as towards the potential benefits from its outcome, will affect his quantum of effort put into the process. If this phenomenon can be harnessed and manipulated to induce a positive attitude, and subsequently, an increased effort, then this intervention can be seen as a conscious act of instructional design. This study attempted to create and manipulate that phenomenon.

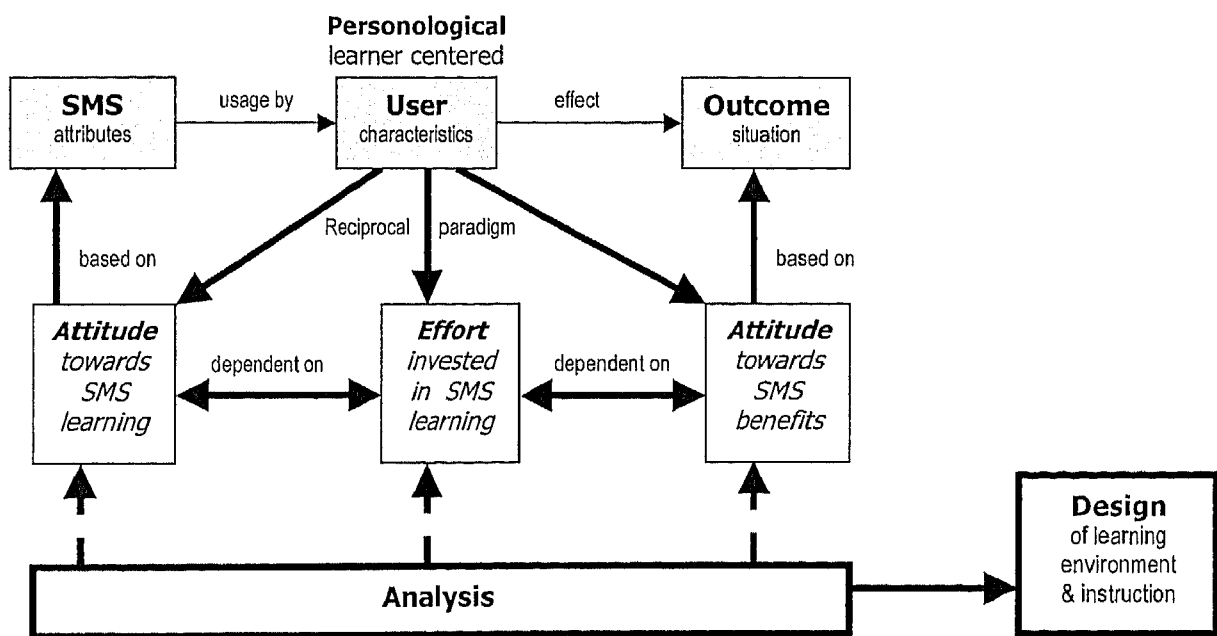


Figure 3 - 8: Influence of Learner Attitudes in SMS based Instruction

This instructional design can produce two types of learning –i.e.-
transference of knowledge or skill (Salomon & Perkins, 1984):

- Mindful - knowledge or skill deliberately decontextualized
(recorded in abstract code)
- Automatic - knowledge or skill practiced to point of
automaticity

My research endeavoured to identify the formula of how to ensure such
learning phenomena, and how can “mindful learning” (Salomon & Perkins, 1984)
be honed to the point of conversion to automation. Hypothetically, extensive SMS-
usage over long periods of time would produce much learning. And the more
learning that occurs, the faster it gets (due to automation). Lastly, there were
inevitably situations where SMS dialogue was not conclusive on its own:

When learners fail to generate relevant relationships, they
should be made explicit for learners in any means or medium
available.

(Wittrock, 1978)

When SMS communication was insufficient, the instructor needed to
phone or email the learner to provide more detailed advanced organizers or more
elaborate scaffolding. In cases such as these, the additional forms of
documentation were examined as an integral part of the relevant dialogue.

The next section of this chapter provides a step-by-step description of the actual logistics carried out in this study. However, some of the detailed methodologies are presented only subsequently, in Chapter 4, as part of the findings. This was due to the “action research” nature of the study, which was predominantly ongoing and never-ending. These “additional” steps were formulated only as a result of the ongoing formative findings.

In short, this study evolved as it progressed, becoming more defined although simultaneously more confounding, as the observations unravelled more discoveries. And from these findings, the patterns observed were used to inductively formulate conclusions which could be used as learning models for future application.

Documentation and Presentation

Documentation Process

All SMS communication was recorded and stored methodically. The total collection of data, or Transaction Transcript Documentation (TTD) was systematically recorded as follows (Table 3 – 1):

Step 1	Automatic electronic record of SMS transaction received on personal handphone memory card
Step 2	<p>Manual transfer of data to logbook of TTD in consistent format:</p> <p><i>Text text</i></p> <p><i>Date 00 00 03 Time 00:00</i></p> <p style="text-align: right;">NOTE: SMS text written in original form – unaltered spelling, grammar, syntax</p>
Step 3	TTD was filed and stored for reference in chronological order of data recording in hardcopy (manual logbook) and softcopy (database) formats (Table 3 - 2)
Step 4	<p>TTD was reviewed and analysed daily. The set evaluation (refer Data Content Criteria) was carried out in reference to TE relevant at that period</p> <p>Observations were recorded in the same logbook in chronological order and checked against internal and/or external bias controls on an ongoing basis</p> <p>Findings were used as formative evaluation to improve strategy for further covert-immersion participation in the study on an ongoing basis</p>
Step 5	<p>At the end of the study period (31 December 2003), the complete TTD was compiled and reviewed in totality. Patterns observed were categorised and recorded in relation to the respective research questions</p> <p>Sample TTD which explicitly exemplified the various categories of patterns were pinpointed and</p>

	selected for presentation
Step 6	These TTD samples were sorted and manually marked according to “Dialogs” –i.e. group of SMS transactions relevant to one Task Execution (TE)
	Dialogs were then typed in the designed table format (<i>refer example TTD Analysis Format</i>) and analysis of observations were recorded as per format
Step 7	Analysis obtained was summarized in diagrammatic as well as prose form for reading convenience and easy understanding (<i>refer example Discussion Format</i>)

Table 3 – 1: Systematic Steps in Analysing the Transaction Transcript Documentation (TTD)

Documentation Format

TTD Database Format. An example of the Microsoft Access file is as follows (Table 3 - 2):

The screenshot shows a Microsoft Access window with a form titled "InputTransaction". The form is divided into several sections:

- TransactionID:** 4
- Date:** Friday, June 20, 2003
- Receiver:** 3:53:15 PM
- Sender:** GP
- Receiver:** FH
- Text:** Yes in capitals! where r u. Come Now for mtg w susan
- Text2:** (Empty)
- Transaction Length:** 52
- Dialog ID:** 200603-sukesti1
- Dialog Participants:** Sukesti, FH, GP, PS
- Dialog Length:** (Empty)
- Transaction #:** (Empty)
- Instructnl Objective:** prepare event
- Analysis Checkboxes:**
 - Pure SMS mode
 - Short Form
 - Colloquialism
 - Intimacy
 - Personal Rapport
 - Instrctn Downwards
 - Instrctn Upwards
 - Instrctn Same Level
 - Contains Information
 - Sender-Learning Instrctnl
 - Receiver-Learning Instrctnl
 - Sender-Learning Osmosis
 - Receiver-Learning Osmosis
 - Sender-Outcome Procdtn
 - Receiver-Outcome Procdtn
 - Sender-Outcome Personal
 - Receiver-Outcome Personal

At the bottom, it says "Record: 14 of 7". The window title bar shows "Form View" and "NUM".

Table 3 - 2: Sample of Database Input Form

TTD Manual Format. Due to confidentiality issues, arising from the covert nature of the study, examples of the TTD Logbook are not included in this paper.

Analysis Process

Patterns Analysis. An example of tabulated data used for identifying patterns of categories is as follows (Table 3 – 3):

Variable	Short form code	Colloquialism	Symbols	Diagrams	Graphics	Animation
transactions						
Curt	Often	n/a	n/a	Never	Never	Never
Short	n/a	n/a	n/a	Never	Never	Never
Medium	n/a	n/a	n/a	Seldom	Seldom	Seldom
Long	Always	n/a	n/a	Seldom	Seldom	Seldom
Essay	Always	Typical	n/a	Never	Never	Never
dialogs						
1-way	n/a	n/a	n/a	n/a	n/a	n/a
2-way	n/a	n/a	n/a	n/a	n/a	n/a
Multiple	n/a	n/a	n/a	n/a	n/a	n/a
Type of IR						
IR =close+pre-extg	Always	Typical	n/a	Seldom	Seldom	Seldom
IR =close	Typical	Typical	n/a	Seldom	Seldom	Seldom
IR =casual	Seldom	Seldom	n/a	Seldom	Seldom	Seldom
IR =formal/only work	Seldom	Never	n/a	Never	Never	Never

Rows for referencing observations of different variables

Columns for comparing different variables

Identifying variables with specific characteristics

Identifying conditions leading to non-conclusive patterns

Identifying variables that do not contribute to observable changes

Identifying patterns of consistent observations with specific variables

Interpreting patterns to identify causal relationships
(IR increase = colloquialism decrease)
(IR decrease = colloquialism increase)

Defining & operationalizing levels of interpretation for all observable variables (eg. levels of IR)

Table 3 – 3: Sample of Patterns Analysis

Quantitative Analysis. An example of a Microsoft Excel spreadsheet file used for sorting categories of findings is as follows (Table 3 – 4):

short form	#ch	actual meaning	#ch	#dif f	%diff	description
1	1	want	4	3	75%	use letter sound
2	1	to	2	1	50%	use letter sound
2	1	too	3	2	67%	use letter sound
4	1	for	3	2	67%	use letter sound
!	1	what do you mean	n/a	n/a	n/a	use letter meaning
#	1	number	6	5	83%	use letter meaning
&	1	and	3	2	67%	use letter meaning
?	1	what do you mean	n/a	n/a	n/a	use letter meaning

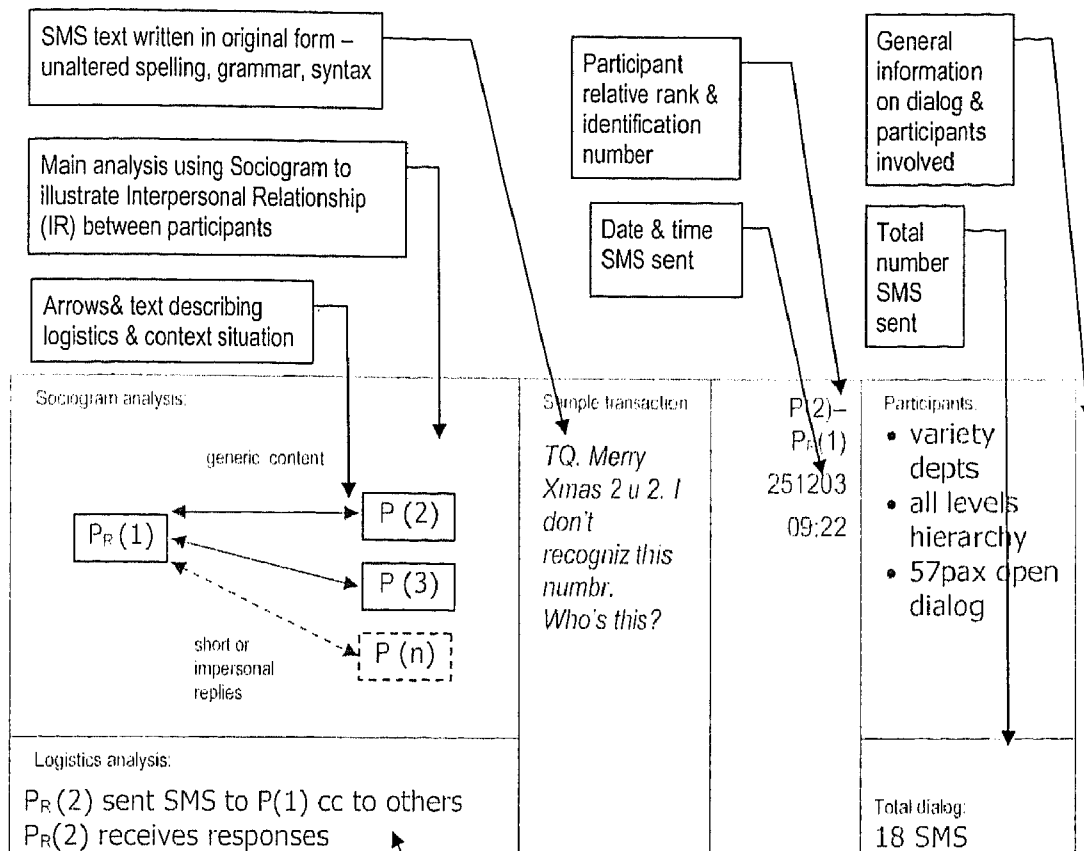
Annotations:

- Documentation of SMS text observed (short form) - points to 'short form' column
- Characteristics of observations (Number of characters) - points to '#ch' column
- Description column to record category of patterns observed - points to 'description' column
- Interpretation (actual meaning) of recorded observations - points to 'actual meaning' column
- Characteristics of interpreted meanings (Number of characters) - points to '#ch' column
- Column for analysis of observations (difference in word length = column B – column D) - points to '#dif f' column
- Column for analysis of effects (percentage reduction efficiency = % difference) - points to '%diff' column
- Column for analysis of various patterns observed (data sorted in multiple permutations to obtain different perspectives of analysis) - points to 'description' column

Table 3 – 4: Sample of Quantitative Analysis

Analysis Format

TTD Analysis Format. An example is as follows (Table 3 – 5):



descriptor	observation	analysis
transaction speed	erratic; inconsistent	weak IR
transaction length	as short as 2-characters	efficient SMS; not elaborated
dialogue length	as short as 1-transaction	success SMS not guaranteed
linguistics	shortform; colloquial; generic	rapport impersonal
confidentiality	none, multiple forwarded SMS	Automation; efficient;
time of day	normal; range 9am-9pm	impersonal/formal/polite
venue sender	local & international	borderless=powerful IR builder
communication	pure SMS	efficient SMS; not need support
dialogue intent/TE	season greeting; build rapport	repeated =investment IR

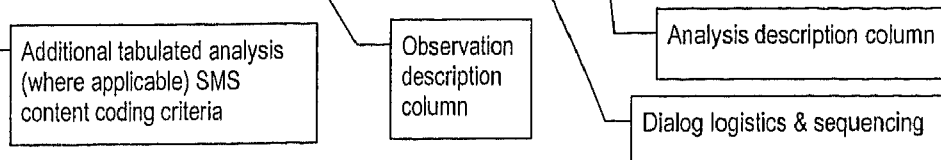


Table 3 – 5: Sample of Transaction Transcript Documentation (TTD) Analysis Format

Prose. This paper is written in a customized two-column prose format to allow for easy cross-referencing of the Transaction Transcript Documentation (TTD). An example format is as follows (Table 3 – 6):

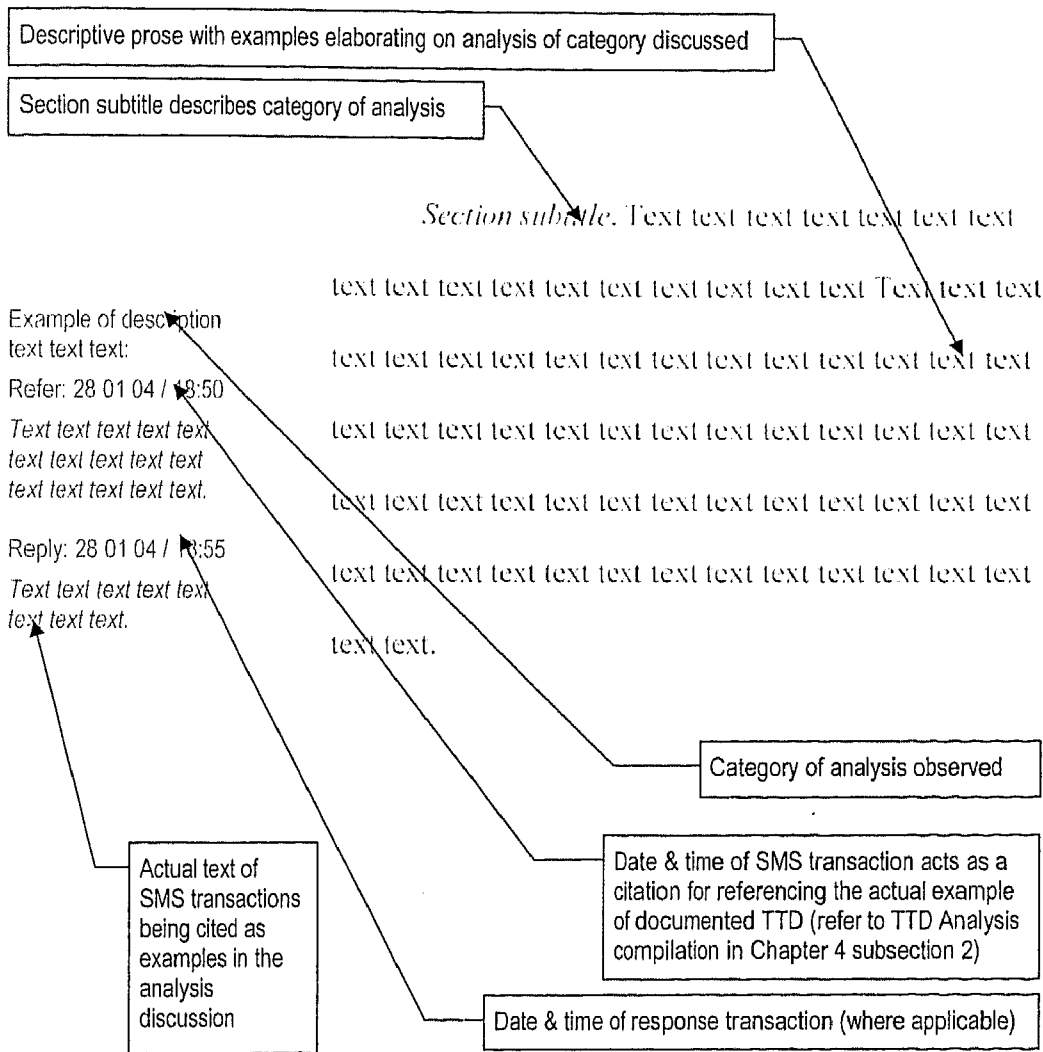


Table 3 – 6: Sample of Discussion Format

Presentation Sequencing

All samples used for discussion in this paper are organized as appendices within the chapter relevant, immediately after the discussion prose presentation.