

CHAPTER 1

INTRODUCTION

Background to the Study

The context

The study was carried out in a private university in Malaysia, which specializes in creative based programs. The establishment, originally a small college focused on the delivery of art and design Certificate and Diploma courses, has grown within 12 years, into an international level university which delivers a wide range of cutting-edge technology-based creative and critical thinking Degrees and Diplomas, ranging from Information Communication Technology (ICT), to Advertising Multimedia Broadcasting (AMB), to Interactive Multimedia Design (IMD), to Architectural Technology (AT) and other creativity-technology hybrid programs.

In order to provide a suitable learning environment relevant to the creative-technology programs it offers, the establishment practices widespread application of the same creative-technology principals in both its physical as well as psychological infrastructure. Not only are cutting-edge hardware and software promiscuously used by both staff and students in all daily routines, but also the stress of its application is that of innovative use, rather than of rote mechanics. Staff and students are expected to use all technological affordances for all efforts in all situations in this “Technology-Based Learning Environment” (Phillips, 2001).

Everyone is expected to be involved.

Tell me, and I forget. Teach me, and I may remember.
Involve me, and I learn.

(Franklin, B., n.d.)

If anyone is not familiar with any area, they are required to learn it on-the-job. Responsibilities and daily job scope of all employees are mutually understood to be inclusive of “learning” what one’s job role is. This unwritten but publicly known company policy has created a “learning culture” within the organization. Thus, the working environment of the said case study can be classified as a “Learning Organization” (Senge, 1990). The philosophy of work ethics and corporate vision focuses on on-job learning and perpetual development –i.e.- the pursuit for learning is not just for its students, but for all staff as well.

Learning organizations [are] organizations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to see the whole together.

Senge (1990)

Thus, the character of the context in this study is that of constant change. This corresponds to Sternberg’s contextual sub theory (Sternberg, 1977) which stipulates that a learner’s learning is defined by his socio-cultural context, and that the said context, in turn, is also shaped by the learner. While the university environment influences its staff, the staff characteristics and actions also influence the university environment.

The Subjects

In this light, it would be interesting to note that the typical staff profile in this university is that of non-conformity. As the working and learning environment here is not typical to that of traditional universities, the type of manpower needed to run such an establishment is also atypical. A staff in this university would need to be multi-disciplinary, multi-tasking, multi-adaptive, and most of all, be able to keep up with the ever-changing expectations.

The objective is
to do as much as I am capABLE.
If that fails, make sure I am adaptABLE.
If that fails too, as long as I am durABLE.

P_R - P_L (personal communication, 22:00 July 10, 2003)

And since these abilities are relatively unique to the context, prior knowledge of these necessary skills is generally scarce. Thus, the majority of the staff must learn these skills on-the-job.

The Learning

In the theory of multiple intelligences Gardner laid out seven different types of “intelligences” that are possible. He advocated that “different intelligences account for a broader range of human potential”, and that due to these differences, “the subsequent paradigm of teaching and learning must also differ correlatively” (Gardner, 1983). Thus, it can be assumed that in order to produce effective learning on-the-job in this atypical context:

- Individuals should be encouraged to use their preferred intelligences or style of learning
- Instructional activities should appeal to various different forms of intelligence
- Assessment of learning should measure multiple forms of intelligence

Statement of the Problem

Learning Barriers

Given the contextual diversity, its needs and affordances for learning are equally diversified. This research proposes to explore the barriers of on-job learning. Some examples:

- Conflict of personalities due to the many differing types of intelligences (Gardner, 1983)
- Differences in learning aptitudes (Gagné, 1991) due to the differing types of natural talents
- Generation gap due to the age and hierarchy differences between the younger and older staff
- Sensitivities in race, religion and culture due to the multicultural international community of staff and students

Interpersonal work-relationships affected by these barriers, in turn will affect efficiency of learning-on-the-job. The fewer the barriers, the faster the learning (from one person to another). This study (Figure 1 - 1) proposes to show how the advancement of technology has effected these interpersonal relationships and to explore how it can be controlled to improve learning-on-the-job.

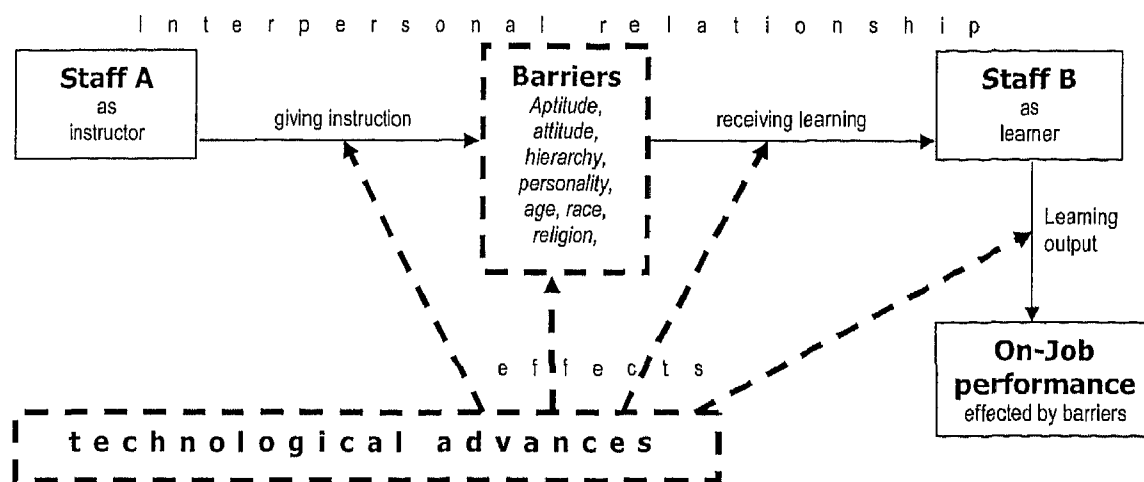


Figure 1 - 1: Effects of Technology on Interpersonal Relationships and Job Performance

Existing Paradigm

Previously, the common mode of non-verbal communication, or "instruction", from boss to worker (or vice versa) was via a written "memo". Memos are generally typed on word processors i.e. Computer Aided Communication (CAC). This technology renders the instructional task much more efficiently than its predecessors of electric typewriters or pen-and-paper by allowing the memo-writer, either the instructor or the learner, to:

- Self-pace formative evaluation (Scriven, 1967) through ongoing easy-editing
- Self-reflect via archive retrieval of backup which is easily stored for future reference
- Automate for multi-audience communication through easy and fast duplication
- Master skills (Bloom, 1968) with user-friendly high-tech desktop publishing visual formatting, grammar & spell-check, copy-cut-paste and other word-processing tools

Then, in recent years, the common mode of non-verbal instructional communication has evolved into a paperless environment via "email". This allows additional affordances of:

- World-wide access via simple internet connectivity (no physical or geographic restriction)
- Instantaneous access in real-time (no transaction-relay delay-time)
- Virtual "post-box" (unlimited online direct-line built-in software functions of address book, auto-cc, auto-bcc, save-sent-items, and other email processing tools)

New Paradigm

Today, non-verbal instructional communication is further “reduced” to an even less “permanent” form. It is now possible for an instruction to be communicated via a simple "SMS", or Short Messaging Service on a mobile hand phone. The research proposed in this study addresses this non-traditional medium of learning via SMS communication.

This medium functions as an instructional tool that provides all the affordances of its two technological predecessors, but adds on a multitude of new variables that are now made possible with the advent of satellite communication and worldwide mobile tracking. Instructional communication can now defy the barriers of:

- Sender-control (SMS does not require active participation of recipient unlike email – which requires recipient to log-on to internet)
- Time (SMS accessibility & availability anytime of day or night – due to sender control)
- Space (SMS does not require a physical venue unlike desktop pc email – total mobility)
- Geography (SMS can occur anywhere across the globe in real-time via satellite communication unlike desktop pc email which requires an internet line – no venue limitation)

- Contextual infrastructure (SMS does not require physical set up
– only a hand phone)
- Inter-personal incompatibilities (SMS does not require face-to-face or voice interaction)

In view of this technology evolution, there arises the need to examine the correlating instructional evolution. The problem to be studied involves identifying the SMS instructional form, method, structure, content, speed, efficiency, product, output, outcome, and therefore, the “learning” in the process.

Theoretical Framework

Theories of Learning

The main focus of the study involved the analysis of the effects technology has on interpersonal relationships and its subsequent effect on job performance. Thus, much of the study revolved around the various theories of constructivism.

As advocated in “Social Constructivism” (Vygotsky, 1978), interpersonal relationships, which are influenced by cultural and social context, in turn influence learning. In the context being studied, SMS technology has changed the mechanics of interpersonal relationships. Areas inspected were issues of privacy, intimacy, rapport and inhibitants, and how these issues effected learning on the job.

On the other hand, in addition to the actual situation, what the learner perceives to be reality, as explained by “Radical Constructivism” (Glaserfeld, 1970), also influences the learner’s output. SMS communication omits face-to-face

and verbal interaction. The meaning of the text communication is constructed totality in the mind of the receiver. How and what the learner understands from the SMS text depends totally on his prior knowledge. As explained by “Cognitive Constructivism” (Piaget, 1955) the learner “assimilates and accommodates” his understanding of the SMS text, based on previous “schema” (Bartlett, 1932, 1958). And since there are vast background differences between the various learners, their respective prior knowledge also differs tremendously.

Instruction given through SMS, like any other instruction, involves providing “advanced organizers” (Ausubel, 1960) and “scaffolding” (Vygotsky, 1978) for learning. Similar to the four-stage model of “Zone of Proximal Development (ZPD)”, the learner gradually develops the ability to perform certain tasks without help or assistance (Vygotsky, 1978). However, as the interaction between the instructor and learner is not face-to-face, issues relevant to distance learning, such as reminders, learner readiness, contiguity, feedback time, evaluation and remediation (Friedman & Fisher, 1998) will also be studied.

Although the focus of study predominantly involved issues pertaining constructivist type learning, since the SMS communication requires the learner to attain a certain level of technological “Mastery” (Bloom, 1968), a few Behaviourist ideas were also studied. For example, that of Bandura (1962):

- Attention: Individuals cannot learn much by observation unless they perceive and attend to the significant features of the modelled behaviour. In this study, the learners eventually learn to imitate actions that are displayed by the instructor.

Sometimes, repeating identical syntax, language, and symbols in their SMS text as that used by the instructor.

- **Retention:** In order to reproduce the modelled behaviour, the individuals must code the information into long-term memory for future retrieval. All SMS users require learning by rote repetition the abbreviations and symbols needed for SMS communication.
- **Motor reproduction:** The observer must learn and possess the physical capabilities of the modelled behaviour to be able to reproduce it. In order for the learner to assimilate the instructor's actions, the learner must learn how to use SMS in the same style as the instructor.
- **Motivation or reinforcements:** The observer expects to receive positive reinforcements for the modelled behaviour. Interactive two-way SMS communication requires participation from both sides. Anticipation of receiving a response to a SMS is in itself a positive reinforcement.
- **Environmental experiences:** Individuals are more likely to act similar to others in their own environment. As SMS communication is commonplace in the Learning Organization being studied, all the community members of the Learning Organization are socially pressured to follow the trend – everyone uses SMS for on-job instructional communication.

Thus, in order to ascertain the learner's "Learning Rate" (Carroll, 1963), quantitative observations of behavioural outcomes such as speed, length and number of transactions were also analysed in addition to the more qualitative content of the SMS transactions studied.

Models & Strategies

Precedents of Instructional Systems Design (ISD) such as the Analyse, Design, Develop, Implement, and Evaluate (ADDIE) model (Dick & Carey, 1996), although useful as a knowledge base foundation, in actuality become cumbersome and limiting if applied to cutting-edge technology, such as the SMS.

Since the medium of SMS affords the learner and instructor instantaneous speed, the motions of going through an ISD process for each instructional transaction would have been stifling.

Thus, the models used in this study are less structured and more situational.

...Over-introspection reduces the likelihood that new ideas will emerge in the field... A discipline that (only) draws on its own practices as the primary inspiration of its research and theory risks stagnation and decline.

(Kozma, 2000)

To avoid such in-breeding, several models, from sources outside of the traditional scope of instructional technology, were borrowed for this study. While some were sourced from fields related to instructional technology, such as Information Communication Technology (ICT), others were derived from the pure

sciences, such as plant biology and thermal physics. It would be interesting to note that this eclectic choice of sources, a conscious yet unplanned effort, mirrors the creative environment of the project study, emulating the unpredictable and spontaneous nature of the research context.

In loose terms, the philosophy in which this study was formulated, was very much in line with my own ideas of “evolution” (Hussin, 1991), where the form, characteristics, and logistics of a “live” or “on-site) study will instinctively follow the process of “natural selection”, “spontaneous mutation” (Darwin, 1959), symbiosis (Margulis, 1991) and other biological or natural phenomena, rather than be shaped by pre-planned regulations or requirements. Thus, the array of strategies and models used in this study ended up as more a result of experimentation, rather than a pre-defined selection.

Of all the instructional strategies applied in this study, the “Socratic Method” (Joyce, Weil & Calhoun, 2000) of questioning was most often applied. SMS communication comprises text dialog between two or more parties. This questioning method stimulated cognitive responses from the learner. The instructor could easily pose leading questions to the learner, prompting the learner(s) to respond constructively and interactively with relative ease.

The underlying theme in all the SMS interactions is the “Personal Family of Models” (Joyce, Weil & Calhoun, 2000). As the SMS transactions are spontaneous (unplanned schedule) and free-flow (unstructured content) a parallel can be drawn to that of non-directive teaching (Joyce et al, 2000). Both the learner and the instructor undertake the process of unpremeditated interactions and

experience exploratory learning, often in a two-way flow. And the motivation to embark in these transactions is fueled by the need for self-improvement in both parties.

These “Concepts of Self” can be better explained through Maslow’s “Hierarchy of Needs” which advocates that humans eventually evolve to a higher state of being, “developing the desire to teach others, to pass on the knowledge to the next generation for self-fulfilment, to attain self-transcendence” (Maslow, 1971).

Also, according to Maslow, we experience “Homeostasis” (Maslow, 1954) in a cyclical manner, forever instinctively needing to seek the opposite state of being. Homeostasis, a physics phenomenon, is the principle by which a furnace thermostat operates: When it gets too cold, it switches the heat on; when it gets too hot, it switches the heat off. In the same way, Maslow extends the homeostatic principle to human needs. A learner, when lacking a certain substance, develops a hunger for it; when the learner gets enough of it, then the hunger stops.

This reinforces my own theory of “Osmosis Learning” –i.e.- that learners experience osmosis to equalize their level of “lacking knowledge” to that of “higher knowledge”, and when that level is achieved, the learner will instinctively seek a different benchmark to “absorb” from.

Absorption through osmosis in a biological sense (Dutrochet, 1847) refers to the act of penetrating a structural barrier or membrane. The passage of water or another solvent across a semi permeable membrane into a compartment that has a higher concentration of solutes tends to regulate the concentration of solutes in the

two compartments. The rate and efficiency of biological osmosis depends on the cellular structure of the barrier. Similarly, SMS aided Osmosis Learning depends on the structure of the SMS mechanism. Some hand phones provide user-friendly short-cut keys, encouraging a more fluid flow of communication, both in speed and quantity. Others require cumbersome overly structured or nested commands, prohibiting the flow of SMS.

However, the fluidity of SMS flow does not necessarily mean that a faster flow is better for learning. Cronbach & Snow advocated that highly structured instructional environments tend to be most successful with students of lower ability. Conversely, low structure environments may result in better learning for higher ability students. These Principles of Aptitudes (Cronbach & Snow, 1989) were applied to Osmosis Learning in the SMS environment. Patterns of SMS language were studied to describe these aptitude differences. Usage of “free-form” abbreviations, as opposed to “prompted text”, or preference for “blank palette”, as opposed to “preset messages”, were studied in correlation to the “learning output”.

Lastly, the “Language Shift Mechanism” (Dillenbourg, 1992) model from computing technology was studied. This concept explains the elevation of the learner's levels of control and abstraction having inverse correlation to the learner’s cognitive load, resulting in escalated progress. Increase in Short Term Storage Space (STSS) permits transition from one sub-stage to the next, making the Operating Space (OS), within the Total Processing Space (TPS), more utilized to control active schema.

Basically, when a learner masters the short-cuts in his hand phone SMS

functions, his ability to focus on content, speed, timing or sequencing, is increased. This improvement in ability increases continually with every learned new upgrade of SMS system or function. This model illustrates an example of the unique inter-dependency of Osmosis Learning to the technology-based environment in which it exists.

Research Study

Scope / Focus

Although the potential scope for on-job learning is non-quantifiable, for the purposes of this particular research case study, I focused on two specific learning applications:

- Task execution (constructivism): To get a task done better, faster, less mistakes (additional data to be collected to ascertain the actual task for each respective SMS being studied). This was defined as Instructional Learning (IL).
- Self-reflection (meta cognition): Individuals as part of "learning organization" self-reflect on what he/she has learned (content of SMS to be analysed for proof of meta cognition by SMS-sender). This was defined as Osmosis Learning (OL).

Research Questions

This research sought answer the following questions (Figure 1 - 2):

- RQ 1 How does the use of SMS communication effect interpersonal relationships (IR) on the job?
- RQ 2 How does the use of SMS communication effect task execution (TE) of a job?
- RQ 3 How does the nature of interpersonal relationships (IR) effect task execution (TE)?

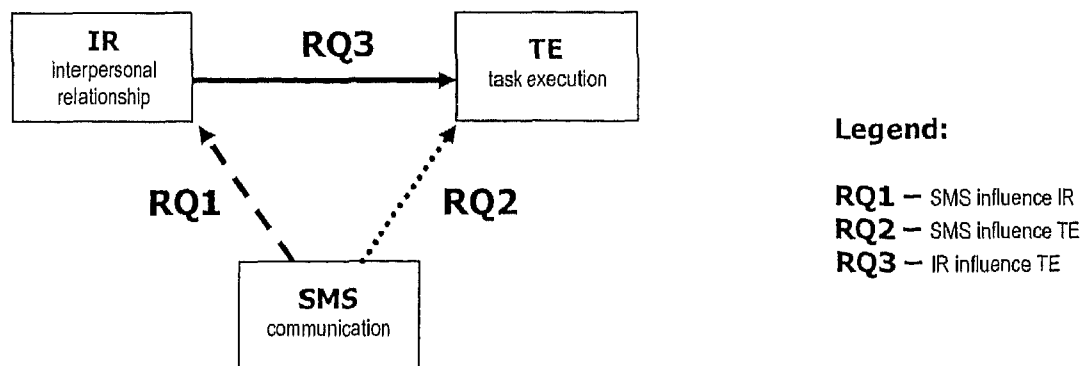


Figure 1 - 2: Simplified Diagram of Research Questions (RQ)

Significance of the Study

The rationale for the study was the need to identify patterns and models of learning within this technological context, and the objective was to strategize the application of such identified patterns or models, for the mutual benefit of the people and establishment involved –i.e.- to improve on-job learning.

Limitations of the Study

Time Frame

The nature of this study was mostly qualitative, focusing on the phenomenology and exploration of the unknown. In the effort to find and control patterns of learning, a longitudinal study of a substantial duration was needed.

First, the researcher and other subjects being studied needed to become fully immersed in the SMS learning environment and overcome any novelty effects of the medium. This needed to be carried out with extreme care, so as to maintain the researcher's covert status. Also, in order for the observations to be as naturalistic as possible, the process of communication, development of interpersonal relationships, and its subsequent learning outcome, needed to take place at its own pace.

Then, in order to dissect the intricate network learning permutations, the researcher had to explore all avenues of human interpersonal relationships using the medium of study. This effort was not only time, cost and energy consuming, but could also have become endless if not curtailed.

For the purposes of this research study, the time frame for data collection in the field was limited to a finite duration of six months between June to December 2003. This proposed duration, although sufficient to identify patterns for immediate application by the researcher in the intended action research, was hardly sufficient to serve as a solid base for further generalization, and thus, should not be used as such.

Medium

On-job interpersonal communication involves several mediums:

- Face-to-face communication (verbal and non-verbal)
- Verbal communication (fixed line and mobile telephones)
- Text-based communication (hardcopy and softcopy)

Unlike the first two categories, which rely on physical human interaction, either visual or verbal, the last category, text-based communication, is fully dependent on the characteristics of language, syntax, “system symbols” (Salomon, 1979) and the technology medium in which it is delivered within. As this study specifically addressed the effects of technology, only data from this third category was relevant.

The initial intent was to do a compare-contrast between various modes of text-based communications:

- Memo hardcopy - physical transference
- Desktop PC email softcopy - internet transference
- Wireless Application Protocol (WAP) - mobile internet
- Multimedia Messaging Service (MMS) - mobile transference
- Short Messaging Service (SMS) - mobile transference

Due to the limitation of manpower and resources, this study was planned to be limited to data analysis of SMS communication only. However, in the course of the six month study, several developments altered this plan. These changes are discussed in Chapters 4 and 5.

Accessibility

Being a member of the senior management in the establishment, the researcher automatically had access to establishing interpersonal relationships with many other staff of various hierarchical levels. However, as the medium of study was only that of SMS communication, the access to other staff was limited to those who used hand phones diligently in the course of their daily work.

Task Type

As the nature of SMS text is relatively short, the maximum length being only between 170 to 450 characters depending on hand phone brand and model, the types of on-job instructions that could be carried out via SMS was also limited.

In some cases, supplementary communication via verbal hand phone discussion and/or text-based email was used when the SMS technology was unable to fulfil the task needs. This issue is discussed further in Chapter 4, Data Analysis section, as this did not always pose as a limitation. In some instances, the necessity to condense instruction into an SMS format gave rise to new learning skills.

Application

The researcher/author of this paper was an employee in the establishment being studied. The findings of this study were used by the author, as part of an action research in an on-job situation. Future plans had included a summary of findings to be submitted to the management of the establishment in concern, to be reviewed for adaptation into its existing staff-training program.

This paper was written explicitly for academic purposes only. Critical appraisals, evaluations, or assessments, of the persons or establishments being studied, as illustrated in this paper, do not reflect official opinion of the author, and should not be quoted as so. Similarly, recommendations, prescriptions, and directions, for the issues addressed in the strategic plan, do not necessarily reflect intended action by the author, and should not be assumed as so.

Researcher/Author

The author of this paper, (yours truly) was also the researcher and participant-observer in the referred study. Having been a loyal employee of the establishment for over 10 years, naturally, a certain level of personal bias and prejudice may have developed. While every effort was made to ensure neutrality in data observation, the interpretation of the data, on the other hand, would inevitably reflect the author's past experience.

The following sections of this study were written in first voice to reflect this personal dimension to the study.