

Developing Individuals for Developing Learning Based Systems

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ABSTRACT

Research has highlighted that the implementation of learning based systems development is a complex issue as it requires the input of employees in all the levels of an organization. However, to obtain this is a challenge for organizations as the basic training and education offered by organizations and experiences on their own and other factors such as fear and ignorance prevent such actions. For this purpose, other elements are also required. This research aims to identify and explain the usage of the elements that can encourage employees to contribute inputs necessary for learning-based systems development. To achieve this aim, this research developed a conceptual framework based on the concepts of meta-abilities and tacit knowledge externalization and sharing. The framework is tested using a case study in Malaysia. It is concluded that the future focus the management of information in organizational learning (OL) should be towards the development of an individual's meta-abilities and creating a suitable organizational culture and infrastructure such that knowledge sharing is promoted.

Keywords

Meta-Abilities, Learning Organizations, Tacit Knowledge Externalization and Sharing, Conceptual Framework

1.0 INTRODUCTION

The human aspects of knowledge creation are critical for sustaining learning-based systems within organizations in order to facilitate inquiries based upon the divergence of meanings and perspectives (Courtney, Croasdell & Paradise, 1998). This is due to an organization's knowledge being derived from the organization's employees (Von Krogh, Ichijo & Nonaka, 2000). However, three major issues have been identified as being associated with learning-based systems, which are continuous system re-examination and modification (Meso & Smith, 2000), knowledge externalization and sharing (Haldin-Herrgard, 2000),

and obtaining tangible tacit knowledge (Tsoukas, 2002). This research attempts to propose a conceptual framework that identifies and discusses these issues and to ease the process of developing learning-based systems. To achieve this aim, this research assumed that there are two main aspects to be considered: The ability to externalize and share knowledge and skills, and self-documentation. These two aspects are emphasized as they can encourage employees to contribute inputs towards learning-based systems development (Karhu, 2002).

To develop employees' confidence and a willingness to contribute inputs for learning-based systems development, this research proposes the elements of understanding organizational roles, internal strengths, formal and informal discussions and rational discourse. These elements are combined in a manner such that a novel framework is formed, which is then applied in a real life setting using a case study approach.

The paper begins by offering an examination of the main concept of meta-abilities in the organizational development and management literature. The IS, management and organizational development literature are then surveyed for specific guidance in relation to tacit knowledge externalization, OL and meta-abilities and a framework synthesizing the prior research is developed and presented. Following this, the research approach is outlined, which then leads to a description of the case study. The theoretical concepts and the conceptual framework are then studied in the context of an organizational setting. The paper then finishes with conclusions and suggestions for further research.

2.0 LITERATURE REVIEW

To understand how the externalization and sharing of tacit knowledge and meta-abilities can be used to support OL-based systems, it is useful to have a fundamental understanding of the underpinning concepts. This is provided in the following subsections.

2.1 The Difficulty in Tacit Knowledge Externalization and Sharing

Due to its transparent and subjective nature, tacit knowledge is not easily externalized (Augier & Vendelo, 1999). Difficulties appear when expressing or documenting knowledge that appears obvious and natural to one (Haldin-Herrgard, 2000). Further, the difficulties in externalizing and sharing of tacit knowledge are also linked to language, time, value and distance (ibid). Alternatively, there are factors that prevent individuals from sharing their tacit knowledge or seeking clarification from colleagues and peers, including the lack of confidence, anxiety, unwillingness, confusion, and being carried away by strong feelings (Harvey & Butcher, 1998).

Generally, the above discussion identifies the main factors requiring consideration when attempting to externalize and share tacit knowledge. Therefore, in order to obtain inputs from employees an understanding of how to encourage individuals to externalize, share and document their tacit knowledge is imperative.

2.2 Frameworks in Organizational Learning

Senge (1990) defines a LO as an organization “in which you cannot not learn because learning is so insinuated into the fabric of life.” However, this aspiration gradually diminishes if there is no teamwork amongst the staff members.

Huber (1991) considers four constructs as integrally linked to OL: (1) knowledge acquisition; (2) information distribution; (3) information interpretation; and (4) organizational memory. However, Huber’s (1991) framework is built on the belief that staff members have self-confidence, a sense of responsibility and feelings of belonging to the company in order to externalize and share their tacit knowledge. As a result, this framework has a potential to fail if there is no commitment from the staff members when supporting it. To overcome this issue, this research incorporated the concept of meta-abilities in the learning-based systems developmental framework.

Klimecki & Lassleben (1998) conceptualize OL as a communicated-based process where the organization overcomes its previous boundaries of knowledge and ability by allowing its members to share knowledge, interact, influence each other and cope with difficult situations. Combining Huber’s (1991) and Klimecki & Lasslebens’ (1998) perspectives, Nonaka & Takeuchi (1995) viewed OL as involving the generation, absorption and sharing of tacit knowledge and they emphasized the importance of interaction amongst people towards the development of OL capabilities.

However, to enable the communication process, employees have to be self-confident and to be encouraged to talk to others in the workplace. The lack of confidence and anxiety will demotivate an individual from communicating with others and consequently reduce the effectiveness of the framework (Harvey & Butcher, 1998).

However, it has been argued that learning emanates from the iterative process of knowledge externalization and internalization (Meso & Smith, 2000). Externalization occurs when an individual’s tacit knowledge is captured as explicit knowledge (ibid). Internalization occurs when this captured explicit knowledge is then transformed into another individual’s tacit knowledge (ibid). In this case, OL occurs at the intersection of tacit and explicit knowledge during the interaction of various employees, departments or teams in an organization (ibid). However, this framework still relies on the ability of staff members to externalize and internalize knowledge (Haldin-Herrgard, 2000).

In summary, the capability to externalize, share and document tacit knowledge is of paramount importance to OL frameworks. This in turn illustrates that employees should be instilled with that capability. This research intends to use this reasoning to illustrate the role of meta-abilities in OL, which is discussed further in the next section.

2.3 Meta-Abilities and Tacit Knowledge

Understanding the ability to externalize, share and document tacit knowledge enables an organization to undertake continuous IS updates and consequently disseminate new insights for learning (Malhotra, 2004). The following subsection presents an overview of meta-abilities that will be used as a means for developing employees’ abilities to externalize, share and document tacit knowledge. Thereafter, the elements that will be used to develop the meta-abilities are dealt with.

2.4 Meta-Abilities Development

To develop an organization, it has been suggested that competencies should be generic rather than organization specific (Butcher, Harvey & Atkinson, 1997). Therefore, competencies should involve increasing self-knowledge and improving “meta-abilities” – those personal, acquired abilities which underpin and determine how and when knowledge and skills will be used (ibid).

Butcher *et al.* (1997) found that there are four meta-abilities that are critical in organizational development: (1) cognitive skills; (2) self-knowledge; (3) emotional

resilience; and (4) personal drive. The description of each meta-ability is offered in Table 1.

Table 1. The description of meta-abilities

Meta-abilities	Description
Cognitive skills	Includes the ability to notice and interpret what is happening in interpersonal situations; to entertain multiple perspectives and integrate them; to envision strategic futures; and to sort and analyze data. These skills allow employees to “read situations, understand and resolve problems.”
Self-knowledge	Seeing oneself through another’s eyes, knowing one’s own motivations and values and distinguishing one’s own needs from those of others. These skills allow employees to consider a range of options in their own behavior and to make better judgments of what to do. They allow other skills and knowledge to be used more flexibly.
Emotional resilience	Includes self-control and discipline; the ability to use emotion well to cope with pressure and adversity; and balance feelings about oneself. These skills allow employees the personal robustness to direct their energies, deal with intense situations and manage challenges healthily.
Personal drive	This involves self-motivation and determination, a willingness to take responsibility and risks. This helps employees to persist, motivate others and meet targets.

Source: Butcher et al. (1997)

However, meta-abilities do not develop on their own. The presence of various elements is required (Butcher et al., 1997). This research proposes the following elements that are required to develop the above meta-abilities: (1) understanding organizational roles; (2) internal strengths; (3) formal and informal discussion and (4) rational discourse. These elements were selected as they are more focused upon developing the employees’ communication skills, assertiveness and dealing with conflict, persuading others and managing organizational politics, which are relevant to achieve the objective of this research. To acquaint the reader to the elements, the definitions, descriptions and justifications of each element are provided in the following paragraphs.

This research asserts that employees’ need to understand three fundamental aspects when working in organizations: (1) personal responsibility; (2) task priority and (3) personal targets (Schroder, 1989; Butcher et al., 1997). This understanding is essential as it promotes the judicious use of accumulated experience and is beneficial when considering learning activities.

Further, we propose that eight internal strengths should be instilled within employees’ in order to develop meta-abilities and thus establish a learning environment. These eight internal strengths were chosen as they enable the use of knowledge and skills in an effective manner (Goleman, 1995; Malhotra, 2004).

The first internal strength that is proposed in this research is personal confidence. Personal confidence is a self-belief in undertaking and accomplishing organizational tasks (Pedler, 1994). As one of the elements that prevent staff members from externalizing and sharing their tacit knowledge is lack of confidence (Harvey & Butcher, 1998), this element should be emphasized when understanding an OL framework.

The second internal strength proposed in this research is observing accepted organizational approaches. By observing accepted organizational approaches, staff members can undertake tasks based upon “the right approach for the right situation” (Schroder, 1989). As this internal strength promotes sharing information with, and obtaining clarification from, other parties, it needs to be emphasized in creating a learning environment (Karhu, 2002).

The third internal strength was identified as undertaking tasks with commitment and self-discipline. Without these values, employees tend to undertake a job hastily and carelessly. This in turn will badly affect the quality of organizational operations. The fourth internal strength was recognized to be self-awareness. Self-awareness is defined as “an ability to determine the tasks that need to be accomplished at the current time and accomplish the determined tasks according to an accepted organizational approach” (Butcher et al., 1997). In other words, it is related to the phrase “do the right things at the right time.” The fifth identified internal strength is self-remembrance. For the purposes of this research self-remembrance is defined as “the value that requires staff members to mind their actions when undertaking a task so that it can be accomplished effectively and to remember that through their effective actions the company can achieve a good profit and consequently give them a good salary and bonus” (Schroder, 1989). Compassion was viewed to be the sixth element. Being equipped with this value, staff members can trust each other and consequently neutralize the feeling that prevents them from sharing information with other members.

To ensure that every employee has a feeling that he/she works for the sake of the company and for fulfilling his/her responsibility to the company, the element of sincerity is pertinent. Sincerity can motivate employees to work collectively and harmoniously in the workplace. Finally, employees must have the willingness to change whenever the need arises. This is

due to rapid changes in the organizational life and business environment.

Another element that is proposed by this research when developing the meta-abilities is the ability to conduct formal and informal discussions within the organization. This is because staff members face various tasks in daily activities – routine, non-routine, official and unofficial (Earl & Hopwood, 1980). Formal approaches are procedures such as meetings, progress reports and performance evaluation reports (ibid). Within organizations there are also instances of ‘chats around the water fountains’ or ‘in the corridors’, which are also known as informal discussions. Other forms of informal approaches include dialogue, face-to-face interaction, corridor meeting, lunch table chats and coffee/tea table chats (ibid). Through good communication, learning and teaching activities can be undertaken actively amongst staff members. Therefore, this value should be emphasized in order to create an effective OL framework.

When considering the establishment of a platform in an individual’s mindset, particularly when creating a learning environment in an organization, the presence of another element is required; this is rational discourse. A rational discourse can legitimize the selection of a design ideal because it ensures that the arguments of all interested parties are heard, that the choice results in an informed consensus about the design ideal, and the formal value choice is made only by the force of the better argument (Klein & Hirschheim, 1996). These values are critical for developing the above cognitive skills and self-knowledge. In addition, they are able to promote active tacit knowledge externalization and sharing amongst staff members, especially in meetings and dialogue. Therefore, rational discourse should be considered for establishing a platform in an individual’s mindset for creating learning environments in an organization.

From the aforementioned discussions, it is declared that the concept of meta-abilities in this research is developed based upon the elements of understanding organizational roles, internal strengths, formal and informal discussion and rational discourse. This is something that prior research such as that by Butcher *et al.* (1997) has not undertaken. Additionally, the concept of meta-abilities in this research is utilized for developing an effective OL framework and not organizational development, as proposed by Butcher *et al.* (1997). This strategy makes this research unique to that of Butcher *et al.* (1997).

2.5 Seven Competency Sets and Tacit Knowledge Externalization

Based on the aforementioned discussion, it can be learnt that meta-abilities can assist in building a

confident and responsible individual (Harvey & Butcher, 1998). These values, in turn, create three important competencies. First, meta-abilities create individual influencing skills (ibid). Second, meta-abilities develop individual sharing attitudes (ibid). Third, meta-abilities develop inquisitive tendencies (ibid). It was also found in the earlier sections that there are problems when developing OL-based IS, which is the need to develop an individual’s ability when externalizing and sharing tacit. In such an instance, meta-abilities, influencing skills, sharing attitudes and inquisitive tendencies (seven competency sets) are the humanistic elements that should be considered when considering means of overcoming them.

By practicing the above influencing skills, sharing attitudes and inquisitive tendencies, individuals can generate creative ideas (I), actions (A), reactions (R) and reflections (R) (Choudrie & Selamat, 2005). The terms ideas, actions, reactions and reflections represent forms of activities within an organization. These activities then allow the externalizing and sharing of tacit knowledge that can provide synergistic inputs for a continuous development of IS (ibid). However, for this the tacit knowledge must be initially documented. This can be achieved by the value of self-documentation, which is also developed by meta-abilities (Butcher *et al.*, 1997). Due to the development of meta-abilities, the willingness to question implicit assumptions, explore new possibilities and directing energies toward higher standards enables the staff members to be well prepared, using good documented progress reports or working papers (ibid). In the longer term this then ensures that there is a tangible means of the verification and validation of tacit knowledge.

Reflecting on the above discussion, it can be determined that individual development is the starting point of an OL framework. Additionally, it can be learnt from the previous discussion that understanding organizational roles, internal strengths, formal and informal discussion and rational discourse should become the starting point for the individual development.

2.6 A Conceptual Framework

As described earlier, to construct an initial framework that displayed the relations of each of the above dimensions for OL development, two domains of research were drawn from the literature. The initial literature focused upon the difficulties associated with making tacit knowledge tangible (Augier & Vendelo, 1999; Haldin-Herrgard, 2000). However, as this research is focused upon IS, the impacts of knowledge management upon learning based systems became imperative. Subsequently, emphasis was drawn to OL (Argyris & Schön, 1978; Senge, 1990; Huber, 1991).

Building on this literature an initial conceptual framework is proposed that suggests that the aforementioned dimensions relate to one another and are important for individual development, which is illustrated in Figure 1. As shown in the diagram, individual development is initially fostered by the elements of understanding organizational roles, internal strengths, formality and informality, and rational discourse (Stage A). The element of understanding organizational roles increases the motivation to work diligently and thoroughly in the organization amongst the employees (Schroder, 1989; Butcher *et al.*, 1997). This, in turn, increases the employees' concern with the relevancy of the provided information in order to accomplish organizational tasks. Therefore, the element of understanding organizational roles should be included in OL-based IS development.

The internal strengths earlier proposed by this research, personal confidence, observing accepted organizational approaches, undertaking tasks with commitment and self-discipline, self-awareness, self-remembrance, compassion, sincerity and willingness to change were selected as employees equipped with these elements determine how and when knowledge will be practiced within the organization, which is critical to the learning process (Goleman, 1995; Malhotra, 2004). These characteristics, in turn, increase the applicability of the proposed eight internal strengths in developing an OL-based IS.

Another element that is proposed by this research when developing individuals is the ability to conduct formal and informal discussions within the organization. When equipped with the ability to conduct formal and informal discussions, it is argued that staff members can read situations, understand and resolve problems, and consider a range of options in a collective manner (Earl & Hopwood, 1980). These values can highlight the need to continuously re-examine and modify the contents of the system (Malhotra, 1997). Therefore, the element of formal and informal discussions is beneficial to be included in OL-based IS development.

The final individual developmental element that is proposed by this research is rational discourse. Rational discourse was selected as whenever an IS is applied, it serves some human interests; therefore, the design choices are made to serve some interests at the expense of others and involve moral value judgments (Klein & Hirschheim, 1996). This means that practical advice concerning the design of a learning-based IS must not be limited only to the technical aspects, but also address moral issues, such as what is good or bad, or what is right or wrong in any particular application. Therefore, there is a need to establish a platform to approach such value judgments in a rational way.

As the conceptual framework was developed it was found that a gap consisted of knowledge and skills not being enough for individual development, which, in turn is necessary for learning based systems development. This led to the concept of meta-abilities (Harvey & Butcher, 1998) to be incorporated within the framework. This section explains how the framework functions with the presence of meta-abilities.

As the elements of understanding organizational roles, internal strengths, formal and informal discussions and rational discourse enable the use of knowledge and skills in an effective manner (Goleman, 1995; Butcher *et al.*, 1997; Malhotra, 2004), they are pertinent for the development of meta-abilities (Stage B). Butcher *et al.* (1997) defined meta-abilities as the underlying learned abilities that play an important role in enabling, and making effective, a wider range of managerial knowledge and skills. Four main meta-abilities that were identified in the organizational development area as follows: (1) cognitive skills; (2) self-knowledge; (3) emotional resilience and (4) personal drive. Being equipped with these competencies, staff members can face the difficulties in the externalization and sharing of tacit knowledge and in obtaining information from colleagues, and can consequently become the enablers of tacit knowledge externalization and sharing.

Additionally, it can be learnt that meta-abilities can assist in building a confident and responsible individual (Butcher *et al.*, 1997; Harvey & Butcher, 1998). This can be learnt from these three competencies. First, meta-abilities can create individual influencing skills (Stage C) (*ibid*). Second, meta-abilities can develop individual sharing attitudes (Stage D) (*ibid*). Third, meta-abilities can develop inquisitive tendencies (Stage E) (*ibid*). Being equipped with these competencies, staff members can face the difficulties in the externalization and sharing of tacit knowledge and in obtaining information from colleagues. Consequently this can provide externalized tacit knowledge for OL-based IS development.

When undertaking influencing, sharing and inquiring activities, an individual implicitly expresses tacit knowledge. This expression is either in physical form (actions and reactions) or verbal form (ideas and reflection) (Choudrie & Selamat, 2005) (Stage F). This I-A-R-R continuum provides externalized tacit knowledge for OL-based IS development (*ibid*). However, it must initially be documented (Huber, 1991; Karhu, 2002). This process is undertaken at Stage G. At this stage, the externalized tacit knowledge is documented and transformed into explicit knowledge (e.g. through business reports, written descriptions or instructions). Knowledge documentation can be achieved by the value of self-documentation, which is also developed by meta-abilities (Butcher *et al.*, 1997; Choudrie & Selamat, 2005). This is because, due to the

development of meta-abilities, the willingness to question implicit assumptions, explore new possibilities and direct energies toward higher standards enables the staff members to be well prepared, using good documented progress reports or working papers (ibid). All these self-documented facts in turn provide inputs for IS continuous update.

As noted above, the responsibility to update the system is the responsibility of system officers. At this stage, the system officers study the documented inputs provided by staff members and codify them (Stage H). By the time the inputs are transformed into codified domains within the systems, they become information that assists staff members in fulfilling their responsibility. In the diagram, this process is represented by Stage I.

The tangible information in the system can then be disseminated within an organization by using networked systems (Stage J). By obtaining new information, a staff member is able to identify an operational progress, to access to new operational approaches, and ultimately internalize them. At this stage, staff members can improve their actions through better knowledge and consequently undertake their tasks effectively – the learning process. Through the learning process, an individual's understanding of the organization's activities (tacit knowledge) is enriched. This new understanding in turn becomes a platform for continuous IS re-examination and modification processes.

In this section the framework for OL represents a framework for developing learning-based systems and was used to guide the research process. The framework illustrates the elements that should be considered in order to create a learning environment within the organization. The cooperation between individuals, the systems officer and the organization is also an important attribute to include in the process of developing learning-based systems.

3.0 RESEARCH APPROACH

Although the aim of this research was clear, the novelty of the topic under study for the IS discipline meant that many of the questions were unknown and would evolve over the duration of this project. This presented many challenges for the research process as the questions had to be ground to the 'real world'. Further, as this research involved studying the behaviors of employees a deep understanding of the humanistic elements (Myers & Avison, 2002) was required. For this a qualitative approach that involved data focused upon words (Miles & Huberman, 1994) rather than numbers was undertaken (Myers & Avison, 2002). An in-depth case study process was used and involved employing a large Malaysian organization

that was committed to the project; that is, full access and participation was offered to the researcher. The organization recognized the importance of meta-abilities from earlier discussions and sought to explore the application of the concept in an environment that consisted of technology, people and information.

The research activities consisted of preparing a training module, conducting the training program and collecting data within a duration of approximately a year. The module contained the descriptions of the elements of understanding organizational roles, internal strengths, formal and informal discussion and rational discourse and was utilized to instill the concepts of meta-abilities amongst the respondents during the training program.

The participants used in this research consisted of 31 engineers and 8 system officers. The engineers were selected as they were the critical group in ensuring the smooth operation of the plant; therefore the learning process was emphasized to them. Alternatively, the system officers were selected because they were the critical group for information processing; therefore it was relevant to study the impact of the framework in information processing and consequently the learning process. The participants consisted of the Centralized Maintenance Management System (CMMS).

Two months after the training session, face-to-face interviews were conducted. A two-month period was allocated to enable the progress review process and the participants to understand and utilize the elements that were discussed in the program. A face-to-face interview approach was utilized as it provided flexibility in the questioning process, control of the interview situation and provided the opportunity to obtain additional information, such as the background information or natural reactions of the participants (Nachmias & Frankfort-Nachmias, 1996). The interviews were tape-recorded and transcribed on the same day. This approach was utilized to ensure that all the information and any further details that were imperative for this research were recorded and not missed out (ibid). The data were analyzed by using a manual analysis process due to the small number of participants.

4.0 DISCUSSION OF THE DATA

From the aforementioned discussions, the researcher wanted to investigate whether the elements of understanding organizational roles, internal strengths, formal and informal discussion and rational discourse can develop meta-abilities, influencing skills, sharing attitudes and inquisitive tendencies in the research participants' mindsets. In addition, the researcher wanted to investigate the impact of meta-abilities, influencing skills, sharing attitudes and inquisitive tendencies on tacit knowledge externalisation and OL-

based IS development. The answers for these research questions are offered in the following subsections. The discussion of the following subsections will follow the functioning of the framework illustrated in Figure 1.

4.1 Meta-Abilities

An overview of the responses indicated change across all the seven competency sets of the individual development process. With regards to the cognitive skills, the interviewed participants indicated improvements. For example:

“This program increased my confidence in communicating with my subordinates or superiors. I set in my mind that everything that I did was my duty and therefore it is my responsibility to accomplish it for the sake of Perwaja. I should not become arrogant, annoyed and sensitive to any instruction if it has been agreed in the meeting or is beneficial to my staff and company.”

Mr. Abdul Rahim

“Before the course, I did not know how to solve a problem in an effective manner. After the course, my mind was concerned with the planning for the unit and the approach to integrating all members in the decision making process such as through discussion, face-to-face meeting, dialogue and meeting with the senior management. The meeting discussed the problems, their causes and the actions to solve them. In other words, the course gave me a smooth guidance on how to tackle problematic situations effectively and efficiently.”

Mr. Norazlan

Mr. Abdul Rahim highlighted the ability to notice and interpret what is happening in interpersonal situations. Contrastingly, Mr. Norazlan highlighted the ability to envision his strategic actions in the workplace. These skills allowed the employees to read situations, understand and resolve problems (Butcher *et al.*, 1997). All these abilities, in turn, developed their cognitive skills (*ibid*). Therefore, it can be learnt that the training program had successfully developed the research participants' cognitive skills.

The research participants also described increased self-knowledge as an outcome of the training program. For example:

“I feel that this program has instilled virtuous working values in the participants. This is because I can differentiate between the important work and the less important work, the task that should be completed first or postponed, and others in the workplace. The contents of the course can be implemented in any situation and by any people.”

Mr. Mohd Wahyudi

“The program made me more concerned with daily tasks and implemented them according to their priority and after undertaking meticulous evaluation. It made me aware that if we make mistake, the company will have to bear the risks and therefore make us feel guilty to do it.”

Mr. Ishak

From the above statements, Mr. Mohd Wahyudi highlighted the ability to judge an approach to different situations by helping him to distinguish between his

personal needs, the needs of the situation and of other people. Mr. Ishak, on the other hand, experienced a profound development of the ability to consider a range of options in his own behavior and to make better judgments of what to do. These skills allowed other skills and knowledge to be used more flexibly (Butcher *et al.*, 1997). Therefore, all these skills illustrate a significant development of self-knowledge amongst the research participants. Subsequently, it can be learnt that the training program has successfully developed the research participants' self-knowledge.

The research participants also described increases in emotional resilience as a result of the training program. For some, the focus was on self-discipline:

“With the support of the family, boss and friends, I was able to do my work in a determined way. In other words, I was able to focus on my work and put aside all distractions. The course has strengthened this value in my heart. I would not give up in anything that I do in the future. Instead, I will improve the performance of my unit and achieve the best for the company. All these factors will also improve my personal development.”

Mr. Zainol

For other research participants, the impact of emotional resilience was upon how to manage feelings. For example:

“Yes it is. I am a bad tempered guy. I will give an instruction in a direct manner, without a friendly smile or joke. This scenario may be due to the army training that I gained at university. But after the course, I was able to control my temper. I could feel the change in my action or approach. In addition, I was able to deal with my colleagues or staff.”

Mr. Shaarin

By far the most dominant theme in the responses on emotional resilience concerned personal confidence. The research participants felt a great deal more confident as a result of the training program. For example:

“Yes, of course. This course taught me to dare to receive complaints and objections from colleagues. In this case, I should be confident to face all these phenomena.”

Mr. Zulkipli

From the above statements it can be seen that Mr. Zainol, Mr. Shaarin and Mr. Zulkipli experienced a profound development of self-control and discipline, the ability to use emotion well to cope with pressure and adversity and balance feelings on oneself. In other words, the research participants experienced a profound development of emotional resilience. In turn, this development illustrated that the training program had successfully developed the research participants' emotional resilience.

The research participants also described increases in personal drive as a result of the training program. For example:

“Good! I can see many changes in myself which enable me to deal smoothly with others. I can be confident in expressing ideas or give opinions. I am equipped with abilities to solve problems by using right and systematic approaches and also without creating conflicts with others. Overall, everything is really excellent.”

Mr. Rosli

From the above statements it can be learnt that Mr. Rosli experienced a significant development in self-motivation and determination and a willingness to take responsibility and risks. These values helped him to persist, motivate others and meet targets (Butcher *et al.*, 1997). In other words, he experienced a significant development in personal drive. This development illustrated that the training program had successfully developed the research participants’ personal drive. To recapitulate, the aforementioned empirical results demonstrate a significant development of meta-abilities (cognitive skills, self-knowledge, emotional resilience and personal drive). This verified that the elements of understanding organizational roles, internal strengths, formal and informal discussion and rational discourse are capable of developing meta-abilities. From these findings, it can be said that the foundation of this research, the conceptual framework, has been successfully established (stages A and B of Figure 1). This, in turn, justified the relevancy of the elements in developing the concept of meta-abilities for this research. The following subsections will discuss the impact of meta-abilities on tacit knowledge externalization and sharing and, in turn, OL-based IS development.

4.2 Influencing Skills, Sharing Attitudes and Inquisitive Tendencies

After being questioned about the post-training meta-abilities, the respondents were asked about the impact of meta-abilities on the post-training influencing skills, sharing attitudes and inquisitive tendencies. The research participants described increases in the influencing skills as a result of the program. For example:

“The most important things that I learnt from this course were communication skills. With these skills, I was able to solve a problem rationally and control emotions during the meeting. If I have a problem, I will express it and there is no need to blame anyone else. So with this skill and plus rational discourse, I was able to solve the problem effectively.”

Mr. Mohd Wahyudi

From the above statements it can be learnt that Mr. Mohd Wahyudi experienced a significant development in communication skills and a willingness to persuade others. These values helped him to effectively utilize knowledge and skills in order to influence others in the organization. This development illustrated that the training program had successfully developed the research participants’ influencing skills.

As well as this, the research participants significantly commented on the development of sharing attitudes. For example:

“On returning from the program, I felt that all the staff members were like one big family. It is my responsibility to help others, share the information that I possess and establish a good relationship with others.”

Mohamed Ridzuan

From the above statement, Mr. Mohamed Ridzuan highlighted the ability to inform others about the need for changes or improvements. This ability helped him to explain everything that needs to be undertaken during the operations to others. This development illustrated that the training program had successfully developed the research participants’ sharing attitudes.

With regards to the inquisitive tendencies, the research participants indicated improvements as a result of the program. For example:

“I was involved in many projects including the external projects. As a result, I needed to understand and catch up with so many things in one time. This is due to the different projects requiring different technical understanding. So the best way to face it is by asking the experts. The program assisted me in this by providing the techniques to understand other staff members and the working environment.”

Mr. Yumas

The aforementioned empirical results demonstrated a significant development of Mr. Yumas’s ability to ask others more effective questions. This ability helped him to undertake tasks according to the accepted procedures. Therefore, it can be learnt that the training program had successfully developed the research participants’ inquisitive tendencies in this research.

From the aforementioned discussions it is clear that significant development of meta-abilities (as mentioned above) is followed by a significant development of influencing skills, sharing attitudes and inquisitive tendencies. These findings illustrate that stages A, B, C, D and E of the research conceptual framework (as illustrated in Figure 1) have been achieved. In other words, the elements of understanding organizational roles, internal strengths, formal and informal discussion and rational discourse had successfully developed meta-abilities, influencing skills, sharing attitudes and inquisitive tendencies in the research participants’ mindsets.

At this point, the impact of the elements of understanding organizational roles, internal strengths, formal and informal discussion and rational discourse on the development of meta-abilities, influencing skills, sharing attitudes and inquisitive tendencies have been discussed. However, the externalization of tacit knowledge has not yet been investigated. For this the next subsection will describe the externalization of tacit

knowledge through the medium of ideas, actions, reactions and reflections.

4.3 Externalized Tacit Knowledge: Ideas, Actions, Reactions and Reflections

One of the greatest issues of concern in this research was improving the research participants' ability to externalize their ideas. The following example offers an overview of the improvements described by the research participants:

"By asking and sharing, it was admitted that the ideas' expressions were quite common in my department. Because of the persons who attended the program, the meeting became alive and active."

Mr. Zainol

Mr. Zainol highlighted the ability to externalize ideas. In this case, he mentioned the importance of sharing ideas with others in the workplace. Therefore, it can be learnt that the training program had successfully developed the research participants' ability to externalize ideas.

With regards to the actions and reactions, the following is the example that illustrated the participants' ability to externalize and express them:

"By observing what I learnt from the program, I was able to rationalize my working style and consequently improve its effectiveness and efficiency. Having an idea of the work of 10 people is much better when improving our actions and reactions."

Mr. Yaakop

The above empirical results revealed that Mr. Yaakop described changes in an ability to perform ideal actions and to change his perceptions or working techniques in order to cope with changes in the environment (reaction process). This value, in turn, enabled an active re-examination and revaluation process of the needed information. In turn, this development illustrated that the training program had successfully developed the research participants' ability to generate actions and reactions in the workplace.

As a result of the training program, the participants described changes in their ability to reflect upon problems and, in turn, determine a suitable solution. These changes were the result of the participants' responsibility and awareness in improving their organization. The example is as follows:

"Influencing, sharing and inquiring activities are like an early warning system. Through all these activities, I was able to detect working problems earlier and thereafter seek preventions or accordingly corrected the plan. As a result, my unit recently received appreciation from the bosses."

Mr. Mohd Rahmat

From the above statements it can be learnt that Mr. Mohd Rahmat experienced a significant development of the ability to reflect upon problems and, in turn, determine a suitable solution. This ability helped him

to effectively utilize knowledge and skills in order to reflect upon problems in the organization. This development illustrated that the training program had successfully developed the research participants' ability to effectively reflect upon problems.

The above results of ideas, actions, reactions and reflections formulation represent the ability of the participants to effectively externalize and sharing of their tacit knowledge. This was further supported by three findings. The first was that the participants were motivated to share their work progress with others. In this case they were not restricted to asking only the CMMS officers for any specific technical assistance. Second, the participants were actively involved in documenting their ideas, actions, reactions and reflections. These documented inputs were then shared with the system officers for the purpose of updating the CMMS. This iterative link between the users and systems enabled synergistic inputs to be provided for continuous CMMS development. Third, the CMMS officers described undertaking sole responsibility and an awareness for updating and utilizing the contents of CMMS. Updating and utilizing the CMMS's contents, in many cases, involved having active communication and face-to-face meetings with the users. All these changes enabled CMMS to obtain new inputs and, as a result, to be able to provide current progress of the maintenance jobs to the users (stages F and G of Figure 1).

Implicit in the above findings was that the seven competency sets did provide a platform to the participants for externalizing their tacit knowledge in a creative and spontaneous manner. This was evident from the ideas, actions, reactions and reflections that they documented and shared with the system officer. Therefore, it is declared that stages F and G of this research conceptual framework (as illustrated in Figure 1) have been substantiated.

When relating the above tacit knowledge externalization issue to IS development, all the participants agreed that there could be a basis for establishing learning-oriented information. In this case, there was a significant relationship between the documentation of the externalized tacit knowledge with the continuous re-examination and modification of an IS contents. It is argued that this type of IS content is capable of promoting OL. The statement made by the one of the system officers was the best example of this issue:

"The course gave me guidance on how to build a good relationship with users in my department. Before this, when I got a complaint I always considered the users' views from the negative side, such as "they are trying to blame me or damage my reputation". But after the course, I had a positive outlook of them and was also willing to collectively solve the problem."

The aforementioned results supported stages H, I, J and tacit knowledge development of this research's

conceptual framework (as illustrated in Figure 1), which is that the externalized and shared tacit knowledge led to OL through updating and progressive IS contents.

From the above discussion it is clear that the development of the seven competency sets can assist in developing an OL-based IS. This is because they create a willingness amongst the staff members to provide knowledge-based inputs to the systems. These inputs, in turn, enable a continuous IS re-examination and modification, given the changing reality. Continuously challenging the current “company norm,” such systems are expected to prevent the core capabilities of yesterday from becoming the core rigidities of tomorrow” (Malhotra, 1997). By obtaining access to that current “company norm” and internalizing them, the staff members can improve their actions through better knowledge. Consequently, tasks can be undertaken effectively – the learning process. Therefore, at this point it is declared that the conceptual framework used in this research can be applied to diffuse the staff members’ knowledge and expertise effectively within an organization.

5.0 CONCLUSIONS

The aim of this research was to study the elements that encouraged staff members to contribute inputs for learning-based systems development. The elements of meta-abilities, influencing skills, sharing attitudes, inquisitive tendencies, understanding organizational roles, internal strengths, formal and informal discussions and rational discourse were considered imperative. For this research, all these propositions are integrated to form a conceptual framework.

As the research topic used for this research was novel in IS terms the research approach involved the use of a qualitative, in-depth case study. From the undertaken research it was concluded that the future focus for an OL-based IS development should be towards individual development strategies that develop interpretive, creative employees. Examples of a type of such an employee are systems analysts. Such employees are preferred because they are capable of externalizing, sharing and documenting their own tacit knowledge based on the situational contexts and orientation. Systems analysts can study the documented inputs provided by the staff members and codify them. This whole process will enable a continuous re-examination and modification processes of organizational IS, thereby making its content become more relevant to OL. This research was undertaken in Malaysia; therefore a limitation is that this research is restricted to a certain context – Malaysia. This includes the elements of culture, faith, perception, values and norms, which are different in that country.

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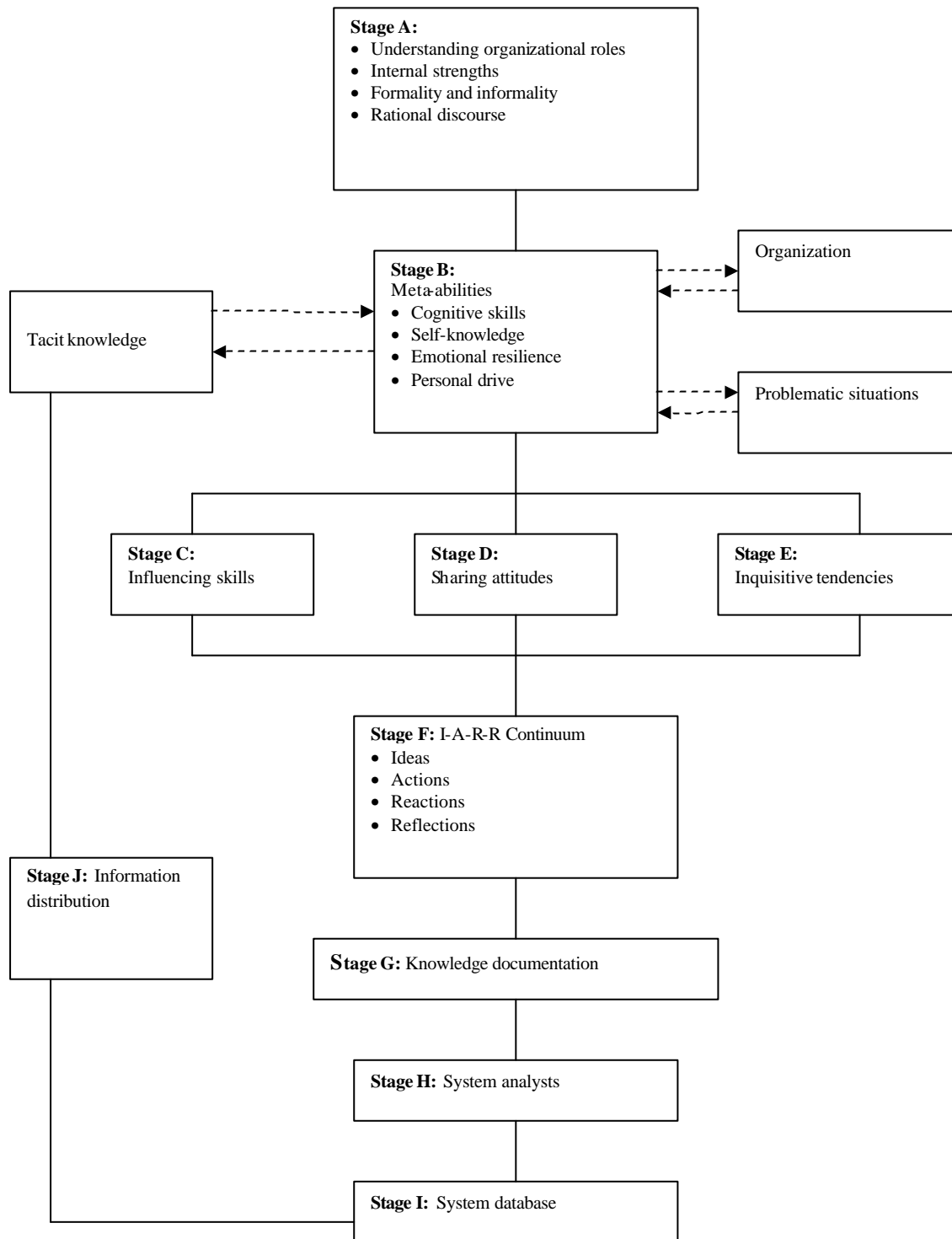


Figure 1: Framework for the learning-based information systems