THE KNOWLEDGE NEEDED FOR SELF-REGULATED LEARNING: APPLYING THE CONCEPT OF COGNITIVE ENABLERS IN PERSONAL KNOWLEDGE MANAGEMENT

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ABSTRACT. With the expansion and diversity of learning methods in recent years due to the emerging enabling technologies, recent research has delved into the domain of personal knowledge management (PKM) for the purpose of understanding the learning needs and determinants. The way learners seek for knowledge and manage it are very much related to the learning processes, yet managing tacit knowledge is still a challenge even with the latest technology in hand. Motivation in seeking for knowledge, on the other hand, is also a challenge to be understood but worth a research. Self-regulated learning (SRL) has been introduced from the domain of social science, and is recently gained interest among researchers due to the change in technology. Despite the importance of SRL, there is still a gap in measuring SRL itself and analysing the motivation towards SRL. In referring to the concept of PKM, there are four cognitive enablers introduced in recent years, which are 'method', 'identify', 'decide' and 'drive', required for personal knowledge and learning to be well managed hence are suitable to be the motivation variables. This paper relates these two aspects – the SRL and PKM – by breaking down the enablers to analyse the SRL among learners.

Keywords: personal knowledge management, self-regulated learning, cognitive enablers

INTRODUCTION

Recent research interest in personal knowledge management (PKM) has been revolving around learning needs and knowledge seeking, due to the trend of Internet of Things and knowledge mobility. The change in technology has changed the way learners seek for knowledge and manage it both online and offline. Despite this trend, managing tacit knowledge is still a challenge, since most online tools could only transfer explicit knowledge and it is highly dependent on the learner to get or convert the tacit knowledge from the explicit ones. The same goes to motivation in seeking for knowledge for academic success, which has changed with the change in technology.

From the social science domain, self-regulated learning (SRL) has been introduced before 1990, and it has recently regained interest among researchers due to the technology change.

As much as agreed on the importance of SRL, there is a gap in measuring SRL itself or analysing the motivation towards SRL. From the concept of PKM, there are four cognitive enablers introduced in recent years, which are known as 'method', 'identify', 'decide' and 'drive', required as enablers for personal knowledge and learning to be well managed. This paper relates these two aspects – SRL and PKM – by breaking down the enablers to analyse the motivation for SRL among learners.

RELATED WORKS

As stated in the previous section, there is a need to look into both sides of the research domains: self-regulated learning; and personal knowledge management. This section presents related works on these domains.

Self-Regulated Learning

The Web 2.0 and the Internet technologies have provided windows of opportunity for many tools that support and enable mobility, ubiquity and information access anywhere anytime. Connectivism theory is introduced, which emphasised that we are living in a networked world today where "learning can reside outside of ourselves, focusing on connecting specialised information sets, and the connection that enable us to learn are more important than our current state of knowing" (Siemens, 2005). In other words, connection or connecting to knowledge sources is vital in surviving today's knowledge management and learning environment.

Social networks, one of the tools using Web 2.0, constitute the base for self-monitoring of learning (Bartolome & Steffens, 2011). This reflects the need to use current tools and technology to facilitate learning in general and monitoring of self-learning. In supporting self-regulated learning over current tools and technology, Bartolome & Steffens (2011) highlighted that: i) learners should be encouraged to plan their learning activities; ii) learners should receive appropriate feedback so they can monitor their learning; and iii) learners should be given criteria so they can evaluate their own learning outcomes.

"Self-regulated learners are aware when they know a fact or possess a skill and when they do not" (Zimmerman, 1990), as they proactively seek out information or knowledge when needed and take the necessary steps to master what they get. Persistent in study, self-regulated learners would find a way to succeed by encountering obstacles (Zimmerman, 1990) in understanding new knowledge through daily learning activities. Self-regulated learning means "a student's ability to independently and proactively engage in self-motivating and behavioural processes that increase goal attainment (Zimmerman, 2000), and it is an important skill for learners to take advance and learn well in online learning (Azevedo & Cromley, 2004).

Out of three cyclical phases (i.e. pre-action, action, and post-action phases) that are said to influence each other while giving impact on subsequent learning state (Klug et al., 2011), the pre-action phase is the one that becomes the predictor of the learning processes in action (Schmitz, Klug and Schmidt, 2011). It is the phase when the situation and assigned task are the source from which the learners set goals, develop attitudes towards learning, and develop self-efficacy for managing tasks (Schmitz, Klug and Schmidt, 2011). If this phase is managed well, it would be a good chance that the learners could be guided positively towards their self-regulated learning processes.

It is inevitable that self-regulation skills are correlated to academic performance (Zimmerman, 1990), but it is not taught to learners like any other skills. With the current reliant on online tools, it is important to designed online learning environment that support self-regulated learning strategies (Hartwig & Dunlosky, 2012), instead of leaving the learners to know on their own on how to self-monitor and manage their learning.

Personal Knowledge Management

The personal knowledge management (PKM) framework has been applied to case studies in education industry in recent research (Ismail, Abdul Latif & Ahmad, 2012; Ismail, Mohammad Suhaimi & Ahmad, 2013; Ismail et al., 2013; Ismail, Othman & Ahmad, 2014). The framework of effective PKM is introduced by Ismail and Ahmad (2012), focusing on the personal level of knowledge management (KM), which is said to contribute to the bottom-up approach towards organisational KM. The significance of this model is that it does not stop at analysing the processes of managing personal knowledge (i.e. get/retrieve knowledge, understand/analyse knowledge, share knowledge, and connect to knowledge source), but it also postulates the cognitive enablers that are found exist in the whole PKM processes (Ismail & Ahmad, 2012).

Cognitive enablers, i.e. method, identify, decide and drive (MIDD), are claimed to be the mediating variables for PKM processes to achieve effective PKM (Ismail & Ahmad, 2012). The cognitive enablers are described as follows (Ismail & Ahmad, 2011):

- *Method*: main method or tool used in managing personal knowledge at almost all stages of PKM processes, commonly due to the reliability of the tool as the primary means of communication;

- *Identify*: how learners identify knowledge sources, e.g. online search, online database search, and recommendations by online peers;

- *Decide*: learners have to decide on the approaches to take in seeking knowledge experts, with possibility of deciding on different approaches each time the need arises, even though the tasks are similar in nature; and

- *Drive*: the learners' drive to seek knowledge experts, relating to the diligence they possess, e.g. personal goal, responsibility, and urgency.

As proven of their existence in recent research and their relation to the psychology domain, the MIDD cognitive enablers are found to be useful for software agent mediation in KM system development, as well as for reporting of a learner's action in academic (Ismail & Ahmad, 2014). Since the MIDD concept is well tested in the domain of education, it is found suitable to be applied to SRL cases and for the benefit of the self-regulated learners as well. In other words, although they are coined as mediating variables in previous research, the MIDD are found to be acceptable as independent variables or factors in different case scenario, specifically one such as this research. The following section elaborates on this.

METHODOLOGY

This research started off with literature analysis, in which the two domains of research are found inter-related and can be connected into one model. This is followed by the illustration of the proposed conceptual model that represents the link between these domains, as presented in the next section.

The cognitive enablers (i.e. the MIDD), as discussed in the previous section, are used to guide the design of the proposed model. The questions asked in forming this model based on the MIDD are as follows:

- *Method*: How would the learners know what they need to know?

- *Identify*: What could the learners know from what is made known to them?

- *Decide*: What would the learners do when they know what they know? How would they know which decision to take and why?

- *Drive*: What would make the learners act to do something with what they know? When would they act or how long would it take to make them take that action after they know what they need to know?

A case scenario that can be applied to answer these questions in the same flow as follows:

- *Method*. A learner is given a status report on his/her online activities in certain frequency, e.g. daily, weekly, or monthly.

- *Identify*. The status report would summarise the learner's personalised study progress status or percentage by calculating the online learning time and social time, minus the play time and idle time.

- *Decide*. The report would also predict the learner's success in study if the status remains as it is or becomes worse for the next reporting cycle.

- *Drive*. It is up to the learner to decide what to do next and work on action plan if needed, after knowing from the status report.

PRELIMINARY FINDINGS AND DISCUSSION

Figure 1 shows the cognitive enablers as independent variables for the dependent variable called self-regulated learning. This is the overview of how the relationship exists between the two domains. In other words, each cognitive enabler affects the self-regulated learning at the pre-action phase, since this first phase in self-regulated learning becomes the predictor and motivation towards the act of learning processes. Cognitive enablers already consist of variables that facilitate learners in self-regulated learning, hence they are related to the missing knowledge requirements for the pre-action phase. As stated in the previous section, the cognitive enablers complement the pre-action phase by enabling the learners in setting goals, developing attitudes towards learning and developing self-efficacy for managing tasks, with the knowledge of MIDD provided to the learners. Therefore, further detail on each enabler is required to measure the strength of the relationship.
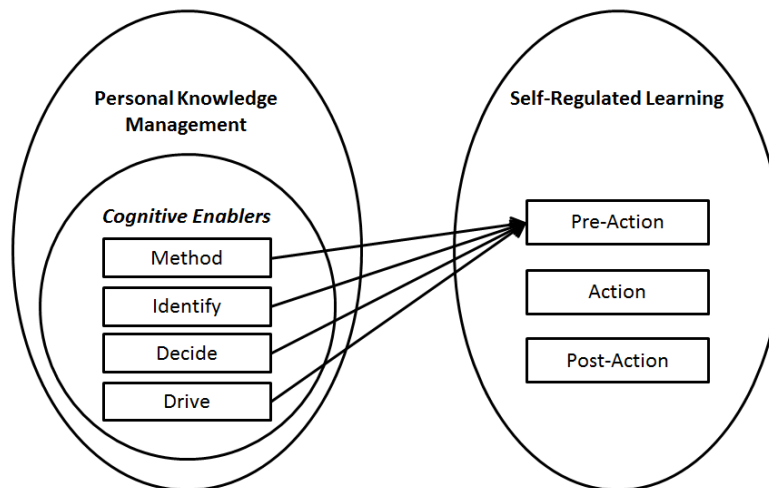

Figure 1. Overview of the Relationship between Cognitive Enablers and Self-Regulated Learning.

Even though Figure 1 stated self-regulated learning as a whole, it actually means that the MIDD enablers determine the status of the SRL when they directly affect the pre-action

phase, whether it is going to be positively affected or negatively affected. For example, if the learner is exposed to his/her status of online learning activities, the positive effect would be a positive drive or the learner feels motivated to spend more time on study and continuously be proactive in SRL. If the SRL is negatively affected, then the learner would be behaving negatively towards study, in which he/she feels demotivated to study more or feels over-confident that he/she will succeed and starts to neglect study.

Since the cognitive enablers are derived from a bigger model, and the SRL consists of more cycles within its model, the elaboration of this model is deemed possible. As shown in Figure 2, cognitive enablers can be collectively affecting the pre-action phase of the SRL. Since it is proven in previous work that MIDD are the cognitive enablers for the PKM processes, then the cognitive enablers are also collectively affecting the PKM processes (as shown in Figure 2).
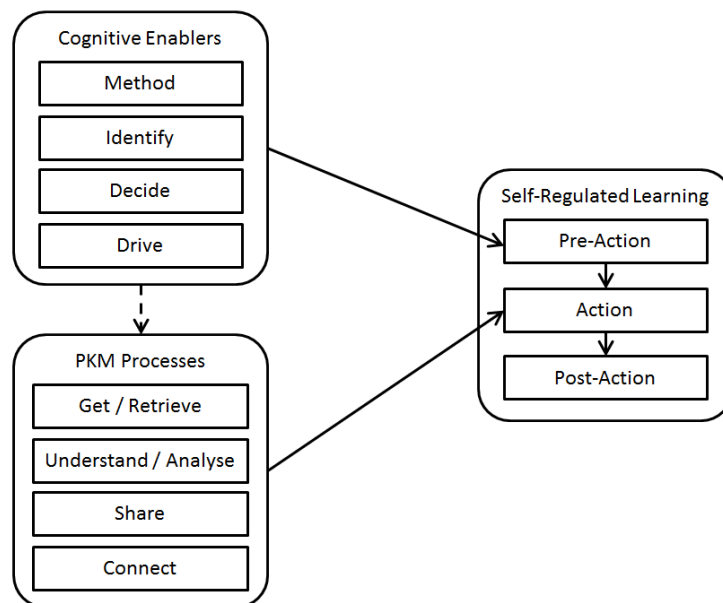
Figure 2. Relationship among Cognitive Enablers, PKM Processes and Self-Regulated Learning.

PKM processes are mainly the stages when all activities of managing knowledge happen in a case. In other words, the processes are the action of managing knowledge or learning itself. Collectively, PKM processes are affecting the action phase of the SRL. The SRL action phase includes learning strategies and metacognitive strategies, such as self-monitoring, resource management strategies. In order to perform these strategies, the PKM processes of get, understand, share and connect are highly needed.

To reiterate the findings of this paper, the cognitive enablers (i.e. method, identify, decide and drive) are proposed to be the knowledge needed for self-regulated learning, before the real action of self-regulated learning could happen. Without the needed knowledge, further learning processes like PKM processes and SRL action may not be fully monitored, understood nor evaluated. On the other hand, the cognitive enablers are also suggested to be useful to outline the knowledge needed for SRL, as elaborated in the Methodology section.

CONCLUSION

Evolution of models is seen as presented in this paper, as shown in Figures 1 and 2. In the end, it is the post-action phase of SRL that would be the final dependent variable in this whole case scenario. At the moment, this research is only able to capture as much as Figure 2 could present, with a gap in expanding the post-action phase of SRL with perhaps another model from other domains. If the same domain is deem fit for this, the area of knowledge audit could be introduced as the independent variable that relates to post-action phase of the SRL.

In general, this paper proposes the conceptual model that relates the PKM cognitive enablers and the self-regulated learning. It does not elaborate on the PKM processes due to the purpose of highlighting the knowledge needed for SRL only, i.e. in this case it would be the factors affecting the pre-action phase. Future works will be on the research design and delivery to evaluate and prove the models, applying to real case scenarios that illustrate the cognitive enablers and the pre-action phase of SRL.

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