Knowledge Management in Learning Environment: A Case Study of Students’ Coursework Coordination

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ABSTRACT

Continuous research on students’ learning environment in institutes of higher learning has proven the existence of a knowledge management (KM) pattern within the social interactions among students over the social network. This KM pattern is at the personal level, also known as personal knowledge management (PKM), with processes postulated to be a cycle of Get-Understand-Share-Connect (GUSC). In extending the research on students’ KM practices in a learning environment, this paper covers the aspect of KM in managing group coursework or coursework coordination. In group coursework coordination, there is a need to rely on online tools to maintain the connection between the group members and update each other in meeting some deadline. This paper quantitatively proves the existence of the GUSC process cycle in coursework coordination, with an additional variable of technological tool features as a control variable in the GUSC Model.

Keywords: Personal knowledge management, GUSC, institute of higher learning, coursework management, learning environment.

I INTRODUCTION

The current pattern of university students being online almost 24 hours a day, just to keep track and keep in touch with the updates from peers and fellow lecturers, has aroused the interest among researchers of knowledge management (KM). The postulated KM processes at personal level, known as personal knowledge management (PKM) processes, has proven the existence of KM processes within the learning environment over social networks, mainly for subjects or projects that require heavy self-learning on the students’ side.

Under the realm of PKM, the GUSC Model (i.e. Get-Understand-Share-Connect Model) was introduced in recent years to clearly define the significant processes at personal level, which are get/retrieve knowledge, understand/analyse knowledge, share knowledge, and connect to knowledge source (Ismail & Ahmad, 2012). With this model being proven reliable to be used to measure students’ KM in learning environment, we decided to use it in this research on students’ KM in coursework coordination.

Coursework coordination is chosen as the research setting because group coursework or project is deemed challenging among students and project members due to the high reliance on self-discipline and self-learning, in ensuring that the project outcome could be submitted by the given deadline. This research is quantitatively measured and analysed for a better visualisation of the PKM processes existence within the learning environment.

The purpose of this study is to understand and validate the existence of the PKM processes in learning environment, at university students’ level, especially during critical time of completing group projects or coursework. In achieving this main purpose, quantitative data is gathered and analysed to validate the GUSC model, to prove the following hypotheses:

H1: Collinearity exists between Get, Understand, Share and Connect in the GUSC Model.

H2: The relationship is stronger between Understand and Share compared to Understand and Connect.

H3: The relationship between Understand and Share is more significant if Feature is the control variable in the GUSC Model.

In proving these hypotheses, it is expected that the following generalization can be made: Only Get, Share and Connect are the main variables for PKM in students’ learning environment.

II RELATED WORKS

Previous works on knowledge management (KM) have focused the scope on personal knowledge management (PKM) in recent years, especially in relating the KM practice to the implementation of intelligent software agent systems for knowledge workers. This section details out this scope according to the KM at personal level and KM in learning environment.

A. Knowledge Management at Personal Level

The research on knowledge management (KM) generally begins with analysis of knowledge workers’ practice in managing what they know
within organisational boundaries. This has changed throughout the years, with more researchers realising the need to look at the individual knowledge workers’ level to better design and implement a usable and reliable KM system in organisations.

The research in KM domain has evolved in the past decade, from organisational perspective (top-down approach) to personal perspective (bottom-up approach). At personal level, the evolution is in terms of the processes, which are seen differently by different authors throughout the years. Table 1 shows the chronology of KM research at personal level from 2001 to 2012.

<table>
<thead>
<tr>
<th>Author (Year)</th>
<th>KM Processes</th>
<th>Domain perspective</th>
</tr>
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<tbody>
<tr>
<td>Avery et al. (2001)</td>
<td>Retrieve, Evaluate, Organise, Collaborate, Analyse, Present, Secure</td>
<td>Theory of human practice</td>
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<tr>
<td>Pettenati, et al. (2007)</td>
<td>Create, Organise, Share</td>
<td>Human behaviour over Web 2.0 tools usage</td>
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<td>Jarche (2009)</td>
<td>Seek, Sense, Share</td>
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<td>Verma (2009)</td>
<td>Find, Learn, Explore, Connect</td>
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<tr>
<td>Jarche (2010)</td>
<td>Aggregate, Understand, Connect</td>
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</tr>
<tr>
<td>Ismail &amp; Ahmad (2012)</td>
<td>Get, Understand, Share, Connect</td>
<td>Human behaviour over Web 2.0 tools usage</td>
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The KM research at personal level can be classified according to two domain perspectives: theory of human practice; and human behaviour over Web 2.0 tools usage (Ismail & Ahmad, 2012). Towards 2012, the understanding of human KM practice is clearly seen from the usage of Web 2.0 tools.

The GUSC Model (Ismail & Ahmad, 2012) has covered the aspect of KM at personal level in working environment in Malaysia. The processes defined by this model consist of “tasks performed to get/retrieve knowledge (e.g. online search, RSS feed, aggregation, ‘follow’ shared updates), understand/analyse knowledge (e.g. summarise, write research papers), share knowledge (e.g. blog, RSS to blog, share link with reviews, tag people when sharing link, wiki), and connect to other knowledge sources and/or knowledge experts (e.g. from comments by others, from votes by others, from ‘following’ other’s work or profile, email, online messages)” (Ismail & Ahmad, 2012).

These processes are found to be in similar nature as the renowned SECI Model (Nonaka & Takeuchi, 1995) used for organisational KM. It is postulated that generally get knowledge is an externalisation process, understand/analyse knowledge is an internalisation process, share knowledge is a combination process, and connect to other knowledge is a socialisation process (Ismail & Ahmad, 2012).

B. Knowledge Management in Learning Environment

In a previous study, the aspect of PKM has been investigated in students’ learning environment, an environment that “includes informal learning and managing knowledge in the process of learning, using tools made available by computer and internet technologies” (Ismail, Abdul Latif & Ahmad, 2012). Knowing the fact that knowledge is something that is gained or learnt not only during student years but also in working environment, the previous study has taken into account the PKM processes as learning cycle in students’ daily usage of computer and internet technologies.

“Learners are no longer necessarily tied to a particular course in order to gain a qualification but are able to present their learning to prove they possess such competencies or are able to achieve those outcomes” (Attwell, 2007). From this statement, the term personal learning environment (PLE) emerged to extend the concept of learning environment to a wider scope, not bounded merely on the traditional classroom environment or online learning system provided by the institute of higher learning. Having said this, the social network, which has been the popular tool among the digital natives, has been the scope of ‘learning environment’ that most researchers find interest in. The key reason behind the social network to be the favourite informal learning environment is the ‘connection’ among people within that social environment. ‘Connection’ that is made available by the social network breaks down social barriers, promotes trust, and enables wider learning experience (Ismail, 2009).
The results from a previous study concluded that get/retrieve knowledge is the most significant process students practice in a learning environment, indicating that “the members (or students, in this case) are using the social network to get knowledge more than anything else” (Ismail, Abdul Latif & Ahmad, 2012). The study also measured the cognitive enablers, with a result indicating that “drive” is a significant enabler among the students, “when the members panicked over deadlines or have seen others who were already far ahead towards reaching their goals, apart from being urged” (Ismail, Abdul Latif & Ahmad, 2012).

Following this previous study, a research was done on implementing the GUSC Model in a smart notification system for university students. The paper suggested an absence of ‘U’ (i.e. Understand) process “to purposely simplify the development of the agent-based system” (Ismail, Mohammad Suhaimi & Ahmad, 2013). Seeing that “Understand is tacit in nature and usually happens in the mind of the human users” (Ismail, Mohammad Suhaimi & Ahmad, 2013), it may not be possible for the respondents to relate their understanding process with a feature in a technological tool. The important aspect is still on Connect process, which is dependent on the Get and Share processes.

Overall, there is a proof that PKM exists in learning environment, with adult learners or university students being the population mostly practice the processes over the social network. While the GUSC Model is originally developed for KM in organisations, related works (Ismail, Mohammed, Md Yusof & Ahmad, 2013; Ismail, Mohammad Suhaimi & Ahmad, 2013; Ismail, Abdul Latif & Ahmad, 2012; Ismail, Md Noor & Ahmad, 2014) proves that the model can also be applied in education environment.

III METHODOLOGY

This study focuses on the groups of students registered for the core subject with the code WBB10102, mainly in the three last semesters. The number of students taking this subject is usually above 150 per semester, with a majority joins the Facebook™ Group for communication and coursework coordination outside the classroom. This social networking tool is deemed important especially in keeping track of students’ progress in the major group coursework or project.

A. Research Settings

A questionnaire survey is used as the research tool, by announcing and distributing the online questionnaire hyperlinks on the Facebook™ Group Wall. In most cases, the students were no longer interested to answer any questionnaires because they have passed the subject but their membership to the Facebook™ Group is still active. Figure 1 shows the response rate from these students, according to the semester they registered for the subject.

Since WBB10102 is a core subject for all students from 8 degree programmes, it was expected that each programme would have at least a few representatives. Figure 2 shows the number of students participated in the questionnaire survey, according to their degree programmes, namely BCAD, BCE, BCEC, BCEM, BCSS, BIMD, BNS and BSE¹.

The questionnaire design is divided into three sections: demographic information, GUSC practice, and features of the mobile application for coursework coordination. Apart from the demographic section (Section A, with some results shown in Figure 1 and 2), the rest of the questions (i.e. Sections B and C) are based on statements for the respondents to rate the agreement using 5-Likert scale (i.e. 1 for strongly disagree, 2 for disagree, 3 for neutral, 4 for agree, and 5 for strongly agree).

The data retrieved from Sections B and C is tested and quantitatively analysed using SPSS (i.e. Statistical Package for the Social Sciences). The total number of 100 respondents is considered ample for analysis in SPSS.

¹The full name of these degree courses is not made available here due to its length and confidentiality.
B. Research Validity and Reliability

Factor analysis was conducted to test the validity of the questionnaire survey data. The communalities of each item in the variables are checked in this analysis. “Communalities indicate the amount of variance in each variable that is accounted for” (Ismail, Ahmad & Hassan, 2013), and in SPSS, the values shown as extraction communalities are the ones used to interpret the validity of the data.

The total number of responses (n = 100) are found valid in the factor analysis test, with all items in each variable having high communality values, which is above 0.668. The result of the communalities on the variables in general also shows high values except for one item under Get variable, i.e. GE6 (0.494). The small value for this variable item means that the item does not fit well with the factor solution, but on the other hand the value of 0.500 and above shows that the sample size is enough for further analysis.

Cronbach’s alpha (α) reliability coefficient measures the internal consistency of the variables being tested by looking at how a set of items are closely related as a group. The values derive different meanings according to the range they belong to: α> 0.9 is excellent, α> 0.8 is good, α> 0.7 is acceptable, α> 0.6 is questionable, α> 0.5 is poor, and α< 0.5 is unacceptable. This research takes into account that the Cronbach’s alpha (α) is acceptable from 0.70 onwards, considering 0.70 is the cutoff value for being acceptable. Based on this interpretation, Table 2 shows that all variables are reliable.

Another round of reliability test was conducted to understand the consistency of the five main variables. Figure 3 shows the result from SPSS, showing the strength in Cronbach’s alpha value of 0.866, which is good and meaningful to indicate that the variables are reliable.

IV PROVING THE HYPOTHESES

In the process of proving the hypotheses, the variables in the GUSC Model and the additional variable called Feature are analysed using SPSS. The following subsections explain the details in achieving analysis results that prove the hypotheses.

A. Collinearity between G, U, S and C

Taking into account that the Connect is a possible dependent variable for this case study (Ismail, Mohammad Suhaimi & Ahmad, 2013), we tested other variables against Connect. The correlations analysis shows that the variables are positively inter-related, with high collinearity exists for Get-Connect and Share-Connect relationships, with r = +0.802 and r = +0.816 respectively.

Figure 4 shows the correlations table generated in SPSS, proving the existence of collinearity among the G, U, S and C. As proven in the previous research (i.e. research by Ismail, Mohammad Suhaimi & Ahmad, 2013), the G, S and C are more significant for a case of university students’ personal KM. The Understand variable is found to be very weak, since the KM is identified and measured over a technological tool.
Figure 5. Correlations between G, U, S and C from SPSS.

Putting aside the Feature variable temporarily, Figure 5 shows the GUSC Model based on this case study and further proves the first hypothesis, **H1**: Collinearity exists between Get, Understand, Share and Connect in the GUSC Model.

B. The Position of U in the GUSC Model

Referring to the weak relationship between Understand and Connect in Figure 4, there is a possibility of Understand to have an extended relationship with other variables. We noticed the strength in relationship between Understand and Share \((r = +0.482)\), and between Understand and Get \((r = +0.492)\). Even though the latter relationship is stronger than the former, the fact that understanding new knowledge is highly dependent on sharing the knowledge in the first place, and getting new knowledge does not ensure an understanding of that knowledge, then the Understand-Share relationship is chosen for further analysis.

Figure 6. The improved relationship for Understand.

With this justification and the improved Understand-Share relationship, the second hypothesis, **H2**: The relationship is stronger between Understand and Share compared to Understand and Connect, is proven to be true.

C. The Significance of Feature in GUSC Model

At this stage, we bring in the Feature variable to collectively understand the role of the technology features on personal KM practice among university students. From Figure 4, the relationships between Feature and Share \((r = +0.534)\) and Feature and Understand \((r = +0.546)\) are higher than the Understand-Share relationship \((r = +0.482)\). As expected, the Feature variable is what makes the processes of sharing and understanding new knowledge stronger. Figure 7 shows the relationship between these three variables, to reflect that the more sharing features available can increase the understanding process. Even though the relationship value is not as strong as other variables in Figure 5 (i.e. Get-Connect and Share-Connect), the availability of Feature improves and strengthens the other relationship within the GUSC Model.

This improvement of relationship strengths, upon the introduction of Feature as a control variable in between Share and Understand, proves the third hypothesis, **H3**: The relationship between Understand and Share is more significant if Feature is the control variable in the GUSC Model.

V FINDINGS AND DISCUSSIONS

Further quantitative analysis in SPSS is done by generating the model summary, to explain the goodness of fit of model. This is done by generating three stages of sub-models within one. In the model summary (as shown in Figure 8), R square 0.745 means that 74.5 percent (74.5%) of variation is explained by the model, and the adjusted R square adjusts for the number of explanatory terms (i.e. independent variables) in the model and increases only if the new independent variable (or variables) improves the model more than would be expected by chance (Ismail, Mohammed, Md Yusof & Ahmad, 2013).

Figure 8 shows the slight changes of improvement in R square and adjusted R square when Feature and Understand variables are introduced at stages 2 and 3. This shows that the model is at a better fit when
Feature is introduced (R = 0.746), and it is in the best fit when Understand is introduced after that (R = 0.748), even though the adjust R square is slightly decreased in value, from 0.740 to 0.738.

Analyzing the model summary (Figure 8) alone is insufficient to claim that the model is a fit model. There is a need to analyze the collinearity diagnostics in SPSS to ensure that there are less or no critical problems in the model. Figure 9 is derived from SPSS to answer this matter.

The diagnostics shown in Figure 9 displays the condition index value of greater than 15 but less than 30, meaning that there is a possible problem with collinearity but it is not serious. Even with the extension of Understand and Feature variables, the condition index is still lower than 30, indicating that the model is still acceptable.

The finalized model for GUSC with Feature variable can be drawn as shown in Figure 11. Seeing the strength in relationships between the Get, Share and Connect, it can be generalized that only Get, Share and Connect are the main variables for PKM in students’ learning environment, as proven in the previous study by Ismail, Mohammad Suhaimi and Ahmad (2013).

Compared to previous related works, this study has achieved in generally supporting the significance of GUSC Model in learning environment, and also in specifically supporting the significance of GSC Model with Feature included, in students’ learning environment during coursework coordination.

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