The Impact of Personal Knowledge Management on Learning Outcome

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Abstract—The purpose of this paper is to investigate the relation between Personal knowledge management (PKM) and Learning outcome. PKM is an advanced concept to assist students to carry out their individual career goals and academia interests. By employing PKM model of Harold Jarche, we develop a framework to describe the impact of Seek, Sense, Share on Learning outcome; and also the influence of Gender on PKM and Learning outcome. Data was collected from both methods survey (32 students of Databases Management course) and an interview (instructor of this course). The results of this study show that PKM has significant influence on Learning outcome. In addition, while gender has impact on learning outcome but it has no effect on PKM activities. Based on these results of this study. learners have suitable methods to leverage PKM to enhance learning outcome. In addition, instructors also have suitable policy to encourage students employ PKM.

Index Terms—seek, sense, share, personal knowledge management, learning outcome

I. INTRODUCTION

It is essential for students to have sustainable learning plans to increase their competecies in the job market [1]. They spend time, efforts to take courses. However, learning outcome is far from their expectation. Reason is that they don't know how to capture, organize, and use what they learn. Moreover, the rapid changes in the use of technology support students in collecting information from multiple sources force students need to know how to organize in sensible manner, transfer to knowledge [2]. Therefore, it is essential for students to know how to manage their personal knowledge effectively.

Personal Knowledge Management (PKM) is an advanced concept to assist students to carry out their individual career goals and academia interests. The practice of PKM on their own learning allows students to update and improve personal knowledge system, increase competitive power, and adapt to the emerging knowledge economy era. The significance of exploring PKM may contribute to human cognitive capabilities [3]. Therefore, this study aim to examine the relation between PKM and learning outcome, we would like to know:

- How each activity of PKM process impact learning outcome?
- Which activity of PKM is more applied by students?

• *Is the gender impact PKM and learning outcome?*

II. LITERATURE REVIEW

A. Personal Knowledge Management

Knowledge management is defined as a systematic attempt to create, gather, distribute, and use knowledge [4]. The flourishing development of knowledge management in enterprises promotes the development of Personal Knowledge Management (PKM). PKM is a conceptual framework to organize and integrate information that we, as individuals, feel is important so that it becomes part of our personal knowledge base. It provides a strategy for transforming what might be random pieces of information into something that can be systematically applied and that expands our personal knowledge [5]. Recently, Pettenati and Cigognini (2009) grouped PKM skills under three intertwined macrocompetence categories: creation, organization and sharing [6]. Utilizing PKM for acquiring knowledge refers to a collection of information management processes that an individual learner needs to carry out in order to gather, classify, store, search, and retrieve information in his daily activities [7]. The more successful students usually know how to decide on and seek out relevant information and experiences, therefore, are more likely adept at managing their own personal knowledge [8].

In this study, we define PKM as a collection of processes that a person uses to gather, classify, store, search, retrieve, and share knowledge in his or her daily activities [9]. A response to the idea that knowledge workers increasingly need to be responsible for their own growth and learning [10].

B. Learning Outcome

A learning outcome is the specification of what a student should learn, as the result of a period of specified and supported study. Learning outcomes are concerned with the achievements of the learner rather than the intentions of the teacher [11]. They can take many forms and can be broad or narrow in nature [12]. However, learning outcomes and objectives are more difficult to distinguish as objectives can be written in terms that are very similar to that used in learning outcomes [13].

In this study, learning outcomes are concerned with the achievements of the learner. A learning outcome is what the successful student/learner is expected to be able to do at the end of the module/course unit, or qualification [12].

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III. RESEARCH FRAMEWORK AND HYPOTHESES

A. Research Framework

PKM is a framework for individuals to take control of their professional development through a continuous process of seeking, sensing-making, and sharing [14].

- *Seeking* is finding things out and keeping up to date. Building a network of colleagues is helpful in this regard.
- *Sensing* is how we personalize information and use it. Sensing includes reflection and putting into practice what we have learned.
- *Sharing* includes exchanging resources, ideas, and experiences with our networks as well as collaborating with our colleagues.

The more successful students are usually very adept at managing their own personal knowledge. PKM prepares the mind to be open to new ideas (enhanced serendipity) [14].

B. Hypothesis Development

Seeking is finding out who and what to connect to. Seeking out interesting people who share their knowledge and insights is a good start. It is also finding the right way to express thoughts in the sense-making process. Therefore, we suppose that:

• H1: Seeking positively impact learning outcome

When people seek, they also filter, because it is difficult to read everything that passes by or watch every explanatory materials available. They can use judgementbased criteria, from Naive (based on our own lack of understanding) to Expert (based on those who know). Therefore, we suppose that:

• H2: Sensing positively impact learning outcome

People can also use networks, or the opinions of many experts to help them filter. By participating in professional networks, information is constantly filtered. A diverse group ensures that it doesn't suffer from groupthink, so be selective in network participation. Therefore, we supppose that:

• *H3: Sharing positively impact learning outcome*

In addition, understanding better gender differences in students' attitudes towards PKM and learning, teachers will know how to encourage and improve learning processes for students against gender. Some researchers contend that without studying gender as an important variable, human information processing will remain incomplete [15]. Therefore we propose that:

• H4: Gender has influence on PKM

Moreover, researchers agreed that there is a need for more research on gender debate about differences and similarities from learning strategies to performance (Demirbas, and Demirkan, 2007; Yukselturk, and Bulut, 2009). Therefore we propose that:

• *H5: Gender has influence on learning outcome*

Based on the above discussion we figure out the research framework as follow (Fig. 1)



IV. METHODOLOGY

A. Data Collection and Analysis

The study included 32 graduate students who attended at the Database Management course of the Information Management Department in a university in Taiwan. All students have no experience in this field. However, after finishing this course, they are required to submit a project in which a real database is designed and apply in a specific area based on instructor's requirements. Therefore, they need to work hard to find the way to fulfill the requirements.

We employ both quantitative and qualitative methods to collect data. Based on the content of PKM process defined above, we design questionnaires and distribute to 32 students. Because of small sample, we also conduct an interview with the instructor of this class to make sure the reliability and validity of collected data. The questionnaire has 13 items (Appendix A, B) which are prepared in both English and Chinses to help local and international students can fulfill it without any problem. After collecting data we use SPSS 16 to analyze and show the data as the following sections.

B. Findings and Discussion

We distribute questionnaires to 32 students but collect 30 valid responses. The detailed information of sample is described in Table I.

Variable	Frequency	Percent
Gender		
Male	17	56.7
Female	13	43.7
Age		
20-30	27	90
30-40	3	10
Education		
Master	27	90
Ph.D	3	10

TABLE I. DEMOGRAPHIC INFORMATION

Table II illustrates the results of the descriptive analysis of PKM processes. The alpha coefficient for the 13 items is .953, suggesting that the items have relatively high internal consistency (Table III).

TABLE II. DESCRIPTIVE STATISTICS

	Ν	Minimum	Maximum	Mean	Std. Deviation
SEEK1	30	2	4	2.90	.607
SEEK2	30	1	3	2.37	.809
SEEK3	30	1	3	2.17	.699
SEEK4	30	2	4	3.03	.669
SEEK5	30	2	4	2.93	.583
SENSE1	30	2	4	3.13	.629
SENSE2	30	1	4	2.73	.785
SENSE3	30	2	4	2.83	.461
SENSE4	30	2	4	2.90	.662
SHARE1	30	1	4	2.63	.718
SHARE2	30	2	4	2.77	.774
SHARE3	30	1	4	2.77	.774
SHARE4	30	1	3	2.37	.669
Valid N (listwise)	30				

TABLE III. RELIABILITY STATISTICS

Cronbach's Alpha	N of Items
.953	13

After checking the goodness of data we continue to test the suggested hypotheses by using regression analysis. Based on the results we found that Seek, Sense, and Share have proportional relations with learning outcome (Fig. 2, Fig. 3, Fig. 4).



Figure 2. Seek-learning outcome



Figure 3. Sene-learning outcome



Figure 4. Sense-learning outcome

We found that students prefer to employ "Seek" than "Sense" and "Share" in order to enhance learning outcome. Seeking information is an important foundation to PKM. In fact, Sense-making is an activity, a regular practice. It can be a simple as creating a list (Filtering) or as complicated as a thesis (Customization). People with better sense-making skills are able to create higher value information and when this is shared, they contribute to their networks [14]. However, students have not leveraged this activity effectively.

In addition, we also can found that PKM has significant impact on learning outcome (Fig. 5). The results also show that PKM can explain 76% factors impact on learning outcome.



Figure 5. PKM - learning outcome

PKM is an individual, disciplined process by which we make sense of information, observations and ideas. However, PKM is of little value unless the results are shared by connecting to others and contributing to meaningful conversations. Without effective PKM at the individual level, learning has less value. Because PKM process can help to develop critical thinking skills, where sense-making includes observing, studying, challenging, and evaluating. Developing these skills takes practice, appropriate feedback and an environment that supports critical thinking [14].

By using t-test to examine the relation between gender and PKM and gender and learning outcome. The results are presented in Table IV and Table V. We found that while gender has influence on learning outcome, it has no impact on PKM activities.

The columns labeled "Levene's Test for Equality of Variances" tell us whether an assumption of the t-test has been met. The t-test assumes that the variability of each group is approximately equal. If that assumption isn't met, then a special form of the t-test should be used. Look at the column labeled "Sig." under the heading "Levene's Test for Equality of Variances".

Table IV show that the significance (p value) of Levene's test is .053. This value is bigger than .05, the null hypothesis is accepted. There is no relation between gender and PKM. However, from the Table V we can see that the significance (p value) of Levene's test is .007. This value is less than .005, then we can reject the null hypothesis that the variability of the two groups is equal, implying that the variances are unequal. Therefore, gender difference has impact on learning outcome.

According to Grossman and Grossman (1994) males do well in some areas and poorly in others because of the different activities they engage in [16]. Cook (2006) suggests that males are under-performing in school, compared to their female counterparts [17].

ſ		Levene's Te of Va	st for Equality riances		_	t-tes	t for Equality of Mea	ns		
								Std. Error	95% Confide of the Di	nce Interval fference
l		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Difference	Lower	Upper
ľ	KM Equal variances assumed	4.069	.053	-2.792	28	.009	50573	.18116	87683	13463
1	Foual variances not assum	od .	1	-2.043	27 505	007	- 50573	17185	. 85707	- 153/0

TABLE IV. GENDER AND PKM (SEEK, SENSE, SHARE)

TABLE V. GEN	DER AND LEARNING	OUTCOME
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		Levene's Test for Equality of Variances		t-test for Equality of Means							
		95% Confidenc Std. Error of the Diffe			nce Interval fference						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Difference	Lower	Upper	
PERFORMANCE	Equal variances assumed	8.444	.007	-1.506	28	.143	430	.285	-1.015	.155	
	Equal variances not assumed			-1.627	25.349	.116	430	.264	974	.114	

As we mentioned above, since we collect data from a small sample, in order to provide more reliable explaination, an interview was conducted. We have 45-minute interview with the instructor of this class to get indepth understanding why PKM takes important role in learning outcome and clarify the relation of gender and PKM or gender and learning outcome.

Based on the results of interview, we found that Seek, Sense, and Share are all important. However, the students have trend to apply Seek and Share more than Sense. Maybe most of students have no experience in this field, they need to get more general information from different sources. In addition, the instructor also evaluates learning outcome based on group's performance, they need to work together to share information. However, she also emphasizes that students need to "sense". Because if they want to design a database or system they really need to practice by themselves.

Related to the issue of gender, PKM can applied by Male and Female. Unfortunately, Female has better learning outcome than Male due to the characterictics of this course. Before designing the database, students need to take time to analyze every single task. Female students are more patient and careful than Male students, then they get better learning outcome.

V. CONCLUSION

This empirical research demonstrates that the students have been aware of the importance of the PKM in enhancing their learning outcome. However, the content of course can impact on the leveraging different activities of PKM (Seek, Sense, and Share). The findings of this article provide a new research direction for researchers by digging into the role of PKM. For instructor, based on these results they can encourage students to apply PKM in their learning. For students, if they understand the role of PKM, they can leverage it well to support their learning. Since the sample in this article is small, it difficult to come up more explaination, we will conduct more studies in the future to make this research more complete.

Category	Statement	Often	Sometimes	Seldom	Never
		4	3	2	1
	 I read different materials related to DBMS (SEEK1) 				
	 I ask Professor for explanation in order to get more 				
	understanding about the content of DBMS (SEEK2)				
	·I ask teaching assistant (TA) for explanation in order to get				
Seek	more understanding about the content of DBMS (SEEK3)				
	 I find information related to DBMS from different sources 				
	(SEEK4)				
	•I read information related to DBMS frequently (SEEK5)				
	•Lorganize information related to DBMS in a way that helps				
	me to understand the content easily (SENSE1)				
	the to understand the content cashy (SER(SER))				
	 I define concepts related to DBMS in a way to support my 				
Sense	understanding (SENSE2)				
	 I practice and explore different ways to apply my knowledge 				
	of DBMS (SENSE3)				
	 I try to integrate my knowledge of DBMS to fulfill 				
	requirements of assignments (SENSE4)				
	 I attend "discussion group" or "study group" to share my 				
Share	knowledge of DBMS (SHARE1)				
	•I share my ideas related to DBMS in class (SHARE2)				
	•I discuss information of DBMS with other people (SHARE3)				
	 I post my ideas on portal to share with other classmates 				
	(SHARE4)				

APPENDIX A QUESTIONNAIRE IN ENGLISH

How many hours per week do you spend on studying DBMS?

 \Box Less than 2 hours $\Box 2 - 5$ hours

□ More than 5 hours

Do you think you have a good method to study this course? □ Yes □ No

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