The relationship between knowledge conversion abilities and academic performance

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Abstract

The main purpose of this research is to examine the relationship of knowledge conversion abilities and academic performance. Knowledge conversion abilities comprise of four dimensions, namely, socialization, externalization, combination and internalization. Using the survey research method involving 263 respondents from the Faculty of Information Management, Universiti Teknologi MARA, the four independent variables are found to have a significant relationship with academic performance. Further analysis showed that the four independent variables are significant predictors of academic performance. The present study provides both a theoretical and practical contributions to understanding the predictors of academic performance and should be of interest to both researchers and practitioners.

Keywords: knowledge conversion abilities; academic performance; knowledge management; Malaysia.

1. Introduction

Students are most essential asset for any educational institute as the social and economic development of the country is directly linked to students’ academic performance (Mushtaq & Khan, 2012). According to Alfan & Othman (2005), students’ performance in universities attracts the concern of corporations which are often said to be the “end user” in the supply chain of graduates for the labor market. Realizing the importance of students’ academic performance, scholars and researchers have developed various models and frameworks portraying the determinants
or predictors of academic success. However, due to the on-going change that is taking place in the university landscape and the technology surrounding students’ personal lives, the available models and frameworks for academic performance requires updates and revisions. According to Uyar & Gungormus (2011), determining the factors that affect the student performance is important because primarily institutions and lecturers have to find out ways to increase student performance and to motivate students for better performance. Various factors have been identified by researchers and scholars as determinants of academic performance. Among the mostly researched factors are gender, previous academic performance, living place and income level of family, social environment, the type and quality of the high school graduated, the high school grade point average, the score obtained from nationwide university entrance exam (OSS), time spend in studying, learning ability and living place during the university life (Erdem, et al., 2007). Very few researchers have attempted to explore the role of knowledge conversion abilities of the students’ academic success. Based on Nonaka’s (1990) knowledge spiral theory, several researchers have conceptualized knowledge conversion abilities as the combination of socialization, externalization, combination and internalization. All of these factors are apparently consistent with the Theory of Educational Productivity developed by Walberg (1981) that suggest three groups of factors that influence students’ academic performance, namely, affective, cognitive and behavioral. A good of Academic Institution’s is depending on their student academic performance (Chow, 2003; Ali et al., 2009). Although most academic or higher learning institutions in Malaysia have adopted knowledge management approach in their learning system, it is still uncertain to what extent it has been practiced in order to get a better performance result (Daud et al., 2008). Likewise, a research on how the conversion of knowledge took place in an academic setting among students is still lacking.

Given the aforementioned background, this study is aimed at investigating the influence of knowledge conversion abilities on students’ academic performance. Specifically, this study will examine the influence of the four dimensions of knowledge conversion which are socialization, externalization, combination and internalization on students’ academic performance. In addition, it is aimed to identify which dimension is the strongest predictor of students’ academic performance.

2. Literature Review

2.1. Students Academic Performance

Academic performance refers to how students deal with their studies and how they cope with or accomplish different tasks given to them by their teachers. In addition, it is also described as the ability to study and remember facts and being able to communicate knowledge verbally or down on paper (Ervina & Othman, 2005). Kuncel et al. (2004) noted that academic performance in the classroom is the end product of much other behavior. For example, obtaining a good grade after answering examination items is the result of effective performance, studying, managing goal conflicts, coordinating work with classmates, seeking additional information, negotiating with peers and faculty, avoiding counterproductive behaviors (e.g., drugs and alcohol), handling finances, and structuring effective communications (Kuncel et al., 2004).

Presently, the standards of academic performance have been established in order to measure the students’ achievement. Its’ usually calculated with a grading system set up by the academic intuition. Grading systems came into existence in America in the late Victorian period, and were initially criticized due to high subjectivity (Kuncel et al., 2004). The famously known of the grading system used by numerous higher learning today in measuring their student achievement is via grade point average (GPA) and cumulative grade point average (CGPA) i.e. a number which is the average mark received for all the courses a student takes and shows how well the student is doing. In Malaysia, most universities measure their student performance based on CGPA (Ervina & Othman, 2005; Ali, et al., 2009).

In line with the Theory of Educational Productivity (Walberg, 1981) various factors associated with the students’ affective (Olani, 2009; Richardson et al., 2012), cognitive (Harb & El-Shaarawi, 2006; Olani, 2009; Uyar & Gungormus, 2011; Ren & Hagerdon, 2012), and behavioral abilities (Harb & El-Shaarawi, 2006; Olani, 2009; Uyar & Gungormus, 2011; Mushtaq & Khan, 2012; Richardson et al., 2012) have been identified as the predictors of academic performance. Besides that, other demographic factors such as age and gender (Erdem, 2007; Olani, 2009; Ebenuma-Okoh, 2010; Ren & Hagerdon, 2012); and other external factors such as the number of sisters/brothers in
school, education level of parents, and expression of family expectations about the school (Erdem, 2007; Ebenuma-Oko, 2010; Mushtaq & Khan, 2012) have also been found to have a profound effect on students’ academic performance.

2.2. Knowledge Conversion Abilities

Marwick (2001) defined knowledge as an individual’s experience and understanding. Davenport & Prusak (1998) defined knowledge as “a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information”. Nonaka & Takeuchi (1995) classified knowledge into explicit and tacit. Tacit knowledge is linked to personal perspectives, intuition, emotions, beliefs, know-how, experiences and values. Tacit knowledge is intangible and not easy to articulate, making it difficult to share with others (Nonaka & Takeuchi, 1995). In comparison, explicit knowledge has a tangible dimension that can be more easily captured, codified and communicated. Knowledge creation refers to the ability of an individual or organization to develop novel and useful ideas and solutions.

Through the famous SECI (socialization, externalization, combination and internalization) model as shown in Figure 1, Nonaka & Takeuchi (1995) explained the term knowledge conversion. According to them, the process of knowledge conversion (the dynamic interrelationship between tacit and explicit knowledge) lies at the heart of knowledge creation which involves an interaction between socialization (tacit to tacit), externalization (tacit to explicit), combination (explicit to explicit), and internalization (explicit to tacit/implicit). Choo (2006) stated that the role of knowledge conversion process is to develop the conditions that would be enabled the creation of knowledge at the individual, group, organizational or inter-organizational levels. The elaborations of these SECI model are as follows:

- **Socialization** is the process of converting *tacit knowledge into tacit knowledge* through shared experiences, such as observation, imitation, and practice. Socialization typically occurs in a traditional apprenticeship, where apprentices learn the tacit knowledge needed in their craft through hands-on experience. Socialization also may occur in informal social meetings outside the workplace, where tacit knowledge, such as world-views, mental models and mutual trust can be created and shared.

- **Externalization** is the process of articulating *tacit knowledge into explicit knowledge* and involves the interchange of tacit knowledge to explicit knowledge. When tacit knowledge is made explicit, knowledge is crystallized, which allows it to be shared by others, and it becomes the basis of new knowledge. The tools of this conversion use different metaphors, analogues, concepts, hypotheses and models.

- **Combination** is the process of converting explicit knowledge into more complex and systematic sets of explicit knowledge (*explicit knowledge into explicit knowledge*). Explicit knowledge can be accumulated from inside or outside the firm and then combined, edited or processed to form new explicit knowledge. Through presentations or meetings, this new explicit knowledge can be directly disseminated among the members of the organization.

- **Internalization** is the process of embodying *explicit knowledge into tacit knowledge* and may be embodied in actions and practice, so that the individual acquiring the knowledge can re-experience what others go through. Some of the means through which individuals may acquire knowledge through the internalization processes are learning by doing, learning by observing, face-to-face meetings, and on-the-job training.

![Fig.1 Modes of knowledge conversion (Nonaka & Takeuchi, 1995)](image-url)
3. Research Framework

Figure 2 showcases the research framework used in the study. Theory on Educational Productivity (Walberg, 1981) and Theory on Knowledge Conversion (Nonaka, 1984) were used as the main theory for the development of the framework. In Nonaka’s SECI model of knowledge conversion process, the interaction between the knowledge conversion patterns, i.e., socialization (from tacit to tacit), externalization (tacit to explicit), combination (from explicit to explicit) and internalization (from explicit to tacit); and this continuing process can generate a new knowledge between individual, team, organizational to inter-organizational level. The SECI model suggests that the knowledge conversion processes, i.e. the four knowledge conversion abilities will encourage the process of knowledge creation to generate better outcomes (Huang & Wang, 2002). Daud et al. (2008) described that the four knowledge conversion abilities as active learning processes that will give an impact on innovation in academic performance. Ali et al. (2009) found that students who actively engaged in the learning process and involved in extracurricular activities obtained greater cumulative grade point average (CGPA). Based on this premise, the following hypotheses are established:

H1 – Socialization is a significant predictor of a student’s academic performance
H2 – Externalization is a significant predictor of a student’s academic performance
H3 – Combination is a significant predictor of a student’s academic performance
H4 – Internalization is a significant predictor of a student’s academic performance

4. Research Methodology

The study used a survey method with questionnaire as the instrument for data collection. The questionnaire was developed based on the instruments used by a previous study by Huang & Wang (2002). Perceptual measures in the form of statements were developed for measuring each variable. For each statement or items, a corresponding Likert scale anchored as 1 for “Strongly Disagree”; 2 for “Disagree”; 3 for “Neither Agree Nor Disagree”; 4 for “Agree” and 5 for “Strongly Agree” were also prepared. The questionnaire was pre-tested with several experts and prospective respondents. Subsequently, it was pilot tested with 30 students. The results of the pilot test are illustrated in Table 1 showed that the Cronbach Alpha for all variables were well above 0.7, indicating that the questionnaire was acceptably reliable.

The population of the study was students of Faculty of Information Management, Universiti Teknologi MARA Shah Alam. A total of 450 (i.e. 20% of the population of 2231) questionnaires were sent to the targeted students. The number is considered appropriate and in line with the suggestion of Sekaran (2003) that at least 15% of the total population must participate in the study. After the duration of the data collection was over, a total of 351...
questionnaires were returned, yielding to 78.0% response rate. However, 88 were found to be unusable for further analysis as they were incomplete. The remaining 263 were analyzed using IBM SPSS. The statistical analyses carried out were frequency analysis; descriptive analysis focusing mean and standard deviation; factor analysis (EFA) for assessing common method bias; correlation analysis for looking into the relationship between variables; and multiple regression for testing research hypotheses.

5. Findings

Table 2 displays the demographic information of the respondents. Out of 263 respondents, 76.8% were female while the remaining 23.2% were male. In terms semester, the majority indicated to be in semester five (38.8%) while the minority indicated to be in semester seven (0.4%). Full time students contributed 85.2%, while the remaining were part-time (6.8%) and distance learners (8.0%). Students enrolled in BSc Library Science were also found to be the largest participants (31.2%). In comparison, students registered for Bsc Records Management were the least (3.8%).

In order to ascertain whether common method bias is a threat to the research data, Harman’s single factor test was executed. All items from all constructs under study were entered for analysis and constrained to only a single factor. The results showed that the single factor explained only 34.40%, less than the benchmark value of 50% of the total variance, implying that the collected data is free from the problem of common method variance. Accordingly
reliability analysis was also performed and the results indicate that the Cronbach Alpha values are well above the cutoff value of 0.7. The recorded Cronbach Alpha values are between 0.727 and 0.798 implying that the instrument used in this study is acceptably reliable.

The mean scores of all variable are well above the mid value (i.e. The middle value of the Likert scale is 3), suggesting that in general, the respondents of the study skewed to practice with the listed knowledge conversion practices, i.e. socialization, externalization, combination and internalization (refer Table 3). In comparison, the results of the correlation analysis suggest that, all independent variables have a moderate relationship with academic performance (CGPA). This finding denotes that each independent variable by itself, has some influence with academic performance. The strongest relationship is for variable combination \( r = 0.396, p < 0.01 \), followed by externalization \( r = 0.394, p < 0.01 \).

| Table 3. Mean, Standard Deviation and Correlation Analysis |
|----------------------------------------------------------|
|              Cronbach Alpha  |       Mean       |     Std. Deviation |     [1] |     [2] |     [3] |     [4] |     [5] |
| SOCIALIZATION |       0.798      | 3.9913           |     0.452 |     1.000 |
| EXTERNALIZATION |    0.748       | 3.6616           |     0.438 | 0.526** | 1.000 |
| COMBINATION |       0.749      | 3.7123           |     0.468 | 0.565** | 0.587** | 1.000 |
| INTERNALIZATION |    0.727       | 3.8821           |     0.477 | 0.449** | 0.516** | 0.512** | 1.000 |
| CGPA | NA | 3.279 | 0.4344 | 0.387** | 0.394** | 0.396** | 0.362** | 1.000 |

Regression analysis was performed to test the proposed hypotheses and the results are displayed in Table 4 and Figure 3. The F statistics produced \( F = 19.284, p < 0.01 \), thus confirming the fitness for the regression model. The coefficient of determination, \( R^2 \) was 0.23 which suggests that the four factors can significantly account for 23.0% in academic performance. Based on this result, all established hypotheses H1, H2, H3 and H4 are fully supported.

| Table 4. Results of Regression Analysis |
|----------------------------------------|
| Independent variables | Dependent variable – CGPA |
| Socialization | 0.165* |
| Externalization | 0.153* |
| Combination | 0.145* |
| Internalization | 0.135* |
| \( R^2 \) | 0.230 |
| Adjusted \( R^2 \) | 0.218 |
| \( F \) value | 19.284* |

Notes: * \( < 0.01 \)
6. Discussion

The present study provides both a theoretical and practical contributions to understanding the role of knowledge conversion abilities towards academic achievements. All the four dimensions of knowledge conversion abilities are found to have a significant relationship with students’ academic performance. The combination of the four dimension accounts for 235 variances in students’ academic performance. Out of the four dimensions, socialization turned out to be the strongest predictor ($\beta = 0.165$, $p < 0.01$). This result indicates the importance of socialization in shaping students’ academic success. This result is almost consistent with that of Mushtaq & Khan (2012) who found that communication as a significant predictor or academic success. Socialization requires an individual to heavily involve in various modes of communications. Being university’s students, communications with lecturers, supervisors, colleagues and others is definitely inevitable. The implication of this study is that, the educators of the university should encourage their students to improve not only their communication skills, but also their intensity of communications with people of all ranks.

The second strongest predictor discovered in this study is the externalization ($\beta = 0.153$, $p < 0.01$). The finding suggests that the higher is the engagement of externalization, the better would be the performance of the student. According to Nonaka & Takeuchi (1995), externalization involves the converting tacit knowledge to explicit knowledge and the tools that can be used for the conversion include analogues, concepts, hypotheses and models. All these various conversion tools are no alien to the students as they are used to engaging them in their learning process. Nonetheless, this finding signals the need for educators to continuously engage students to visualize their tacit knowledge in the form of models or diagrams. This approach will enable other students to also learn and at the same time promotes knowledge sharing.

The third strongest predictor of students’ academic performance is combination, which involves the conversion of explicit knowledge to explicit knowledge ($\beta = 0.145$, $p < 0.01$). The results suggest that, in the absence of combination, students’ academic performance will be greatly impacted. Knowledge acquired from the class lecture combined with the knowledge obtained from fieldwork research among the student will definitely produce new explicit knowledge. As advocated by Nonaka & Takeuchi (1995), this new form of knowledge can be shared with others through the medium of presentations and meetings. This finding further stresses the significance of doing fieldwork research as it will further enrich the students’ knowledge, which in turn improves their academic performance. Educators should respond to this finding by giving more exercise that will require the students to do fieldwork research.

The last significant predictor discovered in this study is internalization ($\beta = 0.135$, $p < 0.01$). Internalization involves the conversion of tacit knowledge into explicit knowledge. As suggested by Nonaka & Takeuchi (1995), activities such as learning by doing, learning by observing, face-to-face meetings, and on-the-job training are examples of which the internalization can occur. All these activities are very common for students because the nature of their learning process will require them to engage in these activities. Given this result, academics and educators should further intensify the activities as outlined by Nonaka & Takeuchi (1995), because by doing so, will further improve students’ academic performance.

7. Conclusion

The purpose of this article has been to examine the influence of knowledge conversion abilities which consists of four dimensions which are socialization, externalization, combination and internalization on students’ academic performance. Drawing upon Nonaka & Takeuchi’s (1995) model of knowledge conversion, this study developed an empirical based framework which connects the dimensions of knowledge conversion to students’ academic performance. The results of the analyses suggest that all the four dimensions are significantly correlated with students’ academic performance. Further analysis proves that socialization, externalization, combination and internalization are truly significant predictors.

While this study has achieved its objectives, it is still subject to several limitations. Firstly, this study collected data from one university only. Future researchers should consider testing the developed model in a bigger scope of
the population. Secondly, this study collected data based on perceptual measures. Future studies can further extend this research by integrating the objective measurement or evidence-based measures.

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