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Pedagogical Discussion Cases in Higher Education: The Role of Knowledge Sharing in Students' Learning

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Abstract

The research incorporates a knowledge sharing approach, in an undergraduate classroom, using discussion cases to investigate the role of knowledge sharing on students working in groups to find solutions for the cases. The goal is to provide empirical evidence as well as additional information on knowledge sharing among students in group settings using discussion cases. A survey was adopted to investigate the relationships between the environmental factors, motivational factors, students' individual characteristics, the lecturer's role, the industry representative's role and knowledge sharing - outside and inside of the class - on students' learning experiences and outcomes. The framework was modified from existing frameworks and current literature's lessons learned on knowledge sharing approaches in educational contexts. The results showed that environmental factors positively influenced the students' knowledge sharing motivation. In addition, the industry representatives (case protagonists) active involvement in the classroom had a significant impact on the students' knowledge sharing behaviour. This finding contributes to future directions on developing strategies to improve knowledge sharing in higher education classrooms through enhancing classroom environment as well as involving industry representatives when designing the classroom experience.

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1. Introduction

In today's competitive knowledge-based economy, the knowledge and skills earned by universities graduates are integral to their future employment prospects as well as the country's competitiveness as a whole [1]. To prepare work-ready graduates, educational institutions and educators constantly strive to be innovative in their quest to develop novel teaching methods, provide students with challenging tasks, design and implement practical pedagogies which could enhance their learning outcomes [2]. Discussion cases are constructive pedagogical instruments, which improve the in-depth coverage and synthesis of theories and ensure student's involvement [3]. A multimedia case-study environment would enhance the students' confidence in their knowledge and stimulate their curiosity by illustrating the application of theories in real situations [4]. Discussion cases are commonly used at business schools because of their very nature of exposing students to real-life situations through a comprehensive interaction among students and their instructors [5]. In addition, they enable the students to be proficient in communication, self-management, decision-making and problem-solving skills [6].

In this research, case studies were developed by the lecturer as educational support tools in collaboration with the industry to expose students to real life business situations and challenges. The research focuses on the sharing and retention of knowledge among students working in groups to solve a real-life problem presented in a discussion case during a semester-long project. The exchange of knowledge among all the individuals involved does contribute to the learning process at all levels. While most previous research in Knowledge Management and education focused on the factors and motivations of sharing knowledge among academics and students in general, this research adopts a new perspective on addressing the role of knowledge management on the students' learning based on the knowledge shared between the students, the lecturers and the industry representatives. This process incorporates, in addition to knowledge sharing, knowledge creation and retention as elements for improving the students' learning outcomes. By understanding these relationship, it is possible to design a higher education classrooms that encourage the sharing of knowledge among potential employers, academics and students, which will, in turn, lead to new knowledge creation such as innovation in the future.

2. Knowledge sharing (KS)

Nonaka and Peltokorpi [7] distinguished knowledge from data and information by stating that "Data can be classified as raw numbers, images, words and sounds derived from observation or measurement. The information represents data arranged in a meaningful pattern. Unlike information, knowledge is about beliefs, commitments, perspectives, intention, and action [based on this knowledge]" [7]. This definition is complex and intentionally broad but encompasses the cognitive and attitudinal aspects of knowledge based on individual perception of information [7]. Other authors argued for a need for a broader definition of knowledge for effective Knowledge Management (KM) and stated that knowledge is a highly complex concept that it is difficult to share among organizational employees and among groups [8]. The type of knowledge typically of concern in teaching is objective knowledge (facts and procedural knowledge that can be communicated using spoken or written language) [9]. However, a Piagetian perspective on knowledge holds that knowledge can be constructed through experience and interactions with others [9].

KM is often defined as an organizational capability for leveraging its knowledge assets in order to make the organization more competitive [10]. Knowledge Sharing (KS) is a subset of KM. Wang and Noe [11] defined KS as it "refers to the provision of task information and know-how to help others and to collaborate with others to solve problems, develop new ideas, or implement policies or procedures". They added that KS could happen through formal documentation (knowledge capture), direct communication, or through writing [11]. Others stated that KS is conceived as the flow of information between individuals, both providing and receiving knowledge [12]. Within this flow, individuals provide, seek out, and receive knowledge from others and integrate it into their own knowledge set [12]. Although Wang and Noe [11] distinguish this interactive process as knowledge exchange (KE), it is useful to consider the process of KS to be a reciprocal process following Cabrera, Collins and Salgado [12]'s.

3. The role of pedagogical discussion cases in knowledge sharing

Gill [13], stated that discussion cases serve as the basis for discussions, most commonly in higher education class settings where students must come up with solutions to problems which are identified in the cases and to make decisions to solve these problems. Students are exposed to real-life situations using these discussion cases through a comprehensive interaction between students and their instructors [5]. Learning through discussion cases is often set out for students to tackle common issues in the real business world, while students are required to connect theory and application. At the same time, students' interaction is enhanced and they feel more engaged [14, 15, 16] which leads to significantly higher students' perceptions of the materials and concepts being taught and provide students with satisfaction, and usefulness of the course content [17].

The ultimate goal of a university is to create, share, and disseminate knowledge, both between its students and teaching staff and with the environment (for example the industry and the government) [18]. Thus, higher education already has an affinity for the concepts of KM, particularly in Knowledge Creation (KC) and KS. Although universities do not necessarily take the same approach to KC and KS as is used in the business-oriented KM model, these activities are still embedded in their purpose and goals as well as their activities [18].

The students' KC and KS during the process of solving the discussion case is an integral part of this research. Currently, the literature lacks motivational factors which enhance the Knowledge Sharing (KS) among students, instructors and industry representatives (case protagonists) based on the use of an active learning process during the use of pedagogical discussion cases.

This paper addresses this gap by introducing a new perspective on the application of KS as part of the students' learning through the identification of motivational factors, which would increase the sharing of knowledge between the instructor, the students, and the organization's case protagonist. These motivational factors intend to increase the students' knowledge creation and retention, hence better students' learning experience and outcomes. The use of pedagogical discussion cases as a mediator will help in achieving this aim, through the incorporation of the Problem-based Learning (PBL), the cooperative learning and the work-integrated learning techniques in the classroom's teaching process.

4. Research framework and hypotheses

Based on the literature, the research introduced a conceptual framework and an associated set of hypotheses for empirical testing. Many of these hypotheses are exploratory, due to the limited nature of the research on KS in the classroom context.

H1 Student individual characteristics

- H1a: Students' individual characteristics have a positive correlation to students' KS motivation.
- H1b: Students' individual characteristics have a positive correlation to students' KS intention.

H2 Environmental factors

- H2a: Environmental factors have a positive correlation with students' KS motivation.
- H2b: Environmental factors have a positive correlation to students' KS intention.

H3 Motivational factors

- H3: Motivational factors have a positive correlation to students' KS intention.

H4 Students' KS intention

- H4 Students' intention to share what they know has a positive correlation to knowledge sharing.

H5 Lecturer's role

- H5a: Lecturer has a positive correlation to students' knowledge sharing behaviour.
- H5b: Lecturer has a positive correlation to students' KS intention.
- H5c: Lecturer has a positive correlation to students' KS motivation.

H6 Industry representative's role

- H6a Industry representative has a positive correlation to students' knowledge sharing behaviour
- H6b Industry representative has a positive correlation to motivation factors

H7 Learning outcomes & satisfaction

- KS behaviour during pedagogical discussion cases has a positive correlation to students' learning outcomes and satisfaction.

The hypotheses presented above are summarized on the conceptual framework below (Fig. 1), which indicates the variables, relationships and hypotheses that are proposed for the study [19].

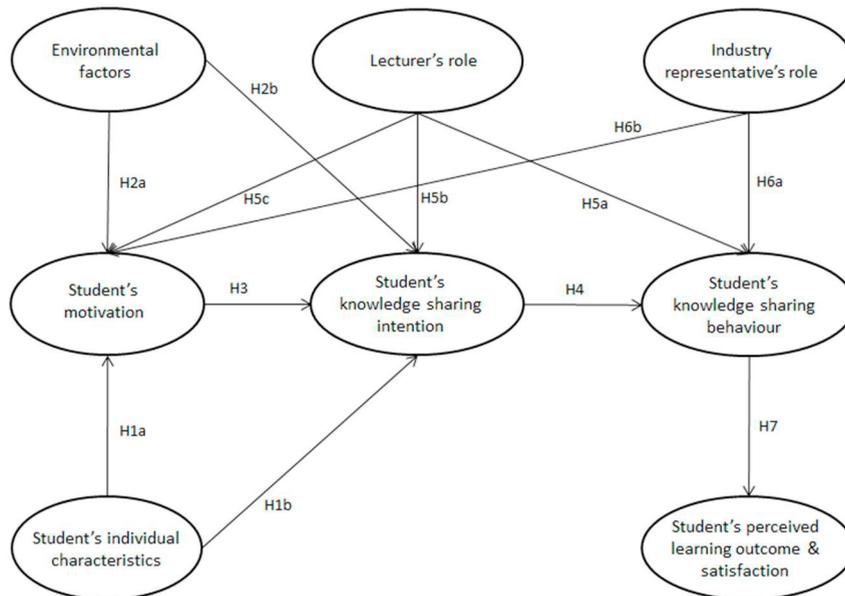


Fig. 1. Research Framework [19].

5. Methodology

A quantitative survey method is adopted for this paper. The research was conducted at an international university in Vietnam. The level of analysis for this research was the individual student. The population of interest included undergraduate program graduates who had taken a specific Information systems course that adopted pedagogical discussion cases as part of the teaching materials. Data collection was conducted using an online questionnaire. A self-administered questionnaire was used to improve respondent comfort with the survey process and to maximize the number of members that could be included in the sample [19]. The exact population size of the study could not be determined, because the confidentiality of the student records meant that information about courses taken by graduating seniors could not be accessed. Instead, this research fell back on methodological rules of thumb to determine an appropriate sampling size. The SEM approach requires a somewhat larger sample than traditional regression methods, and a standard rule of thumb is that the minimum sample should be 200 members of the population [20, 21]. The final sample size, which was 241 students, exceeded this threshold.

The research instrument was adapted from existing instruments that have measured similar or the same constructs. The adaptation approach was chosen because this helps ensure that the items have passed a basic check of face validity and have been validated in similar contexts [19]. Some of the scales were created by the researchers because no satisfactory existing instrument existed. The scales were measured using seven-point Likert scales. Seven-point Likert scales were selected because of the Likert scale's ability to measure attitudes consistently [22]. Additional items included demographic questions (measured using closed categorical items).

Although some of the items had been tested for reliability and validity in their previous contexts, the recombination of items and application in a new context meant that the questionnaire had to be re-tested [23]. Additionally, the new scales had not been tested previously. The Cronbach's alpha coefficient was used for interrater reliability of the Likert

item-based scale since all these scales had more than three items [24]. Alpha values between 0.70 and 0.90 are typically accepted as indicating that the scale is unidimensional; outside this range, scale reduction is recommended to remove unrelated or redundant items [25]. Following the process of Cronbach's alpha, confirmatory factor analysis (CFA) was used for scale reduction to eliminate unrelated variables (thus extracting the latent variables from the observed variables in the study) [26]. Data analysis was conducted using structural equation modelling (SEM). SEM is a family of regression-based techniques that test an entire model, rather than single individual relationships [27]. As these authors explain, SEM is a hypothesis-testing model, which uses techniques such as regression and CFA to test relationships between variables and, if necessary, to adapt the measurement model. The tool used in this research to implement SEM was the SPSS AMOS.

6. Findings

The descriptive statistics demonstrated that the sample was mostly Asian students, mostly aged between 20 and 23 years. Although the gender in the research was non-uniformly distributed, with approximately 59% of the respondents were male; it was consistent with the overall gender enrolment statistics at the university. Most of the respondents were Bachelor-degree graduates in Business sub-specialties. Thus, the sample was broadly representative of what was expected given the students who take the class and the sampling frames.

Initial analysis included the reliability and validity testing, along with descriptive statistics. The data reliability and validity testing demonstrated that there were some problems with fitting the observed variables. A process of Cronbach's alpha and adjustment using modification indices was used for scale reduction in order to optimize the scale fit, but this did not result in a perfectly fitted scale by most measures. Thus, it was already clear by the preliminary analysis that there were problems with the measurements. However, because it was not possible to specify the instrument, the analysis went ahead. The descriptive statistics showed that while the members of the class were generally positive about their experience, there were some gaps. Students tended to have a weak relationship with their team members, expressing low levels of social or personal interest building up effective relationships within the teams. In addition, the results demonstrated that the students voiced a weak perception of support from the university, although the lecturer's supports were generally strong.

The inferential analysis started with testing the assumptions in the SEM. The data distribution within the variables was inconsistent with the normal distribution following implementing both the unidimensional and the multidimensional measures. However, a minimal number of outliers, correlation and covariation results were acceptable, demonstrating independence. Following the assumptions testing, the SEM process began with the measurement model to evaluate the fit of the observed and the latent variables. The goodness of fit of the measurement model was relatively poor as expected based on the reliability and validity testing as well as from the scale reduction process. Particularly, some issues were observed with the fit of the SSI and SLO scales, where none of the observed variables demonstrated a significant regression relationship with the latent variable.

Ultimately, SEM is a tool for hypothesis testing [26]. This research proposed seven hypotheses addressing the relationships between the observed variables, which were based on the empirical findings and the literature's theories. The hypotheses are evaluated using the unstandardized regression outcomes, with a standard significance level of $p < .05$ for acceptance. The use of $p < .05$ (corresponding to a 95% confidence level) is consistent with standard practice for hypothesis testing [28]. While the magnitude of the unstandardized regression coefficient is not a concern, the direction of the coefficient is. This is because unstandardized coefficients can vary widely, but the directionality of the relationships identified was established in the hypotheses themselves. The outcomes of these hypotheses are discussed below, including the evidence for significance and direction.

Following the measurement model, the structural model was implemented to test the hypothesis outcomes at a significance level of $p < .05$. Hypotheses 1, 3, 4, 5, and 7 were fully rejected. H2 was partially accepted, with H2a being accepted and H2b being rejected. H6 was also partially accepted, with H6a accepted and H6b being rejected. Furthermore, the rejection of H5 was a bit complicated. While H5b was rejected because of non-significance, H5a and H5c were rejected because their observed relationships were negative rather than the positive relationships specified within the model. This suggests that there is only weak evidence for the role of knowledge-sharing in case-based classroom experiences. However, the poor fit of the measurement model and the violation of assumptions of SEM in a relatively small sample also created some concerns about its specification, rather than actually being

insignificant. While the measurement model examines the relationship of observed and latent variables, the structural model examines the relationships between the latent variables [29]. A brief overview of the goodness of fit of the model is then followed by the regressions, which are used to evaluate the hypotheses. Unstandardized and standardized regression estimates of the relationships between the constructs are presented in Table 1.

Table 1. Regression Coefficients of Final Structural Model (Relationships between Latent Variables).

	Unstandardised		Standardised		
	Estimates		Estimate		
	B	S.E.	Beta	C.R.	P
SM→ EN	0.804	0.158	0.359	5.102	***
SM→ SIC	-0.064	0.06	-0.068	-1.07	0.285
SM→ L	-0.917	0.35	-0.194	-2.618	0.009**
SM→ I	0.353	0.198	0.115	1.779	0.075
SSI→ EN	0.009	0.032	0.411	0.295	0.768
SSI→ SIC	0.001	0.004	0.107	0.292	0.77
SSI→ SM	0.002	0.008	0.218	0.294	0.768
SSI→ L	0.019	0.064	0.392	0.295	0.768
SSB→ SSI	27.55	93.474	0.295	0.295	0.768
SSB→ L	-0.828	0.351	-0.185	-2.359	0.018*
SSB→ I	0.696	0.2	0.239	3.491	***
SLO→ SSB	0.003	0.011	0.248	0.244	0.807

Note: * $p < .05$, ** $p < .01$ and *** $p < .001$

The regression estimates are presented as part of the SEM outcome process. The unstandardized estimates were used for the hypothesis analysis. A summary of the hypotheses outcomes is presented in Table 2.

Table 2. Summary of hypotheses and outcomes.

Hypothesis	Relationship	Regression Outcome		Accepted?
		β	p.	
H1a	SM ← SIC	-.064	.285	No
H1b	SSI ← SIC	.001	.77	No
H2a	SM ← EN	.804	<.001	Yes
H2b	SSI ← EN	.009	.768	No
H3	SSI ← SM	.002	.768	No
H4	SSB ← SSI	27.55	.678	No
H5a	SSB ← L	-.828	.018	No*
H5b	SSI ← L	.019	.768	No
H5c	SM ← L	-.917	.009	No*
H6a	SSB ← I	.696	<.001	Yes
H6b	SM ← I	.303	.075	No
H7	SLO ← SSB	.003	.807	No

Note: * Rejected because of direction of relationship (significant negative relationship exists)

7. Discussion

Both sub-hypotheses in H1 were rejected. These rejections, although contradict most of the literature' findings [30,31,32,33,34,35] which embraces a strong positive relationship between the students' individual characteristics and their motivation to share knowledge and knowledge sharing intentions [11,36,37,38,39], are not surprising as the latter was conducted in traditional classrooms teaching and on methodologies which were not based on the use of discussion cases as in the current research. The research posits that its findings divergence from the literature is dependable on factors which were not addressed in the literature such as the age and industry-based research. These are foundational differences when comparing the individuals' motivations and intentions of participants in discussion cases-based classroom to an industry platform. In addition, the findings of the current research demonstrated that the students valued the role of the instructor's support over the university's'. This finding is original and it shed lights on the research's negative results on the students' motivations and intentions to not to share as compared to employees' appreciation of the organization's as well as the management support to sharing. H2 addressed the relationship between environmental factors and the students' knowledge sharing. Both sub-hypotheses, H2a and H2b were rejected. These findings contradict the majority of existing literary studies where a relationship between the environmental factors and knowledge sharing intentions were supported [11,36, 40,41,42,43] and that between the environment and knowledge sharing motivations were not supported [30].

The research posits that the reason for these contradictory results is attributed to the relative role of the environment in prior literary studies. The demographics characteristics in the current study did not play an integral role and their influence on the students' knowledge sharing intentions as well as the team structure were not addressed because most of the students were Vietnamese and of similar age and educational background. Therefore, this research posits that the differences caused by the team diversity and structural characteristics have minimal effects on the students' intentions to share. Accordingly, these discrepancies suggest that the current research's classroom environment have influenced the students' motivations to share rather than their intentions to share.

H3 addressed the relationship between students' KS motivations and their KS intentions. The hypothesis was rejected; a result which is extremely surprising. The authors pose the following question: what are the implications when the identified motivational factors do not influence the students' knowledge sharing intentions? The research identified altruism and enjoyment of sharing [45,46,47], trust [33,44,47], as well as social norms and attitudes [32, 33,46] as in other prior research. The literature identifies few potential motivators that could generally influence knowledge sharing in the classroom and it is apparent that they were not sufficient motivators to influence the students' intentions to share in this research.

University students, where their future advancement is contingent with the so-called extrinsic rewards such as grades, and/or recognition, may have a very different perspective from employees in organizations, which have fundamentally different expectations when it comes to the effects of the extrinsic motivations. This is a result of extrapolating knowledge sharing research from workplace settings to a classroom setting.

H4, which predicted a positive relationship between the students' knowledge sharing intentions and their knowledge sharing behaviours, was also rejected. The research posited that there could be Knowledge barriers (KB) not identified earlier in this research. KB refers to specific procedural, operational, or interpersonal barriers that prevent the sharing of knowledge between individuals or groups [48]. In a learning environment, there are a number of different barriers that could be identified [49] such as interpersonal conflict within the team or lack of personal relationships which impede knowledge sharing.

The classroom environment possesses different barriers to knowledge sharing among individuals in the workplace. However, barriers do not necessarily have to be obvious to affect the knowledge sharing such as trust, if it is low among the team members or there is team cohesion; the students' knowledge sharing behaviour would be affected although the students were made aware of the importance of sharing what they know and the positive effects on the group such sharing might have. Similarly, the lack of support from subjective norms to knowledge sharing inside or outside the classroom is also an inhibitor to effective sharing.

The fact that the students rejected this relationship is not an indication that the model was broken. Instead, it is important to consider that classroom knowledge sharing is ringed with barriers that are structurally different from those in the workplace, such as the pressure for attaining a pass or good grade and the limitations on the students' overall prior knowledge as well as their abilities to share what they know.

H5 examined the role of the lecturer on the students' knowledge sharing behaviours in the classroom. H5a, which proposed a positive effect of the lecturer's role on the students' knowledge sharing behaviours, was rejected. However, this rejection was not due to the insignificance of the observed relationship, because the actual relationship was negative rather than a positive one. The same was also true for H5c, which proposed a positive relationship of the lecturer's role in knowledge sharing motivations. However, H5b, which proposed a positive relationship of the lecturer's role on the students' knowledge sharing intention, was rejected for non-significance. These findings are not necessarily problematic since the lecturer's role in the students' knowledge sharing process is one of the least examined areas of classroom knowledge sharing [11]. Previous studies reflected conflicting findings on the lecturer's role in knowledge sharing [50]. Some studies have supported such a relationship [43,51,52], while others have rejected it [53].

One possible reason for the negative effect of the lecturer could be embedded in the Vietnamese culture where most of the sample's respondents came from. Vietnam is commonly regarded as a Confucian culture [54]. However, it is possible that the presence of a well-regarded lecturer in the classroom could actually reduce the student's tendency to share knowledge since the students subconsciously consider the teacher as the appropriate source of such knowledge [55]. It is possible that this effect could be at the heart of this research's negative relationship between the lecturer's role and knowledge sharing motivation and behaviour.

This finding is particularly important because it highlights an important fact: students can have a good opinion of a lecturer and still not be motivated to share knowledge. Thus, the lecturer's role in knowledge sharing is an area for future empirical and theoretical research.

H6 examined the role of the industry representative (or the case protagonist) on the students' knowledge sharing intentions. Two sub-hypotheses were presented with contradictory results. While H6a, proposed a positive effect of the industry representative role on the students' knowledge sharing behaviour was accepted, H6b, which proposed a positive effect of the industry representative's role on the students' knowledge sharing motivation, was rejected.

The introduction of the role of the industry representative and his/her effects on the students' knowledge sharing is novel and had not been widely addressed in the literature as prior literary studies on this role considered it as the static, non-interactive role of stereotyped information, as in a typical business case [13]. The industry representative role, as a customer or business partner, with the syndicate groups provided the students with confidence, encouragement and challenges. These observations are echoed in the literature by Morris, Bessant and Barnes [56] who posited that when the industry representatives were directly involved in the discussion case, the individuals' formal knowledge, practical know-how, and other types of knowledge were highly enhanced.

The role of the industry representative in knowledge sharing in case-based learning strategies was also addressed by Finney & Pyke [57] who concluded that when the industry representative was viewed by the students as relevant to the case, they were encouraged to increase their participation and knowledge sharing. Gill [13] argued favorably as well on this role by stating that the selection of an appropriate case protagonist would place him/her at the center of the data collection process.

The realization in the research that the industry representative has an integral role in knowledge sharing behaviour, but not knowledge sharing motivation, suggests that the industry representative is creating a positive environment for cooperative learning. The industry representative's presence provided incentives to the students to share knowledge, breaking down some of the barriers previously addressed, such as lack of trust or student perceptions that they were not supposed to share knowledge in the classroom. Without team cohesion and trust, which the descriptive statistics did suggest were lacking, students may not have had a strong motivation for sharing knowledge even if their behaviour might give the impression that they are willing to share.

H7 suggested that the students' knowledge sharing behaviour would have a positive effect on their learning outcomes and satisfaction of the course. This hypothesis was rejected due to non-significance. This finding is obviously a theoretical problem since this relationship was supported in previous research [30, 41, 43, 58, 59, 60, 61, 62 63]. The rejection of this relationship would not have a drastic effect between the students' knowledge sharing and their learning outcomes as its original is in the misspecification of the students learning outcomes and satisfaction variables (SLO). This problem is discussed below, as this is a serious methodological problem that could have influenced the findings. However, this is not only a spurious relationship caused by misspecification but also rooted in the realization that knowledge sharing in the classroom does not influence the student learning outcomes and

satisfaction for the course. This argument and its effect on the use of problem-based and cooperative learning in the classroom in approaches like discussion cases will be discussed.

It is notable that although problem-based learning, the oldest approach to case-based learning, does incorporate cooperation and generation of knowledge and problem-solving skills as intended outcomes, it does not incorporate the process of knowledge sharing [64]. Wood's [65], in his discussion on how problem-based learning works, did not acknowledge the knowledge sharing process explicitly, even though the students were working cooperatively to solve problems.

8. Conclusion

The use of discussion cases distinguishes this research from existing research, the pedagogical methodology and the environmental, cultural and individual factors were also different from those identified in existing research. This research is among the few to consider the industry representative as an active role rather than the passive role. The quest by organizations to capture what employees/students know, to convince them to release what they know and to retain their knowledge and experiences are forcing organizations to change the organizational culture to a knowledge-intensive culture. Unfortunately, the process to achieve this quest is not clear and is characterized with very complex issues and fundamental challenges such as the individuals' resistance to change and their unwillingness to let go of what they think is their competitive advantage. In the classroom, sharing requires different incentives from those in the workplace. This is one of the main reasons for the discrepancies of the literature' results as well as this research's results, and when coupled with the diverse factors which are specific to each research on knowledge sharing, these discrepancies would start to make sense. Students' learning, in contrast to employees' learning, depends on their motivations to learn, consequently, to share. Incentives for the students to learn are associated with factors such as grades and successful completion of their degree.

The uniqueness of the research is attributed to; first, the use of discussion cases as the learning tool. Second, the experiment was conducted with undergraduate students where their knowledge sharing was analyzed in the classroom as well as outside the classroom. Third, the discussion cases were developed with the help of industry representatives, who, in addition, contributed to the students' progress as they were directly involved in the classroom as part of the students' learning. Fourth, knowledge management and knowledge sharing were previously solely being addressed by researchers in a business environment and not in a classroom environment.

Although the current research had identified similar factors adopted in other research such as altruism, enjoyment of sharing, trust, social norms and attitude, the results were incompatible, notwithstanding that only one prior research had a similar conclusion to the research's results. The authors posit that to better model the breadth of the students' motivation to share knowledge, future research should consider extrinsic motivational factors such as economic reward, reputation feedback, and reciprocity, although the author would argue that the classroom context has its own limitations regarding these factors particularly the economic rewards which are ineffective in a classroom settings, particularly because some authors even doubt their effectiveness on enterprises employees' motivations to share.

References

- [1] Glass, N.R. (2008) "College Learning for the New Global Century: A Report from the National Leadership Council for Liberal Education and America's Promise Shared Futures: Global Learning and Liberal Education—By Kevin Hovland Assessing Global Learning: Matching Good Intentions with Good Practice—By Caryn McTighe Musil." *Teaching Theology & Religion* 11 (4): 239-240.
- [2] Hu, S., and G.D. Kuh. (2003) "Maximizing What Students Get Out of College: Testing A Learning Productivity Model." *Journal of College Student Development* 44 (2): 185-203.
- [3] Sudzina, M.R. (1997) "Case Study as a Constructivist Pedagogy for Teaching Educational Psychology." *Educational Psychology Review* 9 (2): 199-260.
- [4] Wolter, B.H., et al. (2013) "Student Performance in a Multimedia Case-Study Environment." *Journal of Science Education and Technology* 22 (2): 215-225.
- [5] Barnes, L.B., C.R. Christensen, and A.J. Hansen. (1994) *Teaching and the case method: Text, Cases, and Readings*, Harvard Business Press.
- [6] Sawyer, A.J., S.R. Tomlinson, and A.J. Maples. (2000) "Developing Essential Skills Through Case Study Scenarios." *Journal of Accounting Education* 18 (3): 257-282.

- [7] Nonaka, I., and V. Peltokorpi. (2006) "Objectivity and Subjectivity in Knowledge Management: A Review of 20 Top Articles." *Knowledge and Process Management* **13** (2): 73-82.
- [8] Quintas, P., P. Lefere, and G. Jones. (1997) "Knowledge Management: A Strategic Agenda." *Long Range Planning* **30** (3): 322385-391.
- [9] Von Glasersfeld, E. (1998) "Cognition, Construction of Knowledge, and Teaching", in *Matthews M.R. (eds), Constructivism in Science Education*, Springer, Dordrecht. pp. 11-30.
- [10] Wiig, K.M (1997) "Knowledge Management: Where Did it Come from and Where Will it Go?" *Expert Systems With Applications* **13** (1): 1-14.
- [11] Wang, S., and R.A. Noe. (2010) "Knowledge Sharing: A Review and Directions For Future Research." *Human Resource Management Review* **20** (2): 115-131.
- [12] Cabrera, A., W.C. Collins, and J.F. Salgado. (2006) "Determinants of Individual Engagement in Knowledge Sharing." *The International Journal of Human Resource Management* **17** (2): 245-264.
- [13] Gill, G.T (2011) *Informing with the Case Method: A guide to Case Method Research, Writing, & Facilitation*, Informing Science Press.
- [14] Kardash, C.M. and M.L. Wallace. (2001) "The Perceptions of Science Classes Survey: What Undergraduate Science Reform Efforts Really Need to Address." *Journal of Educational Psychology* **93** (1): 199.
- [15] Prince, M. (2004) "Does Active Learning Work? A Review of the Research." *Journal of Engineering Education* **93** (3): 223-231.
- [16] Yadav, A., et al. (2007) "Teaching Science With Case Studies: A National Survey of Faculty Perceptions of The Benefits and Challenges of Using Cases." *Journal of College Science Teaching* **37** (1): 34.
- [17] Jeong Kim, H., S. Pederson, and M. Baldwin. (2012) "Improving User Satisfaction Via a Case-Enhanced E-Learning Environment." *Education+ Training* **54** (2/3): 204-218.
- [18] Rowley, J. (2000) "Is Higher Education Ready for Knowledge Management?" *International Journal of Educational Management* **14** (7): 325-333.
- [19] Sriratanaviriyakul, N., and J. El-Den. (2016) "A Conceptual Model for Knowledge Sharing among Small Groups Using Discussion Cases." *International Journal of Computing Academic Research (IJCAR)* **5** (4): 186.
- [20] Iacobucci, D. (2010) "Structural Equations Modeling: Fit Indices, Sample Size, and Advanced Topics." *Journal of Consumer Psychology* **20** (1): 90-98
- [21] Westland, J.C. (2010) "Lower Bounds on Sample Size in Structural Equation Modeling." *Electronic Commerce Research and Applications* **9** (6):476-487.
- [22] Fowler, F.J.J. (2013) *Survey Research Methods*, Sage.
- [23] Azzara, C.V. (2010) *Questionnaire Design for Business Research: Beyond Linear Thinking--an Interactive Approach*, Tate Publishing.
- [24] Stemler, S.E. and T. Jessica. (2014) *Best Practices in Interrater Reliability: Three Common Approaches*, Thousand Oaks, CA: Sage.
- [25] Tavakol, M. and R. Dennick. (2011) "Making Sense of Cronbach's Alpha." *International Journal of Medical Education* **2**: 53.
- [26] Brown, T.A. (2015) *Confirmatory Factor Analysis for Applied Research*, 2nd Ed., New York: Guilford Press.
- [27] Schumacker, R.E. and R.G. Lomax. (2004) *A Beginner's Guide to Structural Equation Modeling*, 2nd Ed., New Jersey: Psychology Press.
- [28] Stevens, J.P. (2009) *Applied Multivariate Statistics for The Social Sciences*, 5th Ed., New York: Routledge.
- [29] Byrne, B.M.. (2016) *Structural Equation Modeling With Amos: Basic Concepts, Applications, And Programming*, 3rd Ed., Lawrence Erlbaum Associates, New York: Routledge.
- [30] Gomez, E.A., D. Wu, and K. Passerini. (2010) "Computer-Supported Team-Based Learning: The Impact of Motivation, Enjoyment and Team Contributions on Learning Outcomes." *Computers & Education* **55** (1): 378-390.
- [31] Littlejohn, A., A. Margaryan, and G. Vojt. (2010) "Exploring Students' Use of ICT and Expectations of Learning Methods." *Electronic Journal of E-Learning* **8** (1): 13-20.
- [32] Papadopoulos, T., T. Stamati, and P. Nopparuch. (2013) "Exploring the Determinants of Knowledge Sharing via Employee Weblogs." *International Journal of Information Management* **33** (1): 133-146.
- [33] Quigley, N.R., et al. (2007) "A Multilevel Investigation of the Motivational Mechanisms Underlying Knowledge Sharing and Performance." *Organization science* **18** (1): 71-88.
- [34] Shroff, R.H., D.R. Vogel, and J. Coombes. (2008) "Assessing Individual-Level Factors Supporting Student Intrinsic Motivation in Online Discussions: A Qualitative Study." *Journal of Information Systems Education* **19** (1): 111.
- [35] Tseng, F.-C. and F.-Y. Kuo. (2010) "The Way We Share and Learn: An Exploratory Study of The Self-Regulatory Mechanisms in The Professional Online Learning Community." *Computers in Human Behavior* **26** (5): 1043-1053.
- [36] Cummings, J.N. (2004) "Work Groups, Structural Diversity, and Knowledge Sharing in A Global Organization." *Management Science* **50** (3): 352-364.
- [37] He, W. and K.-K. Wei. (2009) "What Drives Continued Knowledge Sharing? An Investigation of Knowledge-Contribution and-Seeking Beliefs." *Decision Support Systems* **46** (4): 826-838.
- [38] Kuo, F.Y. and M.L. Young. (2008) "A Study of The Intention-Action Gap in Knowledge Sharing Practices." *Journal of the Association for Information Science and Technology* **59** (8): 1224-1237.
- [39] Tohidinia, Z. and M. Mosakhani. (2010) "Knowledge Sharing Behaviour and Its Predictors." *Industrial Management & Data Systems* **110** (4): 611-631.
- [40] Michailova, S. and K. Hutchings. (2006) "National Cultural Influences on Knowledge Sharing: A Comparison of China and Russia." *Journal of Management Studies* **43** (3): 383-405.
- [41] van Woerkom, M. and K. Sanders. (2010) "The Romance of Learning from Disagreement. The Effect of Cohesiveness and Disagreement on Knowledge Sharing Behavior and Individual Performance within Teams." *Journal of business and psychology* **25** (1): 139-149.

- [42] Wilkesmann, U., H. Fischer, and M. Wilkesmann. (2009) "Cultural Characteristics of Knowledge Transfer." *Journal of Knowledge Management* **13** (6): 464-477.
- [43] Zhu, C. (2012) "Student Satisfaction, Performance, and Knowledge Construction in Online Collaborative Learning." *Journal of Educational Technology & Society* **15** (1):127.
- [44] Chang, H.H. and S.-S. Chuang. (2011) "Social Capital and Individual Motivations on Knowledge Sharing: Participant Involvement as a Moderator." *Information & Management* **48** (1):9-18.
- [45] Hung, S.-Y., et al. (2011) "The Influence of Intrinsic and Extrinsic Motivation on Individuals' Knowledge Sharing Behavior." *International Journal of Human-Computer Studies* **69** (6): 415-427.
- [46] Lin, H.-F. (2007) "Effects of Extrinsic and Intrinsic Motivation on Employee Knowledge Sharing Intentions." *Journal Of Information Science* **33** (2): 135-149.
- [47] Choi, S.-Y., Y.S. Kang, and H. Lee. (2008) "The Effects of Socio-Technical Enablers on Knowledge Sharing: An Exploratory Examination." *Journal of Information Science* **34** (5): 742-754.
- [48] Paulin, D. and K. Suneson. (2012) "Knowledge Transfer, Knowledge Sharing and Knowledge Barriers—Three Blurry Terms in KM." *The Electronic Journal of Knowledge Management* **10** (1): 81-91.
- [49] Szulanski, G. (2000) "The Process of Knowledge Transfer: A Diachronic Analysis of Stickiness." *Organizational Behavior and Human Decision Processes* **82** (1): 9-27.
- [50] Szulanski, G. (2002) *Sticky Knowledge: Barriers to Knowing in the Firm*, Sage.
- [51] Ahmad, M., et al. (2011) "An Investigation of Knowledge Creation Process in the Learningzone Learning Management System Amongst Postgraduate Students", in *7th International Conference on Advanced Information Management and Service (ICIPM)*, IEEE.
- [52] Pellet, S.H. (2012) "Wikis for Building Content Knowledge in The Foreign Language Classroom." *Calico Journal* **29** (2): 224-248.
- [53] Tomkin, J.H. and D. Charlevoix. (2014) "Do Professors Matter?: Using An A/B Test To Evaluate The Impact of Instructor Involvement on MOOC Student Outcomes", in *Proceedings of the First ACM Conference on Learning@ Scale Conference*, ACM.
- [54] Kelley, L.C. (2006) "'Confucianism' in Vietnam: A State of the Field Essay." *Journal of Vietnamese Studies* **1** (1-2): 314-370.
- [55] Marlina, R. (2009) "I Don't Talk or I Decide Not To Talk? Is It My Culture?—International Students' Experiences of Tutorial Participation." *International Journal of Educational Research* **48** (4): 235-244.
- [56] Morris, M., J. Bessant, and J. Barnes. (2006) "Using Learning Networks to Enable Industrial Development: Case Studies from South Africa." *International Journal of Operations & Production Management* **26** (5): 532-557.
- [57] Finney, S. and J. Pyke. (2008) "Content Relevance in Case-Study Teaching: The Alumni Connection and Its Effect on Student Motivation." *Journal of Education for Business* **83** (5): 251-258.
- [58] Schul, J.E. (2011) "Revisiting an Old Friend: The Practice and Promise of Cooperative Learning for The Twenty-First Century." *The Social Studies* **102** (2): 88-93.
- [59] Jolliffe, W. (2007) *Cooperative learning in the classroom: Putting it into practice*, Sage.
- [60] Du, H.S. and C. Wagner. (2007) "Learning with Weblogs: Enhancing Cognitive and Social Knowledge Construction." *IEEE Transactions on Professional Communication* **50** (1): 1-16.
- [61] Lui, A.K., et al. (2006) "A Study on the Perception of Students Towards Educational Weblogs." *Informatics in Education* **5** (2): 245-266.
- [62] Weinberger, A., K. Stegmann, and F. Fischer. (2007) "Knowledge Convergence in Collaborative Learning: Concepts and Assessment." *Learning and Instruction* **17** (4):416-426.
- [63] Yuen, T.J. and M.S. Majid. (2007) "Knowledge-Sharing Patterns of Undergraduate Students in Singapore." *Library Review* **56** (6):485-494.
- [64] Hmelo-Silver, C.E. (2004) "Problem-Based Learning: What and How Do Students Learn?" *Educational Psychology Review* **16** (3): 235-266.
- [65] Wood, D.F. (2003) "ABC of Learning and Teaching in Medicine: Problem Based Learning." *BMJ: British Medical Journal* **326** (7384): 328.