Effect of sustainability and ecological knowledge management on knowledge creation and team learning of MICE professional teachers

Wan-Yu Chang¹*

¹ Hua University, Department of Tourism and MICE, Chung, Section 2, Wufu Rd, Xiangshan District, 300 Hsinchu City, Taiwan

Abstract. In face of the waves of globalization, democratization, and knowledge-based and green sustainable economy, schools and MICE professional teachers, in the 21st century, should break through the independent and closed classroom kingdom in the past but, with open attitudes, have themselves become the managers of sustainability, ecological and professional knowledge learning for the sustainable development of schools. Individual knowledge and experience could be accumulated through sustainability, ecological and professional knowledge management and organizational learning to become organizational knowledge to further improve the movement of schools, promote the quality of education, cultivate excellent talents, and enhance national competitiveness and environmentally friendliness. Aiming at universities in Taiwan, university faculty is distributed 350 copies of questionnaire in this study. Total 287 valid copies are retrieved, with the retrieval rate 82%. The research results show significantly positive effects of 1. sustainability, ecological and professional knowledge management on team learning, 2. team learning on knowledge creation, and 3. sustainability, ecological and professional knowledge management on knowledge creation. Finally, according to the results, suggestions are proposed, expecting to have schools comprehend the importance of MICE professional teachers’ sustainability, ecological and professional knowledge management and further propose effective coping strategies to promote the overall performance.

1 Introduction

In the globalization time with rapidly changing knowledge, the management of organizational knowledge becomes the key in the survival and maintenance of competitiveness of an organization. How to enhance the application and innovation of organizational knowledge therefore becomes a primary issue. For this reason, schools and MICE professional teachers, in face of the waves of globalization, democratization, and

*Corresponding author: wchang@g.chu.edu.tw

© The Authors, published by EDP Sciences. This is an open access article distributed under the terms of the Creative Commons Attribution License 4.0 (https://creativecommons.org/licenses/by/4.0/).
knowledge-based economy in the 21st century, should break through the independent and closed classroom kingdom in the past but, with open attitudes, have themselves become the managers of knowledge learning. Individual knowledge and experience could be gathered through knowledge management and organizational learning to become organizational knowledge and further improve the movement of schools, promote the quality of education, and cultivate excellent talents to enhance national competitiveness. In the knowledge-based economy era stressing on self-transcendence, knowledge management to accumulate the self-growth energy of an organization through team learning presents the meaning and importance.

Traditionally, school MICE professional teachers are mostly high intellectuals. Nevertheless, the kept knowledge becomes “static knowledge” due to lack of exchange, management, and interaction with others. In the knowledge-based economy era with rapidly changing knowledge, knowledge without being updated with the time would result in great crises for MICE professional teachers’ personal development and schools’ sustainability. In this case, the enhancement of MICE professional teachers’ and schools’ competitiveness to cope with the challenges of globalization, democratization, and liberalization as well as the ideas of knowledge management and team learning present the importance for schools. Most research on knowledge management stress on business management, but little on domestic education that it shows the space for research. Based on the importance and value, higher education MICE professional teachers’ knowledge management, knowledge creation, and team learning and the relative research are discussed in this study, expecting to have schools comprehend the importance of MICE professional teachers’ knowledge management and propose effective coping strategies to promote the overall performance of schools.

2 Literature and hypothesis

2.1 Knowledge management

Knowledge management is the ability to help others develop effective actions, i.e. individual willingness of managing the knowledge to assist knowledge acceptors in the learning (Fugas et al., 2012). Santosh&Muthiah (2012) regarded knowledge management as spreading personal information or knowledge to others for the knowing and possessing the same information or knowledge. Knowledge management involved in managing personal knowledge, managing learning opportunities, and encouraging others’ learning (Ooi et al., 2012).

Wang&Shao (2012) regarded knowledge delivery as the process of selective “supply”, while knowledge acceptance as the process of “demand”. The mutual exchange between knowledge providers and demanders was the concept of “flow”. Knowledge management could be regarded as the process of push-pull balance; with the objective and value, it was not simply the increase in personal knowledge and experience, but could develop synergistic effect for teams or organizations (Ueno, 2012). Knowledge management should be encouraged and rewarded (Aalbers et al., 2013).

In order to solve knowledge management, factors under transaction costs would obstacle or reduce knowledge management. The solutions could be found out from social exchange theory. Huang et al. (2013) pointed out exchange as the economic process of individual executing and exchanging valuable resources with others. People were willing to continue such behaviors as the positive rewards acquired in the transaction process were higher than the price paid. For an individual, such an opinion was because of individual needs and the possession of valuable objects to the opposite party inducing exchange behavior [1-22].
Referring to Cho et al. (2013), the following dimensions for knowledge management are applied to this study.

Resolving prescription: Practitioners, when seeking for solutions or enhancing operation, have to precede real-time knowledge management.

Experience: Experience acquired through practitioners are recorded and saved to avoid repeat the same mistake in the future use process.

Social creation: Knowledge generated in the social interaction in problematic context is the product of interpersonal relationship (Ooi et al., 2012).

2.2 Team learning

Markus (2012) explained team learning as the process of integrating and developing team ability to satisfy the demand of team members. When a team sought for the members’ complementary skills, knowledge, and ability, the integrated team could present the effectiveness. Team learning was necessary for developing organizational learning ability and executing vision. Individual insight, when being managed by other members, through team learning skills of in-depth dialogue and discussion, and formed actions in the organization, could really help the organization (Rahman & Nas, 2013).

A team being able to precede overall learning could gather the common direction and harmonize individual power. Team learning referred to team members revealing the assumption in mind to further make considerations together (Alfalla-Luque et al., 2012).

In the discussion of MICE professional teachers’ team learning, Wang et al. (2015) pointed out team learning as team members having the common goal and being able to mutually coordinate and learn, exchanging professional experience and knowledge in the exchange process, and further stimulating thinking to exceed individual thinking performance. Team learning focused on tasks, personal growth orientation, and book clubs. In face of severe competition and team learning in the working environment, a business organization had to stress on improvement-based learning for correcting mistakes and inquiry-based learning for stepping toward innovative development (Hamilton et al., 2012).

Referring to Chuang et al. (2013), the dimensions for team learning in this study are deduced from team context, process, and result.

Team operation: Team members could openly consider other members’ opinions, emphasize themselves as a member of the team, and present team synergy in the action.

Expression of opinion: Team members have the opportunity to express the opinions about the team mission, goal, and operation.

Operating principle: A team could establish the commonly agreed belief, value, objective, structure in order to effectively establish relationship and collaboratively complete tasks.

2.3 Knowledge creation

Hau et al. (2013) divided knowledge into tacit knowledge and implicit knowledge (Rigby et al., 2012).

1) Implicit knowledge referred to the knowledge which could be clearly expressed by texts, numbers, figures, or other symbols (e.g. handbooks, books, and programs), i.e. definable, acquirable, and easily communicable knowledge.

2) Tacit knowledge referred to knowledge planted in individual mental mode, including experience, judgment, association, creativity, and potential, which were highly personal, hard to be formalized, and merely to be understood but not explained.

Tuzun & Kalemci (2012) mentioned that each member in an organization had to properly analyze and apply shared knowledge, according to individual situations, and add personal
creative thinking to spread knowledge to others (Deci&Ryan, 2012). Referring to the SECI model proposed by Fong et al. (2011), “socialization”, “externalization”, “combination”, and “internalization” are regarded as the research dimensions for knowledge creation in this study.

**Socialization:** To achieve the transformation between tacit knowledge through “unconscious influence” of observation, imitation, and practice as well as the management and assimilation of experience.

**Externalization:** To transform tacit knowledge into explicit knowledge, which could be defined and appealed to texts, for the members clearly understanding the concept and goal delivered by the organization to take specific actions.

**Combination:** To generate new explicit knowledge from existing different explicit knowledge through analysis, classification, management, and recombination.

**Internalization:** Members learn theoretical knowledge through practice or constant education and learning to form personal knowledge and become personal valuable asset.

### 2.4 Relationship between knowledge management and team learning

Cho et al. (2013) stated that knowledge management and exchange among team members allowed the team understanding more about the structure of decision-making systems to learn the interactive mechanism between policies and systems. Huang et al. (2013) discovered that interdisciplinary MICE professional teachers enhanced the learning of team professional knowledge in the daily interaction through team meetings, discussions among members, and personal reflection. Knowledge exchange in a team contained the patterns of cooperative, diagnosis, and professional behavior, arrangement of interdisciplinary place, and connection with social informal relationship (Fugas et al., 2012).

Wang & Hou (2015) discovered that the intervention of dialogue techniques would enhance virtual teams managing the mental mode to remarkably enhance the performance on task related cooperative learning and decision quality after the experiment. Santosh & Muthiah (2012) found out higher perceived team learning of teams with frequent discussion and online knowledge management. Yu (2013) proposed that team learning members preceding information management through constructive argument to enhance information processing range could benefit team learning. Accordingly, the following hypothesis is proposed in this study.

**H1:** Knowledge management presents remarkably positive effects on team learning.

### 2.5 Relationship between team learning and knowledge creation

Wang et al. (2015) pointed out the important contribution of team cooperative learning to the success of creative project. Team cooperative learning content contained communication, cooperation, member contribution balance, mutual support, efforts, and cohesion. All team members could openly manage and exchange relevant project information as well as easily acquire information from other team members. It proved the positive relationship between team learning and product knowledge creation (Hamilton et al., 2012).

Markus (2012) considered that each time of team learning could enhance the accumulation and growth of organizational knowledge, and the knowledge created from the experience in each time of team learning was the knowledge creation basis of next team learning. Chuang et al. (2013) indicated that team learning allowed an organization, when facing rapidly changing environment, faster and more effectively acquiring and applying knowledge than the competitors.
Winkelbach & Walter (2015) mentioned that team learning could enhance organizational effectiveness and efficiency and overall innovation ability as well as assist an organization in effectively coping with external changes. The promotion of team members’ learning ability could help the organization absorb and assimilate information. Apparently, team learning could also be the factor in innovation ability and affect performance (Alfalla-Luque et al., 2012). The following hypothesis is therefore proposed in this study.

H2: Team learning shows notably positive effects on knowledge creation.

2.6 Relationship between knowledge management and knowledge creation

Hau et al. (2013) indicated that it depended on members’ preceding knowledge management in the organizational learning process. Individual involvement in knowledge and exchange with others referred to the psychological filter of members’ trust, which would affect the members’ willingness to involve in knowledge and precede management.

Yücel & Richard (2013) stated that an organization established trust in members’ relationship through psychosocial skills to influence organizational members preceding knowledge management and further affecting the knowledge creation learning process. Team members with specialty were collected the relative information through knowledge management.

Tuzun & Kalemci (2012) indicated that exchanging, expressing, and managing knowledge ideas through various formal and informal gathering would benefit the promotion of team learning ability (Ooi, 2012). Fong et al. (2011) explained that, in order to facilitate synergy, knowledge creation teams needed to transfer, manage, and instruct knowledge among team members to develop the learning of team-related task reflection and action to facilitate problem improvement and knowledge creation. Consequently, the following hypothesis is proposed in this study.

H3: Knowledge management reveals significantly positive effects on knowledge creation.

3 Sample and indicator

3.1 Research sample and object

Aiming at universities in Taiwan, university faculty is distributed 350 copies of questionnaire. Total 287 valid copies are retrieved, with the retrieval rate 82%.

3.2 Reliability and validity test

The questionnaire items in this study are referred to domestic and international research, and a pretest is preceded before the distribution of formal questionnaire that the questionnaire presents certain content validity. Dimensions of knowledge management, team learning, and knowledge creation are preceded overall structure causal relation test. The linear structural relation of model analysis result reveals overall model fit achieving reasonable range that it shows favorable convergent validity and predictive validity. Item-to-total correlation coefficient is used in this study for testing the construct validity of the questionnaire content, i.e. reliability analysis. The calculated item-to-total correlation coefficient is applied to judge the questionnaire content. The item-to-total correlation coefficients of the dimensions in this study are higher than 0.7, revealing certain degree of construct validity.
To further understand the reliability of the questionnaire in this study, reliability analysis is preceded. According to the standards, the formal questionnaire is developed. The Cronbach’s α appears in 0.76~0.88, apparently conforming to the reliability range.

4 Empirical result

4.1 LISREL model evaluation indicator

LISREL (linear structural relation) model combines factor analysis and path analysis in traditional statistics and adds simultaneous equations in econometrics that it could simultaneously calculate multi-factor and multi-causal path. In regard to the evaluation of model fit, Bagozzi et al. (1998) considered to evaluate from preliminary fit criteria, overall model fit, and fit of internal structure of model.

The research data are organized as below. The preliminary fit, internal fit, and overall fit are explained as following.

From the complete model analysis result, Table 1, three dimensions for knowledge management (resolving prescription, experience, social creation) could notably explain knowledge management (t>1.96, p<0.05), three dimensions for team learning (team operation, expression of opinion, operating principle) could significantly explained team learning (t>1.96, p<0.05), and four dimensions for knowledge creation (socialization, externalization, combination, internalization) could remarkably explain knowledge creation (t>1.96, p<0.05). Apparently, the overall model in this study presents good preliminary fit.

<table>
<thead>
<tr>
<th>Evaluation item</th>
<th>Parameter/evaluation standard</th>
<th>Result</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preliminary fit</td>
<td>knowledge management</td>
<td>resolving prescription</td>
<td>0.723</td>
</tr>
<tr>
<td></td>
<td></td>
<td>experience</td>
<td>0.751</td>
</tr>
<tr>
<td></td>
<td></td>
<td>social creation</td>
<td>0.746</td>
</tr>
<tr>
<td></td>
<td>team learning</td>
<td>team operation</td>
<td>0.782</td>
</tr>
<tr>
<td></td>
<td></td>
<td>expression of opinion</td>
<td>0.775</td>
</tr>
<tr>
<td></td>
<td></td>
<td>operating principle</td>
<td>0.793</td>
</tr>
<tr>
<td></td>
<td>knowledge creation</td>
<td>socialization</td>
<td>0.815</td>
</tr>
<tr>
<td></td>
<td></td>
<td>externalization</td>
<td>0.796</td>
</tr>
<tr>
<td></td>
<td></td>
<td>combination</td>
<td>0.803</td>
</tr>
<tr>
<td></td>
<td></td>
<td>internalization</td>
<td>0.811</td>
</tr>
</tbody>
</table>

Note: * stands for p<0.05, ** for p<0.01, and *** for p<0.001.

From Table 2, knowledge management shows positive and notable correlations with team learning (0.833, p <0.01), team learning reveals positive and significant correlations with knowledge creation (0.886, p <0.01), and knowledge management appears positive and notable correlations with knowledge creation (0.871, p <0.01) that H1, H2, and H3 are supported.

<table>
<thead>
<tr>
<th>Evaluation item</th>
<th>Parameter/evaluation standard</th>
<th>Result</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>internal fit</td>
<td>knowledge management→team learning</td>
<td>0.833</td>
<td>21.72**</td>
</tr>
</tbody>
</table>

Table 1. Overall linear structural model analysis result

Table 2. Overall linear structural model analysis result
Team learning → knowledge creation 0.886 28.51**
Knowledge management → knowledge creation 0.871 24.66**

Note: * stands for p<0.05, ** for p<0.01, and *** for p<0.001.

From Table 3, the overall model fit standards $\chi^2/\text{Df}=1.732$, smaller than the standard 3, and RMR=0.007 reveal the proper results of $\chi^2/DF$ and RMR. Furthermore, chi-square value is extremely sensitive to sample size that it is not suitable for directly judging the fit. The overall model fit standards GFI=0.985 and AGFI=0.933 are higher than the standard 0.9 (the closer GFI and AGFI to 1 revealing the better model fit) that this model presents better goodness-of-fit indices.

Table 3. Overall linear structural model analysis result

<table>
<thead>
<tr>
<th>overall fit</th>
<th>X2/DF</th>
<th>1.732</th>
</tr>
</thead>
<tbody>
<tr>
<td>GFI</td>
<td></td>
<td>0.985</td>
</tr>
<tr>
<td>AGFI</td>
<td></td>
<td>0.933</td>
</tr>
<tr>
<td>RMR</td>
<td></td>
<td>0.007</td>
</tr>
</tbody>
</table>

Note: * stands for p<0.05, ** for p<0.01, and *** for p<0.001.

5 Conclusion and Suggestion

The research results reveal that higher education school faculty, in order to effectively precede knowledge creation, would arrange the time and location for collaborative discussion to review the knowledge creation result or make the direction for the next step. During the discussion, higher education school faculty would share personal perception and enhance interaction. A team, in the knowledge creation, does not simply apply the known ability to process information. In addition to reinforce the problem discussion, feedback, experiment, performance correction, and mistake improvement, higher education school faculty must reorganize known cognition map, through the internal & external explicit and tacit knowledge, externalization, combination, and socialization, to enhance the knowledge creation processing ability.

Higher education schools have to shape the faculty’s behavior and attitude as well as reinforce the sense of belongingness. A higher education school leader therefore has to instruct the assistance process and reinforce the socialization and interaction among higher education school faculty when enhancing the collaboratively contact with knowledge creation tasks. After higher education school faculty understand the match of self-benefit and team goals, team learning of knowledge creation could be easily involved in.

5.1 Aiming at the research results, the suggestions are proposed in this study

In the “knowledge-based economy” era, people intend to acquire “soft power”. In the behavioral intention of knowledge management, external rewards do not appear attraction. Higher education school organizations and managers therefore should fully practice “reward systems” to have higher education school faculty be confident of knowledge management. Besides, faculty should not be compulsorily forced to practice knowledge management, but should be encouraged, to present the positive effect.

When preceding knowledge management, higher education schools should create complete “organizational knowledge management climate” to have the faculty perceive concerns and passion from peers during knowledge management. Higher education schools should frequently hold activities to enhance the internal harmony and further have
the faculty realize that knowledge management is harmless, but would improve the relationship in the team.

Higher education school managers could establish knowledge management systems to form the knowledge management culture. When the management system is effectively implemented, higher education school faculty would take knowledge giving for granted and would not resist. Higher education school faculty could also spontaneously exchange knowledge to stimulate creative and unique ideas to promote the value of the organizational exclusive knowledge bank.

References

8. C.S. Fugas, S.A. Silva, J.L. Melia, Another look at safety climate and safety behavior: Deepening the cognitive and social mediator mechanisms. Accident Analysis & Prevention, 45, 468-477 (2012)


