CUMULATION OF COLLECTIVE TACIT KNOWLEDGE

IN HIGHER EDUCATION

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Abstract

More and more students in higher education are working during their studies when "anytime, anywhere" learning have added value for adults leaners [4]. The information and communication technology have been perceived as the solution to improve quality, reduce costs, and increase access [7] consequently universities are providing different multiform learning possibilities like collaborative study projects in the self-determining teams where students are working and learning together. In this study we describe Master students learning process in virtual teams in the Project Business course by using four phases of SECI model of knowledge creation. SECI model is applied to assess transforming students' individual tacit knowledge into explicit knowledge and enriching it to tacit knowledge again in the individual and the group level. [9]. In the paper is presented how the graduate students' learning process occur in a teamwork exercise. During the focal course in our study students are producing in teams essays about different project management perspectives during the four phases of SECI model. The essays are publish in essay collection.

Keywords: SECI, tacit knowledge, learning, team work, higher education, virtual

1   INTRODUCTION

Several studies ([4]; (2011); [12]; [6]; [7] indicate that online learning environment supports the knowledge processes and create conditions for Nonaka's and Takeuchi's knowledge creation SECI model. In online education networks serves as a settings where to discuss and exchange ideas and generate new knowledge. [4]. Regardless of the virtual team consisting of homogeneous and heterogeneous students, they can share their know-how, mental models, attitudes, skills and improvisations. In teams shared mental models and a collective know-how developed. [8]

Researchers agree that team-based learning has a positive relationship with student's performance [5]; [18]; [3]. Collaboration allows for giving and receiving help, exchanging information, giving and receiving feedback, and jointly reflecting on progress [5]. Team-based learning provides students with the opportunity to not only engage in discussion, but also become critical thinkers [17].

Schein [15] describes team as a number of people who
- interact with each other
- are psychologically aware of each other
- perceive themselves to be a group
- purposefully interact towards the achievement of particular goals or aims.

If these criteria are not met people work independently in the team. The group is formal if the members exist because someone at a higher level has decided their membership and specific targets. [14]. Group cohesion is important feature that can have effect on the effectiveness of performance and decision making. [14].

In this study we observed Higher education students among Tampere University of Technology and Turku University Business School. Students were working at joint classroom.

2 SECI MODEL UTILIZATION

In several studies Nonaka's and Takeuchi's SECI model is used to research learning phenomenon in the companies for increasing the performance of organizations. [16] when individual learning has not been in the focus [13]. The SECI model of knowledge creation suggests that human knowledge is creative and it is expanded through social interaction between tacit knowledge and explicit knowledge. Tacit knowledge and explicit knowledge are not separate but they interact with and interchange into each other in a person's creative activities. Knowledge is created through four phases, which are socialization, externalization, combination and internalization. Socialization is connected with the theories of group process and organizational culture whereas combination has its roots in information processing. Internalization is closely related to organizational learning [9]. Knowledge creation requires that all the SECI phases have be performed. Individual know-how develops in internalize phase and collective knowledge in combination phase.. In the figure 1 has been presented the SECI model of knowledge creation. [10]; [16]. In the figure *i* (individual) represents a student, *g* (group) a student team and *o* (organization) the whole class comprising the teams.
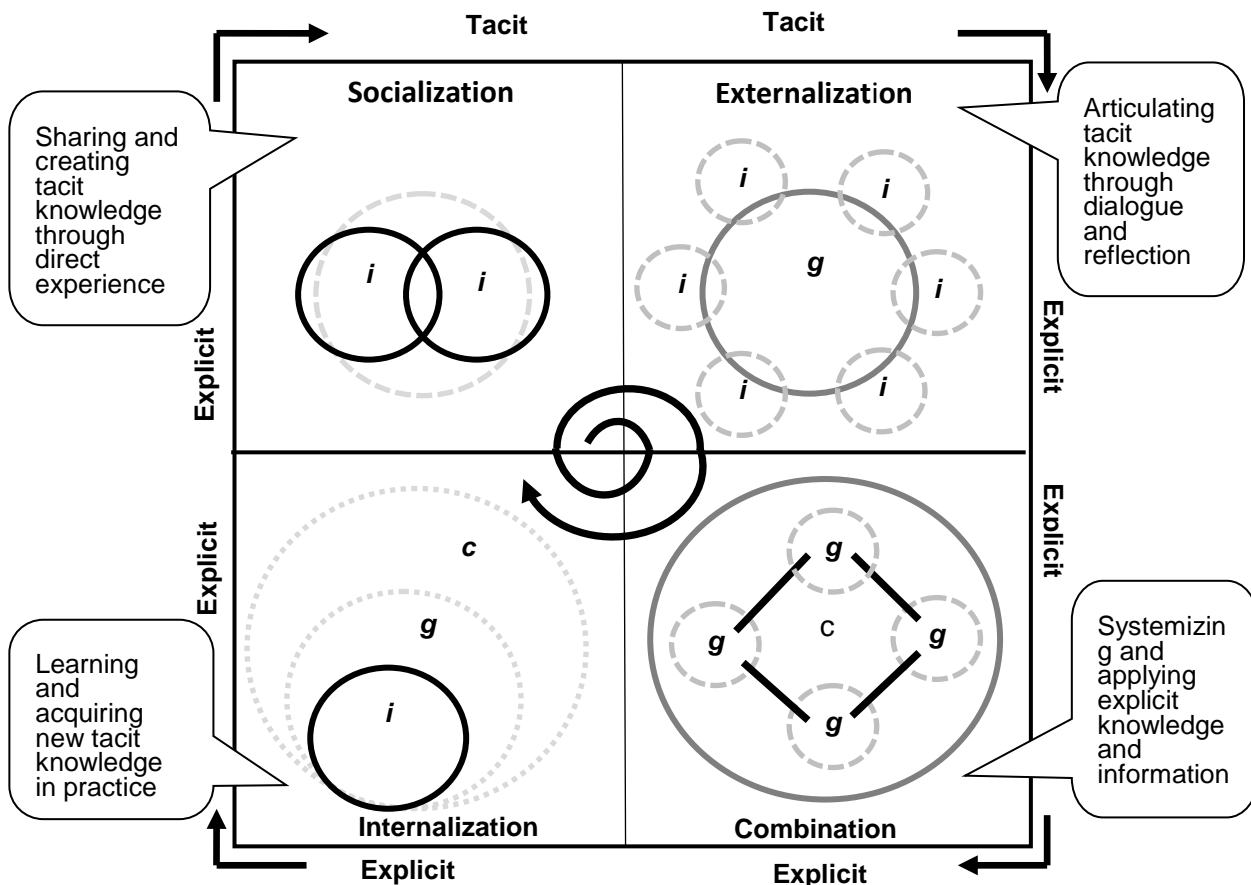

Figure 1. The SECI model of knowledge creation. [10] ; [16]

The SECI model could enable teachers to describe how they learn from colleagues and make their knowledge explicit [19]. In next chapters we describe how students learn and make their knowledge explicit. The SECI model is based on the assumption that knowledge is creative through a process in four phases as follows:

Phase 1: Socialization, from tacit knowledge to tacit knowledge

In socialization phase building of interaction is started. During socialization process people share their experiences and thereby create tacit knowledge such as shared mental models and technical skills. It is needed some form of shared experience in order to project herself or himself into another individual's thinking process. [9] Since tacit knowledge is difficult to formalize and often time and space-specific, tacit knowledge can be acquired only through shared direct experience, such as spending time together. People embrace contradictions rather than confront them when they absorb knowledge in their social environment through action and perception [10].

Phase 2: Externalization, from tacit knowledge to explicit knowledge

In the externalization phase people articulate hidden tacit knowledge using appropriate metaphor, analogy concepts, hypothesis or models because tacit knowledge is hard to communicate. During externalization process tacit knowledge becomes understandable explicit concepts when image is conceptualized by writing and shared the articulated knowledge with others. [9]

Although there are discrepancies between images and expressions they help reflection and interaction between individuals. The externalization phase is seen as the process of concept creation through dialogue or collective reflection using deduction and induction methods. [9]; [10]

Phase 3: Combination, from explicit knowledge to explicit knowledge

In the combination phase explicit knowledge is collected from inside or outside the organization and then combined, edited, or processed to form more complex and systematic explicit knowledge. [10] Combination process is systemized concepts into a knowledge system when bodies of different explicit knowledge is combined through documents, meetings, or computerized communication networks. Reconfiguration of existing information through sorting, adding, combining, and categorizing of explicit knowledge can lead to new explicit knowledge. [9]

Phase 4: Internalization, from explicit knowledge to tacit knowledge

Learning by doing trigger internalization which is a process of embodying explicit knowledge into tacit knowledge. When the knowledge is verbalized or diagrammed into documents or manuals explicit knowledge is able to become tacit knowledge. Individuals internalize by documentation what they experienced thus enriching their tacit knowledge. Explicit knowledge is transferred by documents and manuals helping people share their experiences with each other. [9] (Internalized experiences through socialization, externalization and combination in the form of shared mental models or technical know-how are valuable assets.Through the internalization process explicit knowledge is created and shared throughout an organization then converted into tacit knowledge by individuals. Knowledge is applied and used in practical situations and becomes the base for new routines. [10]

Ba is a context where knowledge can be created. BA was primarily submitted by Japanese philosopher Kitaro Nishida. It can be defined as a shared context in motion, in which knowledge is shared, created, and utilized. Ba provides the energy, quality, and places to perform the individual knowledge conversions. Ba can emerge in individuals, working groups, project teams, informal circles, temporary meetings and virtual space. Ba is a place where people share their images and create new meanings through interactions. Ba is not necessarily a physical place but it is interaction. It can be physical, virtual, mental or a collection of them. [10];[11]

Ba aims to unify the physical space (such a meeting room), the virtual space (such as the e-mail or a virtual community) and the mental space (such as shared ideas and mental models). [1]. Hosseini (2011) [4] suggests that virtual learning class is a setting for creating a shared mental space which is necessary for knowledge creation. Fuller and Söderlund (2002) [2] emphasized that virtual "chat rooms" are common virtual meeting places. In chat-space can be created significant dialogues and the virtual networks is created through dialogues. Therefore virtual class serves as a platform in which students are able to discuss and share their models, believes, experiences. Virtual class features like online chat improve the ba creation the phases of knowledge

3   METHODOLOGY

In this research we conducted a case study method by observing students working with their task. In this study we observed Higher education students among Tampere University of Technology and Turku University Business School. Students were working at joint classroom. There task was to write

4   RESULTS

In our paper, we present learning process of the students in higher education via the SECI model. Furthermore, we discuss the different learning phases on the writing process of the students' essays. The main contribution of this study is to model team learning phenomena in educational settings based on the assumption that knowledge is created through the interaction between tacit and explicit knowledge. During the focal course in our study the students produced in teams essays about different project management perspectives. The essays were published in an essay collection. In this study, we describe Master students' learning process in the Project Business course by using four phases of SECI model as a research framework.

In the first lesson of the course the supervisor explained the targets, assignments and the schedule of the exercise. All the materials and information had been saved in Moodle, which was the learning platform of the course. As the first task of the exercise the students were asked to form teams comprising of 3-4 persons. All the teams had a private chat rooms in Moodle where teams communicated. The chat rooms were virtual meeting places, which worked as the ba in socialization, externalization and combination phases, when in internalization phase the ba was the classroom during the presentations of the essays.

In the following chapters we discuss how learning process occurred in the virtual teams through SECI model.

Phase 1: Socialization, Students' team building

In the first SECI phase of the learning process the virtual teams were building shared understanding by communicating with each other exchanging their opinions and ideas. The students presented their personal and professional descriptions, their learning objectives, their skills and capabilities contributing to the objectives, perceived challenges in working in network environment and perceived rewards in working in a virtual environment. Interaction and shared understanding was important because all the team members had their own experiences about project management. This way they formed divided understanding about how they continued as a team because they had to choose one collective theme of the project management for their essay. Before the socialization phase, the first task of the students was to explore articles of International Journal of Project Management, Project

Management Journal, International Journal of Project Organization and Management or International Journal of Managing Projects in Business.

Phase 2: Externalization, Students' collective planning

In the next phase the students of the teams discussed and reflected about their preunderstandings by sharing their opinions about the theme which they have chosen in the socialization phase. In this stage they had to make decision about the research question of their essays. But before the decision, they discussed in the chat area about the articles which they had read, most importantly the research questions, the perspectives, references, methods, results, models and conclusions of the articles.

In the externalization phase the students conceptualized their images and articulated their tacit knowledge which was presented as explicit knowledge in a form of the research question of the essay. Thus collective research question could be shared with others and it became the basis of their writing project.

Phase 3: Combination, Students co-writing the essay

The essays were prepared so that all the team members wrote separately different parts, but in the combination phase they reconfigured all the texts, wrote new text together and finally formed new knowledge in form of an essay which responded to their research questions and the target of the exercise.

Phase 4: Internalization, Final publishing and reading essay collection

During the last internalization phase the students internalized their tacit knowledge and increased collective learning in the teams when they presented their completed essays in the last lesson of the course. The presentations of all the essays, not only the essays of team's own, and new tacit knowledge they have gotten during the team work, helped all the students transformed the explicit knowledge of the essays to tacit knowledge. Thus transforming of knowledge occurred both on the individual level but also on group level when students shared their ideas with their group. During the presentations and discussions students shared their understandings achieved of tacit knowledge in project management. Thus internalization of tacit knowledge continues as lifelong learning in students' working life.

As a summary about the knowledge creation four SECI activities are shown in Table1.

Table 1. SECI activities in teams in Project management exercise

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Socialization	Externalization	Combination	Internalization
Interaction in chat	**Interaction in chat**	**Interaction in chat**	**Interaction in a class room**
• building shared understanding	• reflecting about their preunderstanding	• sharing their opinions	• presenting published essays
• exchanging their opinions and ideas	• deciding the direction of the essay	• sharing individual texts	• discussing about the essays
• forming collective knowledge	• conceptualizing their images	• working collaboratively	• sharing their tacit knowledge
• deciding the theme of the essay	• articulating the research question	• writing the essay	• sharing experiences
		• finalizing the essay	

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5   CONCLUSIONS

In this article it has been described how both virtual teaching and class room teaching can act together as a setting for knowledge creation which has been examined using the SECI model. Based on evaluation of the published essays we have stated that knowledge creation has been proceeded according to four phases of the SECI model. We conclude our observations of the learning process which can be utilized in order to ensure the success of the learning. So that students can work in teams they have to have similar preunderstanding of the assignment. An important part is the space (ba) where students communicate and interact virtually and face to face. When the teacher has given clear instructions, presented the goals and motivated the students, the learning process can start. When students have specific tasks during the four phases of learning process, the SECI process is concluded. These task should be such that students have to share their experiences, opinions, tacit knowledge and explicit knowledge depending on the phase of the SECI model. To summarize, using the SECI model teachers can ensure that student reach the learning objects in virtual courses in higher education.

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