

Group Knowledge Creation and Transfer Works

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Abstract: People are the creators and consumers of knowledge. As Sveiby stated, “A knowledge-based strategy formulation should thus start with the primary intangible resource: the competence of people. People are seen as the only true agents in business; all tangible physical products and assets as well as the intangible relations are results of human action, and depend ultimately on people for their continued existence.” (Sveiby 2001, 345) [1]. Group work is consequently a crucial activity for organizations creating knowledge. Group work is described as a “distillation” process to collect and exchange knowledge, to validate and evaluate the gathered information and to produce “final collective information base” for group decision making. Therefore, the quality of group work process will inevitably affect the result of group work -- be it knowledge creating, sharing, or decision making. (Propp 1999, 226, 231 - 236) [2].

The objectives of this report are to understand how knowledge has been collected, exchanged, created, evaluated and disseminated in group works, to identify the factors that affect group work performance, and finally, to present insights that can improve knowledge sharing and creating in group work. The report studies group work in the context of brainstorming by university students for innovative business solutions and in the context of a driving school -- where tacit knowledge is transferred. Two different models of knowledge creation and transfer, SECI & Ba and CIP model, are applied to analyse the two real life scenarios.

Keywords: knowledge, groupwork, SECI, Ba, CIP model.

1 Introduction

In the last two decades, nations and international organizations such as the World Bank and the Organization for Economic Co-operation and Development (OECD) have recognized the impact of technology on the global economy and the transformation of societies into ones that are based on knowledge (See Brelade & Harman 2003, 12 – 15 [3]; The World Bank 2011 [4]; OECD 1996, 9 - 11, 17, retrieved 18.3.2014) [5]. Our knowledge-based society and the economy, highlight the value of creating and utilizing knowledge, and the importance of knowledge management for organizations (Brelade & Harman 2003, 12 - 15).

This paper concentrates in analysing two real life teamwork cases, one being a university student project and the other is the staff co-operation at a Finnish driving school.

1.1 Case: InnoStart project in the School of Business and Information Management

InnoStart is an annual innovative event organized by the school of business and information management in the Oulu University of Applied Sciences (OUAS). The one-day event invites topics from Finnish companies, and requires innovative solutions from student groups within 4 hours. The 3 best solutions will be selected by jury, which consists of the guest company and 3

teachers. The student groups of the 3 best solutions will be rewarded with a certificate and a small gift.

Students were first-year students from two English degree programmes in OUAS—Business Information Technology (BIT) and the Degree programme in International Business (DIB). The guest company students worked with was Lappset Group Ltd., a Finnish manufacturer of playground, sport and park equipment (2014, retrieved 17.3.2014) [6]. The task was to design a themed playground for teenagers. After the guest company had briefed students properly about their company and the task they had organized, the organizers (teachers) randomly selected groups of five to seven students containing approximately fifty percent from each of the English degree programmes—DIB and BIT groups. The small groups then went off and spent about 4 hours getting to know each other and to come up with a proposal for the task. During the exercise, members of small groups would hopefully merge their IT and business knowledge skills to come up with an innovative solution that will be appealed to the jury. At the end of the group work, the small groups congregated back together, where each group presented their ideas to the jury and other participants. After the presentations, each group received feedback from the guest company, and all the participants voted on their favorite proposal. The best three solutions were later decided by the jury and announced in the evening party.

Intensive communication and brainstorming in a small group, and networking with students from different degree programmes are the main characteristics of the event. We selected it as one of our case studies to review and analyze group dynamics, and to discover insights about knowledge creating in intensive group work that is under time constraint. As we all participated the event, group memory retrieval and discussion were used for reviewing and analyzing the case.

1.2 Case: Knowledge creation and transfer in a driving school

The most common way for Finnish drivers to obtain their driving license is to go to certified driving school. A driving school has a task not only just to teach learning drivers how to pass the exams but also educate them to develop themselves into proactive drivers. Rather than just learning basic traffic rules, the students are expected to become familiar with defensive driving and also become self-conscious of their personal deficiencies as a driver. In order to achieve the goal of training responsible drivers, a 3-phase driving school curriculum has been planned by the Finnish Driving School Association. (Autokoululiitto 2013, 2, 4, retrieved 22.3.2014) [7].

The 3 phase driving school curriculum consists of basic, practice, and advanced phases. The basic phase is formed by 19 x 45-minute theory lessons and 18 x 50-minute driving lessons which include 2 lessons of driving in difficult conditions, e.g. in slippery conditions. The practice phase that lasts 3 to 24 months commences after students pass the driving examination and receive a provisional driving license. The students are expected to attend two driving lessons and one group lesson in the beginning of the phase. The advanced phase consists of 3 theory lessons and 2 driving lessons besides independent learning. The students receive an official driving license after they accomplish all the 3 phases. (Autokoululiitto 2013, 5-6, 10-21) [7].

Both explicit knowledge (driving regulation) and tacit knowledge (driving skills) are transferred to driving school students. Driving teachers and students are the agents in driving knowledge and skills creation and transfer. For driving schools, it is easy to see that efficient teaching methods and interpersonal skills of driving teachers are certainly among the crucial intangible assets, if not the most. As tacit-knowledge is not easy to be transferred without losing essential elements (e.g. personal driving experience) (Brelade & Harman 2003, 11-12) [3], this case provides us with the opportunity to discover how tacit knowledge such as teaching methods and interpersonal skills is shared and transferred in the context of a driving school. A qualitative interview with a driving teacher was conducted.

1.3 SECI & Ba model

SECI: Nonaka and Takeuchi believe that “organizational knowledge creation is a continuous and dynamic interaction between tacit and explicit knowledge” (1995, 70) [8]. SECI model proposes a spiral process that consists of a series of knowledge creating and transferring phases. It depicts how tacit knowledge is externalized to explicit knowledge and how the explicit knowledge is then internalized (see figure 1). Knowledge is created, shared, synthesized, and solidified as it passes through the four knowledge creating phases. (Nonaka & Takeuchi 1995, 61 - 73) [8].

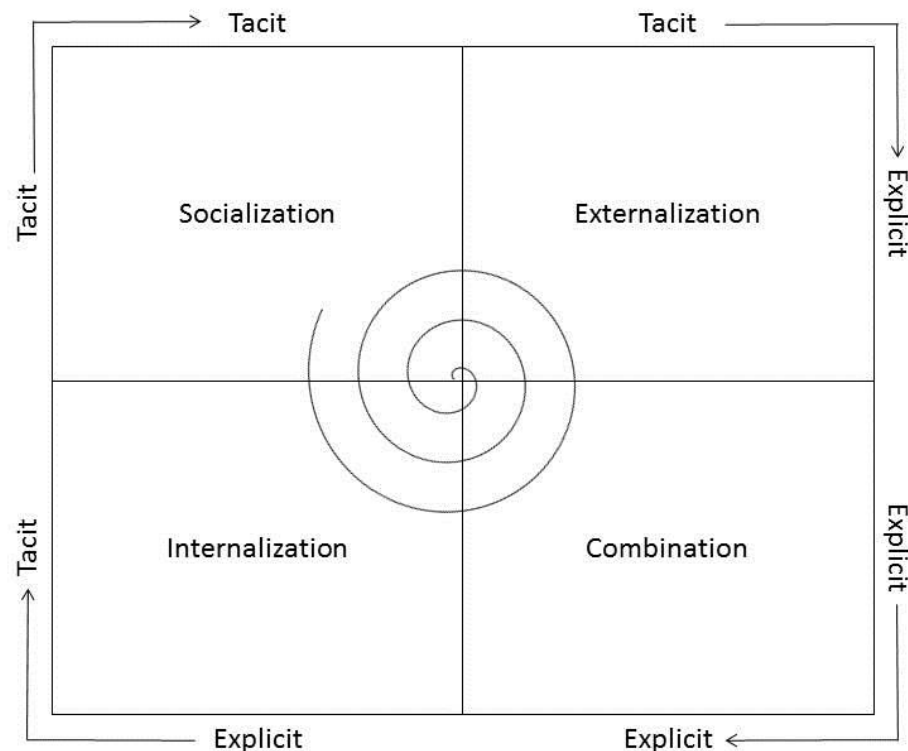


Fig. 1 SECI model of knowledge creation and transfer (Nonaka & Toyama 2003, 5)

The first phase, socialization, uses social interaction to transfer tacit knowledge between individuals. Next, externalization uses metaphors, analogies, concepts, hypotheses, or models to express tacit knowledge explicitly, and calls for dialogue and group reflection. Then, combination organizes, combines, and stores the created knowledge into organizational knowledge system that is accessible by the members of an organization and can help an organization with new knowledge creation processes. Finally, internalization allows individuals to embody the explicit knowledge to improve their own skillset by hands on experience. (Nonaka & Takeuchi 1995, 62 - 70) [8].

Ba: Nonaka and Toyama presented ba to indicate how time, space and relationship with other participating members form a context specific place shared by the participants in SECI activities. Ba is “shared context in motion, in which knowledge is shared, created, and utilized.” (2003, 6) [9]. Unlike a physical place, e.g. a classroom, ba is not static but dynamic. The concept of ba emphasizes interaction among participants or between participants with their environments. It can

be formed, changed, discarded, and reformed. Ba features “here and now”. (Nonaka, Toyama & Konno 2000, 13-15) [10]. Knowledge creation cannot take place without ba (ibid. 16); to fully understand and analyze knowledge creation, one must also take ba into account. Ba can be categorized by how interaction is carried out (individually or collectively) and where it takes place (face-to-face or virtual). There are four types of ba: originating ba, dialoguing ba, systemizing ba and exercising ba (ibid. 16). See figure 2.

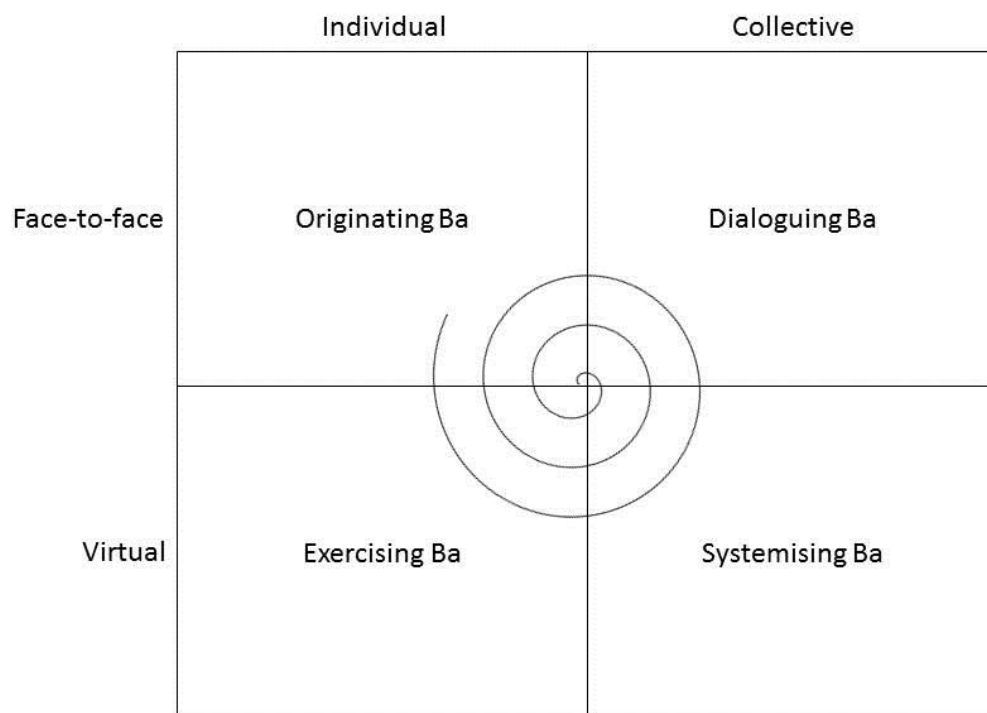


Fig. 2 Four types of ba (Nonaka et al. 2000, 16)

Originating ba is present when personal “experiences, feelings, emotions, and mental models” are shared with others by face-to-face. It is the space where socialization takes place. The quality of originating ba, such as how much participants sense trust, commitment, and other positive emotions among themselves, can either encourage or hinder the transfer of tacit-knowledge. (Nonaka et al 2000, 16-17) [10].

Dialoguing ba is formed when participants pool their tacit knowledge and convert it into explicit knowledge in the forms of concepts, metaphors, models, designs, etc. through a relay between face-to-face dialogue among the participants and self-reflection. Dialoguing Ba is where externalization happens. Consequently, the quality of tacit-knowledge pool, communication and self-reflection affect the result of externalization. (Nonaka et al 2000, 17; Nonaka & Toyama 2003, 5) [10].

Exercising ba appears when individuals embody explicit knowledge by putting the explicit knowledge into practice and sequentially gaining first-hand experiences. It is where internalization is carried out. Reflection on the explicit knowledge, simulations, experiments, learning-by-doing are identified as essential activities for fostering effective and efficient internalization. (Nonaka et al 2000, 17; Nonaka & Toyama 2003 5-6) [9].

In this report, for example, we can identify originating ba when we share personal experiences and opinions in face-to-face conversations, dialoguing ba when we discuss and reflect collectively about theories and cases in group meeting, systemizing ba when we use google docs and social media as the means of documentation and disseminate group work related information, and exercising ba when we try to understand the theories and apply the theories to analyze case studies. The SECI & Ba model will be applied to analyze knowledge creation and transfer in the case studies.

1.4 CIP model

The model of collective information processing (CIP) demonstrates how information (communicated knowledge) can be created, modified and forwarded in group work. The main idea of the model is that team members work together by discussing and searching solutions for a problem/question. The model consists of 4 stages depicting the process of pooling individual knowledge, forming the group knowledge base, processing the group knowledge base into communicated information base, and rendering final collective information base as result. (Propp 1999) [2]. See figure 3.

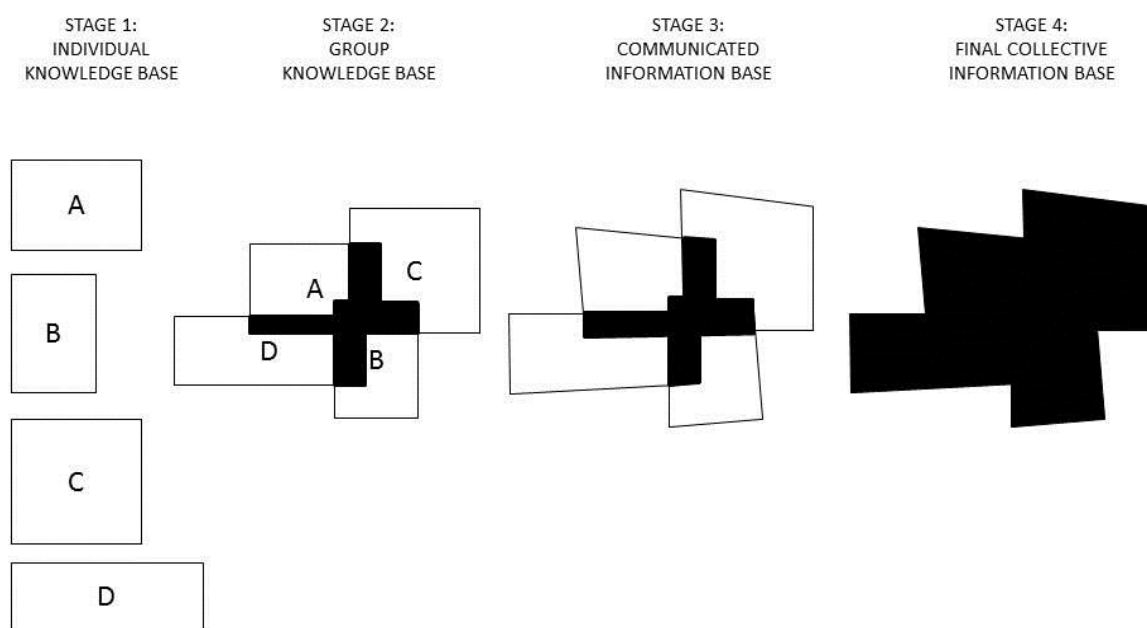


Fig. 3 Distillation model of collective information processing (Propp 1999, 233)

The 1st stage is individual knowledge base. Everyone gathers experiences throughout her/his life that is individualistic, as well as personal perception possesses known only to her/him. The amount and quality of knowledge possessed by each group member determine the maximum size of knowledge pool. The 2nd stage called the group knowledge base forms the common knowledge base for a group from the overlaid knowledge shared by group members. The 3rd stage is the communicated information base where each team member can express her/his own opinions and share her/his knowledge and experiences while proving her/his points. As a result of communication, group knowledge as well as individual knowledge might be modified and updated. The 4th stage, called the final collective

information base, is the logical output from the previous stages. Based on the logical output, the group decision is rendered. (Propp 1999, 231 - 236) [2].

The main advantage of group work is that a group can gather more information than each individual separately, can store and retrieve information more effectively, and can validate the information more thoroughly for decision making. Also, group knowledge is a combination of information and experience from each member, and the group can find more interesting and unusual viewpoints. (ibid. 225, 228-230.) But it is not always the case in reality, as collective information processing (CIP) is influenced by non-communicative factors, for example, the presuppositions of how parallel individual concepts in the group are, the amount and quality of unique knowledge possessed by each member, the size of the group, individual status, relationships in group, characteristics of task, time constraint, and communication medium (Propp 1999, 236-244) [2]. Also, the CIP model reveals that a group considers collective opinions rather than individual ones, thus sometimes individual thoughts get ignored if they are not proved to be worthwhile for the group (ibid. 230-231). In this report, the CIP model will be used to analyze the group work dynamics in the case studies.

2 Case Analysis

For the InnoStart case, group memory retrieval was exercised with all the report members to recall the event. Each member had been working in a different small group. The stages of CIP model was used to help with the remembering of the group work. Different activities, and time spent and non-communicative factors mentioned by each member were documented and synthesized to depict a collective experience of the event.

For the driving school case, a qualitative interview with a driving school teacher was conducted with all the report members participating. The interview took approximately an hour. The topics included the daily routine of a driving school teacher, the ecosystem in a driving school, staff training day, and informal socialization with other teachers in the driving administration center. The interviewee elaborated especially on the staff training day and informal socialization.

2.1 Analysis of InnoStart group works by SECI & Ba model

SECI in InnoStart group works

In the InnoStart event, the spiral of knowledge creation began when the members of a small group introduced themselves to each other. Besides getting to know each other, members also exchanged other tacit knowledge such as personal objectives, opinions, feelings about the event, and initial ideas for the solution. The activity of sharing tacit knowledge between members can be recognized as socialization.

The task for each small group was to create an innovative and appealing playground for teenagers. Therefore, the members began elaborating on the ideas they proposed while discussing their ideas with the other members. Members might also use drawings, childhood experiences, etc. to explain and promote their ideas. Elaborating and promoting the ideas using drawings and childhood experiences can be seen as externalization.

Since a final solution was required from each small group, 4 out of 5 small groups we participated in had to choose one idea from the idea pool generated in the externalization phase, whereas only 1 small group managed to synthesize all the ideas into a solution. The

idea was further edited and finalized into an appealing solution. The activity of group decision making-whether using persuasion, voting, or synthesis, as well as producing a final solution-can be identified as combination.

Finally, each small group presented its solution in front of the jury and the other participants. In the presentation, some groups presented their solution together, whereas some were presented by one or two members of the group. The preparation for presentation can be considered as an internalization activity, as presenters should understand their topics as thoroughly as possible in order to convince their audience that their own solutions are the best. The actual presentation, taking account of its face-to-face interaction and delivery of a group's tacit knowledge to the audience, should be seen as socialization-the beginning of a new spiral process.

Socialization, externalization, combination, and internalization can be recognized from all InnoStart group work we participated in. Though the quality and quantity of knowledge transferred and created varied between groups, we can identify the following SECI activities from all the small groups we participated in (see figure 4):

- The exchange of tacit knowledge between members
- The conversion of tacit knowledge into explicit knowledge when members elaborated on their ideas and discussed these ideas with each other
- The selection/combination and processing of explicit knowledge when producing a final solution
- The internalization of explicit knowledge when the members familiarized themselves with their solutions and prepared for the presentation

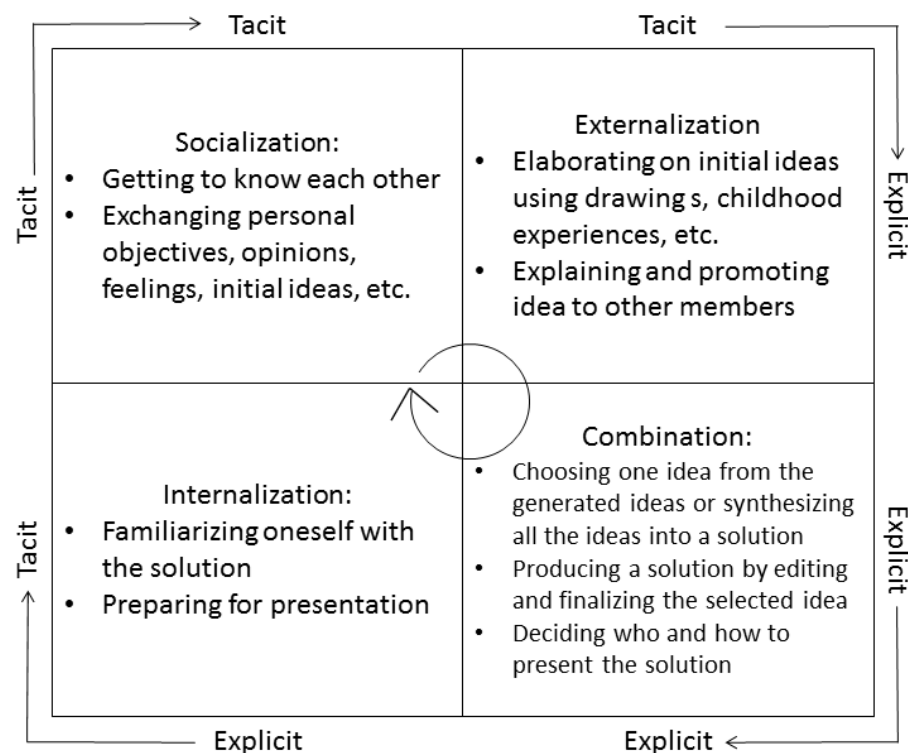


Fig. 4 Socialization, externalization, combination, and internalization in InnoStart group work

Ba of InnoStart group work

Though the similar interaction between tacit and explicit knowledge can be identified in each of the small groups, the members, the interaction among the members of a small group, and the interaction between the members and their environments are different between the groups. Consequently, the results of group work were not the same in terms of individual experience, the quality and quantity of knowledge transferred and created, and the competition result—two small groups we participated in were among the top three solutions. The ba of InnoStart group work is further analyzed in the following. A summary of the ba observed is shown in figure 5.

Originating ba is where the transfer of tacit knowledge between individuals happens. The characteristic of originating ba is face-to-face interaction between individuals. Conducting a group memory retrieval exercise, we recalled that the small groups we participated in spent a different portion of time for socialization—from 5 to 20 minutes. The time spent for socialization affected the scope and quantity of tacit knowledge exchanged. Besides time, people—another essential constituent of ba—were also different in terms of their motivations. Two members sensed the lack of motivation in the small groups they participated in. One member also recalled the physical environment hindered the creative thinking process. For these groups, the lack of motivation and boring environment hindered not only socialization but also the sequential SECI phases.

Dialoguing ba is where the conversion from tacit to explicit knowledge takes place. The characteristic of dialoguing ba is face-to-face interaction as a group. Elaborating on one's own idea and reflecting on the ideas proposed by other members were essential in dialoguing ba. As recalled, the small groups we participated in spent from 33% to 75% of the time for externalization. Different approaches were used by the groups for externalization, like brainstorming, discussing each idea, analyzing what was appealing to teenagers, or being led by dominant members. Individual vision sharing, drawings and note taking were used to support the activity. Dialogue was disabled when members were not motivated. Also dialogue became monologue when one or a few members dominated the group conversation.

Systemizing ba is where the combination of different explicit knowledge is achieved. The characteristic of systemizing ba is collaboration and utilizing of virtual tools such as memos and power points. After groups explored possible ideas and elaborated on them, the small groups had to create an appealing solution based on the explicit knowledge accumulated in the time frame. There was no issue in producing a presentation using power point and Internet resources, but the way each group chose its solution varied. One group synthesized all their ideas into one final solution; one group was led by dominant members; one group was persuaded by an enthusiastic member; two groups decided by voting. Also, the time for choosing an idea and producing a solution varied between the groups, from less than half hour to more than one and half hours.

Finally, exercising ba is where an individual embodies explicit knowledge and converts it into individual tacit knowledge. It features individual learning-by-doing. So, after the group creates a solution, individuals within the group familiarize themselves with the solution by reviewing the presentation material. The presenters should embody the solution and plan their pitches. Each group had very little time for preparation; yet, judged by the presentation

delivered, it is evident that individual motivation and enthusiasm affected on how well the presenters internalized their group solutions.

	Individual	Collective
Face-to-face	Originating Ba - Individual motivation and physical environment can hinder or encourage ALL the ba 5 – 20 min. spent	Dialoguing Ba - Individual vision sharing, drawing, note taking supported elaboration 1.3 – 3 hours spent
Virtual	Exercising Ba - Review presentation material - Plan pitch and rehearse it in mind 10 min. or less	Systemizing Ba - Utilize computer and the Internet - Decide final solution by synthesizing, persuasion, dominant members, or voting 0.5 – 1.6 hour spent

Fig. 5 Ba summary of InnoStart group work

2.2 Analysis of InnoStart group works by CIP model

In the InnoStart event, each small group was formed of 5 - 7 first-year university students, who came from different countries, and studied in different degree programmes (either international business or business information technology). The individual differences between small group members in terms of life background, knowledge, English skill, and motivation were perceived by our group memory retrieval. The personalities, individual knowledge and skills contributed to non-communicative factors, which determined the different individual knowledge bases brought to a small group in the first stage of CIP.

The second stage, group knowledge base, was formed through initial interaction between group members, such as introducing oneself to the others, expressing personal opinions and feelings about the event, and discussing the objectives. There was no status difference as everyone in the small groups was a first-year student. But as we recalled, there were other non-communicative factors that hindered or fostered forming of group knowledge base. Lack of motivation and/or feeling marginalized by dominant members prevented members from sharing their individual knowledge bases with their groups. Consequently, the group knowledge base was not optimized in those groups. On the contrary, motivated and even enthusiastic members were ready to share their individual knowledge. Members felt

comfortable and sensed ownership of the group work when conversation was not dominated by one or a few people. These factors contributed to the optimized group knowledge base.

Based on the group knowledge base, the development of the third stage communicated information base began when members in a group focused their attention and communication on task solving. In this case, the task was a decision-making one demanding creative solutions, not absolute answers. Support from members is essential for resolving a decision-making task. In this stage, knowledge was communicated by the members in the form of brainstorming, analyzing teenagers, elaborating on the ideas proposed by members, etc. The small groups spent most of their time (up to 75%) on this stage. The non-communicative factors identified in the first and second stage continued having an effect on the communicated information base. In addition to those factors, time constraint had both a positive and negative effect on developing a communicated information base. Every group produced a solution within the given time. However, it could also mean that members might not have had equal amounts of time to elaborate on their ideas, and to reflect on others' ideas and feedback, particularly in the groups where conversation was dominated by one or few. Also, resolving decision-making tasks by group consensus could potentially miss unique ideas which require more time for elaboration and dialogue. Those groups that did not give time equally for exploring each idea members proposed produced fewer options to select from.

Finally, each group had to create a solution by choosing the most promising idea or by combining each member's idea. In both approaches, the communicated information base—from which group decision was made—became final collective information base. The groups utilized the final collective information base to finalize their proposals.

The non-communicative factors identified in this analysis explained how we experienced InnoStart group work differently in terms of personality, motivation, and group work dynamics. Motivation, enthusiasm, and rapport with members in the two groups chosen by both jury and students were recalled vividly. These factors affected positively face-to-face communication and consequently individual experience and final collective information base.

2.3 Analysis of knowledge creation and transfer in a driving school by SECI & Ba model

Socialization—transfer of tacit knowledge between individual employees

Due to tight schedule, a driving school teacher does not have much time to communicate with colleagues. Practical driving lectures are conducted throughout the working day and most of the remaining time is used for feedback, scheduling, and pickups. After practical driving lectures end in the afternoon, teachers usually give theory classes until the evening. According to the interviewee, short conversations with the driving school secretary and staff training days (once or twice per year) are the scarce opportunities for exchange of tacit and explicit knowledge.

The secretary is an important source of curricular knowledge for the teachers, especially for new teachers. The secretary is given information about the latest changes in traffic legislation and is responsible for understanding what is going on in the field of driving school teaching. Even though the driving school has lately upgraded its software systems, they are not used efficiently by most of the teachers. Instead, teachers will meet with the secretary to obtain information; this is also an opportunity for them to learn new information the secretary

has acquired. The secretary's office is like a service point and is probably seen as an important part of the teacher's working life, as it will fulfill much of their needs and relieves a lot of the stress of having to organize their own schedules. It is also perhaps a point where the teachers can unload their problems and interact with colleagues.

Another important channel is the staff training day, which is held in the driving school or some other environment. It is an opportunity for the management and the teachers to interact, communicate information, and share experiences together. It was mentioned that during the staff training day, the teachers even have the opportunity to observe how other teachers teach their driving lessons, and afterwards to give feedback to each other. Another purpose of the staff training day is to bolster teamwork; employees hangout e.g. at a restaurant after the training day and are more relaxed to share their feelings, opinions, and experiences about work.

For new teachers, socialization includes practical training and working with the secretary. Practical training is implemented through both theory and practical teaching. After the induction period of a new teacher, their knowledge is tested. This testing is conducted by the Driving Teacher Education Centre of the Häme Vocational Institute and Jyväskylä Institute of Adult Education, as well as teachers working in the field. Working with the secretary is part of new teacher integration—to see how the company is run, and how information is collected and distributed.

Overall, according to the interviewee, driving school teachers do not have enough free time activities with other employees, thus have few opportunities for socialization. Busy and long working day is one of the main reasons.

Externalization—conversion of tacit knowledge to explicit knowledge on the staff training day

The staff training day is the only time when externalization can be easily recognized. Participants range between a few to tens of people. Group sessions for discussing difficult classroom scenarios and for giving feedback about the best teaching techniques require participants to make their ideas and experiences explicit. This is the brainstorming process used in the company, and employees are encouraged to write their ideas and knowledge on a whiteboard. Also, during the day, the whiteboard is used to record other information gained from the event. The staff training day enables the management to discover the complexities of everyday operations hindering the best customer service.

Combination—documentation, organization and dissemination of explicit knowledge in the driving school

As previously mentioned, the driving school secretary is an important source of knowledge to the teachers. The secretary is also the key coordinator in combination. The secretary or the person who fills in for the secretary takes notes and makes minutes about the training day. But teachers do not have access to all the documented information.

The secretary also organizes the work schedule of the teachers using a large desk calendar. Some teachers have their personal calendar; but availability of the teacher must be marked on the “general calendar”. The teacher's names are written alongside the calendar days with the students they will be teaching. The teachers can check their class schedules and company

events, like staff training day from the calendar. A bulletin board is also used for posting administrative announcements. The calendar and bulletin board are the products of combination. Albeit there are e-bulletin boards, although the driving school is not using them efficiently to reach their employees.

Another essential source of knowledge taking digital form is the Finnish Transport Safety Agency website [11], which provides the latest information about traffic legislation and driving regulation. For example, the site has the latest documentation about driving school curriculum which includes the amount of lectures and evaluation procedures.

Internalization—employees embodying explicit knowledge individually

According to the interviewee, the teachers are responsible for learning the legislative information; but the scope and amount of information disseminated on the staff training day can be too much to remember. Therefore, internalization takes place when the teachers familiarize themselves with the latest changes in traffic legislation and driving regulation by visiting the Finnish Transport Safety Agency website after the staff training day. The teachers can find company announcements from the driving school bulletin board. They also take turns to do secretarial work when the secretary has days off. This internalizes their knowledge of the running of the company, and creates new opportunities for tacit knowledge transfer.

External socialization—transfer of tacit knowledge between teachers of different driving schools

So far, the activities of knowledge transfer and conversion mentioned happen inside the company. Yet, there is a valuable socialization activity taking place outside the company. It takes place in the proximity of the driving administration center, where driving teachers of different schools meet and chat while waiting for their students taking driving test. There can be up to 5 teachers waiting at the same time. The teachers do not necessarily know each other by name but know the organizations the others are working for. The topics of chatting can vary but do not reveal any student identity or organizational secrets. For example, it can be about how to handle a difficult driving situation or how to maintain a car. The discussion lasts usually within 45 minutes and takes place outdoor or in a nearby cafeteria. The interviewee perceived receiving more fresh ideas and wider perspectives by talking with teachers from different driving schools

The external socialization can broaden communication channels and possibly capture valuable tacit knowledge from outside of organization, thus can benefit driving schools as well as driving administration centers. According to the interviewee, fostering inter-organizational SECI activities could ultimately have positive impact on traffic safety and the quality of new drivers. Yet these organizations are at the moment the opposites of each other for some reason.

Summary of SECI activities in the driving school

The activities of socialization, externalization, combination and internalization were identified in the driving school, but the extent of these activities varies. Internalization is practiced on daily base when the teachers prepare for their classes. More internalization happens when the teachers check the latest changes in traffic legislation and driving regulation from the Finnish Transport Safety Agency website and company announcements

from the bulletin board. Filling in occasionally for the secretary is also a form of internalization. Externalization, on the contrary, is conducted only once or twice a year in the group sessions on staff training day. The secretary takes notes about the staff training day; but not all the documented information is accessible later by the teachers. As a result of the scarce externalization, combination in the driving school appears to be underutilized. The school calendar, bulletin board and the Finnish Transport Safety Agency website are the major repositories of explicit knowledge.

Evidently, the tacit knowledge is possessed and shared between the secretary and the teachers and among the teachers. According to the interviewee, free time activities are good socialization opportunities for the organization; for example, company sport events would be good for the health of employees and for bolstering the team spirit in the company. Free time activities could be expanded through the whole driving school ecosystem, taking into account other companies and driving administration center staff. Thus, it provides opportunities for inter-organizational knowledge transfer and creation. A good example is the socialization at the driving administration center.

At the moment, the scarce externalization and underutilized combination limit the transfer between tacit and explicit knowledge in the driving school. Consequently, knowledge like best teaching practice and customer feedbacks are still possessed and exchanged mostly by the individuals, not by the school. Figure 6 shows socialization, externalization, combination, and internalization in the driving school with a dotted spiral arrow-headed line depicting the limited knowledge transfer and creation.

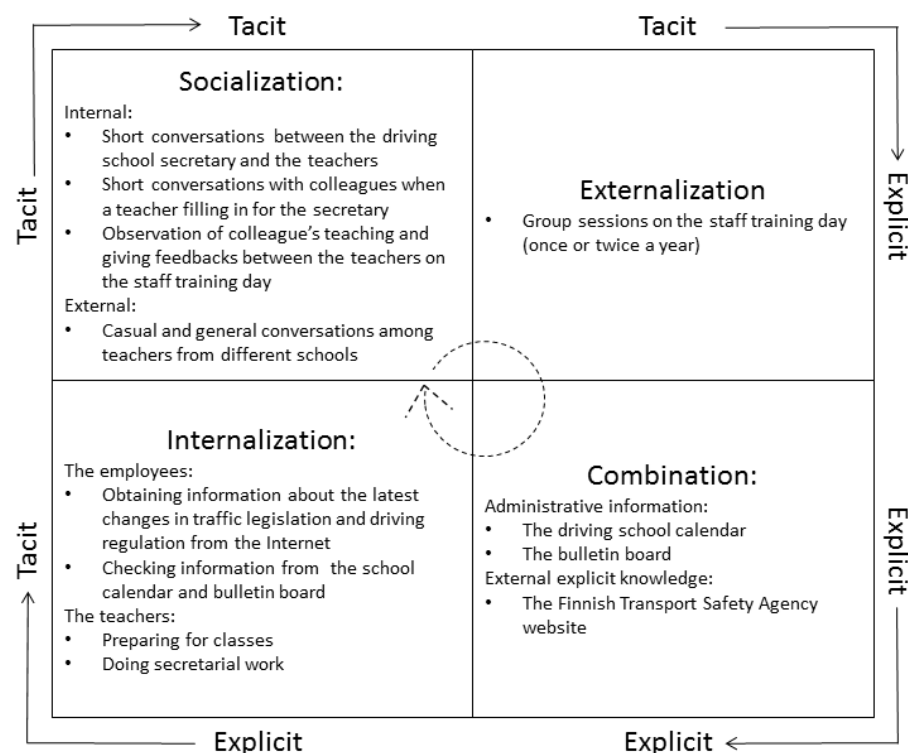


Fig. 6 Limited knowledge transfer and creation in the driving school

Originating ba in the driving school

At work, everyone is busy. The boss of the driving school asked the secretary to make sure that the teachers have full schedules when they come to work. If there are not enough classes for all the teachers, some of the teachers have to teach fewer classes or come to work when requested. This policy doesn't encourage socialization because employees are either too busy to have conversation with each other at work or waiting at home. The secretary, though being an important source of information, is loaded with administrative work. Conversations with the secretary have to be short and limited, such as class arrangements and company announcements. The limited time for communication weakens the originating ba in the company.

Also, unequally assigned job responsibilities can be a hindering factor in the driving school. For example, some teachers have to teach students who are not native speakers more than other teachers; it requires more effort, but the extra effort is not compensated. It can create negative feelings such as unfairness for those teachers who put extra effort but are not compensated. As a result, it has a negative impact on the social cohesion in workplace and SECI activities. In addition to the opinion of the interviewee, Veija-Kujanpää also mentioned in her thesis that the language problem is one of the reasons driving school teachers get tired of their work (2010, 124, retrieved 27.4.2014).

On the staff training days, the participating employees find more time for longer conversation and discussion with their participating colleagues. Some of them also have opportunity to observe the teachings by others. It was mentioned by the interviewee that feedbacks from colleagues on the training days can be refreshing and valuable. There is usually a dinner party after the training day. At the party, employees are more relaxed and more ready to share personal feelings and opinions about work.

Overall, the originating ba in the company does not encourage exchange of tacit knowledge because employees are expected to devote their time to work, not to casual and general conversation. Some employees feel it unfair that their extra effort that is not compensated. The management doesn't realize that time for casual and general conversation and fair company policy are in fact essential for generating "care, love, trust and commitment" which, according to Nonaka et al., foster the environment for tacit knowledge transfer (2000, 17).

Originating ba of the external socialization

On the contrary, the socialization at the driving administration center appears to be more interesting. 45 minutes allow teachers to have conversation, even meaningful dialogue. As shown in the figure 7, the teachers can have conversation while enjoying the good weather outside the office building or over coffee and buns in a nearby cafeteria. Making use of the waiting time motivates the waiting teachers to have conversation with each other. The time away from busy routine, the comfortable physical environment—outdoor or in a cafeteria, and the need and motivation for socializing form a better originating ba than in the driving school and create good experience for the participating teachers.

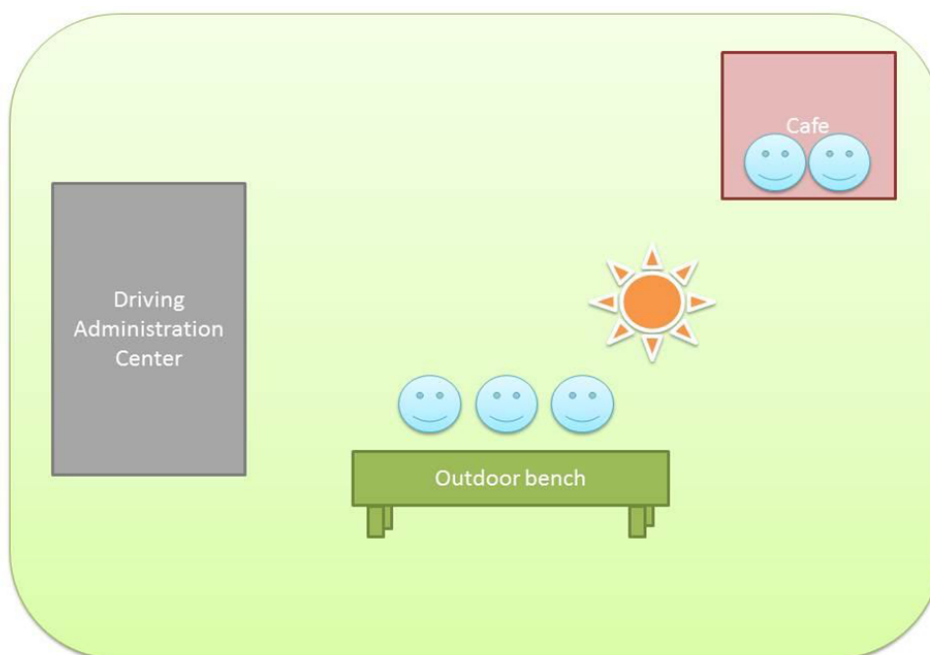


Fig. 7 Originating ba at the driving administration center

Dialoguing ba in the driving school

As mentioned, the staff training day that is arranged once or twice a year is the only activity of externalization for the driving school. The externalization is carried out in dialoguing ba, where participants make their ideas and opinions explicit in face-to-face interaction about a topic proposed by the boss or a colleague. The best teaching techniques and handling of difficult teaching situations are the main topics for the group sessions on the staff training day. The whiteboard is used for brainstorming. An important incentive for the participating employees to externalize their tacit knowledge, such as student feedback and individual suggestions for improvement, is getting paid for participating. But the incentive effect on a participant is negated, if the participant is not going to have enough teaching hours for the next few months. Also, it was mentioned in the interview that the boss was often interrupted by phone calls on the staff training day. Since the boss is the host of the event and participated in group sessions, the interruption of phone calls can hinder the process of externalization.

Systemizing ba in the driving school

According to the interviewee, “not any kind of reporting is done after the working day which will also result in a loss of possibly usable knowledge.” Internal information is disseminated mainly via oral communication. Though a whiteboard is used in externalization, it captures only a small fraction of externalized knowledge, which may or may not be further documented and shared with the employees. The secretary is only responsible for delivering relevant information to the teachers and reminding them about it later if needed. One will not find knowledge about business strategy, best teaching, or customer service techniques from the school calendar or bulletin board. Only a minimal amount of internal knowledge is documented and accessible by all the employees. It appears that the driving school is not

accustomed to documenting and sharing knowledge such as the knowledge learned from staff training days.

Exercising ba in the driving school

The teachers are expected to learn new information such as the latest changes in traffic legislation and driving regulation in their own time. Because of tight schedule, the teachers do not have time to read all the information, but only such information that answers the immediate needs in their teaching. On the other hand, the teachers cannot find documented internal information about best teaching practices, handling difficult class scenarios, or customer service, if they want to improve their teaching. They can only rely on the occasional feedback from their colleagues or students, and self-reflection if time permits. Furthermore, there is no explicit policy in the company for rewarding self-improvement activities. As a result of scarce time, limited documented information, and having no company incentives for self-improvement, the exercising ba in the company enables only a small amount of internalization. A summary of ba is shown in figure 8, with a dotted spiral arrow-headed line depicting the limited knowledge transfer and creation.

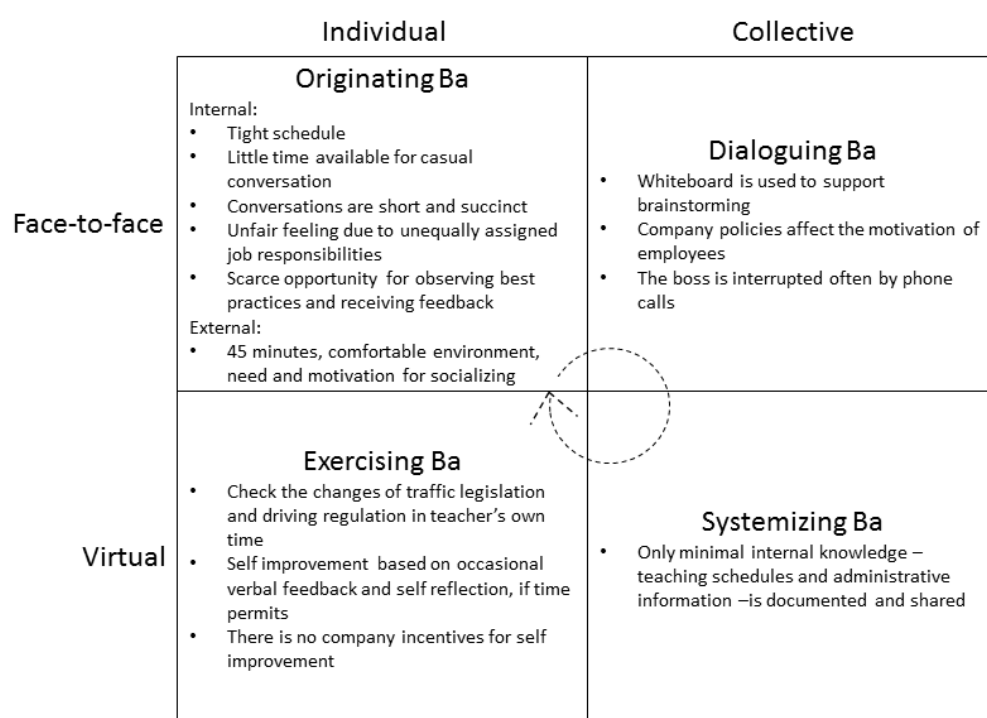


Fig. 8 Summary of ba in the driving school

2.4 Analysis of the group sessions on staff training day by CIP model

Here the focus is on the group sessions on staff training day. The participants of staff training days are the boss, secretary and teachers. They possess similar knowledge about the school and its operations; but individually, they also possess unique knowledge in terms of business intelligence, knowledge about specific kinds of vehicle, feedback of students,

teaching skills, communication skills, personal experiences, IT systems, etc. Besides unique knowledge, individual interest in a topic can also influence the group sessions. The interviewee pointed out that the majority of employees are older and not interested in IT topics, thus they do not pay much attention on IT improvement topics. The knowledge possessed by each participant forms the individual knowledge base in the first stage of CIP. The unique knowledge possessed by participants makes generating new knowledge in the group sessions possible. But the interest of the majority can overlook important but not interesting topics.

In the group sessions, the knowledge of participants forms a group knowledge base that is potentially available for the group. This is the second stage of CIP. The group knowledge base is further influenced by the size of group, and the relationships between participants, etc. On the training day, the size of group varies from a few, to tens of people. According to Propp, a large group has a negative effect on communication efficiency thus hinders group work process (1999, 234). The relationships with other participants, with the boss in particular, affect whether the individual feels free to say his/her opinions in the group sessions. If participants do not feel comfortable to share their knowledge, the knowledge (though possessed by the participants) becomes unavailable for the group.

The developing of a communicated information base (the third stage of CIP) begins when the participants focus on sharing teaching techniques, brainstorming solutions for handling difficult classroom scenarios, and/or better teaching methods. The topics in the group sessions are typical decision-making tasks that require creative solutions instead of absolute answers. According to the interviewee, valuable feedback can be generated from group sessions, but only occasionally. One major hindrance was mentioned—the boss is often interrupted by phone calls. Another possible hindrance for actively participating is when a participant is going to have fewer teaching hours in the near future.

All the non-communicative factors identified above influence the final collective information base (the fourth and last stage of CIP) in the end of group sessions. As mentioned, there is unique knowledge in individual knowledge bases, but new knowledge such as valuable feedback is not always created in the group sessions on staff training day. We identified at least the following reasons that hinder the group sessions:

- Discussions about IT improvements are sometimes underrated by older staff members, because they do not possess any interest on the topic
- Sometimes the group size is too large, over 10 people, which decreases the communication efficiency
- Some participants are not keen to share ideas and opinions when knowing they are going to teach fewer hours in the near future
- Some participants might have felt that they have been treated unfairly in the company
- Interruptions, e.g. phone calls, disrupt creative thinking
- Clear documentation of the staff training day and repository of meeting minutes are not stated, so participants cannot benefit from the documentation

3 Conclusions

The main objectives of this report are to understand how knowledge had been collected, exchanged, created, evaluated and disseminated in group works, to identify the factors that affected group work performance, and finally to present insights that can improve knowledge

transfer and creation in group work. The objectives have been achieved by comprehensive analysis.

Using SECI & Ba and CIP models, we analyzed InnoStart, a brainstorming of business school students in OUAS for innovative business solutions, and the knowledge transfer and creation in a driving school. Both cases provided practical examples of how knowledge is collected, created, shared and transformed and how negative and positive factors affect knowledge transfer and creation. SECI & Ba and CIP models are helpful for understanding how to solve problems collectively and how to achieve better group work results. Additionally, we think that the main advantage of the SECI & Ba model promotes the management of knowledge by using an easy-to-conceptualize framework. However, this model usually works best when tacit knowledge creators stick around for a long time, so that their knowledge can be properly documented and passed on.

From the analysis of InnoStart, we learned that focus and attention to the socialization stage of the group work is essential to good knowledge creation later on. It was also important for students to feel that the work was worthwhile, and that the other students in the same group also felt motivated to participate. Otherwise, some members remained shy and became less cooperative. Not enough communication between members also led to lack of common goals in group work. Consequently, group work became less interesting for members and it was harder to produce great output. Although there seemed to be no negative feedback regarding the social background of the small groups, there was some negative feedback regarding the physical location of the working environment and its surroundings. Other negative feedback was regarding dominating roles undertaken by some of the groups' participants. This encouraged members to take more back seat roles with regards to idea creation and decision making. It seems the groups that had the least negative factors, were the most successful in idea generation, presentation, and job satisfaction.

As for the analysis of driving school, there is evidence of tacit knowledge in the driving school, but it seems that the lack of knowledge management, e.g. good working contracts, company incentives, documented internal knowledge, is a major hindrance to individual sharing tacit knowledge within the company. It is unfortunate that the current driving school environment does not encourage knowledge transfer between professionals; because, in interviewee's opinion, traffic safety could probably benefit from wider collaboration between professionals. The analysis indicated that the group sessions on staff training day can produce more fruitful outputs, if the hindrances of non-communicative factors are removed.

Overall, from both case analyses, we identified the factors that have positive influence on group work, particularly, a good and friendly atmosphere. It is also important to remember that smaller groups tend to produce results easier than bigger ones due to having fewer members to persuade. Good motivation and positive attitude can overcome the challenges and shortcoming in group work better, thus create better chance of success. On the contrary, stressful atmosphere and lack of motivation have negative impacts on group work.

The positive and negative factors that influence group work are not random phenomena, though sometimes we might feel that it is only a matter of luck—being in a productive group or unmotivated group. Instead of praying for being in a productive group, individuals can actually influence group work. And from management perspective, there are ways to foster productive group work and to encourage knowledge transfer and creation in organization, thus to outperform competitors by superior command of knowledge. The results of case analysis showed the omnipresence of people in knowledge transfer and creation, which resonates with

Sveiby's conviction that people are the only true agents in business. We believe that it is possible to overcome the negative factors existing in group work and to achieve excellent results by deploying a variety of management techniques and technologies, but the well-being of group members or employees should always be the focus and foundation—happy and motivated people are more productive.

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