From Tacit Knowledge to Explicit – Taken for Granted Pedagogical Practices Made Visible

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Abstract
Learning by Developing (LbD), is a pedagogical strategy of Laurea University of Applied Sciences for almost 15 years. It is based on authentic co-operation between teachers, students and working life partners. In practice, LbD means that Laurea students are studying in working life projects. Theoretical framework in the article is based on LbD, Tacit Knowledge and the SECI-model. Long use of the LbD model has resulted in documented research as well as numerous unwritten practices. Those teachers that have specialized in LbD pedagogy have formed informal knowledge community. They share experiences, practical ways of implementing the model and furthermore develop the theoretical model as well. In the spring 2020, our team was preparing the online course of LbD for university teachers globally about how to implement LbD in practise. The article tells a story of what we discovered when we formalized and made visible tacit knowledge of LbD and many practices associated with the LbD pedagogy. We noted that the basic steps of the LbD model are easy to communicate and make visible. When we dived deeper into LbD practices and details it became harder even for seasoned expert to express things clearly. Tacit knowledge was unearthed through dialogue. Dialogue-like working required an atmosphere of trust, lack of hierarchies, lack of defensiveness on part of the expert and persons with mixed level of expertise so that there was both dumb questions and room to ask them.

Keywords: Learning by Developing, Working Life Co-Operation, Working Life Project, Tacit Knowledge, SECI Model

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Introduction

The integration of education and working life is recognized as a world-wide challenge. The integration has been highlighted e.g. in the European Union and the European Parliament has called on Member States to promote cooperation between working life and educational institutions in order to get better-trained and more work-life ready students to enter the labor market (European Parliament, 2017). The European Community has declared that higher education institutions (HEI) should co-operate tightly in many ways with working life organisations. According to the new Education Plan of the European Commission HEI should play a wider role in local and regional development e.g. co-operate and develop strategies with cities, businesses and the voluntary sector (European Commission, 2017).

In Finland, higher education is based on a dual model, in which, higher education is provided by Science Universities and Universities of Applied Sciences (UAS). UASs are focused on working life development and education. Science Universities are focused on scientific research and education. In the Universities of Applied Sciences Act, the practical mission of UAS is written as follows**;** Section 4: Universities of Applied Sciences shall also implement applied research, development and innovation activities and artistic activities that serve education in UAS, and also promote industry, business and regional development and regenerate the industrial structure of the region.

In the future educational institutions and working life co-operation will be one of the "key" activities of HEIs. The report "Osaaminen 2035" (Competence 2035), published by the Finnish National Agency of Education (2019), emphasises integrating education to work and workplaces. Integration of workplaces and education develops both organization and the individuals. The Competence 2035 report conclusions emphasises customer-oriented service development competence and recognition of sustainable development as two of the most important future competences.

Laurea University of Applied Sciences (Laurea) has been practicing a working life connected education model, Learning by Developing (LbD), for almost 15 years. This pedagogical strategy is based on authentic co-operation between Laurea staff, students and working life partners. LbD is usually implemented in co-creation projects with students and working life partners (Ojasalo, 2018).

Long use of the LbD model has resulted in documented research as well as numerous unwritten practices in applying the model. According to our experience, those teachers that have specialized in LbD have formed an informal "community of practice" that share experiences and develop the theoretical model as well as practical ways of implementing the model further.

This article describes how we formalised and made explicit many practices and tools associated with LbD pedagogy that we discovered during a project. In the Spring 2020 we were preparing an online course for university teachers globally about implementing LbD in practice. The basic steps of the LbD model at a general level are easy to communicate and make visible. However, when we dived deeper into practices we began to discover that there are things that are easy to express and things

that, even for an expert, require a long time and a substantial amount of application before they have been properly understood.

Learning by Developing Model

Learning by Developing (LbD), a pedagogical strategy of Laurea University of Applied Sciences, was launched in 2007 (Raij, 2014). LbD has been integrated to all education fields in Laurea and nowadays it can be referred to as action model. Laurea is operating in six different campuses, with different locations and fields of education in the Uusimaa region Laurea provides bachelor and master level studies as daytime, blended learning and online education. (Laurea, 2020). According to Laurea, LbD is included as practical actions in all fields of education, and levels (Laurea, 2020**)** as well as quality criteria by always involving the LbD in the learning (Laurea Quality Handbook, 2020).

According to Laurea Quality Handbook (2020) LbD means that learning always involves a co-operation partner organization or/and RDI-project. Raij (2018) notices that due to focusing on LbD in very early stage of Univeristy´s pedagogical development, Laurea has also build trust-based networks with regional actors.

The theoretical characters of the LbD are presented in figure 1 (Raij, 2014). Partnership means co-operation with working life, students and teachers. Genuine working life connection brings authenticity.A research oriented approach refers to studying within the context of higher education. Experimental nature can be understood in different ways e.g. experiences with given meanings constructing competences. Experiencing can also be inspected on the basis of processes that lead to new forms of action. Learning by Developing is value driven and takes a more holistic outlook on students than would be the case where real life projects are the focus. (Raij, 2014).

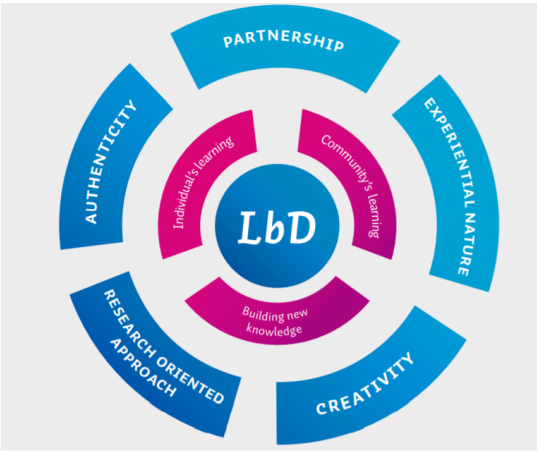

Figure 1: The Characteristics of the Lbd Model (Raij, 2014).

According to many LbD articles, using the LbD action model creates several benefits, Dickinson (2017) concluded that business students got a better understanding of business reality when implementing projects with a working life partner by using LbD. Aalto, Jaakkola, Tallgren & Uusitalo (2019) interviewed graduated students and found out, that by studying using the LbD method, students´ strengthened soft skills

such as; team work skills, responsibility, communication skills, self-direction and leadership skills.

Tacit Knowledge

The concept of tacit knowledge was originally introduced by philosopher Michael Polanyi in 1958 (2005).

Grandinetti (2014) analyses Polanyi´s views of tacit knowledge in the following way, in introducing the" Tacit Dimension" Polanyi said that he would reconsider human knowledge by starting from the fact that we can know more than we can tell. For Polanyi, tacit knowing is an unconscious process. This view is entirely consistent with the traditions of cognitive psychology studies according to which the terms "unconscious knowledge", "implicit knowledge" and "tacit knowledge" are synonymous (although the first is used more frequently than the others). Examples of unconscious knowledge often mentioned by cognitive psychologists include riding a bicycle and recognizing faces.

Furthermore, Bennet (1978) interprets Polanyi´s writing as follows: to Polanyi, the tacit dimension is the presupposition of all knowledge and of all activity. Within any act of comprehension, Polanyi argues, there is both a focal awareness and a sub subsidiary awareness. The object of focal (conscious) awareness is that of which a person might have explicit knowledge. In addition, a person may achieve this knowledge only by virtue of the clues provided by things of which we have subsidiary or tacit awareness. Moreover, Bennet has made notes of Polanyi ´s interpretation that at any moment whatever explicit knowledge a person may enjoy is achieved only through the tacit use of still other knowledge and capacities. It´s not possible to formalize all knowledge. Impersonal and fully explicit knowledge is thus an illusory goal.

Polanyi gives an example of how the difference between our speech and our thoughts varies and can be divided into different categories of cases (Polanyi 2005):

1. The ineffable domain, which is the area where the tacit predominates to the extent that articulation is virtually impossible
2. The area where the tacit component can be communicated so that the tacit is co-extensive with the of which it carries the meaning
3. The area in which the tacit and the formal fall apart since the person does not know, or quite know, what she/he is talking about. There are two totally different cases of this. The first being an ineptitude of speech and the other being symbolic operations that outrun our understanding

According to Oğuz & Şengün´s (2011) review of the literature they argue that in most cases, the literature uses tacit knowledge and "knowing-how" interchangeably. However, this position results in leaving aside a crucial aspect of tacit knowing for the sake of reaching a manageable conceptual structure. Their view seems to be based on the same notion as Polanyi´s that knowledge and knower are ontologically connected, which disappears when the modern usage of tacit knowledge ignores the knower.

Kogut & Zander (1992) rephrase Polanyi´s comment stating that organizations know more than what their contracts say. For them the knowledge of the firm (such as

operating rules and customer data bank) is relatively observable, but organizations know more than these operating rules and customer data banks can demonstrate.

Lazaric, Mangolte & Massue (2003) have studied the French steel industry and more specifically blast furnace operations. According to them, blast furnace related knowledge is still largely empirical in its form, thereby increasing both the difficulties associated with its generalisation and the degree of uncertainty in process control. For Lazaric et. al (2003,1830): "Articulation paves the way for codification and can only be achieved by making the relevant practices explicit within different "communities of practice"".

Nonaka & von Krogh (2009) define explicit knowledge by pointing out that explicit knowledge has a universal character, supporting the capacity to act across contexts. For example knowledge that is captured in drawings and writing is explicit. They further explain that explicit knowledge is accessible through consciousness and differs from tacit knowledge that is tied e.g. to the senses, intuition, unarticulated mental models, or implicit rules of thumb. Nonaka and Von Krogh (2009) state that tacit knowledge is rooted in action, procedures, routines, commitment, ideals, values and emotions.

Nonaka, Toyama, Konno (2000) argue that since knowledge is created in social interactions amongst individuals and organisations, it is inherently dynamic in nature. Knowledge is also context-specific and is dependent on particular time and space. Without connection to the context, it is just information, not knowledge. According to Liew (2013), data comprises of recorded symbols, whereas information is a message that contains relevant meaning and knowledge is the cognition, capacity to act and understanding that resides or is contained within the mind.

SECI Model

Nonaka, Toyama, Konno (2000) presented an illustration of their SECI process. SECI is an acronym that stands for socialisation, externalisation, combination and internalisation. Nonaka et al state that these represent the four modes of knowledge conversion. According to them knowledge in organisations is created through the interactions between explicit and tacit knowledge. They call the interaction between the two types of knowledge as knowledge conversion.

The SECI process consist of four modes of knowledge conversion (see below figure 2). An organisation creates knowledge through the interactions between explicit knowledge and tacit knowledge. Through the conversion process, tacit and explicit knowledge expands in both quality and quantity. There are four modes of knowledge conversion (Nonaka, Toyama & Konno, 2000):

1. Socialisation (from tacit knowledge to tacit knowledge)
2. Externalisation (from tacit knowledge to explicit knowledge)
3. Combination (from explicit knowledge to explicit knowledge)
4. Internalisation (from explicit knowledge to tacit knowledge)

Nonaka et. al (2000) describe socialisation as the process of converting new tacit knowledge through shared experiences. Tacit knowledge is hard to formalise and can be acquired only through shared experience, such as spending time together. An

example of socialisation is a traditional apprenticeship, where apprentices learn the tacit knowledge of their craft through hands-on experience, rather than from written guides.

According to Nonaka et al, (2000) in SECI model externalisation is the process of articulating tacit knowledge into explicit knowledge. Explicit, knowledge is crystallised and this allows it to be shared by others. And thus, it becomes the basis of new knowledge.

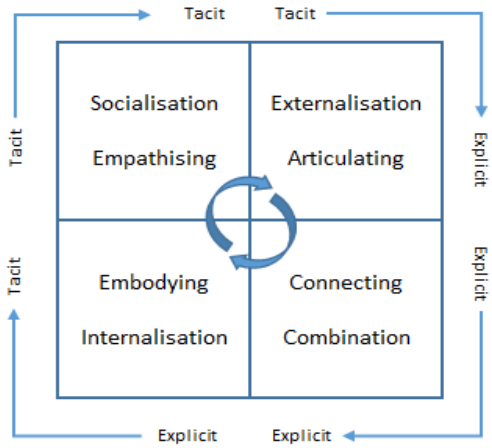

Figure 2: The SECI Process

When the knowledge has been made explicit, to the extent it is possible, the next phase is combination. According to Nonaka et al, (2000) combination refers to a process of converting explicit knowledge into more complicated and systematic set of explicit knowledge. They further explain that explicit knowledge can be collected from inside or outside the organisation. Knowledge is then combined, edited or processed to form new knowledge. For example, when a corporate finance manager collects information about an organization as a whole and combines it with context to produce a financial report, that report is new information because it synthesizes information from many different sources into a single context.

Internalisation, according to Nonaka et al, (2000,), is the process of embodying explicit knowledge into tacit knowledge. Through the process of internalisation, explicit knowledge is converted into tacit knowledge by persons involved. Nonaka et al, (2000) further explain that internalisation is closely related to "learning by doing". Explicit information, such as production methods, must be actualized through action and practice. For example, in training programs, trainees read and reflect on documents and manuals related to their work. Through this, they can internalize explicit information in these documents to enrich their knowledge base of tacit knowledge. Writers acknowledge that this description presented by Nonaka et al is well aligned with Polanyi´s notion that knowledge and knower are ontologically connected when discussing about tacit knowing (Oğuz & Şengün, 2011).

Execution the LbD Course

The need for a LbD course was identified in Autumn 2019 when Laurea UAS had collaboration discussions with Far East Universities. Their desire was to improve working life connections and integrate learning objectives and working life

development projects. In December 2019 a "kick-off" meeting was organized and Laurea set up the team to develop the LbD course. The team consisted of three persons with different types of skill sets and specialisation areas; a productisation specialist, LbD specialist lecturer and visualising specialist. Project steering group included RDI Vice President and Laurea Sales Director. The course target group was defined as universities and their teachers looking a way to integrate working life projects to their courses. The creation process is presented in figure 3 (see below).

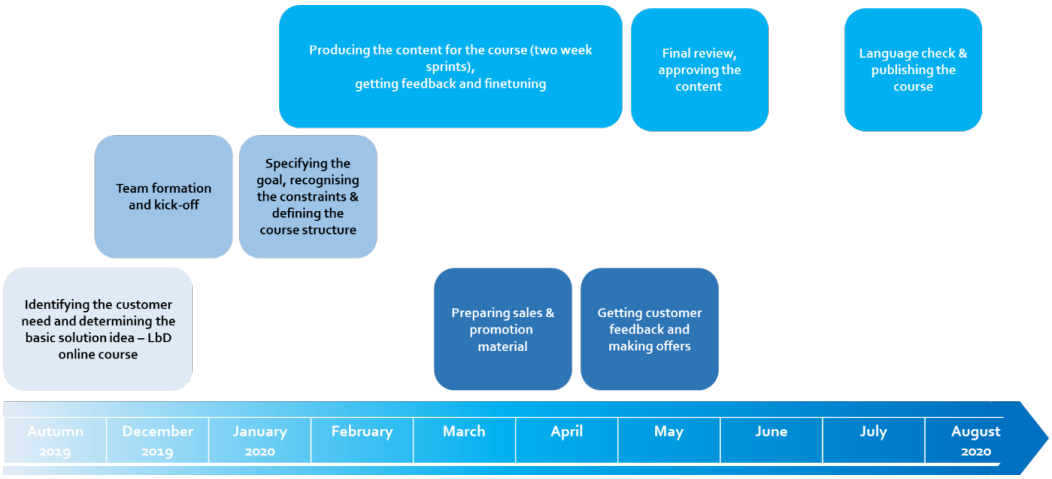

Figure 3: Overview of the Creation Process of Lbd Course.

In the very first phase of preparing the course we (the team) identified core customer needs and also constraints. This led into an agile project plan and rough sub-goals, time schedule and obstacles for the LbD course. For instance, through these initial discussions it became evident that the course should work fully online. The first concrete deliverable was the overall structure for the online course. The course structure, with eight module topics, was finished by mid-February. Those modules follow the same steps as a typical LbD project course implemented by the teacher at Laurea.

After agreeing on the overall structure, we initiated weekly sprints that included one face-to-face weekly workshop. Later we held these workshops virtually due to COVID-19. Our working method was the following:

1. The productisation specialist made sure that each module was carefully described (supplier, input, process, output, customer)
2. The LbD specialist presented the teachers view, e.g. what are the things to do in each module and how to do it
3. LbD specialist was interviewed by other team members and a detailed description was documented

The essential part of the workshops was that the LbD specialists were challenged by asking the questions like what, why and how. Between the workshops the documentation was created which included; descriptions, instructions, templates, questionnaires etc.

We documented the content into Canvas (Learning platform) by the team members. The Course is based on the principle of Learning by Developing idea – during the

Course the teacher implements real working life project with her/his students and working life partner. Every module follows the same structure:

1. Content - overview of the module works and task. In some modules academic LbD articles or part of them are available for reading to get deeper understanding on the subject
2. Guidance – getting in to the LbD mindset and enabling concrete actions with "hands-on" advice what and how to do in practice
3. Tools – project tools and templates help teacher and her/his students in implementing the LbD project
4. Quiz – the quiz questions help teacher to reflect and identify the essential discoveries in the module
5. Feedback – giving the feedback for course organizers

During the preparing of the course Laurea Sales Director was in touch with the foreign universities and got feedback and improvement ideas. This information was analyzed and utilized in the course creation process. Also, the promotion and sales material was prepared during the course creation process and Laurea Marketing team contributed to this process.

The final review and approval by the steering group of the course was made at the end of May. The language checking was done by August 2020.

Applying the SECI Process in Creating the Lbd Course

While the original SECI-model comprises of four phases we limited our own operations to cover the last three phases of the SECI model (figure 4 below). It may be that we didn´t do justice to the original model by choosing this approach, but we justify this limited approach with our narrower focus and acknowledging that we may continue this investigation further once we have the data from the intended end-users.

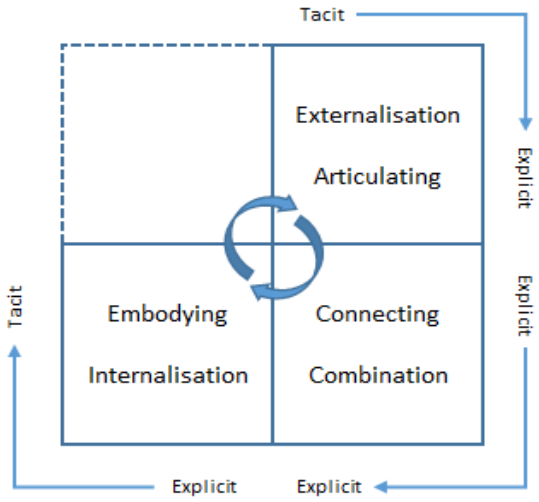

Figure 4: Applying the SECI-Model in the Creation Process

Our process began with externalisation. The basic steps of the LbD model at a general level are easy to communicate and make visible. However, when we looked deeper into practices we began to discover that there are things that are easy to express and things that, (even for an expert), required a longer time and substantial amount of

application before they were properly understood. This tacit knowledge based on experience was unearthed through dialogue. An experienced expert in the LbD model was matched with persons with no prior understanding of the subject. These "outsiders" asked questions and were not content with answers that to be understood would have required prior understanding and even practice. The goal of externalisation was to make information explicit using concepts and models. At this stage, tacit knowledge was also transformed into a form that can be understood by others not just the expert himself. During the preparation of the LbD online course, we identified several common unwritten practices that were applied within the appropriate community of practice, aka Laurea´s teachers.

Figure 5 depicts an example of our discussion and it illustrates our typical discussion on unearthing tacit knowledge. The LbD expert is indicating that at a certain phase the students are evaluated. When we continue with the inquiring details, he first dismisses the questions by stating that evaluating is basic work for the teachers. He takes this evaluation and assessment work and the knowledge required to do the job for granted. He knows how to do an assessment without detailed instructions because he has been doing it for years. However, for persons new to this concept the evaluation does not open up without a very practical description of the matter, which is why the expert is challenged with the question of how to describe the matter even more precisely. That way even "outsiders" can internalize the practical implementation of the evaluation.

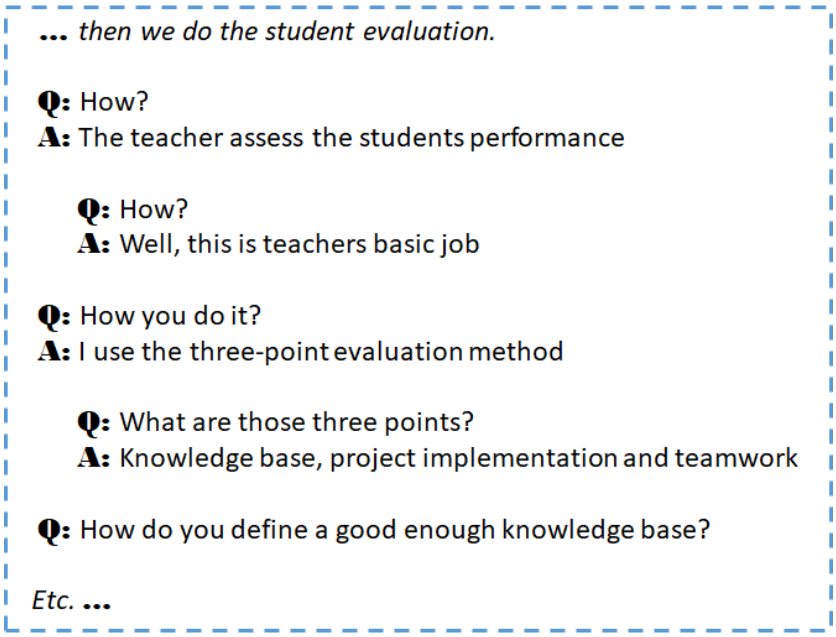

Figure 5: Example of Dialogue in the Creation Process

In the next step of the process, the information obtained explicitly was combined into larger knowledge bases. Once the information is in an explicit form, it can be analysed, organized, and combined with previous data. This was done by adding more subheadings, text, and tool templates under the previously outlined heading structure. Adding, structuring, and enriching knowledge began to form a structure beyond the plan. It was not only a one-way enrichment of the table of contents, but this amalgamation led us to questions our specific contents and, at times, even the very structure. At the beginning of the work, the structure, modules, titles and their content, seemed so clear, but then we had to re-justify them. This led, at times, to us changing

the titles of the modules, as well as refinement of the content and changes in the order of the contents.

The final stage of our process, that is, internalisation, means understanding the explicit knowledge and internalising this knowledge thus converting it into tacit. The information becomes part of the participant's personal knowledge base. Our role at this stage is indirect. We may never be in contact with a course participant, so our influence must be based on other methods and tools. Here lies our pedagogical idea behind the course content. While attending our course the participant is required to set up and implement a course for her/his own students and consequently she/he is learning by doing. That way we have built the course on the same principles as what we aim to teach in the course.

Results

LbD Course

We created a very practical online course for university teachers in which the LbD course consists of eight consecutive modules. Modules provide; background information, instructions on how to implement the module, tools to support the practical execution and reflection at the end of every module. Modules are: 1) Introduction, 2) Choosing a suitable course, 3) Working life partners, 4) Theoretical studies, 5) Working life project, 6) Reporting, 7) Presenting the results, 8) Evaluation (see figure 6).

We are fully aware that for the teacher completing this course this will be a different journey into exploring her/his role as a teacher. In the LbD model, the students and working life partners are the active players and the teacher is encouraged to position her/himself as a mentor and a coach rather than act as a "classic classroom" teacher. This model connects working life partners and students in a very practical way. Students develop real life experience and networks and the working life partner "gets the job done" while also learning. The teacher and her/his university connects with working life, which will increase the relevance and impact of the education work.

The online course itself is based on LbD principles and when a teacher initiates such a course she/he is expected to actually implement real life projects with her/his students and working life partners while completing it. Therefore, we emphasise implementation aspects strongly.There are some theoretical articles to provide a teacher with background information, but the focus is on applying, implementing and reflecting.

We have described the teacher’s journey on the course (see figure 6) who has her/his own path that is interlocked with the path of other significant parties such as her/his students and the working life partners. Teachers are providing learning and guidance to their students and overseeing the co-operation with working life partners.

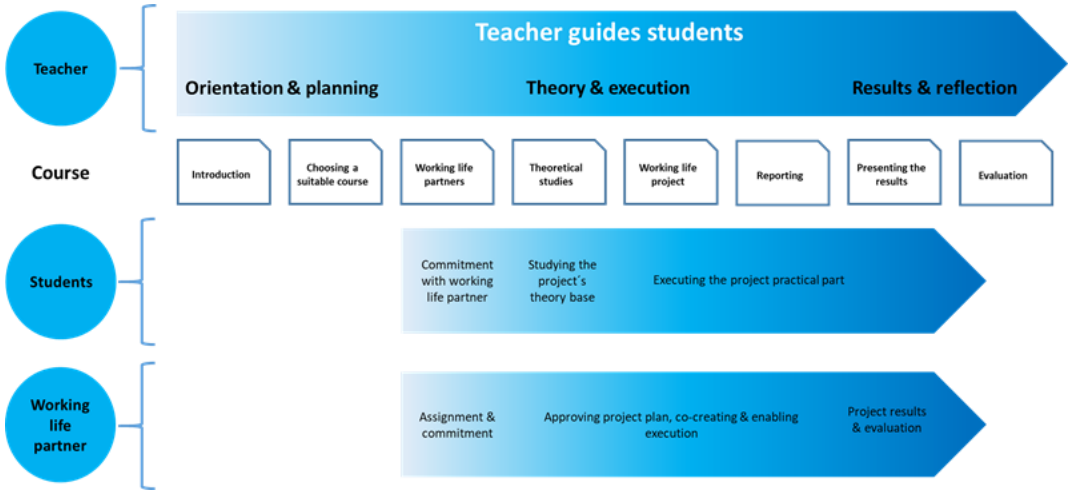

Figure 6: A General Overview of the Course.

Tools

We created several concrete tools to help the teacher with implementation practicalities. These tools included; course timeline tool, course assessment tool, email templates, project commitment document, memo template, student evaluation formula, project plan template, result presentation template and feedback from working life partners.

As an example, there is the Project Commitment Document (figure 7). We recognized that Laurea's existing project agreement was too context-specific and this new document included externalised existing knowledge and new explicit information created during the preparation of the course. The new document was thus not a re-creation of old document but something new. We also tested this and other tools to verify their usability and relevance. Our intention was not to replace existing tools used in Laurea but it turned out that a number of these documents were taken into active use by Laurea experts straight away.

YOUR LOGO

PROJECT COMMITMENT

Working life partner	**Project team (students)**	**Teacher**
Company / organisation *Contact person and contact info*	*Team members* *Project manager and contact info*	*Name and contact info*
Project goal	**Project schedule**	**Other relevant issues**
What is to be the end result of the project and key deliverables?	*Start and completion date*	• *Confidentiality* • *Who can utilise the findings?* • *Who is responsible for costs, e.g travel expenses?*
Date and signatures	*Everybody signs and, in so doing, shares the same understanding and commitment to this shared vision.*	

Figure 7: Project Commitment Document

Earlier in the article (see example figure 5) we described the typical discussion of unearthing tacit knowledge and showing it as explicit knowledge. In that example given the expert was answering an inquiry about the student evaluation and the discussion led to explicit categorisation of the way he conducted the evaluation. When this was documented and analysed, we were able to create a template to be used as a tool to help course participants to evaluate their own students (Figure 8. Student Evaluation Template). This documenting enabled the exposure of the tacit elements of the evaluation for wider discussion among the Laurea experts. As stated previously Lazaric et al, (2003,1830): "Articulation paves the way for codification and can only be achieved by making the relevant practices explicit within different communities of practice". We are now able to see that taking place through such documenting.

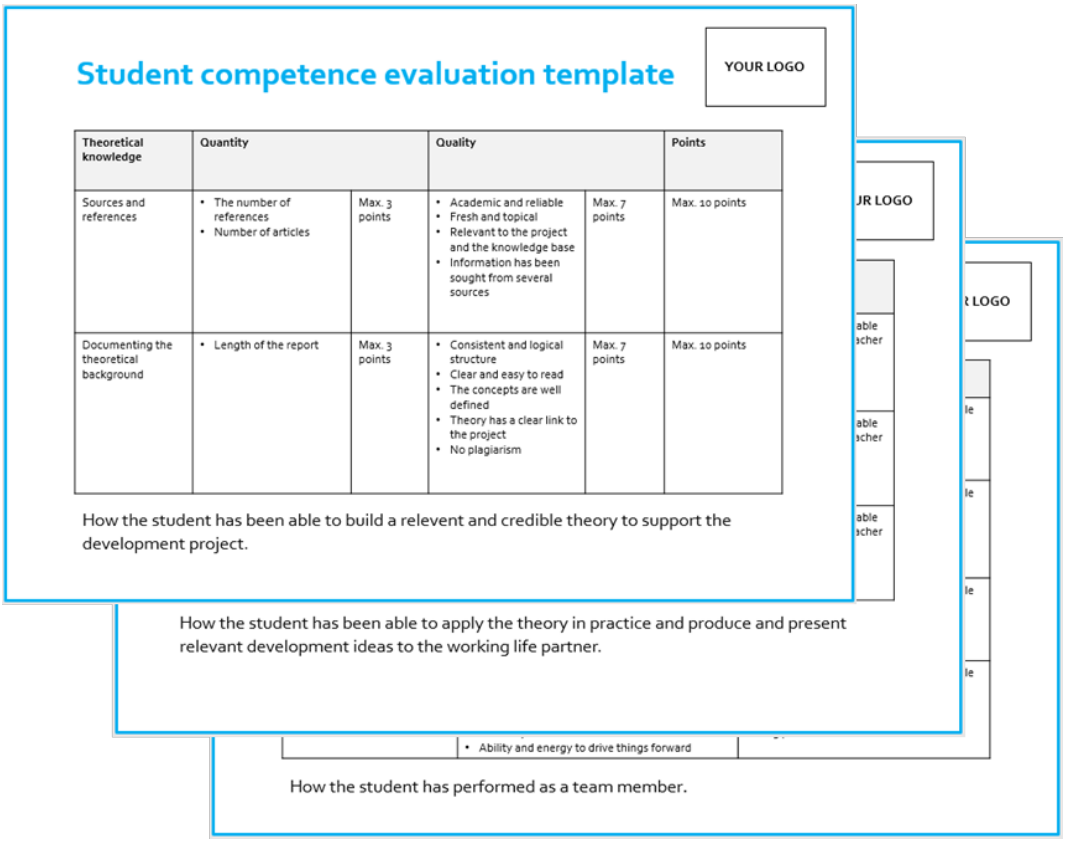

Figure 8: Student Evaluation Template

Conclusions and Discussion

Our primary objective was to make Laurea's LbD know-how, (which has become partially tacit knowledge over a decade), explicit, to be able to combine and communicate this, and to make it possible for other university teachers to internalize this explicit knowledge and turn it into tacit knowledge again. However, it seems that the results generated as a by-product were in the end more insightful than expected. In the shallowest sense, we reached our intended target, at a deeper level we have started to understand the meaning of tacit knowledge. Going even further, we have realised that there are some pre-requisites which are necessary to facilitate successful work which can enable the visibility of tacit knowledge within explicit documents.

We identified several common unwritten practices that Laurea teachers actively use and one such example related to the practices used when preparing the LbD projects for their courses. The way the Laurea teachers contact the working life partners and integrate them into their courses is similar to actual working business practice.For the Laurea LbD teachers it is obvious that they are networked with working life and they have relatively easy access to working life partner decision makers. While these practices are undocumented they are implemented in much the same way. It is perhaps fair to say that tacit knowledge is hiding in plain sight as It is something that is present and used every day whether we are aware of it or not. This was something that became evident to us and this supported Polanyi´s original comment "we can know more than we can tell".

Its worth noting that this making of practices explicit enabled further development of our own tools and processes. Specialist colleagues found something concrete to grab on to and these discussions led for example to revision of existing practices concerning project planning. Previously a project plan was presented by the students 2-3 weeks after the project briefing. New template and practice led to a shorter lead time and shifted the focus more towards co-creating.

We found some crucial ingredients in making tacit knowledge explicit such as making simple questions, digging ever deeper to reach the satisfactory level of shared understanding and challenging each other. We could simply call this a dialogue and what makes this kind of insightful dialogue possible? The key element seemed to be the ability to create a heart-to-heart atmosphere during the discussions. This atmosphere was present due to lack of hierarchies in the team and the absence of defensiveness on the part of the experts. In other words, it was possible to ask very simple and "unintelligent" questions and nobody felt offended. Additionally that satisfactory level of shared understanding is dependent on a pre-existing understanding by team members. Thus instead of having only high level experts in the team we found that it is optimal to have members with different levels of understanding to obtain good results.

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