Research Publication 2013

Kymenlaakso University of Applied Sciences
Mikkeli University of Applied Sciences

RESEARCH PUBLICATION
2013

Contents

Preface

Kymenlaakso University of Applied Sciences (KyUAS) and Mikkeli University of Applied Sciences (MUAS) have extended their cooperation over the last four years. KyUAS and MUAS were transferred to a common holding organization in 2012 and the next steps on the road to integration are to be taken within two years' time. This joint publication is one result of the cooperation and provides a window into the research and development activities at these two higher education organizations.

In this second issue of the research publication, the focus is on innovation to support regional development in the South Savo and Kymenlaakso regions. Often, innovations come about when various different parties interact. Universities of Applied Sciences work closely with businesses and public sector organizations to increase the effectiveness of both R&D and education in their operational environment. This research publication consists of eight articles presenting research, development and educational activities that promote and strengthen the regions' competence and competitiveness through innovation.

In the opening article, project manager Eeva Kuoppala discusses what is understood by innovation in educational organizations and what could be done to promote innovation in the context of education. In the second article, senior lecturers Sinikka Pekkalin and Sinikka Ruohonen present the results of a survey carried out as part of the INTOVERKKO project. Following that, development engineer Arja Sinkko presents a collaborative event entitled "24-hour take-off" that aims to find new innovations in cooperation between business and university staff.

RDI manager Juhani Talvela's article is based on an interview study carried out among small and medium-sized enterprises and public organizations in South Kymenlaakso. It describes the role of public organizations in aiding companies in their innovation activities, growth and internationalization. In the fifth article, research director Hanne Soininen discusses the innovation arising from the needs of local businesses in South Savo. The focus is on converting by-product flows of rural and industrial enterprises into commercial products, and utilizing them to produce energy, eco-efficiency, bioenergy, and environmental safety. After that, researcher Riku Kopra and the director of MUAS' Fiberlaboratory Tapio Tirri present the results of recent studies from mill-scale measurement of brown stock washing in the chemical pulp mills.

In the seventh article, project manager Osmo Palonen describes cooperation between MUAS and archive foundation ELKA in digital archiving of historical information, and, to finish, planning officer Eveliina Heino, principal lecturer Minna Veistilä and planning officer Nadezhda Kärmeniemi consider the role of cultural interpreters among Finnish family workers and Russian families in two Finnish municipalities.

We would like to thank the various professionals for contributing to this publication.

16.3.2013

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DEVELOPING EDUCATIONAL INSTITUTIONS' INNOVATION COMPETENCES

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ABSTRACT

Worldwide economic and social changes challenge educational and business organizations to re-design their activities. Innovations are seen as important factors for success in working life. The objective of this article is to scrutinize the concept of innovation in an educational context. The article asks what we actually talk about when we talk about innovation in educational organizations. What could we do to promote innovation in the context of education? In this article the theoretical insights to innovation and innovation pedagogy are explored. The case study is the on-going ESF-funded project, KINOS (Developing Innovation Competences of Educational Organizations), which aims to develop educational institutions' innovation competences. The project is led by Mikkeli University of Applied Sciences. Partner organizations are Mikkeli University Consortium, South-Savo Vocational College and Otavan Opisto. The goal of the project is to develop a model for multi-professional and multi-organisational innovation communities and operations to implement innovation-related activities in the future. Such activities require learning and collaboration between different kinds of organizations. These new forms of collaboration can be found in the partnership and co-configuration between working-life partners and educational organizations. Shared objects of collaboration can promote motivation and learning.

1. INTRODUCTION

Innovation – a word which is loaded with heavy expectations about future success. We have different kinds of strategies to develop innovations and there is plenty of literature on the subject. Rehn (2009, 2) claims that one of the truly tricky things about innovation is that it is incredibly difficult to really take it seriously. He continues that the reason for this is that we are conditioned and even neurologically programmed to focus on what we know and what we can infer from this. The problem of innovation is that it is about our future. Knowledge, which we are used to leaning on, is about our past. When we are asked to think of innovation, we often retreat into things we already know, whereas the point of innovation should be to break with our old frameworks and history-laden ways.

This sets us a great challenge: innovations are needed to develop and promote activities, but how can we challenge ourselves and our organizations to go beyond "old habits" or "best practices" (Rehn 2009)? The purpose of this article is to scrutinize the concept of innovation in an educational context. What do we actually talk about when we talk about innovation in educational organizations? What could we do to promote innovation in the context of education? At the beginning of the article the theoretical insights into innovation and innovation pedagogy are explored. Then the ESF-funded project, KINOS (Developing Innovation Competences of Educational Organizations), is presented as an example of a way of developing educational institutions' innovation competences. The last part of the article reflects both the theoretical and empirical aspects of innovations in vocational and higher education.

Concerning innovation, there is no such thing as ultimate truth. Hopefully, this article will give some perspectives, ideas and moments of "seeing the light" concerning innovation activities in an educational context.

2. INNOVATION AND INNOVATIVENESS

What exactly is an innovation? It is easy to talk about innovation but to define it can be challenging. Innovation is often defined as an idea, practice or object which is considered to be something new. Innovations can also be seen as solutions which bring economical benefits. Finland's national innovation strategy (2008) describes innovation as competitive advantage based on knowledge. In a pedagogical context the process of innovation is important. Innovation is in that sense understood as a process of constantly improving knowledge, which leads to new ideas, further knowledge or practices which are applicable in working life. (Kairisto-Mertanen & al. 2012, 71) In other words; innovation is about finding workable solutions and new approaches (Rehn 2010, 8).

Quite often people confuse creativity and innovativeness. These concepts are related but not synonyms. Creativity is an essential part of innovativeness but it is not sufficient as such. Innovativeness also demands an ability to realize ideas. Innovativeness is defined as the sum of creativity and an "ability to do it". (Berg 2012, Rehn 2011)

In an educational context, innovativeness inevitably concerns learning. This leads us to the pedagogical aspects of innovation. Kairisto-Mertanen & al. (2011, 13) define the overall aim of innovation pedagogy as "to contribute to students' innovation competencies". These competencies refer to the knowledge, skills and attitudes needed for innovation activities.

But what are these competences? Because innovation and innovativeness has become one of the most important aspects of working life, it is quite understandable that education has also turned its focus towards the skills required in our innovation- and knowledge-based society. Hakkarainen & al. (2004, 4) have stated that the desirable characteristics for a productive person in the modern working place include a high level of technical skill and the ability to be independent, to improve one's competences and to develop new methods for coping with challenges. This list could also include good social and communicative skills, creativity and the ability to learn (Kuoppala 2013). Heinonen (2010) also emphasizes the fact that there are no signs that the value of these kinds of skills will diminish in the future; instead, shared learning and "portable skills" are becoming more and more important. By "portable skills", Heinonen means skills that are not tied to a specific context. They are the skills that employees take with them when they change jobs.

3. PEDAGOGICAL ASPECTS OF INNOVATION

Can innovation skills be learned simply by sitting in the classroom? Apparently not. Bereiter & Scardamalia (2003, 2) claim that the most promising way to teach this kind of skill is *immersion*. They continue that if we want students to learn the skills needed to work in knowledge-based, innovation-driven organizations, we should place them in an environment where those skills are required. Such a way of teaching naturally puts great emphasis on guidance; students must get support to handle and reflect on the situations they are dealing with. One attempt to rise to this challenge of learning is the model of work-based pedagogy used in the degree program of Cultural Management at Mikkeli University of Applied Sciences (MUAS). The model is based on activity theory,

and emphasizes the communal nature of learning in authentic cases. Compared to traditional classroom teaching, work-based pedagogy has been a major driver of change in the context and content of learning assignments, schedules and evaluations. (Kuoppala 2012, 18; 2013).

Kettunen (2011, 57) points out that the pedagogical roots of innovation pedagogy in Universities of Applied Sciences (UAS) are in the pragmatism of Dewey (1925); learning from experience (Dreyfus & Dreyfus 1986); the activity theory (Engeström 1987); inquiry learning (Hakkarainen, Lonka & Lipponen 1999) and connectivism (Siemens 2005). Applications of these types of theories in UAS include learning by developing (Raij 2007) and work-based pedagogy (Kuoppala 2012). If, and when, all of these theoretical insights have an impact on innovation pedagogy there must be some key elements which are shared across all of these perspectives. The communal nature of activity, authentic learning cases, dialog between students, teachers and working life partners, knowledge creation and development can be considered as shared elements.

As is already clear, when we talk about innovation pedagogy we aren't dealing with "brand new" ideas. Why has it taken such a long time for these ideas, which have been discussed since the beginning of the 20th century, to be realized? Probably the most general perspective into this is that school was originally created to serve a totally different kind of society than that of today (Robinson 2010, Lonka 2012). The roots of school are in the industrial age, when one of its essential task was to educate workers for the needs of factories; repeating things they had learned without questioning them. Conversely, today's society requires competences concerning knowledge creation, collaboration and innovating. "Traditional learning" has led to a situation where school is not connected to students' everyday lives (Engeström & al. 1984, Miettinen 1990, Ziehe 1982). According to Engeström (1987), this disconnection between reality and school is one of the biggest contradictions of school. From the perspective of activity theory, the outcome of students' activities is to reproduce and modify oral or written forms of a text. In other words, text becomes a closed world, a dead object cut off from its living context (Kuoppala 2012, 15). Although these notions were presented in the 1980s, the same contradiction can still be found. In addition to research, public discussion in newspapers has recently brought up this perspective by arguing that "school has forgotten to update itself" (Kaaro 2012).

4. LEARNING COMMUNITIES

The role of community in learning is emphasized in several studies (Pereira-Queroll 2011, Engeström & Kerosuo 2007, Toiviainen 2003). Hakkarainen (2010) has compared intelligent human activity with a wireless network in which only a part of the processing takes place in the human mind. He continues that this heterogeneous network expands intellectual resources (called networked intelligence). From this perspective learning is defined as a process of becoming a part of cultural-historically evolved collective knowledge network. Hakkarainen & al. (2004) define learning "as a process of inquiry where the aim is to progressively expand one's knowledge and skills by relying on previous experiences and knowledge." They continue that it is characteristic of this kind of knowledge advancement that it takes place within innovative knowledge communities rather than within individuals.

Belpaire (2012) points out that most European strategies are still based on the requirements of the knowledge society while, for example, Chinese people are already talking about a learning society. Learning has been seen as the next "hype" after innovation (Berg 2012). These perspectives on learning and society are especially interesting from the point of view of educational organizations. Because of their tasks (teaching, RDI and regional development), UAS could, and should, be at the forefront of this kind of learning activity.

Virkkunen & Ahonen (2008, 13) have presented the assumption of developmental direction at UAS (figure 1). The historical development is assumed to proceed in two directions. Firstly, the development can be seen to proceed from separately in school learning or professional learning to communal learning that takes place where schools and working life meet. Secondly, the development is seen as proceeding from changing from the competences required in present-day working life towards creating the competences related to developing working life. The conceptual differences between task-oriented competence and expertise are strongly related to this dimension. New methods can be discovered where these two developmental tendencies overlap. This method is based on the continuous development work carried out in UAS and in organizations and companies. According to them, the development will encourage partnership and co-configuration with organizations and companies. The term, "co-configuration", was originally used by Victor and Boynton (1998, 195) to describe the latest form of work which is based on co-creation and the strong involvement of clients.

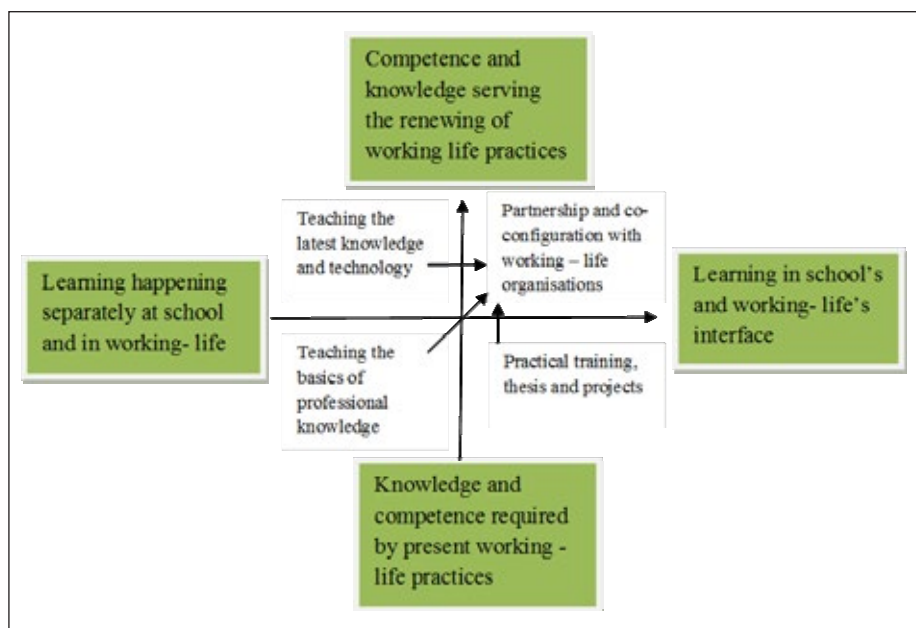Figure 1. The assumed developmental direction of Universities of Applied Sciences (Virkkunen & Ahonen 2008, 13).

According to recent studies, it seems inevitable that new forms of learning and working in partnership with companies and organizations must be studied. MUAS is the leader of the ESF-financed project, KINOS (2011-2013), which aims to develop the innovation competences of educational organizations in the Mikkeli region.

5. KINOS PROJECT: DEVELOPING INNOVATION COMPETENCES OF EDUCATIONAL ORGANIZATIONS

The Strategic Regional Plan 2020 (2012) defines the strategic goals for the South-Savo region as follows: *successful entrepreneurship, an accomplished workforce and good innovation environment, high-quality welfare services and a good operational environment.* The role of educational organizations in the area is emphasized in the strategy, especially concerning education and innovation activity. Education and research is seen as a crucial factor for supporting economic life in the region.

Innovation activity is, at its best, systematic collaboration between different organizations where multidisciplinary groups develop new products, services and operational models. The students and staff at educational organizations can be seen as having significant innovation potential. However, it hasn't been utilized properly. Models for collaboration between different educational organizations concerning innovation activity must be developed. These are the challenges that the research and development project, KINOS, attempts to address. The project is funded by the European Social Fund. It started in autumn 2011 and will continue until the end of 2013. The goal of the project is to develop multi-professional and multi-organisational innovation communities and operational models for implementing innovation activity in the future. Mikkeli University of Applied Sciences, Mikkeli University Consortium (MUC), South-Savo Vocational College and Otavan Opisto are involved in the project. Representatives of each organization participate in the coaching process and piloting cases relating to study modules. (KINOS project plan 2011)

The KINOS project is conducted through five activities: *Surveying the present situation of innovation activity, Coaching and benchmarking, Developmental assignments, Piloting and Publishing the results.* At the first stage, the staff of MUAS, MUC and South-Savo Vocational College responded to a questionnaire designed to assess the present situation of innovation activity. The questions concerned the innovation climate, operational environment, networking, measuring the results of innovation activity, anticipating the changes and requirements of society, and resources for innovation activities. The results were similar between the organizations, although there was variation in how important they appeared to be for different organizations. In brief, the innovation climate was seen as mostly positive. A "good atmosphere" and trust could be identified among the answers. Challenges were seen in the openness of the innovation climate. Respondents felt that more encouragement was needed for innovation activities. Also, it was mentioned that the potential of staff and students wasn't recognized and utilized properly. More detailed results are reported in Juvonen's Masters thesis (Juvonen 2012). Concerning this first stage, scenarios for the future have been worked on using the eDelfoi method developed by Otavan Opisto. In the spring 2012, future scenarios for four themes were gathered by eDelfoi: driving forces, competences, guiding ideas and the future. The results revealed some guidelines and shared interests for local educational collaboration. Play pedagogy was seen as one of the shared interests of these organizations. The second round of eDelfoi in autumn 2012 concerned that topic. The results are still being analyzed but will be used to develop a model for innovation activity.

The second stage is about coaching and benchmarking. At the beginning of the project, volunteers from all of these educational organizations were asked to participate in a coaching process. In total, 27 staff members took part in the coaching, which included training concerning innovation activity in the context of education. Participants were divided into six multidisciplinary groups. The coaching enabled the groups to develop innovative learning cases (developmental assignments) which will be piloted in spring 2013 (piloting). During the piloting, the students and teachers will be learning and developing their innovation competences. They will report about the difficulties and advantages of this type of collaboration. This information will also be used to develop a model for innovation activity (Publishing the results). In addition, the project includes benchmarking trips for staff and students at organizations in which innovation activity can be considered advanced.

Partly because of the results of the innovation survey, the role of students and managers was taken more strongly into account in project activities. Multidisciplinary groups were formed to consider the theme of innovation from their perspectives. Information produced in these situations is utilized to create a model. With the help of the KINOS project, the vocational and higher educational organizations have found each other and have discovered methods for future collaboration. The atmosphere within project meetings has been inspirational. There have been open and honest discussions about the challenges and benefits concerning innovation activity, learning and local collaboration. This type of discussion and opportunity for collaboration are crucial to innovation activity. By getting to know each other we can create opportunities to build trust and to learn. These are prerequisites for successful collaboration (Toivianen 2003). One of the teachers put it nicely:

"*At the beginning we were quite confused: what on earth could a hairdresser, engineer and designer do together? But then we realized that that is exactly the point; we don't know yet but we want to try.*"

6. DISCUSSION AND CONCLUSIONS

To meet the challenges of the worldwide economic situation and social changes many organizations need to redesign their activity and reconfigure their capacity to promote innovation (Kerosuo & al. 2010, 111). This requires collaboration and learning between different kinds of organizations. These new forms of collaboration can be found in partnership and co-configuration with working-life partners (Virkkunen & Ahonen 2008, Kuoppala 2012). One of the most crucial aspects of collaboration is the shared object (Engeström 2001). The object of activity has been seen as a true carrier of motivation and learning (Leont'ev 1978, Engeström 1987, Kaptelinin 2005, Engeström & Sannino 2010). This activity theory perspective of human actions is quite easy to agree with; we are usually motivated when we feel that the action is beneficial to us. Knowledge about the subject also helps us to motivate ourselves (Lonka 2012). In other words, in successful collaboration we must be able to find cases which are truly in the shared interests of the partners. This doesn't mean that the object must be exactly the same for all of the partners – that may even be impossible – but that the connection to all of the partner organizations' interests should be found.

From the perspective of innovation activity it is important to ask whether companies and organizations can find objects that are shared by educational organizations, and thus also the motivation for collaboration and learning (Kuoppala 2012, 15). At this point it seems that the willingness to search for it is strong. This leads us back to the pedagogical aspects of innovation activity: authentic cases and co-creation. If, and when, we want to develop operational models to promote innovation activity, learning and entrepreneurship, there are some aspects mentioned in this article that must be considered. One of the most essential is the nature of learning. As several studies have proved, learning is a communal collaboration process. It's about creating and applying knowledge, not repeating it. It is no longer restricted to the classroom; rather, it takes place in networks that focus on authentic cases. No longer are the learners only students; they are also teachers and collaborators within companies and organizations.

This kind of development has had a significant effect on the work of teachers. The fragmented and multidimensional nature of UAS teachers' work challenges traditional teacher competences, such as substance and pedagogical competences (Mäki 2012, 14). Beside the teachers, changes in learning patterns also challenge students, companies and organizations. Students have learned to learn in a traditional way; this new kind of learning requires different actions from them. In most cases this is not easy, but often it is more efficient. Companies and organizations instead are challenged to see collaboration with educational organizations as a learning process for them. For example, participating in the co-creation of a shared case study could be seen as further training for companies and organizations.

Kerosuo & al. (2010, 111) claim that the design process of innovation is often disconnected from organizational development and learning. In conclusion, it can be said that economic and social change in our society are challenging both educational and business organizations to redesign their activities. Innovations and innovation competences are seen as important factors for success in working life. Therefore, developing new forms to collaborate and learn is crucial and must be supported.

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THE INTOVERKKO PROJECT SEEKS WORKING-LIFE-ORIENTED METHODS

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ABSTRACT

Vocational colleges and Universities of Applied Sciences are seeking new ways to apply teaching methods involving contact with external organizations and companies. Professional competence is as essential as ever, but the principle of lifelong learning has raised the importance of more general skills that are required in the workplace. Learning environments have expanded beyond the walls of educational institutes and into professional networks, thereby encouraging teachers and students to become involved in new projects and teams. In this article we will present the results of a survey carried out at the beginning of the INTOVERKKO project, which ran from 2011 to 2013. The survey set out to gauge the experiences of students and teachers in relation to tasks assigned to students, teaching methods, evaluations and feedback, as well as analyzing the way in which students and teachers interacted with external organizations and companies. This information will be used to evaluate the effectiveness of the project and to create a networked, learner-centric pedagogical approach in which educational institutes at various levels collaborate with external organizations and companies to form a genuinely multidisciplinary learning environment.

The INTOVERKKO project (2011–2013) is funded by the European Social Fund (ESF) and belongs to the ESF programme in mainland Finland. Kymenlaakso University of Applied Sciences (KyUAS) and the Kouvola Region Vocational College (KSAO) conducted the project. The authors of this article were involved in the project as researchers.

1. INTRODUCTION

Professors Antti Hautamäki and Tarmo Lemola, researchers into innovation activity, have identified a shift in business life: Finland is now building an innovation environment based upon expertise and innovative drive, rather than the innovation system it had previously focused upon (Hautamäki 2008a, 2008b). Educational institutes are encountering new ways of thinking in which innovative learning-related approaches and models have risen to the fore. Whether an educational institute is part of the innovation environment depends to a large extent on the use of teaching methods related to working life. In this context, the challenge facing educational institutes is to organize their activities in such a way as to enable students, during the course of their studies, to develop professional competence as well as the general skills and abilities required in the workplace. These skill sets include the abilities to identify new opportunities, to think and act differently from others and to cope with unpredictable situations. Teaching methods have an impact on innovative thinking. According to Siltala's dissertation (2010, 73, 62–68), innovative thinking can be defined as creativity resulting from a broad-ranging education that can have a positive practical effect on a process or event.

Teachers' innovative thinking forms an integral part of their quest for regeneration and reform. From the point of view of innovative thinking, it is important for teachers to attempt to regenerate their teaching methods and to seek combined approaches for working and teaching.

The INTOVERKKO project was run jointly by KyUAS and KSAO. Its main objective was to produce a networked approach that can further improve collaboration with com-

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panies, in which entrepreneurship plays a key role alongside a working-life-oriented, student-centric pedagogy. Within the scope of the project, entrepreneurship refers to the abilities to think innovatively, take risks, cope with uncertainty, identify opportunities and solve problems. The approach seeks development in the following key areas: using collaboration with companies as a learning environment, preparing curricula, preparing schedules/timetables, using learner-centric evaluation methods and defining the roles of the personnel involved in collaboration with companies. In this article we will present a study into pedagogical activity, which was carried out in 2012, at the beginning of the project. These results will be used later on in the project cycle to provide a basis for developing and evaluating pedagogical methods when the project ends in 2013. We will conclude by considering the methods that will enable pedagogical approaches to attain greater visibility to all of the stakeholders concerned, throughout all stages in the learning process.

Within the scope of this article, a learning environment is defined as a combination of social, physical, technical, local and didactic factors. The last of these factors results in learning. In terms of learning environments, key didactic elements include learners' own activeness and an opportunity to learn in authentic situations, either full-time or as part of a course of studies. It is essential to enable direct interaction and a problem-centric approach, rather than focusing on subject-oriented learning. Studying then becomes process-based and encompasses far more than traditional course- and lesson-based approaches. The process is also relatively long-term in nature. Students are supported within the learning environment by various experts and networks; the teacher functions as a facilitator and a support person. Locality introduces a contextual perspective: the best way to learn is by doing in authentic situations. It also facilitates more informal, day-to-day learning alongside the structured learning that takes place within the educational organization. (Manninen 2007, 35–41; Manninen 2001, 29–30.)

2. TEACHING-RELATED METHODS FROM THE PERSPECTIVES OF TEACHERS AND STUDENTS

In this section, we will describe the results of a survey of teachers and students at KyU-AS and KSAO that was carried out at the beginning of the project. The questionnaire included sections on teaching and evaluation methods, as well as on the structures for collaborating with companies. The objective was to identify the current status of pedagogical approaches and collaboration with external organizations and companies at KyU-AS and KSAO. The survey will enable us to define development initiatives for the pedagogical implementation of learning projects related to the INTOVERKKO project and for the creation of mutual operating methods.

The research was carried out using a quantitative survey, which included categorized questions and open-ended questions. The questionnaire was sent to 455 teachers, and 151 teachers responded. Of them, 87 taught at KyUAS and 64 taught at KSAO. The response rate was, therefore, 33%. The questionnaire was also sent to students and 829 responses were received, of which 555 were from KyUAS students and 274 were from KSAO students. The responses have been analyzed and grouped in terms of the educational institutes in question. There was insufficient data to provide a statistically signif-

icant result for narrower categories. Student numbers differ considerably from department to department and, consequently, the number of responses received also differed considerably from department to department.

Numerous studies have shown that school is not the only place where people learn; often, the most significant learning experiences occur somewhere else entirely. For adults, learning is a highly selective, goal-oriented process, and the subject matter must be of importance to the individual's life and identity. For adults, experiences in the workplace, as a factor of the person's life experience as a whole, are extremely significant from the point of view of learning. (Antikainen 2009, 89-91.) In the open-ended questions in this questionnaire, teachers rated their own learning experiences as significant when they were associated with experience, learning by doing, or with a project (31 mentions). Learning from others in a group was also considered significant (24 mentions), as was self-reflection (10 mentions). Individual mentions of significant learning experiences included essays, exercises, theory/practice, problem-based learning, company visits, problem-solving and self-study.

Students were also asked an open-ended question about how they think they learn best. Most (KyUAS: 209, KSAO: 104) nominated exercises, learning in practice and learning by experimentation as the best ways of learning. Some students also described learning effectively by taking notes and then using their notes to put theory into practice. The second-highest number of mentions (KyUAS: 160, KSAO: 75) was of students learning by attending lectures and completing exercises. Many also mentioned that writing is important in itself. There were a total 528 responses from KyUAS students and 251 responses from KSAO students. Self-realization and research were mentioned by only four KyUAS students. Discussion, sharing information with others and advising others were mentioned by 23 KyUAS students and six KSAO students, while 18 KyUAS students and eight KSAO students mentioned group work. Six students at the University of Applied Sciences mentioned positive learning experiences arising from being involved in project work with the right type of clients.

2.1 Projects and collaboration with external organizations and companies as a part of learning

Both KSAO and KyUAS have long traditions of collaborating with external organizations and companies. Learning that occurs in the workplace is referred to as "learning at work" at vocational colleges, whereas Universities of Applied Sciences use the term, "internship". At the vocational college, many of the students are still minors and teachers' work includes visits to the workplace during the placement (1.5 hours per student per week), whereas teachers at the University of Applied Sciences do not generally visit students on internships; instead, the students are expected to report on their internships. Of KSAO's teachers, 67% reported visiting workplaces often or very often. The corresponding figure for KyUAS was 24%. However, the responses did not indicate the reasons for teachers' visits to workplaces: were the teachers visiting students? Were they negotiating potential projects? Were they doing extra work in addition to their teaching duties? Of the KyUAS teachers who responded to the questionnaire, 46% reported being involved in projects with external organizations or companies every year, while the corre-

sponding figure for KSAO is 11%. Of the KyUAS students who responded to the questionnaire, 34% said that they have quite often or very often gained knowledge during company projects, while the corresponding figure for KSAO is 22%. Occasional involvement in projects was reported by 30% of KyUAS students; the corresponding figure for KSAO was 40%. Thus, the majority of both institutes' students have been involved in a project at some point during their studies. The respondents to this survey included a lot of first-year students, who naturally had not yet had the opportunity to be involved in a project.

At the beginning of the INTOVERKKO project, an explanation was discovered for why KSAO's teachers had relatively little involvement in projects: the varying basis for calculation the compensation for the work put in the project. In higher education, the salaries of teachers, lecturers and principal lecturers are determined based on formal qualifications (training and experience), rather than according to what they do, where or how they work, or whether they are doing project work or more traditional teaching. KyUAS is of the opinion that teaching and learning can also take place in projects. The university is actively focusing its teaching policies on providing as much project work as possible during normal teaching time so that students have access to authentic learning environments that enable them to solve practical problems that they may face at work. Both institutes also have their own project staff, which offers an explanation of the differences in responses between teachers and students: students may have been working on projects guided by another member of staff rather than by their own teachers.

KyUAS' teachers reported experiencing a heavier workload and burden of responsibility for projects than either KSAO's teachers or the students of both institutes. The added responsibility was considered to be challenging by 73% of KyUAS' teachers and 26% felt that it was suitable. By contrast, 50% of KSAO's teachers and 50% of the students of both institutes regarded the added responsibility as challenging, with the remainder considering it suitable. (Figure 1).

Only 20% of KyUAS' teachers and 35% of KSAO's teachers considered the workload in projects to be suitable, while 26% of KyUAS' teachers and 13% of KSAO's teachers thought it to be too heavy. Conversely, 70% of the students of both institutes considered the workload to be suitable, and none of them reported it is as being too heavy. (Figure 2).
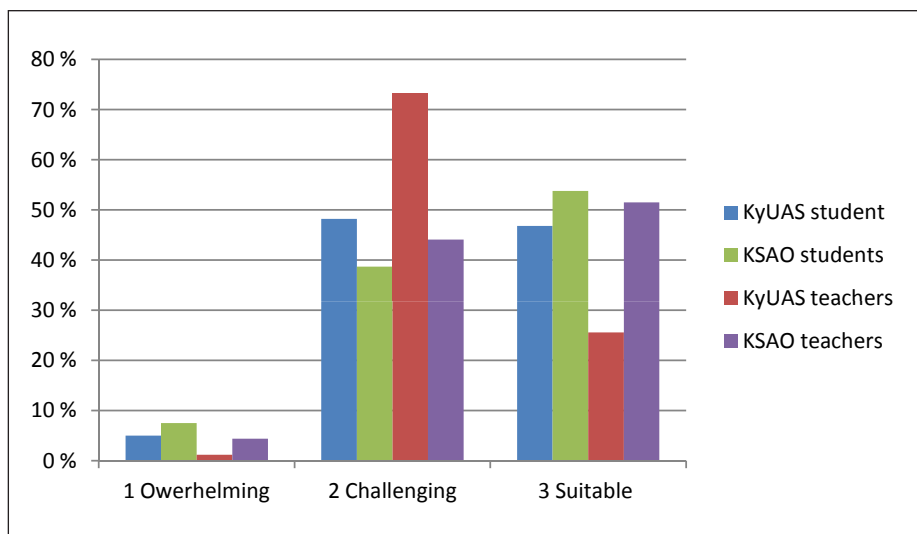
Figure 1. The level of responsibility experienced by teachers and students in projects
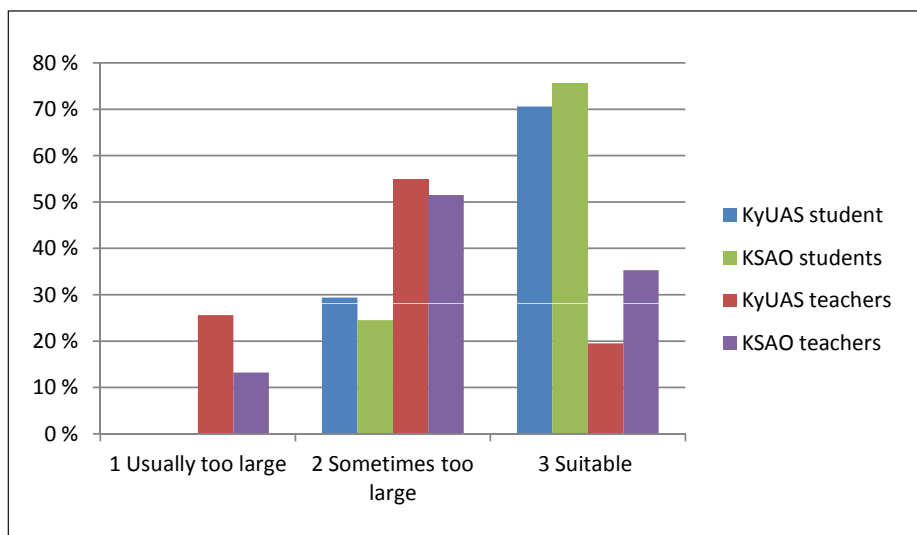

Figure 2. The workload experienced by teachers and students in projects

It is natural that teachers experience projects involving external organizations or companies as challenging, and it is to be expected that some will consider the workload to be too heavy. It is, after all, rather different from traditional classroom teaching and it may require preparation and travel, often long in advance of the start of the project. However, preparation has always been a key part of teachers' work, although it is easier for teachers to prepare lessons within their own areas of expertise. Project work requires different skill-sets related to organization, negotiation, communication, agreements and contact management, including communication with external parties.

Co-operation, team teaching and, in general terms, teamwork constitute a mode of operation that is unfamiliar in teaching work and this may explain the difficulties that

teachers have experienced. It may be that the challenge that teachers experience becomes easier to handle when the team-teaching model is applied, as many teachers share the responsibility. It seemed that, in both institutes, teachers did approximately the same amount of teamwork, so this does not explain the differences between the responses provided by teachers from KyUAS and those from KSAO. However, it may explain the generally burdensome feeling experienced by teachers. Almost half (44%) of all teachers reported planning tasks in tandem with their colleagues quite often or very often, whereas only a third had planned tasks in conjunction with somebody from an external organization or company, and a quarter of teachers had included students in their planning quite often or very often. If students themselves were involved in planning tasks, it could have the effect of increasing the amount of responsibility borne by students while reducing the teacher's burden.

The objective is to use the INTOVERKKO project to encourage more and more teachers to participate in projects involving external organizations and companies and to make projects a more integral part of the curriculum. Reaching this goal may require training in project management skills for teachers and a reassessment of the definition of teachers' working hours.

2.2 Other learning methods

Both students and teachers reported lectures as being the most commonly used teaching method, which naturally does not exclude the use of other methods. Lectures are used more by the University of Applied Sciences than at the vocational college: KyUAS – quite often or very often: 75%; KSAO – quite often or very often: 55%. Homework was completed quite often or very often by 62% of KyUAS' students, compared with 59% of KSAO students. The corresponding figures for examinations or other reading are KyUAS: 61.4% and KSAO: 50%. According to 45% of KyUAS students and 53% of KSAO students, teachers used illustration quite often or very often, while 37% of KyUAS students and 33% of KSAO students mentioned that it was used only occasionally. Demonstrations were also on the list of the most commonly used methods in both institutes: 39% of KSAO students and 30% of KyUAS students reported teachers using them, while 36% of students from both institutes reported demonstrations being used at least occasionally. Figures provided by teachers relating to the use of demonstrations and illustration were somewhat higher, but this may be the result of individual definitions of the difference between "occasionally" (3) and "quite often" (4).

The *learning by doing* method, which is credited as being a powerful way of activating students, was a commonly used method in both institutes, but it was more important for KSAO than for KyUAS (figure 3). *Oral presentations*, on the other hand, are more common at KyUAS than at KSAO (figure 4). The result supports the preliminary view that the teaching at university level is more theoretical than at upper-secondary-level institutes, in which the activation of students is also slightly different. Teachers reported using these methods somewhat more often than students reported them being used. This can be partly explained by the fact that, from a pedagogical point of view, student activation is highly desirable, so teachers are likely to report using such methods often. The students' perspective and experience is different from that of the teacher.
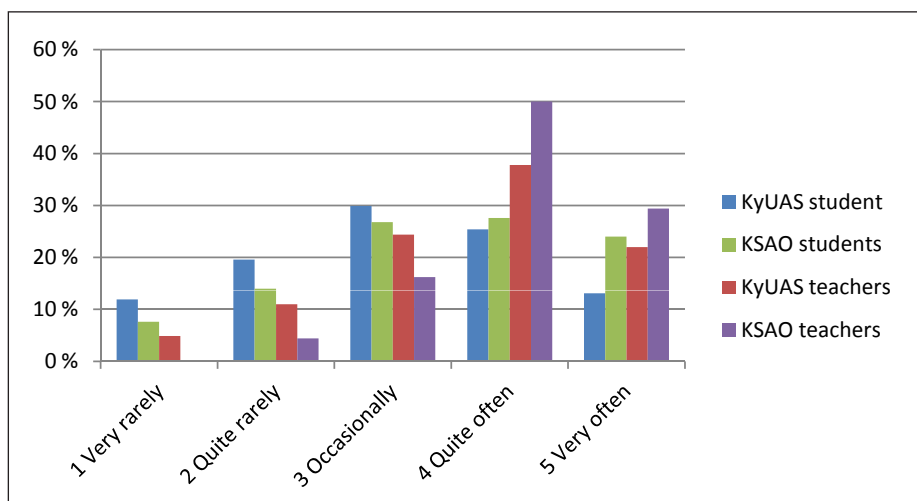
Figure 3. The use of learning by doing according to students and teachers at KyUAS and KSAO
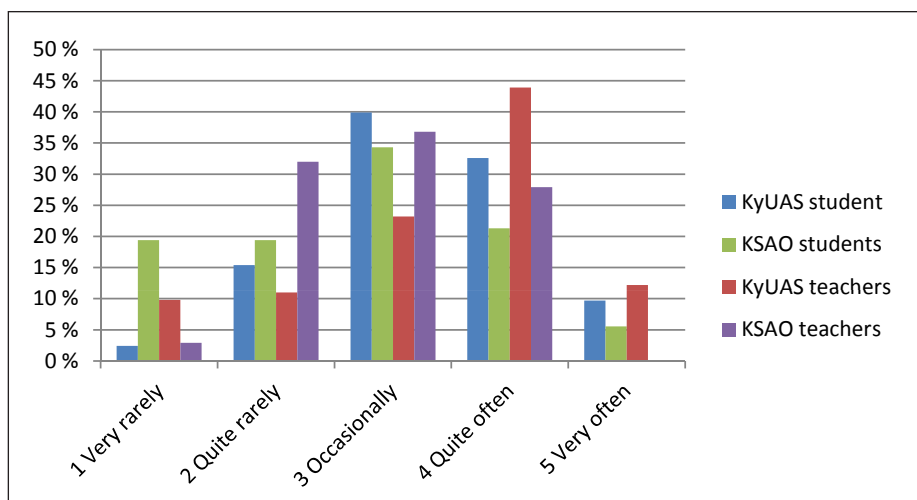
 Figure 4. The amount of oral presentation according to students and teachers at both institutes

Teachers report using co-operative learning much more frequently than students feel it is used (figure 5). Approximately one-half of the teachers at both KSAO and KyUAS report that they use co-operative learning quite often but, according to students, the method is used only occasionally (KSAO: 41%, KyUAS: 37%), although there is plenty of variation in students' responses. The reason for this may be the same differences in perspective as for the aforementioned methods, as well as the fact that the co-operative learning method is highly regarded.
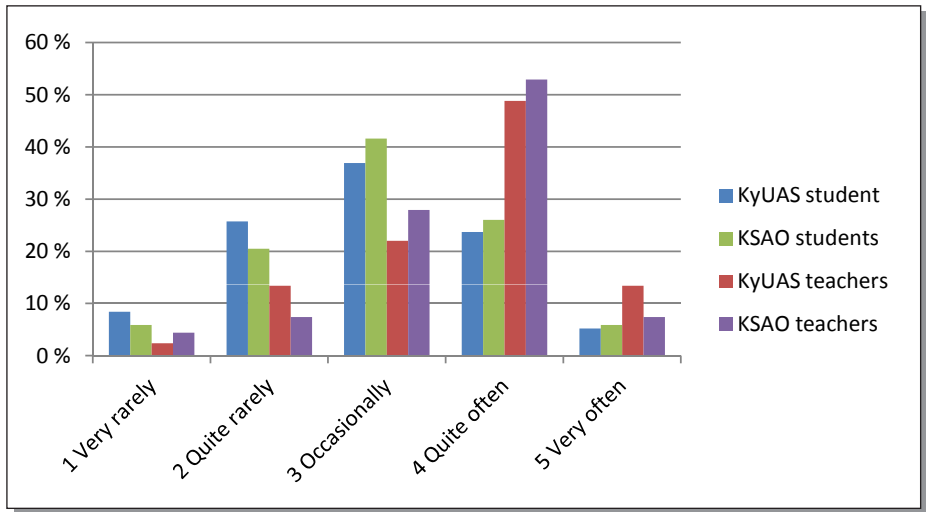
Figure 5. Co-operative learning in teaching at KyUAS and KSAO, as assessed by students and teachers

There were considerable differences in the answers provided by students and teachers on the amount of *laboratory/workshop work* used (figure 6). Approximately one-third of students from KSAO and KyUAS reported there being no laboratory or workshop work in their studies at all. The difference is starker at KSAO, where 40% of teachers reported using laboratory or workshop work quite often, but only 19% of students agreed with this assessment. The large variation and inconsistency in the responses can be explained by the fact that it is precisely in the use of these methods that courses differ the most: courses in design feature a large amount of workshop activity, whereas there is no workshop teaching to speak of on courses in business and economics, which may also explain the weighting of the responses.

Figure 6. Laboratory/workshop use in teaching, as assessed by students and teachers at KyUAS and KSAO.

E-learning is a way of expanding the learning environment and making it independent of time and place. For projects involving external partners, it enables participants to communi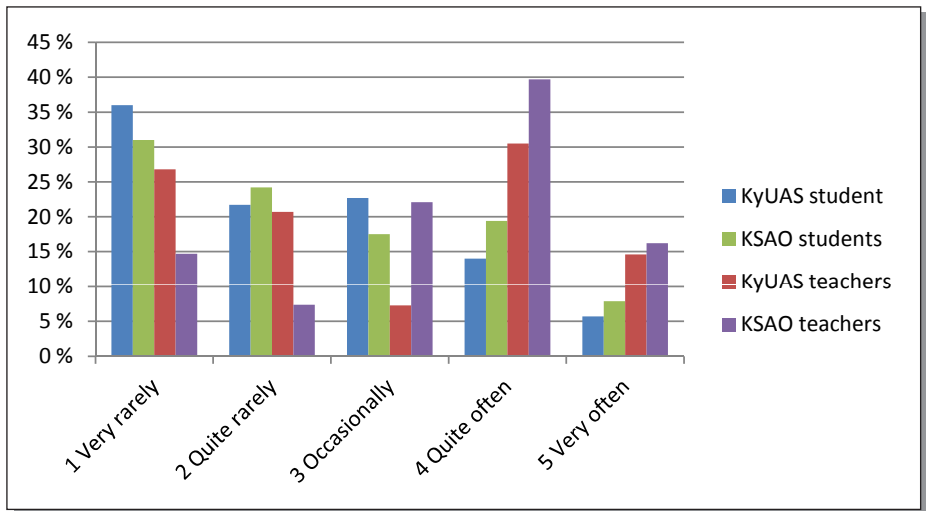cate and share information. It was used more at KyUAS than at KSAO. This result is also in line with the results of the teacher survey, but teachers report using e-learning much more than students report it being used. The "quite often" column (4) is distinctly higher than the others for teachers at KyUAS (figure 7). One key factor in this is certain to be KyUAS' rule that all courses must have a page on Moodle (the online learning platform used by educational institutes), which, in its most basic form, must contain the course objectives, assigned tasks, schedule and functionality for submitting completed tasks. The disparity may also be due to differences in people's understanding of precisely what e-learning constitutes. Courses are often partly internet-based and partly based on traditional contact time. The amount of contact time and the amount of time to be spent using online learning environments can also vary greatly from course to course. If the main focus is on classroom education and only a fraction of the course is to be completed online, it may be that students do not consider the course to be an e-learning course. Also, teachers may have worked hard to create Moodle pages for the course with accompanying materials and, therefore, may consider that a large amount of their working time has been spent creating an e-learning course. Although students may only use Moodle to submit completed assignments, evaluating those assignments may consume a hefty chunk of the teacher's time, whereas students' sole online action is submitting the assignment. Students can complete assignments on their own computers, at a workshop, by searching for material in town, by interviewing someone, by taking photos, by drawing something, by scanning something, etc. Although they may submit completed assignments online, they do not necessarily perceive the teaching method to be online teaching.
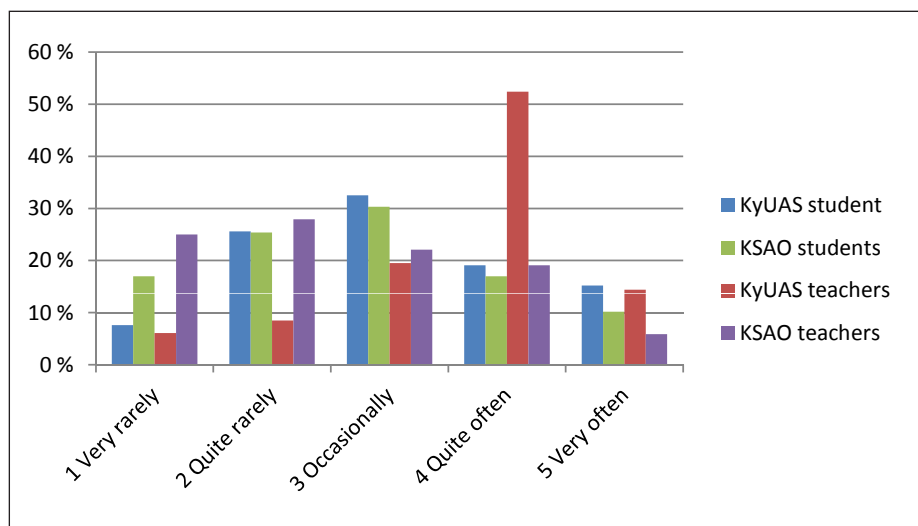

Figure 7. Students' and teachers' experiences of the amount of e-learning used at KyUAS and KSAO

Online learning and communication could be utilized on a much larger scale than it currently is. Some teachers use the internet all the time (e.g., Hartikainen, 2012, 98-99) and, for students, it is a natural forum for debate. A blog was created for INTOVERK-KO's various sub-areas because only registered students can access their own institute's Moodle sites. As the project progresses we will be able to see how successful it will be as a tool for communication and sharing information.

The least used methods, according to the responses from students and teachers, are *drama pedagogy, learning café, learning by developing* (LBD), *expert interviews, study visits, learning journals* and *problem-based learning* (PBL) (figure 8). All of these methods have been proven to activate students and provide positive learning experiences, so it is worth considering making better use of them. There may be many reasons for such infrequent usage. Teachers do not necessarily feel comfortable using them or may be unable to think of appropriate ways to apply them to their own subject area. They may also feel that the methods are time-consuming and, as classroom contact time is limited, they may be keen to impart as much knowledge as possible in the short time available. That is, however, not the most productive or effective approach from the point of view of learning.
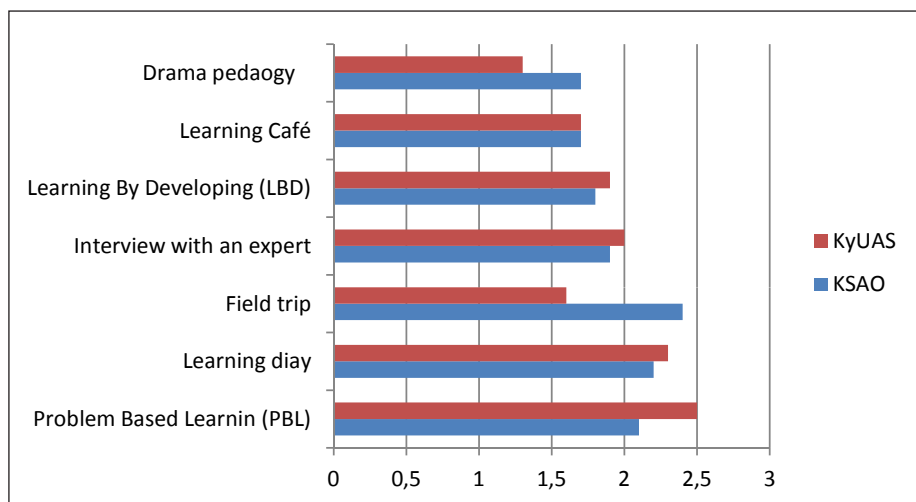
Figure 8. Averages of the least used teaching methods as evaluated by KyUAS and KSAO students on a scale of 1–5, where 1 = very rarely, 2 = quite rarely, 3 = occasionally, 4 = quite often, and 5 = very often.

Teachers, however, report using these methods slightly more than students experience them being used. The differences between the student and teacher responses may be due to the fact that lesser-used methods may be less familiar to students than more common methods. It is also possible that the teachers who responded to the survey are precisely those who are keen on experimenting with different methods, while the students who responded are evaluating the educational methods in use at the institute as a whole.

2.3 Evaluation and feedback as a means for learning

Evaluation and feedback are important parts of the learning process. They should be used throughout the educational process – not just at the end – so that at least some errors can be avoided. Students' attitude to failure was very positive and about 70% of all respondents felt able to learn from failure quite often or very often. An equal proportion of the respondents from both institutes felt that their institute had a permissive atmosphere, which is very important for enabling errors to be analyzed and learnt from. Evaluation should not only focus on the substance matter. General workplace skills have become increasingly important because they provide the ability to cope with changing circumstances and, if the need arises, to switch to a different position, or even to retrain (Antikainen 2009). Both institutes' evaluation procedures took account of students' varied ways of working, their ability to apply their skills in a professional field and their capacity for solving problems. The evaluation methods are applied in many ways. The teacher is not solely responsible for evaluating students; students are usually asked to evaluate themselves or their own groups within KSAO and KyUAS.

Teachers were asked to describe how they evaluate students' workplace-related skills. Three of the respondents described evaluating workplace-related skills as an integral part of the teaching process.

"I take note of general workplace-related skills as part of the course objectives and working methods, and also as part of the evaluation, by focusing on sub-sections related to working methods [...]."
"To begin with, I define the nature of the skills and then open them up to discussion; we discuss what these skills are and why they are important, the types of situations in which they might be needed, and so on, and I explain how they will affect the overall grading of the course. At the end of the course (and also in the middle of long courses) I explain how they have been realized; for example, there may have been a group discussion based on self-evaluations or feedback from the learning journal. [...]"
"The tasks always have one assessment criterion relating to knowledge, skills and attitudes required in the workplace."

Some teachers described their own individual methods, some said that they had provided feedback when working with small groups (six mentions), and some respondents mentioned specific workplace skills that they sought to evaluate (a large number of mentions). There were also individual mentions of certain ground rules for working life, such as behaviour, interaction and independent activity. The respondents drew attention to respecting timetables in their evaluations (19 mentions). A few teachers said that they used innovative methods to evaluate workplace-related skills. Teachers from KSAO combined professional skills with a period of learning at work (six mentions).

The quantitative questions exposed differences between the institutes. When evaluating students and providing feedback, KSAO's teachers drew more attention to workplace-related skill sets, asked students to evaluate themselves and highlighted the need for students to take responsibility for their own learning. KSAO's teachers also stressed the need to apply the principles of sustainable development, improve communication and interpersonal skills, and develop a customer focus to a greater extent than KyUAS' teachers. KyUAS' teachers, in turn, drew more attention to the evaluation of project compe-

tences, stressing the need for students to take responsibility for group learning and to use material in a foreign language.

The ability to work in multicultural groups received surprisingly little attention in the responses provided, both among teachers and among students. Teachers paid slightly more attention to this in their responses than students did (figure 9). One explanation for the differences between the responses could be that students on English-language courses work separately from those on Finnish-language courses. It is also easier to place exchange students into groups in which the language of instruction is English. English-language and Finnish-language groups do not normally come into contact with each other, although some projects may be carried out in mixed groups. The differences between the responses provided by teachers and those provided by students could be explained by the fact that teachers may come into contact with foreign students as well as Finnish students and, therefore, consider there to be more multicultural interaction.
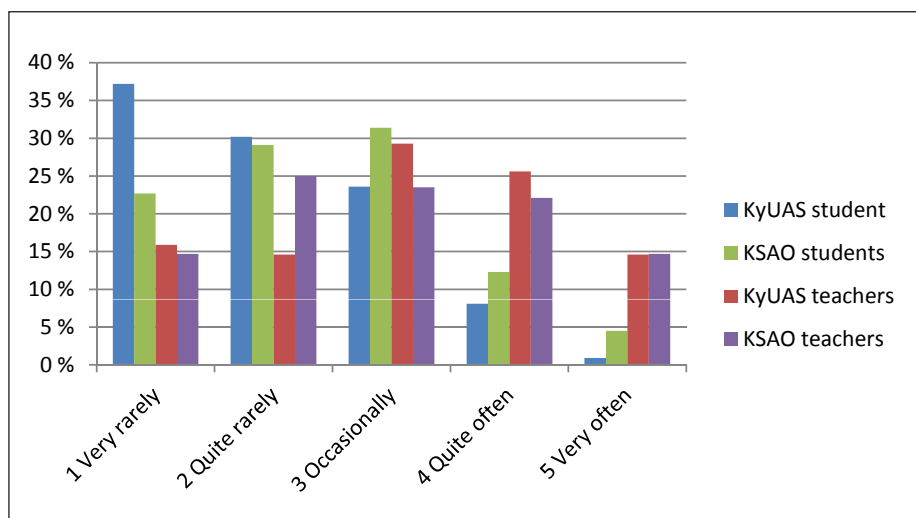
Figure 9 Students' and teachers' experiences of the extent to which students' ability to work in multicultural groups is assessed

The difficulty of finding work placements for foreigners in Finland has been the subject of much public debate in recent times. The same debate has taken place within educational institutes, as groups of English-speaking students have found it difficult to secure placements for training or learning at work. This is a major obstacle which educational institutes and external organizations must overcome.

3 HOW CAN LEARNING BE MADE MORE VISIBLE?

The goal of the European Qualifications Framework (EQF) is to improve the transparency, comparability and portability of qualifications. The Finnish national qualification framework (NQF) is based on the EQF (Ammattikorkeakoulut Bolognan tiellä 2009, 12, 41). The Rectors' Conference of Finnish Universities of Applied Sciences (ARENE) is an organization that represents all of the rectors of Finnish Universities of Applied Scienc-

es. ARENE has defined recommendations for the applications of common competences (Auvinen et al. 2010).

The evaluation plan – an essential part of the curriculum description – makes the institute's activities more visible, particularly to internal participants. Companies involved in the learning process also appreciate being able to see the objectives of their partnership with the institute from the perspective of learning. In this case, a good way of improving visibility is drafting an agreement for a development project. The agreement naturally contains a number of legal issues that define its content. These include the names of the contracting parties, the aim and content of the agreement, the schedule, the way in which the results will be presented, the entry into force of the agreement, the names and contact details of the client and the implementers, an itemization of the potential costs and payment terms, and how disputes will be settled. The agreement may also contain details of the competence sets on which the development project is focused and the skills which the agreement aims to develop. The contract may contain an agreement on how the company will participate in evaluating students and providing feedback. From the point of view of business development, the agreement may also contain a section in which the company's own representatives define which skills they hope to develop during the project. By defining all of these aspects at the contract stage, a firm basis is laid out, enabling all parties to learn effectively and ensuring that the partnership remains strong, from the target-setting stage right up to evaluation and feedback.

As a key factor in implementing extensive learning modules, a genuine workplace context enables the reconciliation of theory and practice. Evaluation and feedback are an essential part of the learning process, in which competence is made visible to all parties when comparing acquired competences with written objectives. Interactivity between teachers and students has increased, as has the diversity of evaluation methods used. The objective is to involve representatives from partner companies in the evaluation process to an ever greater extent.

4 DISCUSSION AND CONCLUSIONS

Introducing life-long-learning strategies to vocational colleges and defining the general workplace skills (NQF competences) required by all students at Universities of Applied Sciences has had the effect of clarifying and strengthening teachers' work. Integrating workplace skills into the learning process has, however, presented teachers with two distinct challenges: firstly, teachers are required to pay attention to the types of competences on which they may not have consciously focused in the past, or which have not previously been entirely relevant to their own field of specialization or interests. Good examples of this include group-working skills, leadership and project skills. In order for new skills to be learned, the teaching, evaluation and feedback processes must become more diverse and teachers may even be required to teach entirely new subject matter. The second challenge is creating educational and other plans, such as project contracts, in which the level of expertise required must be made clear to students, partner companies and other parties to the learning process. This requires good planning, especially when teachers from many different subject areas are involved in the learning process alongside multiple groups of students and company representatives.

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3

"24-HOUR TAKE-OFF"
– A COLLABORATIVE EVENT FOR FINDING NEW
INNOVATIONS AND SOLUTIONS TO OLD PROBLEMS

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ABSTRACT

Co-operation between higher education institutes and enterprises, known as university–business cooperation (UBC), has been happening all over Europe. In this study, a practical co-operation event is described. The "24-hour take-off" event was organized with a group of companies and the project and teaching staff of the Technology and Logistics Department. The idea of the event was to develop an environment which could give rise to new solutions and innovations. To generate innovations, a critical mass of ideas is needed. A group of students or even bigger entities (such as all of the students on a study programme) could form a think-tank in which problems can be considered and new ideas can be raised. More experience and even more sophisticated ways of working together are needed, though.

1 INTRODUCTION

The requirements in terms of competencies and skills for future engineers have changed a lot over the past 20 years. Enterprises expect that incoming students or newly graduated engineers have basic professional skills. However, employees must also have skills for problem-solving, team-working, cooperation and networking, as well as language and ITC skills. Motivation, commitment and adaptability are on the list, too. These expectations create high pressure for pedagogical development and teaching methods and for the teachers, too.

At Kymenlaakso University of Applied Sciences, the Learning and Competence-Creating Ecosystem (LCCE®) model is the tool for the renewal of pedagogical practices. The Technology and Logistics Department has taken many steps towards reforming the conventional "classroom teaching" pedagogy and implementing the LCCE methodology. In engineering education, long-running co-operation between universities and enterprises exists. However, projects are more or less focused on a small group of students and individual teachers – organizational learning is lacking. According to LCCE pedagogy, more collectivism and co-operation among the university's teachers is required. The new pedagogical approach provides integration between theoretical lessons and practical exercises in an authentic environment, meaning that students may work with companies to solve problems or develop new ideas, while being guided by teachers (Fig 1).
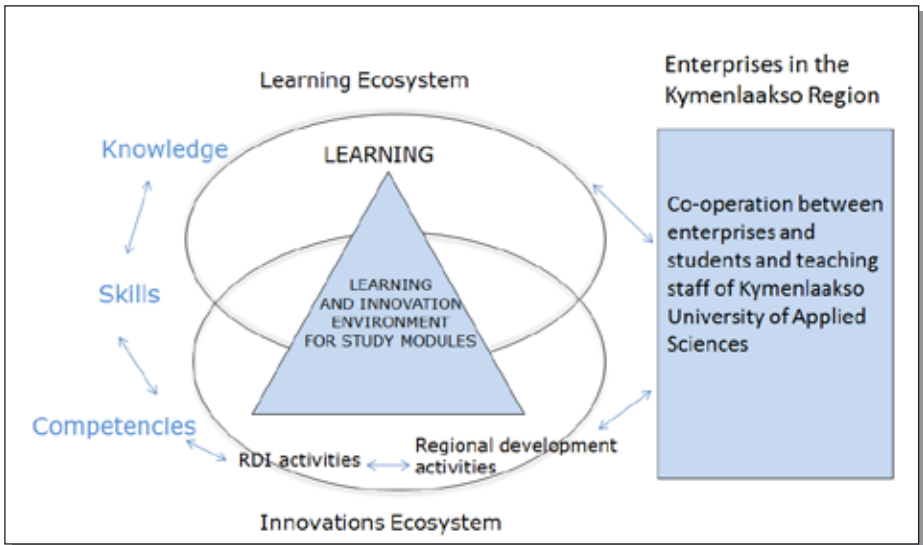
Figure 1. New pedagogical approach (LCCE model)

Collectivism also means teamwork: the teachers work is target-oriented and they work together to find ways to reach shared goals.

2 CASE STUDY: "24-HOUR TAKE-OFF" ("24 H PONNISTUS")

The project, "YTY – From collaboration to joint operations – development of logistics skills and networking in an international operating environment", which is coordinated by Kymenlaakso University of Applied Sciences and partnered by Cursor Oy, Kotka-Hamina Regional Development Company, started at the beginning of 2012. A collaborative case study with enterprises and students and teachers at Kymenlaakso University of Applied Sciences took place during the autumn semester of 2012. The main idea was to bring real-life business problems and development issues from the companies[1] into the hands of logistics students from the business logistics and engineering logistics study programmes.

The pedagogical framework followed in this case is known as "Meaningful Learning". The model is widely used, especially in e-learning environments. The model has been formulated by many authors (including D.P. Ausubel, L. Kester and associates). The model by David Jonassen (1995) is presented below (Fig 2).

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[1] Companies involved: Huber Oy, Woikoski Oy, Cursor Oy, KINNO Oy, TNT Suomi Oy, Pyroll Oy, Finex Oy, Polar Logistics Oy
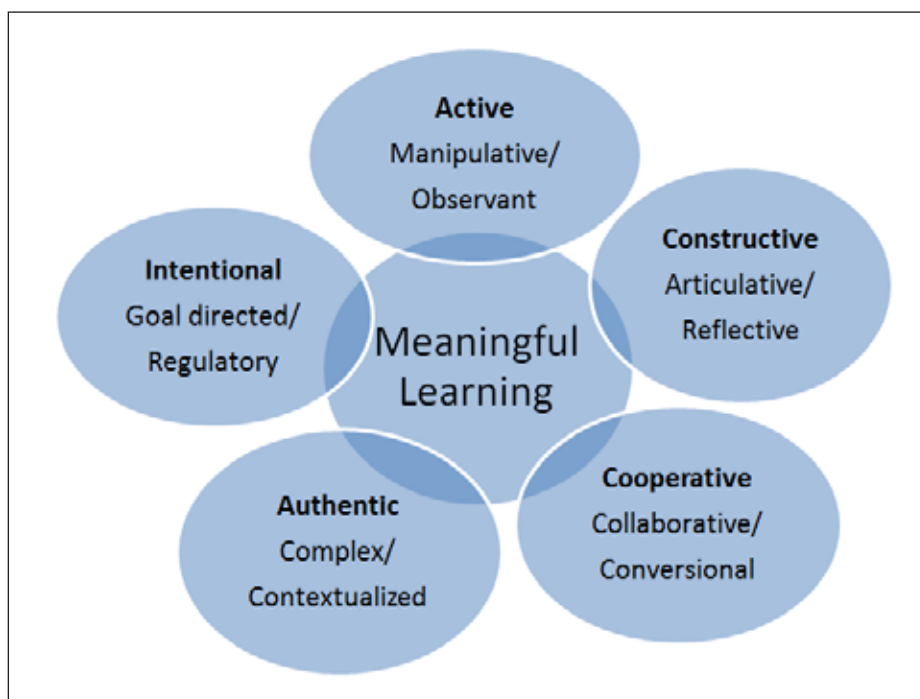
Figure 2. Characteristics of Meaningful Learning (Jonassen, 1995)

Making efforts to gain deep understanding, meaningfulness and significance are very important aspects contributing to good learning experiences from the students' point of view. The characteristics of Meaningful Learning have been found to be key success factors.

About 70 students were involved in the "24-hour take-off" event and they had 24 hours to spend innovating and problem-solving. The session started on 6 November at 11:00 am and ended on 7 November at 11:00 am. Representatives of the companies were present at the opening sessions and explained the task or tasks to the student groups (3 – 5 students/group, both engineering and business logistics students). After the opening session, the groups worked separately: the dynamics of the groups were formed very quickly. The six teachers involved were available during the official hours and the company representatives provided additional information by phone for a couple of hours in the afternoon as well.

Figure 3. Students Kirsi Villanen, Jaakko Antinkaapo and Henna Tarvainen working up the problem (Photo: Anita Heikkinen)

The following day, the ideas and solutions were presented to the company representatives. Most of the groups had found innovative and interesting ways to solve the given problem. The companies were pleasantly surprised with the students' ability to work under pressure within a short period of time. Since the event, the university has been in regular contact with companies such as Huber Oy, Polar Logistics Oy and Cursor Oy, initiating cooperation and even organizing trainee recruitment.

Of course, there were some unsuccessful assignments, too. From the students' perspective, some tasks were too complicated, whereas others, on the other hand, were too easy. This prevented innovative or useful solutions from being found. Some of the companies had misunderstood the nature of the event – they complained that it took too long to brief the student groups or that they were not present at the closing sessions. Students were also disappointed that the companies were not present at the closing sessions.

Comments and observations

Feedback and comments were collected, both from the participating companies and the students. One of the satisfied companies said, "We received good, practicable ideas and, what is best, we were able to get to know your smart, active students! We would be pleased to work with you again in the future: it's clearly fruitful for both of us."

According to the feedback from the students, and compared to the pedagogical framework, most of the students were excited about the opportunity to combine theoretical knowledge with real-life problem solving (constructivity, contextuality). Although there was only a little information beforehand, the students were active and willing to put in

effort and time to solve the given task (goal directed). Teamwork with mixed groups (study year, programme) was found very profitable. Some students disliked the method and felt that the final result would have been better if more task-related information had been available and the entire event had been more strictly structured.

Discussion and Conclusions

Co-operation between higher education institutes and enterprises has been happening all over Europe. The common result of the studies is that the cooperation is vital for university education to fulfil the competence needs of future professionals. Companies also need to upgrade their ability to innovate and find new solutions to retain their competitive positions on the global markets. To generate innovations, a critical mass of ideas is needed. A group of students or even bigger entities could form a think-tank, where problems can be considered and new ideas can be proposed. More experience and more sophisticated ways of working together are needed, though.

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4

ROLE OF PUBLIC SUPPORT ORGANIZATIONS IN PROMOTING INNOVATION

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ABSTRACT

Innovation is the key element in today's creation of wealth. Innovation is sought, desired, catalyzed, and promoted around the world by any means possible, and Finland is lucky to be one of the top innovation societies in the world. Innovation requires bright minds, bold risk-taking, and devoted entrepreneurship.

There are a number of public support organizations aiming to help and support companies and businesses in their innovation, growth, and internationalization. These organizations operate on a regional or national scale, and are supplemented by even more organizations at EU and international levels.

An in-depth interview study with some SMEs from the Southern Kymenlaakso area was carried out to elicit views and experiences of the quality and performance of public support organizations. The study was accompanied by interviews with public support organizations. The public organizations evaluated by the interviews were Cursor, Tekes, ELY-keskus centers, KyUAS, Ekami and Lappeenranta University of Technology.
The results from these studies provide an overall rating of these organizations from the companies' perspective. A number of issues are listed that the public bodies could work on in order to gain better results and become more attractive from the companies' point of view. Additionally, a need to improve co-operation between the public organizations was raised. Presently, public organizations cover their scope and field of activities and they are aware of one another's activities, although they collaborate rather inefficiently. A clearer line of responsibilities should be drawn up for public bodies in order for the companies to make efficient use of their multitude of services and know-how.

1. INTRODUCTION

In modern economies, innovation is ranked the most valuable means to add to the wealth and prosperity of nations. Results from independent studies show that:
a. investment in research and development creates innovation, and
b. innovation improves labor productivity, resulting in increased GDP value.
   (Romer 1986, Griffith etal. 2002, Rouvinen 2002, Aghion and Howitt 2009).

A traditional definition is that *innovations are new creations of economic significance*, primarily carried out by firms. Innovations can be either product innovations or process innovations. Product innovationsare new – or improved – material goods, as well as intangible services. Process innovations are new ways ofproducing goods and services. They may be technological or organizational.

Finland, Denmark, Sweden, and Germany form the top-4 list of EU innovators, but remain inferior to global innovation leaders, the USA and Japan (Innovation Union Scoreboard 2010). Still, the Finnish position is advantageous in a global race for wealth.
The Finnish innovation ecosystem was thoroughly evaluated by Veugelers etal.in 2009. One of the recommendations provided in the report discussed ways to produce more high-growth entrepreneurial firms (HGEF). Finland is currently lagging behind competitor countries in the number of world-class HGEFs which are considered key drivers in the performance of national economies. This shortcoming could be overcome by transforming the Finnish innovation ecosystem into an easy-to-access, streamlined, and

integrated support service available to Finnish HGEFs, and enhancing HGEFs' abilities to recognize global opportunities and utilize international networks.

The emphasis and main goal of the Finnish innovation ecosystem is to help and enable companies to innovate, to bring out new products, services, and solutions and put them on the global marketplace. In this process, universities of applied sciences have a strong position, as local and regional sources of knowledge, research expertise, and skilled labor. Universities of applied sciences seek to serve local companies and local regions by building a strong basis for business growth.

2. AIM AND SCOPE OF THE STUDY

Innovation processes occur over time and are influenced by many factors.Because of this complexity, firms almost never innovate in isolation. Inthe pursuit of innovation, they interact with other organizations or groups ofactors to gain, develop, and exchange various kinds of knowledge, information, and other resources. These actors or organizations – also called 'players' in the field of innovations – might be other firms (suppliers, customers, competitors) but also universities,research institutes, investment banks, public agencies, and individualcustomers.

This study discusses how public support organizations perform when participating in innovation processes as players. As the naming suggests, public organizations are not studied as sources of innovation but as players in a process where private companies initiate and develop innovations within their scope of business.

Companies interviewed for this study are all located in the Southern Kymenlaakso region. Thus, public support organizations not serving the region are outside the scope of this study. Also, firms other than small and medium-size enterprises (SMEs) are not included in the study, as their innovation processes differ from those of SMEs (Berglund 2007, page 24).

As the interviews with entrepreneurs, company decision-makers and public body decision-makers covered topics wider than innovations, one could question their relevance in accordance with innovation-related processes. The support provided more generally for innovating companies, however, is a reasonable measure of the support that the companies might receive for their innovation processes.
The primary aim of this study is to assess, through open, unstructured discussions, the quality of co-operation between private SMEs and the public support organizations.

3. INNOVATION PLAYGROUND

The companies working with innovation processes meet a lot of other players on the field. Sources of innovative ideas are plenty: customers, competitors, employees, other companies in the same business cluster, innovators close to the company, research projects, etc. How innovative ideas are sought – or whether they are just stumbled upon – and how ideas and innovations are processed differs hugely from company to company.

In SMEs, the search for innovative ideas is seldom a conscious process, nor is there any decisive method in place to process those ideas.

Public support organizations seek to catalyze the generation of innovative ideas, and facilitate the processing of those ideas for innovative companies. There are plenty of different organizations that support companies in order to boost innovation, growth, internationalization, and job creation. These organizations include local and regional business development companies, such as Cursor Oy in the Southern Kymenlaakso region, and KinnoOy in the Northern Kymenlaakso region, as well as the regional office of the national center for economic development, transport, and the environment (ELY-keskus), and the regional council of Kymenlaakso (Kymenlaaksonliitto), for the Kymenlaakso region as a whole.

On a national level, Tekes, Finpro, Finnvera, Keksintösäätiö, and many others provide assistance, financing, and other support to companies. The companies might even find access to the various financing and support facilities at the EU level or beyond.
Universities and colleges support businesses in their search for new solutions, ideas and better performance. Collaboration between companies and universities and colleges stems from a mutual interest. Companies wish to find and hire the best professionals-in-waiting, and to draw new knowledge and ideas from the melting pot of an educational institution. Universities and colleges are primarily focused on providing education to degree students. Curriculums include project work courses, practical training, and thesis work that is often accomplished in collaboration with companies and other non-university/college organizations. In some cases, universities' professional expertise and equipment is used to provide services for companies. And, thirdly, universities and colleges seek to involve companies in research, development, and innovation projects as co-financers and partners who may later make use of the outcomes of the project.
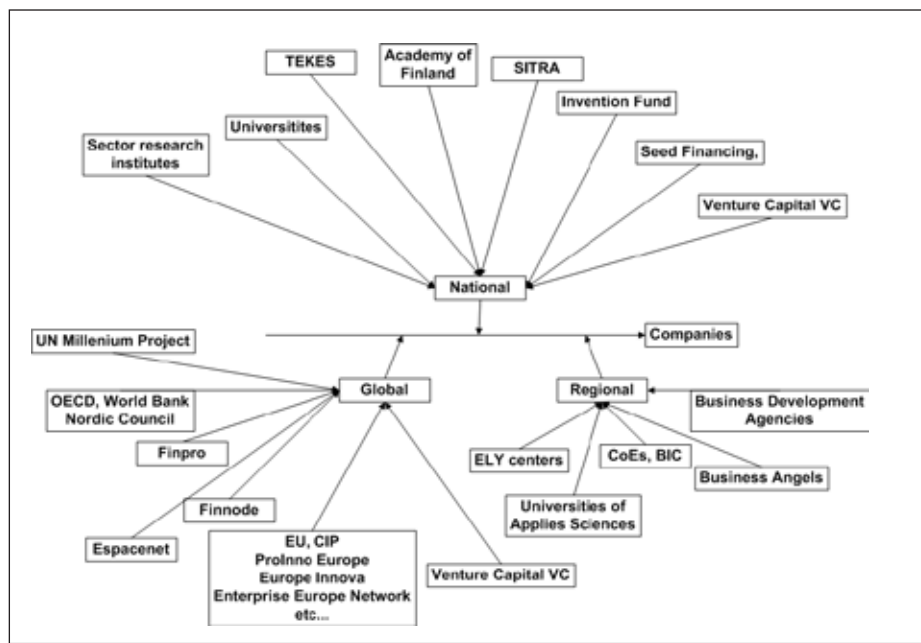

Figure 1.Players in the field of innovation in Finland - regional, national and global.

It is clear that companies looking for assistance for their growth, internationalization, innovation generation, or job creation might have a hard time figuring out whom they should turn to. Although some support organizations claim to provide a one-stop shop for companies, it is hard to see how any one organization could master the entire web of supporters and their services and capabilities. In this network of public support organizations, there is a good level of co-operation and shared services, each covering a distinctive goal in business development, but a company still needs to be active to find and identify the best public sector development partners to work with.

4. EXPERIENCES FROM CO-OPERATION

Interviews were conducted to compile experiences and information on the co-operation practices between companies and public support organizations. The first phase of interviews, conducted in the spring of 2012 involving eleven SMEs, provided an insight into their experiences of working with public support organizations. The interviewed companies came from the following fields:
- Software development
- Media and gaming
- Production and assembly
- Metals and machinery
- Construction

This phase of the study was carried out by Jani Nykänen as a part of his B.Sc. thesis work. The interviews were first planned, and the entrepreneurs and company decision-makers selected jointly by the author and Jani Nykänen. Interviews were conducted by Jani Nykänen in the late spring of 2012, and the results were jointly analyzed and evaluated. The process and in-depth results were documented in Jani Nykänen's thesis (2012).

The interviews were qualitative, thematic and unstructured discussions with entrepreneurs and company decision-makers, who discussed their experiences and the achievements that they had gained from the co-operation. General topics, such as the support organizations' capabilities, service orientation, overall image, responsibilities, and service portfolio were used as a guideline, but only loosely followed in the discussions. Suggestions that would arise in the discussions for the public organizations were invited and documented.

The second phase of the study, carried out in the fall of 2012, involved further interviews with company decision-makers, as well as representatives of the public support organizations. The key findings and recommendations are presented in the following chapters.

4.1 Regional support organizations

Cursor Oy is by far the most important support organization for companies in the Southern Kymenlaakso region. All of the companies interviewed had been in contact with Cursor. Kinno (providing similar services for Northern Kymenlaakso) and BIC Kymi were familiar to a few interviewees but are not reported here, due to a low number of comments.

Based on their experiences, companies ranked Cursor as the best of all public support organizations. Several respondents made it clear that, when co-operating with Cursor, it is the company that carries out all the work, and that Cursor is there only to facilitate and enable the work to be carried out. They considered this to be the correct way of organizing the co-operation. Financial support and cost sharing in the various development tasks was considered most valuable. Networking events and trips to international fairs were named among the best practices.

The capabilities and enthusiasm of Cursor employees seem to be high. Some respondents remembered Cursor's predecessor and were impressed by the improvements that had taken place during the last decade or so.

Some criticism was raised, too. The main topics were as follows:
- Finding the right person to contact in the Cursor organization was sometimes considered difficult and the need for a one-stop shop for companies was raised.
- Companies from traditional industriesfelt that Cursor is interested in new technology businesses, and not in their needs.
- Some concern was raised about the assumed Kotka-centricity of Cursor, leaving the rest of the South-Kymenlaakso unattended.
- Small companies would like to see Cursor come to them, instead of the entrepreneur needing to visit Cursor's premises.
- Cursor's focus should be on getting results, not on general PowerPoint slides and public announcements of Cursor's good work.

Finally, Cursor's capabilities in project work received some mixed responses. Some respondents felt positively that Cursor's project topics were good and justified, and that the projects had a positive overall effect on the regional business environment. Some others felt that project management was either inefficient or incapable, and that the projects were not focused on results. The organization was considered too big and a suspicion that projects were run merely for self-employment was raised.

In two cases, Cursor's ability to safeguard confidentiality was questioned. Fears were raised that a company sharing information with Cursor would soon find that Cursor used that information to boost other companies in the region, too. True or not, this is a major concern that should be dealt with. Clear rules for confidential information management should be put in place and communicated by Cursor.

The opinions about Cursor are more industry dependent than for other organizations. Gaming and software companies were most satisfied with Cursor and felt that Cursor could help their growth and success in many ways. These interviews also draw criticism by nature, as the human mind is somewhat more eager to point out problems and mishaps than successes and good experiences. This criticism is partly justified but should be considered with regard to Cursor's own strategy, which defines certain fields of business as key priorities.

Despite some critical comments, Cursor was considered a fast-moving, low-bureaucracy organization that companies, in general, are happy to work with.

4.2 National Support Organizations

All of the interviewed companies had been in contact with either Tekes or the regional branch of the national network of ELY-keskus centers. Experiences from those encounters are discussed in this chapter. Over half had made use of Finnvera guarantees for loans from banks or other financial institutes. However, Finnvera generated only few comments from the interviewees. Other national support organizations, such as Finpro, Finnode, VTT, Sitra, and Keksintösäätiö, received some comments and are not included in this discussion.

TEKES

Tekes – the center for development of technology and innovations – offers project grants and low-interest loans for companies performing challenging development tasks in search of innovation. In addition, Tekes provides support for internationalization, especially for SMEs hoping to tap into EU funds.

Companies in the field of emerging technologies and services had made most use of Tekes' services. They say that the financial support provided by Tekes was a significant factor in enabling them to generate innovations and foster their development projects. Tekes not only provides financing, but encourages companies to build networks and find other companies and organizations to work with. This creates new value by widening the scope of the market and technology, beyond national limitations.

Tekes' expertise and professionalism were highly regarded. Tekes can present a wealth of opportunities for companies looking to work on a viable new idea or innovation, both domestically and at the EU level.

Being too bureaucratic and stiff was the main criticism directed at Tekes by several companies. The client-friendliness of Tekes' reporting and reimbursement processes was considered low, although it was understood that providing public financing for companies comes with a certain level of control. However, the reporting procedures of Tekes were considered by many to be just too burdensome to handle, particularly when combined with other daily business routines.

Applying for Tekes funds was also considered difficult. Applications were found to be hard to complete to the required level of depth. The emergence of a consulting industry assisting companies in making Tekes applications was seen as a sign of this.

The start-ups were unhappy to discover that Tekes would not fund any newly established companies. Requiring several years of business before becoming eligible for funding was considered a mistake. They pointed out that a lot of technological innovations were developed and brought to market by start-up companies, such as game developers.

ELY-keskus

The regional centers for economic development, transport, and the environment (ELY-keskus) offer mentoring, training and education services, as well as providing grants for establishing new companies or developing and expanding existing SMEs.

The companies interviewed indicated that the most valuable service that ELY-keskus centers provided was financial support for training the company's personnel – both current and new employees. It encourages companies to seek and provide training and further education to their employees, thus improving their work performance and productivity. Additionally, support for recruiting new employees was deemed a good and important service. Companies expressed satisfaction that ELY-keskus centers would pay up to a third of a new recruit's salary for the first year, and organize and finance their training programs.

However, some respondents found it troublesome that the rules and practices differ significantly according to where in the country the ELY-keskus center is located. Southern Karelia, for instance, enjoys higher company support levels than Kymenlaakso. This would raise considerations about the fairness of competition between companies from different regions. Also, ELY-keskus experts were found to have lost touch with real-life company needs. Although the ELY-keskus was considered less bureaucratic than Tekes, it was still found to be difficult to approach.

4.3 Education and research organizations

All of the companies interviewed had gained some experience of working with the Kymenlaakso University of Applied Sciences (KyUAS), Southern Kymenlaakso Vocational College (Ekami), or the Lappeenranta University of Technology.

Kymenlaakso University of Applied Sciences

Companies co-operate with the Kymenlaakso University of Applied Sciences (KyUAS) in different ways. Connections were closest in the gaming industry and in the civil engineering sector, where forms of co-operation include company experts frequently participating in course planning and even giving lectures on some courses. Through these close connections, many students had been employed by companies for practical training and were assigned topics for their thesis work.

The most important reason for companies to work with KyUAS is the benefit they receive when recruiting graduates. Other reasons include solving some company development needs and accessing research networks through university co-operation.

Completing project work with KyUAS is a good way for companies to get close contact with students. Three types of projects are used most often:
a. Hiring a student for practical training.
b. Assigning a task for the student's thesis work.
c. Having a teacher solve a specific task with a class of students as an element of a relevant course.

Practical training is the most reliable way to evaluate a student's skills and potential from the company's perspective. Alternatives b) and c) involve working with and through the teachers to reach the students. In all cases, the companies were able to train students to master some industry-specific skills, which is difficult to achieve through KyUAS education alone.

Some companies had made use of the teachers' expertise, or KyUAS' in-house resources and equipment to solve specific problems. This, too, was found useful in terms of absorbing new knowledge and getting a practical problem solved.

Many problems and needs for improvement were identified. The following were mentioned most frequently:

- KyUAS teachers are less interested in inviting company experts to participate in curriculum planning and to give lectures than before.
- Companies,especially those in traditional industries, found that KyUASdoes not fully understandtheir needs and ways of doing business. They also found KyUAS to be somewhat reluctant to co-operate.
- KyUAS has failed in establishing and maintaining active connections with companies. This makes KyUAS hard to approach and restricts its offering of available services and co-operation opportunities.
- KyUAS does not have good practices for guiding and supporting students in their work. Many company-provided tasks are left unfinished or are not carried out to a high level of quality. Sometimes, a student working on a company task just "vanishes" without ever completing the task. Teachers should take more responsibility to make sure that students understand the task given, and that they are expected to fulfill the assignment in due time and at a high level of quality.

Better connections with KyUAS were called for and KyUAS was encouraged to develop means to make it easier for companies to get in touch with the relevant people in its organization.

Southern Kymenlaakso Vocational College

The Southern Kymenlaakso Vocational College (Ekami) has actively co-operated with traditional industries. The apprenticeship system has been actively used by the industry to recruit and train personnel for vacant positions. The system is considered to work well and is beneficial to companies. They are happy that Ekami takes care of the bureaucracy, saving companies from unnecessary workload in applying for funding and organizing apprenticeships. Several companies were seeking to expand their co-operation with Ekami in this field.

The companies were somewhat unhappy to find that the quality of students fluctuates considerably from year to year. Although the companies were active in providing opportunities, they sometimes considered it difficult to find suitable students to recruit. In some cases the students' attitude towards work in general was considered unsatisfactory. The teachers' attitudes towards involvement in company co-operation also left something to be desired. One specific criticism was that teachers are unwilling to visit companies because they are not paid extra to do so.

However, co-operation with Ekami was considered fruitful for companies and valued as a source of skilled workers.

Lappeenranta University of Technology

Some companies had experience of co-operation with universities, with Lappeenranta University of Technology (LUT) being mentioned most often. This was mainly thesis work or hiring a student as an intern, though a more comprehensive package of expert services provided by LUT was also available for companies that needed to tackle more challenging research and development issues. All in all, the services provided by LUT were considered higher in value and the expertise better in comparison with those of KyUAS.

5. DISCUSSION

The interviews were carried out with companies that had experience of collaboration with at least some public support organizations. Some consideration was given to possible reasons why other companies had not made use of the support provided by these organizations, resulting in the following notes:

- Attitude: Some companies consider using public support for developing their business undesirable. They feel that businesses should manage on their own, without public intervention.
- No time: There is a common understanding among companies that public organizations are by nature bureaucratic and sluggish. Some companies might feel that they don't have the time and energy to "walk slowly enough" to allow public organizations to keep pace. As we have seen from the experiences in previous chapters, there are reasonable grounds for this opinion.
- Lack of knowledge: The offering, working methods and division of responsibilities of public support organizations were far from clear, even to those who had worked with them. As the organizations fail to disseminate knowledge about their services and how companies can make use of those possibilities, there is little improvement expected in raising the number of companies utilizing such opportunities.

As for public support organizations in general, the interviews gave rise to some suggestions for performance improvements:

a. TEAM PLAY: Public support organizations should demonstrate a better understanding of each other's field of activities and be able to improve their team play to provide companies with prompt, low-bureaucracy, approachable, and complementary services. Barriers to entry should be lowered: companies should have easier access to public support organizations, including a one-stop shop to enable them to make full use of the available support.

b. UP AND OUT: Co-operation is unlikely to bear fruit if public support organizations are not willing to get out on the field. Companies and decision-makers just don't have the time to investigate all of the available support services from various organizations. It is highly recommended that support organizations take the initiative and approach companies instead.

c. FOCUS ON RESULTS: Public support organizations should put a much stronger emphasis on getting real results. They should not settle for fulfilling the pre-defined scope of a project but make sure that the project is truly productive and result-driven. Also, support organizations should not use resources to gain publicity

at the cost of getting results. Additionally, educational and research organizations should make sure that the work carried out by their students is of sufficient quality and proceeds without delays.

Public support organizations, on the other hand, reserve a certain criterion for the companies that they would like to support. As well as providing companies with advisory services, public bodies seek to support businesses as indicated in their own strategies. Cursor and Tekes are actively seeking to support business that have the potential for fast growth, are aiming for international markets, and are forerunners in their respective business fields. Educational and research organizations don't have similar reservations as to which companies they would like to service.

5.1 Comparisons with previous research

Laitinen-Väänänen et al. (2013/1) recently studied the co-operation between universities of applied sciences and member companies of SuomenYrittäjät ry. The country-wide questionnaire was filled in by 1488 entrepreneurs or company decision-makers, 64 of whom were from the Kymenlaakso region. The report detailed companies' experiences of working with universities of applied sciences. The findings clearly show that the forms of co-operation and the overall rating depended on the company's size. One-man businesses and micro companies (1-10 employees) tend to have little experience and are least happy with co-operation. Medium-sized companies are the happiest and have also made use of many different forms of co-operation.

Table 1 shows the results of the survey from the Kymenlaakso region's respondents.

Benefits of co-operation. Kymenlaakso				
	Research and development (n=17)	Training &courses (n=20)	Co-op with students (n=29)	Partnership based co-op (n=12)
Don'tknow	11.80 %	5.00 %	13.80 %	16.70 %
None	0.00 %	0.00 %	0.00 %	8.30 %
Fair	64.70 %	65.00 %	37.90 %	50.00 %
Good	23.50 %	20.00 %	48.30 %	16.70 %
Excellent	0.00 %	10.00 %	0.00 %	8.30 %

Table 1. How companies in the Kymenlaakso region rate co-operation with Universities of Applied Sciences. Reproduced and translated from the regional profiles of Laitinen-Väänänen et al. (2013/2).

The interviewees in this study all represented micro companies or small companies, which the Laitinen-Väänänen study found to be less satisfied with co-operation than the medium-sized companies. That considered, the ratings are in line with the findings from our interviews indicating that KyUAS has a long way to go in improving its performance and the quality of services provided to companies.

An international team evaluated Tekes and published a report in June 2012 (van der Veen, et al.). The report presents a wide analysis of Tekes' activities and its performance

among operators in the Finnish innovation ecosystem. The grade given by the evaluation team is high, with some suggestions for improvements. The suggestions relevant to this study are as follows:

- Signposting to other agencies
- The administrativeburden associated with application processes
- Feedback on unsuccessfulapplications
- Speed of appraisal and selection processes
- Linking Tekes' adviceto its customers' business practices

The two top findings and the last finding coincide with comments made in the interviews carried out for this study. There were no comments on feedback or the processing of applications during our interviews, but these findings are nevertheless in line with the overall picture concerning companies' experiences with Tekes.

5.2 Conclusions

An in-depth interview study with SMEs, entrepreneurs, and company decision-makers has shown that many public support organizations are facing the challenge of improving their performance in supporting company development activities. Cursor, Tekes and ELY-keskus centers were all familiar to companies, and Cursor received the highest scores.

Of educational and research organizations, KyUAS, Ekami and the Lappeenranta University of Technology (LUT) were best known, with LUT being the most highly regarded.

Tekes and ELY-keskus centers are facing a challenge in reducing the effect of bureaucracy on their operations. KyUAS' main challenges are to find a way to improve its connections with companies, to monitor the quality of tasks carried out by students, and to ensure that tasks are completed on time.

A more general challenge for all support organizations is to enhance co-operation and cross-organizational service provision. The roles and responsibilities of the various support organizations should be considered and redrawn in such a way that companies can make use of the services without needing to know everything about the innovation support system.

The topics discussed with the interviewees were broad. Open questions allowed discussions to touch on various issues of corporate functions, market experiences, innovation processes, etc. At the end of each interview, companies expressed their general feelings, specific experiences, and ratings of the public support organizations they had dealt with during the last few years. As the results provided only a general performance rating of the organizations, some of the issues raised by the companies might not be problems at all. A note by representatives of traditional industries that Cursor is not actively helping them to develop their businesses is actually well in line with Cursor's strategy, and not a problem as such. Thus, the value of the given results is generic. The list of detailed experiences is by no means comprehensive, and is provided for reference only.

Further research is recommended. A future study could evaluate companies' aptitude and willingness in the following areas:
a.   Innovate
b.   Grow
c.   Go global
d.   Allow dilution of ownership

The study should measure how public support enables and enhances such developments. Limitations to certain fields of business and some defined operations might be considered in order to achieve a more comprehensive and in-depth analysis of the support services provided by public organizations. Such research should provide higher quality recommendations to improve the output of the support services provided and ensure that development goals are sufficiently met.

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5

PRODUCING FERTILISERS AND BIOENERGY FROM THE BY-PRODUCT FLOWS OF RURAL AND INDUSTRIAL ENTERPRISES

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ABSTRACT

In addition to education and training, Mikkeli University of Applied Sciences (MUAS) provides a diverse palette of applied research, development and innovation (RDI) services to promote the competitiveness of companies and organizations in the public and private sectors. MUAS cooperates closely with local businesses, other organisations engaged in education, research and development, the South Savo Regional Council, the local Centre for Economic Development, Transport and the Environment, and other regional administrative units. The primary task of MUAS' RDI activities is to promote regional development and strengthen the region's competence and competitiveness. The University's applied research into environmental technology is geared towards implementing effective, high-quality innovation activities for the needs of local businesses, highlighting the following areas: converting by-product flows into commercial products, utilizing by-products to produce energy, environmental health, eco-efficiency, bioenergy and environmental safety. New product ideas and innovative solutions have emerged from development projects that are currently in progress or being prepared, from commissioned assignments and from student theses. These focus on utilizing by-product flows from energy production plants and material flows from agricultural and municipal sources for producing energy in biogas plants. The above innovations have been developed and tested in detail by the MUAS Environmental Laboratory.

1 INTRODUCTION

1.1 Background for the utilization of material flows

An estimate by the Finnish Environment Institute indicates that the country produces more than 70 million tonnes of waste per annum. From a utilization viewpoint, waste is actually a raw material that just happens to be in the wrong place. Using waste as a raw material source, or for energy production, saves natural resources, some of which are non-renewable. In 2007, more than 29 million tonnes of waste was utilized, corresponding to about 40 per cent of the national total volume of waste produced. Most of this consisted of wood-based waste and sludge materials that were used for energy production. The unutilized waste was chiefly placed in landfill sites or piled up at buffer storage sites. Waste placed at landfill sites accounted for almost 60 per cent of the total volume of waste. Currently, somewhat above 30 per cent of municipal waste is recycled. (Suomen ympäristökeskus 2011.) In accordance with the Waste Act and Waste Decree, 50 per cent of municipal waste is to be recycled by 2016 (Jätelaki 646/2011, Valtioneuvoston asetus jätteistä 179/2012).

Finland has a national strategy towards reducing the handling of biodegradable waste at landfill sites, promoting the utilization of waste placed in landfill sites, and reducing the detrimental effects of landfill sites on the environment and health. Consequently, the volume of biodegradable municipal waste is to be gradually reduced from 2006 to 2016. By 2016, only 25 per cent of the total estimated volume of biodegradable municipal waste may be placed in landfill sites. In order to achieve the above strategic objectives, waste production must be reduced and recycling increased through concrete action. One of the means to this end is to increase the biological pre-treatment of

waste – composting and digestion – and utilize waste materials in energy production. (Ympäristöministeriö 2004.)

The endeavour is to reach the EU-defined target level for renewable energy through the said efforts thus supporting the use of renewable energy, and to simultaneously reduce the level of greenhouse gas emissions, and increase employment. Increasing the use of forest woodchip will reduce greenhouse gas emissions, resulting in higher by-product flows from regional energy production plants at the same time. The employment effect of local biogas reactors is relatively modest but reducing their local environmental impact and emission levels remains important. (Lindroos et al. 2012.) Utilizing the by-product flows of these energy production plants (power plants and biogas reactors) locally as a fertilizer promotes the recycling of nutrient flows and helps retain phosphorus in the natural cycle, the volume of which is limited on a global scale.

In order to achieve the above strategic objectives and statutory requirements on a regional and national scale, new innovations must be found to reduce the consumption of commodities which generate abundant waste in the production phase, on the one hand, while increasing the efficiency of material and energy use during production, on the other. This will save natural resources, reduce the environmental impact and create new employment opportunities.

1.2 Promoting the utilization of material flows through MUAS' innovations

MUAS plays a major role in generating new innovations, disseminating them and encouraging their adoption. In addition, universities of applied sciences can be regarded as practical resources for the national innovation system. The first and foremost contribution of the universities of applied sciences to the national innovation system is to produce a sufficient number of competent people for companies on a regional scale. These institutions put their innovation adoption and dissemination role into practice through development projects. (Korpelainen 2010.)

MUAS is the prime mover in developing vitality, well-being and competence in the South Savo Region. In addition to education and training, MUAS provides a diverse palette of applied RDI services to promote the competitiveness of companies and organizations in the public and private sectors. MUAS cooperates closely with local businesses and industry, other organizations engaged in education, research and development, the South Savo Regional Council, the local Centre for Economic Development, Transport and the Environment, and other regional administrative units. (Mikkelin ammattikorkeakoulu 2010, Mikkelin ammattikorkeakoulu 2011.) MUAS has campus locations in Mikkeli, Pieksämäki and Savonlinna.

The primary task of MUAS' RDI activities is to promote regional development and strengthen the region's competence and competitiveness. MUAS' research, development and service provision activities profile in the following areas of emphasis in accordance with the University's RDI strategy:
- Sustainable well-being

- Electronic archiving and digital services
- Materials and environmental safety

Materials and environmental safety represents a diverse hub of technology competence for MUAS. As defined in the innovation strategy for South Savo, MUAS is a central player in two areas of emphasis in technology innovation: the utilization of biomass, and materials and environmental technology.

"Strengthening the Structures of Applied Research in the Materials and Environmental Sector" is one of the most significant projects currently in progress in the area of materials and environmental safety. This is a partly EU-funded project conducted by the South Savo Regional Council. This project entity strengthens MUAS' applied research into environmental technology by pursuing effective, high-quality innovation activities that serve the needs of local businesses, with a focus on the following areas: converting by-product flows into commercial products and utilizing them for energy production, environmental health, eco-efficiency, bioenergy and environmental safety. One of the project's most significant objectives is to integrate RDI activities with teaching to increase the attractiveness of the degree programmes involved, thus ensuring the adequate provision of a competent workforce for the region's environmental and material technology companies. In addition, the project is geared towards increasing sustainable development in the region, boosting environmental business through knowledge production and providing the region's companies with development-related services. The project is to strengthen and stimulate networking between domestic and international businesses and research institutes engaged in environmental technology, promoting project funding from outside the region.

New product ideas and innovative solutions have emerged from MUAS projects which are currently in progress or being prepared, from commissioned assignments and from student theses. These focus on utilizing by-product flows from energy production plants, and on using material flows from agricultural and municipal sources for energy production. These innovations have been developed and tested in detail by the MUAS environmental laboratory. Some of the environmental technology innovations have received funding from the Product Track Project in 2012 for testing and clarifying their commercial viability.

The chapter below is a brief description of the innovation test environment at MUAS' environmental technology laboratory. Subsequent chapters also contain two examples describing environmental technology innovations relating to the RDI and service business, as well as innovation activities from the viewpoint of regional development.

2 USING AN ENVIRONMENTAL LABORATORY TO TEST ENVIRONMENTAL INNOVATIONS

MUAS' RDI activities are geared towards supporting teaching and learning, and vice versa. This means that teachers can increase their expertise in the development requirements of their own sector, and students are given an opportunity to participate in project activities that support discovery and learning by developing. In addition, the integration

of teaching and research will generate new development work and models of thought to support innovation. New products or operating models are often born from RDI activities or from the 800 student theses produced per annum.

MUAS' Department of Material and Environmental Technology has an environmental laboratory that serves as a teaching and test laboratory for RDI services. The laboratory personnel cooperate closely with the university's environmental, material technology and RDI experts. The laboratory provides facilities to build various measurement and pilot test environments for testing and analysing new innovations (Figure 1).

FIGURE 1. Product development work on by-product flows at the Environmental Laboratory of Mikkeli University of Applied Sciences – using a laboratory-scale granulation plate (photo by Hanne Soininen)

3 UTILIZING BY-PRODUCT FLOWS FROM ENERGY PRODUCTION PLANTS

This section gives an account of the by-product volumes generated by energy production plants in the South Savo area, including the current utilization situation. In addition, a brief description is provided of the measures taken and innovations produced by MUAS to increase utilization efficiency.

3.1 Current situation in the South Savo area

Finland has a national waste management plan that is geared towards achieving a utilization level of 70 per cent of the waste generated by local energy production plants. Over the past 10 years, the volume of peat ash and wood ash has almost doubled as a result of the increasing use of peat and wood in energy production. Promoting the use of renewable energy sources in accordance with the EU's objectives will increase the volumes of biofuel-based ash on a continual basis. (Soininen et al. 2010.) Currently, South Savo has a forest energy utilisation potential of 1.8 million m3, of which about 0.5 million m3 is used today. The use of forest energy is expected to double over the next few years, which also means a considerable increment of the ash volume available for utilization.

MUAS carried out a partly EU-funded project entitled "Utilization of Biofuel-Consuming Energy Plants' Ash Flows and Logistic Flows in Eastern Finland". The results indicated that the biofuel-consuming energy production plants operating in eastern Finland (South Savo, North Karelia and North Savo) produce a total of 100 000 tonnes of grate ash and fly ash per annum. (Soininen et al. 2010, 97.) A total of about 21 400 tonnes of ash was produced in the South Savo area in 2008. The volume consists of grate ash and fly ash produced by local energy production plants. Locally, the largest ash producers are the Pursiala power plant of Etelä-Savon Energia Oy, the Savonlinna power plant of Suur-Savon Sähkö Oy, Versowood Oy, the UPM Pellos plywood factory of Järvi-Suomen Voima Oy, the Punkaharju plywood factory of Finnforest Oy, and the Pieksämäki power plant of Savon Voima Oyj. These six plants produce about 93 per cent of the total ash volume generated in the South Savo area. Power plants producing a small volume of ash (less than 100 tonnes per annum) accounted for less than three per cent of the total ash volume produced.

Over the past few years, some of the locally produced ash has been used for road construction, landfill site construction, other soil construction and forest fertilization purposes. The ash from energy production plants is chiefly placed in ordinary landfill sites designed for ordinary waste for final storage where it can be used for structures replacing natural materials. 28 per cent of the ash flows are channelled to actual utilization (other soil construction and forest fertilization purposes).

3.2 Communication boosts local cooperation

The South Savo Centre for Economic Development, Transport and the Environment will be launching a partly EU-funded project entitled "Biofertilizer – Boosting Forest Growth with Ash" in early 2013. This is a joint venture between Mikkeli University of Applied Sciences Ltd and the South Savo regional unit of the Finnish Forest Centre. The project is coordinated by MUAS' Department of Material and Environmental Technology.

One of the project objectives is to use communication to increase the use of wood- and peat-based ash in forest fertilization on peatland areas by activating local forest owners, forest functionaries, farmers and forestry entrepreneurs. The aim is to steer fertilization to appropriate areas with regards to forestry and environmental management, and to make practical work more systematic and more profitable. The project is expected to

increase job opportunities for rural enterprises in the distribution of ash-based fertilizers. As a result, better application areas will be found for the ash flows in terms of ecology and the environment, while improving the nutritional economy of peatland forests and increasing the growth and vitality of tree stands.

The project will cooperate with local companies, research institutes and authorities. Media conferences will be arranged to create new networks and visions for entrepreneurs and researchers promoting the birth of new businesses and innovations locally.

3.3 Boosting utilization through innovation

In order to be able to steer the ash flows from the South Savo area towards more cost-effective and more ecological utilization, an increased number of regional buffer storage areas is required to handle the ash, in addition to companies specializing in the processing and utilization of ash. In future, the buffer storage areas for ash could also serve regional industries by acting as material banks, boosting the utilization of their material by-flows. (Soininen & Luste 2012, Soininen et al. 2012.) In addition, new innovations should be applied in practice in order to achieve the most ecological means of utilization for the energy industry's by-product flows. Consequently, converting the energy industry's by-product flows into commercial products, and using them for new applications, was tested in 2012 in an innovation produced in conjunction with the Product Track project conducted by MUAS.

4 PRODUCING ENERGY AND FERTILIZERS FROM BIODEGRADABLE MATERIALS

This section describes the biogas potential of the South Savo area and the new learning environment of the MUAS Environmental Laboratory. In addition, it gives an account of how MUAS biogas experts develop entrepreneurial activities in the region and promote the application of new innovations.

4.1 Biogas potential of the South Savo area

In 2003-2004, MUAS conducted a partly EU-funded project entitled "Biogas Plants' Operating and Application Conditions in South Savo" to clarify the region's biogas situation. This project indicated that South Savo has 10 agricultural farms with a sufficient number of animals to produce the volume of liquid manure required to operate a biogas plant profitably. In addition, it is likely that there are groups of farms that could build a biogas plant by jointly using their liquid manure as the raw material for energy production.

In South Savo, the theoretical biogas potential that could be obtained from organic waste materials from farms is about 58 GWh. (Raw material flows from cultivated fields are excluded from this estimate.) However, it is not techno-scientifically possible to exploit this potential in its entirety. Even at present, there are alternative methods for process-

ing most of the organic waste material from communities. The greatest opportunities to benefit from agricultural farms' animal-based raw material flows are found in the area of Rantasalmi and Joroinen. (Soininen et al. 2007, 62 – 63.) Cattle manure, for example, is used as a full-scale fertilizer in the South Savo area (Rinne 2009, 80).

4.2 Providing the Environmental Laboratory with a new learning environment

"ESBIO – Energy Self-Sufficient Farms" was a partly EU-funded project geared towards analyzing the energy technical implementation of primary production chains on energy self-sufficient farms. The project was conducted by the Ruralia Institute of the University of Helsinki (Coordinator), MUAS, MTT Agrifood Research Finland and Lappeenranta University of Technology. MUAS had a sub-task in this project, which was described as "Biogas Plant Analysis – Implementing a Pilot Biogas Plant on a Farm Scale". The task included the following assignments:
- Defining alternative plant solutions, including technical analysis, cost analysis and sensitivity analysis
- Assessing the environmental impact and defining the approval procedure
- Conducting the laboratory tests and pilot-scale tests

During the "ESBIO – Energy Self-Sufficient Farms" project, between 2009 and 2012, MUAS' Environmental Laboratory carried out several laboratory-scale tests on organic materials that are available in the South Savo area (Luste & Soininen 2011, Luste & Soininen 2012, Luste et al. 2012). Results from the laboratory tests were used as an aid when formulating the calculation model during the project. The purpose of the calculation model is to help local rural entrepreneurs analyze the economic factors in the biogas plant's establishment phase. During the project, the calculation model was used to provide profitability analyses for company groups based in Haukivuori, Juva, Mikkeli, Mäntyharju and Kerimäki. In addition, the model may also be useful for biogas plants that are already up and running, when looking for new material options to improve plant profitability, for example.

For testing on a laboratory scale, a learning environment was established for the Environmental laboratory of the Department of Material and Environmental Technology to enable the implementation of batch production tests and continuous production tests on biogas reactors (Figure 2). In addition to procedures required by development projects, the learning environment may be used to implement education and training functions, demonstrations, and innovation activities.

FIGURE 2. MUAS' Environmental Laboratory can be used to study and develop innovations relating to the operation of biogas plants (Photo: Leena Mäkelä)

4.3 MUAS biogas experts as developers of regional business activities

Biogas production is one of the potential forms of bioenergy production for agricultural farms that have a sufficient volume of cattle manure or other types of biomass available for processing. An agricultural farm may use large volumes of manure for energy production in the process of converting manure into a more environmentally friendly form. The by-product consists of digested manure which can be used as such as a fertilizer or processed further into a more manageable form. Currently, there are around ten farm-scale biogas plants operating in various parts of the country. Among other things, the construction and use of biogas plants is restricted by the high investment costs in comparison to their energy sales income. Efforts have been taken to promote biogas investment projects, through investment support from the Finnish Ministry of Agriculture and Forestry, for example. (Soininen et al. 2009, Maa- ja metsätalousministeriö 2007.)

The first centralized biogas plant operating on a farm scale was started up in Juva, South Savo, in late 2011 (Figure 3). The planning of a local biogas plant started as early as 1997 but it was deemed to be economically unviable within the framework of Mikkeli Polytechnic's partly EU-funded Ecotech project. The biogas plant's estimated annual energy production volume is 2 300 MWh (about 60 per cent of production), of which about 1 190 MWh is electrical energy and about 1 120 MWh is thermal energy. The electrical energy and thermal energy is sold to Turakkalan Puutarha Oy, a gardening company operating in the plant's vicinity.

FIGURE 3. The biogas plant of Juvan Bioson Oy has cooperated closely with MUAS biogas experts to improve the profitability of its business (Photo: Hanne Soininen)

Several innovations have been produced for improving the biogas plant's profitability and the utilization of its material flows. One of the innovations produced during the Product Track project conducted by MUAS was used in 2012 to test the utilization of the biogas plant's by-product flows in new applications. In addition, MUAS has promoted innovation and business activities relating to the utilization of biogas plants' by-product flows by publishing several student theses on the theme.

5 DISCUSSION AND CONCLUSIONS

MUAS' Department of Energy and Environmental Technology pursues RDI activities that are geared towards developing and promoting regional businesses. Environment technological RDI activities are aimed at promoting the utilization of by-product flows from the region's rural and industrial enterprises as materials and energy through the adoption of new innovations. Product development work on by-product flows produces environmentally safe solutions supporting sustainable development. Promoting the utilization of material flows also contributes to minimizing the environmental impact of waste on a regional scale, including the adoption of innovative solutions.

MUAS' environment technological RDI activities promote extensive innovation work in cooperation with the region's educational establishments and research institutes, as well as the region's environmental safety and bioenergy development organizations (the Bio-Saimaa Cluster and Safe-Saimaa Mini-cluster). Experimental activities focusing on promoting business opportunities are a special feature of the environment technologi-

cal RDI and service business activities. Innovative, experimental activities can be implemented in research facilities provided by MUAS' Environmental Laboratory, or in those of partner companies, and in learning environments that are currently being planned. Integrating teaching and RDI activities in a learning community will enable the development of innovative cooperation methods and interaction, creative action and new learning achievements between students, teachers, RDI players and regional companies.

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6

USE OF REFRACTOMETER MEASUREMENT IN CHEMICAL PULP MILL APPLICATIONS

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ABSTRACT

The operating principle of the refractometer is based on the refraction of light and the critical angle of total reflection. The light projected to the interface of the material refracts differently for different materials. In addition, the angle of refraction depends on the concentration of the suspension liquid part being independent of the quality and quantity of solids. Originally, refractometer measurements were used in the sugar industry and, over the course of time, the method has been introduced in almost all industry fields, including the food, chemical, pulp, and paper and semiconductor industries.

At the Savonlinna FiberLaboratory we have been studying the applications of refractometer measurement in pulp mill environments since 2006. This paper brings out the results of recent studies from mill-scale measurements of brown stock washing in the chemical pulp mills. The results obtained indicate that the measuring method is very reliable and stable. The accurate measurements of dissolved solids can be used to obtain a better understanding of the basic phenomena of the examined processes. In addition, the refractometer devices have been used for controlling mill-scale processes (so far in brown stock washing) and improving washing efficiency. The deeper we understand the processes on-line, the better we can control them and the more savings we can attain. In the case of brown stock washing, direct savings are realized through optimal wash water use and thus in the energy economy of the whole chemical pulp mill. Better washing results also decrease chemical consumption during oxygen delignification and bleaching.

1 INTRODUCTION

The first refractometer was developed by Ernst Abbe in 1874 for measuring the refractive index of liquids in a laboratory. The evolution of measurement and equipment techniques has enabled this measuring method to be deployed in other industrial-scale processes (Kivenheimo 2002). In the chemical pulp industry, both the traditional and the current use of the refractometer have been to measure dissolved dry solids in high alkali concentration fractions (black and white liquor).

Kraft pulping is a series of water-based chemical processes. The purpose of pulp washing is to remove black liquor, which contains wood-based organic and inorganic material that results from the cooking process, from the pulp suspension. Pulp is washed in a way that the dissolved material in the black liquor can be utilized in energy production and for the recycling of chemicals. The parameters used to describe the performance or effectiveness of washing can be divided into two categories: wash loss and dilution factor. Wash loss is defined as the amount of washable compounds (soluble compounds) in the pulp suspension that could have been removed in washing. Originally, the amount of sodium in the pulp suspension after washing has been used as an indicator of wash loss. Nowadays, wash loss is evaluated mainly by measuring the amount of chemical oxygen demand (COD). The dilution factor represents the net amount of water that is added to the washing system (Crotogino 1987).

The composition and amount of harmful components causing wash loss were investigated in earlier studies (Viirimaa et al. 2002, Sillanpää et al. 2003a, Sillanpää et al. 2003b, Sankari et al. 2004a, Sankari et al. 2004b). The results show that there were several compounds which cause organic load (COD) in the wash waters but only some of them –

such as lignin and certain sugars – are harmful. Low molecular organic compounds such as alcohols, which cause high COD loads, were completely harmless compounds in the washing and the following bleaching stages. Because lignin has a high molecular size and refractive index, it is feasible to create a refractive index measurement device to control the wash loss level. Understanding this information led to laboratory tests (Kopra et al. 2008), and then to mill-scale investigations (Kopra et al. 2010, Kopra et al. 2011a) and finally to measuring real-time wash loss in the fibre line (Kopra et al. 2011b, Kopra et al. 2012).

The purpose of this paper is to present the highlights of the results based on our research in the field of brown stock washing of chemical pulp.

2 MATERIALS AND METHODS

2.1 Refractive index measurement principle

Refractometer measures analyze chemical concentrations in solutions by measuring the refractive index. Refractive index measurement is actually a measurement of the speed of light in a medium. The speed of light in a medium depends on the medium itself, its temperature and the wavelength of the light. The refractive index depends on the concentration of dissolved solids. In general, the larger the molecular size of the dissolved solids, the higher the refractive index per concentration unit. Suspended solids, bubbles and fibres do not affect the measurement of the refractive index because they do not affect the speed of light in the medium, although light may be reflected, diffracted or absorbed. The laboratory reference temperature is usually 20°C or 25°C. Due to the wavelength dependency, the refractive index is measured with monochromatic light. The principle behind the measurement of the content of dissolved dry solids through refraction has been presented in detail in our earlier studies (Kopra et al. 2008, Kopra et al. 2011a).

2.2 Installation cases of the refractometer devices

Case I: The pressure filter being investigated is the first post-digester washer following the first screen and pressure thickener in the brown stock washing line at a Finnish kraft pulp mill, **Fig. 1. Case II:** The research was carried out by installing 12 continuous refractometers in the brown stock washing line at a Finnish kraft pulp mill, **Fig. 2**. Measurement devices were installed in order to evaluate the efficiency and performance of the washing line.
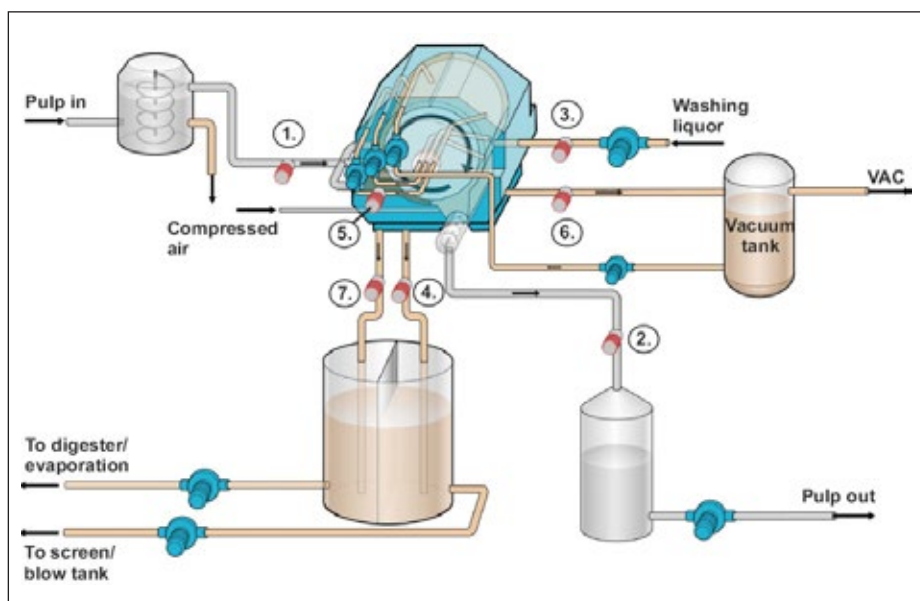
Fig. 1. Refractometer installation points on the pressure filter washer (Kopra et al. 2011a).
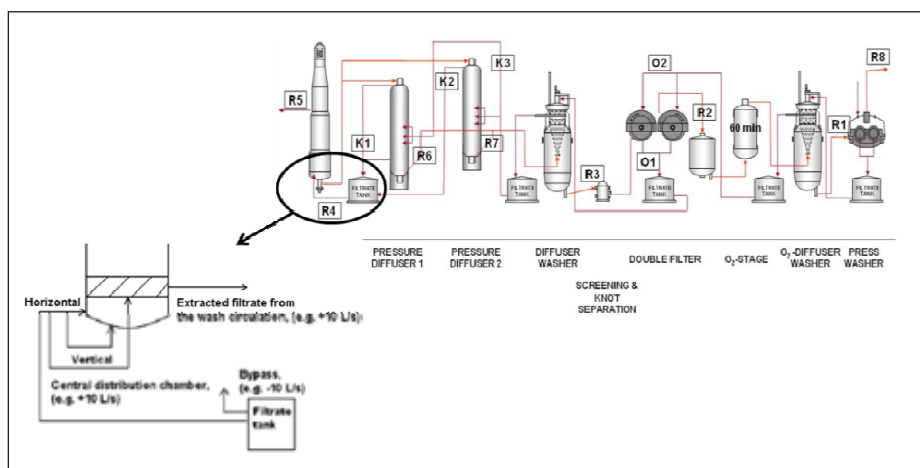

Fig. 2. Installation sites of the refractometers on the pulp mill's brown stock washing line (Kopra et al. 2012).

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2.3 Calibration, data acquisition and process data analysis

In all cases, before trial runs, the refractometers were calibrated in co-operation with the refractometer supplier. Calibration was carried out by taking liquor samples from all the installation points. The samples were taken from both hardwood and softwood campaigns. The liquor was squeezed out of the pulp samples and they were analyzed about half an hour after sampling. The amounts of dissolved solids were analyzed by using SCAN-N 22:77. More samples were taken during a trial run to re-check the calibration. All the calibration analyses were carried out in the pulp mill's laboratory.

In Case I, data was acquired both by the mill's own data collection system and by a separate personal computer. In Case II, the data was collected only by the mill's system. Additionally, in Case II, the data was collected and analyzed using the Wedge™ program, which is a commercial software tool developed by Savcor Forest Ltd. Wedge is designed for managing process data and analyzing process fluctuations. By utilizing Wedge, it is possible to collect and analyze the mill's process data continuously and historically and remove faulty measurement periods from the process data if necessary (Anon. 2007).

3 APPLICATIONS

Case I: Mill A, Optimization of single washer

Increasing the dilution factor increased the displacement ratio and thus improved washing results, as shown in **Fig. 3**. On one hand, the results indicate that increasing the dilution factor from 1 to 3 can slightly increase the displacement ratio. On the other hand, when the dilution factor decreases below unity, the displacement ratio of the washer decreases very quickly, yielding a low washer performance. The dilution factor should therefore be above unity to guarantee unimpeded washer performance. However, the use of a dilution factor above 2 is not feasible, because the higher amount of wash water would increase the cost of black liquor evaporation.
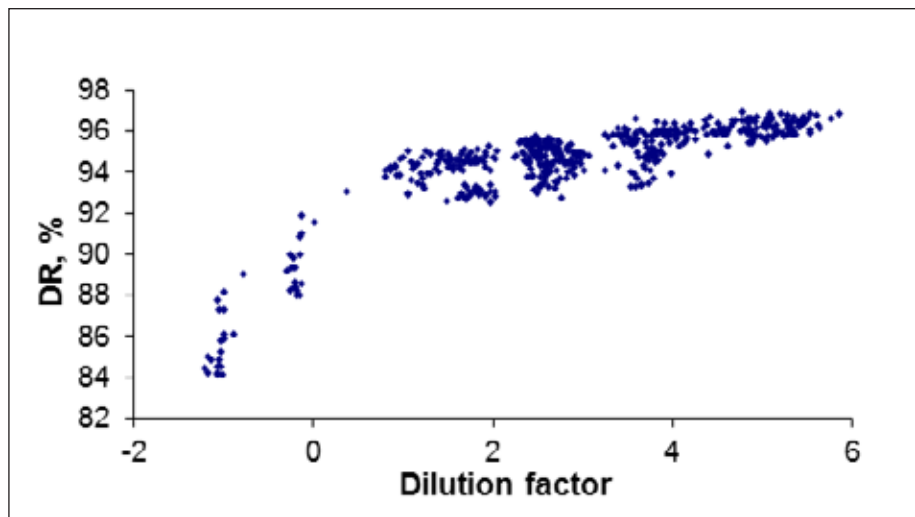

Fig. 3. Experimental results for the displacement ratio versus dilution factor (Kopra et al. 2011a).

Increasing washing consistency improves the washing effectiveness as shown in **Fig. 4**. Clearly a higher consistency of feed pulp increases the displacement ratio and thus leads to more effective and economical pulp washing.
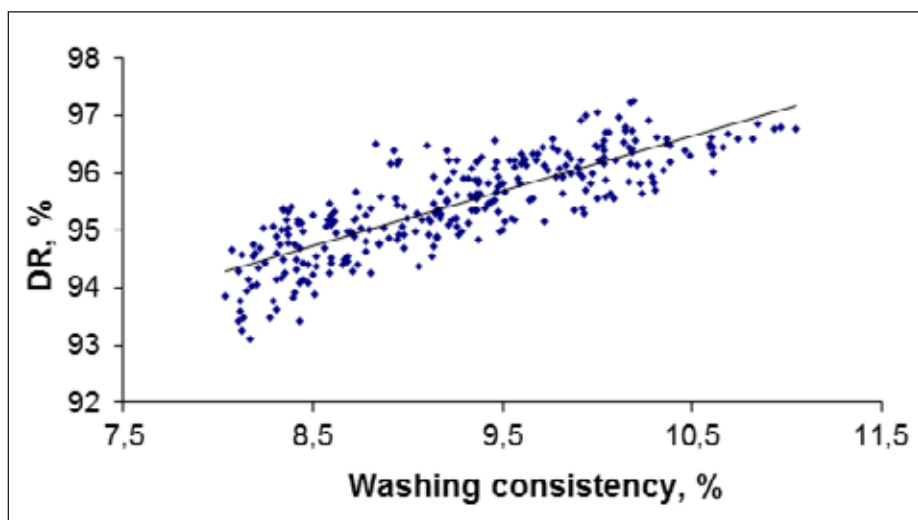
Fig. 4. Experimental results for displacement ratio versus washing consistency (Kopra et al. 2011a).

Case II: Mill B, Optimization of brown stock washing

Figure 5 represents the effect of the washing loss on the oxygen delignification response. As can be observed from Fig. 5, the oxygen delignification response was highly affected by the amount of washing loss with hardwood. When the amount of washing loss in the oxygen delignification feed increases, kappa reduction decreases. This is due to the fact that oxygen is consumed in the oxidation reactions of the washing loss. In other words, the selectivity and performance of the oxygen delignification decrease as the amount of washing loss increases. The biggest deterioration of the oxygen delignification's kappa reduction was when wash loss increased from a value of 250 kg DS/BDt to 300 kg DS/BDt. The wash loss should therefore be less than 250 kg DS/BDt to guarantee unimpeded oxygen delignification performance in the mill.

Figure 6 represents the effect of the washing loss on the oxygen reactor's temperature with softwood. From Fig. 6 it can be noticed that the temperature in the oxygen reactor correlated clearly with the amount of washing loss. As the washing loss to oxygen delignification increased, the temperature in the oxygen reactor increased. The temperature in the oxygen delignification tower can increase and thus accelerate unselective reactions in the fibre because of the residual alkali present in the black liquor and the exothermal oxidation reactions (Vuorenvirta et al. 2000). In addition, the high washing loss may increase the amount of hydroxyl radicals, which has a negative effect on cellulose degradation and viscosity loss (Sankari 2004c).

Figure 7 represents the effect of the dilution factor on the evaporation energy cost. From Fig. 7, it can be seen that by increasing the dilution factor by one unit, from 1 to 2, evaporation costs increase on average by 13%/BDT in the mill.
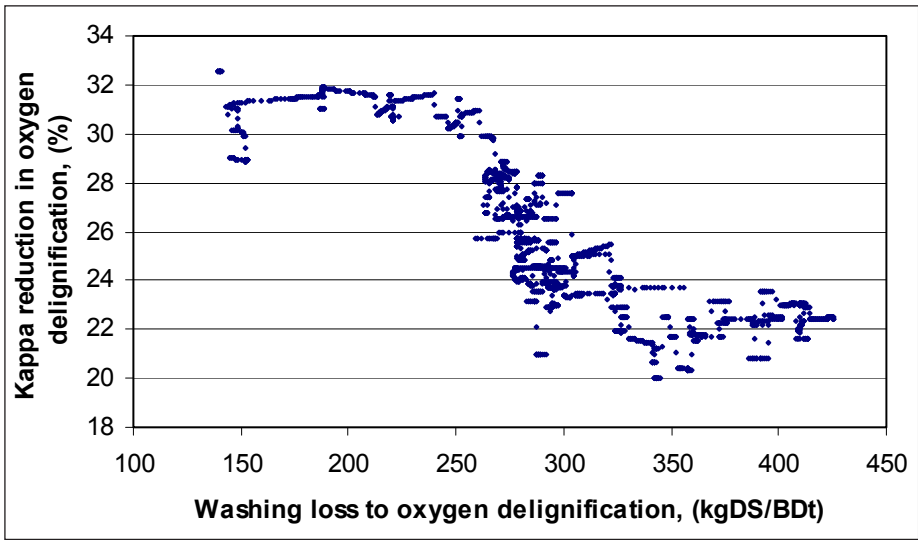
Fig. 5. Effect of the washing loss on the oxygen delignification's kappa reduction. Hardwood, production rate from 1035 **BDt/d** to 1125 BDt/d (Kopra et al. 2012).
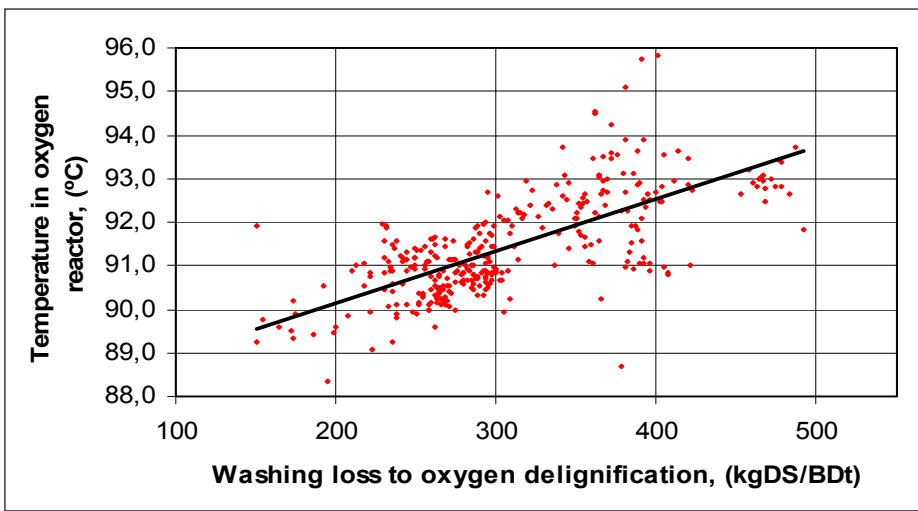
Fig. 6. Effect of the washing loss on the oxygen reactor temperature with softwood. An hourly average from June 2009 to August 2009 (Kopra et al. 2011b).
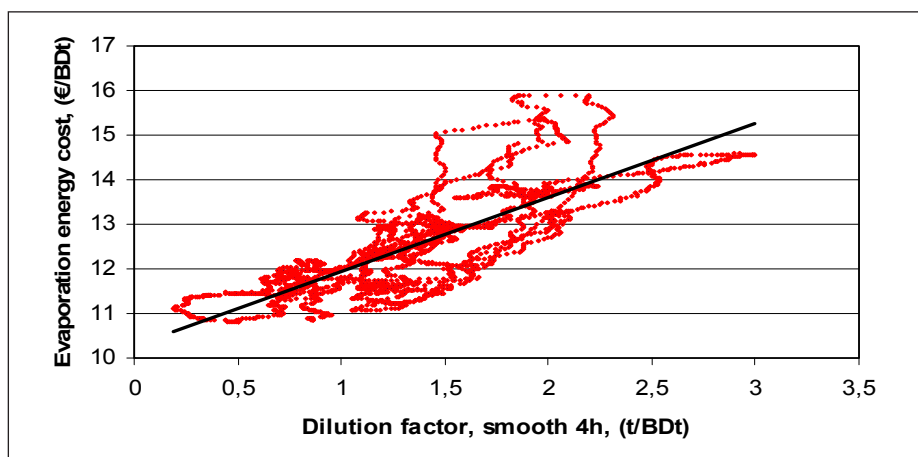
Fig. 7. Experimental results showing how evaporation energy costs are affected by dilution factor (Kopra et al. 2011b).

4 CONCLUSIONS

The results show that a refractometer device can be used for online measuring and monitoring the total dissolved solids (TDS) in brown stock washing at chemical pulp mills with very high accuracy. More efficient online monitoring also creates the potential for better process optimization and, therefore, economical savings. In addition, reliable TDS measurement combined with advanced data-analysis tools can constitute a good combination for process optimization in daily life at the mill.

ACKNOWLEDGMENTS

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7

ELKA AND MUAS
– PARTNERS IN DIGITAL ARCHIVING

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ABSTRACT

Private enterprises are often considered the primary partners for technology-orientated R&D activities within the Universities of Applied Sciences. As Mikkeli is not a industrial city by nature and history, the IT organisations in MUAS have found partners of different type to work with on R&D projects. Central Archives of Finnish Business Records (ELKA) is a foundation that takes care of the historical material born in the private sector organizations in Finland. ELKA has been the primary partner in EU-supported projects implemented by the Department of Information Technology at MUAS. As an archive, ELKA is not the fastest-growing enterprise in the ever-changing consumer market. However, there is a digital revolution in the field of business archiving and records management. This article, written by Osmo Palonen, attempts to explain how project activities involving MUAS and ELKA have tried to get this revolution under control. During the last decade, the archive and the university have co-operated in half a dozen projects in which both have created new digital activities and learned a lot about international developments in digital content management and archiving. With the help of these projects, new educational programmes have been developed at MUAS. Many ELKA employees have participated – or acted as guinea-pigs – in these projects.

1. INTRODUCTION: ARCHIVING – TRADITIONAL PROFESSION AS KEY DRIVER IN REGIONAL INNOVATION

Archiving and digital library activities have been key targets of R&D activities in the Mikkeli Region for more than a decade. MUAS started projects with this target in mind in the late 1990s. Since then, there have been many R&D projects and nearly all of those have produced both educational activities and new services provided by MUAS. (Mikkeli Region 2001-2013)

This development has been the one of the primary examples of MUAS putting its duty to serve the region and community into practice in activating its connection with working life, as set out in the law on universities of applied science. This article is a short historical review of the partnership with ELKA and the results of this cooperation.

Since MUAS has been working with Archiving and Records Management there has been a major change in the worldwide community of archiving and record keeping. At the end of the 1990s, an influential group of archivists still held the opinion that digital or electronic archiving is not possible. Fifteen years later, nearly everyone in the community knows that there is no alternative to digital archiving for preserving the memory of today's society. Digital archiving is the only way to preserve the cultural, industrial and political heritage of the 21st century. Similarly, electronic records management is the only viable method for running administration in private and public organizations.

1.1 Relocation and new development

MUAS's role in serving memory organizations in the region and nationally is based on regional activities in connection with archiving and libraries. The Provincial Archives of Mikkeli were established in the late 1940s as the successor of a similar operation in the

city Viipuri, which was left to Russia in the terms of a peace treaty between Finland and the Soviet Union during World War II. (Mma 2013)

The next step in this process in Mikkeli was the establishment of national business archives at the beginning of the 1980s. Instead of leaving each private enterprise and organization to manage and preserve their historical material by themselves, focal organizations in Finnish business life – the Central Chamber of Commerce Union of Employers, trade and industry organizations – decided to establish the Central Archives for Finnish Business Records with government financial support in Mikkeli. The City of Mikkeli also had a crucial role in this development. (Elka 1981-2013.)

The third step in this background process was the Finnish government's decision to build the conservation centre of the National Library in Mikkeli as a result of regional policy at the beginning of the 1990s. Adding digitization to the activity of this centre led to co-operation with MUAS. At the turn of the millennium, the first educational programme organized at MUAS was to train personnel to work in digitization at the local National Library unit. (Dimiko 2013.)

At that time, regular meetings between these three organizations and MUAS were arranged. Since then, new partners, such as museums and public libraries, have joined the project and a coordination organization called DigitalMikkeli has been established. (Digital Mikkeli 2013.)

1.2 Education, research and development at MUAS

All of the partners in the above described co-operation have utilized education organized by MUAS. However, ELKA has been the main partner for MUAS for a decade. When MUAS project activities became more practical and included digitization and digital archiving applications as core R&D functions, a significant number of those projects were done based on the needs of ELKA. (Järn 2008, 11–13.)

In the new millennium, a new model has arisen for archiving the nation and society. It has been understood that history is no longer written in official paper documents called records; instead, it is also recorded in newspapers, magazines, moving image tapes and films, sound recordings, brochures, advertising, project memorandum files and e-mails. To make an image of life in society, it is necessary to include more than just a government archive. While mainstream historical research has also been trying to widen the historical view from the history of the mighty to the history of individuals and private organizations, the contents held in archives are expected to provide material for this renewed paradigm. ELKA, as the national archives of trade and industry, was the leading private archive that had the material required.

2 DIGITAL PARTNERSHIP WITH ELKA

The director of ELKA, Matti Lakio, understood in the early years of 2000s the value of audiovisual material held in the archive. He also realized that this "special content" was in danger and needed to be digitized for preservation, which represented the starting

point of the ELKAD project (2004-2006). Lakio also knew that the archive did not and will not have resources to research digitisation, digital content management and preservation by itself, which represented the starting point for a joint R&D projects with MUAS. Since then, ELKA has been a permanent R&D partner of MUAS in all projects that include digitization, digital archiving and digital preservation. The archive has also been a partner in projects for carrying out market studies and business models of digital archiving and preservation.

From MUAS' point of view, the projects with ELKA have provided the real world and real content for developing archiving and digitization. Instead of having test material with moving image or sound to digitise and hundreds of gigabytes of archiving material, the connection with ELKA has provided real material for developing factory-scale digitization units for analogue sound, video and film and thousands of gigabytes of archive material in digital format to store, manage and preserve – and to keep alive for decades, or even centuries. The research and development done with ELKA has provided MUAS an opportunity to provide similar services for paying customers and partners. Currently, most of the private archives in Finland are, in one way or another, working with MUAS. To get a deeper understanding of the connection between MUAS and ELKA, summaries of the projects and their effects will be described in this article. They also show how a partnership between a University of Applied Sciences and an organization other than a private enterprise can be also effective, successful and beneficial for both parties, as well as for the community as a whole.

2.1 ELKAD – the birth of a partnership

The ELKAD project, which was partly financed by the EU (ESF), had quite a few pioneering tasks to be done. In ELKA, the starting point was the audiovisual material that was becoming obsolete. The analogue sound and video tapes were ageing and losing information and, perhaps more importantly, playback devices had ceased to be manufactured years previously and used ones were becoming scarce. In 2004, memory organizations were digitizing sound, but not very often videotapes. Factory-type solutions were not common, nor had formats for digitized files been studied and decided upon: no standards for preservation and access were in use. The project also had a ground-breaking role in defining metadata types and naming conventions. All of this work was done in a combined effort between ELKA and MUAS. As an example of the depth of co-operation, the development manager of ELKA was employed in the MUAS project team.

Results were achieved within two years and four months and they were excellent from the project partners' point of view. The ELKAD application was the first digital video and sound archiving system for private archives. There were other partners in addition to ELKA and MUAS. For the national broadcasting company, YLE, the project provided the first long-term preserved database in Finland and, a new photo archive was created for forestry giant UPM. In the case of UPM, information was collected from an old information system (Lotus Notes) and stored in the database of a modern RDF-based archive application. The acronym, RDF (Resource Description Language), was also a new development in content management. Although it was already a W3C standard, it had not previously been widely used in archiving. All in all it was a powerful tool for describing contents and their relationships. This can be seen clearly today, as modern Web 2.0

technology is using RDF and it is used by Adobe and Microsoft.

In the field of narrow film digitization, ELKAD was the first project in Finland to utilize new, high-quality technology with reasonable costs. The technology was brought in by a German manufacturer, WMA, and an industrial CCD-based scanner with sound and adjustable speed control was taken into use at MUAS. The test and first production material for new technology studies was again provided by ELKA.

In the ELKAD project, methods and policies for long-term preservation have to be considered, although they were not the key field of study. Still, the practices formed in the project made up the first set of digital preservation principles in the repository, which was set up within the department of information and media technology. The role of archivist organization ELKA was significant in familiarizing IT personnel with the tradition of archiving and the associated rules. These also needed to be converted into digital format.

The ELKAD project was the first project in which a memory organization and MUAS developed new approaches for archiving. It also provided MUAS students with opportunities: two BSc theses were written on the topic. One concerned the digitization of moving images and the other concerned the digitization of audio content. Continuous education for archives and libraries was tested with a training programme for MUAS, ELKA, provincial archives and the national library's personnel in Mikkeli. In the next MUAS project, entitled KUNDA, content and methods were created for a 30 ECTS postgraduate programme, entitled SAHA. The programme was conducted seven times from 2006 to 2012. A crucial principle "You cannot educate if you are not putting into practise" was discovered during the project work. It turned out to be an essential aspect of the programme, as there were initially no practical experience of digital archiving and very limited of digitization.

2.2 Project ATON – the trusted repository concept

Co-operation with ELKA was not a one-off event in the ELKAD project. In fact, the project gave rise to a partnership between the business archive and MUAS. While digital long-term preservation was just one part of the ELKAD project, the next project focused entirely on preservation. The project was entitled ATON – Expanding knowledge in digital preservation (2006-2007). The role of ELKA was again to bring in archival knowledge and understanding. As before, the thousands of gigabytes created in the digitization part of ELKAD provided good reason to study how this information can be preserved for decades and centuries.

ELKA participated in the research activities of the ATON project, rather than simply providing feedback and advice. ELKA's five specialists completed five of the 11 publications made under the auspices of the project. The main assignment of the project – the preservation strategy – was also produced in close co-operation with ELKA. While ELKA had provided financing and personnel for the first project, its contribution to the ATON project consisted of donating its personnel's working hours, which represented a significant factor in financing.

The results of cooperation have been published in several international conferences. Dr. Anssi Jääskeläinen having his speech in the Archiving 2012 conference in Copenhagen.

The Central Archives of Finnish Business Records (ELKA) is located in Mikkeli.

One part of the R&D operations is to create international and national contacts. International workshop in digital preservation was organised in Mikkeli. The participants came from Finnish and Estonian National Archives as well as the Swedish LDB Centrum together with the specialists from MUAS.

Tape libraries based on LTO technology is used in the MUAS archiving solutions.

The contribution was by no means one-sided. The strategy work and developed processes utilized knowledge and practical experiences. The preservation strategy and migration management were – and still are – key areas of interest for the archive institution. In its role supporting the community in the region, MUAS has been the key source of information with the help of the ATON project.

The third project – in collaboration between MUAS and ELKA – was a small, short-term project, called Dark. It was carried out in spring 2008 and ELKA acted in an advisory role as the technology for video digitisation and preservation data storage was updated.

2.3 VIVA3 – a step in a new direction

While the cornerstones of digital archiving were being studied, a new project, entitled VIVA3, aimed to expand digital content management and archiving to a new area of 2D and 3D material. The rapidly developing digitization of video processes also needed to be updated. In this context, an important development occurred: a new organization, the Finnish Industrial Design Archives (FIDA), was established as a part of ELKA.

ELKA's role in the VIVA3 project was similar to its role in ATON, with the exception that there were other partners in the project, including museums, the National audiovisual archive and private enterprises. In the field of moving image a study to find content in memory organisations that needed to be digitized was carried out in co-operation with ELKA. The improved video digitization processes and new preservation formats were also tested and commented on by ELKA and the other three partners. This study provided information for the plan to expand the digitization service.

When entering the new field of 3D, some common tests were made to digitize the artefacts held in FIDA, for example. From MUAS' point of view, co-operation provided ideas of the opportunities in 3D modelling. In this part of the project it was discovered that there are no generally accepted and utilized standards for preserving and distributing information in 2D and 3D format. This is causing problems for all types of modelling information, regardless of whether the documents concerned are to be used in engineering, architecture, museums or computer game industry. In this way, the project was similar to the moving image digitizing in the ELKAD project: when there are no standards, the partners had to select formats using their best knowledge and hope that content preserved using those can be converted into a new standardized format in the future.

2.4 Business model for archiving service

Funded by Tekes, the national R&D support organization for industries, MUAS and ELKA studied the market for digital archiving service in private enterprises in three phases, from 2008 to 2011, and made a business plan for a new operation in this field. Although the company had not yet begun operating at the time of writing, there is a realistic basis for expanding the service, both in the archive and within MUAS. A complete picture of the needs of audiovisual enterprises was made, in connection with the information collected from the memory organizations earlier.

In this project, the partnership between ELKA and MUAS opened a discussion about deeper collaboration; the opportunity to establish a common organization between the partners arose. This could be a realistic continuation for long co-operation. However, it has not yet been realized.

2.5 Capture and OSA – two sides of a coin?

In the Capture project (2011-2012), the roles of the project were reversed: ELKA was in charge of administration and MUAS was the participating organisation, operating as a subcontractor. In this project, ELKA studied all of its service processes and the needs of its customers, and wrote a wish list of all the functions needed in a new information architecture. MUAS made a data model and specification of the aims. This project was completed at the end of 2012. MUAS developed also a pilot version of the Capture Client software that can be used to ingest unstructured material into the archive from the clients. (Capture 2013)

MUAS started a new project in the summer of 2012, entitled OSA – Open Source Archive. In this project, ELKA will again play a significant role as partner. It is partly based on the information created in the Capture project, but there are also other partners with their own ideas. In this project, the target is to create a new open-source-based modular IT infrastructure for the archives and use as many ready-developed open source modules as possible. One part of the testing software, the Dark archive, has already been selected for pilot implementation and it will be based on the DAITSS software, which is under development in Florida. To implement modules for ingest and for the service platform based on the needs of the archiving partners in the project, components will be needed from multiple sources.

In a way, this OSA project can close the co-operation circle. In 2012, MUAS took over the archival applications that ELKA had created and purchased with a local IT developer close to 15 years ago. This application is still the main finding aid and process control software in ELKA. Now the target is to create a replacement in the OSA project.
The information in this chapter is based on project reports and publications that are listed in the references, as well as on the experience of the author.

3 RESULTS OF THE CO-OPERATIVE EXPERIENCE

ELKA's role in education has long been important. In all educational programmes a group of students have always been chosen among their personnel and ELKA has always encouraged their employees – management and practitioners – to participate in both post-graduate ERMA and the Master ESDA programmes. Their participation and feedback has been a key factor in developing the programmes.

In summary, the 15 years of collaboration between ELKA and MUAS can be said to have been beneficial to both parties. The partners worked together closely at times – at other times less closely – but it can be said that, if they had not worked together, the partners would not have developed their digital operations and knowledge to the same extent, if at all. There cannot be proper research at a university of applied sciences without close connection with real businesses and organizations. Furthermore, with the resources ELKA could have afforded in R&D, the results would have been much narrow-

er in focus than those that were achieved in cooperation with MUAS. Although ELKA did not spend an extremely large amount of money in the projects – compared to the more than two million Euro total expenditure – the archive has always been an important piece when collecting the funding. This is valid also for the working hours counted in as project funding. Without these, at least some of the projects could not have started.

The co-operation and its results have also provided much publicity for both partners and the Mikkeli archiving and library community. An early, shining example of the interest created in the work of the partners was the visit of a group of international evaluators led by Sarah Tyacke, Chief Executive of the National Archives of England and Wales, on 13 December 2005. The evaluators visited both ELKA and MUAS and wrote positive statements in their report, which was published in February 2006. To get the Ministry of Education to accept the plan for a Master degree programme in Digital Archiving at MUAS, the following statement from the evaluators' report may have proven crucial:

"The Polytechnic at Mikkeli offers a post-graduate programme for digital archiving and is intending to offer a Masters programme with IT in digital archiving, preservation and EDRMS in 2007... These programmes would answer the urgent need for education and training in the new skills of information management for archivists both in terms of EDRMS, information legislation and its application, and digital content and preservation skills where there are few experts and even fewer practitioners available." (NAS Evaluation 2005)

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8

COMPREHENSIVE SUPPORT FOR FAMILIES: CULTURAL INTERPRETATION AS A NEW SOCIAL INNOVATION OF FAMILY WORK

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ABSTRACT

In this article we will discuss using cultural interpreters as a new form of family work in child protection services. This work took place among Finnish family workers and Russian families with child protection services in two Finnish municipalities, starting in 2011. The ultimate goal of cultural interpretation has been to develop a professional, effective practice that is sensitive to multicultural issues. Consequently the objective of this study was to scrutinize experiences of the workers and clients who participated in this activity.

The primary data of the study consists of responses to a questionnaire for workers and phone interviews of clients. The results of our study show that the work of a cultural interpreter is experienced as an effective form of work. Clients reported receiving emotional and linguistic support, clear information about social work and public services and increased trust in social work while working with a cultural interpreter. Family workers described this form of work as highly effective and supportive, both for themselves and for their clients. Although our study shows positive results, this form of work needs modelling and clarifying in the future. Furthermore, our study showed that there are broader issues that need to be addressed when working with immigrants. These issues include making sure that there is a mutual understanding between workers and clients by using language interpreters, conveying clear information to clients and taking into account the effects of the immigration process on the well-being of these families.

INTRODUCTION

Cultural interpretation has been developed within the framework of the project, "Empowerment of Families with Children", governed by the University of Helsinki, Palmenia Centre for Continuing Education, Kotka Unit. The project is taking place in the Kymenlaakso and South Karelia districts in Finland and in St Petersburg and some other municipalities in Russia from 29 April 2011 to 28 April 2014. The partners in the project are Kymenlaakso University of Applied Sciences, Saimaa University of Applied Sciences, the City of Imatra, St Petersburg State University: the International Centre of Social Service Studies, Complex Centres of Social Service of Population of St Petersburg (Admiralteyskiy Dictrict), Vyborg, Pikalevo and Svetogorsk.

The overall objectives of the project are to improve the welfare of families in the Finnish-Russian border area, to ensure easy access to high quality services in multicultural society, both in Finland and Russia, and to increase mutual understanding of the social service system and family culture. To reach these objectives, the project's activities include the following: (1) Developing the work of a cultural interpreter. (2) Professional exchange between Finnish and Russian workers in the social sphere, study trips for workers and students and exchange of good methods and best practices for working with families. (3) Developing multicultural study modules at the Saimaa and Kymenlaakso Universities of Applied Sciences and providing education for workers. (3) Conducting qualitative and quantitative research, seminars, international research cooperation and publications. (4) Developing work community training aimed at providing workers with skills and tools to operate in a multicultural working environment.

Our article concentrates on the first activity mentioned: developing the work of a cultural interpreter. In the first chapter of this article we will discuss how social innovations can support the acculturation process of Russian immigrant families. In the second chapter we will describe how the work of a cultural interpreter has been developed and what this form of work contains. The third chapter will be dedicated to a study which followed the work of a cultural interpreter, and the results of this study will be presented in chapters four and five. In chapter six we will give voice to a person who has herself worked as a cultural interpreter during this project. In the discussion chapter we will summarize our results.

1 SOCIAL INNOVATIONS AND ACCULTURATION PROCESSES

Social innovations have been defined as new ideas born of creative processes involving people or communities and leading to added value in well-being or service systems. They may give rise to new ways of producing services or they can be entirely new societal ways of understanding things. (Kari 2007.) Social innovations are born when we see things differently, creating a deeper understanding of phenomena. Nordic walking, paternity leave, green care and the maternity package are often used as examples of excellent Finnish social innovations.

We are going to need social innovations, especially in the public sector. Our population is growing older, more workers are needed and it is already accepted as a fact that these workers will need to come from abroad. Thus, one of the many current challenges for the public sector in Finland is to develop new ways of helping immigrant families to acculturate to our country and culture.

Acculturation is a process which takes place within communities and individuals, but especially within families, when different cultural groups come into contact with each other and this contact changes the original cultural model of the groups. Acculturation is a powerful change that influences the inner interaction models of the family, parenthood and the upbringing of children, the well-being of all family members and the development of children and youth. This process is constantly changing and it is affected by several factors: in the case of immigration, political decisions and the attitudes of the host society are especially important, as are the immigrants' own human, economic and social capital and cultural distance, but family structure, the roles of different family members and family dynamics, as well as the ideals and values of child development and upbringing children, also play significant roles. (Alitolppa-Niitamo 2010, 45–61)

How can social innovations be of use in helping the acculturation of families with Russian backgrounds in Finland? The idea of an innovation chain is noticing a need or a problem, researching the phenomenon and understanding it, finding solutions, assessing the solutions (pilot projects) and disseminating best practices (Vainio 2006). In this article we present the development process of a cultural interpreter, an innovation chain that we find very promising in this field of work.

2 DEVELOPING A NEW FORM OF FAMILY WORK

The cultural interpretation service started in September 2011, and it was carried out in two municipalities in South-Eastern Finland. The person acting as cultural interpreter is a native Russian speaker who has moved to Finland from Russia, and who is trained in psychology. Her work took place among family workers and Russian families who come into contact with child protection services. Since the cultural interpreter service was a development project, the interpreter's job description was not defined in detail at the beginning, but was allowed to take shape throughout the course of the project.

As a professional practice, the service is unique, especially in the context of child protection, and it differs from the work of a foreign language interpreter in that the latter is limited by a strict code of professional ethics. This prevents the foreign language interpreter from taking any kind of stand in a discussion or asking clarifying questions and interfering with work processes. In research regarding foreign language interpretation (Forsander 1996), it has also been found that problems with interpretation include the availability of interpreters, especially in urgent situations, insufficient time for discussions to be carried out with the interpreter's help, and variation between languages in the meanings attached to the vocabulary used in child protection.

The cultural interpreter, on the other hand, is not bound by professional interpreting ethics, which means that the service can be flexible and client-centric, and that the cultural interpreter can ask both workers and clients clarifying questions, improving mutual understanding of the issues at hand. Thus, cultural interpretation combines foreign language interpretation, peer support and case management. In developing this service, the goal was to create culturally sensitive approaches that will facilitate family workers' efforts to help families of Russian origin.

Client relationships with the cultural interpreter were preceded by a worker from the social services contacting the interpreter and arranging a joint meeting with the social services worker, the cultural interpreter and the family. The actions of the cultural interpreter were guided by the individual needs of each family, and her tasks included meeting client families in network meetings, in the presence of officials, and making house visits on her own. In some cases the cultural interpreter also acted as a foreign language interpreter between the workers and the clients, if the clients' language skills were poor. Client relationships with the cultural interpreter lasted from a few meetings to 2-3 months, and some of them have continued up to this date.

Cultural interpretation mainly took place among the mothers, and became extensively mother-centric, which, in our view, stemmed from four factors. Firstly, family work has become mother-centric among Finnish clients as well, so the workers may have followed previously adopted working practices (Berg 2008). Secondly, some of the client families were single-parent families, where the mother was the primary caregiver, and in some families the parents were about to separate, with the intention of the children continuing to live with the mother. In such cases, child protection issues were seen as concerning the mothers more than the fathers. Thirdly, one third of the families were in a situation where the mother was considered to need cultural interpretation more than the father, because the father had better language skills and better knowledge of the functioning of the Finnish social services. This situation could arise either because the father was

of Finnish descent or because, in a few cases, the father had lived in Finland considerably longer than the mother. Fourthly, the mothers were the ones who primarily maintained contact with social workers and actively used the cultural interpreter's services of their own initiative. The factors described above may explain this, but the cultural interpreter's gender may also have had an effect, as may the role of motherhood in Russian culture. It has been perceived as a very powerful role, both historically and in contemporary culture, and mothers are still seen as being primarily responsible for the raising of children and the management of the family's daily life (Rotkirch 2007, 17-21).

3 EVALUATION OF A CULTURAL INTERPRETER'S WORK

After six months of the beginning of the cultural interpreter's work we conducted a small study aiming to scrutinize the work of a cultural interpreter and to develop this form of work. The data used in the study was collected from February to March 2012. Workers' views were collected using a questionnaire and clients were interviewed by phone. A semi-structured questionnaire was used to gain information from workers and clients. All interviewees were asked almost identical questions, in an identical order. The data consists of two parts:

(1) The first part consists of an e-mail survey of workers who were involved in family work and participated in the cultural interpreter service. The questionnaire was sent to 11 people, of whom 9 answered.

(2) In the second part, the mothers of the families that participated in the cultural interpreter work were interviewed by phone. Of the seven mothers involved, six were interviewed, as one could not be reached. The cultural interpreter mainly worked with the mothers, so we concluded it was best to interview the mothers only. At the time the cultural interpreter service started they had been in touch with child protection services for 1–18 months.

The theme of the survey and the interviews was experiences of the cultural interpreter service. Although the ultimate aim of our qualitative study is not to draw generalizing conclusions from the data, we believe that it is possible to find out, by studying a small data set, what factors are significant in the phenomenon. The purpose of our qualitative study was to provide a meaningful description of the experiences gained from the cultural interpreter service trial.

4 RECEIVING MULTIDIMENSIONAL SUPPORT: EXPERIENCES OF CLIENTS

In the next subchapters we will discuss different forms of support. Even though these forms of support are not clearly categorized, we feel that in our analysis of data this division is necessary, because it illustrates different aspects of the work of a cultural interpreter.

4.1. Emotional support

"I was suffering from psychological stress, but the cultural interpreter listened and support-ed me. She also told me what options I have, helped me to think positively, and helped to solve problems, which calmed me down and gave me strength. (Client 5.)"

Emotions play a key role in personal well-being, since they provide the individual with information and clues about how safe the situation is, about the general atmosphere, level of acceptance, support and freedom of action, as well as interactions between peo-ple. If the emotions are positive, they release the person's resources. (Siitonen 1999, 152, 154.) In this study, the significance of emotions emerged as a strong theme. All respond-ents brought up the fact that the emotional support they received from the cultural in-terpreter was especially important to them. Most of the clients had no friends or rela-tives in Finland, and some of them were going through divorce, which meant that they could not receive support from their spouses. The cultural interpreter was the only per-son to whom they could talk about their personal issues.

The data shows that the respondents considered self-expression in their native language as an important element of emotional support, because it highlighted respondents' roles as experts in their own situations and enabled them to participate in defining the situa-tions. Respondents also described how, after conversations with the cultural interpreter, they had become able to see different options and think about positive future scenarios, which brought them a sense of calmness and strength.

4.2 Linguistic support

"The cultural interpreter explained everything in detail and asked the workers many clari-fying questions. Before that, many things had been unclear to me. (Client 2.)"

In a number of studies, the language barrier and difficulties in comprehension have been found to constitute some of the greatest challenges to cooperation between Finn-ish workers and immigrant clients (Heikkilä-Daskalopoulos 2008; Anis 2008; Peltola & Metso 2008; Hammar-Suutari 2009; Pitkänen 2006; Kupari 2007). The results from our study are coherent with the earlier studies, as all the clients brought up the lack of a shared language as the greatest obstacle to cooperation.

However, in our study the clients felt that mere technical translation was less important than the linguistic support provided by the cultural interpreter. It was brought up in the interviews that the cultural interpreter was able to clarify matters between clients and workers. She explained things to clients and workers alike, asking both parties further questions when necessary. It was precisely these further questions that seem to have had an important role. Previously, workers may have been under the impression that the cli-ents had more information than they actually did, whereas the clients actually did not know what questions to ask, because both child protection social work and the entire Finnish system were unfamiliar to them. It can be seen that clarifying matters increas-es the clients' awareness of the workers' tasks, and that this is important for cooperation and commitment on the clients' part.

Thus, the cultural interpreter enabled the clients to participate in the discussion defining their situations, providing them the opportunity to express their own views and opinions. This is important, since it is by getting their voices heard that people feel they have the opportunity to control their fate and to affect the decisions that concern their lives – to attain active agency.

4.3 Receiving information

"The cultural interpreter explained to me what kinds of support people can get in different life situations, and where it can be found. This information should be given at the very first stages of moving to Finland. That way, people would know where to apply for help if they need it. Perhaps our family's problems would not have become so bad. (Client 1.)"

Knowledge and power are often seen as intertwined, since some forms of managing and applying knowledge can bring power (Lonka 2001). Knowledge regarding a society may be reflected in increased opportunities for societal action and choice, and thus increased freedom. According to the respondents, one important element in the cultural interpreter's work was conveying information regarding the purpose of child protection social work and the Finnish social service system. In addition, the cultural interpreter had provided information that the respondents had not been able to request, which played an important role. Asking can be difficult if clients do not know the system, since they will not know what they should focus on and what to ask.

Respondents also mentioned that knowing about the service system allows them to conduct their affairs on their own, and to apply for help when it is needed. Thus, it can be seen that their opportunities for action have increased. Furthermore, several respondents felt that this type of work and receiving the necessary information could also help in preventing problems, if the information were provided to immigrants in the early stages of moving into the country.

As they received more information, the respondents' fears of the child protection service were allayed, and their chances of acting independently within the system increased. Acting within the system is considered important, as the immigrants' extended family and other social networks that support them can be diminished. In this situation, the roles of various public service officials may become heightened in the immigrants' lives (Hirstiö-Snellman et al. 1998, 6). With increased awareness of the service system, it also becomes possible to seek certain kinds of help from the service system.

4.4 Gaining trust in social work

"The cultural interpreter clarified some misconceptions that I had towards child protection, and helped to clear up misunderstandings between myself and the Finnish social workers. Now it is easier to trust in social work. (Client 1)".

In social work, establishing trust can be considered a prerequisite for good interaction and joint work. However, trust does not come automatically, since clients can be afraid of working with officials on the basis of, for example, their previous experiences, stere-

otypes, or the controlling features of social work that exist alongside the support role (Kananoja et al. 2007, 109-110). This theme was clearly highlighted in the data set, when respondents discussed having difficulties forming a trusting relationship with social workers until they began working with the cultural interpreter.

Respondents clarified that gaining trust is related to the issues mentioned in the previous chapters, such as linguistic support and receiving information. According to the respondents, receiving information about the principles of child protection helped them to trust in family work and in workers. Confidence in child protection as an institution helps to build trust in individual workers (cp. Seligman 1997, 18). Furthermore, respondents highlighted that gaining trust was related to an open atmosphere, which was created by the presence of the cultural interpreter. Reasons that respondents gave for the open atmosphere were the opportunity to speak their mother tongue, and shared common experiences with the cultural interpreter, such as immigration experiences, which gave them the feeling that they were being understood. Respondents also felt that there were no power differences between them and the cultural interpreter, which gave them a feeling of safety, and they felt that they could receive information and trust it, because it was not given "from above". Gaining trust is seen as a key issue in social work, because it is grounds both for cooperation with workers and commitment to the common goal. In a broad perspective, trust is seen as a precondition for positive change in clients' lives. (Dominelli 2004).

5 EFFECTIVENESS AND GROWTH OF CULTURAL KNOWLEDGE: EXPERIENCES OF WORKERS

"We received a lot of help from the cultural interpreter. The difference between a cultural and a language interpreter is that a cultural interpreter can participate in the working process as a family worker, not only as an interpreter. In this way, a cultural interpreter can give great support to families. Clients also trust the cultural interpreter and that's why cooperation goes more smoothly and social work is much more effective." (Worker 4)

All of the respondents said that they got a lot of help from the cultural interpreter and that they and their clients could concentrate on important things, rather than wasting their time and resources on clearing up misunderstandings. In this way, this form of work was experienced as highly effective. Respondents reported that cultural interpretation had the effect of preventing problems, since families had opportunities to get various types of support and information from one person.

Respondents also mentioned that they gained new skills and information during their work with the cultural interpreter. For example, they gained a better understanding of the fact that some clients can be afraid of social work in Finland because they are not used to receiving help from social officials, and because they can compare it to social work in Russia, where the work is quite marginal, and interference by social workers implies that the family's situation is very serious, and can be stigmatizing.

Respondents also had suggestions for future development. They felt that, in the future, this form of work should be modelled more precisely. This modelling could include clar-

ifying the role of a cultural interpreter in the field of social work, establishing criteria for clientship, defining clear goals for the work and developing an information channel between a cultural interpreter and social/family workers. Respondents also suggested that a cultural interpreter could give working communities training and lectures about Russian culture and about working with immigrants.

6 FROM THE FIELD OF SOCIAL WORK: EXPERIENCES OF THE CULTURAL INTERPRETER

"During my work as a cultural interpreter I noticed that, firstly, immigrant families need a lot of information about Finnish society and public services. Conveying information is crucial, especially if the family has recently moved to Finland.

"Secondly, language interpreters are not used enough, which has negative consequences. The lack of language skills put clients at a disadvantage, since social workers are speaking their native language and clients are speaking a foreign language. In addition it is difficult for clients to control the situation, since it is possible that, due to a lack of understanding, they are not aware of their options or their opportunities to influence the discussion and any decisions based on it. Furthermore, failing to ensure the client's comprehension may result in clients feeling that they are not respected, as their opinions are not regarded as important.

"Thirdly, in current practices of social work, 'culture' is used too often as an explanation. It is easy to use cultural differences to explain things away, because that way you don't have to think more closely. However, it is difficult to talk about a uniform Russian culture, because the clients have moved out of Russia at different periods of time, some during the Soviet era. Also, the clients come from regions that differ greatly from each other. I believe that deficient care or harmful childrearing practices should not be explained by culture because it means that the issues will remain out of reach. Also, even if there are childrearing problems in some families of Russian descent, it does not mean that they concern all Russian families or that they are a part of the Russian culture. Rather than considering cultural differences, it is important to take into account individual life situations and the stress involved in the immigration process, and to develop appropriate forms of support on that ground."

Nadezda Kärmeniemi, Cultural interpreter

7 DISCUSSION AND CONCLUSIONS

According to our results, the clients who participated in the cultural interpreter trial felt that they got emotional and linguistic support and received information regarding child protection social work and Finnish public services in general. These were the issues that helped them to gain trust in social work and social workers, to receive support from social work, to participate in decision making regarding their own lives and to act independently in Finnish society. Workers who were involved in family work and participated in the cultural interpreter work felt that the cultural interpreter supported them in their work and that the trial was effective. Workers also felt that they gained new knowl-

edge and skills for working with clients.

These results imply that cultural interpretation can be seen as a social innovation. This form of work is multidimensional and highly varied. During this work, participants gained a deeper understanding of the underlying phenomena affecting social work. Our data also highlight the fact that cultural interpretation enabled workers and clients to cooperate more effectively. Regardless of these positive results, this form of work is not yet modelled, and there are issues that need to be addressed. For example, the role of a cultural interpreter in the field of social work should be further clarified.

Furthermore, it is noteworthy that, even though our results show that cultural interpretation is an effective service that combines foreign language interpretation, peer support and case management, there are also things that all workers could consider doing in order to make cooperation with immigrant clients easier. To begin with, it is crucial to make sure that there is a mutual understanding, and that clients have the possibility to express themselves, by using interpreters. It is impossible to talk about real cooperation and committing to mutual goals if there is no common language and no understanding. Interpreters do not even need to be invited to the meetings in person, since telephone interpretation services are widely available, flexible and cost-effective. Furthermore, clients need to be provided with clear information about Finnish public services and their rights and obligations in Finnish society, preferably immediately after moving to Finland, because the lack of information limits a person's possibilities to make reasonable decisions and to act in society. And, finally, it is important to consider in concrete social work situations whether the use of "culture" as an explanation is a fruitful viewpoint. Although there can be differences in the values, views and traditions of people who have grown up in different cultural environments, it is problematic to explain social phenomena through these differences. When these kinds of explanations are used, there is a risk that cultural identities and differences are assumed to be static, even though the significance of a cultural background to any individual cannot be known beforehand. Instead of looking at cultural differences it would be better to develop practices that are sensitive to the acculturation processes of immigrants, such as providing emotional and psychological support.

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