



Bitstream – Capacity Building for Innovation

Final Report

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Introduction

The report presents the realization of and results from the Botnia Atlantica funded project BitStream – Capacity Building for Innovation. The project started March 15 2013 and ended October 31 2014. Originally the project was scheduled to end April 15 2014, but for several reasons the project applied for and was granted extension until October 31 2014. The coordinating funding receiver has been Umeå University and the other Swedish partners has been the municipalities of Sorsele and Storuman. In Norway the partners has been Nesna University College, University of Nordland, the municipal of Bodø and the Norwegian National Collection Agency in Mo i Rana.

In short, Bitstream is based on the starting-point that successful development of public administration requires good understanding of how its activities are conducted and how they are perceived by its citizens/customers. This means that process mapping and subsequent process analysis and impact mapping is a fundamental condition for innovative business development aimed at creating ICT innovations in the form of, for example, mobile apps or web-based services.

The main objective of the project was to create a transnational platform for capacity building and exchange of experiences in the area of innovative business development. This includes capacity building for staff in the public sector in Norway and Sweden. The project deliverables has been to accomplish

- A virtual and physical transnational platform for capacity building that includes a cross-border exchange of experiences, research and developments in innovative business development.
- Prototypes of methods and tools that are adapted to sustainable innovative business development in the public sector.
- Increased competence of the public sector to conduct innovative business development and to act as a competent authority in procurement processes, and also increased competence of Norwegian ICT companies.

The project has been organized in six work packages Project coordination and management, Development of a platform for the transnational skills supply of the future, Investigation and evaluation of methods and tools for innovative business development in the public sector, and Pilot test of the transnational platform, Evaluation of the transnational platform, the capacity building and the project, and finally, Dissemination and completion of the project. Each work packages has had a WP leader and a strict time schedule.

The rest of this report is organized as follow. The next section discusses the realization and results from the different work packages and the final section conclude the report by presenting some proposals for continuing work.

Realization of and results from work packages

As said in the Introduction the project was divided into six work packages. This section is a straightforward description of the realization of and the accomplished results from each of the packages. Work in the project has been organized in such a way that there have not been any Norwegian or Swedish work packages. All work packages have had both Norwegian and Swedish participants, and leadership of the packages have been organized so that the Swedish and Norwegian participants have been WP leader for every other work package.

Work package 1: Project coordination and management

Mikael Söderström, Umeå University has been project coordinator for the project and Terje Fallmyr, University of Nordland has been project leader in Norway. They have shared the leadership of WP 1 which means that most of the decisions regarding the project has been made jointly or together with the steering committee. During the project Mikael and Terje has worked closely and in such a sense that most of the project management has been handled by them together.

The steering committee has consisted of Mikael Söderström, Umeå university, Terje Fallmyr, University of Nordland, Frode Nilsen, Bodø kommune, Jan Ask, Sorsele kommun, Peter Persson, Storumans kommun and Geir-Tore Klæboe, Høgskolen i Nesna. During the project the steering committee has met three times May 2 2013, August 28 2013 and December 12 2013. Most meetings have been quite un-dramatic and have mostly discussed progress reports regarding the project from Mikael and Terje.

In general terms project coordination and management has been very easy going. The project has been running very smoothly, and the only major revision of the project was that start of the project was delayed due to late decision from the Botnia Atlantica secretariat.

Work package 2: Development of a platform for the transnational skills supply of the future

Ulf Hedestig, Umeå University has worked as WP-leader for this package. The other participants have been Geir-Tore Klæboe and Hallstein Hegerholm from Nesna University College. All participants have distinguished expertise in distance education and e-learning, both from research and teaching within the topic area. The aim of the work package was to create a transnational platform, flexible enough to allow both physical and virtual meetings. The work has been based on joint collaboration between Umea University and Nesna University College with physical meetings and workshops in Storuman, Umeå, Bodø, and Mo i Rana. In addition to these workshops, monthly coordination meetings and status reports has been made by using Adobe Connect.

State-of-the art

The background analysis of trends and opportunities within e-learning showed that the concept of openness is currently a keyword within the area of e-learning. The concept consists of different perspectives and a short description of each aspect is presented. Firstly, the idea of open access means unrestricted access to research literature and primarily intended for scholarly journal articles. A common consequence is that international and national research councils require that funded research projects must provide their results as open access. Secondly, the perspective also includes the concept of open source, which refers to computer programs with the source code available for the general public for use or modification. Within education this has resulted in learning platforms such as Moodle (www.moodle.org) and Sakai (www.sakaiproject.org). Thirdly, the perspective also includes Open Educational Resources (OER). OER is free accessible learning material, e.g. documents or media, available for teaching and learning purposes. In Sweden the Swedish network for IT in higher education (ITHU) and the teacher network Dela! participate in a project (oersverige.se), with the aim of stimulate open discussion regarding the use and production of OER. In Norway a similar network (Delogbruk.no) focusing on sharing experiences among teachers, researches, librarians etc. Two

effects of OER is that it have led to the development of licensing systems, e.g. Creative Commons, and the development of new educational models, such as Massive Open Online Courses (MOOC).

The second area investigated in this work package was workplace learning. The participants involved in the pilot were all full-time employed and had to follow the course while at the same time working. Workplace learning differs from higher education since the concept includes a complex web of situations and conditions that involve learning. First, learning can be regarded as formal and acquiring, i.e. structured learning activities with explicit goals that result in certificates or a grade. Secondly, it can be informal and participative, i.e. implicit and reactive based on informal communication within a community or in apprentice situation. Thirdly, it can be non-formal, which is something between the other two concepts, characterised by loose interconnection but in some way organised. Examples on non-formal learning are participation in workshops or seminars that are not connected to formal courses or some kind of syllabus.

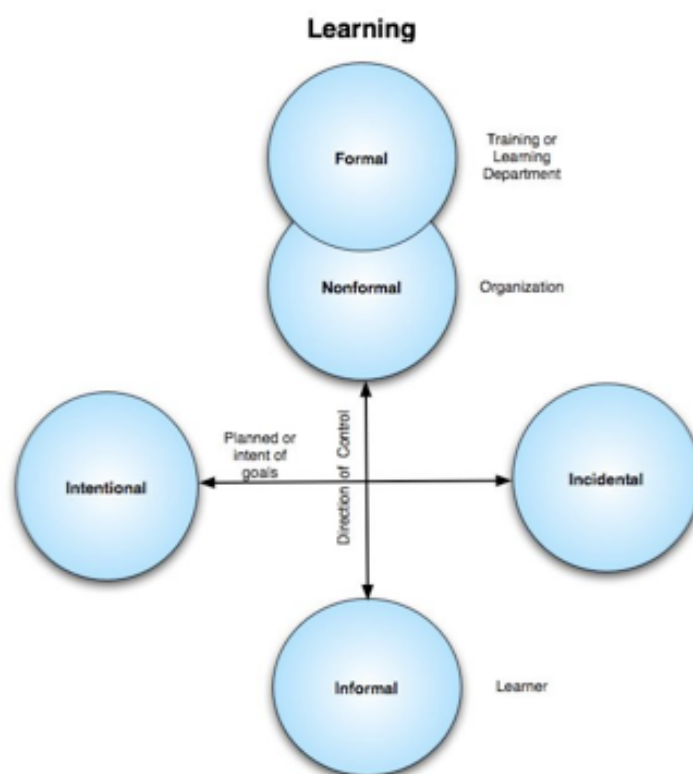


Figure 1. Formal and informal learning (www.knowledgejump.com)

The different modes of learning can be described as more individual and self-directed in the informal learning mode, and more organisational oriented when formal and non-formal modes are used. Learners control the objectives in informal settings, and the organisation has control in formal settings. The formal methods are more intentional in the sense that the learners discovers that he/she needs to learn something and their organisation recommend them to follow a curtain process or procedure. On the other hand, learning becomes more incidental as the learner internationalise the knowledge, which tends to cause him/her to loose the focus on organisational learning objectives. Hence, in workplace learning the learning setting is more complex than in for instance learning in higher education. Therefore, during the past decades different approaches in organisational learning have been developed. Examples of models that have had impact on workplace learning are:

- Single-loop and double loop learning, (Argyris and Schön, 1978)
- Expansive learning, (Engeström, 1987)
- Communities of Practice, (Lave and Wenger, 1991)
- Space for learning, Ba, (Nonak, Konno and Toyama, 2001)

- Innovative Knowledge Communities, (Paavola, Lipponen and Hakkarainen, 2004)

All models describes the interrelationship between the externalisation and internationalisation of knowledge and how it relates to individual and organisational learning.

The question of what type of models that are appropriate in workplace learning can be explained as in figure 2, showing different ways of optimise learning. The novice learner sets greater value on formal learning methods, but more experienced learners prefer more informal ways of learning. In our case we have participants in the pilot course with long experience of their own working context, but with no or little experience of innovative business development and especially business modelling techniques.

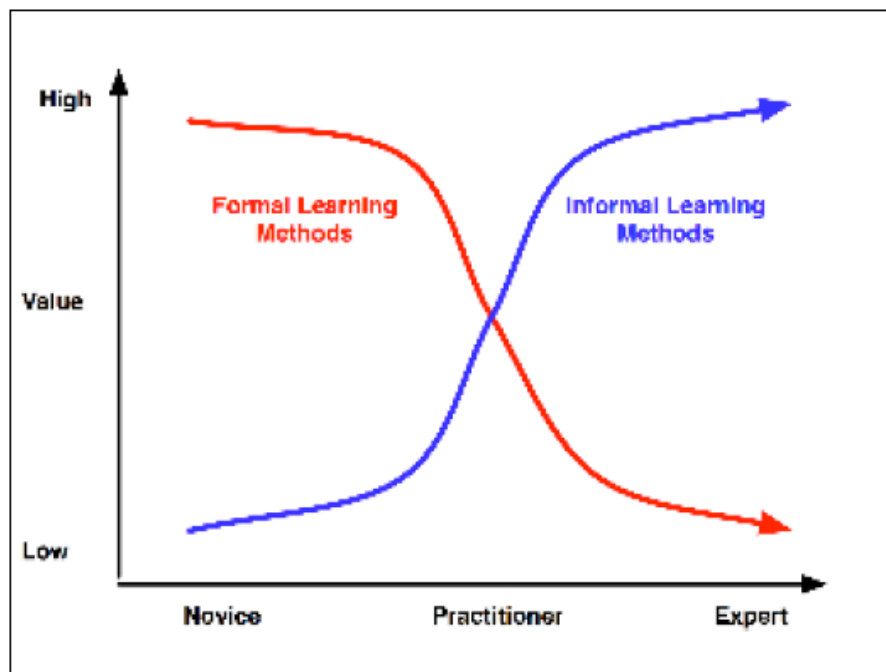


Figure 2. Ways to optimise formal and informal learning (performancedesign.wordpress.com)

Hence, a suitable solution for the pilot test of the platform would be to start organise the pilot course according to a formal learning method, and then at a later stage establish more of communities of practice among the participants.

The learning platform and adaption

The idea stated in in the project description on using open and flexible solutions is well in line with the aspects on openness discussed above. The project group of this work package evaluated the existing learning platforms used by the participating universities, which use different learning platforms; Nesna University College utilizes Moodle, Umea University uses Sakai (with the local name Cambro), and University of Nordland has Fronter as their main learning management system. Umea University also uses Moodle in some faculties (medicine and teacher education). All three learning platforms were known in both countries and Moodle and Sakai is open source software.

The working group decided to use Moodle, mainly for it fulfilled the requirement being open source. Moodle was also known by the teachers and used both in Sweden and Norway. Nesna University College had already operations and maintenance personnel working with Moodle, and therefore it became logically to install the site for the pilot course on servers in Nesna. The difference with the ordinary Moodle installation was that the project group put the course outside the ordinary Moodle servers at Nesna. The reason for this was to control the application and be more flexible in experimenting and optimising the recourses within Moodle. It is usually difficult to experiment within

a system that is running and therefore you are not allowed to make such efforts on systems critical to the business. Example of other limitations of the university's installation of Moodle was limited file size of uploading documents and a fixed set of features.

The result was that the Moodle platform for the pilot test was installed on a specific server that the project had control over, with a neutral layout, which did not follow any templates or graphic profiles from participating universities, see figure 3.

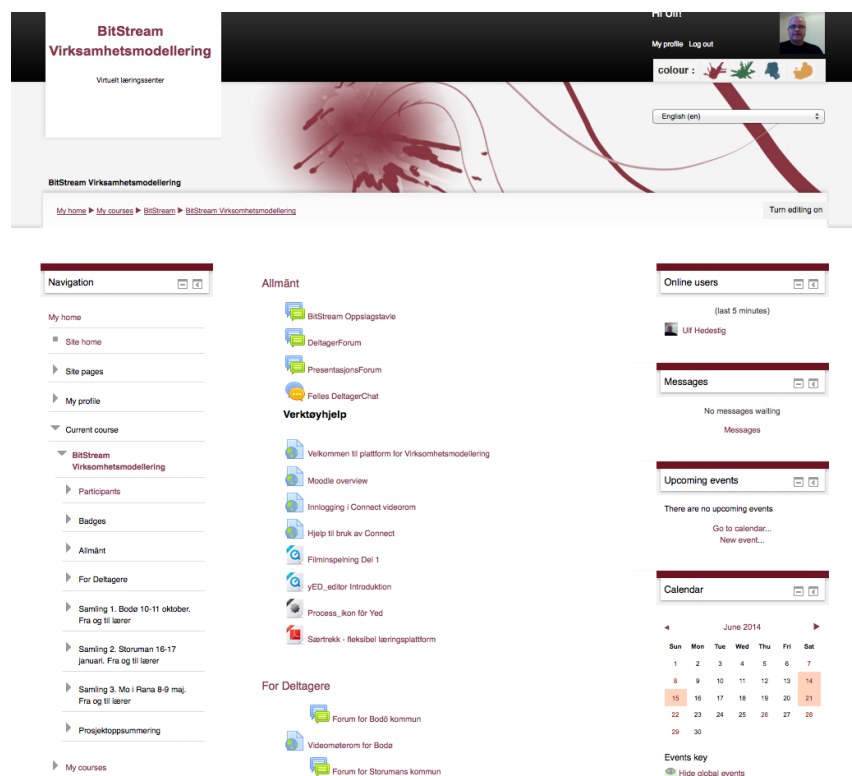


Figure 3. Screenshot from the course site in Moodle

The structure of a course in Moodle is that you have three columns of information. In the middle is the course content, organised chronologically with lectures, documents, assignments, etc. The left column contains navigation and administrative resources, and the right column involved the features and resources specific for the course. An important aspect of the platform was to provide both asynchronous and synchronous interaction. Therefore resources such as a chat and forums were included in the site. To provide a synchronous audio and video system the project group decided to use Adobe Connect and integrate it within Moodle. The choice of Adobe Connect was based on the premise that national university networks in Norway and Sweden provide the software for free to students and teachers. Another reason was that most of the public authorities in Sweden and Norway uses the software in their daily communication. To avoid frustration on jumping between applications and difficulties on remembering addresses to the meeting rooms, Adobe Connect rooms were created in advance and integrated in the Moodle site for the course.

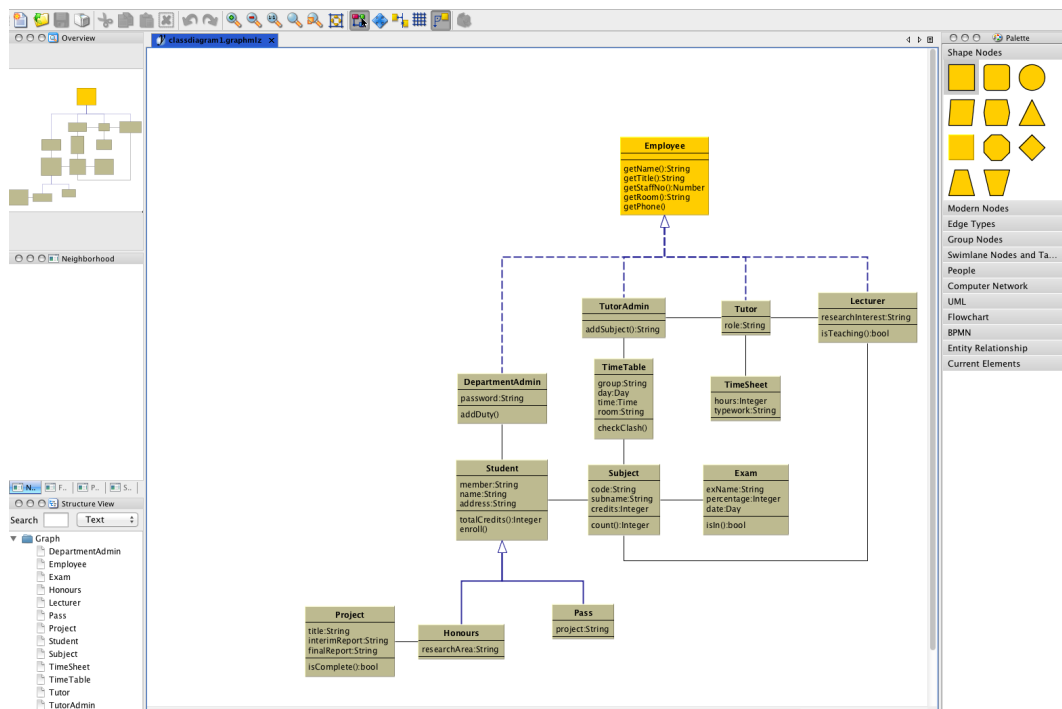


Figure 6. Screenshot from the yED graph editor.

For each of the applications a text or video introduction was provided to the students. Some of the introductions could be re-used from other contexts but new ones were also produced, for instance the introduction to yED.

Verktøyhjelp










-  Velkommen til plattform for Virksomhetsmodellering
-  Moodle overview
-  Innlogging i Connect videorom
-  Hjelp til bruk av Connect
-  Filminspeling Del 1
-  yED_editor Introduksjon
-  Process_ikon for Yed
-  Særtrekk - fleksibel læringsplattform





Figure 7. Examples of videorecorded introductions of the Moodle site and other course resources

To summarise, the structure and features used in Moodle was organised by the idea of having three physical course meetings and between these meetings tutoring was conducted through Adobe Connect, asynchronous communication or physical meetings. The course was structured so that we had the meetings covered between one and three of the six modules that the course consisted of. Each meeting had already at the start features for a questionnaire, folders for lectures, assignments, and feedback set up at the course site, see figure 8.


Samling 1. Bodø 10-11 oktober. Fra og til lærer

 Deltagerundersøkelse
Bakgrunnsinformasjon om deltagere på kurset


Materiale fra lærer til deltagere før samling

 Föreläsningar
 Innlevering 1: Kontext- och Konzeptmodell
 Innlevering 2: Mål och Målhierarkier
 Innlevering 3: Processdiagram

Oppsummering etter samling

 Kjells eksempel Sorsele
 Tips for bruk av Business Modeling with UML
Orientering om innhold relatert til prosjektoppgaven

 Tilleggsopplysninger om Kontekst og konsept
Mer om kontekst- og konseptdiagram

 Supplerende om Mål
Mulig starthjelp ved målformulering


 Samlede tilbakemeldinger
Skisser og idéer som er gitt som tilbakemelding til de enkelte gruppene. Kan være av allmenn interesse.

Figure 8. The structure for the course meetings

The language issue was of less importance since the platform itself had the possibility to change language for the main features and commands. The content however, required some reflection and the headers and filename were under consideration. Some concepts and words are rather similar in Norwegian and Swedish and was selected before others. For instance, the word tutoring is called *veiledning* in Norwegian but in Swedish it is usually called *handledning*. But, *vägledning* in Swedish is also common and therefore it became selected. Other examples of similarities in language were *undersøkelse-undersökning*, *opplysning-upplysning* and *innlevering-inlämning*. All of these terms could be interpreted easily by the participants.

To summarise, the platform consists of both asynchronous and synchronous communication. Teachers and students can choose appropriate communication methods based on the purpose of the interaction. Here, Adobe Connect can be a useful tool for tutoring or fast feedback on issues or questions between the participants. The asynchronous forums in Moodle are of more reflective nature and help student to interact over time. The platform can also be considered as supporting information distribution since the features in Moodle consists of both videorecorded lectures, distribution of assignments, documents and literature, etc.

Work package 3: Investigation and evaluation of methods and tools for innovative business development in the public sector

Terje Fallmyr, University of Nordland has been the WP-leader for work package 3. The other participants have been Kjell Ellingsen, University of Nordland and Mikael Söderström, Umeå University. During work in the work package the working group has also consulted Frode Nilsen, Bodø kommune and Axel Birkeland, the Norwegian National Collection Agency and some ICT companies. The aim of the work package was to review existing methods and tools for business development with focus on methods and tools for business modelling, and to develop prototypes of methods and tools adapted to innovative business development in the public sector.

More specifically, the goals of WP3 have been to evaluate and methods and tools that have potential to be of good use for innovative development of services and organizations in the public sector. The sub-goals and activities have been to:

- Develop prototypes of open, generic methods and tools for innovative (service and organization) development (and digitization) in the public sector.
- Emphasize methods and tools for
 - process mapping and descriptions
 - process analysis
 - effect study

Innovation is regarded as one of the key elements to solve major challenges in the public sector, among others those related to the health and social services domains (NOU 2011:11). The solutions to these challenges require a broad and integrated approach with a mix of political, economic, and social measures (Bygstad and Lanestedt, 2014). There are high expectations to the potential of information technology as a part of the solution space (Norwegian Ministry of Health and Care Services, 2011).

Innovation and digitization are central in order to maintain and develop the Nordic welfare model (St meld nr 7 (2008-2009)). At the same time, it is known that many initiatives to use ICT for better organizational performance and innovation fail to deliver as expected (DND, 2013). Even though IT is central to innovation and digitization of public services, the success is not so much about technology per se. The most important factors are how organizations can improve their abilities to deliver new services and use IT to support these (DND, 2013).

Digitization means a transition to digital services, in particular the digitization of the information handling – that is a vital part of almost any action on the factory floor, aka work process. Digital first choice is a concept used in connection with renewal, simplification and improvement of the public sector. Transition to digital services also means that the work (the work processes) to deliver the services needs to be changed in order to fit with the new digital reality. Service innovation is necessary, which in turn means a greater understanding of digital business processes (Digital agenda for Norge, stm.2012-2013). Today's processes must be changed and fitted to new technology in order to be of future use.

The state of affairs concerning "IT projects"

The relative poor benefits realization of what is often called IT projects has been well known for many years. Recently, the Norwegian multi-billion IT-project at NAV was terminated prematurely. The report "IT i praksis" (DND, 2013) has for several years documented poor benefits of IT projects, coupled with finding that indicate a tendency to focus too much on IT and too little on organizational issues. Another recent example is the system Pust Siebel developed by the Swedish Police Force. A lot of money was spent on developing the system, but it all ended as in the NAV case. The system was terminated prematurely (<http://computersweden.idg.se/2.2683/1.547944/haveriet-inifran-sa-gick-pust-fran-succ-till-fiasko>).

Another important contributor to the poor success rate is the low competence in organizations regarding how IT and organization can be understood and treated together, both among management and in the organization at large (Kharabe, Lyytinen, and Grover, 2013). Massive hiring of external consultants does not seem to help. In the practice oriented business arena, consultant companies and system solution providers have made and sold an abundance of frameworks which propose to tell how organizations should conduct "best practice" and then have success. That does not seem to help either. The frameworks are in general considered difficult to implement and institutionalize (DongBack and La Paz, 2008) in organizations. In terms of ordinary practice and culture the frameworks come in as "strangers" in many organizations and don't get the required management support.

The development of software systems has the same kind of problems regarding elicitation of requirements for the future systems in the making. Organizations (the customers) do not know what they need, mainly because they don't know themselves the level of detail that is required. There is reasonable doubt whether consultants can reveal those needs by interviewing some managers or employees over a short period of time. One way to mitigate this situation is to extend the competence that exists in organizations and empower them to handle the important aspects of their own future development. Much could be gained if organizations would engage in developing a better common understanding of themselves, their goal, customers, products and services, work processes, collaboration both internally and externally, and how to use information and IT better. If present and future situations could be visualized better then maybe much misunderstanding and resistance could be avoided, and maybe more positive energy could be directed towards a better understood future. That would indeed be of great help to innovation, especially in the public sector.

Capabilities for innovation in the public sector

Often emphasized requirements for public innovation are leadership, employeehip (a mindset of partnership and responsibility), good organizing of innovation, and visibility (Vinnova, 2011). Sørensen and Torfing (2011) argue that our current understanding of the sources of public innovation is inadequate. They emphasize, *"Innovation is always driven by social and political actors who are facing specific problems and demands and choose to exploit particular opportunities"*. This project focuses on the capabilities for innovation in the public sector. The work is founded on the premise that innovation requires a proper understanding of the organization and its capability to perform changes related to service and process innovations. The use of IT plays an important role, but we believe that the capabilities to use IT with success are based on process knowledge.

IT systems often support (or even dictate) business processes and must be developed on some formalized knowledge of the processes. The quality of this formalized knowledge, which should be expressed as models, relies on general and informal knowledge of the organization's competence and culture, including tacit knowledge. Therefore, we have sought a methodology that most importantly develops and documents how the organization works, i.e. the business processes, not the formal structures. Understanding the role of IT should be a part of the documentation so that we can understand organization and IT together (Zammuto, 2007).

For our purpose, understanding of the organization is based on intimate knowledge of how the organization works, which services are offered, the work processes employed to deliver the services, and the required technology (ICT) support. This understanding can only be found among those who work in the organization. The methodology should foster employee participation and take advantage of the intimate and often tacit knowledge of how business processes are actually carried out. Support from employees are also crucially important for successful change.

The time frame of this project has been too short for an extensive survey of existing methods. Therefore we have chosen a flexible and adapted approach based on many years of experience with research, but also teaching business related and applied student projects. Our methodology is among others based on Business Process Modelling (Eriksson and Penker, 2000), Business Process

Management (Harmon, 2014, Iden, 2013), Performance improvement (Rummler and Brache, 2013), Lean (Modig and Åhlström, 2012) and others. The goals of the BitStream methodology is that it:

- Should work in a real-world setting.
- Support common existing organizational processes regarding planning, analysis, management and decision making.
- Provides a better and faster foundation for creating a common understanding between stakeholders regarding goals and problems.
- Should emphasize analysis of external factors (context and the needs of "customers").
- Should support internal analysis of processes and information flows.
- Should support viewing interaction patterns.
- Should provide easy-to-do modelling and readable models.
- Provides better horizontal and vertical consistency.
- Presents holistic views that support analysis, decisions and design.
- Supports externalization of tacit knowledge into the models.

The methodology

The quality and usability of the models is to a large extent dependent on how the models reflect what actually happens in the business, and that both explicit and tacit relevant knowledge is captured into the models. For that purpose, it is vital that the various employees participate in the modelling process. The modelling process itself is maybe more important than the specifics of the models. Using this approach we can obtain better models and strengthen the organization's knowledge about itself. This is different from the results that can be obtained by interviews or other common techniques performed by hired consultants. We base our methodology on the premise that the best way to externalize tacit knowledge is to insist on that those who know the processes also have impact on the process models.

The development of local competence in enterprise modelling and process management is essential. Business processes may be results of a planned development (strategy) or they may be a result from emergent processes based on local initiatives, competence and culture. Our approach supports both approaches. A top-down approach is akin to what most frameworks support. Emergent approaches will tend to activate tacit knowledge and engagement that will be important for a successful organizational change.

Even though the statements above are also research questions and effects are hard to measure, our preliminary results after just one year indicate quite clearly that engaging local competence in business modelling in the public sector builds some capabilities that make a good foundation for service innovation and the required organizational change. This will be described in some more detail in the presentation of WP4.

Description of our methodology

Organizational improvement often requires a coordinated effort in three areas: business analysis, organizational development and understanding of technology. The analysis should most importantly yield a holistic and common understanding of the present status, problem areas, causes of problems, and also a high level view of possible alternatives for solutions. Improvements will often involve both organizational and technological change, and should be directed towards the root causes of problems from the analysis. Therefore, the analysis is important and must come first. The one-year time frame for BitStream was not sufficient to cover all three areas, so we concentrated on the analysis phase.

Our approach to strengthen the organization's knowledge about itself has been to develop a customized 7,5 ECTS bachelor level course in Enterprise modelling and let participants from the participating organizations extract important issues from their own everyday work, formalize them, and describe them in a small number of models. The course is described in detail in the presentation of WP 4.

We used an expanded version of the approach found in Eriksson & Penker (2000) and we used a version of Unified Modelling Language (UML). Most of the participants used UML, but we also allowed those who preferred BPMN to use that. We used the model types: concept, goal/problem, process, and collaboration. In addition we used a context model that shows important external stakeholders and the relations to these. The models were made using simple drawing tools like MS Visio, MS PowerPoint and *yEd* (freeware from www.yworks.com). We kept the tools simple in order not to spend valuable time on mastering the tools.

Course literature

For the modelling we used parts of Eriksson and Penker's book "*Business Modeling with UML*" (Eriksson and Penker, 2000) with the addition of teaching material developed by the instructors. In order to set the business modelling in a context and relate to useful applications, we also included literature that covered Process Management and Lean. Lean was covered with the book "*Dette er Lean*" (Modig and Åhlström, 2012). It is available both in Norwegian and Swedish. Process Management was covered with: "*Prosessledelse*" (Iden, 2013) (in Norwegian).

Assessments

After completing the course, we have good feedback that the series of models we chose was reasonable and that the series of models cover important perspectives. As always, based on our experience, the work to ensure consistency between models led to several iterations of the models, which in turn often led to new insight and improvements. Our expanded Eriksson and Penker approach is very good at covering several perspectives and connect the individual models to a comprehensive and consistent whole. As an example, each process diagram has attached a specific "goal" for this process, which we should be able to retrieve from the goal hierarchy, flow of information and physical elements going to or from the process. We can see the activity flow (the process logic) that depicts the dynamics, and also supporting resources and guiding management processes.

We have evaluated other modelling methods, but have found them to focus too much on only the processes. Accordingly, some of them do not distinguish between the concepts "enterprise modelling" and "process modelling". We have noted that some BPMN-based methods seek to attach a responsible role (a process owner) to the processes, but do so using extra text boxes, outside the modelling language itself. The use of UML was evaluated as part of a student project at Umeå University. Based on interviews with participants and teachers on the BitStream course, external consultants and researchers, they concluded that this language might have a high threshold concerning formalism. We recognize these issues and have exploited the space that UML gives to avoid the difficulties with the formalisms even though we must also recognize that the purpose with the formalisms is to develop a common expression and interpretation of models. This, in turn, makes it easier to understand models made by others. The frustration that participants reported may as well be caused by the challenge to select and abstract what parts of "reality" that should enter the models.

One goal in the project was to establish interaction between groups. Allowing more than one language was not helpful in that respect, and interaction was sometimes impeded. However, one other goal was to let participants bring in their own projects, their daily practice, including knowledge of modelling languages. These two goals may be in conflict for which there is no definite solution. We also noticed that all groups had problems in the early stages with understanding the use and contribution of the concept model. However, during the evaluation in the final session the concept model appeared as one of the most useful elements of the set of models. For participants with some years of work experience, it may be a better idea to delay the introduction of the concept model until a later stage of the course.

Work package 4: Pilot test of the transnational platform

Terje Fallmyr, University of Nordland has been the WP-leader for work package 4. The other participants have been Kjell Ellingsen, University of Nordland and Mikael Söderström, Umeå University. The aim of the work package was to develop course material for a transnational course in

business modelling in the public sector based on the work done in work package 3, and to conduct the course through the Moodle platform developed in work package 2. During work in the work package the working group has worked close to the working group of work package 2. The reason for this is obvious. There is a very close relationship between the course and the Moodle site that has been the main channel for delivering the course.

The course material

The course material regarding business modelling that was developed for the course were to a large extent based on the work conducted in WP 3. The most important starting points for the development of the course material were:

- It should help participants to develop local competence in business modelling.
- It should help the participants to develop an understanding of their own business.
- It should contribute to the participants learning of techniques for describing a business.
- It should introduce perspectives from process management and Lean.

Based on those starting points we chose to use Eriksson and Penker (2000), Iden (2013) and Modig and Åhlström (2012) as the course literature. Modig and Åhlström is available both in Norwegian and Swedish. The literature was complemented with articles and material that was developed by the teachers of the course, for instance lectures and exercises that clarified and developed the content of the literature.

The most important pedagogical idea of the course was that the participants had to choose a process from their own business that they were required to work describe, analyse and improve during the course. This is discussed more in detail in the section “The course” below.

The cohort

The aim of the pilot was to enrol 20 students from the participating public authorities. In the first course meeting in October 2014, 19 students from the municipalities of Bodø, Storuman and Sorsele and the Norwegian National Collection Agency in Mo i Rana participated. The average age in the cohort was 47,8 years and included 11 women (57,9%) and 8 men (42,1 %). Their occupation were mostly senior management, see table 1.

Technical manager	Head of Human Resources	Building permits administrator
Manager Organisational Development	ICT-adviser	Business and Innovation manager
Counselor	Head of Library and learning centre	Head of Social Welfare
Head of Unit	CIO	Senior advisor
Head of Education	Traffic planner	Manager Special Education

Table 1: Exemple of the participants occupation

The experience within business development varied among the participants. 12 students (63%) claimed that they in some way had worked with those issues. Examples of activities that they expressed were organisational change within a unit, implementation of new work processes, adaptation of information systems. Eleven students (58%) answered that they were currently involved in such development project.

The Course

The content of the course is, as said, based on the investigation and evaluation of methods and tools conducted in work package 3, and the means of delivery was to a large extent based on the transnational platform developed in work package 2.

Formally, the course was given as a 7.5 credits course, and it had a Norwegian syllabus for the Norwegian participants and a Swedish syllabus for the Swedish participants. The Norwegian participants were enrolled at Universitetet i Nordland or Høgskolen i Nesna, while the Swedish students were enrolled at Umeå universitet. This meant that the participants that wanted to could get University credits, of course given that they fulfilled the course requirements. More than half of the participants took out their credits.

One of the prerequisites for the course included authentic cases from the participants, that is, each participant had to choose their own process or activity to examine, describe and analyse during the course. This was perhaps the most important pedagogical idea of the course. The whole course was set-up based on the premise that the participants should work with their own business processes, and that their work should be of use for their organisations and also contribute to the development of it. It was also important to structure the course in such a way that the participants could take the opportunity to exchange knowledge and experiences with each other. This was done both during physical meetings and on the course site. During the meetings time was always reserved for collective discussions and participant's presentations of their work. All the participants were required to upload their own material to the course site to make it accessible to the other participants. All the participants succeeded to provide the teachers with a short description of the processes they wanted to examine before the course began.

The following processes or activities were selected:

- Recruitment process.
- Strengthen the process to get more people into work
- Reception of unaccompanied pupils and pupils with special needs.
- Inquiry/application process.
- Home care
- Pupil transports
- Aid management in home care.
- The procurement process of the library.
- Detail planning of construction development.

The motives for the students selection differed among them, but the most common objective was economical, meaning that the chosen process must be made more effective because of financial reasons. In other words we can interpret this as a way to find solutions to produce more or deliver more with less resources. Other motives included for instance: a) Better competence and knowledge of our business and processes, b) Utilize tools and models that can create common understanding of our business, c) A pedagogical model to communicate processes with different participants, d) Unclear understanding of what we really are doing, e) How can we become more efficient and save money in our business, f) Identification of bottlenecks in our business.

The course was structured in six modules; introduction, stakeholder analysis and context diagram, objectives and hierarchies of objectives, processmodellering, assembly line diagrams and modell analysis, completion and final presentations. The teaching of the course has been a combination between physical meetings and digital teaching at the course platform as described in the presentation of WP2. The six modules were discussed during the physical meetings. Meeting one covered module one to three, meeting two module four to five and meeting three module six. The pedagogical idea of the meetings was to avoid extensive lecturing, and instead spend the time on student active teaching forms. This implied that the meetings were structured in the same way. The teachers gave short lectures, 15 to 20 minutes. After that the participants worked in groups with their processes, and finally this set of work was ended with participant's presentations of the work they had done in their groups and a collective discussion of it.

Between the physical meetings the participants worked with their processes at their own workplace. This work was following a schedule with deadlines for handing in the different kind of models produced. During this work the participants were tutored by the teachers on a regular basis. The tutoring was conducted in the Adobe Connect rooms integrated in the course platform.

Work package 5: Evaluation of the transnational platform, the capacity building, and the project

Geir-Tore Klæboe, Nesna University College has been the WP-leader for WP 5. The work package has been conducted in close cooperation with the WP-leaders from WP 2, 3 and 4. The aim of this work package is to evaluate the transnational platform (i.e. the Moodle Platform), the course and the project as a whole.

The platform (and Learning Management System)

The experience of using learning management systems (LMS) among the student cohort varied. Fortyseven percent of the students (9 of 19) answered that they had experience of LMS, but only 36,8 % of them (7 of 19) expressed that they had used it when participating in distance education or e-learning courses. Example of distance courses that some of the students had participated in were master of management, IT-courses such as PHP and Java script, Law, etc. A reason for the difference in knowledge and use of LMS and participation in distance education or e-learning courses could be that the students that are parents had knowledge of the LMS since their children use LMS in primary and secondary school.

The teachers had knowledge of LMS but no prior experience of using Moodle in teaching. Their main experiences of LMS were from the platforms Fronter and Sakai, but most of the features and the design and structure in these platforms are similar to Moodle so the lack of experience of Moodle did not create any problems.

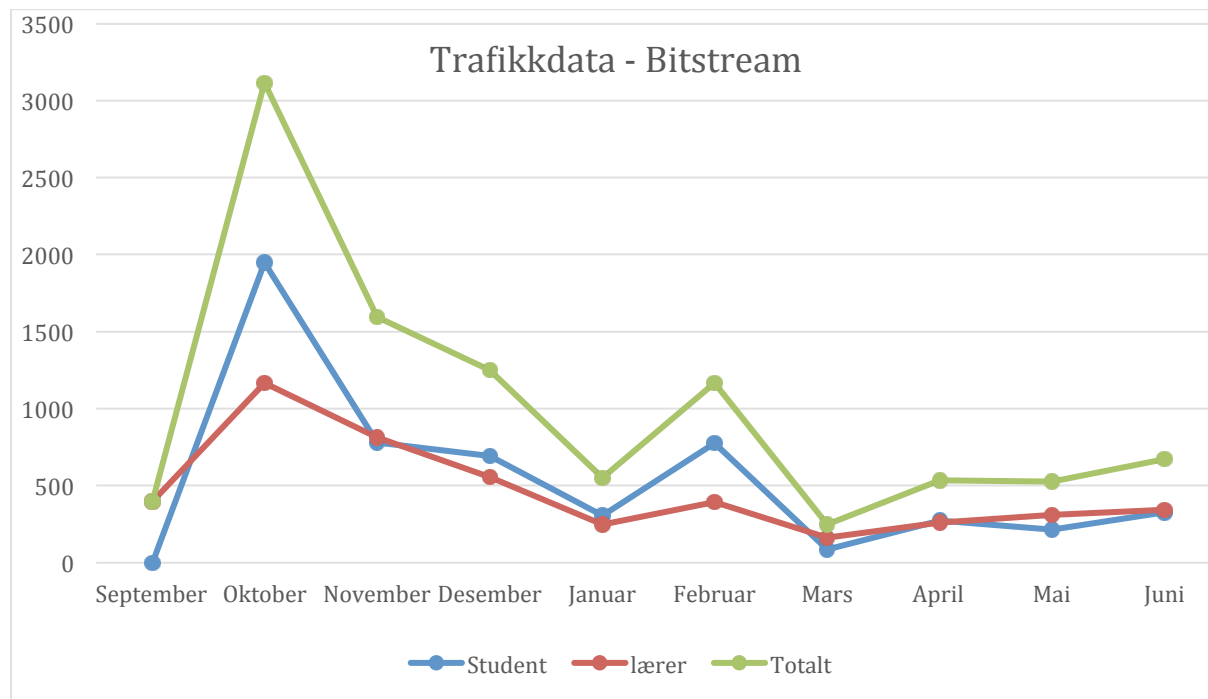
The overall communication activity in the platform during the course have been as follow:

- Bulletin board: 20 messages
- Common forum: 6 messages
- Presentation forum: 3 messages
- Forum for Bodø municipality: 3 messages with 9 replies
- Forum for Storuman municipality: 1 message with 3 replies
- Forum for Norwegian National Collection Agency: 8 messages with 6 replies
- Forum for Sorsele municipality: 1 message

The level of activity is to a large extent as expected, given the fact that most of the participants did not have much experience with the tools used, and the fact that course was planned in such a way that communication through the forums in the platform was not mandatory. But if we look at the number of visits at the course Platform the picture is a bit different. As you can see in the table below the platform has had quite a lot visits, especially when you take into consideration that the course only had 19 students.

Måned	Student	lærer	Totalt	%-vis fordeling
September	0	398	398	4,0 %
Oktober	1950	1167	3117	31,0 %
November	780	815	1595	15,8 %
Desember	694	557	1251	12,4 %
Januar	305	248	553	5,5 %
Februar	776	392	1168	11,6 %

Mars	86	163	249	2,5 %
April	274	261	535	5,3 %
Mai	217	311	528	5,2 %
Juni	327	345	672	6,7 %



The Moodle platform in itself has not been a problem during the project. Given that most LMS are rather similar both regarding structure and features we might have used any open source LMS platform both for the project and the course. The structure of the course site could have been better, but there was limited knowledge of Moodle within the project group. However, the students never commented or complained about the structure and the overall conclusion is that the LMS met the expectations of both the students and the tutors, despite its limitations.

The evaluation from the students show that they mainly have positive experiences of the use of the learning platform. Moodle has been the channel for information distribution and Adobe Connect for synchronical communication. This cohort have been more dependent on synchronous communication than other student groups normally are. Every participant had a full time work and they were all also senior managers which often resulted in long working hours. On top of this workload they participated in the course that covered 200 hours of work. Nobody of the students received any reduction in their workload, so most of the time they did their studywork at home or when there was “free time” at work. Under such circumstances they were extremely satisfied with the synchronical tutoring used by the teachers. Many of the students worked alone and they often felt that they needed fast feedback and suggestion for their course work. Without that possibility it had been difficult for them to succeed and pass the assignment. The participants has in different situations put forward the importance of the synchronical communication, and some of their views are:

“The tutoring were essential.”, Swedish student.

“The tutoring in Adobe Connect has been incredible.”, Norwegian student.

The teachers has put enormous amount of time in tutoring us in Adobe Connect.”, Norwegian student.

“Adobe Connect have been a really useful tool and perfect for us.”, Swedish student.

The teachers was very flexible in the scheduling of the tutoring sessions and everyone had prior experience of using Adobe Connect. The students argued that it was difficult to plan in advance in what times they could focus on the course, but acclaimed the teachers willingness to schedule tutoring when they worked with the course.

The Course

The evaluation of the course below are based on five significant sources:

1. The student's perception of his own knowledge development
2. The organizational use of the competence after the course is completed.
3. The final evaluation of the course done by the students.
4. Observations of students and their work during the teaching.
5. Three bachelor theses written by students at Umeå universitet (two of them) and Universitetet i Nordland (one of them)

The students completed a survey at the end of the course, and from this survey we can draw some preliminary conclusions regarding the development of competence. The student's comments in the survey suggest something about their perception of their own knowledge building. Onehundred percent answered that the overall outcome of the course was Good (30 %) or Very Good (70 %). This indicates, along with the fact that all students answered that they would recommend the course to others, that the students are satisfied and that they have experienced development of knowledge during the course. The students were especially satisfied with the pedagogical idea to work with processes from their own businesses, and the presentations of them and the following discussions at the physical meetings. And as said above, they were also very satisfied with the large amount of tutoring that they got. The extensive tutoring meant that most of the research done in the project was done as action research, during which students and teachers worked close together.

The learning outcome according to the students differs but some common arguments from the cohort are identified. Firstly, the support from top management level is of crucial importance. The majority of the participants claimed that it was crucial that their managers were involved and that their participation was anchored at the top level. An important argument was that if business development would continue in the organisation after the course ended, then the top management had to be involved. Otherwise, the effort of obtaining new knowledge in business modelling would not be valuable for the organisation if the work only stop at a single unit or office.

Secondly, the majority also stated that the models they worked with gave clear visibility of the process and clarified what really is happening in a process. This way of representing the process creates a good opportunity for common understanding of specific processes. As a side effect some of the participants claimed that the models could be a very good pedagogical tool: a) To introduce new employees and give a clear job and process description, b) To support decision making of managers. Models give a better overview of a process than long texts or oral discussions, c) To inform external stakeholders of a specific process.

Thirdly, the models were a useful tool to analyse and explore processes, especially for identifying bottlenecks and problems. Many of the participants had no tools to analyse models prior to the course. They explained that the situation in their organisations was of a kind where they had difficulties to create a common ground of how to run the business or what caused the problems when they did not keep the budget or experienced staff shortages. When they were supposed to solve problems in their businesses our participants experienced a fragmented picture of the situation, with multiple perspectives of what is the key objective for the business and how to solve the problem. In such circumstances, the business models became crucial for identifying the bottlenecks.

Forthly, the majority also stressed the importance of having a good experience and understanding of the process studied and analysed. An issue that was discussed during the course was the relationship between external IT-professionals and their ability to capture tacit knowledge and complex processes in an organisation. According to the course participants local competence and deep process knowledge are a key driver for change management.

Fiftly, all claimed that the real cases we used were of great importance to their competence development in business modelling. To use your own case created motivation and commitment to participate and helped to prioritise and take the time to study. If conceptual cases had been used it had been “too theoretical” according to the participants, and it could have been a barrier and could have created drop-outs.

Reflections and outcomes from the course of a more individual kind were also expressed in the participant’s evaluations. One of the organisations reflected upon the circumstances that they did not succeed in collaboration with other participants to the amount that they wanted. It could have been more communication between Sweden and Norway. Most of the communication occurred in conjunction with the physical meetings. Between the meetings there were few informal contacts between the participating organisations. The reason for this is difficult to answer but some participants claimed it could be two important reasons: a) The current organisational culture did not facilitate interorganisational communication. Or as they put it “*We are sitting in our offices and close our doors to our colleagues in the corridor. If we do not communicate with our own staff – how can we then expect to communicate with other organisations?*”, b) A lack time which resulted in a focus on understanding business modelling rather than sharing experiences. The participants had limited time to participate in the course and prioritized understanding of business modelling over discussing common problems and solutions. Before they could start collaboration they needed a common language and tools to analyse a situation or a process.

Another organisation argued that even if they had a long experience of business process modelling they received new knowledge and understanding of especially the relationship between the operative and strategic level. Most of their change management has been focused on the operational level but the course made them realise that if organisational changes would become sustainable, the strategic level has to be taken into account.

Regarding the organizational use of the competence after the course was completed, 60 % of the students answered that the course have had significant impact on their organizations’ ability to comprehend the principles of process modelling and that it have turned some minds in their respective organizations. Forty percent of the student commented that the course and the competence that they have gained have not had any significant impact on the organization.

Quite surprisingly, despite the short time of the project all of the participating organisations have had one or more impacts to their businesses. The result from the students cases have had different impacts on their organisations. Some of these are presented below.

- In one of the participating organisation, business modelling is included in their three-year leadership training programme.
- In conductor agreements and yearly performance among leaders at one participant, a key evaluator is business modeling.
- A common project method which includes process modelling is applied in the one of the participating organisations.
- The students from one municipality have been designated as the business development team of the municipality.
- To implement the business models one municipality have changed all its business objectives – going from an overall vision to objectives for all offices in the municipality. The objectives are

decided by the political committees in each office and work as a starting point for the governance within each administrative office.

- Include the strategic dimension in the current business models. One organisation have been working with process mapping and business development for a long time, but realised that they had not fully focused on the strategical level, that is, goal hierarchies, interdependencies, etc.
- In one participating organization they realised when they analysed one process that the key personell that was a bottleneck did not have to perform all the tasks. This has been changed accordingly.

Nevertheless, the overall conclusion is that the course has had large effects regarding the development of the competence of the students, and some effects on their respective organizations. However, this must be studied more carefully before any detailed conclusions can be drawn. It is laso important to realise that the evaluation of both the course and effects it have had on the partcipating persons' organisations were done right after the course ended in may 2014. It seems reasonable to assume that in course of time there will turn up more organisational effects.

If we as teachers and project members should evaluate the course the first thing to say is that we are very satisfied with its outcomes and the quality of the models produced by the participants. However, there are some parts that we could have done better. Firstly, during the course the participants experienced some issues with concept confusion. The Swedish students had some problems with the Norwegian concepts that we used, and both the Swedish and Norwegian students had some problems with the Neglish concepts used during the course. We believe that this problem can be solved by using both Swedish and Norwegian course literature to a larger extent than we did. Secondly, we think that the participants could have advanced quicker in their modelling work if we had begun the course presenting a relevant example model from a public business in which the students can recognise their own businesses. Thirdly, in the initial tutoring of the students the teachers had problems understanding the nature of the businesses processes that the students were describing and analysing. In some cases this led to misdirected tutoring which confused both the students and the teachers. How to avoid this is difficult to say. Working with processes from the participants own businesses will inevitable mean that the students know the processes much better than the teachers. Fourtly, the amount of tutoring conducted during the course were way more than would have been the case for a similar course at anyone of the participating universities. We believe that the main reason for this is that the processes from an actual business tend to be quite complicated. However, having educated people in the participating organisations means that if we give the course again we a number od persons that can act as mentors for the new participants. Hopefully, this reduces the amount of tutoring needed. Finally, we did not succed in having participants from different organisations working together to the extent that we had hoped for. This can be taken care of by including moments in the course that force the students from different organisations to work more closely together.

The project

The project have been run quite traditional with a steering committee, a project manager and a project group which partly also have been the academic staff working on the course. There have been a Norwegian project manager, which have coordinated the activities on the Norwegian side, but the main project management has been on the Swedish side.

The work in the project group have been well organized and well structured. As said earlier, all work packages have been conducted in a manner where both Norwegian and Swedish participants have worked together in the same packages. We believe this to be perhaps the most important factor behind the successful results of the project. By working closely together we have also succeeded to make sure that all the results of the project have been used in both Norway and Sweden, and that there has been a significant amount of exchange of experinces and knowledge between the two countries. The use of the Moodle platform for the internal communication in the project, have contributed significant to the

building of competence of LMS use amongst the project members. This has been useful, and probably necessary to secure a successful outcome of the project.

The composition of the steering committee might have been better. There were only two members of the committee that was not either a member of the project or a participant in the course. In principle, this could have undermined the purpose of having a committee steering the project. However, this was not a problem in the project and the steering committee made good decisions to ensure that the project had the right environment for its completion and success.

The overall evaluation of the project is that it was well planned, executed and governed.

Work package 6: Dissemination and completion of the project

The WP-leaders for this WP has been Mikael Söderström and Terje Fallmyr, but all project members has participated in disseminating project results. The aim of the work package has been to disseminate the results of the project and its work packages, and to merge the methods and tools developed in work package 3 to a more general model of innovative business development in the public sector.

Throughout the whole project different dissemination activities have occurred. The main dissemination channel has been the project's website, <http://bitstreamproject.org/>. At the website news regarding the project, results and presentations have been published. The site also contains some videoclips presenting the project.

Besides the website the project has been presented on several occasions. Some of them are:

- 17 of April 2013: Participation in meeting with Botnia Atlantica in Skellefteå
- 10-11 of September 2013: Participation in Annual Botnia Atlantica meeting in Vasa, Finland.
- 19-20 of September 2013: Presentation of Bitstream at Academy North conference in Sollefteå.
- 1 of October 2013: Presentation of BitStream at the workshop Making eGovernment work: improving Organisational Process, ePractice, Brussels.
- 2-3 October 2013: Presentation of Bitstream at Nordic Science Conference, Luleå.
- 27 of May 2014: Presentation of Bitstream at the seminar Digital Learning – Flexibility through digital solutions for educational programs at Nesna University College, Mo i Rana
- 21 of August 2014: Presentation of BitStream at Botnia Atlantica Seminar, Bodö
- 24 of September 2014: Presentation of BitStream at Forskningsdagene Campus Helgeland, Mo i Rana
- 28 of October 2014: Presentation of BitStream at NOKIOS, Trondheim

In general there has been a quite large interest for the project, and there have been several municipalities, except the ones already participating in the project, that have shown interest to become a project participant.

A large part of the project's dissemination has been done inside the organizations participating in the project.

Suggestions for continuing work

During BitStream a number of ideas for continuing work have come up, and all the organisations that participated in the project are interested in continuing working together in a sequel. Among the ideas discussed for a "BitStream 2" are for instance:

- Co-operation over borders and working together to develop common transnational processes.
- Further competence development of the public authorities that participated in BitStream.
- Design of future services for the citizen and the accompanying service declarations.
- Management of process descriptions and analyses. Roles, responsibilities and organisation.

- Best practice for implementing processes.
- Developing an organisational project office and a joint project methodology.
- Mapping and evaluation of potential e-solutions, and design and implementation of e-solutions. Models for both quantitative and qualitative evaluations of e-services.

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