Integrative Action and Learning by Developing (LbD): Canonical Action Research

Rauno Pirinen
Laurea University of Applied Sciences

Key words: Canonical action research, competence creation, innovation system, integrative action model, research framework

Abstract:

This study examines the setting of canonical action research in an integrative action process within Learning by Developing (LbD) culture. The evaluation phases of this action research are based on the evaluation transactions of the Finnish Higher Education Evaluation Council (FINHEEC) and furthermore the canonical evaluation to the research is produced. Canonical is defined as “exactness” or “strict precision” and it is understood as “a generally accepted principle” in the context of the widely practised and reported form of action research in information systems literature. This study develops and tests integrative action and design principles in the research and practice of implementing the three statutory tasks of Finnish universities of applied sciences: education; research and development; and regional development. The term canonical is used to formalize the association of the iterative, rigorous and collaborative process oriented model of action research.

1 Introduction

The mission of a Finnish university of applied sciences is to be a workplace-oriented, regional, multidisciplinary and international promoter of its students’ professional growth. This means that students develop and co-create the kind of expertise that guarantees their advancement in the world of work in local and global markets. The statutory task of a university of applied sciences is to provide higher education, which is focused on competences that require professional expertise and are based on the requirements of the labour market, its development, scientific research and also on artistic principles. Thus it supports the professional development of individuals and carries out research and development work in the service of the development of education, the labour market and regional development, while taking into account the social structures of the region in question. Universities of applied sciences provide and develop adult education in order to maintain and increase workplace competence. In completing their tasks, universities of applied sciences collaborate with representatives of industries and other employers, particularly in their own region, and also with Finnish and foreign higher education institutions and other educational establishments. If higher education is based on the demands of the employment market, universities of applied sciences and the world of work must work together closely. Research conducted by students, based on the demands for development in the employment market, can be used in the workplace to generate new competences and promote regional development, and help to fulfil the three tasks given to the Finnish
universities of applied sciences: education; research and development; and regional
development. The subject organization in this canonical action research (CAR) [1, 5] is
Laurea University of Applied Sciences. Laurea was appointed as a centre of excellence in
regional development for 2003-2004 and 2006-2007, and as a centre of excellence in
education for 2005-2006 and 2008-2009. This study’s two action research cycles were
addressed to the Finnish Higher Education Evaluation Council (FINHEEC) for the evaluation
transactions of excellence in higher education 2003-2006 and 2006-2009. Furthermore the
performed action research has been canonically evaluated. The FINHEEC is an independent
expert body that assists Finnish universities, universities of applied sciences, and the Finnish
Ministry of Education in matters related to evaluation, and thus it contributes to improving the
quality of higher education.

2 Creativity and Transformation within Learning

2.1 Pedagogical Literature Formulation

The main theoretical background of Laurea’s learning culture includes a combination of
concepts, models, and innovative development theories. It is a pedagogical approach which
has constructively and incrementally developed into the present framework of a proactive
learning culture called Learning by Developing (LbD), described in Fränti and Pirinen (2005)
[8, 21].

Yrjö Engeström studied innovative learning cycles in teams by using the cultural-historical
activity theory and the theory of expansive learning as frameworks for analysis. He
emphasized the knowledge-creation phase, where problems are first formulated and analyzed.
Expansive and innovative learning begin by criticizing, questioning and analyzing existing
practices. The focus is on dialectical tensions and contradictions within communal activities,
although these are usually ignored by approaches that focus on immediate empirical
generalizations. The model is understood through the analysis of elements found in an
expansive learning cycle, as innovative learning cycles do not follow any fixed order. The
arguments for this method are described in Engeström (2001) [6].

Kai Hakkarainen explained the progressive inquiry process with its characteristic autonomy
and self-regulation of a learning process. The progressive inquiry process utilizes diversity
and the associated “creative chaos” rather than the pre-structured and strictly controlled
instructional processes, which do not have any degree of freedom. The model captures certain
essential aspects of a knowledge creation process, such as the importance of questions and
problems, deliberately working for knowledge advancement, engagement in a deepening
inquiry, and the socially shared process of inquiry. These are all essential aspects of
productively working with knowledge and are routinely practiced within knowledge intensive
organizations. This perspective is clarified in Hakkarainen, Palonen, Paavola and Lehtinen
(2004) [9].

Carl Bereiter and Marlene Scardamalia are strong advocates of student communities working
together to become proficient in fields of knowledge. They introduced the concept of
knowledge building communities, where students learn to work with theoretical and practical
concepts as objects. They strongly advocate that students become knowledge builders and
active participants in knowledge building discourse. The focus here is firstly, on problems and
the depth of understanding, secondly it focuses on decentralized, open knowledge
environments for collective understanding, and the third focus area is on productive interaction within broadly conceived knowledge building communities. Knowledge building theory was created and developed for describing what a community of learners needs to accomplish in order to create knowledge. The theory addresses the need to educate people for the knowledge age society, in which knowledge and innovation are pervasive [3, 26]. Twelve identified principles of knowledge building are proposed by Scardamalia (2002) [25].

Networked expertise refers to competences that arise from social interaction, knowledge sharing, and collective problem solving, and are embedded in the shared competence of communities and organized groups of experts and professionals. Cognition and intelligent activity are not limited to an individual’s mental processes but also rely on socioculturally developed cognitive tools. These tools include physical and conceptual artifacts. Networked expertise is rational. It is constituted in interaction between individuals, communities and larger networks supported by cognitive artifacts. It also co-evolves with continuously transforming innovative knowledge communities. The approach emphasizes the development of expertise, distributed cognition and shared expertise, collaborative and cultural learning, and inquiry based learning processes [9].

2.2 Elements of Integrative Action

There are several reasons for a clearer specification of the elements of the general integrative action model [18]. The first is the confusion surrounding practical management. In fact, a completely different type of management is required for different actions. The second reason is the core idea behind the “changing of objectivity”, which refers to the balancing of subjectivity and objectivity to support creativity. The third reason is that commercially beneficial innovation is impossible without radical intervention, which makes a cyclical orientation different from other orientations. The fourth reason is the fact that we live in a time of globalization. While the Finnish population’s average age is rising, its actual population is set to decrease in size, which means that future business will focus more on creativity and innovation. The fifth reason is that good quality is important and yet also differs between different types of action e.g. it takes creativity and innovation into account and yet ensures that the research carried out includes relevance, validity and rigor. The sixth reason is that an application of the pragmatic theory of knowledge and the activities of innovation orientation need a different type of action and flexibility. A pragmatic situation is different to an innovation situation because a supporting structure for creativity operates better in the region of freedom of methods. The seventh reason emphasizes competence because action bridges competences in the first place in innovation system. Hence, rigorous knowledge bases are co-created in a common, shared domain of knowledge. For example, participatory action occurs within an authentic situation, while the existence of a competence creation emphasizes the use of the latest knowledge in action. The eighth reason is the placement of different interests into integrative action e.g. research, development, education, innovation, regional, communal or economic interests. Based on these reasons, a clearer definition is sorely needed in order to differentiate between and clarify different actions. In the case of integrative action the four elements are specified: 1) cyclical - in order to support creativity and innovations; 2) thematic - to allow the co-creation of lead innovations, scopes and the structure of a body of knowledge; 3) linear - to implement research, development and action processes; and 4) relevance - to ensure validity and scientific rigorousness as well as the quality of the execution of the work.
2.3 Learning by Developing Culture (LbD)

Learning by Developing (LbD) is a pedagogical and communal approach in which learning is linked to an applied research and development and culture. This means learning expertise that arises from social interaction, knowledge and competence sharing, researching and problem solving related to collective objectives. The “dimension model” [21], emphasizes cooperation and creating a “learning and developing” culture, which makes it possible to include and use various scientific perspectives and methods of learning, and research and development in operation and action. The model represents a management and work philosophy based on the production of shared competence and creativity. In the revised dimension model that is used in this study, the four layers may rotate in different positions independent of each other during the implementation phases. Thus, the dimension model can be understood by implementing different elements in a learning cycle. Innovative learning cycles do not follow any fixed process order [6], but cumulative learning is implemented as a whole, covering competences defined in a curriculum and implemented in a syllabus with “no upper limit”.

The proposition in Pirinen and Fränti (2007) [20] focuses on the fact that LbD has a learning culture in which proactive knowledge development and learning have the following meanings for the participants and actors involved:

1) For the learner, LbD means growing up in a culture that focuses on expertise which arises from social interaction, knowledge sharing and collective development. This implies growing up with the lifestyle of a developer, immersing oneself in proactive learning and personal knowledge management.

2) It means increasing the value of innovations for all co-operators in applied research and development and creating new knowledge, competence, innovations, service products and practices.

3) For a university of applied sciences, it means changing its organizational and cultural role towards becoming a cooperative community regarding the creation of new knowledge and expertise. This means that an institution’s own development process enriches the expertise within its community and increases its role in the value network by being a cultural prime mover and a new actor sharing innovations within a network.

4) The LbD culture contributes to regional development by having student’s interaction with other regional participants in projects, and especially by playing a strong role in creating international links.

The presented dimensional model of LbD is illustrated in Fig. 1. This revised model underlines the relation of cultural mutability and learning. It means changing of culture to be more creative. Creativity itself is seen as result of shared inspiration, cognition, participation and social knowledge sharing in social context.
Figure 1 illustrates the integrative dimensions of LbD by placing the students and three perspectives of learning: knowledge acquisition, participation and knowledge creation in the centre. The derivative dimensions of learning are an individual’s learning, a community’s learning and the pragmatic principle that action bridges knowledge and competence in the framework of a base and body of knowledge. The impacts of LbD are: support for creativity; partnership in action; a basis in authenticity; the development of an experimental nature and research that features international cooperation. The dimension model supports the construction of creativity and innovations within the three statutory tasks, in which learning does not follow any fixed process model but the implementation of competence based syllabuses brings out the dimensions in complementary ways. The elements on the right hand side join the construction to other integrative models.

2.4 Integrative Action Model

The integrative action process [18, 19] is a logic model of action and is used in the best practices of exploratory, creative learning and LbD culture [21]. The objective was to implement and integrate the three statutory tasks in the context of services, service design, security and ICT in the case of Laurea University of Applied Sciences. The main contribution of the integrative action and process model was the creation of a linear development framework for cyclical innovation activities with a quality perspective. The model itself is a liberation process [21] for innovative activities, rather than a process for automatic innovation generation. The innovative learning cycles do not follow any fixed order [6] and freedom of methods and creativity are emphasized in the innovation orientation [19]. Hence, the nature of the integrative process is supportive rather than managerial in the cyclical and thematic elements, and objective in the linear and relevance elements. In this case, the objective was to develop, help and support the construction of innovation and creativity. This process systematically combines changing orientations and synthetic transformations. In Service-Oriented Architecture (SOA) the components of integrative action are represented as units of logic and are known also as services [7].

The framework described in the trimming process model (as a proportional-integral-derivative (PID) controller, which is probably the most-used feedback control design) has five components or units. They are (1) science and innovation (cyclical), (2) collector of co-creative objectives, emphasizing full duplex transformation functions (thematic), (3) development (linear), (4) results (relevance) and (5) quality (relevance). The starting point of the implementation process may be any of the components from (1) to (5). The starting point
varies and depends on the objectives and perspectives. The integrative action process is illustrated in Fig. 2.

Figure 2 the Integrative Action Model is the “logic of action” that is used for the best practices of LbD. Its objective is to implement and integrate the three statutory tasks in the context of services, service design, security and ICT within Laurea University of Applied Sciences. The Elements with colours are used as full duplex and co-creative interfaces. In this study Canonical Action Research (CAR) is embedded into the feedback and feed-forward system in order to provide scientific rigorousness and relevance.

Science and innovation: the cyclical science and innovation components emphasize creativity and include the elements that solidly link research on future information technology, lead innovations and new service generation together. The research ranges from the implementation of fundamental methods and new technologies to the creation of novel applications and services, and their action impact on individuals and their region and society. In this case it also involves service design, innovations and responsibility. The science and innovation component produces a cyclical activity for development objectives, strategies and future programs such as those of the ICT cluster of the Finnish Strategic Centres for Science, Technology and Innovation (ICT SHOK) and other constructions for lead innovation systems. The science and innovation component emphasizes cooperation in a community of practices built around shared expertise or a new project that the members of a community have agreed on and for whose future development they take joint responsibility.

Collector of co-created objectives: the thematic collector component represents the function of the linearization of the creative objectives of the boundary objectives [27] combined with flexibility for development. There are many suitable and useful development and research methods for the cyclical to linear transformation and realization process. The first useful example is the progressive inquiry (PI) model [9]. The PI model describes the elements of expert knowledge practices in the form of a cyclical inquiry process that produces synthesis and defined results.

Development: the linear development component refers to development methods [16] and cooperation in communities of networked expertise. From the learning perspective, it means expertise that arises from social interaction, knowledge, competence sharing, research and
problem solving related to collective and specific objectives. The development component emphasizes cooperation and creating a “learning and developing” culture. It makes it possible to include and use various scientific perspectives and methods of learning by developing and researching in operation and action. Suitable development methods are available for the realization process. One example of an implemented case is the rational unified process (RUP). The RUP model’s aim is to contribute to the building of resilient systems that can grow and adapt to new needs [11].

Results: the results component is presented from the perspectives of the three tasks of universities of applied sciences, namely (1) education; (2) research and development; and (3) regional and societal development. As the results of research often show the increasing effects of globalization, hence global impacts are also included in the paper as a fourth result or effect. The regional development task further creates the possibility for results related to value and also knowledge transfer to innovations, new services and improvement of productivity, new business and Living Lab environments linked to global markets, the vitality of networks, safety improvements and welfare. Regional, societal and global impacts are the drivers for the creation of new knowledge. The values and prospects associated with competitiveness underscore the importance of knowledge transfer and its ability to enhance innovations and new services. The impacts of the action model include the possibility of full duplex transfer between local and global levels.

Quality: the relevance component includes quality management at the national and global levels. Laurea’s Quality Management System (QMS) and quality activities are currently implemented on a local level. The QMS is based on Laurea’s values and strategic intent, and on the strategies derived from these. The aim of the system is to systematically produce quality related data, make functions visible and produce material for developing operations and processes. The quality management system provides a general view of the links between the different elements of quality development, and identifies the responsibilities of various parties. The system is used to harmonize and increase the efficiency of operations. It provides the context for systematizing functions, while allowing for unit specific solutions. Laurea’s quality documentation describes the management system as a whole, and does this by defining the objectives of the quality effort, the organization and the responsibilities inherent in the quality and evaluation work.

Canonical Action Research (CAR) is a set of interdependent principles and associated criteria that researchers and reviewers can use to ensure and to assess the rigor and relevance of action research as it is one of the more widely practised and reported forms of action research within information systems’ literature. The term “canonical” is used to formalize the association with the iterative, rigorous and collaborative process-oriented model developed by Susman & Evered (1978) [28] that has been widely adopted in the social sciences and hence has gained ‘canonical’ status [1, 2, 5].

3 Action Research

As in this study, the philosophy for most action researches is pragmatism. Pragmatism concentrates on asking the right questions and receiving empirical answers to those questions. Action research provides a method for explaining why things do or do not work [1, 4]. Action research aims to solve current practical problems while expanding scientific knowledge. Unlike other research methods, where the researcher seeks to study organizational phenomena
but not to change them, the action researcher is concerned with bringing organizational change in front while studying the process. It is strongly oriented towards collaboration and change, involving both researchers and subjects. In this case it is iterative in scope and a continuous research process that capitalizes on learning by both a researcher (as a member of the expertise community) and other participants (e.g. students, colleges, collaborators and management). In Laurea’s case, it is a clinical method that puts researchers in a cooperative and co-creative role. Action research is an interventionist approach toward the acquisition of knowledge that has its foundation in the post positivist tradition. Action research assumes that a complex social process is best studied by introducing changes in that process and observing their effects (included the results of integrative action in Fig. 2). Action research links theory and practice in a cyclical process. The intention is to create a synthesis with specific knowledge that provides actors to be in a situation with the ability to act and to generate knowledge that is useful in similar situations.

3.1 Integrative Action Research

The study carried out by Laurea has combined theory and practice and was mainly based on Susman and Evered’s (1978) classic action research process [28], as well as Checkland and Holwell’s (1998) action research cycle [4], and McKay and Marshall’s (2001) model [15], which also references Susman, Evered and Checkland in relation to problem-solving and research. This approach is widely used [1, 14].

The action research model of this study consists of five consecutive phases that are repeated, so that the results of one process cycle are feedbacks, which are inputs for the next cycle. The phases of the used action research cycle are: (1) Diagnosis and reflection: reflection on the work or the work environment from the perspective of the three statutory tasks; raising questions; recognizing and specifying a problem area to be researched and treated with new, changed actions. (2) Action planning: learning about the problem and planning for a change; introducing and self-motivating through the co-creation of strategies, scopes, plans and implementations using the organizational bottom-up model [18, 19]. In particular, planning also connects the thematic and linear elements to action research. (3) Action taking: changing the ways in which work is carried out; implementing the changes; connecting the linear element of integrative action to action research. (4) Evaluation: the assessment of the effects of the change; the evaluation of the new situation and the success of the changes involving the relevance of element of integrative action. (5) Specifying learning: reflection on what has been learnt and reporting the whole effort, and updating the knowledge base, the body of knowledge [16] and documentation. Future research interventions continue from the next focus area that emerges from this phase. In Laurea’s case it temporarily continues from the initiation stage. Slight variations in the cycle (e.g. more fine-grained phases) have been proposed, but the five steps mentioned above contain the essence of Laurea’s approach, which is inducing change to tackle a problem in an organization while being supported by research that influences the co-decisions made on what to change and how to change at the linear and relevance levels of integrative action.

The analysis of the evaluation criteria of this study incorporates the action research characteristics of Canonical Action Research [5]. The study’s action research system and joining elements are illustrated in Fig. 3.
Figure 3 the study’s action research cycles are mainly based on Susman and Evered’s 1978 model. The right-hand side is populated with the steps encountered in research interventions. Canonical Action Research covers the linear and relevance elements of the integrative action model. In particular, the cyclical and thematic elements exist in the action planning and specifying learning phases.

3.2 Action Settings

The action research involved in integrative applications and the learning practices of the integrative implementations of the three tasks was performed at Laurea University of Applied Sciences between 2001 and 2009. The integrative action model is used as part of a larger innovation system value network. An intervention must be part of a larger network of transactions and international transformations. Integrative action and the Learning by Developing (LbD) culture influenced Laurea’s appointment as a centre of excellence in regional development for 2003-2004 and 2006-2007, and as a centre of excellence in education for 2005-2006 and 2008-2009. In this study the action research phases address the scope of excellence and quality in education. The first phase covers the evaluation of Learning by Development from 2003 to 2006 and the second phase covers the evaluation of the security management unit of Laurea from 2006 to 2009. The two dedicated action research phases include the analyzed results and effects of the awards given by FINHEEC (Finnish Higher Education Evaluation Council). Both phases are canonically evaluated and presented in appendix section of this paper.

4 Contribution and Implications for Research and Practice

The six years research time clarified that canonical action research is a sustainable body of research processes and framework. This work involves the collection of numerous data and analyses [22], interventions and activities such as projects, the making of models and prototypes and co-creative development activities. Action research [1, 2, 4] as well as design science research [10, 12, 16] are units of the integrative action model. This study has generated rigorou sness and relevant knowledge by use of the implementation of the integrative action model combined with Learning by Developing (LbD) culture as a way of instigating creative learning.
The Learning by Developing (LbD) model contributes to the body of pedagogical literature seeking to align competence and knowledge creations in different and complementary ways. It provides a conceptual framework for inter-operative learning that includes creativity as a value in networks and organizations. The integrative action model contributes information systems as logical model of action or, in other words, “action logic”, so it is similar to business logic in service oriented architecture (SOA) where the used components are represented as units and services [7]. The integrative action model should answer future questions e.g. what system architecture and philosophy should be used in the management of a networked international innovation system in higher education. It also provides a conceptual framework for understanding the management of competence creation in higher education, which ensures that the system or process does not prevent creativity or innovation from occurring. These integrative models further extend the conceptualization of knowledge, competence and creativity at the level of the individual participant (a student, a teacher, the management or another co-creator).

The design principles extend earlier work on Learning by Developing (LbD) [8, 21] and Integrative Action [18, 19] by empirically and canonically [5] demonstrating the paradigm shift in education from traditional methods to methods based on knowledge creation through research, development and learning. This is, of course, challenging but possible.

In first action research cycle [24] Learning by Developing (LbD) and integrative action empirically demonstrate the learning framework that includes co-instructing, co-operating and co-constructing, which can further extend students’ collaborative work to cooperation within the Finnish innovation system. Two emphasized results of that evaluation are: “the learning environment is conceived broadly from the perspectives of the workplace, the region, a science university and even an incipient internationalisation”. This adds credibility to the future significance of the pedagogical development work. In addition, the integrated pedagogical approach is based on student oriented activities and focuses on future workplace skills. Thus, it is an excellent approach for contributing entrepreneurial elements to education at universities of applied sciences, especially as the overall mission of universities of applied sciences is seen as consisting of practical operations that integrate the three tasks. It is a procedural and proactive model that integrates students’ everyday activities with the development of the employment sector, which is based on working towards solving genuine problems. The model’s theoretical foundations are solid and built on carefully considered analyses of chains of operation.

The evaluation of the second cycle [23] stated that: “it is also commendable that Laurea has made sustainable strategic choices and evaluated and developed its operations in a far-sighted way, which means that the results now being produced are nearing excellence”.

The cyclical action research process model and its canonical rigorous structure were used as well as tested in this research. In general, canonical action research [5] is an applicable approach in the context of an integrative process. Furthermore, it complements a quality system. Thus, canonical action research is the backbone of rigorous and relevant action in an integrative model. Integrative learning in canonical action research focuses on: the binding of theory; research and development in integrative action; the evaluation of action within an innovation system; freedom within a framework and student-centric co-creation in action and learning; and reflection and co-creation within an innovation system and its value network.
This research model is further extended and practiced in current curriculum development work. The curriculum of the master of business administration in information systems studies is revised using the integrative research framework model. The planned studies are included in action research and design science research transactions and cycles. The next actualization of these studies is going to be in January 2010.

5 Discussion of Integrative Action

If the innovation centre based objectives and lead innovations are used in education then learning action can create deeper and more relevant knowledge and competences for expert communities than a workplace’s or a student’s own themes or areas of interest [13]. This is reasonable to say because the innovation topics and research areas of innovation centres can be expected to be verified and deeply analyzed in the current and proactive perspectives. This does not include any major contradiction with creativity as it is possible to keep the creative scopes and themes of an innovation centre flexible, motivating and creative enough for students in any integrative action process.

The opposite perspective is demonstrated in our new security and ICT cases SATERISK (risks of satellites) and FLOODWARE (flood readiness and research of flood systems), both global, large R&D projects. The integrative action model was implemented for enabling knowledge creation and globalization of transformations. The idea, foundation, focus, themes, topics and spirit of SATERISK were elaborated by students, so SATERISK is purely students’ innovation and creation. This means that creation by student as well as innovation center-based and driven objectives and scopes may also be “co-creative creations” and supporting of agility in integrative action is necessary to be underlined. The agility was innovation enabler in this case. Thus co-instructive, co-operative and co-constructive creativity are supported in Learning by Developing culture.

In our discussion: “creativity is the result of inspiration and cognition”; “participation and knowledge sharing contribute creativity and social context helps creativity in case of integrative action”; “LbD requires mindset transformation and co-evolution yields to co-specialization in the learning culture and learning is seen as cultural movement in perspective of creativity and innovations”.

During this study the mutual and mutable roles of Finnish university, university of applied sciences, innovation system and regional-societal development were discussed in perspective of learning: “creativity and freedom of innovations have to be supported in learning; added value is produced if local or global innovation systems are intervened to learning processes; network is a university and value network is a university of applied sciences is a work distribution where action in learning bridges and forms a body of knowledge to competences, hence a competences are in first place on stage of clusters and in innovation systems which underlines funding, trust and timing (agility in business); and lastly the integrative action and LbD is a intellectual fusion and it is a form of mutual action and learning in innovation ecosystem”.

References:


Appendix A: The Action Research Cycles

### Canonical Action Research (CAR) Project in Laurea (2003 – 2009)

**Role of researcher and client:**

The author, Pirinen, works at Laurea as principal lecturer in the area of research and development within information systems and multidisciplinary research projects. Research, development and education (LbD) with learning environments and frameworks are his main tasks which form the basis of his work at Laurea. The management (client) at Laurea includes the vice rector and the heads of the departments of Laurea University of Applied Sciences. The management participates intensively in research and development action. The leadership style is based on a bottom-up, student-centric vision and relationship, It is also based on an LbD orientation and management culture and philosophy.

Data in the evaluation process: Quantitative and qualitative data in both research cycles is mainly based on a common measurement system which is used by the Ministry of Education and all Finnish universities of applied sciences (AMKOTA). The data is already in analyzed form and is available to both evaluators and applicants. The base evaluations are conducted every year and presented during negotiations with the Ministry of Education. For this research the data was presented in applications to FINHEEC and then analyzed as evidence on day the evaluations.

On an evaluation day several data categories are presented as evidence. For R&D work this involves those people who have cooperated in the main activities and areas of projects. Internationalisation: the international projects, including the main scope of research and development with the main accounting information, involve the role of Laurea and different types of experts in international co-operation as well as the publishers of research and papers of international journals. The action data consists of the total number of years spent by teachers in R&D work, the financial structure of the R&D, theses based on projects, grades and awards for theses. OPALA (feedback system) based data consists of the analysed feedback received from mentoring and the assessments of the quality of education i.e. the analysed data gained from co-operation and the quality of the learning environments, the evaluation of internships. Furthermore, the AMKOTA data: includes the implementation of courses which are connected to R&D work, the analysis of the average time spent at university before graduation; the analysis of the course completion rate, how many applicants per study are there, a five year analysis of employment, the participation of students in co-operation. Quality system related data includes how developments are connected to the feedback and quality system, the management system and the relevance of the quality processes and their data.

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<td><strong>Research Organization:</strong></td>
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<td>Laurea University of Applied Sciences and its units in: Hyvinkää; Kerava; Leppävaara; Lohja; Otaniemi; Porvoo; Tikkurila; and Vantaa.</td>
<td>Laurea University of Applied Sciences has a security management unit in Leppävaara which launched a Bachelor of Business Administration degree focused on the private security sector in 1998. In 2008, the security management unit had 133 young students and 102 adult students taking the Bachelor’s degree, as well as 26 students taking specialisation studies in international security management. The unit’s security team comprises four principal lecturers (two with PhDs and two licentiates) and four senior</td>
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<td>Laurea is the fourth largest university of applied sciences in Finland, and operates in the Greater Helsinki Region at seven units.</td>
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the adult education programmes.

Laurea produces new competences in the field of service innovations and carries out professionally orientated education, regional development and R&D activities according to the Learning by Developing (LbD) operational model.

Laurea

University of applied sciences
LAUREA


Research Question:

The question of this research cycle: What are the results and influences of the Integrative Action Model and Learning by Developing (LbD) from the perspective of the FINHEEC evaluations, conducted from 2003 to 2006 at Laurea University of Applied Sciences?

Co-operators and participants:

WM-Data Novo and the Finnish Heart Association focused on nutrition services and the perspective of health as related to nutrition.

Research was carried out in cooperation with the Atria Group, Apetit and the Raisio Group. It was focused on food production and the design of prepared food products.

Konecranes and Kone cooperated in the area of developing solutions and research with regard to the crane and lifting business as well as the development of co-operational models with Laurea University of Applied Sciences.

Kones and Kone, together with the University of Technology and Tampere University of Technology, worked on developing solutions and research with regard to the crane and lifting business as well as the development of co-operational models with Laurea University of Applied Sciences.

Helsinki University of Technology and Tampere University of Technology as well as the University of California in Santa Barbara were partners in the research and participated in the knowledge transformation.

Discussions, Reconsidering, Designing, Sharing and Organizing

Cycle 1. Diagnosing

Cycle 2. Diagnosing

lecturers (one licentiate, three with master’s degrees).

Research Question:

The question for this research cycle is: What are the results and influences of the integrative actions and Learning by Developing (LbD) model from the perspective of the FINHEEC evaluations, conducted from 2006 to 2009 with respect to the security management unit?

Co-operators and participants:

The OP Bank Group was involved with developing the evaluation and mapping system for staff security related training needs, web-based personal safety materials and instructions, and travel safety instructions.

City of Espoo: Security and safety of the city’s departments and bureaus, and community safety.

The S Group and Laurea developed the S Group’s security management and fire and rescue safety procedures at S-market stores and Stockmann and Laurea developed the occupational safety of staff and created models for monitoring access key use.

The Federation of Finnish Commerce and Laurea developed commercial safety labelling, and a tool for commercial safety and security planning, and created a guide for preventing store crime.

EADS Secure Networks and Laurea cooperasted on development projects related to data security for authorities and Securitas Ltd: Several theses were completed by Laurea based on research on Securitas’ Estonian workforce.

The Rescue Departments of the Helsinki Metropolitan Area and the Central Organisation of Rescue Services in Finland worked with Laurea to develop the safety and security of the region.

Finnish Defence Forces and Laurea worked on the development of the Defence Forces’ IT risks, their management system procurement process, and traffic monitoring.
Identification of needs and commitments:

The first cycle identified the need for improvements in the integration of the three statutory tasks: education; research and development; and regional development.

It also identified the need to improve the educational methodology and integrative action model as well as its integrative learning environments.

It further identified the need for Laurea to publish research in order to build up their ability to share knowledge and produce a more rigorous and relevant knowledge base for the co-creation process of the “body of knowledge structure”.

Laurea committed to an integrative student-centric principle and made the decision that it is not going to do research at separate R&D institutions.

Work hypothesis: Laurea should network its expertise and become a prime mover in regional development.

Data sources: Information is collected from: a series of development days held by the units. Information is also contained in articles and publications by Laurea; of which there were 101 in 2006 and 142 in 2007. Additionally there are six Laurea days, which involve all units.

Laurea has built up its own open access publication series since 2004. Papers and ideas about research and development work from 2003 to 2006 have been published in this series.

Data analysis: The data was collected and analyzed in collaborative sessions involving a researcher or researchers, participants and management. The focus in the data analysis of the diagnostic action led to the decision that “what and why” are important in action.

Based on grounded theory: an applied version of data analysis is based on grounded theory studies: the open, axial and selective coding of grounded theory [22]. This often appears in the publication and papers of researchers as category and relationship models (known as noun-verb-noun maps in Laurea).

Application to FINHEEC: The application for an evaluation in order to determine whether Laurea is a centre of excellence in education is collected from these data sources, the results of analysis, applied

Identifications:

Learning by Developing was implemented in the security management unit by Laurea’s own teachers and co-operative partners during the first cycle.

Researchers have also worked as teachers and developers on several projects and the implementations of courses. The base for development has been: Pedagogical Strategy 2002, 2007; Regional Development Strategy 2002, 2005; R&D Strategy 2004.

The Bachelor’s Degree Programme in Security Management has since been expanded to include advanced specialisation studies in data security, risk management and international security management.

The work hypothesis is to become an internationally recognised university of applied sciences specialising in future competence and regional development.

There were three development areas within the security management unit in May 2006:

First: Solutions for security competence in the realization and implementation of a competence based curriculum so that all three tasks are implemented and the R&D is focused.

Second: The building up of scientific rigorousness and the creation of a relevant knowledge base in the area of security management for national and international purposes.

Third: The development and launching of a Master’s Degree Programme in Security Competence.

Data sources: The data was collected and analyzed in collaborative sessions involving a researcher or researchers, participants and management. The focus in the data analysis of the diagnostic action led to the decision that “what and why” are important in action.

Data analysis in diagnosing: The main study themes that have led to the categories [22] to be diagnosed are the purposeful development of security competence; the development of education in security management; active networking in the security management field; monitoring and predicting change in the security operating environment; and swift reaction to those challenges identified. Part of data has been composed and
and used theories and publications. Analysed in FINHEEC application.

| Area for Research, Purpose of Team, Goals and Forms, Agreements and Binding Theories |
|---------------------------------|---------------------------------|
| **Cycle 1. Action Planning**    | **Cycle 2. Action Planning**    |
| **First design principle:**     | **Design principles**           |
| Empirical practice (2001-2003)  | The design principles for design research include the development of expertise for the development of the security management sector and its work communities, as well as generating new scientifically rigorous and relevant knowledge and competence: “developing for the world of work”. |
| and literature have shown us that, in order to develop expertise for a pragmatic situation, students and other participants must integrate a body of knowledge with knowledge understanding and action within authentic situations [6, 9]. |
| The term “authentic” means that all transactions and implementations of learning situations are simultaneously connected to real development cases in the world of work and have a definite value in the value network. |
| **Second design principle:**    | **Binding theoretical base for the social sciences:** |
| The existence of competence creation means using knowledge in action. This knowledge is based firstly on the pragmatic theory of knowledge and secondly on cyclical action, in which learning is approached through the three metaphors of learning: (1) knowledge acquisition; (2) participation; and (3) knowledge creation clarified in [17]. This perspective and application includes a student-centric principle and the understanding that it is possible to support creativity and innovation within any relevant field but it must be remembered that the forcing of learning does not benefit creativity. |
| **Selection:**                  | The main perspective of the security management unit is based on the social sciences. It is critical for the unit to understand the legal aspects of human behaviour and to be able to communicate and interact based on that. Expertise is reflected in the ability to take an organisation in a chosen strategic direction while making use of individuals’ and communities’ competence in management and development. In brief, “action is based on theories”. |
| Laurea University of Applied Sciences has co-created and selected Learning by Developing (LbD) as its principal pedagogical approach and learning culture [8]. |
| **The LbD model’s implementation as branded product:** |
| The design principles were developed for the concept of integrative action and exploratory research as well as an inquiry based learning culture. These were branded to become Learning by Developing (LbD) and used in the application to become a centre of |
| **Agility has crucial role in the framework of security management in perspective of learning and regional - societal development. In this context the agility means the ability and motivation to respond quickly to “dynamic and static” challenges. The agility is related to co-operation with other actors on clusters stage focusing a proactive action.** |
The applica-  

tion includes the paper written by “Fränti, M. & Pirinen, R. 2004. Unpublished source”, this paper was then published in 2005 and in Laurea’s publication series in 2006 [8].

Models of integrative action and LbD were ready for implementation at all eight units of Laurea in 2004.

Collecting the Data, Research & Education, Development & Design and Service & Product

<table>
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<tbody>
<tr>
<td><strong>Evidences of action:</strong></td>
<td><strong>Implementing Learning by Developing:</strong></td>
</tr>
<tr>
<td>Models of integrative action and LbD were implemented in various degree programmes in all eight units of Laurea from 2003 to 2006. All units implemented Learning by Developing principles and a new competence based core curriculum and reform was concluded in 2006.</td>
<td>Laurea’s core process is the process of high-quality learning by developing (LbD), which forms a structure that links the labour market with learning. As an example, more than 90% of the theses in security management are project based. Working at the meeting point between employment and studies, students import the development targets of the labour market into the world of education.</td>
</tr>
<tr>
<td><strong>Integrative Learning Environments:</strong></td>
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<tr>
<td>Research, Education and Development Laboratories (REDLabs) was founded at the Lehtimäki site in 2001 and moved to Leppävaara in 2002. REDLabs focused on internationalization and knowledge transformations from 2003 to 2006. BarLaurea was implemented at Leppävaara in 2002 and was developed further from 2003 to 2006. The research was student-centric and the main focus areas were: service development; production and the design of food products; nutrition; and health related products. The TL-laboratory was established at Leppävaara in 2002 in the field of network management and was developed further from 2003 to 2006. Design science research e.g. how to use and manage huge amounts of the latest knowledge in learning and the use of virtual equipment and actors in the context of network management as well as the use of scaffoldings in learning.</td>
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<tr>
<td>The next stage in Laurea’s integrative environment creation was to turn Laurea’s units into innovation</td>
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Figure “producing competence in the security management unit” illustrates the integrative action model in security management.

**Action taking within the world of work:**

The forms of action taking are carried out through: 1) high-quality Learning by Developing (LbD); 2) development labs and networks; 3) adult education and the pressure of new knowledge; 4) the use of
environments. Laurea’s Otaniemi campus, the Well Life Center, opened in late 2004. This innovation environment involved Laurea, Helsinki University of Technology, city councils, businesses and the Uusimaa Centre of Expertise Programme in 2006.

A competence based curriculum:

The Learning by Developing model defines curriculum development as a continuous and dynamic process, in which a degree programme’s curriculum is used as a basis for the students’ target-setting and competence evaluation. An extensive curriculum reform (2003-2006) was concluded in 2006, which led to the creation and implementation of a shared competence based core curriculum for the whole of Laurea for 2006 to 2008.

alumni; 5) using workplace experts as lecturers; 6) advisory boards; 7) having plan based regional development and; 8) using international employer links.

RIESCA:
The TEKES-funded RIESCA (Rescuing of Intelligence and Electronic Security Core Applications) project produces subjects for study for the various degree programmes. Among other projects, one project involves 20 students taking specialisation studies in international security management. As a part of their studies, they generate new competence for the project’s business partners and for society, while also producing fresh data for the degree programme’s content and acquiring the competence they will need in the future.

| Results of Integrative Action evaluated by the Finnish Higher Education Evaluation Council (FINHEEC) |
|-------------------------------------------------|-------------------------------------------------|
| Cycle 1. Evaluation                             | Cycle 2. Evaluation                             |
| The Finnish Higher Evaluation Council (FINHEEC) performed a day long evaluation on March 7 2005. The author (Pirinen) participated as an expert and founder of the integrative learning environments in Laurea and was also a target of the evaluation. This evaluation of first cycle was published in [24]. | The Finnish Higher Evaluation Council (FINHEEC) performed a day long evaluation on September 11, 2008) for Laurea’s Security Management unit. The author’s role was same as in the previous cycle of April 2005. This evaluation of the second cycle is published in [23]. |
| Evaluation objectives:                          | Evaluation objectives:                          |
| The evaluation objectives were decided and sent to the universities of applied sciences by FINHEEC in June 2004. | The evaluation objectives were decided and sent to the universities of applied sciences by FINHEEC in November 2007. |
| The evaluation objectives were:                 | The evaluation objectives were targeted towards assessing the results of action: |
| 1. The description of action and its binding to the whole task and the pedagogical strategy of Laurea university of applied sciences: | Action: |
| • a description of the unit and its innovative solutions | The description of action in the education unit and its linking to strategies and their main pedagogical alignment: |
| • the key competence of expertise                | • key competences                                |
| • its co-operation with world of work            | • connection to the world of work                |
| • its interaction in networks of universities of applied sciences | • networking within the universities of applied sciences’ networks, and participation with co-operators (action and the advantages of synergy, the accumulation of knowledge, co-operation and action) |
| • its analysis of education and expenses         | |
| • two categories of action or education that have proved successful | |

Evaluation objectives:

The evaluation objectives were decided and sent to the universities of applied sciences by FINHEEC in June 2004.

The evaluation objectives were:

1. The description of action and its binding to the whole task and the pedagogical strategy of Laurea university of applied sciences:
   • a description of the unit and its innovative solutions
   • the key competence of expertise
   • its co-operation with world of work
   • its interaction in networks of universities of applied sciences
   • its analysis of education and expenses
   • two categories of action or education that have proved successful
2. Designing and developing education:
   • the setting of a curriculum and development practices
   • students’ participation in the development of education
   • the tracing of developments in the world of work and their mutual impacts on syllabuses

3. Learning process and its steering:
   • education and learning environments
   • educational methods and learning
   • a student’s role and the development of their expertise

4. The evaluation of action and education:
   • the actualisation of the curriculum
   • the evaluation of learning and competence
   • employment achieved by Laurea students and the tracking of their career development as well as the utilisation of feedback
   • the evaluation of action
   • the next critical steps towards development of action and education

5. The how and why of application’s and the reasoning behind the selections made:
   • the initiation of application
   • how and why the application is like that
   • the development process of the application
   • students’ participation
   • the decision making system

Data sources: the application, evidence given on the day of the evaluation; including qualitative and qualitative data, posters, observations and the 22 interviews that were conducted on the evaluation.

Data analysis: peer review and FINHEEC analysis.

Evaluation Feedback

May 2005: The evaluation team set up by the Finnish Higher Education Evaluation Council (FINHEEC) considered Laurea’s pedagogical operating model, Learning by Developing, to represent a high quality innovation effort, which met all the quality criteria set by the council either well or excellently.

A description of Operations and their Links to the University of Applied Sciences’ Overall Mission and Pedagogical Strategy

The productivity of the required competences and responses to the requirements:
   • the management of resources as well as their evaluation and development
   • infrastructure money, knowledge and capital
   • the design and implementation process of the curriculum (including students and other participants)
   • the learning process and its management
   • learning environments
   • the quality system

Results:

The results of the unit in relation to the stated objectives (the evaluation of the reality of the objectives):
   • result related to students
   • results related to the world of work
   • results related to vacancies
   • results related to the performance of the economy
   • results of internationalisation
   • results of regional development

Data sources: application, evidence presented on the evaluation day - including qualitative and quantitative data, posters, observations, the 21 interviews conducted on the evaluation.

Data analysis: peer review and FINHEEC analysis.

Evaluation Feedback:

February 2009: The evidence provided indicates that the degree programme’s links to the world of work are strong and diverse. There is a growing need for security competence in the region and in the country as a whole.

The strategy

The strategy is based on good background research, and it is clearly future oriented. Future predictions are made by a security expert forum that convenes twice a year, with representatives from all the main
The Learning by Developing innovation is a pedagogical application in which investigative learning is linked to development projects. The overall mission of universities of applied sciences consists of practical operations that integrate the three tasks. It is a procedural and proactive model that integrates the students’ everyday activities with the development of the employment sector, and which is based on working towards solving genuine problems. The model’s theoretical foundations are solid, built on carefully considered analyses of chains of operation. Learning by Developing is clearly documented and well justified. The core competence produced by a university of applied sciences plays a significant role in developing the employment sector, which is noted both in the model’s theoretical foundations and in its practical implementation.

**Planning and Development of Education**

The operating model describes traditional structures and views (e.g. curricula, learning environments, conception of learning) in a new way, from the perspective of authenticity. The generic competence-based curriculum, the open innovation environments, the focus on students and phenomena, and the development of partnerships in employment sector development projects are functional and useful methods. They appropriately define the university of applied sciences’ duty as a producer of experts for the employment sector. The Learning by Developing model and its implementation are rooted in an orientation towards employment. The model carefully considers the cyclical interaction between practice and research. The pedagogical principles also raise Laurea’s research and development competence profile and lead to the production of competence through target oriented development projects.

**The Study Process and its Management**

The learning environment is conceived broadly from the perspectives of the workplace, the region, a science university and even incipient internationalisation. This adds credibility to the future significance of pedagogical development work. The integrated pedagogical approach is based on student oriented activities and focuses on future workplace skills. Thus it is excellent for contributing entrepreneurial elements to education at universities of applied sciences. Also the joint creation of new kinds of innovation environments (e.g. development bodies. The Security Management unit’s strategy is also strongly linked to Laurea’s overall strategy.

**Evidence of R&D in education**

Laurea’s pedagogical operating model is well-structured and one noteworthy aspect is the linkage of two of the statutory tasks of universities of applied sciences – education and R&D – at the various stages of the security management learning process. Although R&D is closely linked to teaching, it also produces new knowledge, competence and methods for companies in the sector.

The evidence shows that Laurea’s Security Management unit carries out comprehensive future prediction activities, and concretely uses its outcomes in its strategies. Laurea has chosen and developed a strong pedagogical model called Learning by Developing (LbD) for rolling out and implementing its strategy. LbD’s research oriented and developmental approach to work have successfully been applied to the students’ professional growth process in the Security Management unit. LbD dictates that students complete a significant number of projects based on genuine customer needs. Students learn about group work and about the rules of working life, for instance in relation to schedules and reporting. The development of the learning environment is organically linked to the chosen pedagogical solution.

**Problems in the learning process**

One challenge for the degree programme is to identify the weak points in the learning process and set up an effective development project to address them.

**The perspective of adult education**

Laurea has conducted a successful, future oriented reform of its curricula. The large proportion of adult students in relation to young students has been found to be noteworthy. This probably indicates a significant shortage of training options in the security field. If this is the case, the unit must prepare for a fall in demand for adult education in the future. It must also be aware that it may one day lose its monopoly.

**The Quality system**

The proposed unit controls its quality in accordance
platforms, pilot factories and Living Labs) is seamlessly integrated into the operating philosophy. Together, these characteristics may reform the cost structure of education as well as the creation of curricula. If innovations produced by students are used as a basis for planning and instruction then the role, forms and focus of instruction will shift primarily to those process facilitators and supporters. It can increase the integration of lecturers’ workflows and free resources reserved for instruction that can then be used in the development of learning processes.

Evaluation of Operations

In the Learning by Developing operating model, students evaluate their own learning procedurally and assume responsibility for its outcomes. The role of lecturers changes in the learning process. Students consider the pedagogical model to be well-functioning, which indicates that the principles have been integrated into practical work. The success of the model is also reflected in the students’ enthusiasm and motivation, which are indications of creative and committed work. The evidence showed that although the innovative model is still in its early stages, it has been implemented simultaneously in several fields of study. It was also evident that the model is supported in the integration principles of Laurea’s management system. This prepares the ground for the future strengthening of communal processes that foster the organisation’s broad based commitment to the chosen model.

Areas for Development

The Learning by Developing model represents a management and work philosophy based on the production of shared competence and creativity. The objectives given in the model – the evaluation criteria for the usefulness of competence – may be difficult to define in advance. However, for setting their own targets, students should know on what and how they will be evaluated in relation to the starting points and objectives of the learning process and also to other participants, as they do in traditional evaluation concepts. More work is needed to integrate the innovative and traditional evaluation perspectives.

Other future challenges are to further refine the monitoring process, the modelling of operations and the dissemination of tests and outcomes. This means that the criteria according to which the effectiveness of operations is evaluated, the monitoring models with Laurea’s quality system. Quality assurance measures are comprehensive and systematic. For example, curricula are evaluated according to predefined criteria. Student related measurements and a student feedback system have also been defined and are in use.

Evaluated action and project based theses

The outcomes of operations are systematically monitored. This has been done comprehensively, including student outcomes (project based theses), the quality of instruction and guidance, virtual studies, and employment levels. The unit has a widespread partnership and development network. The competence of graduates has been found to correspond well to employers’ needs.

Monopoly in education

The Security Management unit enjoys the advantage of a monopoly position that allows for student selection from a large number of applicants. Due to training in the field having been offered for such a short time the demand from employers is high.

Problem of the degree completion rate

In terms of the degree completion rate and graduation times, the unit’s performance is somewhat below the national average. The evaluation team was particularly concerned about the degree completion rate, which is only 48%, i.e. less than half of all students complete the degree. According to an explanation given to the team, many students find jobs during their studies, partly due to an increasing demand in the field, which draws students away from their studies. The causes should be analysed more carefully and a plan should be made to improve the completion rate.

Internationalisation

The degree programme has made good international connections, particularly in project work. One challenge lies in improving the students’ opportunities for international exchange, which currently seem fairly limited.

Outlook

On the whole, the Security Management unit at Laurea University of Applied Sciences has managed to define the central elements of the core competence of its education programme (security competence),
and publication procedures must be developed and expanded. In addition, the evaluation council would like to encourage Laurea to develop its incipient international activities, both in the pedagogical model and in the natural part of the students’ learning processes.

Outlook

The operating model is clear and transparent. It can be adopted favourably by other universities of applied sciences. The structure of the Learning by Developing model is also easy to adapt and renew when changes occur, which means that it can develop from the inside on the one hand, and produce innovations on the other.

<table>
<thead>
<tr>
<th>Reporting, Feedback, Reviews, Measures and Creations</th>
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<tr>
<td><strong>Cycle 1. Specifying Learning</strong></td>
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<tr>
<td><strong>May 2005:</strong> Working hypothesis “Networked Expertise” was supported quite well in the feedback gained from the evaluation report. The area of development separated themes and outlined three main areas for more detailed analysis and objectives for future development:</td>
</tr>
<tr>
<td>1) The evaluation of students: Students should know on what and how they will be evaluated in relation to their starting points, the objectives of the learning process and in relation to other participants.</td>
</tr>
<tr>
<td>2) The criteria according to which the effectiveness of operations is evaluated, monitoring models and publication procedures must be developed and expanded.</td>
</tr>
<tr>
<td>3) International activities, both in the pedagogical model and in the natural part of the students’ learning processes must be focused on.</td>
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<tr>
<td>Lessons learnt from September 2005 to May 2006 and further developed from 2006 to 2009.</td>
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<tr>
<td>The analysis [22] of the evaluation has led to improvements in the design and construction of syllabuses. Currently, evaluation criteria are specified in more detail and well before the</td>
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<tr>
<td><strong>Cycle 2. Specifying Learning</strong></td>
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<tr>
<td><strong>December 2008:</strong> The working hypothesis was either well supported or nearing excellence in this second cycle.</td>
</tr>
<tr>
<td><strong>Feedback</strong></td>
</tr>
<tr>
<td>A Master’s Degree Programme in Security Competence was started in the autumn of 2008 (18 students). Furthermore the R&amp;D activities included in the education process have strengthened the regional influence of the unit through newly funded projects namely SATERISK (the risks faced by satellites) and FLOODWARE (flood readiness and the research of flood systems). Both are large, global R&amp;D projects. The integrative action model was implemented to enable knowledge creation and the globalization of transformation.</td>
</tr>
<tr>
<td><strong>Creation</strong></td>
</tr>
<tr>
<td>The idea, foundation, focus, themes, topics and spirit of SATERISK were generated by students, so SATERISK is a student innovation and creation. This is the first evidence for the “informing or re-informing theory” in evaluation to canonical action research in part (5f). Creation namely “the theory of how to support creativity and innovations in higher education”. This first testing of the themes is based</td>
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</table>
implementation of courses. A basic question is still unresolved, “how is it possible to construct an evaluation system or method which will support the world of work, an innovation system and motivate students to learn simultaneously. This challenging work is still under design research in 2009. One promising perspective could be context based evaluation.

An analysis of the effectiveness of operations and monitoring models for action has led to the conclusion that the problem is how to improve throughput rather than the method of measurement. This meant a more prepared implementation of courses so that the scopes were more clearly led. The result was that if innovation centre based objectives (lead innovations) are used in higher education, learning action creates deeper and more relevant knowledge and competence for expertise communities rather than a workplace’s or a student’s own themes or areas of interest. This is reasonable to say because the innovation topics and the research areas of the innovation centres are verified and deeply analyzed from a future perspective. This does not contradict creativity too much as it is possible to keep the creative scopes and themes of the innovation centre flexible, motivating and creative enough for students in the integrative action process [19].

Another development area concerns publication procedures, which it indicates must be developed and expanded. This has resulted in the improvement of online library services and open access publication to theses developed and implemented (2006-2008).

**International Expertise Services**

The analysis of international activities has resulted in the development of International Expertise Services (IES) in REDLabs. This is a practical and innovative way of integrating the three tasks and strategy of Laurea, which is achieved by using international partnerships to bring in expertise from Higher Education Institutions and similar labour market clusters from around the world.

In Short IES means doing regional development through international research trainees.

on Checkland and Holwell (2009) [4].

**Review in February 2009**

During the review of the second cycle, the first observation was that a knowledge base for security management was still necessary in order to produce more visibility from national and international perspectives.

The second observation of analysis is that the security management unit needs to have deeper cooperation with the security cluster and the Finnish innovation system. The internationalisation of the security cluster and the security management unit are important for strengthening higher education and cooperation within the European security network as well as the framework programmes e.g. European Commission’s Seventh Framework Programme (FP7).

The third challenging analysis’ result addressed the evaluation itself. The next evaluation is seen as being necessary to perform in an international context so that the international value network and the cluster of the security and education unit are evaluated together.

The fourth review emphasized the student-centric principle, which sees students as influencing co-creators. This analysis part verifies the utility of the strategies and the student-centric principle.

The fifth observation is the implementation of the integrative action model and the third task in an integrative way. This is a challenge in Laurea’s everyday work, because it implies a paradigm shift in education from traditional methods to ones based on knowledge creation through research, development and learning. However, the benefits achieved by the change are clear and the results gained will motivate Laurea to continue on its current path.

Although formal research, especially research results and relevant problems, are good starting points for the innovation process, more support for creativity, global thinking and transformation is needed in order for Laurea to be less reactive and even more proactive.
Appendix B: The Canonical Evaluation of Action Research at Laurea

Canonical research is defined as “exactness” or “strict precision” and is considered to be “a generally accepted principle” in the context of the widely practised and reported forms of action research in information systems literature [1, 5]. In this context ‘canonical’ is used to formalize the association with the *iterative, rigorous and collaborative* process oriented model developed by Susman and Evered (1978), which has now also been widely adopted in the social sciences, hence it has gained ‘canonical’ status. Canonical action research includes a set of interdependent principles and associated criteria that researchers and reviewers can use to ensure and to assess the *rigorousness and relevance* of performed action research. In this study the evaluations are based on the criteria of canonical action research proposed by Davison, Martinsons and Kock (2004) [5]. It is a framework that identifies five methodological principles; each includes a list of specific criteria. The evaluation compares the performed interventions, each of which is reported in the *existence* section of the numbered principles.

1. **The principle of the researcher–client agreement**

This first principle ensures that the researchers, practitioners and other actors develop a mutual understanding and commitment to the research project i.e. its scope, focus, areas of interest, and mode of inquiry. The next table includes the specified criteria and their existence or realization in the performed research process.

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<th>Did both the researcher and the client agree that canonical action research was the appropriate approach for the organizational situation?</th>
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<tr>
<td>1a</td>
<td>The work planning and agreement including section of research work is underwritten every year. The need for systematic analysis and a research framework are outlined early in Laurea. Canonical action research is an iterative research process, comprising canonical analysis, including action planning, interventions and evaluations. Both the researchers and the management of Laurea have agreed upon integrative action and LbD as frameworks of action for Laurea.</td>
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<td>Was the focus of the research project specified clearly and explicitly?</td>
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<tr>
<td>1b</td>
<td>The focus of the research was documented and formulated in proposals for integrative learning environments. The documentation of the research projects and plans are clearly and explicitly agreed by the funding agencies and research and cooperation participants. A strategy specifies the focus areas of the research in Laurea.</td>
</tr>
<tr>
<td></td>
<td>Did the client make an explicit commitment to the project?</td>
</tr>
<tr>
<td>1c</td>
<td>Research is included in the work agreements of researcher and it has been explicitly committed to by Laurea. The funded project proposals were finalized and signed by the participants and Laurea.</td>
</tr>
<tr>
<td></td>
<td>Were the roles and responsibilities of the researcher and client organization members specified explicitly?</td>
</tr>
<tr>
<td>1d</td>
<td>All project participants signed the work agreement which includes the policy of Laurea. It specifies roles and responsibilities explicitly. The researchers’ responsibilities are clearly specified. Also mentioned were specific regulations or demands of credit or trust references in the agreement, if a project demanded it.</td>
</tr>
<tr>
<td></td>
<td>Were the project’s objectives and evaluation measures specified explicitly?</td>
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<td>1e</td>
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</table>
2. The principle of the cyclical process model

The second principle is for verifying that all five action research phases are performed in a sequential and systematic manner to ensure scientific rigorousness. Progressing through the cyclical process model in a sequential fashion will help to ensure that a canonical action research project is conducted with systematic rigor e.g. diagnosis followed by planning and so forth.

2a | Did the project follow the cyclical process model or justify any deviation from it?
---|---
Existence | Two cycles of canonical action research from the perspective of excellence in education were performed; both cycles included phases of diagnosing, action planning, action taking, evaluating and specifying learning. The action research model used consists of five consecutive phases which are repeated, so that the results of one process cycle are fed back as inputs for the next cycle.

2b | Did the researcher conduct an independent diagnosis of the organizational situation?
---|---
Existence | An independent diagnosis of the results of each action research cycle was completed, discussion with management was performed and the results were used in the everyday best practices and action of Laurea.

2c | Were the planned actions based explicitly on the results of the diagnosis?
---|---
Existence | In both action research cycles the diagnostic sections produced context for the planning phase. The execution of diagnostic part included the following activities; discussions, reconsidering, designing, sharing and organizing.

2d | Were the planned actions implemented and evaluated?
---|---
Existence | In the first action research cycle the planned Learning by Developing (LbD) model was implemented into the organization of Laurea. In the second action research cycle the security management programme was selected as the focus of action. Several international and Finnish founding agency based projects were realized. Both cycles were evaluated by the Finnish Higher Education Evaluation Council (FINHEEC).

2e | Did the researcher reflect on the outcomes of the intervention?
---|---
Existence | Reflection is performed collaboratively with the project’s participants. The teachers’ and the other actors’ reflections took place during the development days. The author was involved in all four FINHEEC evaluation days and processes in the role of expert and researcher and as the founder of the Research and Development Laboratories (REDLabs) in Laurea. The outcomes are reflected on constantly and in a non hierarchical way with Laurea’s management.

2f | Was this reflection followed by an explicit decision on “whether to proceed through an additional process cycle or not?”
---|---
Existence | The diversity of the implementation level and the challenges of extending the operational model and culture to whole of Laurea led to additional organizing and other research processes throughout Laurea e.g. campus based operations, the rethinking of profiles and the reconsidering and designing of research scopes. However, if different organizations and people would like to implement integrative action, then they have to find their own motivation and own way of implementing it. Regarding the criteria for the next FINHEEC evaluation on excellence in education, the second cycle of this action research addressed the quality and action of the security
3. The principle of theory

In the list the third principle states that action research without theory does not constitute research. This section is focused on the importance of using one or more theories and relating findings to the extant literature.

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<tbody>
<tr>
<td>3a</td>
<td>Were the project activities guided by a theory or set of theories?</td>
</tr>
<tr>
<td>Existence</td>
<td>Papers on canonical action research, theories in networked expertise, and theories of learning, all three metaphors of learning and theories of knowledge building were used as a guide and also as a theoretical basis for this research.</td>
</tr>
<tr>
<td>3b</td>
<td>Was the domain of investigation and the specific problem setting relevant and significant to the interests of the researcher’s community of peers as well as to the client?</td>
</tr>
<tr>
<td>Existence</td>
<td>The research objectives were co-created in collaboration with all participants. The integration of the three tasks was a relevant, challenging, common and authentic research area and problem in Laurea. All institutes of Laurea accepted and were aware that the integrative approach is a strategically important choice for the whole organization.</td>
</tr>
<tr>
<td>3c</td>
<td>Was a theoretically based model used to derive the causes of the observed problem?</td>
</tr>
<tr>
<td>Existence</td>
<td>Theories of network expertise, theories regarding the three metaphors of learning and LbD were applied and bound to action in both action research cycles. The theories formulated the application of observed problems.</td>
</tr>
<tr>
<td>3d</td>
<td>Did the planned intervention follow from this theoretically based model?</td>
</tr>
<tr>
<td>Existence</td>
<td>Interventions were guided by the integrative action model and canonical action research. The argument that the integrative action model is more conducive to student-centric action is an application from theories of network expertise.</td>
</tr>
<tr>
<td>3e</td>
<td>Was the guiding theory or any other theory used to evaluate the outcomes of the intervention?</td>
</tr>
<tr>
<td>Existence</td>
<td>The theories of evaluation are based on peer evaluation methods and the evaluation methods of FINHEEC.</td>
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</table>

4. The principle of change through action

The purpose of the fourth action research principle is to document how action resulted in change that dealt with an unsatisfactory situation. Interventions result from encountering a problem and thus organizational change and action are required.

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<tbody>
<tr>
<td>4a</td>
<td>Were both researcher and client motivated to improve the situation?</td>
</tr>
<tr>
<td>Existence</td>
<td>Organizational change is focused on the three statutory tasks prescribed by Finnish law. The researchers and as well as management of Laurea seek ways to integrate the three statutory tasks and improve creativity and innovation within every day learning and action in Laurea.</td>
</tr>
<tr>
<td>4b</td>
<td>Were the problems and their hypothesized cause(s) specified as a result of the diagnosis?</td>
</tr>
</tbody>
</table>
| Existence | The problem and integrative hypothesized causes were collaboratively identified and documented. The analysis of the results and the annual reports includes the conclusions of the
### 4c Were the planned actions designed to address the hypothesized cause(s)?

| Existence | In the first action research cycle the implementation of Learning by Developing guided the needs of quality system improvements and also focused on the measuring of creativity and innovations in every day action. These assumptions have been further developed. In the second cycle a lack of knowledge and the needs of competence transformations were developed to address the problem setting of the project scopes in international co-operation and transformations. |

### 4d Did the client approve the planned actions before they were implemented?

| Existence | Actions were discussed, reconsidered, designed, shared and organized on regular development days and also at project meetings with all participators and actors, which were held often. |

### 4e Was the organization situation assessed comprehensively before and after the intervention?

| Existence | Workshop sessions and development days included assessments before and after any intervention. |

### 4f Were the timing and nature of the actions taken clearly and completely documented?

| Existence | The complete action research project activities were documented and included in reports and stored in a learning environment platform. In the second cycle the reports were also sent to a funding agency. |

### 5. The principle of learning through reflection

In the fifth principle (5) the clients focus on practical outcomes while the research community is interested in the discovery of new knowledge. Practical progress and the advancement of knowledge both result from considered reflection and learning. Learning through reflection stems from the multiple responsibilities of the action researcher to clients and to the research community. The list of questions based on this principle includes:

### 5a Did the researcher provide progress reports to the client and organizational members?

| Existence | In the first research cycle the integrative action report was provided and announced in the publications made by Laurea. Research papers were provided as was the development day documentation, which is available through the Optima environment. Communication was conducted on a regular basic and meetings were organised whenever needed. |

### 5b Did both the researcher and the client reflect upon the outcomes of the project?

| Existence | Collaborative reflection took place at meetings and during many conversation sessions between the researcher and the client where both shared their understanding. This was organised very often, sometimes regularly e.g. once a week during the research project. |

### 5c Were the research activities and outcomes reported clearly and completely?

| Existence | Research papers were written and published throughout the project progression. Conference and journal papers were included in the project results and documentation. The number of publications has grown throughout this research project. |

### 5d Were the results considered in terms of implications for further action in this situation?

| Existence | Laurea is implementing theoretical and practical principles from both evaluations of the projects. The Principles of Learning by Developing (LbD) are currently and largely used in the domain of the universities of applied sciences in Finland. The internationalization of security management is being applied to the process. One tenth of all the applied cases of integrative action, from the different programmes that have been carried out at Laurea, have been published by Laurea. |

### 5e Were the results considered in terms of implications for action to be taken in related research domains?

| Existence | The results of this research were discussed in terms of their implications and the realizations taken in the related research domain of the national level network of Finnish universities of applied sciences as well as in different institutes within Laurea. Several applied instances exist in the network and certainly all use their own name for an application and for different scopes, but the core of integrative action and rethinking is based on the LbD model and the same theories. |
Laurea has been awarded the title of prime mover four times in the area of services. It is a proactive and international research and development co-creator and user of networks for knowledge transformations.

5f Were the results considered in terms of implications for the research community e.g. general knowledge, informing or re-informing theory?

Existence THEMES: creativity and innovations in learning are possible to support but not to force; creativity in learning starts when forcing in learning ends; and principles, action and results are evaluated but are not formalized in advance. That makes it possible to support creativity and innovations so that they are likely to occur and exist. These themes and the SATERISK case were developed from the first cycle of theory testing used by Checkland and Holwell [4].

5g Were the results considered in terms of the general applicability of canonical action research?

Existence The cyclical action research process model and the rigorous canonical structure were used as well as tested in this research. In general, canonical action research is an applicable method for our project context. Furthermore it complements the quality system. Canonical action research is the backbone of scientifically rigorous and relevant action in the integrative model. In this implementation, design is focused, and action research is similar to but differs from design science. In this research, action research and design science strengthen and complement each other. In our multidisciplinary integrative framework canonical action research is used for its sustainability, rigorousness and relevance. It is further recognized as providing a backbone for action; case studies are used to gain a detailed understanding of innovations; design research produces viable artifacts, innovations and services; design science produces the knowledge to implement an innovation; and a proactive approach is used for influencing the future. In contrast, a service design is an activity aimed at materializing the non-material dimensions of services. The integrative learning in action research focuses on theory binding; research and development in integrative action; the evaluation of action within an innovation system; freedom within a framework and student-centric co-creations in action and learning; and reflection and co-creation within an innovation system and value network.