

COURSE MATERIAL

COMMENTS

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Juha Kettunen, Ursula Hyrkkänen & Anttoni Lehto (eds.)

APPLIED RESEARCH AND PROFESSIONAL EDUCATION

Proceedings from the first
CARPE networking conference
in Utrecht on 2–4 November 2011



TURUN AMMATTIKORKEAKOULU
TURKU UNIVERSITY OF APPLIED SCIENCES

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CONTENTS

APPLIED RESEARCH AND PROFESSIONAL EDUCATION IN THE EUROPEAN STRATEGIC NETWORK	9
<i>Juha Kettunen</i>	

SUSTAINABILITY

THEME INTRODUCTION	14
<i>Walter Leal</i>	

SUSTAINABILITY ISSUES INCORPORATED IN BUSINESS AND LEGAL STUDIES – TEACHING PROACTIVE MANAGEMENT AND PROACTIVE BUSINESS LAW IN HIGHER EDUCATION	16
<i>Kaisa Sorsa</i>	

TAKING RESPONSIBILITY – THE INTEGRATION OF SUSTAINABILITY AND PROJECT MANAGEMENT	26
<i>A. J. Gilbert Silvius & Jasper van den Brink</i>	

NETWORKING GLOBALLY FOR SUSTAINABLE DEVELOPMENT – SMALL ACTIONS IN FINLAND, SWAZILAND, VIETNAM AND BRAZIL	41
<i>Jari Hietaranta & Jenni Koivisto</i>	

DEVELOPING A NEW CURRICULUM FOR ENERGY ENGINEERING AT THE HU UNIVERSITY OF APPLIED SCIENCES UTRECHT	60
<i>Martijn G. Rietbergen</i>	

ENTREPRENEURSHIP

THEME INTRODUCTION	76
<i>José Millet</i>	

PROMOTING ENTREPRENEURSHIP AND INNOVATION IN AFRICA <i>Leendert de Bell</i>	78
E-HEALTH BUSINESS MODEL DYNAMICS IN LONG TERM CARE – CASE STUDIES IN THE DUTCH MARKET <i>Roderick Udo, Hein Roelfsema & Helianthe Kort</i>	90
THE CONCEPT OF ENTREPRENEURSHIP IN EDUCATION AND RESEARCH AT THE IDEAS INSTITUTE, UNIVERSITAT POLITÈCNICA DE VALÈNCIA <i>Michael Willoughby & José Millet</i>	100
INTERNATIONAL INNOVATION <i>Martijn Adriaan Boermans & Hein Roelfsema</i>	116
SELF-LEADERSHIP, ENTREPRENEURSHIP, CREATIVITY AND PRODUCTIVITY IN THE NETHERLANDS AND THE UNITED ARAB EMIRATES <i>Paul Breman & John Politis</i>	124
SOCIAL INNOVATIONS	
THEME INTRODUCTION <i>Jean-Pierre Wilken</i>	144
THE VALUE OF NARRATIVE IN SELF-ASSESSMENT <i>Ali Gardner</i>	146
EXTERNAL AND INTERNAL RELATIONS AS SOURCES OF UNCERTAINTY IN SYSTEMIC INNOVATION IN PUBLIC WELFARE SERVICES <i>Harri Jalonen</i>	157
KNOWLEDGE TRANSFER IN CHILD CARE INSTITUTIONS – IMPLEMENTATION OF KNOWLEDGE INTO PROFESSIONAL BEHAVIOUR BY TRAINING AND MANAGERIAL STRATEGIES <i>Petra Strehmel & Daniela Ulber</i>	171

TEACHERS AND TEACHER TRAINERS RESEARCHING IN
MULTICULTURAL SCHOOLS – REGIONAL COOPERATION
WITHIN AN INTERNATIONAL SETTING 182
Leif Åhlander, Mariann Enö & Maaïke Hajer

ARE ‘PAYMENT BY RESULTS’ AND ‘SOCIAL IMPACT BONDS’
THE MOST EFFICIENT WAY TO ADDRESS THE CHALLENGES
FACED BY THE CRIMINAL JUSTICE SECTOR? 193
Chris Fox & Kevin Albertson

PROMOTING COLLABORATION BETWEEN POLICE AND
SOCIAL WORK IN THE FIELD OF INTEGRATION 207
Sari Vanhanen & Mira Ojalehto

HEALTH CARE

THEME INTRODUCTION 218
Harriet Wittink

NÄYTKÖ PROJECT – TOWARD NURSING STUDENTS’ AND
PROFESSIONALS’ SHARED LEARNING 220
*Camilla Laaksonen, Hannele Palta, Marjale von Schantz,
Minna Ylönen & Taina Soini*

DEVELOPING DIALECTICS 227
Annikka Mattinen

CREATIVE ENGINEERING

THEME INTRODUCTION 236
Juha Kontio

FACTORS FOR SUCCESSFUL ENGINEERING AND
EXPLOITATION OF SERVICES: FOUR EXPLORATIVE
CASE STUDIES ON SERVICIZATION 238
*Mireille Stout, Johan Versendaal, Justian Knobbout,
Kristian Spek, Mark Tammer & Martijn Zoet*

INNOVATION PEDAGOGY WITH THE CDIO FRAMEWORK – A STRATEGIC CHOICE	250
<i>Juha Kontio</i>	
BRIDGING THE COMMUNICATION GAP IN INFORMATION SYSTEM PROJECTS – ENABLING NON-IT PROFESSIONALS FOR THE REQUIREMENTS ENGINEERING PROCESS	259
<i>Rüdiger Weißbach</i>	
TARGETING INNOVATION COMPETENCIES WITH THE HELP OF DIVERSIFIED LEARNING PATHS	268
<i>Liisa Kairisto-Mertanen</i>	
DIGITAL COACH SUPPORTING THE CREATION OF A PROJECT PLAN (A.K.A. PID OR PLAN OF APPROACH)	280
<i>S.A. Nijhuis</i>	
NANOINFOBIO: A CASE-STUDY IN INTERDISCIPLINARY RESEARCH	289
<i>Naomi Jacobs & Martyn Amos</i>	
APPLIED ARTS	
THEME INTRODUCTION	310
<i>Timo Tanskanen</i>	
TRADITION AND INNOVATION – BASIC DESIGN AS A SOURCE OF INNOVATION	312
<i>Cristina Iranzo Reig</i>	
BRINGING THE PAST TO THE PRESENT – THE USE OF TAGGING AND STORYTELLING FOR THE ENRICHMENT OF DIGITAL CULTURAL HERITAGE	319
<i>Erik Hekman & Harry van Vliet</i>	

PUBLIC BROADCASTING ONLINE SERVICES IN THE EUROPEAN SINGLE MARKET – A CONFLICTING SITUATION FOR THE PUBLIC MANAGEMENT <i>Martin Gennis & Hardy Gundlach</i>	327
MOTION CAPTURE – ART, TECHNOLOGY & COLLABORATION <i>Peter Twigg & Steve Hawley</i>	340
SHARING SIMILARITIES AND DISCUSSING DIFFERENCES – HOW UTRECHT’S INTERNATIONAL JOURNALISM STUDENTS CROSS CULTURAL BORDERS <i>Els Diekerhof</i>	352
EDUCATION, CRISES AND COMMUNICATION – AN INTERACTIONAL ANALYSIS OF HIDDEN CRISES <i>Annette Klarenbeek</i>	359

APPLIED RESEARCH AND PROFESSIONAL EDUCATION IN THE EUROPEAN STRATEGIC NETWORK

Turku University of Applied Sciences and HU University of Applied Sciences Utrecht have collaborated since 2008 to establish a European strategic network aiming at joint applied research and development as well as pedagogical development in the fields of professional education. Many meetings were held in Utrecht, Turku, Valencia, Hamburg and Manchester to plan the network.

The strategic plan of Turku University of Applied Sciences was approved in September 2010. According to the plan, the institution deepens its strategic collaboration with HU University of Applied Sciences Utrecht and broadens its network of strategic collaborators to geographical areas that are important for exporting companies. The strategic partnership has been agreed by four European universities:

- HU University of Applied Sciences Utrecht (Hogeschool Utrecht)
- Turku University of Applied Sciences (Turun ammattikorkeakoulu)
- Polytechnic University of Valencia (Universitat Politècnica de València)
- Hamburg University of Applied Sciences (Hochschule für Angewandte Wissenschaften Hamburg)

There has also been a plan that the Manchester Metropolitan University will join the strategic partnership. In any case, the purpose is that the number of partners will be rather limited to support the trust and cohesion of the institutions. With extraordinary partners, the strategic network is able to cover a large area of European higher education.

The CARPE institutions have the profile and the fields of education that are close to each other, but in many cases their expertise complements each other. All of these partners have applied research and development which is essential for the economic growth, employment and welfare in their regions. On the other hand, these institutions have professional education which produces graduates capable to develop their working environment.

The purpose of the Finnish universities of applied sciences is to promote regional development. Europe is the most important market area of companies located in Southwest Finland. Therefore the European strategic network is necessary to support the export of companies and the international activities of other organisations. This notion of internationalisation clearly connects it with regional development.

The aim of the strategic partnership is the collaboration in the European research programmes. To achieve this objective the partners of the consortium plan and apply funding from the European Union for applied research and development. These universities integrate the joint projects with education and develop study programmes.

The student and staff exchange supports the collaboration between the universities, companies and other organisations in Europe. Erasmus and project funding can be used to support the collaboration. The aim of the CARPE partnership is also to establish a strong European reputation, which is necessary to strengthen the strategic partnership and the economic development in Europe.

This publication is based on the first CARPE conference held in Utrecht on 2–4 November 2011. More than a hundred papers were submitted for the conference. The conference deepened the collaboration between management, researchers, teachers and other staff. The conference also included the signing ceremony of the general cooperation agreement.

The conference included comprehensive and topical interest areas which were shared among the CARPE universities. This publication follows the structure of the conference and presents selected articles from the following tracks:

- sustainability
- entrepreneurship
- social innovations
- health care
- creative engineering
- applied arts

Many of the topics are based on the interdisciplinary needs of working life. The projects of applied research and development respond to these development needs.

An avant-garde feature of higher education is to integrate the customer-oriented and interdisciplinary research and development with education using flexible curricula and promote entrepreneurship and internationalisation to support the innovations in the region. These features are the foundations of innovation pedagogy, where individual learning is extended with collaborative and networked learning. Innovation pedagogy is a pedagogical approach developed at Turku University of Applied Sciences to support the innovations of working life.

Hopefully this publication provides necessary and important information about the knowledge of the researchers at the other universities so that knowledge can be used in the joint projects of research and development. With active participation in the projects funded by the European Union and other funding bodies the future of the CARPE network will be fruitful and thus the universities of applied sciences are able to increase the competitive advantage of Europe.

Turku, February 2012

Juha Kettunen

Rector

Turku University of Applied Sciences

SUSTAINABILITY

THE THEME OF SUSTAINABLE DEVELOPMENT AT THE FIRST CARPE CONFERENCE

Walter Leal

Hamburg University of Applied Sciences

walter.leal@haw-hamburg.de

It is widely acknowledged that sustainable development is a long term goal, which both individuals and institutions and countries need to pursue. This important theme is characterised by an intrinsic complexity, since it encompasses ecological or environmental considerations on the one hand, with economic matters, social influences and political frameworks on the other. This makes provisions in respect of education for sustainable development a particularly challenging task, but one which is feasible and achievable, provided the right elements are put into place.

The session at the CARPE conference, devoted to sustainable development, was one of the most interesting elements of the meeting. It met the need for documenting and disseminating experiences from different parts of Europe, where learning for, about and through the principles of sustainability is taking place in various sets and contexts.

The papers documented and promoted by means of this report tackle a number of issues, varying from the need for international networks to matters related to project management. In addition, curriculum development is also a matter debated. In particular, the question as to how integrate sustainability issues in the context of different subjects is one of the most pressing needs seen today.

Sustainable development is not only about education. It is also about agriculture, transport, energy, climate change, consumption. Therefore, if we

ever want education for sustainable development to succeed, we need to take these wide-ranging issues into account.

I would like to thank all authors for making their experience available in their chapters, and the willingness to share their ideas. Much can be gained by providing a platform for the debate on education for sustainable development in a pragmatic way, and by providing their inputs the authors have made a positive contribution towards a debate which needs to be present and reach a depth far beyond what conferences, workshops or seminars may be able to offer.

SUSTAINABILITY ISSUES INCORPORATED IN BUSINESS AND LEGAL STUDIES

Teaching Proactive Management and Proactive Business Law in Higher Education

Kaisa Sorsa

Turku University of Applied Sciences

kaisa.sorsa@turkuamk.fi

INTRODUCTION

Sustainability issues have set new challenges to be taken into account in global economy. In order to tackle environmental, social or economic challenges, interdisciplinary, proactive and outcome-oriented approaches are required from all actors of society (Sorsa 2008a; 2008b; 2009a; 2009b). So far the phenomenon has generated technological and economic innovations. This paper will focus on the innovations proliferated in the field of private regulation of sustainability and challenges it mirrors to higher education. This paper is based on research conducted in the field of proactive law (Sorsa 2009c; 2010a; 2010b; 2010c; 2011). Innovations in the field of law do not get as much attention as economic or technological innovations. Private regulation is an exception as the research on the proliferation of private regulation has been conducted in different fields.

The aim of this paper is twofold: first, the aim is to describe the concept of Proactive Business Law which captures the dynamic, enabling and empowering nature of private regulation. Second, the aim is to describe the new curricula (24 ECTS), Proactive management and Proactive business Law (PAM PAL), developed for Higher Education Institutions in the project funded by the EU Lifelong Learning, Curriculum development programme. The purpose

of this article is to share the development process, design and content of an interdisciplinary proactive management and proactive law curriculum that integrates business studies with legal studies while enlivening students' relationships through problem-based learning, case studies and student projects. PAM PAL plays a role by acting as a meeting point for students from different disciplines to study sustainability in an interdisciplinary and problem-based way.

Despite the academia's vital role in the success of any plan or strategy towards a sustainably developed society, there are still many barriers to the interaction inside the academia and between academia and the community in which it operates in. Business and legal curricula have so far been isolated islands focusing on strictly specialised areas of subjects. Law degrees have also been focused mainly on statutory law and court cases. The PAM PAL curricula changes the focus on society and sustainability and establishes education for sustainable development through university research, teaching and learning.

Empirical studies focusing on contracting capabilities (Haapio 2007; Sorsa 2009b; Nysten-Haarala 2008) and research on dynamic capabilities (Teece et al. 1997; Crant 2000; Eisenhardt and Martin 2000; Goerdel 2005; Pitt 2002; Sandberg 2007) have shown that proactive behaviour (Crant 2000; Sandberg 2007; Goerdel 2005; Pitt et al. 2002; Eisenhardt and Martin 2000) and initiatives become even more critical determinants of organisational success in Europe. In tandem, in the sustainability research field the importance of proactivity of frontrunner companies has become evident. As an outcome, these companies have created different new tools for solving global challenges either in co-operation with other companies or with non-governmental organisations. Non-governmental organisations have also developed new tools for solving global problems. They are called non-state-market-driven schemes (Sorsa 2011b). The importance of sustainability issues is ever growing both on the private sector (Deloitte 2011a; 2011b) and in the public sector.

PROACTIVE LAW AS A REGULATORY INNOVATION

Proactive law is an enabling, empowering and dynamic field of law which has emerged in the field of contracting and especially in the field of global private regulation in which new management tools for global value chains have been developed (Sorsa 2010b). These include self and private regulation instruments

and standards which have been developed in different business sectors, with non-governmental-organisations and in public-private co-operation. Private actors can be called as “law makers” and not only “law takers”. (Sorsa 2009c and 2010c¹).

Proactive law has been a topic of legal research during the last ten years in Finland and in the Scandinavian countries (e.g. Wahlgren 2006). In the core of this research has been to find out how the legal knowledge could better support businesses. Research was first focused on proactive contracting which highlights the use of contracts as a tool to prevent legal risks from emerging and to promote reaching the business goals (Haapio 2007; Pohjonen 2002 and 2005; Salmi-Tolonen 2005 and 2008). Empirical evidence, on the other hand, for the use or lack of use of legal knowledge for business success in Finnish companies was received during the “Corporate Contracting Capabilities” (CCC) project (2006–2009). The aim of the project was to recognise, discover and assess contracting capabilities as a method for supporting today’s business forms. The objective was to find out what is included in the contracting capabilities, how they can promote different business models and how they could be the source of competitive advantage for a company (Nystén-Haarala 2008; Sorsa 2009b). Needs for the development of contracting related competences was evident as an outcome of this research.

Research on the field of private regulation was carried out in the Proactive Law and Competitive Advantage² in 2009–2011 (Sorsa 2011). An emergence of corporate social responsibility (CSR) in society has brought other stakeholder groups in addition to contracting parties and new legal tools (Sorsa 2008a and 2008b) to the business agenda. The importance of legal environment for businesses has grown continuously over the last two decades (CEO Survey 2008, 56-57). The role of self-regulation (standardisation, code of conducts, code of ethics, general terms and conditions etc.) has become an important part of daily business especially in international context. In the multilevel, networked environment, companies need capabilities to manage these multilevel rule systems and the capability to use other tools in addition to contracts, in order to manage all the relevant relationships with their different stakeholders. The need to broaden the perspective from contractual relationships to value chain

1 The research of CSR and private regulation consisted of analysis of 42 self and private regulation systems and their role in global value chain management (Sorsa 2009d, 2010b and 2010c).

2 The project was funded by The Finnish Cultural Foundation.

management called for understanding the role of self and private regulation in managing the critical sustainability issues in global value chains (Sorsa 2008b; 2009d and 2010d). This also means that proactive management of contractual relationships is not enough.

The knowledge of future experts needs to be broadened towards the issues of private regulation and business ethics and their role in business management. The proliferation of private regulation in the context of sustainable business in global economy has brought out to the need to develop new proactive law competences (Sorsa 2011). There is also an ever growing need to implement sustainable management practices on company level.

The topic of so-called proactive management and proactive business law has not been in the curricula of law faculties or business schools. The complexity of real-world sustainability challenges and desires to train students for the emerging green workforce both suggest the need for developing core competencies and innovative educational practices. The role of institutions of higher learning is especially crucial in that they educate a great number of professionals and leaders of tomorrow's society. In addition to the basic knowledge of law and business, future managers need to be more proactive in combining business and legal knowledge, tools and skills. This has already been acknowledged by some business law professors and professionals (Tolonen 2007; Rudanko 2004; Lampe 2006; Compete&Collaborate 2008). Our new curriculum, developed in concert among seven European higher education institutions, focuses on what business managers should know about the proactive law and how they should learn it (Lampe 2006; Barton et al. 2006).

DESCRIPTION OF PROACTIVE MANAGEMENT AND PROACTIVE LAW CURRICULUM

Competences

The content for proactive management and proactive law competences have been developed as part of a curriculum development project: Proactive management and proactive business law (PAM PAL) funded by the EU Lifelong learning programme. The writer was the Sub Project Manager in the CCC project and Project Manager in the latter project. The seven project partners are from European law schools and business schools in four different

countries. One SME company is also involved. The partner institutions are: Hogeschool Utrecht (NL), Florida Centre de Formacia (ES), Aarhus School of Business (DE), FerensLegal (NL), ICN Business School (FR), Universidade de Santiago de Compostela (ES) and the University of Turku (FI).

The development of general competences for PAM PAL were developed based on research conducted in the context of CCC and PLA projects and in the context of the PAM PAL curriculum project. Two sets of competences, the general ones for proactive management and proactive law, and more specific ones for proactive contracting were developed. During the PAM PAL project we defined four general competences which characterise proactive behaviour in management and business law:

- 1) multidisciplinary analysis
- 2) cross-professional communication and networking
- 3) creative thinking
- 4) outcome orientation.

As an outcome of the CCC project the competences ‘contract contents’, ‘contract process’, ‘contractual relational capability’ and ‘contractual capability as organisational and personal proficiencies’ were defined (Sorsa & Salmi-Tolonen 2009).

The concept of personal competencies is quite broad, including not only technical skills or knowledge, but also those competencies that conform to the foundation and ruling principles of the professional activity. The professional activities in which our students will enter after passing our course might be in the field of general management, contract management, product management, CSR management, lawyering, marketing or accounting. One can see that the spectrum of the different professional activities is very wide. This means that we wanted to develop some general competences and some more specific ones for contracting.

Curriculum – 24 ECTS

The new curriculum involves the interdisciplinary integration of knowledge, insights, skills and practices from the business management and legal sciences directed to generate the PAM PAL competences. Our curriculum emphasises interaction, reflexivity and the integration of theory and practice

(Sorsa 2010e). It also aims to foster interdisciplinary collaboration between engineering, social sciences and law through problem-based learning opportunities. An interdisciplinary synthesis of concepts and praxis is more likely to generate innovative solutions to complex business challenges. Our curriculum development is concordant with the aims of the new higher educational European framework, which was created in 1999 with the adoption of the Bologna Declaration. One of the key elements of the reform is the establishment of a new learning model, in which the acquisition of competencies by the student is recognised as especially relevant. Therefore, the idea is that the student becomes more proactive and engaged already in his/her own education. This way, this acquisition of competencies reaches a new dimension.

The new curriculum of 24 ECTS consists of three teaching modules.

- 1) *Proactive law and prevention and resolution of disputes*
focuses on how companies can act as “private law makers” and not only “law takers”. The role of non-governmental organisations in relation to companies will be discussed. Alternative dispute resolution mechanisms and conflict management methods are presented and promoted instead of court cases.
- 2) *The proactive management and business ethics module*
focuses on proactive management and practices on the company level. This module concentrates on integrating sustainability to company practices as well as generating innovations.
- 3) *Proactive contracting and risk management*
gives insights into how contracting and private regulation can be used as an opportunity management and risk management tool in global value chain management. It also introduces concepts and tools for contract management.

Piloting the two modules of PAM PAL curriculum and using the teaching materials took place e.g. in autumns 2010 and 2011 in Turku University of Applied Sciences. One group of students consisted of international bachelor students, one of Finnish bachelor students, and two groups were Finnish students from the Master’s Degree Programme in Business Administration.

Several challenges accompany the efforts to implement an interdisciplinary curriculum. The PAM PAL curriculum is aimed for both higher education organisations of business schools as well as law schools. Obstacles to incorporating private regulation, self-regulation and other soft-law concepts and business concepts into legal education are challenging. Students with social sciences background may be disinclined or lack the confidence to study normative issues. We also offer these modules to engineering students. More generally, there are also challenges associated with implementing collaborative learning (Chau 2007) designs among students who identify with different disciplines. On the other hand, the elements that characterise the goals of these approaches are positive interdependence, individual accountability, group processing, social skills, and face-to-face interaction (Rosca 2005).

DISCUSSION

Proactive law competences are needed in order to succeed in the future business environment. Developing proactive management and proactive business law competences in an organisation is particularly crucial in global business networks.

After the first trials of implementing this curriculum and teaching materials developed for it, several questions arise: what approaches are the most effective strategies to develop problem-centred learning and the PAM PAL curriculum? What are the challenges and how can we overcome them?

Despite the efforts to develop an integrated curriculum of proactive management and proactive business law, broader educational trends have emerged as persistent obstacles, and possibly stifling innovation (Haigh, 2005). These trends include:

- increasing specialisation into narrowly defined academic disciplines, e.g. a law degree, business studies, engineering
- departmental and other institutional barriers to collaboration amongst faculty and amongst students
- ivory-tower teaching traditions that externalise the outside world are hindering scientific literacy. (Barlett and Chase, 2004; Godemann, 2008; Warburton, 2003).

It seems to be quite difficult to get a new curriculum to be integrated to a narrowly defined curriculum (e.g. law degrees in universities). There also seems to be different understandings and foci between the researchers about the content of the proactive law concept, especially researchers having only the law degree seem to consider the concepts and ideas of private regulation rather odd.

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TAKING RESPONSIBILITY

The Integration of Sustainability and Project Management

A.J. Gilbert Silvius

HU University of Applied Sciences Utrecht

gilbert.silvius@hu.nl

Jasper van den Brink

HU University of Applied Sciences Utrecht

jasper.vandenbrink@hu.nl

INTRODUCTION

Sustainability is one of the most important challenges of our time. How can we develop prosperity, without compromising the life of future generations? Companies are integrating ideas of sustainability in their marketing, corporate communications, annual reports and in their actions. Projects as instrument of change are crucial to sustainable development. Association for Project Management (ex-) Chairman Tom Taylor recognises that “Project and Program Managers are significantly placed to make contributions to Sustainable Management practices”. Furthermore at the 2008 IPMA World Congress, Vice-President Mary McKinlay stated “the further development of the project management profession requires project managers to take responsibility for sustainability”. It is for that reason inevitable that ‘sustainability’ will find its way to project management methodologies and practices in the very near future (Silvius et al., 2009). But how is this responsibility put to practice?

This paper explores the concept of sustainability and its application to project management. Based on the studies on the application of these principles in project management we will build the argument that the project management profession should take responsibility for not just for the process of delivering a project, but also for the content and the results of the project itself, including the sustainability aspects of that result.

In the last 10 to 15 years, the concept of sustainability has grown in recognition and importance. The pressure on companies to broaden its reporting and accountability from economic performance for shareholders, to sustainability performance for all stakeholders has increased (Visser, 2002). The recent world crises may even imply that a strategy focused solely on shareholder value is no longer viable (Kennedy, 2000). Following the success of Al Gore's 'inconvenient truth', awareness seems to be growing that a change of mindset is needed, both in consumer behaviour as in corporate policies. How can we develop prosperity without compromising the life of future generations? Proactively or reactively, companies are looking for ways to integrate ideas of sustainability in their marketing, corporate communications, annual reports and in their actions (Hedstrom et al., 1998; Holliday, 2001).

Sustainability, in this context, is defined as "Adopting business strategies and activities that meet the needs of the enterprise and its stakeholders today while protecting, sustaining and enhancing the human and natural resources that will be needed in the future." (International Institute for Sustainable Development, 1992).

The concept of sustainability has more recently also been linked to project management (Gareis et al., 2009; Silvius et al., 2009). Association for Project Management (ex-) Chairman Tom Taylor recognises that "the planet earth is in a perilous position with a range of fundamental sustainability threats" and "Project and Programme Managers are significantly placed to make contributions to Sustainable Management practices" (Association for Project Management, 2006). Also in academic research, the relationship between project management and sustainability is explored (e.g. by Gareis et al., 2009; Labuschagne and Brent, 2006; Silvius et al., 2009) as one of the (future) developments in project management.

But how does this attention for sustainability find its way to the shop floor? How is sustainability taken into account in project management processes, methodologies, competencies, etc.? If organisations 'put their money where their mouth is' on sustainability, its criteria and indicators will influence project management methodologies and practices sooner than later.

This paper explores the concept of sustainability and its application to project management. It aims to identify the responsibilities surrounding the integration of sustainability in project management.

THE CONCEPTS OF SUSTAINABILITY

The balance between economic growth and social wellbeing has been around as a political and managerial challenge for over 150 years (Dyllick and Hockerts, 2002). Also the concern for the wise use of natural resources and our planet emerged already many decades ago, with Carson's book "Silent Spring" (Carson, 1962) as a launching hallmark. In 1972 the 'Club of Rome', an independent think tank, published its book "The Limits to Growth". In the book, the authors concluded that if the world's population and economy would continue to grow at their current speeds, our planet's natural resources would approach depletion. The Limits to Growth fuelled a public debate, leading to installation of the UN 'World Commission on Development and Environment', named the Brundtland Commission after its chair. In their report "Our Common Future", the Brundtland commission defines sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (1987). By stating that "In its broadest sense, sustainable development strategy aims at promoting harmony among human beings and between humanity and nature", the report implies that sustainability requires also a social and an environmental perspective, next to the economical perspective, on development and performance.

The visions that none of the development goals of economic growth, social wellbeing and a wise use of natural resources, can be reached without considering and effecting the other two, got widely accepted (Keating, 1993). In his book "Cannibals with Forks: the Triple Bottom Line of 21st Century Business", identifies John Elkington, this as the 'triple bottom line' or 'Triple-P (People, Planet, Profit)' concept: Sustainability is about the balance or harmony between economic sustainability, social sustainability and environmental sustainability (Elkington, 1997).

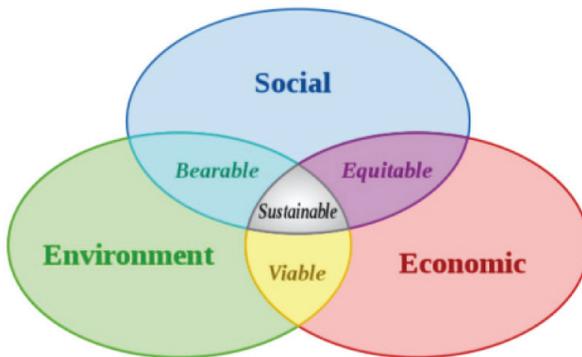


FIGURE 1. *The Triple-P concept of sustainability.*

Based on the concepts and standards described above, a number of key elements, or principles, of sustainability can be derived. For example Dyllick and Hockerts identify three “key elements of corporate sustainability”: Integrating the economic, ecological and social aspects into the firm’s strategy, Integrating short-term and long-term aspects and Consuming the income and not the capital. Gareis et al. define sustainability with the following principles (Gareis et al. 2011): economic, social and ecologic orientation; short-, mid- and long-term orientation; local, regional and global orientation; value orientation. The recent ISO 26000 guideline on social responsibility mentions accountability, transparency, ethical behaviour, respect for stakeholders’ interests, respect for rule of law, respect for international norms of behaviour and respect for human rights as ‘principles’ of sustainability. After considering these sets of elements or principles we conclude six ‘principles of sustainability’ that will be our guiding principles in the integration of the concepts of sustainability in projects and project management. (Silvius et al., 2012). These six principles of sustainability are the following.

Sustainability is about balancing or harmonising social, environmental and economical interests

In order to contribute to sustainable development, a company should satisfy all ‘three pillars’ of sustainability: Social, Environmental and Economic (illustrated in Figure 1). The dimensions are interrelated, i.e. they influence each other in various ways. One way of considering sustainability is to ‘balance’

social, economic and environmental aspects by trading off the negative effects of doing business for a somewhat lower profit. For example compensating CO₂ emission by planting new trees or compensating unhealthy work pressure by higher salaries. A more proactive approach to sustainability looks at how organisations create a ‘harmony’ of social, environmental and economic aspects in their activities. This approach is not about compensating bad effects, but about creating good effects (Silvius and Schipper, 2010).

Sustainability is about both short term and long term orientation

A sustainable company should consider long-term consequences of their actions, and not only focus on short-term gains. Especially firms listed on the stock market have overemphasised the importance of short-term gains, trying to increase performance from quarterly report to quarterly report, and thereby losing long term vision. This element focuses the attention on the full lifespan of the matter at hand. An important notion in this aspect is that the economical perspective, because of discount rates, tends to value short term effects more than long term effects, whereas social impacts or environmental degradation may not occur before the long-term.

Sustainability is about local and global orientation

The increasing globalisation of economies effect the geographical area that organisations influence. Whether intentionally or not, many organisations are influenced by international stakeholders whether these are competitors, suppliers or (potential) customers. The behaviour and actions of organisations therefore have an effect on economic, social and environmental aspects, both locally and globally. “In order to efficiently address these nested and interlinked processes sustainable development has to be a coordinated effort playing out across several levels, ranging from the global to the regional and the local” (Gareis et al., 2011).

Sustainability is about consuming income, not capital

Sustainability implies that “the natural capital remains intact. This means that the source and sink functions of the environment should not be degraded. Therefore, the extraction of renewable resources should not exceed the rate at

which they are renewed, and the absorptive capacity of the environment to assimilate waste, should not be exceeded.” (Gilbert et al., 1996). This principle is common knowledge in business from the economic perspective. Finance managers know that a company which does not use its income to pay for its costs, but instead uses its capital, will soon be insolvent. From a social or environmental perspective, however, the impact may not be visible in the short-term, causing degradation of resources in the long run. In order to be sustainable, companies have to manage not only their economic capital, but also their social and environmental capital.

Sustainability is about transparency and accountability

The principle of transparency implies that an organisation is open about its policies, decisions and actions, including the environmental and social effects of those actions and policies. This implies that organisations provide timely, clear and relevant information to their stakeholders so that these stakeholders can evaluate the organisation’s actions and can address potential issues with these actions. The principle of accountability is logically connected to this. This principle implies that an organisation is responsible for its policies, decisions and actions and the effect of these on environment and society. The principle also implies that an organisation accepts this responsibility and is willing to be held accountable for these policies, decisions and actions.

Sustainability is about personal values and ethics

As discussed earlier, a key element of sustainability is change. Change towards more sustainable (business) practices. As argued by Robinson (2004) and Martens (2006), sustainable development is inevitably a normative concept, reflecting values and ethical considerations of the society. Part of change needed for more a sustainable development will therefore also be the implicit or explicit set of values that we as professionals, business leaders or consumers have and that influence or lead our behaviour. GRI Deputy Director Nelmara Arbex puts it simple and clear: “In order to change the way we DO things, we need to change the way we VIEW things”.

These sustainability principles provide guidance for the analysis of the impact of the concepts of sustainability in projects and project management in the following section.

SUSTAINABILITY IN PROJECT AND PROJECT MANAGEMENT

The concepts of sustainability have only recently been linked to projects and project management (Gareis et al., 2009; Silvius et al., 2009). We consider projects as temporary organisations (Lundin and Söderholm, 1995; Turner and Müller, 2003) that deliver (any kind of) change to organisations, products, services, business processes, policies or assets. These project-organised changes, or simply projects, are characterised by:

- a temporary nature or temporary organisation
- most often across organisational structures and boundaries
- a defined deliverable or result, logically or preferably linked to the organisation's strategy or goals
- specified resources and budget.

In this definition, projects are, as temporary organisations, related to a non-temporary 'permanent' organisation, and realise changes that benefit the strategy or goals of this organisation. The permanent organisation utilises resources and assets in its operational business processes to deliver benefits or value to its customers and ultimately deliver business performance (e.g. profit, market share, return in capital, etc.) to the organisation and its stakeholders. Its activities are based on goals that are developed or set in a strategic management process.

The strategic management of the organisation, however, not just includes setting goals. It also includes evaluating the business performance of the organisation against these goals. If the performance is satisfactory, the operations may continue. But if the performance is unsatisfactory, because of lack of performance or because of changing goals, there may be reason to change something in the organisation. In that case, a temporary organisation, in the form of a project, is commonly used to create this change. The change may concern the resources, assets or business processes of the permanent organisation, but also the products/services rendered or the internal policies and procedures. The selection of the 'right' changes for the organisation is usually part of a process called 'portfolio management'. Figure 2 illustrates this relationship between projects as temporary organisations and the permanent organisation.

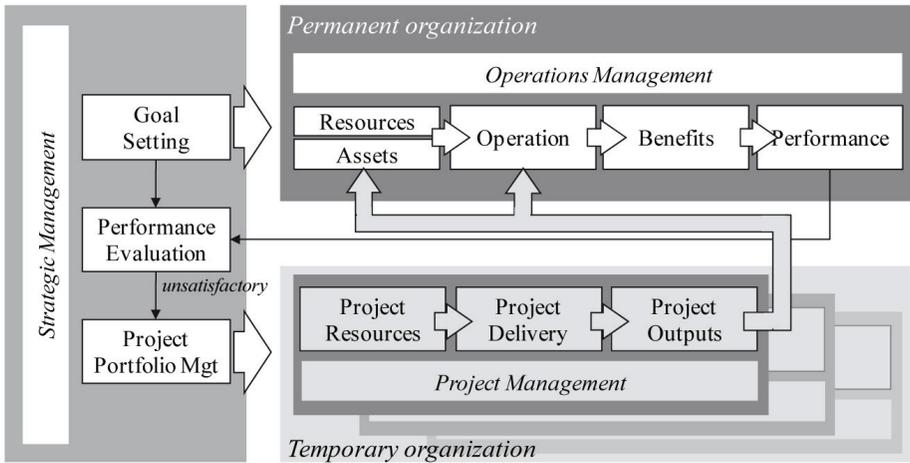


FIGURE 2. Project as temporary organisations that deliver changes to the permanent organisation.

Elaborating on the view of projects as instruments of change, it is evident that a (more) sustainable society requires projects to realise change. In fact, this connection between sustainability and projects was already established by the World Commission on Environment and Development (1987). However, Eid concludes two decades later that the standards for project management “fail to seriously address the sustainability agenda” (Eid, 2009). Given the temporary nature of projects this may not be surprising. Projects and sustainable development are probably not ‘natural friends’. Table 1 illustrates some of the ‘natural’ differences in the characteristics of the two concepts.

TABLE I. The contrast between the concepts of Sustainable Development and Projects.

Sustainable Development		Project Management
Long term + short term oriented	↔	Short term oriented
In the interest of this generation and future generations	↔	In the interest of Sponsor / Stakeholders
Life-cycle oriented	↔	Deliverable/result oriented
People, Planet, Profit	↔	Scope, Time, Budget
Increasing complexity	↔	Reduced complexity

The relationship between sustainability and project management is still an emerging field of study (Gareis et al., 2009). Some first studies and ideas were published in recent years. And although the studies differ in approach and depth, a few conclusions can be drawn.

Conclusion 1:

Sustainability is relevant to projects and project management

As stated in the introduction of this chapter, APM's (past-)chairman Tom Taylor was one of the first to suggest the project management community to familiarise themselves with the issues of sustainability, recognising that more should be done to contribute to a more sustainable society (Association for Project Management, 2006). This appeal was the output of a small working party in APM that recognised that project managers were not well equipped to make a contribution to sustainable development and decided to investigate this issue.

On the 2008 European conference of the Project Management Institute (PMI), Jennifer Russell elaborated on what Corporate Social Responsibility means for project managers (Russell, 2008). She pointed out that a project manager, being in the frontline of new or changed activities within an organisation, is perfectly positioned to influence the organisation's operations towards greater sustainability. Russell also argued that this position is not without responsibility, both for the organisation as for the project manager. She concludes that "Corporate social responsibility is too big an issue to leave to someone else to address."

Conclusion 2:

Integrating sustainability stretches the system boundaries of project management

In some of the first publications on sustainability and project management, Carin Labuschagne and Alan Brent of the University of Pretoria link the principles of sustainable development to project life cycle management in the manufacturing industry (Labuschagne and Brent, 2006). They suggest that the future-orientation of sustainability implies that the full life cycle of a project, from its conception to its disposal, should be considered. Elaborating on this life cycle view, they argue that when considering sustainability in project management,

not just the total life cycle of the project (e.g. initiation-development-execution-testing-launch) should be taken into account, but also of the ‘result’ the project produces, being a change in assets, systems, behaviour, etc. This result, in their words: the ‘asset’, should also be considered over its full life cycle, being something like design-develop-manufacture-operate-decommission-disposal. And taking the life cycle view even further, also the life cycle of the product or service that the asset produces should be considered. Figure 4 visualises how these three life cycles, ‘project life cycle’, ‘asset life cycle’ and ‘product life cycle’, interact and relate to each other. Including sustainability considerations in projects therefore suggests that all three life cycles are considered.

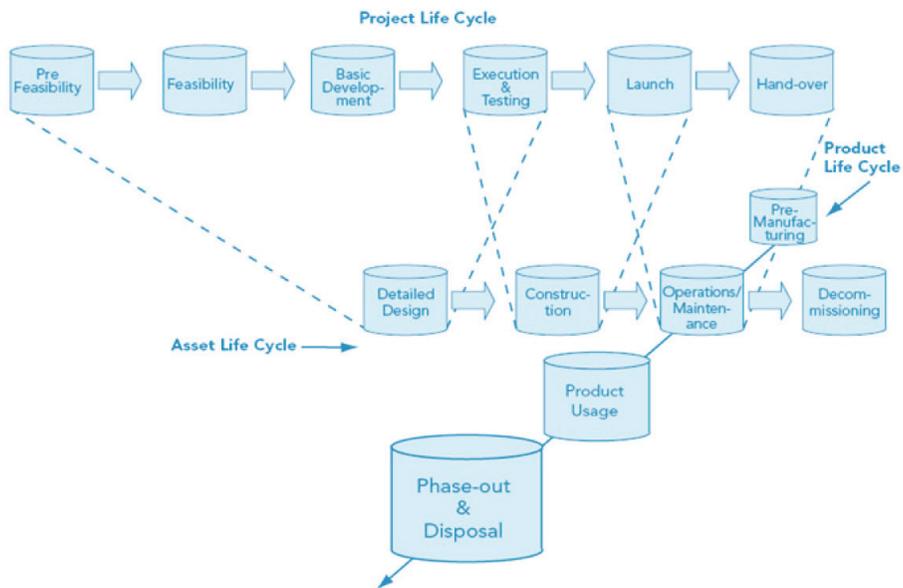


FIGURE 3. *Interrelating life-cycles (Silvius et al., 2009, based on Labuschagne and Brent, 2006).*

Because Labuschagne and Brent include the result of the project, the asset, in their framework, it is sensitive to the context of the project. The general insight gained from their work, however, may be that integrating sustainability in projects should not be limited to just the project management processes. It suggests that also the ‘supply chain’ of the project is to be considered, including the life cycle of whatever result the project realises and also the life cycle of the resources used in realising the result.

Conclusion 3:

Project management standards fail to address sustainability

This conclusion was most clearly drawn by Mohamed Eid in the 2009 book “Sustainable Development & Project Management” (Eid, 2009). Eid studied the integration of sustainable development in construction project management. Some conclusions from his study:

- Project management is an efficient vehicle to introduce a more profound change, not only to the construction industry’s practice, but more importantly to the industry’s culture.
- Project management processes and knowledge fall short of committing to a sustainable approach.
- Mapping sustainable development onto project management processes and knowledge areas, identifies opportunities for introducing sustainability guidelines in to all project management processes.

It should be mentioned, that ‘help may be on its way’ with regards to the integration of the concepts of sustainability into project management standards. For example, Taylor elaborated on his earlier appeal to the project management profession (Association for Project Management, 2006), by publishing ‘A Sustainability Checklist for Managers of Projects’ (Taylor, 2008). This checklist contains a list of suggested considerations for project managers, with which they can incorporate sustainability aspects in their projects. And although the checklist lacks a systematic approach to the concepts of sustainability, it is a meaningful attempt to translate the ‘abstract’ concepts of sustainability to the daily work of the project manager.

Conclusion 4:

The integration of sustainability may change the project management profession

The 2010 IPMA Expert Seminar ‘Survival and Sustainability as challenges for projects’, featured several papers and discussions on the integration of sustainability in projects and project management (Knoepfel, 2010). The conclusion of this seminar was that the influence of the project manager on the sustainability aspects of his or hers project at hand is substantial, regardless

whether he/she actually bears responsibility for these aspects. This conclusion may actually change the nature of the project management profession. From a managerial role aimed at realising delegated tasks, it may need to develop into a more advisory role with autonomous professional responsibilities and aimed at the right organisational changes.

The studies summarised in this section illustrate the current state of knowledge on sustainability in projects and project management. The current state of research on sustainability in projects and project management is mostly interpretive, giving meaning to how the concepts of sustainability could be interpreted in the context of projects, rather than prescriptive, prescribing how sustainability should be integrated into projects. However, the studies also include a vision. A vision on the development of project management as a profession. IPMA Vice-President Mary McKinlay stated in the opening keynote speech of the 22nd World Congress of the International Project Management Association (IPMA) in 2008, that “the further development of the project management profession requires project managers to take responsibility for sustainability” (McKinlay, 2008). In this vision, project managers need to take a broad view of their role and to evolve from ‘doing things right’ to ‘doing the right things right’. This implies taking responsibility not just for the process of delivering a project, but also for the content and the results of the project itself. Including the sustainability aspects of that result.

CONCLUSION

Projects can make a contribution to the sustainable development of organisations. It should therefore be expected that the concepts of sustainability are reflected in projects and project management, and although some aspects of sustainability are found in the various standards of project management, it has to be concluded that the integration of sustainability in projects and project management is not fully recognised yet.

The emerging studies on the integration of the concepts of sustainability in projects and project management point out that although the actual responsibility for sustainability may differ by project, the project manager always will have a decisive or influencing role. The project management profession should therefore also take responsibility for a more sustainable future.

Elaborating on this professional responsibility, it should, however, also be noted that still a lot of work has to be done on the implications of Sustainable Project Management and that there is a growing need of expertise, criteria and concepts to practically implement the concept in the management of projects.

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NETWORKING GLOBALLY FOR SUSTAINABLE DEVELOPMENT

Small Actions in Finland, Swaziland, Vietnam and Brazil

Jari Hietaranta

Turku University of Applied Sciences

jari.hietaranta@turkuamk.fi

Jenni Koivisto

Karlstad University

jenni.koivisto@kau.se

INTRODUCTION

The Degree Programme in Sustainable Development at Turku University of Applied Sciences (TUAS) has been creating a global network of partners for student and teacher mobility as well as for joint projects and research. One basic concept of sustainable development is to "think globally, act locally". Working globally offers opportunities to learn about different ways of working, and about different environments and different ways of solving problems at local level. It also helps us to teach our students to work in multi-cultural and multinational environment and to accept views other than our own. For students and staff alike it can be an eye opening experience to see social, economic and environmental problems and solutions in another environment. Teacher exchange provides the students with a change to their normal studies and "internationalisation at home".

The common theme in this paper is the participation and empowerment in small communities, something that is important when striving towards sustainable development. Turku University of Applied Sciences is involved in several development or management projects in developing countries. The Degree Programme of Sustainable Development has focused its resources into three geographical areas; Southern Africa, Vietnam and Brazil.

Although quite diverse in cultural and social aspects, there are also common aspects within the areas. Vietnam, for instance, is a neighbour to China, Taiwan and Malaysia and the very intensive growth of economy of these newly industrialised counties (NIC) is also boosting the economy of Vietnam. Vietnam is going through the same kind of total restructuring of the economic infrastructure like China and the other South-East Asian countries.

Southern African countries have had long tradition of co-operation within SADEC (South African Development Community). South Africa is the dealing economy and any changes in its economy will affect the economies of Swaziland, Botswana, Namibia, Mozambique, Lesotho, Malawi, Zambia and Tanzania. HIV/AIDS is a huge problem and climate change is going to affect southern Africa in a very remarkable way – all these have a direct or indirect influence on the communities.

Brazil is a major emerging NIC with vast areal and regional variations. In Brazil, the cooperation is concentrating on the South-East part of the country. This area, Rio Grande do Sul, is one of the most prosperous areas of the country, although it is now facing problems with a loss of jobs and emigration.

Our projects in Vietnam, Swaziland and Brazil are largely concentrated on the environment and development with a focus on participation and empowerment in small urban or rural communities. Remarkable social changes resulting from migration, basic changes in economy and cultural values have created the need to strengthen small communities, no matter if they are situated in urban or rural areas. Universities form a base for almost all our cooperation. The universities and academics often have quite a few contacts with surrounding local non-governmental organisations (NGOs) and other organisations, which again are good partners for more practical projects. It is our wish that the projects further help the local institutions to notice the need for cooperation with local level communities.

TABLE I. *Co-operation and main partners.*

Country	Main partner
Swaziland	Salvation Army in Swaziland Mbabane City Council University of Swaziland
Vietnam	Haiphong University Cat Ba National Park Cat Ba town Administration local villages
Brazil	University of Caxias do Sul

THE NEED FOR CAPACITY BUILDING AND EMPOWERMENT IN SMALL COMMUNITIES

According to Bonfignoli (2007), despite of all the problems and treats seen in semi urban areas, there are also quite sophisticated survival and initiative skills that can be improved. The improvement of initiatives develops when it is learned how to unionise the disadvantages and how to earn one's keep by oneself. Mougeot (2005) points out that even though community citizens might suffer from low living standards, these communities (villages, townships) may develop as centres of information, ingenuity and collaboration which can be a useful tool for positives development activities and empowerment (Picture 1).



PICTURE 1. *Official waste management in small communities is lacking. It gives good possibilities for local communities to improve the environment and may also benefit local people economically. Photo from the Gia Luoan village in Vietnam. (Photo by Jari Hietaranta)*

The challenges in development planning and work in communities are various. Perkiö (2009) emphasises that small urban slums or townships possess a multitude of socio-economic and environmental problems which are still underestimated. Rural villages or rural-urban (rurban) communities face the same kind of problems but they are more linked with fast socio-economic changes. Our projects will, therefore, focus on participation and empowerment of these communities to confront these changes.

TOURISM DEVELOPMENT PROJECT IN CAT BA ISLAND, NORTHERN VIETNAM

Tourism is and will be an important part of the way people spend their leisure time and holidays. The increase in leisure time and the possibility to travel long distances quicker and cheaper than before have increased the demands for travel tourism. It is one of the biggest industries in the world, it affects large portions of the economies in many countries, and it is the only economic hope for some developing countries (Picture 2). Some developed countries are also heavily dependent on the tourism business. However, the tourism industry had also to face global environmental and social changes, and this has, in some areas, led to the development of more sustainable tourism.

According to Davidson (2005) tourism is the largest peaceful movement of people across cultural boundaries in the history of the world. Telfer and Sharpley (2008) define tourism in a more conventional way as temporary short-term movement of people to destinations outside the places where they normally live and work and their activities during their stay at these places. Tourism has become one of the most powerful yet controversial socio-economic forces. It is widely recognised as the world's biggest industry and provides around 230 million jobs worldwide. The year 2007 saw a record of 898 million international tourist arrivals and its annual growth rate still increasing from 2 to 4% (Telfer & Sharpley 2008). South and South East Asia have the fastest growth rates in the tourism industry. From the social point of view, tourism industry has recently undergone changes that make the environmental impacts even more significant. Although the traditional tourist destinations still attract conventional travellers, new destinations in, typically, further locations and in developing countries are brought to the tourism market.



PICTURE 2. *New hotels emerging on the narrow coastal strip at Cat Ba town. Hotels are gaining more and more space and old traditional housing areas are forced to move on steep hill slopes. (Photo: Jari Hietaranta)*

The term sustainable tourism is hard to define. Tourism can never be fully sustainable or contribute to sustainable development. Thus, sustainable tourism can be understood to be the kind of tourism that takes its overall impact into consideration and tries to minimise any negative consequences. Conventional tourism can never be truly sustainable but equally the sustainability of some new alternative forms of tourism is perceivable (Hietaranta, forthcoming).

The link between Turku and Haiphong in Northern Vietnam was established in 2008 when there was a growing interest towards Asia at TUAS. The common theme, around which the cooperation is built, is ecotourism. Common factors are unique archipelagos which are partly protected and where the economic, natural and social values are conflicting. The research area, Cat Ba Island, offers an excellent opportunity to research the expansion of tourism, human and ecological resources and changes. The island is also part of the UNESCO Man and Biosphere Reserve Area. The cooperation started in 2009 with a mobility programme and capacity building element with the Haiphong University and

the Cat Ba Nature Reserve. The idea is that future development cooperation projects will be easier to implement once there is some common ground, common concepts and the partners know each other better (Hietaranta, Hillgren & Koivisto, forthcoming).

Vietnam is still behind in tourism industry compared to its giant neighbours such as Malaysia, Thailand or China. The pressure for tourism development in Vietnam is strong. Vietnam owes a lot of potential for tourism – both conventional and sustainable. In their development strategy, tourism is seen as one of the key branches to move the country among medium scale countries based on gross national product (GNP). Owing to this growth the Vietnamese government is heading to a quick and not properly planned decision to fulfil the needs of both national strategies and the growing needs of tourism. Therefore, development planning and activities in Cat Ba Island are becoming more and more relevant. Already it is seen that the local villages and Cat Ba Nature Reserve are more or less on the margin in respect of economic development (Pictures 3 and 4).



PICTURE 3. Information table at Cat Ba National Park. No investments have been made for National Park in spite of its worldwide importance. (Photo: Jari Hietaranta)



PICTURE 4. *In Cat Ba town lots of investments has been made for new hotels. Our research revealed that the infrastructure in the town is poor and not ready for the sudden increase of tourists. (Photo: Jari Hietaranta)*

However, recently there has been more discussion of community based tourism development in Vietnam. Especially, along the coastline in the northern part of Vietnam attempts to establish more sustainable tourism are seen. Turku University of Applied Sciences has started a co-operation project in Cat Ba Island together with Haiphong University and local administration and communities (Hietaranta, forthcoming).

In this case the attempt is to encourage local communities to be more aware about the economic benefits and potential of the products and that tourism can offer. On the other hand, we try to encourage local administration to start actions and projects that will lead to more sustainable development of infrastructure in the villages and Cat Ba town, nature conservation and economic development. The problem, so far, has been that the areal planning is highly centralised (in Haiphong) and sectorial on various planning levels. Challenges are huge when combining rapid urbanisation linked with immigration and increasing tourism masses and nature conservation.

The spreading of new hotel areas and new urban settlements elsewhere on the island and the adaptation of old urban structures to the growing population needs innovative planning and adaptation of old knowledge to fit in the new environment. In this project we are trying to empower local villagers through participatory approach. This social learning approach is vital when planning and implementing different kinds of development ideas into practise. We are discussing people's values in connection to their environment and, at the same time, making those values explicit to them (Hietaranta, forthcoming).

So far, we have collected basic data concerning strategic planning, tourism development initiatives, infrastructure and environment in the field. We have interviewed local villagers, representatives of local administration and researchers of Cat Ba Park Reserve (Hietaranta 2012). Field work will continue during next spring and Haiphong University will take more responsibility for this work. An intensive course next spring (2012) will concentrate more on economic aspects of tourism development and sustainability.

Ideally this will lead to well-managed community based tourism that benefits the local people but can also lead to the outsourcing of tourism products and services. We hope we can achieve some common ground, common concepts and that the partners (local & Haiphong administration, local communities, Cat Ba National Park and Haiphong University and private stakeholders) operating know each other better.

DRY SANITATION AND ENVIRONMENTAL HEALTH EDUCATION PROJECTS IN SWAZILAND

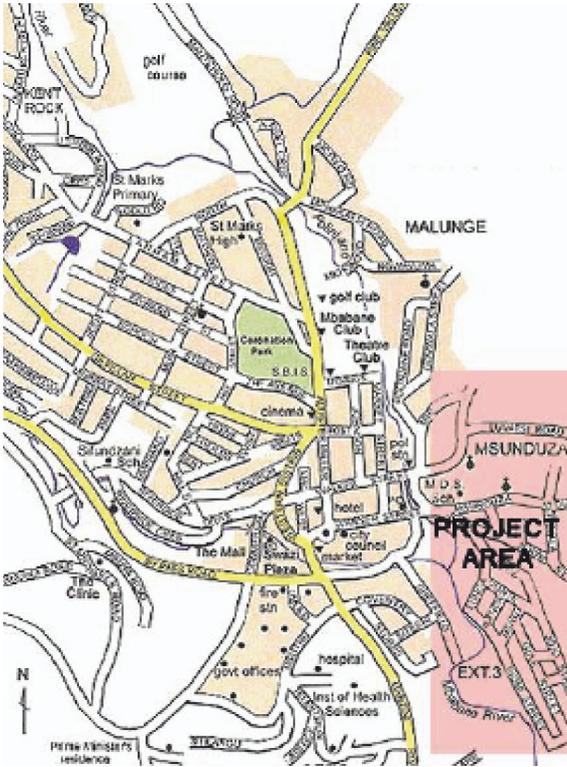
TUAS started operating in Swaziland almost two decades ago. The Degree Programme in Sustainable Development joined in 2003, and permanent links and project work were established a year after. Currently there are many types of activities with a variety of partners, including NGOs, municipal authorities and the local university. The work is quite practical, concentrating on development of a few key areas, these being sanitation, environmental health and environmental education, respectively. The cooperation link provides the students with possibilities for practical training, exchange and thesis work.

Msunduzi is the oldest and largest township in Mbabane, the capital of Swaziland (Picture 6). In this area we have two ongoing projects that are linked with each other. Msunduzi township is a semi urban, partly informal settlement of about 15,000–18,000 people. Msunduzi has some of its typical general characteristics like mountainous terrace, soil and terrain erosion as well as poor infrastructure and temporal housing material, lack of sanitation and waste management. However, the area is not uniform with respect to income or basis of residency, among other aspects. The area is divided into six communities with their own local leadership committees. The six communities are “formal”; in other words, those living areas are officially accepted by the City Council and the areas are served with tap water, sewer lines and waste management, for example. There are also informal residential areas within Msunduzi. They are largely without infrastructure and services from the city. They are also without any legal status and thus can be targets for clearance.

In Msunduzi township, the prevalence of HIV positive people is high. The figure may be even higher than in Swaziland in general, where the prevalence is the highest in the world. It is estimated, depending on the source, being approximately 26 per cent (2009 figure, age group 15–49) of the population (Unicef 2012). Other health problems also prevail, one of the most common and severe being diarrhoea (Koivisto 2005; 2010).

In the Msunduzi Dry Sanitation Project, TUAS has promoted dry sanitation and safe sanitation practices since 2007 together with the Global Dry Toilet Association of Finland (GDTF) and the Salvation Army in Swaziland. The Environmental Health Education Project started already in 2004 and it is carried out jointly with the City Council of Mbabane and the City of Salo. Close cooperation with the local community and years of work has provided us with intimate knowledge of the area.

The main goal of the Msunduzi Dry Sanitation Project is improved sanitation hygiene in the area and people’s increased knowledge of the importance of sanitation and hygiene. During the project, pilot dry toilets have been built for meeting points and other public places as well as for households with no access to proper sanitation. In addition to the construction work, education in various forms have been a major tool in making people aware of the importance of safe sanitation. This has been mainly done by training a group of local people to work as “Sanitation Experts”, who then distribute the information by using various methods and both of the official language of the country (Picture 6).



PICTURE 5. Msunduzi is the oldest and biggest township in Mbabane, situated in the vicinity of the city centre. (Koivisto 2005)



PICTURE 6. One of the main activities of the project is to train local people to give information about sanitation. (Photo: Leena Akatama)

An important objective is that the whole project area and its inhabitants would be inspired by the project and that the safe and sustainable sanitation practices would eventually be obtained by all inhabitants of Mbabane city. The Mbabane City Council is keen on taking further steps in broadening the project area.

Another aim of the project is to inspire people to use composted toilet waste as a fertilizer – to improve the livelihood for poor families and newly urbanised immigrants. Most cultivated crops are maize and leafy vegetables. We have found out that roughly 20% of the surveyed households produce some of their own food (Oikarinen-Mapengo 2011). With increasing crop, the household would be able to sell the surplus in the local markets.

The main objectives of the project are listed below:

- Increased number of improved sanitation solutions in the project area
 - Increased number of built and repaired toilets that are hygienic to use and safe for the environment and the user.
- Increased knowledge on sanitation in different levels
 - Information and knowledge created in individual, project organisation, and national level. The individuals in the community need information on safe sanitation and on how to make it, on gardening, composting and construction, for example. The partner organisations gain experience and knowledge about implementation the project, which can be disseminated to the wider audience. In national level operates the possible participants that get training on sustainable sanitation systems through the project.
- Increased participation in the project area
 - This is strongly linked with prevailing attitudes in the community that the project wants to enhance: to respect ones neighbours by not throwing toilet waste on their yard, to respect and take care of the common facilities, such as toilets on meeting places and sports grounds. The community members are also hoped to take actively part in toilet construction, workshops, to creating own gardens, composting and taking care of their living environment.
- Increased composting and home gardening in the project area.

As mentioned earlier, the project is being implemented in the community level. Whilst NGOs and donors assisting the local governance with development projects and ideas do not always have the same views as the government, these issues have been taken into account when planning the project: it is in line both with Finland's development policies as well as Swaziland's development strategies, such as the poverty reduction strategy.

The local government is often detached from the real situation, although there may be several strategic and general management plans about e.g. sanitation. Thus working in collaboration with the local governance (in this case the Mbabane City Council), the partner NGO and the unofficial but influential "Central Committee of Msunduzi" has been vital for the implementation of the project and has improved the project procedure.

It seems clear that the educational module of the project has been critical, as the message of a new type of toilet and its application to improve health and the environmental state has created a demand for the toilets. The beginning of the construction phase was slow. Although there was an interest in dry toilets, some cultural and sociological aspects hindered the actual setup of toilets.

The *Environmental Health Education Pilot Project (EHEP)* in Msunduzi (Figure 1.) has been ongoing since 2004. The project was initiated due to growing concern of poor environmental health and various environmental problems. Safe environment and good environmental health decreases the occurrence of opportunistic diseases, which, in turn, have a direct impact on the HIV/AIDS mortality rates.

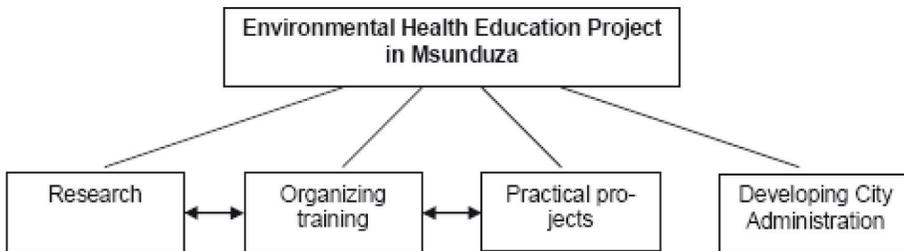


FIGURE 1. *EHEP* project tries to combine the needs of local people and voluntary work associated with the help from local City Council (Adapted from Koivisto 2005).

The project started with quite a comprehensive baseline study in 2004–2005 with an aim to get a good idea of the current state of environment, services, knowledge base, social structures (for example power and gender relations) and the greatest needs in the area. The research revealed, for instance, that a variety of sanitation solutions were in use in the area. In the formal residential areas, almost 70% of the households were connected to the sewage system and had a water closet. In the unofficial area, only 10% had a water closet, of which only 8.6% were connected to the sewage system (see Figure 5) and the rest use the traditional pit latrine.

In certain areas, like in the densely populated Mntulwani Community, households use their neighbours’ toilets, the bucket system or the so-called flying toilet in which the faeces are disposed in nature in a plastic bag causing both social and environmental problems. The same problem is associated with septic tanks, as leaks are numerous. Pit latrines are numerous as well. The problem with them is that within 2–3 years there will be a need to move the pit latrine to a new place, and it is difficult in densely populated areas. (Koivisto 2005; Akatama 2008.)

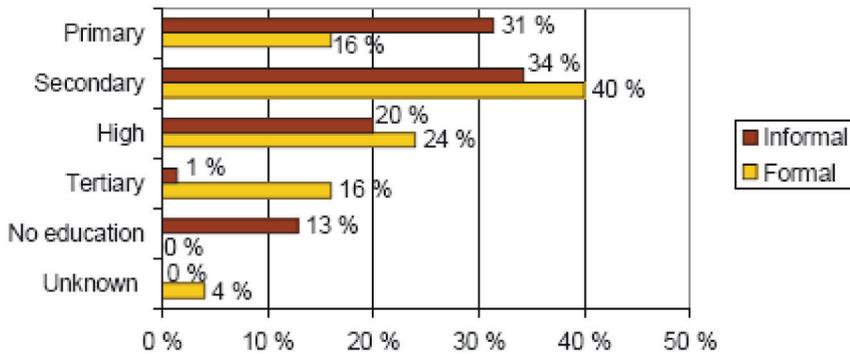


FIGURE 2. Education level in Msunduzwa area (Koivisto 2005). The education level is remarkably high.

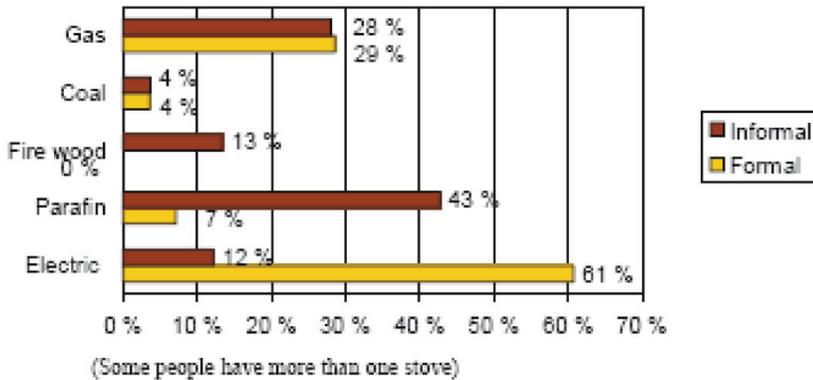


FIGURE 3. Sources of energy (Koivisto 2005).

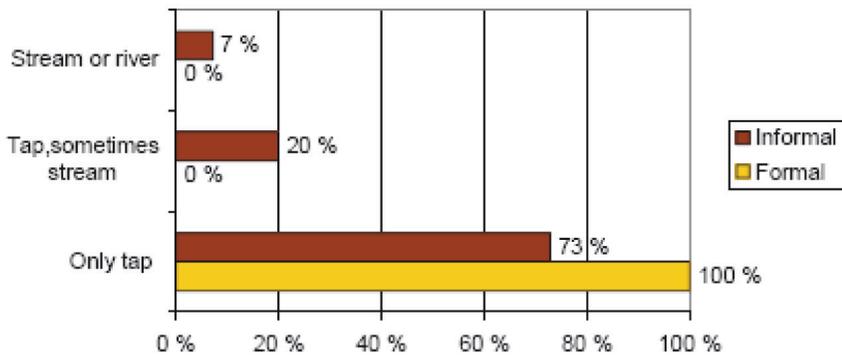


FIGURE 4. Sources of water supply (Koivisto 2005).

Areas like the Msunduzwa township are common and growing due to insufficient rural livelihood and migration to urban areas. The HIV epidemic has had an extremely severe effect on the country’s economy development and social structure. All these effects can be seen in Msunduzwa, too. Sanitation is a necessity for a good quality of life. The reality, however, in the world today is that only half of the population has access to adequate sanitation. Lack of safe toilet facilities brings infectious diseases, child mortality, low productivity, inequality, insecurity, degradation of the environment and poverty (Figure 5).

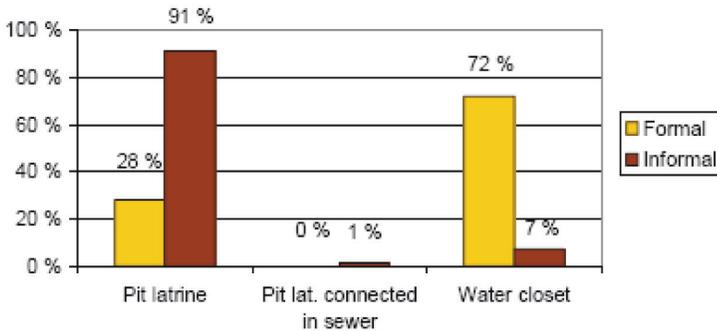
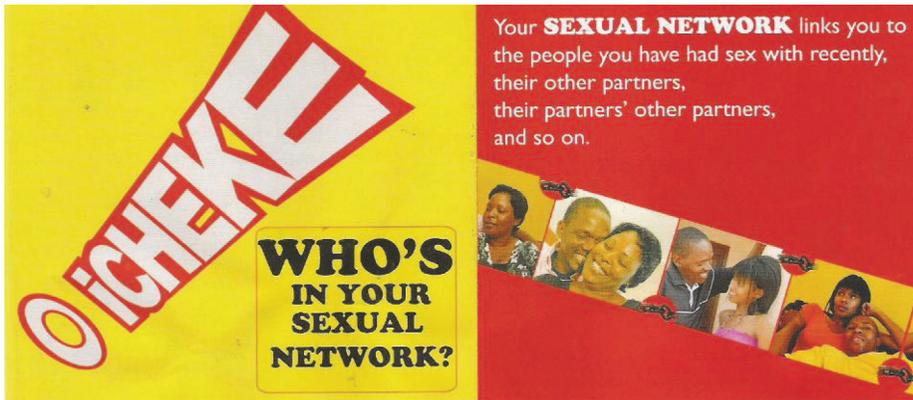


FIGURE 5. *Informal settlement lack water closets almost totally. Thus the dry sanitation project concentrates more on informal communities (Koivisto 2005).*



PICTURE 7. *HIV campaign material (Source: The Monitor, <http://allafrica.com>).*

The main activities under the environmental health project have been:

- Distribution of information on environment, environmental health, gardening and composting through various channels including school assemblies, theme days, clean up campaigns, flyer distribution, workshops and comics. Community activists of Msunduzi have had a key role in disseminating the information within the community.
- Establishment of a Waste Information Centre for the centre of Mbabane to serve all inhabitants in waste related questions.

- Establishment of school recycling points for selected schools in Msunduzi. This successful idea was further copied to other schools in Mbabane.
- Establishment of Msunduzi Community Recycling Centre; this is a pilot concept that is being tested for the first time in Swaziland. It is run by the community members and the money from sold recycling material goes directly back to the community.

Both of the practical projects as well as the mobility programme between TUAS and the University of Swaziland have provided the students with great opportunities to learn and work in the context of a developing country. In addition to cultural learning, the projects offer possibilities for practical training and thesis work. Thus far five students have done their bachelor theses under the two projects and two more are under preparation. In addition, a number of research and management papers have been produced. There are also some other theses and other student works that deal with development issues, but they are not directly linked with a certain area or region. We are also looking for new development projects in e.g. Botswana and Tanzania. These project ideas are at their initial stage.

THE BEGINNINGS OF COOPERATION IN BRAZIL

The connection to southern Brazil was established in 2005 through a mobility programme (Alfa II) where both TUAS and the University of Caxias do Sul (UCS) participated in. Thus far the cooperation has concentrated on the mobility of academics and students between the two institutions. However, mobility can be useful as a beginning for fruitful and long-lasting projects, as has happened with Brazil. Researcher exchanges were an important stepping stone for further collaboration between the institutions. It has led to both teacher and student mobility and planning on joint research and development projects.

There is a great interest and many common R&D themes around which future joint projects will be created, including waste management and wastewater treatment. One fieldwork carried out in Brazil led a PhD study in Finland on eco-efficiency, yet another joint interest area. Because of the similar interests, R&D projects and results of the two universities have been presented in various conferences in both countries, which has also fostered further cooperation.

UCS has worked with recycling, waste management and waste water treatment with good results (Koivisto 2006). This opened interesting opportunities for collaboration, as the thematic area and contextual conditions are similar to those worked in Swaziland. A study of community based low cost recycling systems in Brazil was carried out to see if the practices could be adapted in our project area in Swaziland. Similarly an exchange student from Brazil was working as a project assistant for the Msunduzi Dry Sanitation project, which is a good example of joint interests and knowledge base as well as the benefits of cooperation.

CONCLUSIONS AND CHALLENGES IN THE FUTURE

In our long term strategy, we see that all these projects can benefit the local institutions as well as local communities. We try to find possibilities and tools for adding people's means of livelihood and at the same time, care for the environment and ecological sustainability. We hope to continue and deepen our cooperation in research and mobility in the future, because the same problems between ecological, social and economic aspects are everywhere.

The common denominator of the challenges in the implementation of the project is the lack of capacity. Capacity building is seen as human resource development, the process of equipping individuals with the understanding, skills and access to information, knowledge and training that enables them to perform effectively. In all cases the participation is low. The areas are inhabited by people with little sense of belonging or community; they are struggling to find means to make a living. Thus, volunteer work or activism is not a top priority. More straight benefits to families are needed. Local coordination and the absence of dialogue between locals and local administration are lacking or they are poor in every case. In communities, the struggle over power has also led to many conflicts and reluctance to work together. Especially in Msunduzi conflict management is needed. In Vietnam the competition in tourism business is so high that co-operation is difficult to build. The administration is very complicated and corrupt.

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DEVELOPING A NEW CURRICULUM FOR ENERGY ENGINEERING AT THE HU UNIVERSITY OF APPLIED SCIENCES UTRECHT

Martijn G. Rietbergen

HU University of Applied Sciences Utrecht

martijn.rietbergen@hu.nl

INTRODUCTION

Curricula in higher education are constantly subject to change, especially those curricula that educate people in the dynamic field of energy and sustainability. The aim of this paper is to describe the process of developing a new curriculum in energy engineering, called ‘Advanced Energy Technology’, at the HU University of Applied Sciences Utrecht. The development of the new curriculum started in the end of 2008 and builds forth on preliminary work by Blokland Visser (2007). The new curriculum became effective in the university year 2009–2010. In the following section we will describe the main drivers for developing this new curriculum in ‘Advanced Energy Technology’. Next, we will shortly describe the methodology that we have applied to develop the curriculum and to incorporate the concept of sustainable development in the curriculum.

In the results section we will first present an analysis of the various expected professions of energy engineers in the energy system. Second, the competences that these engineers must obtain during their study programme will be presented. Third, we will sketch the outlines of the study programme, including some highlights of projects and practical assignments. Fourth, we will briefly mention current initiatives at the HU in the field of applied energy research and show how these are embedded in the study programme. The final section summarises the main conclusions.

DRIVERS FOR NEW CURRICULUM DEVELOPMENT

‘Advanced Energy Technology’ is a relatively new major in the bachelor of engineering programme ‘Operations Engineering’¹. ‘Operations Engineering’ is a B.Eng. programme (around 600 students) in the Institute for Engineering & Design² (around 1,900 students), being part of the Faculty of Natural Science and Technology (6,700 students) of the HU University of Applied Sciences Utrecht (38,000 students and 3,500 staff)³. Being a university of applied sciences and thus different from academic research universities, it is primarily responsible for offering programmes of higher professional education, which prepare students for particular professions, and carrying out applied research.

Various drivers initiated the development of a new curriculum in energy engineering. The first and main reason to develop a new major in energy engineering is the growing demand for new professionals in the field of energy engineering. Since the beginning of this decade, there is increasing political attention to find solutions for the mitigation and adaption to climate change. Energy conservation and the large scale introduction of renewable energy are considered as the most important strategies to reduce CO₂ emissions. As a result, many (new) companies started to direct their focus on sustainable energy solutions, requiring more and more highly educated professionals in this field. This demanded a clear and updated profile of the energy engineer as a professional. The second important driver for new curriculum development is the HU wide introduction of a new educational strategy, called “HU Koers 2012”. This new educational strategy aims at introducing ‘competence based learning’ in all bachelor programmes, providing more theoretical background, intensifying study load and to practice more with real life projects (HU, 2007). As a consequence, “HU Koers 2012” demanded major changes in the previous curriculum. The third driver for new curriculum development is the adoption of the ‘Sustainable Development’ concept to become a guiding

1 Other major programmes in B.Eng. ‘Operations Engineering’ are Advanced Mechanical Building Services Technology (HIT), Advanced Electrical Building Technology (EIT) and Integrated Building and Engineering (IBE).

2 The Institute for Engineering & Design is also offering other B.Eng. programmes like Industrial Automation, Mechanical Engineering and Electrical Engineering. These B.Eng. programmes also have their specific major programmes.

3 The B.Eng. ‘Operations Engineering’ programme is only offered by a limited number of Universities of Applied Sciences in the Netherlands (Hogeschool Utrecht, Hogeschool Amsterdam, Hogeschool Zeeland).

principle in curricula, research and also operational management of the HU (Blom, 2009). Within the faculty of Natural Science and Technology ‘energy efficiency improvement’ and ‘renewable energy’ in the built environment were chosen as the key topics of ‘Sustainable Development’ to be developed in research and education (Eweg, 2010). The challenge is to embed these topics in the new curriculum. The fourth and final driver for the development (i.e. redesign) of the curriculum is to increase the cost-effectiveness of the current B.Eng. programmes at the HU. The efficiency of the study programmes should be improved by limiting the number of strongly overlapping courses and increasing the size (ECTS) of courses.

METHODOLOGY FOR CURRICULUM DEVELOPMENT

Nedermeijer & Pilot (2000) describe a methodology to (re)design curricula. This methodology consists of six separate stages, as described in Figure 1. This paper is limited to the first three stages of the development process. In the *first* stage the educational objectives and targets are adjusted to the requirements and needs of the professional field. The main question to be answered here is ‘what type of graduates do we need to deliver?’ This adjustment process needs to be carried out thoroughly and carefully, because the educational objectives and targets are the basis for further development of the curriculum.

First, we have analysed the job market for energy engineering professionals, by compiling various relevant vacancies advertised on the internet or in the newspapers. This resulted in a proper demarcation of the job market that has been extensively discussed with experts in the field. Furthermore, this analysis includes a breakdown of the different roles that an energy engineering professional can have, the specific tasks of the professional and the specific products that the professional delivers. More detailed information about specific tasks and products delivered by the professional was obtained by structured interviews with companies where you can expect job opportunities for recent graduates. In the *second* stage the competences (unique combinations of knowledge, skills and attitudes) required to fulfil various tasks of an energy engineering professional were formulated in consultation with experts in the field. In the *third* stage, we have worked out the educational programme in detail, including courses, project themes, internship, minor and the graduation project. Finally, the educational objectives, the complete set of competences

and the educational programme have been reviewed by an external committee of professionals in the field.

The other challenge in the process of curriculum development was to incorporate the concept of sustainable development in various parts of the curriculum. A reliable, clean and affordable supply of energy is considered to be of vital importance for a sustainable future and thus for our welfare, environment and economy. These three pillars of sustainable development (people, planet and profit) are used to contextualise the concept of sustainable development in the study programme.

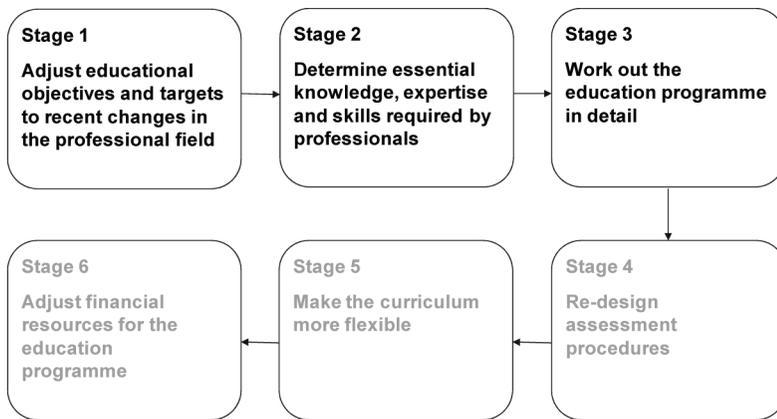


FIGURE 1. *Methodology for the (re-)design of curricula (Nedermeyer & Pilot, 2000).*

RESULTS

This section discusses the added value of energy engineering as a separate discipline, the various professions of an energy engineer in the energy system and the competences required by energy engineering graduates. We will also sketch the outlines of our study programme in ‘Advanced Energy Technology’ and describe how the concept of sustainability is incorporated in the study programme. We will also briefly mention current initiatives at the HU in the field of applied energy research and show how these are embedded in the study programme.

What is energy engineering?

Energy engineering is a multidisciplinary profession. Energy engineering projects often combine expertise from various disciplines like business engineering, industrial engineering, mechanical engineering, electrical engineering, process engineering and construction engineering. The added value of energy engineering is the integrated application of theories and knowledge from these various disciplines for improving the sustainability of various stages in the energy system.

An energy system is the chain from the extraction of energy to the final end-use of energy and its intermediate stages (see Figure 2). The first stage in the energy system is the extraction of energy carriers from natural resources, such as the *extraction* of natural gas. In many cases the extracted fossil fuels must be *converted*, e.g. from coal to electricity in power plants. In the third stage energy must be *transported, stored or distributed* to make it available for the end-user. An example is the distribution of electricity in the grid. Fourth, energy often needs to be converted before being used by the end-user, such as the *end-use conversion* of natural gas into heat by a gas-fired boiler. In the final stage of the energy system, energy is being used to provide a certain service, e.g. lighting a room (*end-use*).

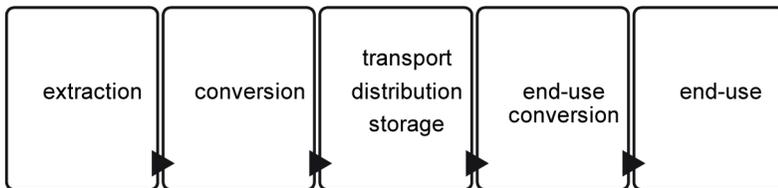


FIGURE 2. *Energy System (Blok, 2009).*

Energy engineering is especially interested in the technical solutions to limit energy demand and reducing CO₂ emissions in the energy system. Energy engineering professionals can play various roles in the energy system. We distinguish process operators, consultants, design engineers, project developers/leaders and energy managers. The *process operator* is primarily responsible for the management, control (monitoring) and maintenance of energy-intensive industrial processes or for large facilities for the extraction, conversion, transport, storage and distribution of energy. The *researcher* or

consultant analyses the efficiency of various stages in the energy system and provides advice for technical and economic feasible energy conservation and sustainable energy measures. The consultant can also be responsible for the sales of energy conservation or sustainable energy products and technologies. The *design engineer* is responsible for the technical design of specific parts of the energy system, like an energy storage system, an energy conversion system or energy distribution system. The *project developer* or *project leader* acquires energy conservation projects, sustainable energy projects and projects for the supply, delivery and distribution of gas or heat. These professionals evaluate the technical and economic feasibility of these projects and coordinate the implementation of these projects. Finally, the *energy manager* is responsible for the development and implementation of energy management systems in an industrial company, SME or in the built environment. The energy manager draws up energy management plans and co-ordinates the implementation. We have performed a quick scan of the job market for recently graduated energy engineers. The quick scan shows that there is a high demand for design engineers (30% of the relevant vacancies), researcher / consultants (25%), process operators (10%), project developers (20%) and energy managers (15%).

In a nutshell, energy engineering can therefore be defined as the broad field of engineering professionals that focus on 1) the operation, maintenance and control; 2) research and design; and 3) development and engineering of facilities, appliances and equipment that extract, convert, transport, distribute, store and use energy.

When is an energy engineer competent?

Energy engineers must acquire the right set of competencies (a combination of skills, knowledge and attitude) during their studies to perform adequately in one of the above mentioned professions. In consultation with professionals in the field we have defined these competences for the energy engineer. We distinguish four main competences that are specific for energy engineers and four competences that are general for all engineering graduates.

First, after receiving his or her B.Eng. degree an energy engineer must be able to apply important research concepts, methods and techniques for the analysis of sustainable energy systems. These include e.g. the concepts of final

and primary energy use, energy efficiency and energy intensity; methods for analysing energy technologies, such as cost-benefit analysis and techniques for calculating the environmental impacts of energy use.

Second, energy engineers must have thorough theoretical knowledge of various machines, equipment and installations for generating, converting, transporting, storing and using energy and be able to apply this knowledge in the analysis of energy systems, during the design or research process and during the operation of (sustainable) energy systems. For example, an energy engineer must have solid understanding of how photovoltaic energy systems work, be able to apply this knowledge in the technical design of these systems and be able to apply this knowledge in the operation, performance monitoring and maintenance of these energy systems.

Third, energy engineers must be able to design technical solutions or provide professional advice to improve the sustainability of energy systems, thereby taking into account various sustainability aspects, amongst others customer requirements, costs and QHSE (Quality, Health, Safety & Environment) regulations. For example, the energy engineer must be competent in designing an energy supply system for a beer brewing company and analyse the possibilities to make the energy supply system more sustainable.

Fourth, the engineers must be competent to operate, maintain and control (sustainable) energy systems. This requires the ability to apply the correct methods for control engineering, techniques for measurement engineering and knowledge about inspection and maintenance. For example, the energy engineer must be able to operate a building management system and control the electrical and mechanical equipment for ventilation, lighting, power systems etc.

Furthermore, there are a couple of general professional competences that an energy engineer must acquire. Engineers must be able to collect, acquire and keep up-to-date relevant knowledge and skills in his/her engineering discipline and apply this knowledge and skills in the analysis, research, design and operation of energy systems. In other words engineers must be able to apply to concept of “learning = working = learning”, see HU (2007). Professionals must also be competent in communicating effectively with people closely related to his/her profession, such as superiors, subordinates, colleagues and clients. Thereby, the professional engineer must also be able to reflect on his/her own behaviour and to give and receive feedback. Finally, graduates must be able to

manage a project. Project management includes the recruitment, planning, organisation, implementation and financial management of projects. All these competences have been further specified into sub-competences; see Rietbergen et al. (2009) for more detailed information.

Study programme Advanced Energy Technology

In the third stage of curriculum development, the competences have been translated into a study programme for ‘Advanced Energy Technology’ (Figure 3). A B.Eng. programme at the HU comprises 240 ECTS, equivalent to 4 years of study. The general structure of a B.Eng. programme is as follows: a propaedeutic year (60 ECTS); a major programme (90 ECTS), an internship (30 ECTS), a minor programme (30 ECTS) and a graduation project (30 ECTS). Student career counselling is also an obligatory part of the study programme.

The *propaedeutic year* is shared with other B.Eng. programmes and mainly consists of introductory courses in physics, mathematics and project management, but also includes an introductory course in ‘Sustainable Development’. In this course students learn about the concept, background and the main strategies for sustainable development.

The *major programme* comprises three semesters of theoretical courses, practical work and projects in the second and third year. All the theoretical courses in the major programme are depicted in Figure 3. The three pillars of sustainable development (people, planet, profit) have been incorporated in various courses of the programme: *people*, by analysing customer preferences and quality, health and safety issues of energy systems; *profit*, by taking into account costs of sustainable energy technologies and *planet*, by studying the environmental impacts of (sustainable) energy technologies, like resources depletion and climate change.

year 4	Minor	Graduation project
year 3	Internship	Project (Sustainable) Energy Systems
		Applied Energy Engineering II
		Energy Storage and Transport
		Inspection and Maintenance
		Control Engineering
year 2	Project CO2 Scan	Project CHP
	Energy Analysis	Sustainable Energy Technology
	Management	System Analysis and Modelling
	Thermodynamics	Measurement Engineering
	Electrical Engineering	Applied Energy Engineering I
year 1	Propedeutics	

FIGURE 3. Study programme ‘Advanced Energy Technology’ (Rietbergen et al., 2009).

We also would like to highlight a practical assignment on domestic solar water heating systems in the course ‘Sustainable Energy Technology’. A small group of students receives a box containing all important parts to engineer and monitor a domestic solar water heating system, like a solar collector, storage tank, a pump, piping material, control unit etc. Their task is to design, engineer and monitor the performance of a domestic solar water heating system. The design of the domestic solar water heating system should combine the simplicity of a simple storage tank painted black and the innovative characteristics of solar water heaters with integrated storage tanks. This practical assignment allows students to practice various professional competences, like designing energy systems, controlling and operating energy systems and project management skills.

In various real-life projects students learn how to apply and integrate the knowledge, skills and attitude, taught during supporting theoretical courses and practical assignments. These projects concentrate on the various tasks of the energy engineer like energy analysis, design engineering, research, consultancy work and project development. These real-life projects allow students to strengthen their ability to “think and act sustainably”. One of the three projects is the ‘Energy and CO2 Scan’ project. A small group of students should first contact a local supermarket (project acquisition). Then, the students should

analyse the energy supply and demand of this supermarket, thereby taking into account all relevant energy functions such as cooling, heating, transport and lighting. Next, the students must investigate the techno-economic feasibility of various energy conservation measures that can be implemented in the supermarket store. Finally, the students must report a well-founded written and oral advice to the manager of the supermarket.

During the compulsory *internship* in the third year students get the opportunity to gain practical working experience in companies and institutes in the field of sustainable energy engineering. A *minor* programme in the fourth year (30 ECTS) is a secondary field that students can specialise in. A popular minor programme in the faculty of Natural Science and Technology is the minor 'People, Planet, Profit'. This minor programme focuses on finding sustainable solutions for environmental problems in urban areas in South Africa. Finally, students must also perform a *graduation research project* to receive a B.Eng. degree. During these graduation projects, students must work independently on a complex assignment and deliver satisfying results. These graduation projects can be carried at various companies or institutes where you may expect job opportunities for graduates.

Hogeschool Utrecht and applied energy research

Research within the HU University of Applied Sciences Utrecht is aimed at the innovation of professional practice and is preferably tightly integrated in the education. Conducting research is however relatively new to universities of applied science (HU, 2009). Within the faculty of Natural Science and Technology a new research group will be established to coordinate applied research projects in the field of 'energy efficiency improvement' and 'renewable energy' in the built environment (Eweg, 2010). Various projects are currently being developed like the 'Sustainable Energy Test Garden', 'Autarkic Buildings', 'Sustainable Residential Upgrading' and 'Sustainable University Campus'. The HU also signed a covenant with the Ministry of Public Health and the Environment to improve energy efficiency with 30% in the period 2005–2020 (VROM, 2008). All these projects aim at establishing strategic partnerships with firms, research institutes and government agencies in the region to strengthen Utrecht's position, including the HU, in the Dutch sustainability debate. The challenge is to continuously embed these sustainability projects in various practical assignments, group projects and graduation research projects in the curriculum of energy engineering.

Currently, one of the more advanced projects is the ‘Sustainable Energy Test Garden’ (Rietbergen, 2009)⁴. The ‘Sustainable Energy Test Garden’ is actually an accessible flat roof of the building housing the technology department of the HU. In the ‘Sustainable Energy Test Garden’ various innovative technologies for energy conservation and sustainable energy generation on roofs will be installed, the performances of which are then measured and made public. The technologies that will be included are solar water heaters, photovoltaic panels, small urban wind turbines, sustainable roof covering and sustainable lighting technologies.

The ‘Sustainable Energy Test Garden’ has three important aims. First, the ‘Sustainable Energy Test Garden’ aims at dissemination of knowledge about sustainable roof technologies to various target groups such as engineers, consultants, housing corporations, policy makers etc. By doing so, we hope to enhance the implementation of these technologies in the built environment. Second, we aim at developing new knowledge about the performance of (combinations of) various sustainable roof technologies, by carrying out joint research projects with research institutes, research universities and suppliers of sustainable roof technologies. Third, we aim at introducing various test facilities of the ‘Sustainable Energy Test Garden’ in the study programme ‘Advanced Energy Technology’. For example, students can measure the efficiency of various solar energy systems (in the course ‘Sustainable Energy Technology’), prepare a maintenance plan for photovoltaic systems and carry out inspections themselves (in the course ‘Inspection and Maintenance’) and study the effect of storage tank size on the efficiency of solar water heating systems (in the course ‘Energy Storage and Transport’). The ‘Sustainable Energy Test Garden’ is therefore a unique project that will allow energy engineering students to gain practical experience with these type innovative technologies in an early stage of their professional career.

4 The Sustainable Energy Test Garden is part of the ‘Sustainable roof plan’ initiated by the Province of Utrecht. The mission of the ‘Sustainable roof plan’ is to use the space above roofs in the Province of Utrecht more sustainable and multifunctional. Small-scale pilot projects like the ‘Sustainable Energy Test Garden’ should contribute to achieving this objective.

CONCLUSIONS

The aim of this paper was to describe the process of developing a new curriculum in 'Advanced Energy Technology' at the HU University of Applied Sciences Utrecht. First, we have described the main drivers for developing the new curriculum. These include a growing demand for new professionals in the field of sustainable energy, a new university wide educational strategy, a university wide focus on sustainable development issues in curricula and limiting costs of educational programmes. Second, we have analysed energy engineering as a professional discipline. Energy engineering can be defined as the broad field of engineering professionals that are focusing on the operation, maintenance and control; research and design; development and engineering of facilities, appliances and equipment in the energy system. The energy system is the chain from the extraction of energy to the final end-use of energy. Energy engineering is especially interested in the technical solutions to limit energy demand and reducing CO₂ emissions in the energy system. Typical job opportunities are process operators, design engineers, consultants, project developers and energy managers. Third, we have analysed the essential competences that an energy engineer must acquire during his/her studies. Apart from general professional skills, the most important competences include the ability to 1) apply important research concepts, methods and techniques for the analysis of sustainable energy systems; 2) design technical solutions or provide professional advice to improve the sustainability of energy systems; 3) apply in-depth knowledge of sustainable and energy efficient technologies in the analysis, design and operation of energy systems; 4) to operate, maintain and control (sustainable) energy systems.

Finally, we have sketched the outlines of our 4 year B.Eng. programme in 'Advanced Energy Technology'. The programme includes a propaedeutic year, a major, a minor, an internship and a graduation project. In the major programme students practice their competences in real-life projects that are supported by theoretical course, assignments and practicals. The challenge is to enforce the cooperation between the curriculum in 'Advanced Energy Technology' and the recently established research group on 'energy efficiency and renewable energy in the built environment' and thereby strengthen the qualifications of future energy engineers.

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ENTREPRENEURSHIP

ENTREPRENEURSHIP RESEARCH WITHIN THE CARPE CONSORTIUM

José Millet

Universitat Politècnica de València

jmillet@ideas.upv.es

A wide variety of interesting themes and discussions arose from the studies presented in the entrepreneurship track. A participative working methodology was adopted following the sessions, as the theme of the track lends itself to this kind of analysis. Participants were grouped by countries and affinities. The contents of each presentation were then analysed and discussed, and the initial outlines were laid down for possible collaborative actions.

The articles focused on three interconnected areas: research, education and cooperation. Some contributions focused on innovation following a rigorous scientific methodology and produced some extremely interesting results. Those present thus expressed the desire to organise an event that would address these scientifically related advances more specifically. Another series of articles focused more on aspects related to higher education, emphasising the skills and abilities of our students, as well as the threats and opportunities offered by the European Higher Education Area, experiences with software and games for teaching support, etc. The debate on this topic was extensive and lively with proposals ranging from small changes to reworking the whole system. One unanimous conclusion addressed the need to galvanise and promote the entrepreneurial spirit amongst the university community and develop entrepreneurial skills among students, not only in related subjects, but also as part of the DNA of all subjects and areas. Highlighting the aforementioned values, the participants proposed to set up initial actions in order to make the possibility of an 'International Master in Entrepreneurship' a reality as soon as possible between the universities involved in the CARPE consortium, along with aspects related to internationalisation and cultural diversity, among others.

As a result of the experience of the cooperation project in Africa, track participants held a debate on the responsibility of Europe in the active cooperation activities and development of other countries in terms of entrepreneurship. Adapting our processes to their specific environment and developing links with other countries were identified as essential measures for success. Much can be learnt from the different leadership styles from other parts of the world in terms of identifying opportunities and overcoming the obstacles to business creation and growth, and how these aspects are linked to a creative mindset. It is our duty to share findings and experiences with other nations and, as one author points out, to help galvanise those countries that have enormous potential for growth and wealth creation, but do not have the knowledge or skills to harness these assets.

Several of the papers tackle the problem of the barriers to the promotion of entrepreneurship in developing countries, and their parallels within the European Union with several countries on the brink of economic collapse. The authors stress the need to look for new solutions to develop existing businesses and to look for a way to turn SMEs into high-growth businesses. Evidently, the papers presented are not only of interest on an academic level, but also provide insights that would be useful for policymakers around the world. The paper on the introduction of new business models based on available innovations provoked interesting debate on how firms need to adapt in order to survive, taking into account the shifting patterns in value chains and highlighting the importance of e-business and e-marketing (in this case in the health industry).

The track's participants agreed that innovation is one of the pillars on which economic renewal will stand, particularly within the context of the global economy.

PROMOTING ENTREPRENEURSHIP AND INNOVATION IN AFRICA

Leendert de Bell

HU University of Applied Sciences Utrecht

leendert.debell@hu.nl

INTRODUCTION¹

The potential contribution of entrepreneurship to economic development has been widely acknowledged (see for example Schaumburg et al., 2010; Brixiova, 2010; Nichter and Goldmark, 2009; Rogerson, 2001; Von der Fehr, 1995; Marsden, 1990). Entrepreneurs do not only create employment, productivity, competition and economic growth, but also accelerate the generation, dissemination and application of innovative ideas, through developing and marketing new products or services, or applying new business models. As such, entrepreneurs are agents of change that expand the boundaries of economic activity (Westhead et al., 2011; Kelley et al., 2010). In recent years, governments, institutions and other policy makers in and outside Africa have therefore paid increasing attention to fostering private sector development as an engine of economic growth, and as a solution to issues of unemployment and poverty (AfDB/OECD, 2010; ADI, 2009; InfoDev, 2006; ECA, 2002).

The main problem is not necessarily a lack of entrepreneurial attitudes in Africa. In fact, entrepreneurial activity is vibrant and can be found everywhere throughout the continent, but its contribution in terms of gross domestic

¹ This article reflects the outcomes of the working group on entrepreneurship during the 'African and European University Partnership Seminar' in Lomé, Togo, on April 15, 2011, which was organised by the Ministry of Higher Education of Togo, UNESCO Regional Bureau for Education in Africa, the African Association of Universities, and Hamburg University of Applied Sciences, with participation of Turku University of Applied Sciences, and HU University of Applied Sciences Utrecht (contacts: helmut.laberenz@haw-hamburg.de; foster.ofusu@turkuamk.fi; leendert.debell@hu.nl).

product (GDP) generally is significantly lower than in other regions. An important explanation is that most entrepreneurs in (Sub-Saharan) Africa do not become entrepreneur by choice but out of necessity, because they cannot find wage employment and do not have any other source of income. As a consequence, the majority of these firms are microenterprises that often operate in the informal economy, and as such have only very limited or no significant positive effect on local economic development (Kelley et al., 2010). What needs to be stimulated, therefore, is more productive, opportunity-driven entrepreneurship with a stronger potential for growth (Rogerson, 2001).

Of course, circumstances for doing business are still far from favourable in many African countries, being hampered by poor basic infrastructure, troublesome logistics, abundant red tape, corruption, limited access to capital, and a shortage of skilled workers, to name a few of the most common obstacles (IFC, 2010; Ramachandran et al., 2009). In addition, numerous countries have until relatively recently suffered, or still suffer, from the consequences of political instability, civil war, and/or chronic diseases such as malaria and HIV/AIDS. Nevertheless, after decades of stagnation, many of Africa's economies are now also growing at an unprecedented speed, resulting in increasing consumer demands, and with more means to spend (Leke et al., 2010; MGI, 2010). With more than 800 million inhabitants at present, which according to the latest estimates will roughly double by 2050 (UNFPA, 2011: 11), new market opportunities are dawning in Africa (WEF, 2009; Prahalad, 2005).

Doing business in Africa may require a different set of skills, more creativity, and greater resilience, but seeing beyond the stereotypes, it also offers huge economic potential for those who persevere (MGI, 2010; Mahajan, 2009). For instance, the African market is not as competitive as other emerging markets, and there still is an unmet demand for many goods and services (Owhoso et al., 2002). Both government and market deficiencies can thereby serve as an incentive for disruptive innovations (Hart, 2007; Prahalad, 2005). The telecommunication sector in Africa, for instance, is one of the clearest examples where the absence of a decent infrastructure actually resulted in so-called leap-frogging with respect to the adoption and implementation of new technologies and applications (Grosskurth, 2010: 40; JIA, 2009: 199). One of the main challenges therefore is to create an environment where innovative, opportunity-driven entrepreneurship can flourish, which in turn can generate local multiplier effects that promote the demand for new potential firms.

In this article we propose to set up a pilot project for a business incubator in Lomé, Togo, to offer start-up support to promising young entrepreneurs, and thereby stimulate the development of dynamic and innovative firms that can contribute to local economic development. Business incubators have proved to be effective in many parts of the world, speeding up the process of business creation and reducing the probability of failure. With the exception of some of the larger economies, business incubation is still in its infancy in Africa. In the next section we analyse some of the major challenges for entrepreneurs in Africa, followed by a section where we focus in more detail on how business incubators could contribute to the promotion of entrepreneurship and innovation in Africa. In the final section, by way of conclusion, we discuss the way forward with regard to this project.

ENTREPRENEURIAL CHALLENGES IN AFRICA

According to the most recent 'Doing Business' report of the International Finance Corporation, Sub-Saharan Africa still is, on average, the most difficult place to do business in the world when it comes to red tape (IFC, 2010: 21). This index examines regulatory obstacles, using criteria such as the ease of starting (and closing) a business, getting credit, protection of investors, registering property, dealing with construction permits, enforcing contracts, paying taxes, and trading across borders. Looking at the ease of starting a business, table 1 shows us that, with a few positive exceptions, countries in Sub-Saharan Africa on average score poorly, in particular with regard to the costs of starting up a business (see also Eifert et al., 2008). In this costly business environment, with high taxes, many restrictive regulations and limited protection, large firms can survive, but others may prefer to 'fly under the radar' by staying small and informal (IFC, 2010: 8; Schaumburg et al., 2010: 4).

TABLE I. *Starting a business (selected countries).**Source: International Finance Corporation (2010), Doing Business 2011, pp.145–205.*

Country	Procedures (number)	Time (days)	Costs (per capita income)	Ease of doing business (world ranking, 1-183)
Singapore	3	3	0,7	1
Finland	3	14	1,1	13
Germany	9	15	4,8	22
Netherlands	6	8	5,7	30
South Africa	6	22	6,0	34
Spain	10	47	15,1	49
Ghana	7	12	20,3	67
Zambia	6	18	27,9	76
Kenya	11	33	38,3	98
Nigeria	8	31	78,9	110
The Gambia	8	27	199,6	146
Togo	7	75	178,1	162
Chad	13	75	226,9	183
Sub-Saharan Africa	9	45	95,4	137

Access to finance also is a serious problem, in particular limiting the development of small and medium-sized enterprises (SMEs) in Africa. In fact, the relatively low presence of SMEs in Africa, often referred to as the ‘missing middle’, is generally attributed to the lack of effective finance opportunities for these companies. Large domestic firms in Africa usually have little problems obtaining credit from banks and other financial institutions, while at the other end of the spectrum many initiatives have been developed over the past decade to finance microenterprises. However, in comparison to the more formal SMEs, these microenterprises generate only limited employment and contribute little to GDP. SMEs are generally much more dynamic, but also need larger and riskier investments to start up and grow, while cash flows are not immediate. With respect to SMEs in Africa, adverse selection is difficult and moral hazard is high. Since the returns of successful SMEs are generally not sufficient to compensate for the failures, transaction costs are simply too high for many lenders (Schaumburg et al., 2010: 5; Von der Fehr, 1995: 27).

While the difficult business environment and credit constraints still dominate the discussion on obstacles for more promising forms of entrepreneurship in Africa, skill shortages now also receive increasing attention (Brixiova, 2010: 441; Rogerson, 2008; Rosholm et al., 2007). Of all necessary resources, adequate training of entrepreneurial talent, both knowledge and skills, may

well be the most important factor for success (Coduras et al., 2010; ADI, 2009: 23; JIA, 2009: 203). Across much of the continent, business schools are now turning out increasing numbers of graduates, but this is still insufficiently translated into the development of new, viable local businesses. This may in part be explained by a lack of practical experience or local applicability within their programmes (Whitehead, 2011). Another important explanation may be that many students still prefer to work in the public sector rather than setting up a business, because the economic rewards may be considerably higher (Von der Fehr, 1995: 27). More focused entrepreneurial training, also outside the formal education systems, is therefore considered essential to unleash the high potential of entrepreneurship in Africa. At the same time, it may also be a viable solution to address the alarmingly high percentages of youth unemployment in Africa (ADI, 2009).

PROMOTING ENTREPRENEURSHIP AND INNOVATION THROUGH BUSINESS INCUBATION

Over the last three decades, business incubators have been increasingly promoted worldwide to help entrepreneurial talent develop their ideas from inception to commercialisation. Business incubators typically offer start-up support to promising entrepreneurial ideas, linking technology, capital and know-how within a protected and enabling environment, thereby speeding up the process of business creation and reducing the probability of failure when these companies are most vulnerable. Most incubators have proved to be an effective means to accelerate the development of new, innovative and potentially high-growth companies, which in turn contribute to local economic development (Grimaldi and Grandi, 2005).

As such, business incubators offer an integrated approach that addresses most of the needs and problems that have hampered the development of innovative and potentially high-growth SMEs in Africa. Although some incubator initiatives have already been developed in countries such as South Africa, Ghana, Angola and Rwanda, incubation in Africa still is in its infancy compared to other regions in the world. The focus on innovation and entrepreneurship is generally not as strong, and opportunities for networking are not as developed as in regions with a longer history of incubation (InfoDev, 2006). There is a lot to be gained, but it is imperative to learn from good practices elsewhere, since

there are many different forms of incubators, depending on their specific focus, their links with knowledge institutions, governments and private sector, and their revenue models (e.g. repayment of loans, or shares in the companies), and not all of them necessarily turn out to be successful (Ndabeni, 2008; Bergek and Norrman, 2008; Buys and Mbewana, 2007; Grimaldi and Grandi, 2005).

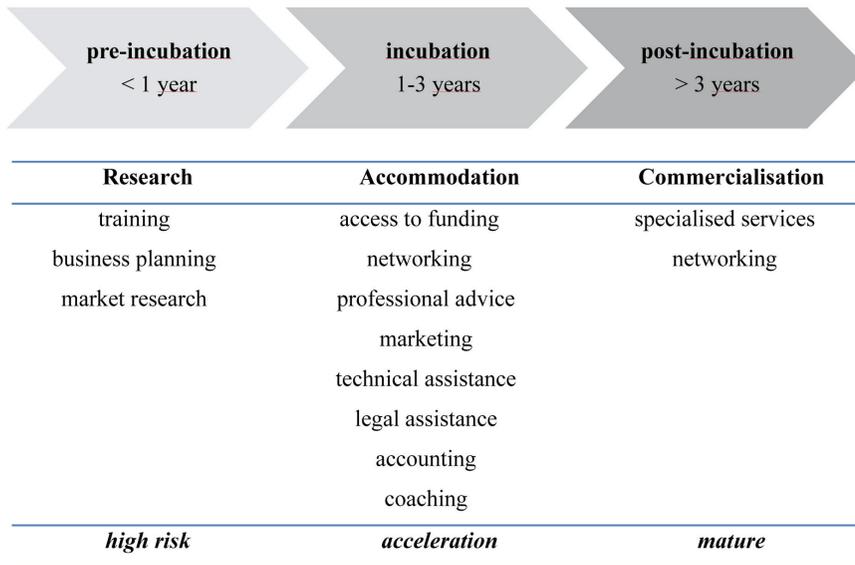


FIGURE 1. *Key stages of business incubation.*

Source: Adapted from Davies (2009), Mixed-use incubator handbook, pp. 8–9.

Figure 1 demonstrates the key stages in the incubation process, during which different types of intervention take place, although the timeframes may be flexible, and the stages potentially overlap each other. Traditionally, business ideas are developed and tested for their potential during the pre-incubation stage. Intervention at this stage is limited, and the risk of failure is high. To guarantee success, it is therefore essential for incubators to maintain selective entry criteria, in particular on innovation and entrepreneurship. The actual incubation starts when the idea has graduated to a plan, a team is put together, and operations have started. During this stage, incubators most commonly offer a variety of support services at an attractive rate, including (flexible) space, (shared) equipment, and administrative services, professional training and coaching, specialised technical and managerial expertise and assistance,

opportunities for networking and access to finance. Companies are usually still vulnerable and not profitable yet, but the focus is first and foremost on 'hands-on support', to accelerate the development of the business, not on 'life-support'. Finally, it is also important to maintain a clear exit strategy after a predetermined incubation period, when the company has reached a certain level of maturity and the new company graduates to become an independent, self-sustaining business. No direct intervention is required during the post-incubation stage, except for networking purposes and specific solicited services (Davies, 2009: 9).

In order to become change agents for local economic development, it is important that incubators are strongly locally embedded. In practice, business incubation therefore relies in great part on establishing good linkages and long-term commitment of many relevant stakeholders. These generally include: universities and other knowledge institutions (for training, technical assistance and source of potential entrepreneurs), governments at different levels (for enabling environment and support), finance providers (e.g. banks, venture capitalists, angel investors), public and private service providers (e.g. lawyers, accountants, marketing experts and other professionals), and the local private sector (for professional assistance, coaching, market access). In the context of developing economies, a mixed-use approach, which allows flexibility with regard to the services it provides to its customers, and a diversified revenue model probably is the most appropriate (Davies, 2009: 10). In general, incubation programmes can remain lean and cost effective with only few employees. What is most important is efficient and effective management, as well as a high level of involvement (Westhead et al., 2011: 185-190). Ideally, business incubators should become symbols for entrepreneurship, innovation and good business practices themselves, thereby giving a strong incentive for further economic development.

THE WAY FORWARD

During the working group on entrepreneurship at the 'African and European University Partnership Seminar' in Lomé, Togo in April 2011, many potential local and regional stakeholders present showed great commitment to promote entrepreneurship and innovation as tools to generate employment, in particular for young people, and local economic growth. Following the discussion

above, the proposal is to set up a pilot project for a local business incubator in Lomé. Apart from hosting the seminar, there are several other important considerations for starting in Togo. Togo is a small, low-income, but politically stable country in West-Africa, which still highly depends on commercial and subsistence agriculture. At present, Togo has a population of almost 6.8 million people, but with a median age of 19, the population growth rate is very high (2.7%) (CIA, 2011). With regard to the ease of doing business, Togo scores poorly across all categories (IFC, 2010: 199). By developing and accelerating potentially high-growth entrepreneurial ideas, setting up a local business incubator could become an important incentive for generating employment, innovation and local economic development.

As a first step, a development team will be formed, consisting of members of Hamburg University of Applied Sciences, Turku University of Applied Sciences, and HU University of Applied Sciences Utrecht. The initial task of this development team is to learn about good practices of business incubation, through available studies as well as visits to successful business incubators. The next step would be to develop a feasibility study of the project. Raising awareness, commitment, and ownership among stakeholders and policymakers who could potentially contribute to the success of this project is crucial at this stage. Important partners that should be actively involved in the setup and ongoing activities of the incubator include the University of Lomé, with respect to training and selection of potential entrepreneurs, the national government of Togo and the local government of Lomé, to support with infrastructure and providing an enabling environment, the local private sector, to provide professional expertise, market possibilities and coaching, and national and international banks, to support the project and provide soft loans or seed money to the entrepreneurs. At a later stage, when the incubator is operating, there will also be a need for venture capitalists and angel investors, which might include the African diaspora, as well as public and private service providers such as lawyers, accountants, marketing experts and other professionals.

The last step in the development stage of this project will be to form a local management team, and write a detailed business plan to apply for (additional) funding. External resources are needed, in particular in the development and start-up stage, but also to secure the longer-term objectives of the project. Depending on the adopted revenue model, evidence shows that it takes a number of years before incubators become self-sustainable. There are a large number of national and international programmes with a focus on private

sector development and youth unemployment in Africa which can be addressed for a financial contribution to this project. These include the European Commission (Development and Cooperation; Europe Aid; Private Sector Development), the African Development Bank (Private Sector Development), UNESCO-BREDA (Sustainable Development; Youth Programmes) and the African Union (Economic Affairs; Private Sector Development), but more possible options still have to be further investigated.

By means of conclusion, it is important to stress that, once this pilot project has been set up successfully, the objective is to scale-up the project and implement a similar format also elsewhere in Africa. Potential countries that were mentioned during the workshop include other small, low income countries in West-Africa, such as The Gambia, but may also include some of the larger countries in East-Africa, such as Zambia and Kenya, where some of the European Universities of Applied Sciences involved already have well-established contacts.

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E-HEALTH BUSINESS MODEL DYNAMICS IN LONG TERM CARE

Case studies in the Dutch market

Roderick Udo

HU University of Applied Sciences Utrecht

roderick.udo@hu.nl

Hein Roelfsema

HU University of Applied Sciences Utrecht

hein.roelfsema@hu.nl

Helianthe Kort

HU University of Applied Sciences Utrecht

helianthe.kort@hu.nl

INTRODUCTION

One of the most important drivers of change in the health care sector is the desire of elderly people to age in place (Kort, Van Hoof and Dijkstra, 2012). The growing use of internet applications and communication technologies together with innovations in buildings have created new commercial opportunities to cater to the demands of the elderly to grow old in their home environment. Many of these opportunities are facilitated by institutional changes like deregulation and privatisation, and benefit from globalisation, for example through stronger incentives for innovation and domestic implementation of ideas that arise in foreign markets.

E-health has become a popular term to describe all forms of electronic health care over the internet and is of increasing importance to elderly people who want to age in place. Eysenbach (2001) defines it as: “the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the internet and related

technologies.” Although it was originally used to describe mainly services that were motivated by financial gain, it has become a more comprehensive term during recent years (Maheu, Whitten and Allen, 2001). More specifically, telehealth can be defined as the integration of telecommunication systems in protecting and promoting health, whereas telecare and telemedicine are used to describe the incorporation of telecommunication systems in curative medicine, involving interactions between patients and physicians (Maheu et al., 2001).

As in many other countries, in the past twenty years the Dutch health care sector has seen dramatic changes. Most agree that there are three underlying currents: technological change, institutional change, and globalisation (Porter and Teisberg, 2006; Christensen, Grossman and Hwang, 2009). Technological change is both embodied in new medical products and services, as well as in new delivery modes, often with the help of the internet. Institutional change refers to privatisation and deregulation in the health care sector. Many firms also started international activities.

However, for a lack of clear business models, many entrepreneurial activities do not survive the research phase and are unable to generate consumer welfare (Spil and Kijl, 2009; Broens et al., 2007; Osterwalder and Pigneur, 2009). We aim to contribute to the process of implementing e-health products and services by analysing the business models commonly used in the health care sector in the Netherlands. For this, we study the business model dynamics of six Dutch e-health companies in long term care. Our aim is to uncover the business models of these firms and shed a light on the factors that shape them.

BACKGROUND: BUSINESS MODELS IN THE HEALTH CARE SECTOR

A company’s business model defines what value the company delivers to its customers, in what way it delivers, how it gets paid and how it makes profit out of its activities (Teece, 2010). Many companies invest in developing new ideas and technologies, while there is hardly any ability to innovate the models through which they make money out of their inventions (Chesbrough, 2010). There are many cases in which experimentation and ‘prototyping’ business models has proved to be a successful way to get inventions to the market

(Chesbrough, 2010; Osterwalder and Pigneur, 2010). The few existing studies on e-health and business models focus on technological change and bringing (technological) innovations to successful deployment (Spil and Kijl, 2009; Kijl et al., 2010) or describe the business model of a certain technology or service (Lin et al., 2010).

To describe the complexity of the business models used in the e-health sector, based on the literature we use the following typologies.

1. *Value chain redesign*: new opportunities arise, for example because of developments in information technology (IT), to redesign the value chain and either disintegrate it (also called unbundling, Osterwalder and Pigneur, 2010) or integrate new aspects (in other words: value chain creation).
2. *Catering to niche markets*: because of mainly IT developments, possibilities to supply to niche markets open up. Firms use these possibilities because they diagnose and recommend specific solutions (solutions shops, Christensen et al. 2009) focusing on what is known as the long tail.
3. *Creating communities*: some firms offer platforms to connect two or more customer segments or product users (what Osterwalder and Pigneur, 2010, call a multi sided platforms model) or they facilitate communities (Christensen et al., 2009, call this facilitated networks).
4. *Smart pricing*: maximising profit streams through broad market access, created by offering free or low priced products or services and making money from secondary streams (like newspapers that sell advertisements) of premium services (often referred to as a 'freemium model', Osterwalder and Pigneur, 2010).
5. *Cost reduction and efficiency seeking*: firms that create competitive advantage by reducing costs by looking for the highest degree of efficiency and standardisation.

The above is our own interpretation of the many different ordinations of business models that can be found in literature, which are commonly applied in technology intensive sectors such as e-health. The central part in all of the five types of business models is the value proposition, i.e. how to deliver value to the customers and/or final users? Around this central part, the company builds

the model, choosing customer segments, channels to reach the customers, cost and revenue streams and many other aspects. Broadly following the nine-component approach of Osterwalder and Pigneur (2010), we describe our expectations about our five types of business models in table 1. After semi-structured interviews with the CEOs of the six case study companies, we classified our cases using the framework in the table.

ANALYSIS: CASE STUDIES

We use case studies of six Dutch companies in the e-health sector to identify underlying fundamentals for business model design and their dynamics over time. In order to get deeper understanding of the causal impact of the fundamental forces of change on business models and how these business models change during the lifetime of the firm, we have questioned senior management of our six case study companies in semi-structured interviews on the design of their business model and how it relates to technological change, institutional change, and globalisation. On top of this, these firms were part of a broader research programme, which has allowed the researchers to observe the firms over time and use the action research method to assess their business models and interventions to these models. Below we present the six cases.

Case 1: Real time medication monitoring

The first company in our study produces solutions to monitor the medication intake of patients who are at home. The medicine box sends information to a central database once the patient takes the prescribed medicine. This multinational company delivers its real time medication monitoring product to researchers (who want to monitor the participation in for example medicine research), pharmaceutical companies (that want to increase the effectiveness of their medicines by making sure that people use them in the right way), insurance companies and individual patients. The first accounts for around half of the sales, the pharmaceutical industry for another third. The company is part of the Dutch Innovative SME Top 100.

Case 2: Communication platform for care givers

The second company that we studied provides an internet communication platform to facilitate informal care suppliers. Relatives or neighbours can use the platform to make arrangements for the care they offer to their beloved. The most important customers of this Software as a Service (SaaS) provider are local governments that want to stimulate social cohesion and health care institutions that want to stimulate and support informal care. It operates on the Dutch market, investigating but not yet entering other European markets.

Case 3: Personal alarm monitoring

The third company is a communication technology provider that turned its focus to health care in the early 1990s. It offers communication systems to which all kinds of alarm and monitoring systems can be connected, in such a way that health care professionals can easily monitor and help patients who live in their own homes. The company has a widespread European network with employees in four countries and activities in eleven countries. Health care organisations and, in some countries, also local governmental institutions are the most important customers.

Case 4: Real estate with e-health solutions

The fourth company is a real estate business that built experience and focus in adapting buildings to care solutions, to facilitate for long term care. In recent years, the companies' most important activity is advice and feasibility calculations. The most important customers are health care organisations and housing corporations.

Case 5: Video care advice

The fifth company advises health care organisations about the use of video care solutions. The company offers its customers support on all issues related to implementation of video care: it covers technological support for innovation, financial planning and communication to the users.

Case 6: Smartphone application development

The sixth company in our study develops applications for smartphones that can be used by health care institutions or insurance companies, either as a way to transfer information or as a tool, for example in the case of an app that warns diabetics when they need to use insulin. Some applications are offered and paid by for example insurance companies, some are sold directly to the end user.

Classifying our cases using the framework in table 1, we found that cases 1 and 6 have strongest characteristics of the second type of business model, catering to niche markets. The other cases all have clear characteristics of creating communities as a business model, our third type.

Our questions to the company management did not end with the description of the companies' structures and the choices that were made. We also discussed three forces of change and their impact on the way the company is ran. Internationalisation, technological and institutional factors are all aspects that are considered to be important by the company executives. However, in all of our six case studies, a clear distinction can be seen between factors that are facilitating and therefore necessary to the success of the company but not determining the way it is ran, and one factor that is generally seen as shaping the business model.

The larger companies in our study consider internationalisation as a crucial factor to create scale for their operations, simply because the Dutch market is too small for their specific (niche) product. The smaller companies' managers said that they did not adapt their business model to international opportunities, because they built expertise on the best way to deal with Dutch governmental and insurance company structures.

With respect to technology, only the emergency monitoring supplier considers this a crucial factor. One of the managers stated that: "20 years of innovation opportunities are ready to be taken to the market". The question arises why a sector with seemingly many innovative technologies, cannot reap the maximum benefits of the abundant possibilities to satisfy the customers' needs.

TABLE 1. Framework of five types of business models.

		Categories (based on Osterwalder and Pigneur, 2010)									
Business Model typology ↓	Value propositions	Customer segments	Delivery channels	Customer relationships	Revenue streams	Key resources	Key activities	Key partnerships	Cost structure		
1. Value chain redesign	Product innovation (PI), Customer relationship management (CRM) and Infrastructure management (IM) in three separate entities, either in 1 company or in 3 related companies	- <i>PI</i> : often B2B, offering products through intermediaries focusing on customer relations - <i>CRM</i> : consumers - <i>IM</i> : mainly B2B	Strong ties to customers, mostly through specific company aimed at CRM	Strong relationship with customer, mostly through specific company aimed at CRM	- <i>PI</i> : High premium price, because of novelty factor - <i>CRM</i> : aimed at large 'share of wallet' through high customer involvement - <i>IM</i> : low margins, high volume	- <i>PI</i> : strong pool of talent - <i>CRM</i> : customer base, trust of customers - <i>IM</i> : high volume / scale	- <i>PI</i> : R&D management, attracting talent - <i>CRM</i> : acquiring customers, maintaining relationships - <i>IM</i> : infrastructure development, management	The three parts are partners of each other: CRM buys innovation (products / services) from PI, IM standardizes and creates high volume	- <i>PI</i> : high labour costs - <i>CRM</i> : high costs of acquiring customers - <i>IM</i> : high fixed costs		
2. Catering to niche markets	Specifically adapted to niche markets, possibly several different propositions, or even a wide scope of niche-content (long tail)	Specific and specialized, sometimes also suppliers of niche content (which can lead to a community / multi-sided platform business model)	Channels adapted to wishes or processes of customers, often through e-business / e-commerce	Often a quite strong relation with customers (because of adaptation to specific wishes)	Either dependant on a few customers in a strong relationship with specific content or 'selling less of more' (long tail)		Platform management, delivering services / products, promotion	Niche content suppliers (in some cases user-generated content)	Development and platform management costs		
3. Creating communities	Attract customer groups, facilitate interaction	2 or more segments, each with own value proposition	Often internet platforms	Usually through internet platforms	Different streams for each segment, sometimes free or	Platform (technology)	Platform management, service delivery, marketing of	Customers as partners, also in innovation of the product / service	Development and maintenance of platform; costs are		

	between different groups, organize platform	and revenue stream. Each segment does not exist without others		reduced prices for one segment	the platform	controlled by structuring the platform well
4. Smart pricing	Good product or service generates much traffic which makes it interesting to advertisers or Offer a basic free service with paid premium services (freemium) or offer a free 'bait' to attract customers and sell the 'hook'	Advertisers and users of (free) product or service or Many users who use the product/service for free, 'subsidised' by a usually smaller group of paying customers or people attracted by a cheap or free initial product	Usually through a multi-sided (internet) platform or Automated and large size network with adaptable features or lock-in, strong link between initial product and follow-up product or service	Revenues from advertisements or Revenues from premium service / product or Low revenues from initial 'bait' sale, compensated by frequent sales of the 'hook' product / service	Platform (not necessarily digital; can also be e.g. newspaper), accessibility for masses or Platform (offering free basic service against low marginal cost) or Strong brand, patents	Development & maintenance of platform and acquisition costs or high fixed costs, low marginal costs of delivering to free users, additional cost premium user or subsidising 'bait' product / service and production of follow-up
5. Cost reduction and efficiency seeking	Offering products / services at lowest possible price, cost focus, standardisation, efficiency	Large groups of customers with the same requirements, standardised	Non-specific, not strong, large scale	Revenues from selling at a large scale, economies of scale important	Production, cost reduction	Often high fixed costs

The way in which the companies operate is strongly influenced by institutional structures. The managers of the two internationally operating companies in the sample experience difficulties because they have to adapt to many local situations in Europe. With respect to the Dutch market they state that they do not find a (financial) structure for e-health at governments and insurance companies. In the four cases we studied of Dutch companies that operate nationally, a clear adaptation to institutional structures can be observed. The internet platform provider adapted its business model after they felt that the government budget cuts created a customers' need, the real estate company and video care advisor adapted to the regulatory environment that is very specific in the Netherlands and to changes in health care financing. Also the developer of smart phone apps, who sells a product that can easily be introduced in many markets internationally, decided to build specific expertise on Dutch health care market structures.

Thus, institutional factors take a central position in the business model dynamics of the companies in our case study. Government structures and the position and procedures of insurance companies directly influence the possibilities of getting technologies to the market and also influence the willingness to pay of final users and the extent to which they are used to family care. Particularly the smaller firms we studied show high adaptation to the situation in the Dutch market, which may reduce their chances to internationalise.

CONCLUSIONS

This study of six different companies in the Dutch e-health market is clearly meant to identify issues that require more attention in building a view on what shapes business models of e-health firms. It became clear that studying the dynamics of the business models covers many questions at the core of the market for e-health and long term care. In our case studies, the strongest influence on the companies' ability to satisfy the customer needs is of an institutional nature. An important question for future research is if in general companies in the e-health market adapt the way they serve their customers and final users to the government and insurance companies' structures and if so, what the forces behind this strategy are.

An interesting link may be made to the influence of technological development. Future research will have to make clear whether the view that technologies are abundant but fail to reach the market, which is the experience of some of the larger cases we studied, can be confirmed for the market as a whole. The role of internationalisation is not clear and needs separate research on the question whether firms do and need to internationalise at all. In general, finding out how and to which influences business models are shaped, does not only add to the business model literature, but is also likely to offer insights that can lead to a better functioning market for e-health products.

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THE CONCEPT OF ENTREPRENEURSHIP IN EDUCATION AND RESEARCH AT THE IDEAS INSTITUTE, UNIVERSITAT POLITÈCNICA DE VALÈNCIA

Michael Willoughby

Universitat Politècnica de València

mwilloughby@ideas.upv.es

José Millet

Universitat Politècnica de València

jmillet@ideas.upv.es

INTRODUCTION

The incorporation of entrepreneurship into higher education still remains a challenge for universities that must be promptly addressed. As a technical university, where science and technology are first and foremost, the Universitat Politècnica de València has made progress in this direction by offering students the chance to configure their curriculum with optional subjects, including this topic in a considerable number of degree courses. Bearing in mind the Bologna directives, and despite a reduction in the number of optional courses, the Spanish education system has incorporated a minimum of six business-related ECTS (European Credit Transfer and Accumulation System) credits into all degrees awarded by technical universities alongside other subjects in humanities and languages.

The IDEAS Institute issued a series of recommendations to the university faculties during the process of the creation of the degree and masters courses. The most important of these states that the different subject areas alone are not sufficient to diffuse entrepreneurial culture and that we need to develop the individual entrepreneurial skills of the student population. This article presents the experience of the IDEAS Institute and its evolution since its inception in 1992 and its success based on four essential pillars: the promotion of entrepreneurial culture, support for the creation of innovative and hi-tech businesses, business development support and, an aspect that underlies all of these; training and education.

European Framework

At a time when the economic recession is rocking the European Union to its very core, and with it the increasingly precarious continuity of the single currency for Eurozone states, the European Higher Education Area (EHEA) might well be singled out as an all too infrequent example of Europe's ability to join and produce a systemic framework that may well prove to be a success. While economists and the rest of the world's political leaders constantly demand that Europe puts its house in order (Glatz et al., 2011), perhaps it is time for Europe to take a look at why the model for higher education (HE) is slowly beginning to drop into place and the reasons why a fundamentally fragmented fiscal system and framework and other related issues such as the value of bond markets in the so-called peripheral countries have been described as a disaster for European political integration (Schelkle, 2011).

HE has shot to somewhere near the top of the agenda in a remarkably short period of time in terms of its evolution since the first timid movements were made towards a more unified system of HE qualifications at Maastricht Treaty of 1992, but it was not until the Lisbon Strategy of 2000 and, in particular, the revised Lisbon Strategy in 2005 (European Council, 2005), which focused more on growth and jobs that the seeds of the EHEA were truly sown. The mid-term review of the Lisbon Strategy plan proposed by the European Ministers for member states included the following aspects among the most pressing matters to address:

- investing more in young people, education, research and innovation to generate wealth and provide security for every citizen
- opening up markets
- investing in modern infrastructure to help enterprises grow, innovate and create jobs
- developing a skilled entrepreneurial workforce
- ensuring a society with high levels of employment, social protection and a healthy environment.

This 5-year mid-term review, which has received a certain amount of criticism with regard to the political nature of its appointed components (Zeitlin, 2008), deemed that the measures taken thus far had not been sufficient in moving toward the goals outlined at the original Lisbon agreement. However, some four years later, and in the midst of one of the worst economic recessions since the 1930s, Sweden's Primer Minister Fredrik Reinfeldt went even further in his declarations and deemed that the Lisbon Strategy had failed in its principal objectives. The failure of member states to ratify a constitutionalisation process of the EU (Kaunert, 2009) as a whole following several referenda makes it perhaps more surprising that Europe has managed to standardise, to some extent, its framework of HE qualifications.

At the recent meeting on the future of higher education in Romania (FOHE-BPRC, 2011), the Bologna Process was described as “one of the most powerful symbols of European-ness” and “the home of common Enlightenment values”. Such ambitious claims are worthy of further examination, and although this paper is not devoted to picking apart the Bologna/Lisbon legacy, it evidently plays an essential part in the implementation of a curriculum where entrepreneurial skills and the working world are meant to play an increasingly major role. Experience in helping and advising nascent entrepreneurs and conversations with established ones reveals the need and desire for graduates to have greater experience and knowledge of business skills. Far too often have sound business ideas fallen by the wayside because technical knowledge must go hand-in-hand with business acumen and an entrepreneurial culture that has hitherto been sorely lacking (O’Shea et al., 2008).

Being a part of the EHEA and subscribing to the Bologna recommendations means greater freedom and control for higher education institutions. The theory is almost flawless; make the skeleton of all European degree courses the same so that student mobility is hugely enabled, this uniformity ensures

a control mechanism that standardises university education to a large extent, reduces state control of internal HE affairs so that the burden of higher education control is shifted away from the state and increased competitiveness will lead to higher standards, while easier access to business-related modules for students across the board increases the employability of Europe's graduates. It sounds like an ideal route to take, so where is the problem? Why were thousands of students and a large number of university staff so opposed to the process that they found it necessary to stage long, vociferous protests? The answer evidently lies in the fear surrounding the fact that, with greater freedom for universities to run their own affairs comes greater responsibility, and while that responsibility is in the hands of an elected body, they are answerable to the public. However, when that responsibility lies principally with the higher education institutions (HEIs), many believe that it threatens the access to the best university education to potentially brilliant students who will no longer be able to afford access to institutions where they have the freedom and ability to impose their own economic policies.

As of 2012, British universities will have the decision-making powers over the fees they charge for degree and masters courses. The consequences of this action will be interesting to observe. Some of the possibly drastic outcomes that have been suggested include universities moving towards an emphasis on branding rather than on education, that students will see their university degrees as a commodity, thereby putting pressure on university staff to lower grading standards, students will want to study degrees that they believe will receive higher remuneration as graduates in order to pay off their debt, and a system that looks increasingly like the existing one in the US might convince the best of Britain's lecturers to cross the Atlantic in search of higher wages (Gusterson, 2011). It might be argued that several of these conditions already exist in some measure and that the impact of a free market for universities can only help to raise standards and competitiveness, but the desirability of this competition remains to be seen. Is the UK (and surely others will follow) moving back to an elitist higher education system where access is not only based on academic results, but on economic capabilities? It should be remembered that the Lisbon agenda talks of investing more in young people, education, research and innovation to generate wealth and provide security for every citizen, not just the privileged few. Current concerns that European economic recovery will be a slow and painful process do not bode well for equal open access to all degree and masters candidates.

This article goes on to examine the role of the so-called entrepreneurial universities and how they have absorbed the ideals laid down by the European Council via the Lisbon Strategy/Bologna. It then describes what one European entrepreneurial university is doing exactly to stimulate entrepreneurship in education and research and ends with some conclusions and thoughts on how we can use and share past experience to shape the future of entrepreneurship education for HEIs.

ENTREPRENEURIAL UNIVERSITIES

Out of the five major topics that were named as being increasingly important to academic and organisational agendas at the recent Bologna Process Researchers' Conference was the stimulation of entrepreneurship at universities (FOHE-BPRC, 2011), and if we look again at the list of priorities established by the modified Lisbon Strategy, universities have a key role to play in each and every one of them. The need for close ties and a network of influential bodies to bring universities in line with the needs of the business world have been highlighted in numerous contributions from academics. Etzkowitz (2004) emphasises the triple university-industry-government helix as the pillar on which entrepreneurial universities must be constructed. The benefits of this move towards an entrepreneurial culture and preparing graduates for the working world are apparent, and the desirability of business parks and incubators is outlined in Schulte's (2006) research on creating entrepreneurial universities, whilst creating ties and sharing knowledge with local industry has become the integral third mission of universities (Laredo, 2007; Nellis and Vorley, 2010) Lisbon Declaration is testimony to such a move.

The promotion of the entrepreneurial amongst the university community is key to providing the raw materials to bring about change, and convincing students and graduates of the possibility of starting their own business must become a priority for HIEs (Van Looy et al., 2011). Some authors suggest that pressure to innovate and to transfer knowledge and know-how from a top-down management perspective may even be detrimental to the chances of creating entrepreneurial universities (Philpott et al., 2011). These authors also believe that there is a need not only to train potential entrepreneurs among

the undergraduate and post graduate students, but also amongst the staff themselves in order to give them the tools to have an impact on the third mission. Measures of entrepreneurial universities are somewhat difficult to gauge because of the different legislation history of each area, particularly if the number of patents registered by universities is the main variable to bear in mind (Grimpe and Fier, 2010). The amount of informal technology transfer that occurs from university to industry may be a good deal greater than the more visible indicators suggest and comparisons with US universities may be somewhat misleading at this point.

Compliance with EU directives has brought about the introduction of business-related modules into the core curriculum of many of the degree courses offered by European universities. In Spain, the decision to introduce 4-year courses of 240 ECTS, as opposed to a 180 ECTS course, is based, to a degree, upon the ability to make the transition into working life an easier one for graduates. The idea is that the 4-year degree will help students to

- be more in line with degree courses around the world, not just Europe and thus enable access, for example, to third-tier studies at US institutions
- graduate at the same time as the majority of students in Europe, i.e. at 22 years of age, some countries where the norm is 180 ECTS begin their university education at 19
- broaden their experience whilst at university: qualifications with 240 ECTS allow for the greater introduction of practical teaching and core business studies components into the curriculum, and external work practice and mobility, whilst each of the 240 ECTS goes towards obtaining the degree
- receive a university education that gives an equal amount of time to practical teaching and experience as it does to the teaching of theory; this is one of the principal criteria laid down for the EHEA and on which universities may be assessed
- degrees of 240 ECTS will enable graduate entry into professional activity due to its practical nature and recognition from employers that further levels of education are unnecessary.

As we will go on to see, the introduction into the curriculum of business and administration studies is a core aspect for complying with the ambitions of the Lisbon Strategy, but other mechanisms are necessary to create the conditions needed for fostering the entrepreneurial university.

THE EXPERIENCE OF UNIVERSITAT POLITÈCNICA DE VALÈNCIA: AN ENTREPRENEURIAL UNIVERSITY

Introducing business skills into the curriculum

With a strong commitment to local and regional industry ties since its inception in 1968, the Universitat Politècnica de València (UPV) was quick to see that its graduates (mostly engineers and scientists) would represent one of the major sources of human capital to both the manufacturing and services sectors. As such, its policy makers have also been very aware of the need, within the framework of the EHEA, to introduce business-related components into core areas of the curriculum. Table 1 shows the components for the 240 ECTS four-year Industrial Engineering and Product Design degree offered at the Universitat Politècnica de València.

TABLE 1. *Breakdown of ECTS for the Industrial Engineering and Product Design Degree at Universitat Politècnica de València. (Adapted from the Universitat Politècnica de València Syllabus 2011-2012.)*

	Basic	Obligatory			Optional	Final project
Modules	Module 1	Module 2	Module 3	Module 4	Module 5	Module 6
Minimum number of ECTS	60	60	48	12	48	12

The area of business training is now significantly contained within the course components described as Basic Education, with six ECTS deriving from the Business Studies component in accordance with the Bologna Directives. As with most of the course components, credits awarded for Business Studies are equal in terms of practical and theoretical assessment. The fact that Business Studies is now included as a core component of a degree like Industrial Engineering represents a tremendous step forward in preparing students for employment in the business world and for starting up their own businesses. In addition, out of the 48 ECTS ascribed to optional courses, students have the opportunity to gain 18 ECTS via work experience initiatives. Nine optional credits can also be obtained for reaching certain levels in language skills; another factor that

increases student mobility and opens up new possibilities of finding work in other geographical areas. This format is now an integral part of the science and engineering courses at the UPV across the board.

Research and technology transfer at the UPV

As can be seen from the graphs below, a huge amount of financial and human resources is spent on RDI (research, development & innovations), not to mention an enormous amount of physical space on campus. The UPV has a wide range of science-based institutes devoted to developing cutting edge research, from nanophotonic technology to agrodiversity, all of which work in close collaboration with departments and faculties.

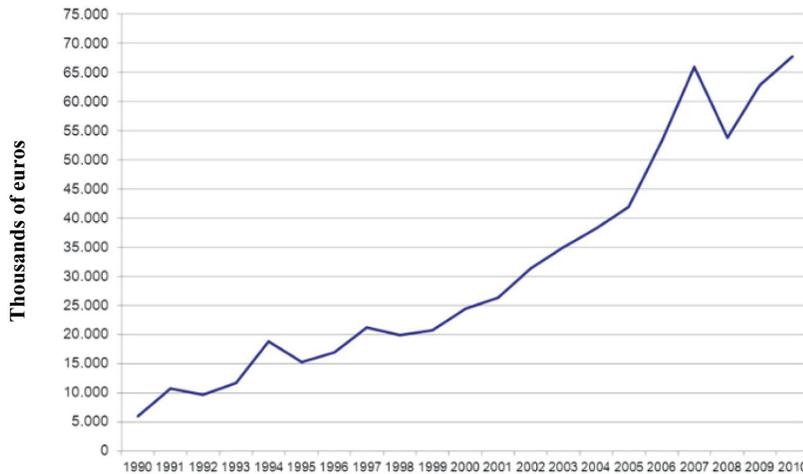


FIGURE 1. *Evolution of total activity in RDI.*

Source: Technology Transfer Centre, UPV.

Even bearing in mind rising inflation, the increase and RDI expenditure has been spectacular. Figure 1 is a reflection, not only of the increasing importance attached by the university to research, but also of the fluctuations in Spain's economy. The sharp rise in the mid-2000s contrasts with the first drop in activity just a few years later, coinciding with two important elements that have shaped the economic futures of most south European nations; their removal as a priority 1 area in terms of receiving EU funding and the beginning of the

economic crisis. Despite this inescapable fact, the entrepreneurial nature of the UPV allowed it to recover from the loss of hitherto sizeable support and find other means of providing resources for its RDI capabilities to grow once again, either through shifting its budget allocation or through private donations and financing. It must be stressed though that the large majority of RDI activities are entirely public funded and are dependent upon the university's desire to devote resources to spearhead innovative research. Figure 2 shows how the university's research activities have evolved in terms of the type of activity with regard to collaborative or competitive research.

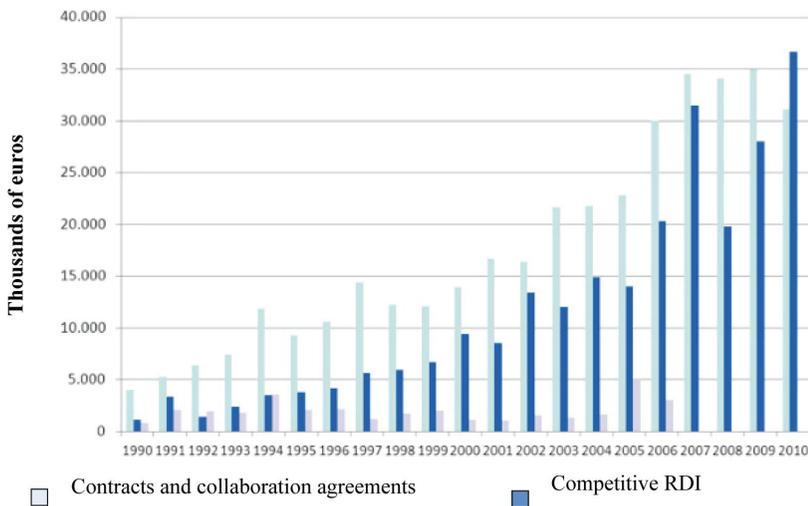


FIGURE 2. *A comparison of competitive and collaborative RDI activity.*
Source: Technology Transfer Centre, UPV.

Figure 2 is indicative of the fact that, even when there is a slump in competitive research activity, the UPV has managed to maintain its RDI portfolio by entering into collaboration agreements with other educational institutions or private companies. This aspect has formed a basic part of the majority of research activity and represents the desire on the part of the UPV to transfer technology to other spheres and applications. It is with this spirit of discovery and the desire to work as an entrepreneurial team that the UPV is committed to taking on a role in the CARPE consortium in the hope of developing an open, fluent flow and exchange of ideas, know-how and joint projects.

Finally, figure 3 gives an indication of the number of patents requested as a result of research carried out at the UPV. At first sight these figures may seem to be low, but recent changes to legislation with regard to spin-off companies may galvanise product development amongst university researchers and thus improve on the current rate of patents.

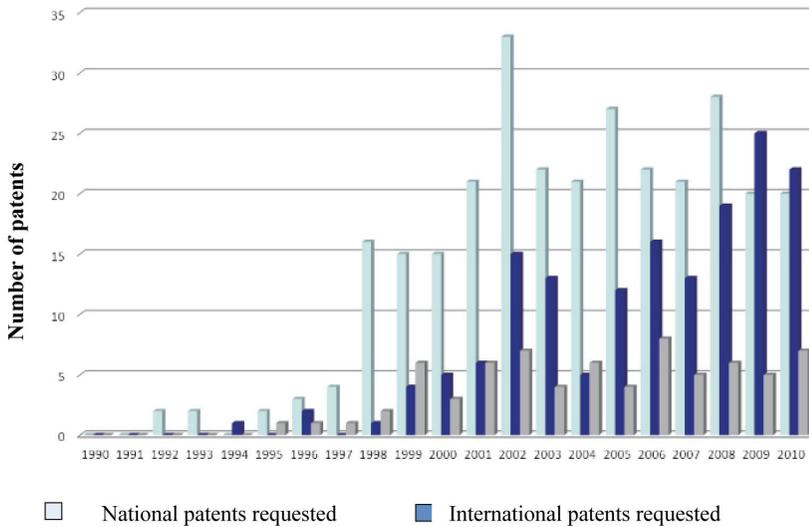


FIGURE 3. Annual patent portfolio at the UPV.

Source: Technology Transfer Centre, UPV.

The rise in the number of international patents in recent years must be interpreted as an extremely positive sign. Researchers are more aware of international markets and begin their research with the idea of transferring (and protecting) that knowledge to other geographical areas, to the extent that international patents have surpassed national ones over the last two years.

The role of the IDEAS business creation and development institute

Despite the vital steps being taken in terms of curriculum policy, there remains a somewhat less concrete, yet equally important task of inducing an entrepreneurial spirit. Recent research questions whether entrepreneurship is actually teachable or, more to the point, can it be learnt (Haarte and Lautenschläger, 2011). These authors suggest that HEIs should stop attempting

to teach entrepreneurship theory and concentrate on providing opportunities for students to actually experience it. If this is so, the fact that students are now becoming obliged to study business as part of their degrees will not suffice as the only means of instilling entrepreneurial spirit amongst the university community and evidence suggests that other mechanisms are necessary for instilling this notion.

With this idea in mind, the Universitat Politècnica de València began the IDEAS Institute for Business Creation and Development in 1992 as the first university business support programme. The objective was to foster entrepreneurship and encourage the creation of innovative and technology-based companies. Activities carried out by the Institute are varied and are essentially based on four pillars: the promotion of entrepreneurial culture, support for the creation of innovative and hi-tech businesses, business development support and, most fundamentally, training and education. The achievements of the IDEAS Institute were recognised by the European Commission in 2009 with the Award for the Promotion of Entrepreneurship, based mainly on the figures of start-up companies that were created with the aid of the team of experts at the Institute. Its services include:

- Integral personalised consulting/mentoring for new business creation
- Creation of technology-based firms and university spin-offs
- Financing and raising capital
- Business development and strategy
- Virtual business incubation
- Communication and diffusion of the entrepreneurial culture
- Training for entrepreneurs
- Knowledge generation and transfer.

The core aspect of its activities is based on a model of continuous mentoring for nascent entrepreneurs in which the mentor must become a part of the entrepreneurial team, the support provided must be flexible and constant, and that the team of experts must be multi-disciplined. Creativity is vital to the entrepreneurial experience (Millet, 2010), and mentors must guide university entrepreneurs in order to draw out their creative intelligence based on providing resources for RDI, entrepreneurial culture, process change, market studies and the search for new markets, protection and patents for new product innovation, problem-solving, awards, business plans, and the search for new members of the entrepreneurial team (Willoughby et al., 2011).

In terms of the diffusion of entrepreneurial culture, the institute carries out the following activities to motivate the creation of new, mostly technology-based innovative companies:

- Business motivation days
- The IDEAS closer to you campaign
- Conferences in schools and faculties
- The IDEAS television programme at UPTV
- The UPV employment forum
- Participation in “The Day of the Entrepreneur” in the Valencia region
- The CONIDEAS Conference
- Promotion of award schemes and prizes, including own “IDEAS Awards”
- Constantly updated website providing important information on national, regional and local government schemes to help start-ups.

IDEAS is a not-for-profit organisation funded almost entirely by the University itself, with sponsorship from some local businesses and banks for certain activities. Herein lies another aspect that has meant the success, but is ultimately a double-edged sword, for the work of the university business creation and development institute, i.e. the service is free to users. To an extent, the idea of a free service that promotes an entrepreneurial spirit is a contradiction in terms, and in a university world that is moving increasingly towards a market based on economic, as well as academic, results, one might suggest that the investment made by the university in future entrepreneurs should expect some investment back from those it helps to establish themselves in business. It is currently not viable to expect to receive the type of funding that many US universities receive either from private companies or from ex-alumni. However, as we move towards a marketable university framework, elements of some kind of payback system may be worth considering.

The results of the IDEAS Institute in terms of business creation (see figures 4-5) are worth looking at. Many of the entrepreneurs that approach the institute come with ideas that do not reach fruition, but the Institute has offered its services to a total of 1949 entrepreneurs since it began and 346 so far in 2011. According to the most recent figures, the Institute has helped to create a total of 545 new companies and this year has provided the mentoring service to a total of 45 firms, 24 of which are newly created and 21 are firms that look to IDEAS for ways of galvanising and developing existing businesses.

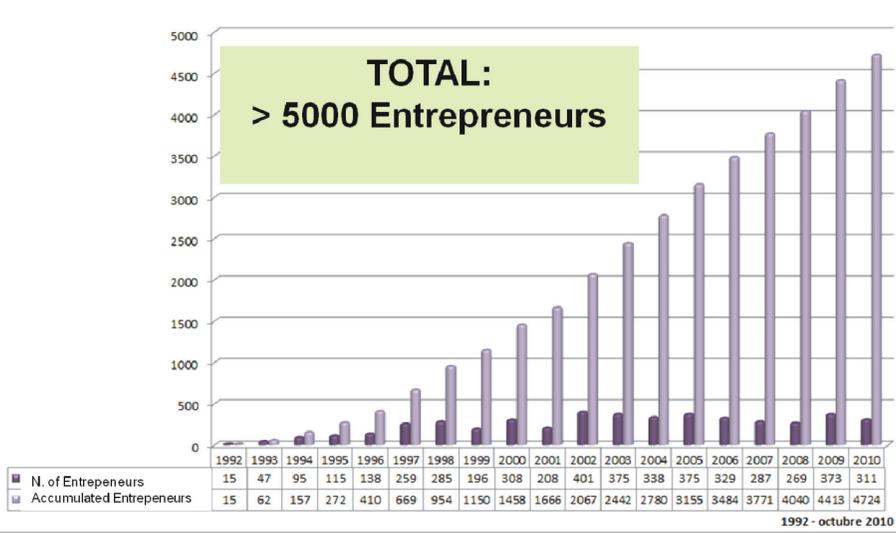


FIGURE 4. Evolution of potential entrepreneurs and entrepreneurial teams advised by the IDEAS Institute.



FIGURE 5. Evolution of Newly created firms at the IDEAS Institute.

This begs the question of the exact role of the business development and creation bodies. The idea behind a service like this is not to create as many firms as possible, but to advise potential entrepreneurs as to the likelihood of success of the business. Bearing in mind the time, energy and resources needed to start up a new firm, such effort should not be misspent in pursuing an activity that is not likely to succeed. It also acts as a networking tool, putting in contact people that come with similar ideas, but from different educational backgrounds in order to bring together an entrepreneurial team that is capable of starting up a sustainable business. Although it is not a source of financing on its own, the Institute uses its network of business contacts to look for possible investors and arranges business angel days where entrepreneurs not only find financing sources but also gain access to advice from current successful businesspeople. Along the same lines, the courses run by the Institute include a course in managerial skills that combines the knowledge of renowned professors with presentations from well-known local entrepreneurs who give accounts on high profile cases of success (and sometimes failure) so that students can learn from their experiences.

CONCLUSIONS

The Lisbon Strategy and its successive modifications have set out the stall for universities around Europe to meet the challenges inherent in increasing their role in contributing to the wealth of society and fulfilling the so-called third mission. Some of those challenges have already been taken up, and the results will be visible when graduates from the newly integrated system begin to take their place in the working world. Some research suggests that the introduction of new business modules into the curriculum is not enough and that first-hand experience of entrepreneurship is the key to promoting entrepreneurship awareness. The transition from an economy based principally on a manufacturing industry with large firms providing jobs for thousands to larger numbers of small hi-tech firms needs entrepreneurs with the vision to start-up companies with opportunities for growth and development and research. Such a transition will necessarily also involve the appearance of a larger number of service firms, but in an increasingly competitive market, these firms will also need to draw out their creative intelligence to provide innovative business formats that offer something new and attractive to the market.

Just as new firms need to be innovative, universities need to keep pace with these developments so that the business world receives highly employable graduates who can use the business skills acquired in higher education to transfer their knowledge and contribute to existing concerns or begin sustainable businesses. HEIs need to look carefully at the needs of their students in each field of study and research and adapt the curriculum accordingly.

Bodies such as the IDEAS Institute can make a meaningful contribution to the success and continuation of entrepreneurial universities, but they will need the support from all sides if they are going to function to their full potential; from the institutions themselves, from private enterprise, from European initiatives and their project partners, as well as the state.

The Universitat Politècnica de València has been recognised for providing its students with the necessary tools for embarking on a professional career with the necessary training and experience to successfully enter working life and has continued to adapt its degree and masters courses to provide core business input across almost all the subjects it offers. One exciting project for the future would be to design an international Master's Degree for entrepreneurs in collaboration with the CARPE consortium.

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INTERNATIONAL INNOVATION

Martijn Adriaan Boermans

HU University of Applied Sciences Utrecht

martijn.boermans@hu.nl

Hein Roelfsema

HU University of Applied Sciences Utrecht

hein.roelfsema@hu.nl

INTRODUCTION

This research project investigates the connection between internationalisation of small and medium-sized enterprises (SMEs) and innovation in the context of the Utrecht Region in the Netherlands. The study makes use of unique data that has been accomplished with the help of Syntens, the regional agency of the Ministry of Economic Affairs that aims to support SME innovation. The research group International Business and Innovation was asked to evaluate the effectiveness of consultancy with respect to internationalisation. To this end, 173 firms returned a questionnaire on their internationalisation success, innovation and the role of public consulting and subsidies. This dataset allows us to analyse the connection between internationalisation and innovation of Dutch SMEs in great detail.

SMES AND INTERNATIONAL ACTIVITIES IN THE UTRECHT REGION

Small and medium-sized enterprises are the largest employment generators in the European Union (EU). In the Netherlands much emphasis has been given to support the private sector by stimulating innovative activities. The Utrecht Region in the centre of the Netherlands is marked as the most competitive region in the EU according to the regional competitiveness index (European Commission, 2010: p.221). In total there are nearly 100,000 registered firms

in the province of Utrecht (Monitor Ruimtelijke Economie, 2010). Almost all these businesses are SMEs with less than 500 employees. From 2009 to 2010, there were more than 2,000 business start-ups in the province of Utrecht (CBS, 2011).

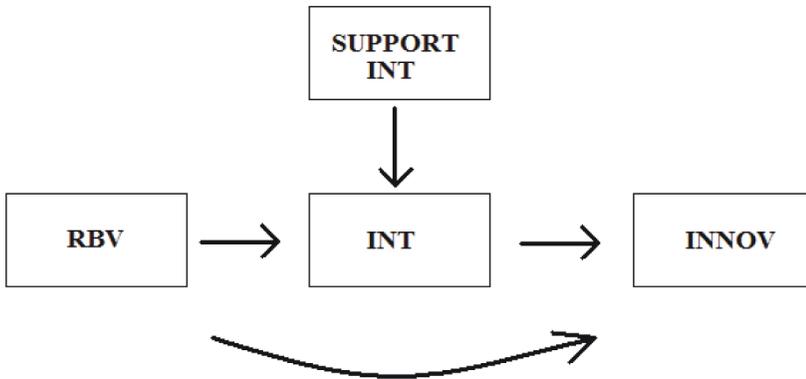
A large chunk of Dutch GDP is earned abroad. In 2010, the total estimated value of total exports is 370 billion euro, of which 75% is traded within the European Union (CBS, 2011). It is empirically well-established that firms that are internationally active perform better than their domestic peers. Larger firms are more likely to export or engage in other types of international activities (Melitz, 2003). As the Dutch economy is well-known as an international trade hub it is surprising that relatively little is known about the international activities of small companies in the Utrecht region (Boermans, 2011). Whereas the Dutch firms are among the world's largest exporters, importers and foreign direct investors, Dutch SMEs, as compared to SMEs from other European countries, occupy a position in the middle with respect to the share of enterprises that export, import or invest abroad.

Very few SMEs are engaged in international trade. Nonetheless, SMEs account for half of the total Dutch exports. According to researchers at EIM Business & Policy Research, in 2007 Dutch SME exports were more than 224 billion euro. Direct importing activities are the most common “international activity” of Dutch SMEs. In 2004, 26% of Dutch SMEs were importing goods or services from abroad, 18% were engaged in exporting activities, 2% invested abroad and 9% cooperated with foreign partners (Hessels, 2005). In 2007 the European Commission completed 604 interviews with managers from Dutch small and medium-sized enterprises (SMEs). At that time only 74 SMEs indicated to be exporting; about 12% of the sample. Based on EIM data, in 2010, 27% of Dutch SMEs were importing goods or services from abroad, 19% were engaged in exporting activities, 4% invested abroad and 13% cooperated with foreign partners. Based on EIM data, in 2006 SMEs in the Utrecht Province earned nearly 5 billion euro in foreign markets. Notice that this represents only 6% of the total economic activity by SMEs in that region, which was more than 75 billion euro in 2006. Although small, Dutch SMEs generate much income and employment, and especially those that are internationally active are an important engine of growth.

Relationship between international and innovation of Dutch SMEs

There is a strong connection between productivity, employment and internationalisation. We are interested to study to what extent international activities contribute to innovation. To this end we collaborate with Syntens, the regional agency of the Ministry of Economic Affairs that aims to support SME innovation. In general this agency focuses on assisting SMEs with innovation; however, a new government subsidy was provided to enable SMEs to internationalise. The programme's aim was to stimulate small business owners to move abroad and search for clients in foreign markets. Based on our internal evaluation of this programme we find that indeed these firms were enabled to internationalise (Boermans & Roelfsema, 2011).

The aim of this research project is to investigate the connection between internationalisation of small businesses and innovation in the context of the Utrecht Region in the Netherlands. Traditionally, internationalisation is viewed as a consequence of innovative capabilities in the domestic market. That is, prior models focused on the realisations of innovative products and services that subsequently could be sold in foreign markets. As such, innovation drives firms to internationalise. However, more recently, emphasis is placed on how internationalisation may improve the innovative capabilities of SMEs. Hence, internationalisation may drive innovation. For example, there is wide evidence that firms learn from exporting (e.g. Boermans, 2010; Wagner, 2002). If indeed there are important spill back effects of internationalisation, establishing causal relations between innovation and internationalisation becomes an empirical challenge. The main contribution of this paper is to use the export subsidy programme as an instrumental variable (IV) for internationalisation. Using IV regression techniques we are able to elucidate the 'causal' relationship from internationalisation to innovation while controlling for other explanatory variables. Further, innovation takes many faces (product, process, organisation) and it is an open question through which channel internationalisation affects innovation and how this is related to the resource base of the firm. In order to test these ideas a questionnaire was set up; the questionnaire was returned by 173 firms, who were all involved with the government agencies' programme directed at starting to internationalise. The firms reported on their internationalisation success, innovation and the role of public consulting and subsidies. This dataset allows us to paint a detailed picture of the connection between internationalisation and innovation of Dutch SMEs, see Figure 1 below.



Note: innovation (INNOV) is determined by the firm's resource base (RBV), as well as internationalisation (INT). In order to test the causal relationship between internationalisation and innovation we use a unique instrumental variable approach, utilising information about the support for internationalisation government programme (Support INT), which only affects internationalisation and not innovation.

FIGURE 1. *Theoretical relationship between internationalisation and innovation.*

DATA AND METHOD

Data

Data was collected between April 13 and May 13, 2011. 755 firms were contacted but 71 were not reachable, leaving a target sample of 684 firms. 173 participated in our study, which gives us a response rate of 25.3%. 13 firms indicated that they did not participate in the programme, so these firms were dropped. 17 firms were unwilling to answer questions related to our key variables so due to these missing values our final sample consists of 143 firms. The full questionnaire is available upon request.

In terms of firm size, 69% of the firms have up to 9 employees, another 15% have between 10 to 19 employees, leaving 7% with more than 20 employees. The percentage of sales that stem from international activities differs widely across firms. 41.3% generates about 1 to 10% of their sales abroad, another 19.6% scores between the 10 and 20%, and, 29.3% indicates to earn more than 20% of their sales in foreign markets (leaving 9.8% with no international sales at all).

Measurements

Dependent variable

Innovation: We have two variables that measure innovative capacity and realised innovations. First, *innovative capacity* measures the perceived innovative competitive advantage of the firm compared to its direct competitors in the sector on a Likert scale from 1 to 5. Here, 51.1% of the firms view their innovative capacity as a highly distinguished competitive advantage. Second, firms indicated whether they realised to produce three or more *new products or services* in the past three years. 58.9% of the firms launched several new products or services.

Explanatory variables

Internationalisation: We use a scale of internationalisation using three items. First, we use a logically ordered categorical variable for the share of sales obtained abroad that ranges from 0 to 10. This measure informs us about the intensity of international activities. Second, we use information on the pace of internationalisation at the onset of the firm. Finally, we asked firms if they are satisfied with the current level of internationalisation on a Likert scale from 1 to 5. After normalisations we construct an internationalisation scale by simple addition (Cronbach's alpha = 0.61). On average, the internationalisation score is 0.45 (SD = 0.29).

Resource base: Firms were asked to indicate their competitive advantage compared to other firms in the sector on a Likert scale from 1 to 5 on five different items. These items include firm resources: technological know-how, market knowledge, business networks, education level employees, and entrepreneurship. In addition, we use information on the importance of each resource for the firm's operations and competitive advantage combined with the perceived resource base by multiplication of the scores, and dividing these rescaled items. The idea behind this hazard rate transformation is that if, say firm A has a high resource advantage in technological know-how, yet earlier indicates that this competitive edge is not so useful in their market, we deflate the resource score accordingly. Finally, we take all five resource items together in a resource scale, where we index the scores between 0 and 1 (Cronbach's alpha = 0.62). Our resource scale has an average value of 0.48 (SD = 0.20).

Instrumental variable

Support internationalisation: Firms were asked to give an overall score ranging from 1 to 5 for the full programme. On average, firms are satisfied with the programme, giving it a score of 3.8 (SD = 0.9). Also, firms were asked if given the experience of the current programme, they would again participate in it. 94.4% indicates that they would like to participate again. Note that the overall rating and re-participation are highly correlated ($\rho = 0.45$; $p < 0.001$). Other instruments include fair participation and whether or not the firm completed the internationalisation programme.

Methodology

Looking at the relationship between internationalisation and innovation, we expect internationalisation to have an endogenous connection to innovation, in the sense that more innovation is also associated with internationalisation. Using a 2SLS set-up we first test if internationalisation has a 'causal' impact on innovation. Our hypothesis is that support for internationalisation has a positive effect on internationalisation, yet that this support should not be related to innovation. We use three novel instruments in this literature: support internationalisation, fair participation, and the finalisation of the programme.

In the first stage, the R^2 is 0,25 which is relatively high, and also, the F -value of the model is 9,90 ($p < 0,001$), suggesting there is no weak-instrument problem. Also, the instrumental variables are highly correlated with the endogenous regressor internationalisation, yet they are not significantly correlated with the outcome variable, innovation. Furthermore, we applied an overidentifying restrictions test to verify the validity of the excluded instruments. Based on the Sargent J test we cannot reject the null, so our instruments are valid ($\chi^2 = 1,33$; $p = 0,52$). However, the Hausman-Wu test does not suggest that we have any endogeneity problem in the present model (and, hence, can simply apply OLS), since we cannot reject the null that the variables are exogenous ($\chi^2 = 0,55$; $p = 0,46$). Nonetheless, given our theoretical priors we do expect that there is an endogeneity issue, which can be mitigated by our unique instrumental variables.

$$(1) \text{ INNOV} = \text{INT} + \text{RBV} + \text{Controls}$$

$$(2) \text{ INT} = \text{IV} + \text{RBV} + \text{Controls}$$

RESULTS

The results in Table 1 show that internationalisation has a significant ‘causal’ effect on both innovative capacity and new products and services. This effect becomes less pronounced when controlling for the resource base of the firm. We find that the resource base of the firm is associated with innovative capacity, but has no relationship to new products and services. Overall, our results highlight that internationalisation has a strong effect on building up innovative capacities, regardless of the resource base of the small business. In addition, the resource base of the firm cannot explain “hard” innovations, while internationalisation has a direct impact on the initiation of new products and services. To our interpretation these outcome show that assisting firms to internationalise may spur innovation

TABLE I. *IV Regression results.*

	<i>Innovative capacity</i>		<i>New products and services</i>	
Internationalisation	0.29** [0.14]	0.24* [0.13]	0.20** [0.10]	0.18* [0.10]
Resources		1.53*** [0.32]		0.09 [0.25]
Obs.	143	143	143	143
R^2	0.12	0.29	0.07	0.13

Standard errors in brackets, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. IV for internationalisation include support internationalisation, fair participation, and the finalisation of the programme. Each specification includes controls for firm size, firm age and four sector dummies (industry, trade, business services and construction). In general, size among SMEs has a negative relationship with innovative capacity and new products and services, other controls were insignificant.

CONCLUDING REMARKS

In this study we analyse the causal connection between internationalisation of Dutch SMEs in the Utrecht Region and innovation. In particular, we make use of an instrumental variable approach, where we are able to use the export participation support programme of Syntens as a unique instrument for internationalisation. We show that internationalisation of SMEs drives the innovative capacities of the firm, regardless of the initial resource base of the firm. Firm resources like technological know-how, market knowledge, business networks, education level employees, and entrepreneurial orientation

strengthens innovative capacities, but cannot explain the launch of new products and services. Internationalisation has a significant effect on innovation in terms of new products and services.

This study provides a very optimistic story for policy makers interested in spurring innovation. It seems that regardless of the firm resources, pushing firms abroad will give rise to new ideas, organisational practices and productivity improvements due to economies of scale and scope. Programmes focusing on stimulating innovation may also be important, however, stimulating internationalisation through export participation is likely to kill two birds with one stone. Future research can improve our theoretical understanding of such transmission mechanism.

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SELF-LEADERSHIP, ENTREPRENEURSHIP, CREATIVITY AND PRODUCTIVITY IN THE NETHERLANDS AND THE UNITED ARAB EMIRATES

Paul Breman

HU University of Applied Sciences Utrecht

paul.breman@hu.nl

John Politis

Neapolis University Pafos

j.politis@nup.ac.cy

INTRODUCTION

The goal of this study is to examine the impact of Self-leadership styles on the dimensions of Entrepreneurial Orientation in organisations in Dubai and the Netherlands: Innovativeness, Risk Taking and Proactiveness. The study also distinguishes the impact of Self-leadership styles and Entrepreneurial Orientation on the dimensions of Creativity and Productivity. A path analysis was performed by applying structural equation modelling (SEM) using analysis of moment structures (AMOS).

Although a handful of studies have explored the relationship between a number of leadership styles and entrepreneurial orientation (EO) (Tapsel & Woods, 2010; Quince & Whittaker, 2003; Wang & Cheng, 2010; Zhang & Bartol, 2010), researchers and practitioners acknowledge that the literature linking specific self-leadership strategies to firms' EO is notably absent. This paper aims to investigate the impact of the specific self-leadership strategies of

‘opportunity’ and ‘obstacle’ thinking on the dimensions of EO, creativity and productivity in entrepreneurial organisations operating in the Netherlands and in the United Arab Emirates.

In the context of this cross-cultural study the entrepreneurial organisation (Barringer & Bluedorn, 1999) is defined as “one that engages in product market innovations, undertakes somewhat risky ventures and is first to come up with ‘proactive’ innovations, beating competitors to the punch. A non-entrepreneurial firm is one that innovates very little, is highly risk adverse, and imitates the moves of competitors instead of leading the way” (Miller, 1983, p.771). The firms’ EO was assessed by the constructs of *Innovativeness*, concerned with the supporting and encouraging of new ideas, experimentation and creativity (Ramos, 2005) likely to result in new products, services or processes (Miller & Friesen, 1983); *Risk Taking*, referring to measuring the extent to which individuals differ in their willingness to take risk is contentious (Lumpkin & Dess, 1996) and *Proactiveness*, concerned with ‘first mover’ and other actions aimed at seeking to secure and protect market share and with a forward-looking perspective reflected in actions taken in anticipation of future demand (Miller, 1983; Lumpkin & Dess, 1996).

Self-leadership involves the influence people exert over themselves to achieve the self-motivation and self-direction needed to behave in desirable ways (Manz, 1992; 1986; Neck & Mantz, 1996). In the literature the three distinct but complementary categories of self-leadership (e.g. behavioural-focused strategies, natural reward strategies and constructive thought pattern strategies) influence employees’ outcomes. In this cross-cultural study the thought pattern strategies of ‘opportunity’ and ‘obstacle’ thinking were employed on establishing and altering desirable employees’ outcomes (Prussia, Anderson & Manz, 1998).

Finally, organisational performance was measured using Amabile’s et al. (1996) constructs of creativity and productivity (Wang & Cheng, 2010; Zhang & Bartol, 2010), which fit into the broader framework of assessing the firms’ EO.

CONCEPTUAL MODEL AND HYPOTHESES

In relation to thought pattern strategies it was argued that many self-leadership strategies provide entrepreneurs with methods for increasing optimistic or opportunity-influenced thought patterns (D'Intino, et al., 2007). Moreover, Politis and Politis (2009) found that the self-leadership thought pattern strategies (opportunity thinking) are positively and significantly related with proactiveness (p.207). It is thus plausible to assume that positive thought pattern strategies will be predictive variables of EO. This assumption is expressed in Hypothesis 1.

Hypothesis 1: The greater the level of 'opportunity thinking' thought pattern strategies, the greater the level of entrepreneurial orientation.

In relation to the negative thought pattern strategies (i.e. obstacle thinking) it was argued that suppressing negative, undesirable behaviours can lead to unsuccessful outcomes (D'Intino, et al., 2007). Moreover, in Politis and Politis's (2009) study 'obstacle thinking' of self-leadership was found to be negatively and significantly related to innovation, risk taking and proactiveness (p.207). It is thus fair to assume that obstacle-type thinking could have a negative influence on the factors of EO. This relationship is expressed in Hypothesis 2.

Hypothesis 2: The lower the level of 'obstacle-thinking' thought pattern strategies, the greater the level of entrepreneurial orientation.

Furthermore, Politis's (2005) research found that specific self-management leadership behaviours were positively and significantly related with the "stimulant" dimensions of the work environment for creativity. But the dimensions of the work environment for creativity measured by Amabile's et al. (1996) scales contain certain themes, such as innovation and creativity, common to those measured by Miller's (1983) EO dimensions. It is thus reasonable to hypothesise that the dimensions of 'opportunity thinking' and 'obstacle-thinking' will be related to the constructs of creativity and productivity. The assumed connectedness between self-leadership thought pattern strategies and creativity and productivity is expressed in Hypothesis 3 and 4, respectively.

Hypothesis 3: The relationship of the 'opportunity thinking' strategies with creativity will be stronger than that with the 'obstacle-thinking' strategies.

Hypothesis 4: The relationship of the 'opportunity thinking' strategies with productivity will be stronger than that with the 'obstacle-thinking' strategies.

SUBJECTS AND PROCEDURE

Sample

The study involves a questionnaire-based survey of employees from a number of organisations operating in the Netherlands and the UAE (Dubai). In both samples anonymity and confidentiality were guaranteed. All respondents were full-time employees and volunteered to participate in the study. Both samples completed identical questionnaires containing items measuring the self-leadership dimensions of opportunity and obstacle thoughts, EO, creativity and productivity. The questionnaire was written in the English language in Dubai and in the Netherlands the questionnaire was translated into Dutch.

In Dubai the sample was drawn from six service organisations which are pursuing entrepreneurial activities. A total of 401 employees returned usable questionnaires (78.6% response rate). Sixteen incomplete questionnaires were excluded from the final sample. The final sample consisted of 32.9% females and 67.1% males. The participants were relatively young as 60.9% were under the age of 30; 80.1% were employed for less than 4 years in the current position and 64.6% were employed for less than 4 years in the organisation. As for the participants educational level, 75.6% had attained a college degree and 11.7% had received technical college qualifications in the English language.

In the Netherlands the random sample consisted of 10,000 SME's all over the Netherlands in different sectors of industry. The total response was 285 useable questionnaires (2.85% response rate). The respondents were all owners and/or managing directors of the company. The final sample consisted of 82.8% males and 17.2% females. The participants were relatively old as 54.7% were above the age of 45; 56.5% were employed in the current position for more than 5 years and 45.3% were employed more than 5 years in the organisation. As for the participants' educational level, 89.5% had attained a college degree and 4.2% had received technical college qualifications.

Analytical procedure

The analysis of moment structures (AMOS) software (Arbuckle, 2003) was used for the factor analysis (measurement model) and for the regression analysis (structural model). A mixture of fit-indices was employed to assess the overall fit of the measurement and path models given by the AMOS software.

These include: the chi-square to degrees of freedom (χ^2/df); the goodness-of-fit (GFI); the adjusted goodness-of-fit (AGFI); the comparative fit index (CFI); the Tucker and Lewis index (TLI); the root mean square residual (RMR) and root mean square error approximation (RMSEA). According to Jorskog and Sorbon (1993), the model fits the data well when the values of GFI, AGFI, CFI and TLI are greater than 0.90; RMR is less than 0.05; RMSEA is up to 0.05 and acceptable up to 0.08; and χ^2/df is less than 3.0. A confirmatory factor analysis (CFA) was performed to assess the factorial validity of the measurement models and the results are shown in Section 4. Subsequently, a path analysis was performed using AMOS.

MEASUREMENT MODELS

Independent variables

Self-leadership constructive thought pattern strategies were assessed using Manz's (1992) 20-item self-assessment questionnaire, which measures employees' opportunity and obstacle thoughts. The instrument employs a 5-point Likert response scale (1 = strongly disagree; 5 = strongly agree). A CFA of all items was conducted checking for construct independence. As the initial CFA revealed 5 variables, which are not in line with Manz's (1992) 2 factors, a series of CFAs were performed until the 2 factor solution was obtained. Thus, the data supported the independence of 'opportunity thinking' and 'obstacle thinking' factors for both the Dutch and the UAE sample. The number of items supporting each factor and their alpha (α) coefficients are shown in Table 1. In addition, Table 1 shows the items not supporting each factor due to cross and/or poor loading. These items were not included in the path model analysis.

Dependent variables

Entrepreneurial orientation constructs (Kreiser, Marino & Weaver, 2002) were assessed using Miller's (1983) scale further extended in the specialised literature (Covin & Slevin, 1989); a 9-item instrument was employed for measuring innovativeness, risk taking and proactiveness, and each factor is measured by 3 items. The instrument employs a 5-point Likert response scale (1 = strongly disagree; 5 = strongly agree). The CFA results supported the

factor of innovativeness (4 items, $\alpha = 0.85$) and risk taking (4 items, $\alpha = 0.56$) for the Dutch sample. The factor of proactiveness was not supported by the data of this study as two of its observed variables were loaded on the factors of innovativeness and risk taking. In addition, the results of the CFA supported the combined factor of innovativeness/proactiveness (5 items, $\alpha = 0.74$) and risk taking (3 items, $\alpha = 0.57$) for the UAE sample. The results of the CFA are shown in Table 1.

Creativity was assessed using Amabile and colleagues' (1996) 6-item instrument, which is part of the KEYS instrument. The instrument employs a 4-point response scale (1 = never; 4 = always). Based on the results of a CFA, the factor of creativity was fully supported by the Dutch sample (6 items, $\alpha = 0.90$) and the UAE sample (6 items, $\alpha = 0.71$).

Productivity was assessed by Amabile and colleagues' (1996) 6-item instrument, which is part of the KEYS instrument. The instrument employs a 4-point response scale (1 = never; 4 = always). Based on the results of a CFA, the factor of creativity was fully supported by the Dutch sample (6 items, $\alpha = 0.89$) and the UAE sample (6 items, $\alpha = 0.77$).

Table 1 contains the variables confirmed by the CFA for each sample. As shown, the variables of 'opportunity thinking' and 'obstacle thinking', risk taking, creativity and productivity were fully confirmed for both the Dutch and the UAE sample. The EO variable of proactiveness was not confirmed as it clustered with innovativeness forming the combined factor of innovativeness/proactiveness for the UAE sample. Furthermore, two items of proactiveness were loaded on the factors of innovativeness and risk taking for the Dutch sample. Hence, the factor of proactiveness was included in the path model analysis. Instead the combined factor of innovativeness/proactiveness was used in the path model analysis for the UAE sample.

TABLE 1. *CFA Results and Alpha (α) Coefficient of the Netherlands¹ and the UAE² Sample.*

Variable	No of Items Supporting the Variable ¹	No of Items Not Supporting the Variable ¹	Cronbach Alpha (α) ¹	No of Items Supporting the Variable ²	No of Items Not Supporting the Variable ²	Cronbach Alpha (α) ²
Opportunity Thinking	8	2	0.61	10	-	0.75
Obstacle Thinking	5	5	0.46	6	4	0.73
Innovativeness	4	-	0.85	-	-	-
Innovativeness/ Proactiveness	-	-	-	5	1	0.74
Risk taking	4	-	0.56	3	-	0.57
Proactiveness	-	3	-	-	-	-
Creativity	6	-	0.90	6	-	0.71
Productivity	6	-	0.89	6	-	0.77

¹ Netherlands, N = 285

² United Arab Emirates (UAE), N = 401

Path modelling

Using the analytical procedure outlined in Politis's (2001, pp. 358–359) study, the regression coefficients (λ s) were calculated which reflect the regression of each composite variable on its latent variable, and the measurement error variances (θ s) associated with each composite variable. Table 2 contains the means, standard deviations, reliability estimates, λ and θ estimates that was used in the path model. Once the λ s and θ s were calculated, this information was transformed to the path model to examine the relationships among the latent variables.

The path models to be tested contain two independent variables (opportunity and obstacle thinking) for both the Netherlands and the UAE sample and the dependent variables of risk taking, creativity and productivity for the Dutch sample and the dependent variables of innovativeness/proactiveness, taking, creativity and productivity for the UAE sample.

TABLE 2. *Descriptive Statistics, Reliabilities, λ and θ Estimates.*

				Loading	Error				Loading	Error
Variable	Mean ¹	SD ¹	Cronbach Alpha (α) ¹	λ ¹	θ ¹	Mean ²	SD ²	Cronbach Alpha (α) ²	λ ²	θ ²
Opportunity Thinking	4.02	0.37	0.61	0.29	0.053	3.78	0.59	0.75	0.51	0.087
Obstacle Thinking	2.30	0.49	0.46	0.33	0.130	3.01	0.76	0.73	0.65	0.156
Innovativeness	3.41	0.85	0.85	0.78	0.108	-	-	-	-	-
Innovativeness/ Proactiveness	-	-	-	-	-	3.76	0.71	0.74	0.61	0.131
Risk taking	2.68	0.63	0.56	0.47	0.175	3.73	0.72	0.57	0.54	0.223
Proactiveness	-	-	-	-	-	-	-	-	-	-
Creativity	2.69	0.58	0.90	0.55	0.034	2.95	0.56	0.71	0.47	0.091
Productivity	2.94	0.48	0.89	0.45	0.025	3.21	0.55	0.77	0.48	0.070

1 Netherlands, N = 285

2 United Arab Emirates (UAE), N = 401

$$\lambda = \sigma \sqrt{\alpha}$$

$$\theta = \sigma^2 * 1 - \alpha$$

Note: λ has been rounded to two decimal places.

The AMOS analysis showed that the structural model of the Dutch sample fits the data reasonably well, with $\chi^2/df = 3.83$; $p = 0.009$, GFI = 0.98; AGFI = 0.91; CFI = 0.95; TLI = 0.81; RMR = 0.019; and RMSEA = 0.100. In addition, the AMOS analysis revealed that the structural model of the UAE sample fits the data reasonably well, with $\chi^2/df = 4.32$; $p = 0.000$, GFI = 0.96; AGFI = 0.82; CFI = 0.92; TLI = 0.77; RMR = 0.021; and RMSEA = 0.153. Alternative models were examined either with paths added, reversed or removed, but all led to significantly worse model fit. Thus, the standardised regression coefficient estimates from the two AMOS structural models were tabulated in Table 3.

RESULTS

Table 3 presents the standardised path estimates (γ s) found from the AMOS analysis, as well as the means, standard deviations, and coefficient alphas (α s) of the two independent variables and the constructs of EO, creativity and productivity. It should be noted that only significant regression coefficients are reported.

TABLE 3. Means, standard deviations, and AMOS standardised regression path estimates of opportunity and obstacle thinking, innovativeness/proactiveness, risk taking, creativity and productivity variables.

Latent Variable	Mean ¹	Mean ²	σ^1	σ^2	1 ¹	1 ²	2 ¹	2 ²	3 ¹	3 ²	4 ¹	4 ²	5 ¹	5 ²	6 ¹	6 ²	7 ¹	7 ²
Self-leadership Constructive Thought Pattern Strategies																		
1. Opportunity Thinking Strategies	4.02	3.78	0.37	0.59	0.61^a	0.75^a												
2. Obstacle Thinking Strategies	2.30	3.01	0.49	0.76	-0.26	-	0.46	0.73										
Entrepreneurial Orientation (EO)																		
3. Innovativeness	3.41	-	0.85	-	0.29	-	-0.14	-	0.85	-								
4. Innovativeness/Proactiveness	-	3.76	-	0.71	-	0.71	-	0.16	-	-	0.74							
5. Risk taking	2.68	3.73	0.63	0.72	-0.28	0.80	0.45	0.32	-0.24	-	-	0.50	0.56	0.57				
Outcome Variables																		
6. Creativity	2.69	2.95	0.58	0.56	0.38	0.52	-	0.36	0.49	-	-	0.46	-0.21	0.44	0.90	0.71		
7. Productivity	2.94	3.21	0.48	0.55	0.19	0.61	-	-	0.27	-	-	0.43	-	0.32	0.35	0.55	0.89	0.77

^a Cronbach alpha reliability estimates (α s) are located on the diagonal **1** Netherlands, N = 285 **2** United Arab Emirates (UAE), N = 401

All standardised path estimates (γ s) ≥ 0.26 are statistically significant, $p < 0.01$; and all γ s above 0.14 are statistically significant, $p < 0.05$. Note: γ s not reported if not statistically significant.

Overall, the results from the path models support two of the four hypotheses. As predicted, the relationship between the 'opportunity thinking' strategies and creativity are consistent with Hypothesis 3. Specifically, 'opportunity thinking' is significantly and positively related to creativity for the Dutch sample ($\gamma = 0.38$, $p < 0.01$), and for the UAE sample ($\gamma = 0.52$, $p < 0.01$). Moreover, Hypothesis 4 was fully supported as the relationship between 'opportunity thinking' strategies and productivity is significant and positive for the Dutch sample ($\gamma = 0.19$, $p < 0.05$), and for the UAE sample ($\gamma = 0.61$, $p < 0.01$).

Hypothesis 1 stated that the greater the level of 'opportunity thinking' thought pattern strategies, the greater the level of entrepreneurial orientation. The standardised path coefficient between innovativeness and 'opportunity thinking' was significant and positive for the Dutch sample ($\gamma = 0.29$, $p < 0.01$). However, the expected relationship between 'opportunity thinking' and the dimension of risk taking was not supported. Contrary to prediction, risk taking was negatively related to 'opportunity thinking' ($\gamma = -0.28$, $p < 0.01$), hence Hypothesis 1 was partially supported for the Dutch sample. The results from the UAE path model however fully supported Hypothesis 1, in that the relationships between 'opportunity thinking' and innovativeness/proactiveness and risk taking were strong and significant ($\gamma = 0.71$, $p < 0.01$, and $\gamma = 0.80$, $p < 0.01$, respectively).

In relation to the 'obstacle thinking' – EO relationships, the findings are not consistent with predictions. Specifically, the results showed that 'obstacle thinking' was significant and positively related to innovativeness/proactiveness ($\gamma = 0.16$, $p < 0.05$) and risk taking ($\gamma = 0.32$, $p < 0.01$) for the UAE sample, not supporting Hypothesis 2. As for the Dutch sample, the relationship between 'obstacle thinking' and risk taking was strong and positive ($\gamma = 0.45$, $p < 0.01$), whilst the relationship with innovativeness was weak and negative ($\gamma = -0.14$, $p < 0.05$), partially supporting Hypothesis 2. No other paths were significant between self-leadership thought pattern strategies and the dimensions of EO.

Although not related to the hypotheses, there are a number of important relationships that are worth mentioning. Specifically, there is a strong, positive and significant relationship between innovativeness and creativity ($\gamma = 0.49$, $p < 0.01$), and productivity ($\gamma = 0.27$, $p < 0.01$) for the Dutch sample. Similarly, there is a strong, positive and significant relationship between innovativeness/proactiveness and creativity ($\gamma = 0.46$, $p < 0.01$), and productivity ($\gamma = 0.43$, $p < 0.01$) for the UAE sample. Finally, risk taking has a significant and strong influence on the variables of creativity ($\gamma = 0.44$, $p < 0.01$), and productivity ($\gamma = 0.32$, $p < 0.01$) for the UAE sample.

INFLUENCE OF INTERNATIONAL CULTURE

The replication or extension from research done in one country to another country focuses attention on the implication of national culture for the research process. Dutch researcher Hofstede (1980) studied national cultures in more than 50 countries, by analysing the organisational cultures of the IBM subsidiaries around the globe and by grouping the national cultures with the help of four dimensions:

- 1) Power distance (PDI)
- 2) Individualism vs. collectivism (IDV)
- 3) Masculinity vs. femininity (MAS)
- 4) Uncertainty avoidance (UAS).

Hofstede (1994, p.7) stresses the importance of national culture when one is undertaking research in management and organisations and concludes:

Therefore management practices in a country are culturally dependent, and what works in one country does not necessarily work in another. However not only the managers and human and children of their culture; the management teachers, the people who wrote and still write theories and create management concepts, are also human and constrained by the cultural environment in which they grew up and which they know. Such theories cannot be applied in another country without further proof if applicable at all, it is often only after considerable adaption.

Taking Hofstede's theories into consideration, we might expect some results in the Netherlands to be different to the results that have been found in Dubai. This could be due to differences in national cultures. On the internet more information about Hofstede's scores of the countries in the world can be found. Hofstede is not reporting about Dubai specifically, but his index of "the Arab World" includes the countries of Egypt, Iraq, Kuwait, Lebanon, Libya, Saudi Arabia, and the United Arab Emirates.

The Power Distance (PDI) of the Arab Countries is 80, which is very high and 38 in the Netherlands, which is rather low. The Arab Countries (68) and the Netherlands (53) both have a high uncertainty avoidance (UAS), although in the Arab World the index is a little higher. The Masculinity index (MAS) in the Arab Countries is 52 and in the Netherlands 14, which is very low, which makes the Netherlands a "feminine culture" country. On the Individualistic

Index (IDV) the Netherlands is much more individualistic (80) than the Arab Countries which rank 38, which shows that these are collectivistic societies. (<http://www.geert-hofstede.com/hofstede>).

DISCUSSION

The aim of this research was to investigate the impact of the specific self-leadership strategies of 'opportunity' and 'obstacle' thinking on the dimensions of EO, creativity and productivity among two distinct cultures. The study provides cross-cultural comparisons in entrepreneurial organisations operating in the Netherlands and in the United Arab Emirates.

The findings of this study give support to the role of 'opportunity thinking' strategies (i.e. optimistic behaviour) in fostering entrepreneurial orientation behaviour mainly in the Arabic culture. Employees in Dubai who are vested with optimistic behaviour are displaying higher risk taking and innovativeness/proactiveness behaviour than the employees in the Netherlands. Surprisingly, in the Netherlands the results showed that the influence of 'opportunity thinking' strategies on innovativeness and creativity was relatively weak ($\gamma = 0.29$, $p < 0.01$) and its impact on risk taking was negative ($\gamma = -0.28$, $p < 0.01$). Although employees in Dutch organisations had a slightly higher level of optimistic behaviour ($\mu = 4.02$) compared to the UAE organisations ($\mu = 3.78$), it appears that they are not prepared to take risk and are less innovative. This difference is surprising as both the Netherlands and the Arab Countries have high uncertainty avoidance. Also the power distance in the Netherlands is much lower than in the Arab Countries. Therefore one would expect a higher tendency for self-leadership in the Netherlands than in the Arab World, which is not shown in this research study.

One can argue that in UAE organisations, and in Dubai particularly, there is a higher level of creative self-leadership towards the generation of improvements and proactiveness to adopt new innovations from the West. New products are frequently marketed in Dubai due to the existence of an affluent Western expatriate society who is willing to pay a premium price for latest Western technologies. This argument is supported by a previous study carried out in Saudi Arabia by Alkeaid (2004) who revealed that the adaptor was considered more creative than the innovator. That is because in the Saudi culture the

innovators and creators are not appreciated as they seem to be abrasive, impractical and disrespectful of group's consensual views (Ramos, 2005). This may be due to the high level of collectivity (Hofstede's IDV) in the Arab Countries where the Western World is more individualist. Moreover, it can be argued that the optimistic behaviour-innovativeness relationship in the Arabic culture is different to the American (Puccio & Chimento, 2001), Argentinean (Gonzalez, 2003) and Japanese (Muneyoshi & Kagawa, 2004) cultures where the innovator is more creative than the adaptor.

Although a weak connection between 'opportunity thinking' strategies and innovativeness ($\gamma = 0.29$, $p < 0.01$) in Dutch organisations compared to Dubai organisations was found, it is believed that the innovative behaviour in the Dutch culture realises the solution by producing a model of the innovation that can be applied and used within the organisation as a whole (Kanter, 1988). It also appears that optimistic thoughts motivate or enable individual innovative behaviour and hence could be the foundation of any high-performance organisation in the Netherlands and the UAE.

The study also offered insights into the self-leadership thought pattern strategies-creativity/productivity relationship. Irrespective of the two different cultural backgrounds, the findings clearly support the relationship between optimistic thought patterns and creativity and productivity (Bakker & Demerouti, 2008). Therefore, despite the cultural differences, organisations should train employees in developing self-leadership skills (i.e. optimistic thoughts) and thereby improve their creativity and productivity. Positive ways of thinking rather than obstacle thinking will assist employees recognising opportunities in difficult times providing solutions to problems and reframing experiences in order to handle organisational challenges (Jones & Kriflick, 2005).

In addition, it was found that pessimistic beliefs (obstacle thinking behaviour) do not contribute to productivity, because these are often disruptive, dysfunctional and endure problems. It is suggested that employees should alter their negative behaviour through more positive type self-talk, which is expected to result in more positive thoughts and behaviours (Carmeli, Meitar & Weisberg, 2006). The positive relationship between obstacle thinking and creativity, found in the UAE ($\gamma = 0.36$, $p < 0.01$) is inconsistent with previous research because non-constructive thoughts are perceived as being dysfunctional and non-creative (Carmeli, et al., 2006; Manz, 1992). Thus, this result might be attributed to particular service organisations in Dubai and

the embedded culture within these organisations. In addition, the subjective assessment of creativity made by the employees requires to be compared with an objective assessment of creativity made by the organisations in order to fully understand this result. The high power distance (Hofstede's PDI) in the Arab Countries does not seem to impede this.

The results of this study also indicate that there is a significant and positive relationship between innovativeness/proactiveness and creativity and productivity. There are the constructive thought pattern strategies that affect employees' emotional and behavioural state (Manz, 1992) in both the Arabic and Western cultures thereby identifying new or novel ideas aiming at improving the operational processes which subsequently will enhance quality and increase productivity.

In conclusion, this study contributes to an emerging research on informal leadership, which thus far has received little cross-cultural attention. It suggests employees possess 'opportunity thinking' strategies (optimistic thoughts skills) irrespective of their cultural background (Arabic and European). Optimistic skills can be developed at work as these have a vital role in contributing to employee's innovative behaviour, which in turn enhances organisational creativity and productivity. Therefore, organisations need to invest in efforts of training employees in constructive thought patterns by teaching cognitive modelling methods (Gist, 1989). In addition, organisations should discourage pessimistic behaviour that can be disruptive, dysfunctional and endure problems which negatively affect performance outcomes.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

While this research has established a clear relationship between the dimensions underlying self-leadership thought pattern strategies, EO, creativity and productivity, this study contains several limitations that may be addressed in future research. First, given that the cross-sectional design of the study renders it vulnerable to problems associated with common method variance. To account for the problem of common method variance, it would be advantageous for future research to gather data from multiple sources (Spector, 1987). Second, although the hypotheses imply causation, cross-sectional studies cannot test causality directly. Thus, in order to obtain more definite results, future research should be extended to and supported by a number of cases or longitudinal

studies showing the connection between self-leadership thought patterns, EO, creativity and productivity. Third, the assumption is that the Arabic and the Dutch cultures are distinct as for the Hofstede cultural dimensions (Hofstede, 1980). So, future research should be included in a research model by constructs measuring the Dutch and the UAE culture.

Finally, the findings are specifically relevant to the Dutch and the UAE organisations that supported the study. Therefore the generalizability of these results might be limited by the specifics of the Arabic and European cultures and the embedded culture within the participating organisations.

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SOCIAL INNOVATIONS

SOCIAL INNOVATION

Increasing Social Value In Society

Jean-Pierre Wilken

HU University of Applied Sciences Utrecht

jean-pierre.wilken@hu.nl

During the 2011 CARPE conference in Utrecht, there were a large number of contributions on the theme of 'social innovation'. This is not surprising, because social innovation is an area which gets more and more attention, and at the same time it is a large and diverse field of interest. In the current European context of economic crisis and change, an urgent appeal is made upon universities, enterprises and governments to change systems and practices towards more stability and sustainability. Although the emphasis seems to be on financial issues, it is clear that social, environmental and organisational issues are as important. Social values and the willingness and ability of people to contribute to productivity, security and welfare are the key to a decent life.

Social innovation is an ambiguous notion. It is a very broad and rather vague term, which suggests at least that 'something new is coming up' and that this new thing is 'social' by nature. So both social and innovation are problematic words. Without any specification social innovation is just a hollow phrase.

Recently, the European Commission issued an interesting publication on Social Innovation in the European Union.* I think it is a valuable source since it sets a framework for what social innovation is about.

Social innovations are defined as innovations that are social in both their ends and their means. Specifically, social innovations can be defined as new ideas (products, services and models) that simultaneously meet social needs (more effectively than alternatives) and create new social relationships or collaborations. They are innovations that are not only good for society, but also enhance society's capacity to act. Thus, social innovation is presented as a multidimensional construct:

1. Social innovation is both a process *and* an outcome. The process is strongly social by nature. The process of social interactions between individuals undertaken to reach certain outcomes is participative, involves a number of actors and stakeholders who have a vested interest in solving a social problem, and empowers the beneficiaries. The process of social innovation is in itself an outcome as it produces social capital.
2. New products, services and models have to meet social needs *and* create new social relationships or collaborations.

Our mission is to generate, disseminate and implement knowledge which contributes to the social quality of society. Part of the process of social innovation in the areas of education, research and practice is that innovations are only created by reflection and learning. For our reflection we use our values as beacons. Our research is not only normative and reflective by nature, but also practice-driven and solution-focused, aiming at both short term solutions and long term results.

* BEPA / European Commission (2011). Empowering people, driving change: Social innovation in the European Union. Luxembourg: Publications Office of the European Union, 2011.

THE VALUE OF NARRATIVE IN SELF-ASSESSMENT

Ali Gardner

Manchester Metropolitan University

ali.gardner@mmu.ac.uk

INTRODUCTION

One of the key challenges for social workers is providing professional support based on experience, knowledge and skills while enabling service users to identify their own individual strengths and solutions. This paper seeks to address both the ideological and practical tensions this juxtaposition presents for the social work role within a personalisation context. Focussing on the use of narrative inquiry as a tool for social workers to employ in assisting service users to direct their own support, the paper attempts to provide a basis for good practice embracing and balancing principles of self-determination with good professional support.

POLICY CONTEXT

Policy makers and social thinkers have wrestled with the concept and role of welfare as far back as the early 19th Century. The stigmatising label of the 'undeserving pauper' has continued to dominate much of the debate in relation to who should and who shouldn't receive welfare support from the Government. Subsequently, the UK has seen a sweep of changing welfare policy reflecting the ideological perspective of each standing Government. Although key definitions and principles of social work have remained, social work has had to develop and embrace practice based on principles ranging from paternalism to neo-liberalism. Higham (2006) argues that social work has a distinct holistic quality, in that social workers can work in a variety of ways depending on the situation and current policy direction.

In 2004, a DEMOS report, *Personalisation through participation: A new script for public services* (Leadbetter, 2004) highlighted the need for people using services to have more say in how money is spent on services and enabling them to be co-designers and co-producers of those services. Importantly, Leadbetter (2004) warned that this was not a simple matter of modifying services but challenging the ideology of the relationship between the state and the service user and changing whole systems of the way people work together.

A few years later in 2007, the Government published the *Putting People First* concordat (Department of Health, 2007), reflecting the themes raised by Leadbetter in 2004. The formal introduction of personal budgets whereby individuals would be assessed and allocated a transparent amount of money based on their need fundamentally shifted the social work role and the relationship between the State and the service user. Broadly, the term *personalisation* refers to individuals having as much choice and control in the way support is designed and delivered.

Whilst the concept of personalisation and self-directed support were formally introduced by the Government in 2007, the ideas behind this model of welfare had been formulated as far back as the 1980's. Since this date, disabled people have continued to campaign for a change in legislation, based on a rejection of paternalistic practice, which would allow them to purchase and control their own support. Finally 1996 saw the introduction of the Community Care (Direct Payments) Act allowing the Government to give cash payments to service users in lieu of services.

Since this date, policy direction has continued to reflect the principles of personalisation. The Coalition Government highlighted personalisation as the cornerstone of adult social care in their 2010 *Vision of Adult Social Care* (Department of Health, 2010) and the subsequent Law Commission report (2011) has signalled the centrality of personalisation in suggesting major changes which are set to reshape adult law. Similarly the work of scholars such as Glasby (2009) and Morris (2004) have focussed on the development of practice based on notions of citizenship and the promotion of rights and entitlements rather than a *Professional Gift Model* as described by Duffy (2004) based on professionals meeting individual's needs.

NARRATIVE INQUIRY

Before considering how social workers might use narrative inquiry to inform their practice within a personalisation context, it might be useful to explore the purpose of narrative generally. In recent years, narrative forms of inquiry have become increasingly visible within disability studies (Goodley et al., 2004, Marks, 1999; Smith and Sparkes, 2005; Thomas, 1999; Todd, 2006). Narrative analysis focuses on the meaning behind the language used placing emphasis on how the story is told and the layers of meaning beneath the words. Czarniawska (2004) stresses the importance of narrative as a rich source of insight, as stories are both a means of communication and form of knowledge. Smith and Sparkes (2008) suggest that we organise our experiences into narratives and assign meaning to them through story telling. *In this way narrative helps constitute and construct our realities and modes of being* (p.2). Goodley, (2001) stresses the importance of recognising that narratives are not simply personal but are heavily influenced by the social and cultural contexts in which individuals exist. Thus an individual understands his or her world according to his or her past experiences and his or her interpretations of these experiences. This in turn influences how an individual will respond to future situations and decisions. In this sense it would be quite impossible for an outsider to make an assessment of someone's needs without meaningful engagement with the individual and the ability to listen and understand their perspective.

SOCIAL WORK ROLE

Defining the specific social work role has never been an easy task. Although government policy heavily influences the way social workers practice and the degree to which social work principles can be enacted, definitions of social work remain broadly the same to those introduced by the IFSW in (2000) based on an activity which promotes social change and focuses on empowerment and liberation of people to enhance well-being.

The current role and purpose of social work continues to be debated and over the past 20 years social workers role and titles have changed reflecting the current political thinking. In 1990 the introduction of the NHS and Community Care Act with a mandate for working in partnership with service users and carers

and an emphasis on consumer power changed the social work role and practice quite dramatically. Social workers became Care Managers required to *act as gate keepers, secure services and support and control the delivery of the care plan* (DH, 1991). Whilst policy makers insisted that such an approach would give people more choice and control and enable support to be individually tailored to their needs, the language used left no doubt as to where the expertise lay in the assessment and decision making process. Gardner, (2011) suggests that the language used within care management suggest the values underpinning this process were based on a paternalistic model whereby *the 'expert' care manager/ social worker would support the service user to make 'sensible' decisions about the best way to meet needs* (p28).

The introduction of self-directed support by *In Control* in 2003 closely reflected the principles of personalisation. *In Control*, a UK based networking organisation developed the notion of self-assessment as part of a seven step process to self-directed support. Individuals were to take on a key role in identifying and measuring their own level of need.

Emerging literature relating to personalisation (Duffy 2010, Glasby 2009, Gardner 2011) suggests a more radical form of partnership working is required whereby power is transferred to the service user if individuals are to take more control in the assessment process. The underlying principle to self-assessment is that individuals understand their own needs better than social workers. (Renshaw, 2008, Morris, 2004) Self-directed support models require social workers to shift to a less directive role becoming a navigator or advisor. Higham (2006) suggests that social workers are ideally suited to undertaking the navigator role, describing this role as one in which the *navigator acts as an ongoing guide and pilot through the complexities of service provision* (p108). Similarly, Tyson, (2009) suggests that because the philosophy and values of the social work profession are so closely aligned with the ethos of self-directed support, they are likely to find it easier to work in a personalised way compared to other allied professionals.

Within a care management framework as introduced by the NHS and Community Care Act (1990), the social worker / care manager assumed the lead role in the assessment. Based on the results, the social worker would proceed to organise a care package based on need. The underlying assumption here is that the social worker knows best. In a sense, the framework could be seen as encouraging the social worker to respond to information rather than

individuals. Whilst partnership working has always been a key component of social work practice, the depth to which practitioners engage with this concept will vary considerably. As Pugh and D'Ath (1989, in Braye and Preston-Shoot, 2001) suggest partnership can be understood as a continuum from involvement in a decision through to service users being in control of a process. Within a self-directed model of support, partnership must always operate at the sharp end of the continuum with the service user leading and consulting with the social worker as well as other trusted networks which they have identified. It requires an appreciation of the service user's insight into their own needs and respect for the relationships and connections they have within families, networks and communities. Thompson, (2006 p.123) suggests that it also requires:

...a degree of humility to accept that professionals do not have all the answers and clients have a major contribution to make in resolving the difficulties that have been identified.

Whilst one would hope that social workers adhere to this philosophy, the emphasis of this ethos is central to a self-directed model and may require practitioners to ideologically re-think and re-frame their relationships and engagements with service users. Transferring power to the service user and adapting the social work role to enable new personalised ways of working will be required if this is to happen at any meaningful level. As Renshaw (2008) points out this may undermine traditional social work thinking. Furthermore the current economic climate has brought with it a sense of mistrust which pervades this agenda for many professionals who fear that personalisation will lead to the erosion of the social work role and adult social care. A criticism that cannot be ignored given the decimation of many adult social work posts in local authorities in the UK.

The value of narrative inquiry is that it begins with the individual; their perspective is the starting point. The individual controls which parts of the story are shared, the order and pace of disclosure along with placing particular emphasis on aspects of their account. It does not rely on a series of questions or procedural documents which may limit their expression.

The notion of self-assessment now commonly used as part of the self-directed model of support has been a key issue for Disabled people. Morris (1993) points out, that service users are best placed to understand their needs. A key misconception of self-assessment is that it is a process exclusive to service

users. The aim of self-assessment or supported self-assessment, however, is that service users fully participate in the process based on the principle that they are likely to be the best experts on themselves. The expertise of the social worker is to assist the service user in this process, to facilitate them in identifying and expressing their needs and at times questioning their interpretation of need. In this process workers need to develop anti-discriminatory approaches which seek to reduce the power differentials by encouraging the service user to lead to process.

Atkinson (1998) stresses the importance of enabling the respondent to maintain control over what goes into the story, how it is said and how it is read at the end. Using reflective and reflexive skills, the social worker can feedback, check out and validate a person's experience, the meaning attached to it and how this might link to helping the service user to construct their own realities. In this way social workers are supporting service users to see more than descriptions of their own lives and scenarios, instead they are supporting individuals to understand and analyse this information by locating it within wider social, geographical and political contexts. Burke and Harrison (2007 cited in Adams et al., 2009) suggest that these new ways of working, informed by a complex, critical, politicised and geographical view of our culturally plural society, will contribute to the development of relevant and appropriate services.

An understanding of the distinction between *anti-discriminatory practice* and *anti-oppressive practice* is important in relation to narrative inquiry. Adopting an anti-discriminatory approach will support practitioners to engage with service users and their families on a one to one level. This will include treating people with respect, being non-judgemental and promoting self-determination at all times. If, however, we are to attach meaning to someone's narrative and begin to understand their world view point, arguably, we need to employ a more radical approach which requires an acute understanding of structural inequalities. It must also include an awareness of oppressive legal structures and practices as well as understanding of the histories and relationships that exist for service users. This, we would refer to as anti-oppressive practice. If we only adopt an anti-discriminatory approach the exchange remains descriptive and surface deep. Alternatively, the adoption of an anti-oppressive approach will enable the professional to understand the narrative from the unique point of view of the individual which has been informed by their history, experience and past relationships with services and powerful agencies. The professional must support service users through their narratives to understand the connections

between their own circumstances and the broader socio-political context within which they exist. As Finnegan (1992) suggests the telling of personal narratives can actually help people validate their lives and make sense of the various life experiences. Gardner (2011) suggests that this radical rather than functionalist approach to problem solving is more likely to equip service users with confidence and skills to demand services and support based on what they want rather than what has been imposed upon them.

In order for practitioners to work effectively a continued commitment to reflective and reflexive practice is imperative. Adopting reflective skills as described by Schon (1986) are central to narrative inquiry. During the exchange, the practitioner becomes pivotal to making the story happen. Reflection outside of this process offers an opportunity to rewind and gain a deeper understanding of the situation. In this way the social worker is using his/her own narrative of the event to help analyse and interpret meaning of the story as well as understanding their own contribution to this dynamic process. It may, however, be necessary to go further than this and employ reflexive skills which will enable us to *evaluate our position within our practice from a personal involvement perspective* (Webb 2006, p36, cited in Jones 2009). Reflexivity in this sense requires workers to challenge themselves at a broader level. As narrative inquiry relies heavily on the skills of the social worker as both the listener and the facilitator it is imperative that social workers have the opportunity to continually question the ethical basis of their involvement.

It is important to acknowledge the value of narrative inquiry from both a personal and structural perspective. Borsay (2005, p7) suggests that the *telling of stories can become acts of liberation for those whose self-esteem has been battered by discrimination.*

As suggested in the discussion relating anti-oppressive practice and empowerment, narratives allow service users to understand their lives in a way which incorporates and an appreciation of wider structural oppression and marginalisation. In a sense, telling ones story provides an opportunity for the service user to almost step outside of their own life and make some observations. With support from the worker they begin to see the significance of disadvantage and structural oppression that impacts on their lives. This enlightenment may provide the first steps towards focussing on change where it is possible.

At a broader level narrative inquiry can provide collective strength and liberation. Borsay (2005) suggests that oral history is as much about survival and change as it is to attach meaning. He claims that it provides the foundation for collective empowerment and resistances. Their first-hand experience can challenge our assumptions and develop a more rounded account of history. Beresford (2003) suggests the danger of ignoring these accounts is that researchers think they are better ‘knowers’ and sources of knowledge than the people who actually experienced it.

Whilst the individualised focus provided by narrative inquiry provides opportunities for service users to assess their needs and design unique support packages, there is a concern regarding the level of emphasis placed on the individual experiences. This viewpoint is largely located within disability studies whereby the fundamental assumption is that disability is quintessentially collective (French and Swain 2006). The Disabled People’s Movement insists that disability is experienced through structural, environmental and attitudinal barriers that marginalise, limit and shape people’s lives. There is a concern that to pay too much attention to the individual experience perpetuates medical model thinking in that the problem is located with the individual and there is no need, therefore, for society to adjust.

Such a critique cannot be dismissed given the current reduction of services and the social work role generally in relation to adult social care. One potential danger of focussing so narrowly on the individual experience is that the collective need remains hidden. With no clear collective need, arguably, the remit for collective responsibility becomes less apparent. Interestingly, this criticism has already emerged in response to the development of direct payments and personal budgets as individuals cease to be seen as part of wider collectives affected by structural inequalities. Furthermore, Spandler (2004) claims that this purposeful fragmentation can lead to a loss of the collective voice easing the Government’s conscience and commitment to a responsibility to deliver high quality services to vulnerable people. Armstrong (2003), however, suggests that to deny the individual experience can equally limit our understanding stressing that the social model of disability relies on an understanding of both the individual and collective experiences of disablement.

CONCLUSION

The opportunity for individuals to take more control in assessing their own needs and designing appropriate support is difficult to argue with and current government thinking clearly places such sentiments at the heart of all emerging policy and government documents relating to adult social care. One cannot help but be at least a little suspicious of the ease the current Government has in embracing personalisation in a culture of such austerity, and those at the forefront of this unfolding agenda have some cynicism in the Government's ability to realise such grand claims of choice and control. Personalisation and personal budgets do not automatically lead to choice and control. Instead they provide an opportunity to engage with service users on a different basis.

One of the major concerns is that personalisation is understood purely at an operational level and that it provides an opportunity to scale down services and professional input allowing local authorities to effectively provide the funds and abdicate any responsibility. Essentially, commitment to personalisation has to be at both an ideological and practical level and as such it must be understood as a new paradigm in which the shift of power sees service users as experts in their own lives using professional support to navigate their way through complex structures and systems. Narrative inquiry provides a theoretical basis for social workers to use in transferring power and facilitating service users in realising and valuing their own expertise. In so doing, the service user assumes a more central role, based on exercising fundamental rights rather than remaining as a passive recipient.

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EXTERNAL AND INTERNAL RELATIONS AS SOURCES OF UNCERTAINTY IN SYSTEMIC INNOVATION IN PUBLIC WELFARE SERVICES

Harri Jalonen

Turku University of Applied Sciences

harri.jalonen@turkuamk.fi

INTRODUCTION

A significant literature exists on the subject of uncertainty in innovation processes (e.g. Souder & Moenaert, 1992; Damanpour, 1996; Rogers, 2003; York & Venkatraman, 2010). A typical source of uncertainty in business innovation is the lack of knowledge about demand for new products and services, and the lack of knowledge about behaviour of competitors. Compared to firms, public welfare care service providers operate in different environments which may be assumed to affect the ways in which uncertainty is felt. It is argued, for example, that due to an increased demand for transparency and accountability, public organisations tend to play safe and avoid uncertainty (e.g. Bhatta, 2003; Potts, 2009). Furthermore, many public welfare care innovations are markedly systemic in their nature. It means that they emerge from, and must address, the complex interplay between political, administrative, technological, institutional, legal and financial matters (e.g. Barlow et al., 2006). It can be presumed that this also affects perceptions of uncertainty in innovation processes.

This paper suggests that stakeholders dealing with systemic innovation in welfare services must deal in circumstances of uncertainty with ambiguous and incomplete information. Based on the systematic literature review

conducted by the author (Jalonen & Lehtonen, 2011; Jalonen, 2011)¹, uncertainty in innovation can be classified as one of following eight factors: technological uncertainty, market uncertainty, regulatory/institutional uncertainty, social/political uncertainty, acceptance/legitimacy uncertainty, managerial uncertainty, timing uncertainty, and consequence uncertainty. However, due to its limited scope, this paper can only focus on, and discuss, relations between the welfare service system and its environment (market and regulatory/institutional uncertainties), and on relations within the welfare service system (social/political and managerial uncertainties). In this paper, the following question is posed: *How does uncertainty in external and internal relations manifest itself in the adoption of systemic innovation in welfare services?*

Uncertainty here refers to the gap between the amount of information required to perform a task and that already possessed by the organisation (cf. Galbraith, 1977). Based on the literature review (Jalonen 2011/forthcoming) and the early findings of the ongoing innovation project (*the Virtu channel* – virtual services for elderly people), this paper develops four propositions that address uncertainty in the adoption of innovation. ‘Innovation adoption’ is defined as an information-processing activity and a decision to make full use of an innovation (Rogers, 2003). ‘Adopters of innovation’ here refer simply to any user (elderly person, care worker, municipal office-holder, local politician) who decides to use the innovation. ‘External relations’ refer to the relations between the welfare service system (which is composed of municipalities and private and voluntary sector organisations) and its environment, whereas ‘internal relations’ refer to the relations within the welfare service system.

The paper is structured as follows: the following section introduces the ongoing innovation project, known as the Virtu channel, which serves as an empirical illustration of systemic innovation. In next sections, the propositions regarding uncertainty in complex systemic innovation are presented and discussed. Finally, in the last section, conclusions and implications for further research are drawn.

1 Jalonen, H. & Lehtonen, A. (2011) “Uncertainty in the innovation process”, Proceedings of the 6th European Conference on Innovation and Entrepreneurship, Robert Gordon University, Aberdeen, Scotland, UK, 15–16 September 2011.

Jalonen, H. (2011) “The uncertainty of innovation: a systematic review of the literature”, Journal of Management Research, Vol. 4, No. 1.

THE VIRTU CHANNEL AS AN EXAMPLE OF SYSTEMIC INNOVATION

Systemic innovation here refers to changes in the integrated system of social and health care practices, services, technologies and organisations that together form a new mode of operation (cf. Barlow et al., 2006). In this paper, the Virtu channel serves as an empirical illustration of complex systemic innovation – a new kind of service model for social media and well-being for elderly people in the archipelago areas of Finland (including Åland) and Estonia. At the heart of the Virtu channel are a handy touch screen and a small camera, which are connected to televisions in people's homes, and a broadband connection, which functions as a link between elderly people, the Virtu channel experts and municipal care workers. The Virtu channel provides several services to elderly people, including interactive programs produced by educational organisations, municipalities, voluntary sector organisations or commercial companies; communication between elderly people and health and elderly care personnel; communication between elderly people and their relatives; and communication between elderly people themselves. On the whole, the Virtu channel provides a new service delivery system, in which elderly people are not seen merely as service receivers, but also as active participants and developers of the provision. At its best, the Virtu channel also enables the birth of a unique virtual community, in which different actors (elderly people and their relatives, educational organisations, technical service providers, municipalities, commercial companies and voluntary sector organisations) from different locations are able to co-operate with one other.

However, the Virtu channel necessitates changes in the municipal service delivery system, in the working environment of the municipal personnel and in the organisation of elderly care (cf. Bruch et al., 2005). The Virtu channel can be deemed a complex systemic innovation because 1) it is founded on change to the supply and demand of service provision, 2) it requires changes in the organisation and the motivation of production, 3) the value it generates has not been generated before, and 4) its value creation is based on the co-operation between various public and private organisations (cf. Barlow et al., 2006).

UNCERTAINTY IN EXTERNAL RELATIONS

Unclear customer needs

The concept of innovation implies that it is invented and implemented in order to meet the needs (real or perceived) of the market. The reviewed literature shows that the market environment of innovation is also a great source of uncertainty. There is uncertainty about the needs of customers, the actions of competitors, and the prices of substitutive commodities (e.g. Souder & Moenaert, 1992; Naranjo-Gil, 2009; York & Venkatraman, 2010). Given the fact that innovations in the public sector are typically incremental by nature (Newman et al., 2001), it is reasonable to expect that market-based uncertainty will manifest itself differently to that in the private sector. Therefore, instead of real and well-articulated customer needs, many innovations in the public sector are 'motivated' by the need to improve the productivity of public service provision (e.g. Barlow et al., 2006). For this reason, the behaviour of competitors and the price development of competing products and services play only a minor role as motivators of innovation in the public sector.

The same holds true for the Virtu channel project. One of the main reasons for its launch was concern about service provision for a rapidly ageing population and the increasing costs of social and health care. Although many elderly people manage everyday life well and enjoy their later years, they are, at the same time, a challenging target group from the point of view of new technology. One difficult issue is whether virtual services really help elderly people embrace the changes that come with ageing (cf. Santamäki Fischer et al., 2008). Rather than focusing on the provision offered by the service provider, what is important is what elderly people need. The true value of innovation to the customer is achieved only when virtual services are aligned with service provision as a whole in a way that fulfils the needs of elderly people. However, this is not an easy task, particularly due to the unclear need for virtual services. The reviewed literature, supported by the early findings of the Virtu channel project, implies that in order to develop useful virtual services for elderly people, it is important to understand the nature of growing to a great age. Following the argument put forward by Coughlin (2010), it can be claimed that businesses which seek to market new technology and governments with broader policy interests must address, and balance, the multiple challenges presented by new technologies. This means, among other things, that instead of developing virtual services aimed only at enlightened and autonomous customers, able to

make intentional and smart choices between different alternatives, developers of virtual services must also take into consideration elderly people who are not used to new technology, for example, due to disability or lack of experience. This leads to the first proposition:

Proposition 1: *Unclear customer needs hinder the adoption of systemic innovation in public welfare services.*

Ambiguous regulatory and institutional arrangements

Paradoxically, regulations and institutions play opposing roles in the processes of innovation. On the one hand, they can be used to facilitate innovation efforts by reducing uncertainty around innovation (e.g. Lambooy, 2005; Foster, 2010). As an example of facilitative regulation, one might mention the intellectual property rights that support and promote the fair and equitable sharing of benefits arising from the development of a given innovation. On the other hand, regulations and institutional arrangements may prove to be obstacles and become a source of uncertainty. Good intentions aimed at ensuring that innovation does not pose a threat to citizens or society as a whole may give way to the slow speed of adoption of innovation. Vermeulen et al. (2007) have pointed out, for example, that the complexity of institutional arrangements may block the dissemination of innovation and constrain change.

The same holds fundamentally true in the case of public welfare service innovations. In respect of the Virtu channel, there are at least two regulatory and institutional issues which need to be approached from the standpoint of uncertainty. Firstly, given that the goal of the Virtu channel is to become a new kind of service system, it implicitly challenges existing working practices within the interface between public and private. Regulations and institutional arrangements are needed in order to support the co-operation between municipalities, firms and the voluntary sector. However, these arrangements can also be a source of uncertainty. This is especially the case when, for example, regulations fail to guarantee firms' efforts at innovation. Since the Virtu channel is in its early development phase and clearly defined markets do not yet exist, firms developing technology may be reluctant to 'put their cards on the table,' if they are uncertain about whether their innovation efforts will be backed up by regulations. Following on from Foster (2010), one might argue that there may be a resultant 'system failure', by which he refers to the institutional

structure that either obstructs or cannot facilitate innovation. Leading on further from Foster's argument (ibid.), it can be claimed that measures to promote innovation can be challenging and may create uncertainty, because they "require an understanding of emergent industries that a public sector administrator may not have."

Secondly, uncertainty may arise from inside the 'public system' – i.e. between central and local government. As an illustrative example, one might mention 'information steering' – an activity integral to the implementation of public policy. Information steering refers to the right of a steering entity (e.g. a ministry), based on status or expertise, to attempt to influence the behaviour of a steerable body (e.g. a municipality). The implicit assumption is that the aim of information steering is not only to guide and control the operations of municipalities and other local-level actors, but also to promote and support their independent development (Stenvall et al., 2007; Jalonen, 2008). However, aside from its good intentions, information steering has disadvantages. Information steering, as a form of activity, has been regarded as equivocal with detrimental practical implications. One typical source of equivocality related to information steering in elderly care stems from inconsistent handbooks explaining the use of technology and its effects on traditional care. The equivocality arises, on the one hand, from the content of these handbooks and, on the other hand, from interpretations made within municipalities.

For the above-mentioned reasons, the second proposition is as follows:

***Proposition 2:** The greater the ambiguity of regulatory and institutional arrangements as perceived by developers and adopters, the more innovation efforts are hindered.*

UNCERTAINTY IN INTERNAL RELATIONS

Stakeholders' interests and interaction uncertainty

There is strong agreement that innovations do not occur in isolation, but are developed and disseminated within interfaces between different stakeholders (e.g. Hurst, 1982; Rogers, 2003). Interaction plays a crucial role, particularly in systemic innovation, which means development activities that involve a

change in multiple interdependent components (Jaspers, 2009). Interaction is required both in the development of new ideas and in their implementation as new practices. Thus, it is not surprising that a growing number of welfare services are nowadays provided in the form of a co-operation between public and private sectors. The attractiveness of co-operation is the result of a logic that argues that the innovation challenges for welfare services may be solved by combining the complementary and substitutive capabilities possessed by different organisations.

Without questioning the potential benefits to be won from interaction, it is important to note that interaction is also a significant source of uncertainty. This is because interaction is a process whereby the diversity of political interests among stakeholders is revealed. In other words, in interaction the political aspects of innovation become visible. Paradoxically, in seeking to reduce uncertainty, stakeholders engage in relationships with one another that, in fact, lead to political uncertainties (cf. Koch, 2004). The Virtu channel project is no exception. Although the project is in its embryonic stage, there are several political issues which may create conflicts of interest and increase uncertainty around virtual services. Common to them is that they arise from complex changes in the relationships between municipalities, service providers, technology developers and customers with their own interests, from which new patterns of interaction emerge (cf. Arias, 1995; Bonifati, 2010). The findings of the Virtu channel project are consistent with earlier studies which stressed that innovation has the potential to disrupt power structures and work routines within an organisation (e.g. Gibbons & Littler, 1979; Chen, 2005; Jun & Weare, 2010). While the definition of innovation adoption as an information-processing activity (cf. Rogers, 2003) implies that decisions about innovation may be improved with access to better information, it should be noted that with innovation come political judgments (cf. Hanft & Korper, 1981). They in turn may result in unexpected behaviour. The role of political judgments is especially significant in respect of welfare service innovation, which typically takes place by means of mixed-sector co-operation. While co-operation increases the potential for innovation in welfare services, it also creates complicated organisational interplay with the possibility of conflicts of political interest. They, in turn, may lead to a situation where this innovation potential remains unrealised (Jalonen & Juntunen, 2010). This leads to the third proposition:

Proposition 3: *Interaction between different stakeholders reveals their political interests, which, when conflicting, increase uncertainty and hinder the adoption of systemic innovation in public welfare services.*

Managerial uncertainty

To define innovation as ‘novelty in action’ (Altshuler & Zegans, 1997), infers that innovation represents change (e.g. Drucker, 1985; Osborne & Brown, 2005) or should be seen as a transformational process (e.g. Gerwin & Tarondeau, 1982) that challenges rational management models (e.g. Thamhain, 2003; Foster, 2010). The reviewed literature agrees that innovation requires intuition – the novel insight into problems that does not result directly from a rational and structured thought process. Innovation involves incremental or radical discontinuity with the past. Since innovation refers both to thinking differently and unconventionally, and to experimenting and implementing new ideas, it is understandable that innovation is a process which implicitly leads to risk and the possibility of failure. The reviewed literature shows that the risk inherent in innovation and the possibility of failure are the most important factors in creating uncertainty in the managing of innovation. Uncertainty arises from a lack of knowledge regarding the effectiveness of management activities used to support innovation behaviour in risky situations where a fear of failure exists.

Risk-avoidance and a fear of failure play remarkable roles in innovation processes within public organisations (e.g. Bhatta, 2003; Parsons, 2006; Potts, 2009). They encourage people to play safe. At its worst, the result is that people do nothing. Early findings from the Virtu channel project indicate that this kind of behaviour is a distinctive option. The logic of playing safe is understandable: since the usefulness of the Virtu channel cannot be known *a priori*, municipalities may be motivated to postpone the adoption of virtual services. In other words, they opt to avoid uncertainty in relation to the consequences of innovation. Without questioning the notion presented by Ortt and Smits (2006) that “innovation is not a matter of optimizing, but a process of trial and error”, the evidence suggests that it is much easier said than done. Furthermore, there is another source of managerial uncertainty in respect of innovation, which is the complexity of innovation when embedded in inter-organisational contexts. Mitleton-Kelly (2006), for example, have pointed to the fact that rethinking existing norms of behaviour and ways of working have emerged from interaction between different actors. They, in turn, have meant “moving into a zone of discomfort and uncertainty.”

Uncertainty related to appropriate management practices can also be identified in the Virtu channel project. There is no clearly defined or accepted answer to the issue of what kind of enabling practices may be used to support innovative action in complex interactions between technology providers, municipalities, educational organisations and other stakeholders. It seems that innovation adoption is a fundamentally emergent process, highly dependent on complex interaction in local situations (Jalonen & Juntunen, 2010). The emergence results from a process whereby each agent in the elderly care domain (i.e. municipal office-holders, local politicians, care workers, clients, and other stakeholders) continually make decisions about which other agent it will co-operate with, and what information and other resources it will exchange with them (cf. Hazy et al., 2007). It is the complex interaction between innovation, the intended adopter(s) and a particular context that determines the adoption of virtual services in elderly care (cf. Greenhalgh et al., 2008). This leads to the conclusion that innovation management in complex welfare systems is “somewhat of a black art” (cf. Muller & Välikangas, 2005). Based on the literature review and the early findings from the Virtu channel project, the following proposition is made:

Proposition 4: *Managerial uncertainty in innovation due to fear of failure and risk-avoidance behaviour, along with complex interaction between different stakeholders, hinders the adoption of systemic innovation in public welfare services.*

CONCLUSIONS

This paper confirms that the adoption of systemic innovation may be defined as an organisational activity fraught with uncertainty. Based on the literature and findings from an innovation project in the field of welfare services – the Virtu channel – this paper discusses two factors of uncertainty: *uncertainty in external relations*, referring to unclear customer needs and ambiguous regulatory and institutional arrangements, and *uncertainty in internal relations*, based partly on the interaction of, and diversity of interests among, stakeholders in the innovation and partly on lack of managerial ability.

Different manifestations of uncertainty have been linked to the adoption of innovation in the form of four propositions. Although the propositions are based on the literature review and early findings from the ongoing innovation

project, it should be noted that these propositions are not indisputable. For example, the classification of uncertainty factors of systemic innovation into two separate categories – uncertainty in *external* and *internal* relations – may be considered contrived. This is because the definition of systemic innovation implies that they emerge from the complex interplay between various elements, where the separation of what is included in the system and what it is excluded from it, is a difficult, if not impossible, task. Furthermore, it should be noted the relationship between uncertainty and the adoption of innovation is not straightforward. One cannot conclude that, where there are unclear customer needs in respect of any given innovation, for example, the result would always be a rejection of the innovation in question. Instead of setting up causal relationships, the propositions made here are more conditional in nature, as best forcing to pay attention to important matters.

However, despite the shortcomings mentioned above, it can be argued that this paper is important both in a practical and a scientific sense. From a practical point of view, this paper helps to identify some of the possible blocks to systemic innovation in public welfare services. As an example, this paper emphasises the various, often conflicting interests of stakeholders, which may disrupt power structures and work routines within welfare services. In order to capitalise on the potential of innovation, this paper proposes that specific championing roles (e.g. the organisational maverick, the network facilitator, the transformational leader and the organisational buffer) of innovation might be established (cf. Shane, 1995) with the aim of preventing escalating conflicts of interest turning into organisational inertia. This paper also provides information for policy makers. It suggests, for example, that technology-based innovation may be fostered by reducing uncertainty in relation to the regulatory/institutional environment of innovation. In practice this requires at least two things to be in place. On the one hand, governments should assure innovative firms that their efforts will be guaranteed, and on the other hand, governments should provide municipalities with clearer guidance about how certain technologies may be used in the care of the elderly.

From a scientific point of view, the paper fills the research gap between issues relating to the failure of innovation (cf. Rogers, 2003). Hence, the paper may be seen as valuable in an intellectual sense, because it rectifies the pro-innovation bias of innovation research. Increasing an understanding of uncertainty in respect of innovation might perhaps eventually also provide new insight into notions associated with successful innovation. Since this paper

has addressed ‘uncertainty’ as negative, or at least problematic, for innovation adoption, it would be interesting to focus on the positive effects of uncertainty in innovation in future research.

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KNOWLEDGE TRANSFER IN CHILD CARE INSTITUTIONS

Implementation of knowledge into professional behaviour by training and managerial strategies

Petra Strehmel

University of Applied Sciences Hamburg

petra.strehmel@haw-hamburg.de

Daniela Ulber

University of Applied Sciences Hamburg

daniela.ulber@haw-hamburg.de

INTRODUCTION

Early education in Germany is changing rapidly. At the latest since the PISA 2000 study (Stanat et al. 2002) we know that education in Germany has to be improved. In addition, since politicians realized the tremendous importance of the early years for life-long learning and development (e.g. ECCE, 1997, Weinert & Schneider, 1999, overview by Strehmel, 2002, 2008a), it newly focuses on preschool education. However, the challenges go beyond children and adolescents: they also concern professional education and training for those who are teaching, educating and caring for the growing-up generation.

We have a broad knowledge on how to create and train academic competencies. But how can this knowledge be transferred into practice? In this contribution we will present the roots and considerations for an investigation in the field of early education to study transfer processes from professional training to educational performance and practice in day care centers.

CHANGES IN THE SYSTEM OF EARLY EDUCATION AND CARE IN GERMANY

PISA promoted a process of innovation and quality development in the field of early education in Germany during the last decade (BMFSFJ, 2003). Each of the 16 states in Germany published educational programs for the youngest (e.g. BStAS & IFP, 2006, overview: bildungsserver.de), new educational concepts for early education and care as well as handbooks for quality management in child care institutions (e.g. Tietze & Viernickel, 2006, Fthenakis et al., 2003). New standards for the vocational education of early education professionals were discussed (JFMK, 2010) and supplies for professional education and training extended (www.weiterbildungsinitiative.de). For the first time in Germany, courses of studies for early education came into being – which had been a matter of course in most of the European countries for several years (OECD, 2006).

At the same time, research and development in the field of early education and care increased and new competence centers were raised all over Germany, one of them at UAS Hamburg. The “Competence Center Kids” (CCKids) is supported by the university management since 2010. In this center 17 professors from three faculties (Business and Social Sciences, Life Sciences and Design, Media and Informatics) join together. They all teach and investigate the growing up of children and come from different disciplines: Educational Sciences, Psychology, Social Sciences, Public Health, Dietetics, Media Education, Library Sciences, Children’s Books Illustration, Economy and Law. Their themes refer to education and the growth of competence, health and nutrition in the early years as well as early intervention and child protection (www.haw-hamburg.de/cckids).

ROOTS OF OUR CURRENT INVESTIGATION: AN EVALUATION STUDY

The roots of our current study emerge from experiences in a former study: the evaluation of a program to foster second language acquisition in migrant children in day care centers. Day care centers pursue to support the children’s personality development and creativity, to foster self-regulation and autonomy,

to enable children to participate in social groups, to increase their knowledge about the world and prepare for school (OECD, 2004). Language is regarded as a key competence for all these learning processes (Jampert, 2007).

The Program and Evaluation Design

The program to be evaluated included trainings for pedagogues (3 days + supervision) for small group interventions to increase the children's vocabulary and grammatical knowledge. Additionally instructions for the institutions were given to observe and document the children's second language development, to select children with poor German language competencies for small group trainings, to implement learning opportunities for second language acquisition in everyday life and to arrange support by the parents (Loos, 2003).

The research questions were:

- 1) Which are the positive conditions for migrant children's second language acquisition?
- 2) Does the introduced program show sufficient effects on the children's language acquisition processes?
- 3) Are there groups of children who gain more from the program than others? (Strehmel, 2008b, 2009)

The theoretical considerations resulted in a variable model (figure 1). In this model language development is intertwined with the child's personality development and socialization process and influenced by child variables such as age, gender and age of onset of institutional care. Characteristics of the family were e.g. the parent's education and German language knowledge, the use of language in the family, etc. Features of the day care centers were e.g. size, concept, age and mixture of the children and the line-up of the professional team.

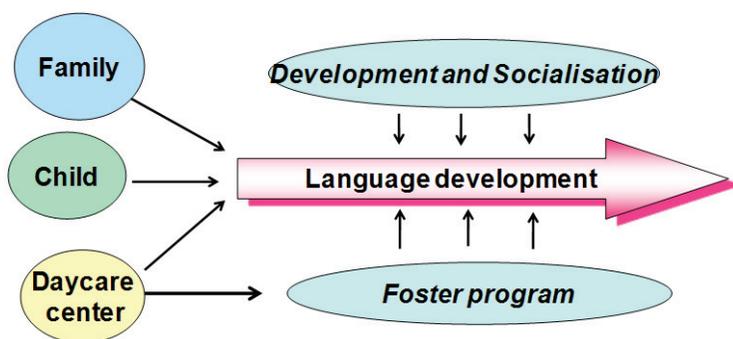


FIGURE 1. *Variable model.*

Variables and processes of children, families and institutions were investigated in a multi-level-longitudinal design, covering two years (figure 2). Children’s language competencies were observed three times: at the program start, the program end (after 1 year) and in a follow-up data collection after the second year. Family and institutional data were collected twice in semi-structured interviews supplemented by intervention diaries, sitting in on small group interventions and group discussions with the professionals.

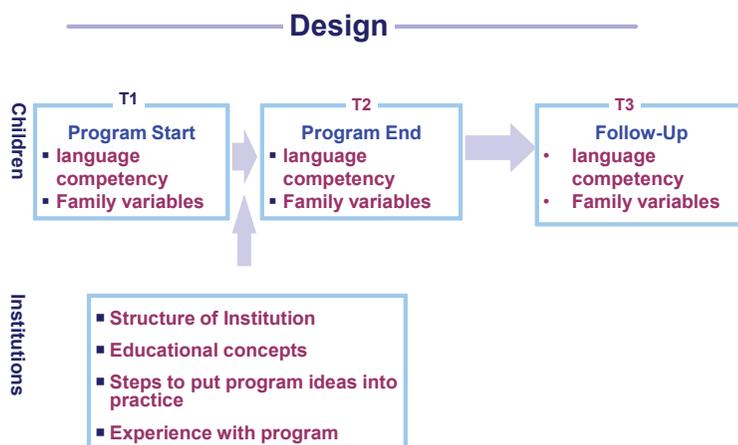


FIGURE 2. *Multi-Level-Longitudinal Design.*

Results and conclusion

We found sufficient program effects only for a small group of children: for those without German language competencies when entering the program, for children from families only speaking their mother tongue, for younger children and more for boys than for girls. Our conclusion was that the program might supply ideas for practice, but has to be adapted and supplemented. Positive conditions to enhance language competencies in the children were language learning opportunities inside and outside the child care institutions, e.g. by the use of media in German language or meeting German-speaking playmates and families in leisure time. For the day care centers we recommended that time and attention are given to the children's individual language competencies and personal needs and to create an elaborated language culture (Strehmel, 2010).

We also reflected the transfer of the program by the institutions and noticed a large variety between the day care centers in the processes in practice: the institutions conducted a different number and density of small group interventions, used different criteria to select children for small group interventions and performed interactions of varying quality with the children, among other things, due to a large variety in the communication skills and language competencies of the pedagogues. In addition the support given by the management was very different. We concluded that we had not evaluated the program, but the transfer of it!

An effective support of children's language learning processes requires to shape language learning opportunities in the institutions, to advise parents how to foster their children at home, to improve basic communication skills in the pedagogues and to train management skills for organizational development. We need training and coaching that guarantee the transfer of knowledge into practice. That is why we now shift our focus from the children's learning processes to those of the educationalists and search for the conditions of the transfer of knowledge. The question is how to transfer knowledge into competence and competence into professional and performance.

TRANSFER RESEARCH: THE IMPROVE PROJECT

Our new research project is called IMPROVE: “Implementationsprojekt zur Verhaltensentwicklung pädagogischer Fachkräfte in Kindertageseinrichtungen” (implementation project for behavioural development of educationalists in day care centers).

Theoretical framework

Baldwin and Ford constructed a model in 1988 as a result of a literature review that has become a relevant basis for transfer investigation.

Training transfer in their view is influenced by three training input factors (figure 3):

- trainee characteristics, such as ability, personality and motivation
- training design, including a transfer aspects and appropriate content
- work environment, namely support and opportunity for use.

These factors influence both; the training output, learning and retention and the training transfer in terms of generalization and maintenance. All these factors apply to training transfer in general, specific conditions of the pedagogical field such as the meaning of communication and the need for cooperation of professionals.

Transfer process

(Baldwin & Ford, 1988)

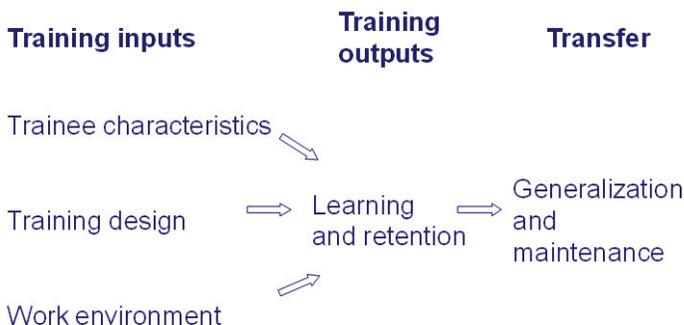


FIGURE 3. *Transfer process by Baldwin and Ford (1988).*

Adapted for the organizational view on the process the course of events looks like this (see figure 4): The first step is to conduct a training needs analysis. If a need for a personnel development measure is diagnosed, the institution, usually its head, selects a specific training program as well as an employee to attend the training. Both – the training and the trainee – are characterized by variables relevant for the transfer, as we have already noted. Training design and participants’ characteristics influence the individual increase of competencies.

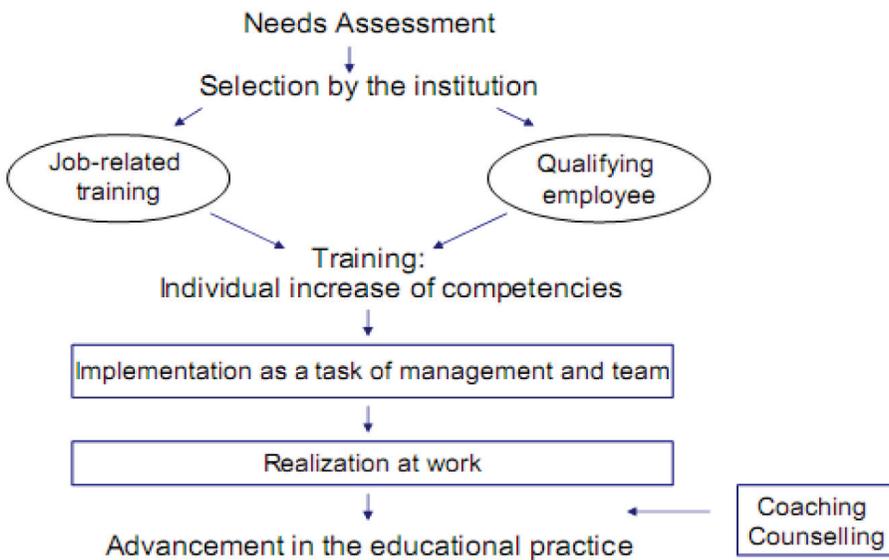


FIGURE 4. *Efficiency of Training: Chains of Formation (Strehmel & Ulber, 2011).*

After the training, the implementation phase starts: The acquired competencies have to be taken up in the teams and change pedagogical routines. To ensure this realization on the job is a managerial task.

Next step is to accompany the concrete realization at work and to have an intensive look at the pedagogical planning, implementation and teamwork with regard to the acquired performance. If product and processes are not adequate, readjustments have to be made, for example in terms of giving more resources. External support as reflection, supervision and coaching may be useful in this phase and could be a part of the training measure. After this process, an advancement in the educational practice, matching the institutions’ needs, can be expected.

STUDY DESIGN

Our project aims to integrate the variables important to the transfer process. As transfer of training (or lack of it) is a complex process, we start our research with an explorative, qualitative approach integrating students' projects and bachelor theses.

In the second phase of the project, we will conduct multiple case studies (Yin, 2009) in a mixed-methods longitudinal design, including the training and the work context at several measurement points of the transfer process using interviews, questionnaires, observation and rating scales. Finally we will analyse common and differential factors in the educators as learners and professionals as well as in the managerial strategies of the child care institutions.

The focused variable complexes for our study have been derived from both models mentioned before – Baldwin and Ford (1988) and our model (Strehmel and Ulber, 2011).

In relation to *institution and personnel* it comprises:

- the concept of human resources development in a broad meaning, comprising variables as individual intentions and concept of human resource management and leadership
- causes and motivation for training, on the individual as well as on the organizational level
- selection of the training, including criteria and reasons for choosing it
- strategies to support the transfer process, in the sense of the planning, the allocation of resources and the realization in practice
- organizational context: climate und structure, which also includes the social context of the institution and specific needs of the children and their families.

Focusing on the *training* important variables are:

- competencies to be learned and the real learning effect
- didactical concept, pedagogical orientation of the trainer and the quality of instruction
- teaching strategies, including structuring and timing of the training and support of transfer inherent in the training concept.

The *transfer* focuses the change in performance on an individual and organisational level. Of course, the concrete research plan of the case studies depends on the concrete characteristics and time schedule of the training.

With regard to the design of the training, we want to investigate along with training conventional training formats as well as sustaining transfer to work, including reflection, “shadowing” and coaching. The investigation plan for a case study of a particular training covers several measurement points and different perspectives. Interviews will be conducted with management and trainees before and several times after the training, while implementing the learned competencies into practice. An interview with the trainer will be conducted to explore the concept of the training and the trainer’s pedagogical orientations. The elements of the training workshops – input and training coaching and transfer – will be observed by qualified students.

CONCLUSION

Our design allows multiple case studies to compare training effects and transfer processes in different fields of education and (social) work. The first findings point out that trainers adapt well to the educationalists as their target group. However, the realization of the newly learned educational techniques and new ways to support children often fail due to lack of time, a missing concept of transfer in the management of the child care institutions and – correlating with the latter – inadequate support for change and innovation from the colleagues in the teams.

On the basis of our results we will develop recommendations to optimize

- conceptions and formats of training as well as trainers competencies
- knowledge transfer into practice at the work place on individual, team and organisational levels.

Thus we are interested in cooperation for studying transfer processes promoted by professional education and training in different fields of practice.

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TEACHERS AND TEACHER TRAINERS RESEARCHING IN MULTICULTURAL SCHOOLS

Regional Cooperation within an International Setting

Leif Åhlander
Malmö Municipality
leif.ahlander@malmö.se

Mariann Enö
Malmö University
mariann.eno@mah.se

Maike Hajer
Malmö University & HU University of Applied Sciences Utrecht
maaike.hajer@hu.nl

INTRODUCTION

An arena of social innovation where universities of applied sciences can play a role is education in a multicultural surrounding. Faculties of social work and education will have to find adaptations of their curricula in order to educate professionals who can take their role in innovative practice. This does not only concern (future) teachers focusing on language development but a much broader range of students. In the recent Report on Migrant Education, the OECD underlines, for instance, the importance of the preparation of all subject teachers in secondary and vocational education for support of migrant students' academic language development through the curriculum (OECD 2010). This specific need was also recognised in Malmö, both in schools and teacher training.

This chapter describes a framework for cooperation between the municipality and university around social issues in schools, as developed in Malmö, Sweden. In the core is the Malmö work in ‘research circles’, in which teachers from schools and teacher trainers get the opportunity to find answers to questions that they experience as relevant for their professional work. In Utrecht University of Applied Sciences, a different model of practice oriented research was explored on the same theme of teaching in multicultural schools that will be described in short in the final part of this chapter, to find common features and identify interesting issues for further exchange.

DIVERSITY ISSUES: PRIORITY FOR MALMÖ MUNICIPALITY AND UNIVERSITY

As in many European bigger cities, schools in the municipality of Malmö face a growing diversity in the ethnic backgrounds of students. The city’s website presents the city as a city in transition:

Malmö is the commercial centre of southern Sweden and an international city. This is visible, not least, by the fact that amongst its 300 000 residents approximately 170 different nationalities are represented. Malmö is also undergoing a transition from being an industrial city to a city of knowledge. Older industries have been replaced by investments in new technology and training programmes of high calibre. Malmö University, which opened in 1998, is Sweden’s latest venture in the field of higher education, accommodating some 15.000 students.

It is clear that in such a city, education reflects the changes in society and high demands are put on the quality of teaching. In the city, as it is all over Sweden, there is a need for research based school development on diversity issues. New ways for professional development have been developed (SoU2009). One of the main tasks for the Research and Development Unit of Malmö municipality is to connect such pedagogical research with school development around the challenges of diversity in local society and students’ background. It is recognised that specific competencies are required of the teachers, without which a decrease in the quality of teaching can arise. Therefore a partnership with teacher training at Malmö University was considered a prerequisite for sustainable changes and for the dialectical development of new knowledge to arise.

At the same time, Malmö University itself has formulated the ambition to adapt teaching and research to the local and regional needs, in which diversity and sustainable development are the main two issues. In the Faculty of Education and Society, intercultural and linguistic aspects are core issues as well as broadening the intake of students from different ethnic groups.

Even though they face similar questions, it is not self-evident that a municipality and university in the same region find each other to work and cooperate on these issues. In Malmö however, acknowledging these needs, a cooperation that is unique for Sweden has been established between the municipality and the teacher training institute of Malmö University to further teachers' competencies. The aim is to identify the needs of schools and to connect the expertise of the teacher training institute in meeting these needs. However, many questions of schools require new insights. Therefore it is important to promote research around common questions, resulting in innovations of the (pre- and in-service) teacher training curriculum. In this way, the competences of the University should continually meet the needs of the changing social context.

The practice oriented research should not only take place at the university: teachers themselves can build their capacity and play an important role in their school's development. Different forms of research and development have been undertaken:

- Research circles of teachers, analysing and exploring questions within their own practice; these are led by teacher trainers with a doctoral degree.
- Opportunities for practicing teachers to undertake MA and PhD studies around diversity issues, supervised by staff from the University. Studies can be undertaken in connection to teaching duties (around 20% of one's appointment), whereas researching and studying is the main part (50%), with an additional assignment to promote school development in the city (30%).
- A support and coordination structure of both circles and teachers studying for MA and PhD, including weekly seminars that take place at the municipality office, but are led by a university staff member.
- A professorship to promote the practice oriented research around language development issues.
- Provision of courses and in-service training for schools.

In our text we will mainly focus on the research circles.

RATIONALE BEHIND THE WORK OF RESEARCH CIRCLES

Since 2007, research circles were initiated for practicing pedagogues. This initiative has taken place both as part of the organisation of the R&D Centre for Diversity in Malmö and within the frame of a national assignment initiated by the former National Agency for School Development.

The aim (Persson 2008) of 'research circles' is to contribute to development of school and university through teachers', school leaders' and teacher trainers' search for knowledge around questions that are formulated by themselves. The formation is a regular part of this cooperation. In groups of about eight teachers or/and school leaders, led by teacher trainers with a doctoral degree, research literature is discussed and research questions are formulated and explored. These activities result after 1.5 years in a publication and presentation of all participants. Since 2007, 34 of these circles have started and/or completed their work.

The concept of Research circles is rooted in the Swedish tradition of adult education and it has developed from a specific idea about knowledge, also called 'another paradigm', in which for example action research is one of the methods. This paradigm is inspired by Khun's critical theories of science as a social construction (Khun, 1996) and it stresses some basic criteria such as participation, communication and knowledge development. The criteria are built on egalitarian and democratic values. Some other keywords are empowerment, emancipation, mutual understanding, trust and responsibility – the participants are active subjects, not objects. The concept includes an approach of really listening to people and a criticism of the dichotomy of theory and practice. The paradigm can also be described as an alternative to the marketing of education (Heron & Reason, 2001; Enö 2005; Rönnerman, 2008).

Enö and Persson (2009) outline the rationale behind the work in research circles. They explain the democratic principle and ideal of equity in the search for pedagogical approaches that function in the Malmö schools. The idea behind the circles is that much educational research is not being used in schools because it is decontextualised. In the circles, the own school context is the starting point for reflection and research of the professionals.

Themes that were in the centre of the circles have for instance been:

- History teaching in a multicultural society
- Parent involvement and democracy
- School leaders on values, knowledge and the school system
- School leaders' perspectives on learning and development
- Science and society in multicultural schools
- Language development in Swedish and Swedish as a second language
- Integration, safety and learning
- School library and diversity.

Circles work on these themes for about 1.5 years. The groups consist of about 8 participants who meet every 3 or 4 weeks, for which they get 2 hours a week on their schedule. The circles leader/moderator gets more hours to prepare and report on the work. The work in the circles is often completed with a written report, but also other products can be chosen.

PROBLEMATIC ISSUES AND POTENTIAL OF RESEARCH CIRCLES

The research circle challenges structures, preconceptions of learning and a 'culture of doing' in Swedish schools (Scherp, 2003). In this context it is important to point out the meaning of long-term process, it is not a 'quick fix'. Sometimes participants get frustrated because nothing seems to 'happen' and they also react on the lack of control. This can be explained by the fact that teachers are not used to take full responsibility of professional development and certainly not when the circle is led by an 'expert' from the university. A subtle resistance can be identified in these situations and it often depends on uncertainty and consequently scepticism towards the field and concept of research. For instance, when it comes to the product, there is a resistance against writing and a certain resignation frequently characterises this part of the process (Lendahls Rosendahl & Rönnerman, 2006; Enö 2005; 2010).

Power and hierarchies characterise the relation between the fields of school and university. The experience of symbolic oppression in scientific environments can be linked to an academic discourse in which inaccessible language and rules of research methodical and formula often dominate (Bourdieu, 1996;

2004). Therefore it is of great importance not to stress out the requirements of writing in an academic way; curiosity, flexibility and creativeness are far more significant.

The evaluation carried out by Holmström (2009) showed some problematic issues in terms of shortage of time and replacement of participants as well as lack of interest in the participants' work from the side of colleagues and school leaders. These are serious hinders of implementation that need to be discussed further. Another problematic issue is that the research circle risks to be reduced to a method and a part of the theory-practice dichotomy that it criticises. Furthermore, the demands of rationality (quick fix), regular audits, evidence based methods and organisational power structures are problematical conditions for the survival of the concept of research circles (Halliday, 2003; Rönnerman, 2005; Enö 2005; 2010).

Though, when you manage to beat the hinders mentioned above, there is a great potential in the research circle and the evaluation showed appreciation of discussions, reflection and literature (Holmström, 2009). In addition to this, the participants described that new views and angles on problems in daily practice developed through analyses and theoretical discussions. This gives the participants the capacity to change both cultural and structural items in the pedagogical context. The participation in the research circle also gives an opportunity to present their knowledge and clarify individual as well as collective skills, which leads to higher self-confidence and counteracts the phenomena that we call 'tacit knowledge'. To be forced to listen and motivate your positions and activities are a part of the communicative rationality Habermas (1996) speaks of. We seldom take the time to really listen because we are so focused on performance and have so few opportunities for joint in-depth reflection. Another significant potential of the research circle is that the processes, besides development of profession and practice, enhance the quality of life of individuals as well as communities.

CONNECTIONS WITH UTRECHT UNIVERSITY OF APPLIED SCIENCES

In the fall of 2010, a visiting professor from Utrecht University of Applied Sciences was appointed by Malmö Municipality and Malmö University to focus on specific aspects of teaching in multicultural schools. She is a researcher,

specialised in the development of teacher competencies in integrating language development in content area teaching and was asked to assist in establishing four research circles in the Malmö model, on this very issue. Working on the same research questions in similar social contexts, the appointment should enable a positive transfer. As in Malmö, the Faculty of Education in Utrecht had considered it as one of its main tasks to ensure students are properly prepared for working in multicultural schools. A slightly different approach was undertaken to connect teacher training, scientific research and the schools. In fall 2002, a research group was formed in Utrecht with the title 'Teaching in a Multicultural School' to identify the required teacher competences as the first of a series of professorships on practice oriented research. The group consisted of experienced researchers, teacher trainers and teachers from the schools who during two periods of four years (2002–2010) together had carried out a number of case studies with interventions (e.g. Hajer 2007, den Brok, van Eerde & Hajer 2009). Aspects of the pedagogic climate, dealing with parents and language in content areas all play a central part. The research group links the questions and insights of working teachers (taking their tacit knowledge to the foreground) to existing theoretical insights. The aim was to include the results in teacher training programmes, implement them in schools and share these with the scientific community.

The research group thus carried out multidisciplinary research on Classroom observation, in relation to the professionalisation of teachers. In addition, the research group initiates developmental research in which, together with teachers, new pedagogic-didactic approaches are examined especially in mathematics, biology and history. The specific pioneering position of the research group in the Dutch educational context made it possible that insights could reach the teacher training programmes and be used in professional development activities for teachers in schools.

In fall 2010, drawing on the Utrecht experiences, the decision was taken in Malmö to compose four new research circles in which not only teachers but also teacher trainers participate, working with issues related to content and language integrated learning and teaching (Hajer & Meestringa 2009/2010). The four circles focus on teaching mathematics, science, social studies and vocational courses. A series of presentations and seminars was organised to start up the work. In the circles the exchange of knowledge between subject and language specialists is promoted as well as between teachers from schools and teacher trainers in the framework of an international cooperation between the universities of Malmö and Utrecht.

STRENGTHS AND WEAKNESSES OF THE PRACTICE ORIENTED RESEARCH – A COMPARISON BETWEEN UTRECHT, MALMÖ AND COMMON RESEARCH SETTINGS

Can lessons from the Utrecht work be used in the Swedish setting and – the other way around – could lessons from Malmö inspire Dutch developments? We can by now formulate some preliminary lessons and thoughts.

Both in Malmö and Utrecht, there is a search for a sustainable model of cooperation that connects teacher training staff to professional issues at school level as well as to insights and networks in scientific research. Organising regular meetings in a research oriented group can foster exchanges between teacher training staff, teachers and researchers. The choice of crossing disciplinary borders is interesting: multidisciplinary research enriches the research process. In both contexts the aims seem to be twofold: developing insights and methods in (in this specific case) content and language integrated practice, but also the development of research skills and reflective practice of teachers and teacher training staff. Specific for the Malmö context is the close cooperation between the municipality as the school board; connections with the field are more limited and seem less sustainable in Utrecht.

In both contexts, there is a tension in the expectation that participants – besides their own development – will also contribute to school development and curriculum innovation. Here, the involvement of school leaders and university management respectively is important and requires attention. Not only in the phase of spreading findings and results, but also in formulating research questions and creating conditions for the research in the school or university setting. The choice of publication type also could be discussed with those who might benefit from the activities: written articles or research conference papers are only one possible outcome, whereas the professional field might be more interested in practical presentations and materials for teacher training. What is the value of both types of outcomes and who accounts for the use of research funding?

In both university contexts we observe discussions on the value and status of practice oriented research, especially on action research as compared to the established more theory driven research of senior scholars. The involvement of university professors in research circles of practitioners is not a normal practice

in Malmö nor in Utrecht's faculty of education; links between the work and outcomes of the circles and established research programmes can easily be neglected or avoided.

Connected to this issue, there are similar questions about the contribution of short term (1.5 years) research projects and the longer term university research programmes. Here universities have to develop a research policy on the type of research that enables universities of applied sciences to play a role in innovative professional development.

FINAL REFLECTIONS

A recent decision from the municipality of Malmö is to focus on 'language and subject' for a longer period; a text is sent for consideration to the local political level. If the centrally decided text is accepted, different ways of supporting pupils will be initiated in the coming three to five years. We consider it important that this is seen as opportunity not only to take concrete actions, but also to involve and engage people. Research on social innovation is not only normative reflective search of explicating knowledge and finding 'evidence' for successful interventions. It also involves people in processes of communication, participation and learning. Language issues are important to discuss in all contexts of learning, especially where sociolinguistic differences put a pressure on students' school achievements. If teachers and students in Utrecht and Malmö can find ways for successful school interventions and by that demonstrate the significance of communication, approach and visibility of language capacity we have come a long way.

Developing language skills depends on how we construct relations and the way we construct relations is a part of our culture. Diversity in culture and society is not just about ethnicity, it is also a matter of class, gender, physical functions etc. When we try to identify the problems and potentials of multicultural as well as monoculture schools, we discover the complexity of individuals and organisations. In other words; immigrant pupils in low resource areas are not homogeneous groups, neither are pupils in high resource areas. Including them actively in research activities might be the outcome of further work in the circles. Understanding and using language diversity is a challenging part of today's teacher training which requires involvement of all actors and connections between research, development and education.

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ARE ‘PAYMENT BY RESULTS’ AND ‘SOCIAL IMPACT BONDS’ THE MOST EFFICIENT WAY TO ADDRESS THE CHALLENGES FACED BY THE CRIMINAL JUSTICE SECTOR?

Chris Fox

Manchester Metropolitan University

c.fox@mmu.ac.uk

Kevin Albertson

Manchester Metropolitan University

k.albertson@mmu.ac.uk

INTRODUCTION

In recent years the UK government has emphasised evidence-based policy, as a part of which the Payment by Results approach has increasingly been promoted. Payment by Results (PbR) allows the government to pay a provider of services on the basis of specified outcomes achieved rather than the inputs or outputs delivered. Linked to PbR is the innovative source of funding social interventions known as Social Impact Bonds (SIBs). These allow the financing of social outcomes via private investment. Return on the SIB is calculated using PbR methodology, and PbR and SIBs are regularly referred to as key tools for delivering change.

However, to date, there has been relatively little academic scrutiny of these concepts and virtually none within the criminal justice sector, where, according to recent government legislative proposals, many criminal justice services will be subject to PbR. Here we set out the challenges likely to arise in developing PbR and SIBs in the criminal justice system.

Payment by Results (PbR) “will link payment to the outcomes achieved, rather than the inputs, outputs or processes of a service” (Cabinet Office 2011: 9). The idea of paying for specified outcomes, which will, it is hoped, reduce government costs, is particularly attractive at the moment because of the current state of public sector funding in the UK.

Because payment arises after outcomes are known, which might involve substantial time delays, a key challenge to the delivery of PbR models of service delivery is the challenge of raising working capital (Mulgan et al. 2010). A related policy innovation, Social Impact Bonds (SIBs) will allow the government, in theory, to privatise the up-front costs of social innovations and the associated risks, thus reducing taxpayer expenditure in the short-term and eliminating the risk of government money being spent on interventions which do not deliver the desired outcomes. A social investor might be, for example, an individual philanthropist or a charitable trust. Mulgan et al. (2010) suggest that a Philanthropic Social Impact Bond will see funds raised from philanthropic sources invested through a special purpose “vehicle” (organisation) which would sub-contract with non-governmental organisations to deliver services to achieve the desired outcomes. Thus the SIB arises from the desire to facilitate the “private” (non-government) sector to become involved in the delivery of social services.

Notwithstanding their apparent attraction, reality often complicates the simplest theories and in this paper we examine the challenges which might arise in the implementation of PbR mechanisms in the criminal justice system of England and Wales. We start by providing a brief outline of the main attractions of PbR and SIBs to government. We highlight previous and current examples of relevant initiatives in the UK public sector. Next we provide an overview of some of the main challenges to PbR, identifying both conceptual difficulties and more practical challenges. To illustrate these points we use the example of the criminal justice system. We conclude by suggesting that PbR has some limitations and note that there are other innovations in the commissioning of public services which might also address some of the aims of PbR.

Overall, we argue that the case for this approach is not yet proven in the criminal justice sector. The evidence base is contested and potential savings are difficult to quantify and realise. We conclude the PbR methodology will be difficult to implement adequately; nor are SIB's likely to succeed as a socially

efficient means of attracting new sources of funding into Criminal Justice sector. In sum, it would appear the joint SIB/PbR approach is unlikely to deliver results for which the government should pay.

POTENTIAL ADVANTAGES OF PAYMENT BY RESULTS

A system focused on the delivery of outcomes might look very different to the current system of government provision. It is suggested there will be a wider range of service providers, more variation in models of service delivery and a much reduced role for “national standards”. Proponents of PbR and SIBs argue they will drive greater efficiency, innovation and impact in tackling social problems while also reducing risk for government. We examine each of these suggested advantages in turn.

Efficiency

The focus on specified outcomes which is a part of the PbR initiative, and the associated reduced focus on commissioners “micro-managing” the processes put in place to achieve those outcomes, seems to be a rejection of the prevailing “New Public Management” approach which has dominated the public sector¹ and, increasingly, the voluntary sector services over recent years. It is suggested greater efficiency may be achieved through the correction of misaligned incentives (Mulgan et al. 2010). PbR is likely, so it is said, to align incentives with specified outputs. In addition, there will be an emphasis on allocating resources to where they will achieve the most impact, particularly as social entrepreneurs consider the likely short-run return on SIBs.

Transfer of risk and deferred payment

By making some or all of payment for a service contingent on that service delivering agreed outcomes, PbR transfers risk away from the branch of government commissioning the service and towards the service provider. Government will only pay if outcomes are achieved. The service provider will

1 See G and Peck (2005) for a summary of New Labour’s approach to public management.

have to raise some or all of the funds to deliver the service prior to being paid for results. From a government perspective, not only is risk transferred to the provider, but payments are deferred until outcomes are apparent.

Encouraging new market entrants and innovation

Implicit in the concept of more innovation and the transfer of risk is the potential of PbR models to promote more market testing of public services and encourage new market entrants, particularly from the private and voluntary sectors. It is held that greater efficiency will result from encouraging public, private and voluntary providers to compete. The current government has a commitment to ensure that proportions of specific public services should be delivered by independent providers, including civil society organisations (mutuals, cooperatives, charities and social enterprises). They also have an aspiration to award 25 per cent of government contracts to Small and Medium Sized Enterprises (Cabinet Office 2011)

Proponents of PbR argue “freeing” up providers to deliver services in different ways will encourage greater innovation. Thus, in relation to criminal justice, the Ministry of Justice Green Paper suggests:

The payment by results approach will encourage innovation and bring out the diverse skills from all sectors. We must ensure our commissioning model harnesses the creativity and expertise that independent providers can bring. This includes the small and specialist voluntary providers and social enterprises. (Ministry of Justice 2010a: 41)

PAYMENT BY RESULTS IN THE UK

The UK government is committed to “introducing payment by results across public services” (Cabinet Office 2011: 9). Currently schemes are being discussed or actively developed in areas including substance misuse, youth justice and children’s services. In this section we discuss some of these.

Welfare

The Department of Work and Pensions is proposing a PbR mechanism as part of its Work Programme. The Work Programme is described as “the centrepiece of the Government’s plans to reform welfare-to-work provision in the UK” (Department for Work and Pensions 2010: 2²). The Work Programme brings together various programmes designed to help people back into work into a single scheme. The Universal Credit brings together current working age benefits and tax credits with a single welfare payment. It is envisaged that the Work Programme will be delivered by large, private sector providers delivering 40 Work Programme contracts across 18 areas with at least 2 providers in each area (ibid.).

Substance misuse

One of the major aims of the new Drugs Strategy 2010 *Reducing Demand, Restricting Supply, Building Recovery* was “to put the goal of recovery for those who are dependent on drugs or alcohol at the heart of all activity” (Department of Health 2010: 2). As part of this commitment to recovery the Department for Health has launched a pilot of PbR in eight areas in relation to drug dependency and recovery services. The initiative will aggregate existing funding streams and align overlapping programmes to increase the funds available for providers who are focused on achieving recovery outcomes. Providers will be paid on the achievement of outcomes such as the recipients being free of drug dependence or back in work (Battye and Sunderland 2011).

Criminal justice

In its Green paper the Ministry of Justice (2010a: 10) states:

Significant amounts of public money have been spent on rehabilitating criminals without properly holding services to account for the results they achieve. We will move to a new approach where providers are increasingly paid by their results at reducing reoffending.

2 Department for Work and Pensions (2010) The Work Programme Prospectus – November 2010, London: DWP.

Proposed pilots of various PbR models are then described. For example, the Youth Justice Investment Pathfinder Initiative will see a portion of the central youth custody budget invested in “pathfinders” where consortia of local authorities or a single local authority use the funding to commission and deliver their own responses to reduce levels of youth custody and youth reoffending in their area. Pathfinders will share the financial risks if the custody rate increases and keep the funding if custody numbers are kept low.

A SIB initiative has recently begun at HMP Peterborough. This is the first pilot of models of this kind in the English and Welsh criminal justice system. The Ministry of Justice has signed a contract with Social Finance (2010) to attempt to reduce the reoffending of a cohort of 3,000 adult males who are discharged from HMP Peterborough having served sentences of less than 12 months in custody.

METHODOLOGICAL CHALLENGES

Analysis of the underlying concepts behind PbR together with early experiences from approaches being piloted in the UK suggests a number of challenges which must be faced if PbR mechanisms are to work effectively. Here, we outline three methodological challenges, before going on to list the more practical challenges facing the implementation of PbR projects.

Gaming

Micromanagement systems often suffer from the problem that the social outcome which is desired is more difficult to define than the specific indicator chosen. Thus, service providers are best to concentrate on achieving merely those indicators specified in the output/outcome mechanism and to neglect other measures even those they know are also important (Hoverstadt 2011). The aim of government in replacing specific targets with more generalised outcome measures is that this problem will be avoided. However, as Hoverstadt (2011: 1) argues:

...merely shifting the level of abstraction of what is being measured upwards from activities to ‘outcomes’, doesn’t alter the systemic structure and the same unfortunate consequences are likely to ensue.

In this sense, PbR is no different from any other performance management system. The choice of appropriate outcome measures is crucial if private sector providers are to deliver what society requires.

Measuring outcomes

The challenge of measuring outcomes is a substantial one, particularly in sectors where outcomes are difficult to define and evaluate. Early findings from the Peterborough SIB suggest that:

The development of a methodologically robust outcome measure, which had the confidence of all stakeholders, was a time-consuming and analytically complex process. (Disley et al. 2011: iii)

Fox and Albertson (2011) discuss this challenge at length and consider three main issues: Defining outcomes; Scale of change; and Evaluation methodology. We consider each of these below.

Defining outcomes

Key to PbR models is a clear definition of the outcome which is being purchased. Using the example of criminal justice, in the English and Welsh criminal justice sector this is not straightforward. Consider, for example, the seemingly straightforward result of reducing re-offending: re-offending will generally be measured via the proxy of re-convictions (i.e. “proven re-offending”). Thus, it would appear to matter little to the PbR model if offenders cease to offend, or merely become less easy to catch. Further, even this proxy can be defined differently. As noted in the recent Ministry of Justice (2010b) consultation on offender statistics, at present, there are six different measures of re-offending. If outcomes are difficult to define and measure, the result is likely to be that PbR models in the criminal justice system will tend to concentrate on the narrow set of outcomes which is easiest to define and measure.

Realisable scale of change

Standard economic theory suggests that a provider signing up to payment by results will want a return on investment that reflects the increased level of risk assigned to them and the investor in a SIB will wish to be further compensated

for their taking on a risk which is arguably higher than that available in the regular bond market. Mulgan et al. (2010) argue prudent impacts for programmes seeking reductions in re-offending would be in the range of 10 to 20 per cent. However, evidence from criminal justice evaluations indicates even well-executed projects and programmes often bring about only relatively small changes; a point made by Berman and Fox (2010) in their thought-provoking examination of success and failure in criminal justice policy reform. If only small changes to outcomes are possible, this potentially creates problems for investors looking for a decent return.

Evaluation methodology

Key to PbR is the ability of a commissioner to be confident the desired outcome has been achieved and that it was achieved because of the actions of the service provider that has been commissioned. Thus evaluation designs with high levels of internal validity (experiments and quasi-experiments) will be preferred to those with lower levels of internal validity. If we adopt this approach to the evaluation of PbR models, the result, as Mulgan et al. (2010) suggest, will be the widespread use of evaluations which make use of comparator groups and this will raise the overhead costs of PbR substantially³. That is, PbR and SIB investors will be required to raise funds to cover the intervention, and a further tranche of funds to cover a costly evaluation.

PbR, it is said, is likely to foster innovation in social service delivery. Thus extensive evaluation both of outcomes and implementation in different contexts will be required. Every time an innovative intervention is implemented, there will be an ongoing need for further objective evaluation. Overhead costs are therefore likely to remain high. However, detecting small changes in outcomes measures will require large intervention cohorts in order to show statistically significant results (Mulgan et al. 2010). This will limit the range of interventions offered, and the organisations able to become involved.

3 D Disley et al. (2011: 8) also point out that outcome measurements relying on comparison with a control group cannot be rolled out nationally because, for example: "If every short-sentenced prisoner in England and Wales could be part of a SIB, there would be no control group with which to compare."

Identifying and allocating fiscal benefits to public agencies

If PbR models are to become widespread they will rely on the commissioning organisation being able to realise a monetary saving from which to pay for the results commissioned. This implies taking a relatively narrow view of value, one in which value is limited to the fiscal benefits realised by the commissioning organisation over the lifetime of the PbR contract.

Consider the example of a PbR contract in which the outcome is a reduction in (criminal) re-offending. Work by economists at the UK Home Office has produced a set of valuations of crime (Home Office 2005) which could be used to place a value on a reduction in re-offending. However, half of the costs identified are a mix of public (fiscal) and private sector costs. Private sector costs can not be recovered by a public sector commissioning body. The remaining costs are the physical and emotional impact on victims (Home Office 2005: Chart 4.2). These are not costs that can be recovered by the commissioning body.

It should further be borne in mind that not all potential fiscal savings can, in practice be converted into cash. Not all such costs are marginal – that is, they will not decline proportionally as re-conviction rates fall. The intervention impact which might allow a whole wing of a prison to close might well be beyond the scope of a single PbR model. In any event, there is no guarantee the desistence from offending of one individual might save any resources. Roman (2004) shows how it is necessary to understand whether demand for a service is finite.

In general, it is not clear monetised savings will accrue in the criminal justice system even where there is a successful intervention; that is, an intervention which reduces societal costs.

IMPLEMENTATION CHALLENGES

Those involved in setting up PbR schemes are also encountering a number of more practical challenges. Generally, these add to the complexity of establishing PbR and increase the risk of establishing perverse incentives which might encourage intervention providers away from achieving the socially efficient outcomes towards a more tightly defined “target”.

Individuals versus groups

As Batty and Sunderland (2011) note, a key choice for those setting up payment by results schemes is whether to pay for the results achieved for individuals or on the results for a group. They contrast the Work Programme, which will pay for individuals who find and then sustain employment, with the Peterborough SIB which will pay on the basis of re-offending rates for specified cohorts. When payments are based on the performance of individuals, one challenge will be to develop a monitoring and payment system which is not overly complex, bureaucratic and costly.

Segmentation

A balance will need to be struck between segmenting populations enough to be confident that services will be tailored sufficiently to the needs of particular groups (Batty and Sunderland 2011) and defining groups which are large enough for statistically robust conclusions to be drawn about outcomes. It is likely the process of assessing client needs and allocating them to different segments will need to be undertaken by a different organisation to the one offering treatment to avoid the possibility of “gaming” the system.

Setting the tariff

Batty and Sunderland (2011) suggest two broad approaches to setting the tariff paid for achieving outcomes for particular client groups. One approach takes the average current cost of service delivery. This has the advantage of being at a level where the commissioners can be confident providers can deliver but has the possible disadvantage of “locking in” any current inefficiencies (ibid.). The other approach estimates the economic value of the outcomes. Batty and Sunderland (2011) suggest that this is an analytically more sophisticated approach which gives commissioners a clearer sense of what they ought to be willing to pay for. However, the potential drawbacks they identify include the creation of perverse incentives and disruption to current providers who may not be equipped to make the transition to PbR (ibid.).

The balance of risk

Part of the aim of a payment by results model is to transfer risk from the commissioner of a service to the provider. However, smaller providers may be unable to operate in this way because of the pressure risk places on their cash flow (Battye and Sunderland 2011). PbR, rather than leading to a greater diversification of providers may effectively exclude smaller organisations and voluntary and public sector organisations from the provision of services.

Allocating payment between organisations

Offenders are often a client group with complex needs, particularly offenders serving sentences of less than 12 months (National Audit Office 2010) where achieving an outcome such as a reduction in re-offending might require several service providers to work together. The challenge this raises is how payments for outcomes will be apportioned between providers given that the outcomes achieved by their respective services might be contingent on the performance of other service providers. Commissioners might address this issue in one of two ways. One option is for commissioners to contract with a “prime” contractor and expect them to negotiate sub-contracts with smaller, more specialist service providers able to address particular needs or engage effectively with particular segments of the client group. A second option is for commissioners to enter into separate contracts with a range of providers. This seems to be approach that might be adopted in some of the drug services payment by results pilots. However, it adds a layer of costly complexity and negotiation.

Carrying payments over financial years

Commissioning in the UK public sector normally follows a cycle determined by established financial years. Where outcomes are longer-term, commissioners will have to establish procedures which allow funds to be carried over financial years and “ring-fenced” in the expectation they may be required to meet future liabilities.

Settlements with providers

Commissioning cycles in the UK will be of several years duration. Thus, a provider will bid to deliver a service for an agreed number of years and, at the end of that period the service will be re-commissioned. Normally, if the previous provider does not win the contract to continue to deliver the service a “clean break” between the commissioner and provider is possible. The same is true if either side use a “break clause” to end a contract for the provision of services. However, under PbR, achieving a clean break will be much more difficult. At any given point in the commissioning cycle there will be future liabilities for the outcomes achieved by a cohort currently being served. Monitoring, and potentially evaluation, may need to continue after the life of the current commissioning round before final payments based on longer-term outcomes can be agreed. The alternative for parties wishing to make a clean-break will be to agree the potential future value of the contract and a one-off payment to cover all future outcomes delivered and liabilities incurred. Working out the value of such a payment will be difficult and the potential for legal action high.

DISCUSSION – THE LIMITS OF PAYMENT BY RESULTS

Payment by results models have a place in the provision of public services. The transference of risk is attractive to government and in some parts of the public sector where the potential client group is fairly large and homogenous, service provision is highly integrated, measurement of outcomes is straightforward and the fiscal return on achievement of outcomes is easy to establish a payment by results mechanism might be attractive to commissioners, service providers and investors looking for a return.

However, as we illustrated through a consideration of the potential for PbR in the criminal justice sector where outcomes are relatively difficult to measure and value, service provision is complex, fiscal benefits are shared across a number of potential commissioners and existing evidence on what works is still relatively patchy, PbR is unlikely to be a panacea as a driver of service reform. Nor are SIBs likely to succeed as a means of attracting new sources of funding into the sector.

There is an inherent contradiction in PbR and SIB models. In general, private investors have a higher discounting factor than government, that is, they expect to see their investments yield returns in the short-term, yet the social return on any social investment is likely to be long-term. There are few quick-fixes in Criminal Justice. In addition, investors will be looking for a return which covers, not only the cost of the intervention, but also the cost of the evaluation. Finally, given that the government is limiting its downside risk, while investors will lose their capital if their projects do not pay-off, only those projects likely to lead to substantial benefits will be offered – those projects where social returns are either large, certain or both. This begs the question, why does not the government invest in such already on behalf of the taxpayer?

In sum, the stated aims of social interventions funded by Social Impact Bonds, with returns calculated by Payment by Results, appear to be unlikely to be realisable. Although this joint approach appears to be firmly founded on simple theoretical models, there are inherent flaws in application which will, we believe, limit their use and the benefits which might be gained from them. It is not altogether clear society as a whole will benefit from their introduction and, if philanthropic entrepreneurs are not forthcoming, we are concerned social services might suffer.

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PROMOTING COLLABORATION BETWEEN POLICE AND SOCIAL WORK IN THE FIELD OF INTEGRATION

Sari Vanhanen
Turku University of Applied Sciences
sari.vanhanen@turkuamk.fi

Mira Ojalehto
Turku University of Applied Sciences
mira.ojalehto@turkuamk.fi

INTRODUCTION

In all EU countries, increasing attention is paid to successful integration processes. This stronger focus also places new demands on public services and for the professionals who work with immigrants. As the work is in change, it is important to try to establish the existing education needs of the professionals in the field of two-way integration.

When highlighting immigrants' fundamental rights, human dignity and solidarity, it is essential to enable them to contribute fully to the European economy and society. Recently an attitudinal change has emerged in European societies and public debate has become more negative towards immigrants. The economic crisis in the EU and a constant flow of immigrants from areas outside the EU countries are impacting attitudes to become more hostile and racism has become more visible. So far, there is a strong need to bring together citizens and professionals from local communities in order to avoid further escalation and radicalisation.

This article is based on a European research and development process conducted in Finland, Sweden, UK, Spain and the Netherlands during 2009–2011. The central concept describing the approach of the development is integration.

This is seen as a dynamic two-way process involving both migrants and the host society, and thus not only meaning integration and social inclusion of the migrants, but also the promotion of mutual adaptation between European nationals and immigrants.

For immigrants from poor backgrounds and living in marginal districts integration may be difficult to achieve. Tensions in their own communities and between the immigrant communities and the society around them (e.g. discrimination, marginalisation, and criminalisation) can hinder integration. Social workers and police officers are one of the most important local professionals who are active in these communities and who are able to stimulate active citizenship and promote inclusion. They can support newcomers to find their way in society and participate as full citizens.

In this article we will describe shortly the outcomes of a comparative research concerning good and promising practices between immigrants, police and social work in five EU countries mentioned above. Our main interest here is to focus on challenges in collaborative work between police and social work in the field of integration. The experiences and findings of joint pilot trainings – *the IPS training model* – are described (see Halttunen & al, 2011). As a conclusion, we point out the issues that we found crucial while enhancing cooperation between these three actors.

INTEGRATION AND ACTIVE CITIZENSHIP

The objective of the development process has been to promote collaboration between police officers and social workers in their work with immigrants and immigrant communities. Secondly, the aim was to share knowledge of intercultural competences and good work practices.

Examples of good and promising practices were collected from each country, and these were used as one part of the learning material in the IPS training model. In our comparative research, four key concepts were focused on specifically as tools for thought. As already mentioned, the concept of integration is an essential part in this context – keeping in mind that this concept may have several interpretations in each country and vary according

to the national immigration policy. The other three concepts we used were *intercultural competence and professional development, multi-professional working* and *active citizenship* (see Heikkilä & al, 2011, 18-22).

Active citizenship is a value-shared framework for social and democratic politics as promoted by the European Union. Active citizenship implies three principles: self-responsibility or self-reliance, the principle of human and social rights, and the principle of social responsibility. However, the principle of self-responsibility assumes that people have resources to meet this self-responsibility. For that reason, this first principle is fully interdependent with the two other principles (see van Ewijk 2010).

According to the aims of the IPS project, the objective of the training programme was 'Improvement of collaboration between police officers and social workers in endorsing the integration of third country nationals'. We want to point out that taking integration and immigrants as a starting point does not imply that immigrants or different cultures are blamed for causing difficulties in our societies. Integration processes are hindered most by existing structures, regulations, the attitudes of citizens and socio-economic positions. Being an immigrant and belonging to a specific culture are no more than factors in a whole array of differences. Each of us is a self-organising person permanently in interaction with our (social) environment; nor are immigrants, police officers or social workers homogeneous groups in themselves.

The EU perspective on citizens is founded on active or participative citizenship. It reflects the idea that integration, safety and wellbeing are based on civil society, endorsed by the State and public services. Integration is an on-going process among citizens and sometimes needs interventions and support from the public sector. In this we find a tension in the sense that the State, its services and society are also 'producing' inequalities, discrimination and oppression. Social workers and police officers alike should be aware of their double sided position and should basically aim at anti-oppressive practices, such as taking impediments away and easing access.

The public professions are based on human rights and on the Charter of Fundamental Rights of the European Union, founded on dignity, freedom, equality, solidarity, citizens' rights and justice.

CHALLENGES IN MULTI-PROFESSIONAL COOPERATION

The innovative feature in the IPS training model is to have two professionals working together and participating in the same course. Sitting around the same table is a very concrete start for collaboration between the police and social workers. For those professionals who are already working together, this can be an opportunity to sit down for a while and reflect on work practices and mutual understanding with the joint responsibilities in working with people with an immigrant background.

It is quite seldom that the professionals have time and space to share their experiences and opinions together and even to find the joy of work with the good practices and positive appointments.

There is a need to be aware of the role of other professionals as well as having a clear understanding of your own role (see also Quinney 2006). Hence, it is understandable to start with ice-breaking activities to clarify these roles both at the administrative and legal level and also more in relation to the attitudes: who are we? Why do we work like this? What is our mission and main aim in our work? What do we expect from the other professionals? With these questions we want to underline how crucial it is to create an atmosphere in a learning group with open, respective and honest communication.

Another key issue in the collaborative work between the police and social work is to develop a model of shared power with clear responsibilities and accountabilities. Connected to this is a need for senior management support as a prerequisite for effective collaborative practice. It is essential to contact the upper management especially in hierarchal institutions such as police organisations. Yet it is important to keep in mind that tensions can and will arise from envy and rivalry between individuals and organisations when competing for resources and power. These elements can be made visible during the learning process so it helps the practitioners to meet and be aware of these challenges in their cooperation. If the process is poorly carried out, it may damage the relationship between the police and social workers and it may even make matters worse for the immigrants.

Once organised and active, cooperation between the police and social work may not only increase the quality of life in immigrant communities, but can make the work of the professionals of both occupational groups more rewarding.

However, one important question needs to be underlined. How do we involve the immigrant representatives in developing the process of joint working practices? What is their impact? During the training sessions and even while planning the content it is crucial to have their aspects taken into account. It is most satisfying is to have a person tell about her or his experiences on a certain topic during the contact days of training, so there is a possibility for participants to ask and discuss further about the matters that they are concerned or want to know about.

TRAINING EXPERIENCED PROFESSIONALS – THE LEARNER AS A STARTING POINT

In supporting immigrants in host societies, police and social work professionals are involved in integration in two ways. Firstly, as facilitators of integration by having a role in promoting safety, wellbeing, human rights and connecting, and secondly, they have a more intervening role in critical situations within a family, in the street, or in the neighbourhood. In critical situations, action is asked and working together and understanding each other is essential.

While planning further education for professionals, it is necessary to have some basic information about the participants for mapping the target group and defining detailed content according to their needs. It is beneficial to have a general idea – if not a very exact one – about the knowledge level of the participants concerning the main topics and the content of the course. At the same time it is necessary to take into account the educational level and background of the learners to tailor the activities and learning assignments for the training.

Moreover, a suitable combination of theory and practice is an essential feature in this kind of education where experienced and young professionals meet each other with their own experiences and various expectations. Following the encouraging ideas of life-long learning, continuous development and reflection on professional competences is necessary. Therefore, it is crucial for the practitioners to update their own knowledge and skills; in this context, in the field of integration through collaborative and intercultural competences.

In training professionals, the educator should be aware of the prior learning of the participants. The contents should be designed to match the context and needs of the target group. The activities, learning assignments and discussion topics should meet the current challenges of working life. The IPS training model is based on the idea of a socio-constructivist approach of learning. This means that the learner needs to actively construct and apply knowledge. The learner is in the key role, not the teacher – the participants are the owners of their learning process.

However, learning is not only an individual process but also a shared experience with the others. It is fruitful for the participants to have a safe environment where they can discuss without haste. At the same time, these discussions need to be structured and targeted to maintain motivation and interest. In this kind of safe learning environment, the participants can share their personal experiences together.

In further education for professionals, learning is meaningful when novice and experienced professionals can learn from each other. At the same time, the trainer should create learning assignments that are challenging enough for the participants' level of expertise. The trainer needs to know what methods can be used with the specific target group. Theory and results from research may need to be processed to meet the practitioners' reality. Participants should be encouraged to read professional literature and journals to keep themselves informed of the latest developments and actual topics. Further education gives the participants an opportunity to take a break from their busy schedules in daily work and think more thoroughly about the working methods and guiding principles of their own work.

PROMOTING INTERCULTURAL AND COLLABORATIVE COMPETENCES – EXPERIENCES FROM PILOT COURSES

The pilot courses were implemented in four countries (Finland, Spain, Sweden and the Netherlands) in close cooperation with local and / or national networks of stakeholders. The course aimed at promoting intercultural competences in cooperation between the police, social work and immigrants. All these national pilots followed two learning lines: collaborative work and intercultural competences. The topics were considered appropriate and the

opportunity to discuss the similarities and differences between the methods, aims and visions was found fruitful.

The objectives of the course were to

- promote integration and active citizenship in the multicultural society
- develop intercultural competences of the key professionals
- enhance collaboration between police and social work in the multicultural contexts.

In the beginning we asked ourselves: what kind of cultural competent practices and competences do social workers and police officers need when working with immigrants? What challenges do we face in training police officers together with social workers? What is common and what differs in the way the two professions work with immigrants? What are their roles and responsibilities?

Concretely speaking, we had a common framework for the pilot course but each implementation was unique and adapted to national context. In the IPS training model the course is structured following the extent of the 6 ECTS with 3–8 contact days in a period of three months, and consisting of face-to-face discussions and independent learning assignments. There are several options for implementation, e.g. an open access course, local or area based course, or in-house training. Our pilots in Finland, Spain and the Netherlands were all open access courses, while in Sweden the pilot was focused on a certain suburb in Gothenburg as a local based course.

The composition of pilot groups varies so that in Finland we had 18 students of whom 10 were police officers and 8 social workers. In the Netherlands, they had 14 students of whom 7 were police officers and 7 social workers. There were also 5 participants with non-western background. In Sweden the course was organised for a local group of community police and social workers who already had done some cooperation together. In Spain course was a process consisting of several seminars along with the contact days of the participants.

According to our experiences it is essential to involve immigrants in the planning and implementation processes to bring in the input of the different multicultural communities. This can be done by inviting immigrants as educators, participants and representatives of the immigrant community to take part in the course.

While promoting the collaborative work practices in multi-professional networks, it is important to be aware of the confidential information in different organisations. There are limitations in sharing information and the limits are not always completely clear. Participants can be afraid to share the views and specific information.

In addition, there can be tensions regarding responsibilities, resources and power between the collaborative partners. These are the issues that should be taken into account and also to be discussed clearly while promoting the interactive cooperation in practice.

Based on our experiences on the pilot courses, three days of training with some independent learning assignments is only a starting point for bringing about a joint reflective discussion on the intercultural competences attached to the work. Intercultural competence can be a fairly new topic for some professionals. Even professionals with extensive working experience might need time to process knowledge, skills and attitudes related to these topics.

As educators we need to respect the experience of the professionals. Participants need time for discussions and for sharing their thoughts together. The course can offer valuable time for self-reflection and network building which would not be possible in the work place.

CONCLUSIONS

According to our findings in five EU countries, the networking between police, social work and migrants is a valuable asset in the empowerment of the communities. A lot of examples of work practices already exist, but given the complexity of the modern societies, there is an explicit need for the development of multi-professional and preventative collaboration as well as for cross-sector further education on intercultural competences. The experiences of the pilot courses are undoubtedly useful when building new cooperation also with other professionals.

Stimulation of successful work practices needs to be supported at the managerial level. Developing processes and learning should involve both the individual and organisational level for a long-term impact and a guarantee of dissemination of the outcomes. The involvement of management is essential

for good cooperation and assures resources and support for practitioners in critical points. To promote the collaboration in practice, the managerial level should be engaged. Also the superiors need to acknowledge that today work has new challenges and employees need to update or confirm their competences. A clearer picture of obstructions and possibilities in multi-professional work is a necessity while promoting two-way integration in practice.

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HEALTH CARE

CARPE AND HEALTH

Harriet Wittink

HU University of Applied Sciences Utrecht

harriet.wittink@hu.nl

We had two days of exciting presentations on the theme of health, in a room filled with passionate people.

Several themes emerged on what we have in common. Most partners have healthy ageing or healthy lifestyle as research themes, although the type of research varied. For example, Hamburg focuses on community based health promotion for elderly Turkish migrants in Hamburg, focusing on improving nutrition, physical activity and social participation and comparative environmental health risk assessment; Utrecht on healing environments and prevention of functional decline in older adults and secondary prevention of disease in patients through increasing physical activity and physical fitness; and Turku on prevention of disease through the development of tools for prevention of mental problems and alcohol abuse in retiring people.

We all agreed that applied research presents its own unique challenges and that research methodology belonging to this type of research deserves more attention. We also agreed that multidisciplinary research is challenging, but necessary. Hamburg provided a good example of how to bundle a wide variety of health related competences in research and teaching in an interdisciplinary and inter-faculty health Competence Centre.

What we also have in common is the link between research, clinical practice and education. Turku presented several interesting projects on innovative educational and clinical practice interventions, such as the NÄYTKÖ project that aims at developing a process that promotes evidence based nursing through nursing students' and professionals' shared learning, workplace learning shared expertise in the changing health care working life and the dialectics project. Utrecht presented research that is expected to lead to a useful instrument that can diagnose specific gaps in Dutch language skills of multilingual university students. Early identification and remediation of poor second language proficiency is expected to improve study results. All these projects illustrate how research can improve the quality of education and evidence based practice.

And then, of course, there was the informal exchange during coffee, lunch and other times during the two days. We have a lot to learn from each other.

NÄYTKÖ PROJECT

Toward nursing students' and professionals' shared learning

Camilla Laaksonen

Turku University of Applied Sciences

camilla.laaksonen@turkuamk.fi

Hannele Palтта

Turku University of Applied Sciences

hannele.palтта@turkuamk.fi

Marjale von Schantz

Turku University of Applied Sciences

marjale.vonschantz@turkuamk.fi

Minna Ylönen

City of Turku

minna.ylonen@turku.fi

Taina Soini

City of Turku

taina.soini@turku.fi

BACKGROUND

Health care professionals are obligated by law (Act on the Status and Rights of Patients 785/1992, Health care act 1326/2010) and ethical guidelines (Ethical guidelines for nurses) to provide care based on best available evidence. Evidence based practice (EBP) incorporates the best available scientific evidence with the expertise of the clinician and the patients' preferences and values. EBP

can be defined as a model for decision making and starts with asking relevant questions, seeking for solutions, making decisions and evaluating clinical practice. (Levin 2006.)

To produce evidence based care (EBC), nurses and nursing students need competences in setting relevant clinical questions, seeking and evaluating different types of knowledge, making decisions based on scientific knowledge, clinical expertise and patient preference, implementing evidence based care and evaluating outcomes. These competences require continuous learning, exercise and evaluation. The responsibility to ensure these competences lays both on organisations providing care as well as organisations providing education in the health care field.

The NÄYTKÖ project is an example of a collaborative effort by health care service and education providers to meet the previously described responsibilities. The NÄYTKÖ project is executed in collaboration between the City of Turku Municipal Social Services and Health Care Department and Turku University of Applied Sciences (TUAS), the faculty of health care.

The NÄYTKÖ project follows the innovative pedagogical approach (Lind 2007, Kairisto-Mertanen et al. 2011). The project strongly focuses on working life, is practice orientated; nursing students, professionals and teachers work as collaborative partners and innovative learning methods, such as journal clubs, are implemented.

AIMS

The aim of the NÄYTKÖ project is to develop a process that promotes evidence based nursing through nursing students' and professionals' shared learning. Sub aims for students, professionals and teachers have been stated below.

TABLE 1. *Sub aims of the NÄYTKÖ project.*

GROUP	AIM
Students	to develop skills for searching, evaluating and communicating scientific knowledge
Nursing professionals	to develop skills to set relevant clinical questions, combine scientific knowledge and clinical experience and implement evidence based practice
Teachers	are to develop skills in teaching evidence based nursing and to support the development of students' and nursing professionals' competences required for producing EBC to develop education that supports students' and nursing professionals' collaborative learning processes integrating the innovative learning approach as the pedagogical background in the teaching practice

IMPLEMENTATION

The NÄYTKÖ project implements a six phased journal club method (Figure 1). Journal clubs have been described in previous literature as meetings where scientific papers and research are discussed in a group of actors. Journal clubs can be defined as teaching or learning strategies that facilitate students' and professionals' understanding and skills to produce EBC. Journal clubs have originally been implemented within the medical field, but adapted also into the nursing field in the past decades. The primary purposes of journal clubs can vary between assessing professionals in improving clinical practice and applying research into practice to develop skills in asking questions, finding evidence and critical appraisal of scientific evidence and outcomes. The purpose of a journal club can also be to introduce students to health care professions, clinical environments and working life. (Kleinpell 2002, Fineout-Overholt 2006, Steenbeek et al. 2009)

In the NÄYTKÖ project, the six phased journal club process starts with the nursing professionals identifying and setting clinical questions. In phase I, nurses discuss their learning needs, fields of interest or clinically relevant topics. The teacher discusses the suggested clinical questions and journal club subjects with the nurses. The final decision about the clinical question and the journal club subject is commonly selected to fit both the nurses' and the students' learning needs and present competences.

In phase II, students and the teacher search for scientific knowledge to answer the clinical question and the subject of the journal club. Knowledge is searched from main health care field databases such as PubMed (MEDLINE), CINAHL and Cochrane. Students fill out a search table stating the searched database, employed search terms, limiters, number of found articles, number of articles selected for further evaluation by title, abstract and finally by full text.

In phase III, articles selected by full text are evaluated in collaboration between students and the teacher. The evaluation of the articles is systematically implemented and discussed using basic evaluation criteria of scientific articles (Burns & Grove 2009). In discussing and evaluating the scientific quality of the selected articles, the level of evidence is also discussed.

In phase IV, students prepare a written paper based on the clinical question, the subject of the journal club and the selected articles. Students also fill out a research table describing the main information of each article, such as authors, year of publication, aim, population, sample, method, instrument, intervention (if included) and main outcomes. The written paper which contains the search and research tables is sent to the nurses.

In phase V, nurses get prepared for the journal club meetings by evaluating the scientific information described in the written papers and their clinical expertise. The nurses also evaluate the quality and relevance of the information to the clinical question and the subject of the journal club.

Journal club meetings are implemented in phase VI. The duration of one meeting is on average 1.5 hours. The journal club meeting starts with the students shortly presenting their written papers. The presentation focuses on the scientific information the paper adds to the clinical question. After the short presentation, collaborative discussion between nursing professionals, students and the teacher starts. The discussion aims at evaluating the scientific knowledge and combining the scientific knowledge and the nurses' expertise.

The discussion also aims at evaluating the relevance of the found information in solving the clinical question, advancing the evidence based decision making and implementation of EBC in the clinical practice. Further clinical questions are also often found during the discussions. The new questions start the need for further journal clubs, the journal club process as well as the ongoing development of EBC.

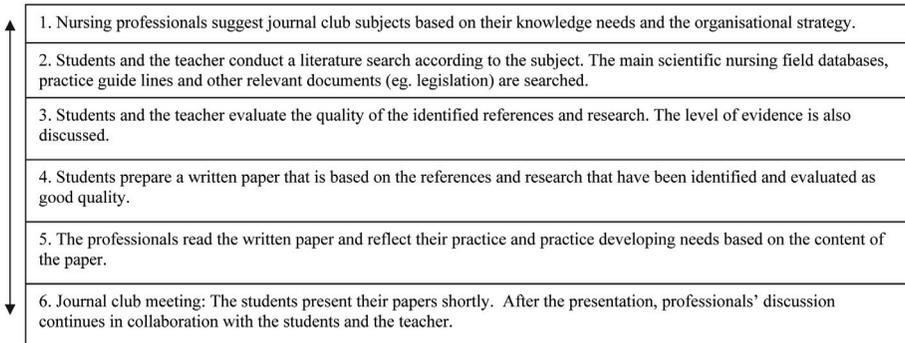


FIGURE 1. *The six phased learning method implemented in the NÄYTKÖ project.*

EXPERIENCES

The NÄYTKÖ project started in fall 2010. At present time there have been about 300 nursing students, 150 nursing professionals and 10 nursing teachers involved in the project. Journal clubs have been utilised in psychiatric, geriatric, surgical and internal disease wards of the Turku Municipal Social Services and Health Services. The study modules involved in the NÄYTKÖ project have been geriatric nursing, health psychology, nursing science, social care, psychiatric and medical nursing and home care. The study modules are located in the 5th and 6th study semester.

Experiences of nurses and students involved in the NÄYTKÖ project have systematically been collected utilising a semi-structured questionnaire since the beginning of the project. The experiences show promising results. Students experience the journal club as a demanding learning method but they experience collaboration with the nurses to be specially rewarding. Students also report good experiences about participating in and learning about

developing EBC in the clinical practice. Moreover, students experience the journal club to support their skills and competences in searching, evaluating and communicating scientific knowledge.

Nurses experience that new knowledge and new perspectives to the work have been gained at the journal clubs. Most nurses experience the journal club as an interesting method and give good feedback to the students. Nurses also report that journal clubs have impact on the development of the care.

The utilisation of the NÄYTKÖ project, experiences of students and nurses participating in the project and a literature review about assessment of EBC have been reported as Bachelor's theses. Outcomes of the project on the clinical practice have not yet been evaluated systematically but will be developed in the near future.

CONCLUSION

Journal clubs implemented in the NÄYTKÖ project promote nursing students' and nurses' competences in producing evidence based care. Journal clubs implemented in the project form a promising model of collaborative learning between nursing students and professionals related to a highly relevant and topical subject, promoting evidence based practice, in nursing.

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DEVELOPING DIALECTICS

Annikka Mattinen

Turku University of Applied Sciences

annukka.mattinen@turkuamk.fi

BACKGROUND

Under the administrative of the director-general of health care, in collaboration with Turku University of Applied Sciences, the project was carried out for health employees to provide clients with nutritional care and guidance (Mattinen 2003). According to a survey, employees gave clients nutritional guidance, and at best, it was guidance centred on the client's needs, but in most cases, however, the same things were repeated in the guidance, irrespective of the client. Employees longed for nutrition training and consultation help from a dietician as well as collaboration between different professional groups. The result of this action was to create the *Developing dialectics* education model.

Developing dialectics gathers various client-centred employees to the same table. This enables multi-professional use of tacit knowledge as well as new approaches to the development of the operational structure. In the education, employees will solve their own customer examples. Employees learn to see their own activity as a part of the entire care chain, and they realise their own role and potential impact on clients' everyday life, or a day in hospital treatment. The knowledge and approaches which have been created during the process are transferred directly into their everyday work. This requires a commitment from the development supervisors.

The model was developed in relation to the project "Client-centred solutions for health education: Case Nutrition Guidance Project" (2006–2008), which was partially financed by Finland's Ministry of Social Affairs and Health. Universities of Applied Sciences Turku, Pirkanmaa and Laurea as well as the Health department of Turku, the cities of Ylöjärvi and Järvenpää and regions of Salo participated in the project. The selected background training philosophy of the education model was problem-based learning, which offers participants the chance to develop their know-how on authorities and group skills. These

were measured in a licentiate work in education sciences (Mattinen 2008). The employees' skills increased significantly for example in measuring the nutritional condition of customers/patients and guidance related to one's own knowledge. They saw an opportunity to work with a new way in work communities, which enables them to act in a multi-professional and multi-field manner and across the administrative lines.

THE DEVELOPING DIALECTICS' CYCLE MODEL

In *Developing dialectics*, learning is based on operating problems, which arise from the work and professions of the real world. This complex information is related to the observation, analysis, integration and synthesis of the target. The problem-solving starts to construct a common knowledge and that is one factor for scientific and multi-professional expertise to produce. *Developing dialectics'* cycle model involves independent learning, group work and shared learning (Figure 1).

Tutorial work is guided by a group tutor. One group focuses on one scenario, which is the starting point for processing. The scenarios are processed one by one. The processing is done in eight-phase cycle of the model in two different tutorials. In the first tutorial, cycle phases 1–5 are carried out. The primary objective is to recall the already adopted data and analyse the knowledge in the group. The first tutorial session ends in the learning tasks setting. In the middle of the sessions, participants acquire knowledge and learn in independent ways, for example by seeking information from various sources, doing interviews and observing the clients, and so on.

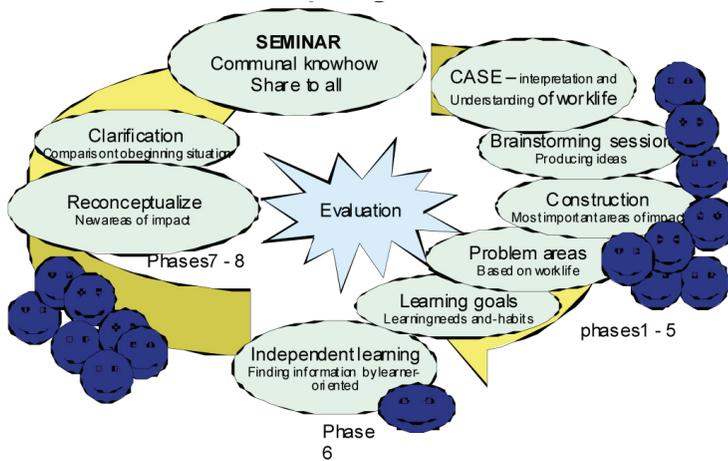


FIGURE 1. *Developing dialectics' cycle model.*

In the first phase, learners get learning objectives which work as the starting point for the tutor. They then define concepts and clarify the starting point for discussion. The tutor will help with the progression.

In the second phase, prior knowledge will be recalled, which involves using the brainstorming technique. Then each participant receives the task to write freely from the starting point that is produced by their mind and thoughts, and thus one word is always written per a piece of paper.

In the third phase, the words associated with the subject entities are recorded. The links between the subjects are critically examined and group of keywords is named.

In fourth phase is selected subject areas in the processing direction of learning objectives, the most important and topical areas. In the fifth phase, the group defines the learning tasks preferably in the form of a question.

In the tutorials, the type of conversation is dialogue, because this will enable a real learning of new things. A dialogue differs from ordinary conversation in that the participants receive constructive dialogue to explore and compare their own beliefs in a safe environment with other supporting participants, while in normal conversation the predominant feature is promoting one's own perspectives. In a dialogical group, everyone is each other's instructor, as they

learn to understand what the other party is trying to convey in different ways (expressions, signs and words). A student secretary will write a memo of phases 1–5 and send it by email to the participants.

The sixth phase is an independent work. The participants have agreed, when they will return the learning task to the tutor. They have access to tutor guidance via email to help them complete the task.

The seventh phase is demanding and the most rewarding. The focus is on independent fact-finding phase of the study and the approach during adopted by the new information in relation to the learning task and prior knowledge. The starting points for discussion are the notes made during the last session. The group discusses a learning task related to the insights and clarifies any ambiguities. The group shares information and works together to create a client-centred health promotion model for the customer.

The eighth phase returns to the initial situation and the learning result is compared to the starting points and goals. In this stage the group agrees also on how their operating premise was built on the process and the process in the content, in particular nutrition and lifestyle management and control of information which will be presented to others tutor groups and other seminar participants in the seminar-afternoon.

THE TUTORIAL ROLES

A chairman is chosen from the members of the group. He/she gives turns to speakers, summarises the cycles and makes sure that everything is going according to schedule. The chairman encourages the quieter participants of the group to participate and secondly guarantees for them a possibility to participate alongside the more active members. The chairman is, alongside the role working, an equal and dialogical member in the group.

The secretary is selected from the University of Applied Sciences' students. He/she records relevant emerging issues and makes a summary. The secretary decides how active a role he/she will take in the group discussions. The secretary and group members gather up the outputs and the secretary makes a PowerPoint presentation from them which is shown on the seminar day. Each member produces material based on his/her own learning tasks and gives it to the secretary.

The group tutor (educator) activates the conversations and, if necessary, gives guidelines for it. The purpose of the tutor is to guide the learners to discuss about the worked case and search for new perspectives and make fact sheets about it. The tutor also guides learners in seeking information and in independent learning.

STRUCTURE OF THE EDUCATION MODEL

Developing dialectics is implemented in work communities with client-centred themes. The *Facing seniors as clients* theme has involved 209 employees; public health nurses and registered nurses, practical nurses, home aids, occupational, physio and nutrition therapists, a director and employees of nutrition, dental hygienists and dentists. The *Facing children and juveniles and their families as clients* theme has involved 106 employees; public health nurses and registered nurses, paediatricians, dental hygienists, social workers, teachers, kindergarten teachers, nannies, a school psychologist and school curator, physiotherapists, physical education instructors, nutrition therapists and a director and employees of nutrition. The *Facing workers as clients* theme has involved 12 employees; public health nurses, dental hygienists, physio and nutrition therapists and an occupational doctor.

The theme of *Families with children as clients* brought about the opportunities to support families with everyday collaboration in concrete workplaces and between different workplaces. For example in day care it was noticed that food service employees' knowledge could be exploited when the goal is to support a family's success in dining at home. This support day care's guiding role in promoting healthy eating habits. This kind of strengthening of collaboration is a big challenge and requires the support of superiors. In the group, the theme *Families with children as clients* has involved dental hygienist students and health care students, public health students and midwifery students.

In the group *Facing seniors as clients*, the investments in senior clients' nutrition, dental care and exercise have started to increase. In Turku, for example, an individual nutrition care plan, a rehabilitation programme and a dental care plan are drawn up for all patients. The whole process is recorded carefully, so the results can be assessed and the quality of the action can be developed. Currently the changes in seniors' functions are studied in a doctoral research in the Faculty of Medicine at the University of Turku. The research is interested

in the meaning of nutrition, dental care and rehabilitation in the recovery process of hip fracture patients. Knowledge transfer seems to be a big problem in the care chain; for example a good implementation of inpatient care may disintegrate the transition to home care. *Developing dialectics* education should be involved in the entire care chain from inpatient to home care. In the group, the theme of seniors as clients has involved dental hygienist students, health care students and public health students.

The theme *Employees as clients* showed that multi-professional collaboration in occupational health has improved the quality of guidance. At the same time it intensifies the used time of the occupational doctor, nurse and special employee. Overlapping with guidance does not happen and different professions will support each other's guidance. In order to help individuals to implement lifestyle changes, the keyword is motivation which is brought about by supportive resources. Dental hygienist students, health care students and public health students participated in the group *Employees as clients*.

EDUCATION GOALS

Organisational perspective

The purpose is to develop the employees' skills in health promotion partly by work-based learning and improve the employees' working habits and their preparedness to develop their own working skills. The purpose is to analyse the client-oriented service chain of health promotion and make necessary changes in it. The goal is to develop a teaching technology, methods and education material in collaboration with Turku University of Applied Sciences.

Employee perspective

The aim is to detect employees' own strengths and weaknesses in knowledge and skills concerning health promoting customer service and to improve them. The purpose is to find health promotion evidence based guidance practices and learn to examine health promotion in the service chain as a whole and find different channels to develop it. The goal is to improve employees' communication skills concerning health promotion with their clients, collaboration organisations and in their own work and increase preparedness for multi-professional collaboration.

The University's perspective

A purpose is to develop the collaboration between working life and the University of Applied Sciences so that the teaching and learning benefits both participants. The collaboration is executed through projects that are based on the University of Applied Sciences' regional development strategy and a prospective of health promotion. The goal is to increase teachers' and students' work knowledge and expand learning environments towards a more open University of Applied Sciences, the goal of which is to achieve authentic and natural learning environments and develop teachers' and students' knowledge of project working.

In line with model the teaching technology, methods and learning materials are developed in collaboration with the working life organisations and approaches and opportunities are increased to develop education models in the work. The goal is also to develop multi-professional collaboration in nutritional therapy and guidance and also to increase collaboration between Universities of Applied Sciences.

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CREATIVE ENGINEERING

REFLECTIONS FROM THE CREATIVE ENGINEERING TRACK

Juha Kontio

Turku University of Applied Sciences

juha.kontio@turkuamk.fi

The creative engineering track expected papers and presentations describing creative practices and solutions, both in education and research, and answering to the engineering and technology challenges of working life in modern society. The track expectations were met and we received 15 high quality proposals. The proposals had two major focus areas. Part of the proposals focused on strategies and practices in organising engineering education. The rest of the proposals focused on specific research areas and described some specific field of technology.

Engineering education related presentations introduced various themes such as innovation competences and innovation pedagogy, CDIO framework, supporting project work with better project plans, student exchange, and interdisciplinary projects. All education related presentations shared and provided a lot of ideas and examples for improving engineering education, but also higher education altogether. The presentations emphasised the ideology that we can do better and that the universities of CARPE are on the right track. We also share the vision that engineering education and our research activities should be strongly connected – learning can be achieved in research and development projects together with working life.

The research specific presentations showed the high level of research in the CARPE network. We heard presentations on topics such as servitisation, software agents, and white space test environments. These quite specific and technical presentations initiated as vivid discussion as the education related presentations did. Based on the presentations we processed possible fields of co-operation and hopefully some common initiatives will begin. For example, joint projects in combining innovative engineering technologies and different services were already considered.

The engineering track proposed to meet again in 2012 in Turku during the ICEE conference at the end of July, and an idea for a CARPE workshop was introduced. A possible topic for the workshop could be promoting multidisciplinary learning and teaching – collaboration between teachers and students from different fields of education. Altogether the creative engineering track concluded that we see lot of possibilities and want to increase our co-operation in the future.

FACTORS FOR SUCCESSFUL ENGINEERING AND EXPLOITATION OF SERVICES: FOUR EXPLORATIVE CASE STUDIES ON SERVITIZATION

Mireille Stout

HU University of Applied Sciences Utrecht

mireille.stout@hu.nl

Johan Versendaal

HU University of Applied Sciences Utrecht

johan.versendaal@hu.nl

Justian Knobbout

HU University of Applied Sciences Utrecht

justian.knobbout@student.hu.nl

Kristian Spek

HU University of Applied Sciences Utrecht

kristian.spek@student.hu.nl

Mark Tammer

HU University of Applied Sciences Utrecht

mark.tammer@hu.nl

Martijn Zoet

HU University of Applied Sciences Utrecht

martijn.zoet@hu.nl

INTRODUCTION

Within a research group consisting of students, lecturers and senior researchers in the field of Business Engineering, four explorative cases are analysed to identify factors for successful servitization using a two-dimensional framework. The first dimension represents the phase of servitization and the second dimension, built on the enterprise architecture principles, corresponds with six different perspectives of service design. Although the amount of cases and data is limited, the found factors can help (manufacturing) organizations exploring servitization or aiming to further develop existing services, specifically in the stage where setting market requirements needs to be aligned with overall business objectives.

Vandermerwe and Rada (1988) identified and described the potential of creating new services and service engineering activities in contrast and in relation to more tangible product engineering. This by them coined servitization is driven by 1) customers requesting total solutions (not merely product-only), 2) increased competitiveness where services tend to have higher margins, and 3) contract manufacturing activities due to globalization. As an example of the first driver, a firm can choose to add after sales support to their existing product portfolio. Major companies with high installed product bases, like IBM, GE and Siemens, have successfully transformed their organizations by designing new services in anticipation of the second driver. Related to the third driver, e.g. in the electronics industry, organizations like Solectron and Flextronics have received contracts for manufacturing from high-tech OEMs, leaving room for the latter for service development.

Baines et al. (2009) provided a thorough literature review on servitization in the manufacturing industry. They concluded with eight findings of which one particularly justifies our research: “There is a paucity of previous work that provides guidance, tools or techniques, that can be used by companies to servitize” (p 562). Consequently, our research question is *what are important factors for service engineering, following the principles of servitization?*

Oliva and Kallenberg (2003) identified a continuum for firms to move from tangible products to service offerings. Segers and Spaargaren (2011) have operationalized this continuum by breaking it down in five clearly identifiable phases. During our analysis we will use these phases as a metrics to position the development of services. The four servitization cases provide us with factors that were categorized using insight from the fields of enterprise architecture (Lankhorst et al., 2005; Zachman, 1996).

First the theoretical framework will give an outline of a set of service design aspects involved and the five already mentioned phases of servitization (Segers and Spaargaren, 2011). Next, four individual cases are summarized and for each, the most prominent factors that have influenced the service development will be highlighted. Then, the outcome of the cases is characterized, taking into account the existing position of a firm in terms of the mentioned phases and design aspects. This characterization can be used to guideline companies embarking on (further) servitization. This paper is completed with a reflection on the educational process of the research workshops.

THEORETICAL FRAMEWORK

Many frameworks have been developed to identify the areas to take into account for operating a business. Examples are the European Foundation for Quality Management (EFQM) Excellence Model (www.efqm.org), McKinsey's 7S model (1980), and the Balanced Score Card (Kaplan and Norton, 1992). We choose to take an enterprise architecture perspective (e.g. Lankhorst et al., 2005; Zachman, 1996) as it includes all aspects of all former frameworks, but also addresses information (technology) as a separate component, which is in our opinion an often neglected component. In alignment with Novay's Agile Service Development project (<http://www.novay.nl/projecten/agile-service-development/7552>) the following classification is identified: 1) a service's interaction aspects, 2) a service's organizational aspects, 3) coordination aspects, 4) functional aspects, 5) rules and constraints, and 6) data and information aspects.

As mentioned before, the other dimension that we take into account is the phasing as provided by Segers and Spaargaren (2011), who have specifically elaborated on servitization and its possible positioning in the organization. Specifically they identify the following phases (increasing as for the degree of servitization): 1) vertically added service; 2) horizontally added service; 3) integrated product & service offering; 4) emphasis on service, with a certain product; and 5) service replacing product. This results in the following outline of our framework (see Table 1). Our operationalized framework will be a cross-table of these two dimensions, filled with data from our four cases.

TABLE 1. *The two dimensions of our framework.*

Dimension 1 Phase:	Vertically added service	Horizontally added service	Integrated product & service offering	Emphasis on service	Service replacing product	
Dimension 2 Perspective:	Interaction aspects	Organizational aspects	Coordination aspects	Functional aspects	Rules and constraints	Information and technology

As for the operationalization the cells in the cross-table will contain factors for successful engineering and exploitation of services. In order to consistently present the factors we will normalize the factors according to the following format:

$$\langle \text{factor}_{i,j} \rangle = [\text{"no condition:"} \mid \langle \text{conditions} \rangle :] \langle \text{action} \rangle$$

A factor implies a certain action, provided 0 or more conditions. For instance, factor_{1,6} deals with a *vertically added service* within the perspective of *information and technology*: e.g. “frequent maintenance need: provide an IT-enabled automatic maintenance trigger for equipment”. If “no condition” holds, we will leave out the text “no condition:” to save space in the operationalized cross-table.

The format implies a certain action related to service engineering, ensuring an active attitude in tackling the associated factor when engineering or exploiting the service. Moreover we anticipate to describe the factors in terms that are case-independent.

FOUR EXPLORATIVE CASE STUDIES

At the Bachelor program for Business Engineering (HU University of Applied Sciences Utrecht, Faculty of Natural Sciences and Technology), students conduct a final practical assignment resulting in a Bachelor thesis. In the spring of 2011, four of these Business Engineering students formed a research group on the topic of Servitization, under the supervision of two lecturers and two researchers affiliated with the research chair Extended Enterprise Studies. During several workshops the students were instructed to identify success factors for their individual servitization projects. While writing their

theses they also included those factors in their texts, within the context of their overall projects. Subsequently the lecturers analysed their identified success factors and the texts of their theses, in order to list and classify the factors.

Following is a short description of the four explorative cases. Already the texts contain (implicit) factors for successful servitization: in that case the related (part of the) sentence is written in italics, with a lower-case character between brackets. The italics parts (combined with the identified factors derived from the student workshops, and their theses texts) will subsequently be translated into explicit factors in the operationalized framework, using the proposed format, and with the former lower-case character replaced as a capital character.

Case I: Scrum service in non-IT environment

In the first case a consultancy firm aims to translate a proven approach for software development environment into a product development environment (non-IT environment). The associated service deals with the implementation of the Scrum method for product development, which provides an iterative and incremental framework that enables development teams to work more effectively and decline the throughput time of design processes. The engineering of the Scrum service for product development was an *iterative (a)* process and the *intermediate results were tested (b1)* in a real life consultancy project in which the *client organization aimed to improve its time to market (b2)*. To successfully design this service for a new market, *all original IT terminology was replaced by generic terminology (c)*. An important conclusion was that the design process in a non-IT environment often deals with the creation or production of a physical prototype, which *enlarges the throughput time (d1)* of the design process. Design processes are also often audited and certified as a part of a quality management system. The case organization had to *incorporate production/design differences (d2)* in its new consultancy service, taking into account that IT and non-IT environments deal with a variety of quality certifications. Summarizing, the consultancy firm adds a new service based on an existing service; we consider this positioned in the 'horizontally added service' phase: the new service is added to the existing service in a new domain.

Case 2: Professionalizing the tender-coaching service

The second case also involves a consultancy firm. The case organization supports organizations during the bid process and participation in European tenders. It wants to be a trendsetter in its market by offering support services especially for SMEs (small and medium sized enterprises), participating or willing to participate in European tenders. The case organization already offers tender-related services; however, their development has been ad-hoc so far. As a result, there are no quality criteria and process definitions for this consultancy service, making it hard to control the process and measure performance. One of the main services, the organizational scan, is improved and standardized by leveraging servitization characteristics. A major part of the analysis involved the *requirements (e1)* of the organizational scan for being a *client specific (e2)* service in the market, yet based on *standardized and efficient internal processes (f1)*. The management decided to apply the *use of formats (f2)* in order to standardize the process and avoid an ad hoc service. These formats are used during the process, e.g. for structuring the interviews with clients, standardizing the production of reports and presentations, and regulating the interaction between the consultants. Consequently, the use of these formats resulted in *major changes in work processes and communication (f3)*. The renewed and standardized service was used while performing the organizational scan during an external project. After the project was completed, an evaluation took place and some minor adjustments were made to fine tune the service. We consider this as positioned in the 'vertically added service' phase.

Case 3: Cloud computing service for software

The third case organization is the Distribution & Logistics unit of an international ICT service provider. One of the core activities of this unit is the consulting and implementation of ERP software systems for large transport and physical distribution organizations. Recent research programs indicated that SMEs do not use integrated Warehouse Management Systems (WMS) and Transport Managements Systems (TMS). The main reason is related to the high cost of investment for WMS and TMS software combined with the cost of procurement and maintenance of hardware servers. The case organization wants to develop Software as a Service (SaaS): WMS and TMS software, in order to provide a Warehouse and Transport Management service for SMEs in the transport sector. The SaaS technology is *based on Cloud computing*

(g1), which makes it possible to offer and use software functionality without the investment for hardware servers and traditional software licenses. In the approach for this service development project, first the *characteristics of Cloud computing were described (g2)* as an enabler of SaaS. Then the demands of the SMEs in the Dutch distribution market *were combined with the requirements and functionalities in the existing thick-client WMS software (h)* to fit this specific market. It was concluded that there was not enough demand for WMS software for SMEs. Consequently, the research continued with an analysis of the opportunities for the development of SaaS TMS software: entering a new market with a new service. This resulted in an advice on service development for SaaS TMS *taking into account the market and competitors, available technology and needs for collaboration (i)*, and finally Product/Service design functionality and support for SaaS TMS Service. We position this service in the ‘service replacing product’ phase.

Case 4: Maintenance service support

The fourth case study originates from the marine sector. A condition based maintenance service for vessels was developed in the case company. All clients have the same ultimate maintenance goal, limitation of downtime of their assets, yet a *thorough analysis of market requirements (j)* resulted in the definition of three different market segments, each with their specific maintenance needs and goals. During the case study, the *existing maintenance services were first weighted on added value, experience, risk of imitation (by competitors) and turnover (k)*. This created the opportunity, in fact, to enlarge the market, *using existing services that were functionally combined into fit-to-market sets (l)* of condition based maintenance. To realize these three new mixes of condition based maintenance services, *interaction and communication between different internal departments must increase (m)*. If needed, *missing features will be provided for through collaboration with external partners (n)*. With this concept the case organization can provide for a condition based maintenance service and offer life cycle support for three different market segments, each with their own needs and specific drivers. We position this service in the ‘horizontally added service’ phase, not as a vertically added service, since external partners are involved in this service.

In all four case studies, the services developed aimed to offer a solution that would support objectives directly related to its customers' primary process. In the first case the consult based on Scrum aims to decline the throughput time of its customers' product development process. In the second case, the service on European tenders supports the client on successful tendering in order to feed the client's primary process with order confirmations. The Saas TMS service in the third case supports its customers' primary transportation process. The latter case provides for a service that helps customers reduce down time of capital intensive assets that play a crucial role in the primary process. Each time the relation between the service and the primary process of the customer was created by a thorough analysis of market needs and service requirements.

FRAMEWORK OPERATIONALIZATION

In Table 2, see the translations of the previously identified factors in the format requested. Note that for spacing reasons we only include the factors identified in case descriptions above and leave out the additional factors that were separately identified when reading through each of the four student theses. Note also that the two phases (columns) that none of the explorative cases refer to are left out: there are only columns in the operationalized framework for 'vertically added service', 'horizontally added service' and 'service replacing product'.

TABLE 2. *The operationalized framework (the capital characters between brackets, in the cells, refer to the lower-case characters in the case descriptions).*

Perspective / Phase	Vertically added service	Horizontally added service	Service replacing product
Interaction aspects	Elicitate requirements that are client-specific (E)	Engineer iteratively (A); Existing service, new market: replace existing terminology with more generic terminology (C); Varying client characteristics: segment market and services (J); Existing service, new market: classify existing services on added value, experience, risk and turnover (K); Existing service, new market: create new fit-to-market sets by combining existing services (L)	
Organization aspects		Engineer iteratively (A); Client's aim is to improve time-to-market: test during engineering (B); Existing service, new market: identify and reconsider internal and interdepartmental collaboration (M) Extension of existing service: identify need for partnership and collaboration based on external factors (market and competitors) and internal technological opportunities (N)	New service, new market: identify need for partnership and collaboration based on external factors (market and competitors) and internal technological opportunities (I)
Coordination aspects	Service efficiency is important: use standardized formats (F)	Engineer iteratively (A); Existing service, new market: identify and reconsider internal and interdepartmental collaboration (M) Extension of existing service: identify need for partnership and collaboration based on external factors (market and competitors) and internal technological opportunities (N)	New service, new market: identify need for partnership and collaboration based on external factors (market and competitors) and internal technological opportunities (I)
Functional aspects	Elicitate requirements that are client-specific (E); Service efficiency is important: use standardized formats (F)	Existing service, new market: requirements also based on differences between old and new market (D); Varying client characteristics: segment market and services (J); Existing service, new market: classify existing services on added value, experience, risk and turnover (K); Existing service, new market: create new fit-to-market sets by combining existing services (L)	New technology used: describe characteristics, operational and technical elements (G); Existing functionality, new market: identify differences and similarities between new market demands and old functionalities (H)
Rules and constraints	Elicitate requirements that are client-specific (E); Service efficiency is important: use standardized formats (F)	Engineer iteratively (A); Client's aim is to improve time-to-market: test during engineering (B); Existing service, new market: replace existing terminology with more generic terminology (C); Existing service, new market: requirements also based on differences between old and new market (D); Varying client characteristics: segment market and services (J); Existing service, new market: classify existing services on added value, experience, risk and turnover (K); Existing service, new market: create new fit-to-market sets by combining existing services (L); Existing service, new market: identify and reconsider internal and interdepartmental collaboration (M); Extension of existing service: identify need for partnership and collaboration based on external factors (market and competitors) and internal technological opportunities (N)	New technology used: describe characteristics, operational and technical elements (G); Existing functionality, new market: identify differences and similarities between new market demands and old functionalities (H); New service, new market: identify need for partnership and collaboration based on external factors (market and competitors) and internal technological opportunities (I)
Information and technology	Service efficiency is important: use standardized formats (F)	Extension of existing service: identify need for partnership and collaboration based on external factors (market and competitors) and internal technological opportunities (N)	New technology used: describe characteristics, operational and technical elements (G); New service, new market: identify need for partnership and collaboration based on external factors (market and competitors) and internal technological opportunities (I)

ANALYSIS OF CLASSIFICATION

Table 2 illustrates that every perspective (each row) contains important factors regarding service engineering. What is also to be noticed is that a certain factor is always related to multiple perspectives. It shows that the perspectives are related to each other, and can even be considered to be aligned. For example ‘Engineer iteratively’ is related to the:

- ‘Interaction’ perspective: because engineering iteratively will involve stakeholders for defining a next cycle.
- ‘Organization’ perspective: to engineer iteratively one needs to e.g. involve different departments, while testing and defining a cycle.
- ‘Coordination’ perspective: because iterative engineering will likely involve different types of stakeholders, while testing a product and defining a cycle.
- ‘Rules and constraints’ perspective: as engineering iteratively prescribes a certain approach for service engineering.

On the other hand, ‘Engineer iteratively’ is not identified as related to the:

- ‘Functional’ perspective: engineering iteratively is more about the process of engineering than the identification of particular features.
- ‘Information and technology’ perspective: engineering iteratively does not necessarily contain (information) technology.

A special perspective is the ‘Rules and constraints’ perspective: all identified factors from the cases are plotted in this particular row. This is undoubtedly because each factor itself is built as a rule with a ‘condition’ and an ‘action’. Even unconditionally defined factors (like ‘Engineer iteratively’) can be considered a rule/constraint for service engineering. Anyway, an important implication seems to be that the engineering of a service can be monitored by a rules management system.

CONCLUSIONS AND FURTHER RESEARCH

In our search for factors of successful service engineering we were able to classify the relevant factors in four cases according to a degree of ‘servitizations’ (see the columns in table 2) and different aspects (see the rows in table 2). Yet

it is difficult to identify different conclusions per phase (column) provided the limited amount of cases and data. Because of the fact that each factor can be described and identified as a rule and/or constraint the management of factors can be performed by a rules management system.

(Manufacturing) organizations willing to embark on servitization may consult table 2 in order to organize for service engineering. Furthermore, organizations already in the process of new service engineering may use table 2 to audit their engineering project(s).

The final assignments of a Bachelor program can provide a great amount of case material. Within Business Engineering the types of case organizations vary continuously and a wide range of business engineering principles is applied in different context. This makes it possible to research the practical use of models and frameworks. In this study the four explorative cases gave the opportunity to look for factors that influence the success of service development in four different situations. All four cases, like many other practical assignments of our Business Engineering Bachelor Program, had a focus on the early stage of service engineering rather than the implementation. Consequently, most factors for successful servitization identified are strongly related to setting market requirements and their contribution to overall business objectives.

The limited number of cases implies that strong conclusions cannot be drawn. Future research should consider more cases, and also more phases (rows in table 2).

Creating a research group that brings together students, researchers and lecturers stimulates practice based engineering and research. For this research, the group was combined on a voluntary basis. Since student participation in the research group is not an obligated part of their graduation assignment, and consequently no extra European Credit Points are involved, students must be driven by internal motivators. This can have an impact on the commitment of student researchers, once their practical final assignment is finished and they have passed their exams. For future organization of these kind of research groups, further research on different ways of internal as well as external student motivation should be considered, in order to create a more structural and continuous input from explorative case studies in a long- term research program.

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INNOVATION PEDAGOGY WITH THE CDIO FRAMEWORK

A Strategic Choice

Juha Kontio

Turku University of Applied Sciences

juha.kontio@turkuamk.fi

INTRODUCTION

The strategy of Turku University of Applied Sciences defines innovation pedagogy as the base of its operations. Innovation pedagogy reflects many challenges that higher education is facing today. It is a pedagogical approach developed for the universities of applied sciences, which emphasises efficient learning and the external impact of the institution on regional development. It reflects well the requirements set by different bodies such as the Confederation of Finnish Industries (2011): “We need to change the ways of learning so that they encourage experimenting and testing and even require them”.

Innovation pedagogy has five underlying elements (Kettunen, 2011): multi-field operation, applied research and development, flexible curricula, entrepreneurship and internationalisation. Innovation pedagogy emphasises efficient learning and the external impact of the institution on regional development. With this strategic focus, our university emphasises the efforts to strengthen the required (Ministry of Education and Culture Finland, 2011) correspondence of education and the demand for work force. Our university’s step is in line with the Finnish Higher Evaluation Council which emphasises that it is up to the HEIs to continuously develop their own operations and improve and assure quality (Finnish Higher Education Evaluation Council, 2008).

Working life is shifting from an industrial society towards an information society where the earnings logic of companies is to an ever greater extent based on innovation. Knowing how to work in a new way and achieving reformed

or new solutions become central. (Confederation of Finnish Industries, 2011) This kind of knowledge intensive society requires skilled workers educated by higher education institutes. The desire and ability to do work in a new way are the basis on which other competences and their combinations are built (Confederation of Finnish Industries, 2011). Innovation pedagogy emphasises group-based and networked learning to promote innovations in working life. Still, we need to remember that there should be variation in how things are done and how things are studied (Confederation of Finnish Industries, 2011).

In the Faculty of Telecommunication and e-Business the ideology of innovation pedagogy is implemented with the Conceive-Design-Implement-Operate (CDIO) approach. The CDIO approach has been the guiding principle of education development in the Faculty since 2006. The approach will be introduced in the next section. In the section after that, the paper continues introducing the strategic steps taken with the CDIO approach. Finally, the results will be discussed and concluding remarks are presented.

CDIO APPROACH

A small group of engineering educators identified a gap between the working life expectations and engineering education in the late 1990s. Based on different discussions, the CDIO initiative was started in 2000. The CDIO initiative is an innovative educational framework for producing the next generation of engineers. The CDIO Initiative is developed with input from academics, industry, engineers and students. It is universally adaptable to all engineering schools. It provides students with an education stressing engineering fundamentals set in the context of **C**onceiving — **D**esigning — **I**mplementing — **O**perating real-world systems and products. The overall idea of the Conceive-Design-Implement-Operate (CDIO) approach is to support engineering education development and educate students who are able to (Crawley et al., 2007):

- master a deeper working knowledge of technical fundamentals
- lead in the creation and operation of new products, processes and systems
- understand the importance and strategic impact of research and technical development on society.

Since 2000, the initiative has attracted several higher education institutes to join the CDIO initiative. Nowadays the number of collaborating institutes all over the world is over 70 (CDIO, 2011). Turku University of Applied Sciences and the Faculty of Telecommunication and e-Business joined the CDIO network in 2007.

One of the key elements in the CDIO initiative is the 12 standards that define a framework for good engineering education. These 12 standards provide support and offer guidance to target the development actions of the universities. The 12 CDIO Standards address programme philosophy (Standard 1), curriculum development (Standards 2, 3 and 4), design-implement experiences and workspaces (Standards 5 and 6), methods of teaching and learning (Standards 7 and 8), faculty development (Standards 9 and 10), and assessment and evaluation (Standards 11 and 12) (CDIO, 2012). For each of the 12 standards there is a description that explains the meaning of the standard, the rationale that highlights reasons for setting the standard, and evidence that gives examples of the documentation and events that demonstrate compliance with the standard. The standards aim at improved learning results, students learning more and students having a better experience at their HEIs. One of the standards focuses on how to evaluate the current quality and activities of the degree programmes. This standard contains a self-evaluation tool that helps to find out the areas that need to be improved. Our faculty has designed its development steps based on the self-evaluations in relation to the 12 standards. Based on the CDIO standards and the self-evaluations we have introduced new structures to our curricula, rewritten the competence definitions and arranged additional staff training, for example.

Another key element of the CDIO initiative is the CDIO Syllabus. The syllabus offers rational, complete, universal and generalizable goals for undergraduate engineering education. The syllabus has four main areas:

- Disciplinary Knowledge and Reasoning
- Personal and Professional Skills and Attributes
- Interpersonal Skills: Teamwork and Communication
- Conceiving, Designing, Implementing, and Operating Systems in the Enterprise, Societal and Environmental Context.

The key value of the syllabus is that it can be a generalised model for engineering programs to derive specific learning outcomes.

STRATEGIC STEPS WITH CDIO

The Faculty of Telecommunication and e-Business learned about CDIO in the summer of 2006 in the Engineering Education conference. During the autumn 2006, the faculty's management team had several discussions about the CDIO initiative. It soon became obvious that the initiative is good continuum for the development activities that had been carried out earlier. We identified several goals and aims for the CDIO initiative that we had already valued before. The initiative emphasised working life related education, increase of active and hands-on learning, emphasis on problem formulation and solution among others. In addition, the worldwide network for sharing successes and challenges was another motivation for the faculty's decision on starting to implement CDIO in our programs. At the end of 2006 a project "International Quality up with CDIO" was designed and it was started in 2007 (Kontio, 2007). During 2007, the CDIO initiative was communicated to faculty personnel, our learning environment was studied and we started the planning of "Introduction to Engineering" courses. Furthermore, 13 teachers worked in the industry for three months to improve their working life knowledge (Kontio & Suni, 2008).

In 2008, the CDIO approach became an official part of the quality assurance policy on the faculty of Telecommunication and e-Business. The CDIO self-evaluations started properly with detailed documentation and the first development actions were defined based on the self-evaluations. Since starting the CDIO education reform, we identified that the old ways of learning assessment might not be valid any more. Therefore we conducted an analysis of assessment in the spring of 2008. In addition, the first introductory courses were taught in 2008. For example, in the Degree Programme in Information Technology a course on Product Development was introduced (Roslöf, 2008). In this course students learn the basic product development process, programming, communication and project work to name a few. The CDIO related activities during the first three years (2006–2008) are shown in Figure 1.

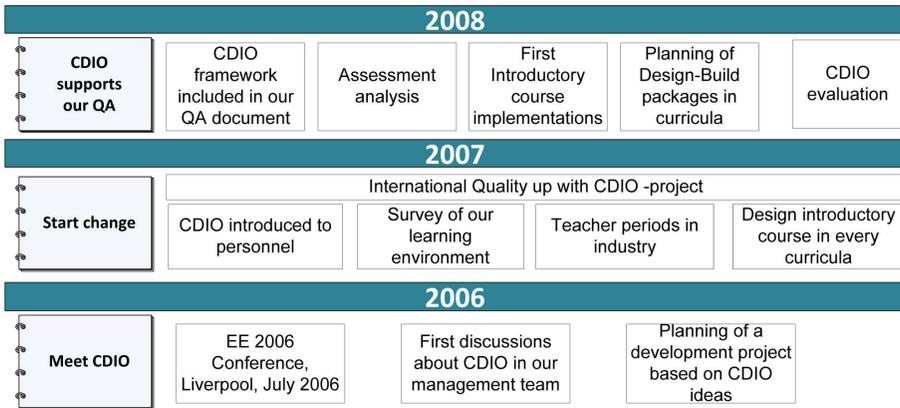


FIGURE 1. *First three years with CDIO.*

Years 4 and 5 were active development of teaching (Figure 2). In 2009, we had an active learning training for our teachers (Kontio, 2009). In 2010, we had two training periods which focused on learning outcomes and assessment. First we learned about defining learning outcomes and, after that, we learned about improving assessment descriptions in relation to these learning outcomes and desired competences.

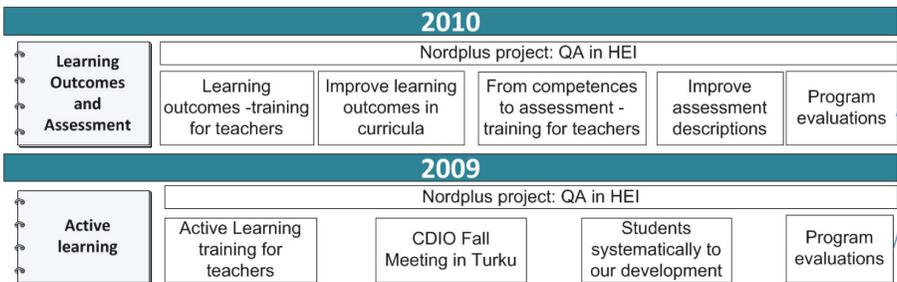


FIGURE 2. *Years 4 and 5 with CDIO.*

In 2009, we also started a project together with three Nordic universities to improve quality assurance procedures using the CDIO self-evaluation and by creating a cross-evaluation structure (Kontio et al., 2011). In 2009, we also engaged our students in our development activities more systematically (Kontio & Tuohi, 2011). Student activity has been very valuable and based on their comments and feedback the structure of the academic year has changed for the better, for example.

In 2011, the focus has been on skills assessment (Figure 3). We have had seminars on skills assessment and we have improved the alignment of competences, teaching and assessment. Furthermore, the planning of capstone projects started and as a result, a new Innovation Project was introduced in the curricula of all faculties' degree programmes. During the seventh year of CDIO implementation, the focus will be on implementing the first Capstone projects. In addition, we will continue enhancing faculties' skills with project work/management training.



FIGURE 3. Year 6 and 7 with CDIO.

We have planned strategic steps for 2013 and 2014, too. These years will focus on ensuring that the spirit of continuous improvement continues and necessary development activities are defined and processed.

DISCUSSION

The selection of the CDIO approach as the guiding principle in our strategic development of the degree programmes has given us a systematic and useful framework. Our strategic steps have loosely followed the general CDIO adoption process description (Figure 4). The CDIO adoption process as well as our strategic steps can be divided in different phases. The first phase is to learn the CDIO approach and agree to commit to start the change. In our case, the first year focused on this – creating better understanding about the CDIO. The second phase is to understand the situation in the degree programmes at the current moment. Broadly speaking, four areas should be invented: curriculum, use of workspaces, approaches in teaching and learning, and practices in assessment. The activities defined in the second

phase of the CDIO adoption process are distributed in years 2 and 3 in our case. The third phase in the CDIO adoption process focuses on the areas of improvement and designing the programmes to meet the goals. We started our continuous improvement process based on the CDIO approach right from the beginning together with the other adoption process activities. The first development activity was the design of introductory courses. After that we have continued the development with design-implement projects, learning objectives and assessment and recently we have introduced capstone projects. Along the CDIO adoption process a key question is the personnel's capability and skills to actually carry out the change and development process. As our strategic path described, ensuring personnel competence has been in focus all the time. Several actions and training periods have been carried out – teacher industry periods, active learning training, competence definitions training and assessment trainings. Furthermore, additional plans to continue this support for our personnel are in place.

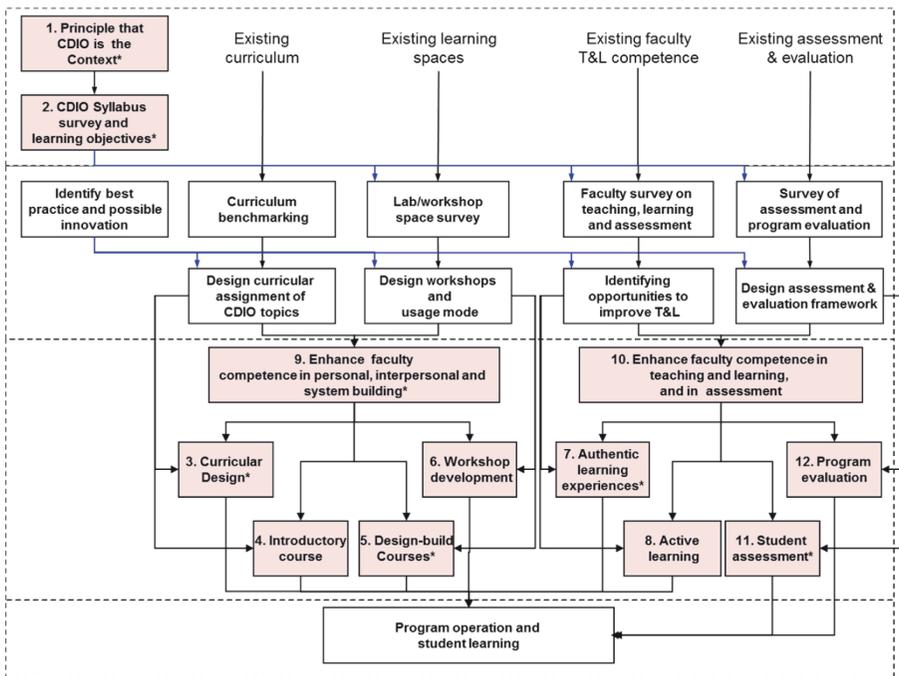


FIGURE 4. CDIO adoption process.

CONCLUDING REMARKS

The selection of the CDIO approach as the guiding principle in our strategic development of the degree programmes has provided us the necessary framework. In fact, CDIO has given us a framework that we believe in and that is easy to commit to. Furthermore, the self-evaluation procedure has strengthened our quality assurance processes and the self-evaluations have given us necessary feedback on our success in development activities. The CDIO approach emphasises the importance of education's relevance to working life similarly like the strategic innovation pedagogy principle in the strategy of our university. The strategic choice of CDIO as the guiding principle has led to concrete results. For instance, now we have Introduction to Engineering courses in every engineering Degree Programme – students get a grip on the profession they are studying from day one. Finally, the strategic path with CDIO has produced more motivated students and teachers and the number of drop-outs is decreasing.

Our experiences with the CDIO approach could be very valuable for the CARPE consortium, too. Turku University of Applied Sciences could support raising CDIO awareness in the other consortium universities with various workshops and common education development projects, for example. The CDIO approach could provide us a method or environment that further deepens the co-operation in the CARPE consortium.

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BRIDGING THE COMMUNICATION GAP IN INFORMATION SYSTEM PROJECTS

Enabling Non-IT Professionals for the Requirements Engineering Process

Rüdiger Weißbach

Hamburg University of Applied Sciences

ruediger.weissbach@haw-hamburg.de

INTRODUCTION

The quality of requirements elicitation and requirements documentation is an important factor for the success in information system (IS) projects.¹ Therefore the discipline of Requirements Engineering and Management (RE&M) is getting increasing significance.² Research and education in RE&M are focused on the perspective of project managers and IT system architects. The RE&M practice however is more complex: A special role of a requirements engineer is only infrequently defined, especially in small and medium-sized enterprises (SMEs). Requirements are often verbalised by non-IT staff and this process is often a task of the line management, not only of the project management. In every case the RE&M process is a communication process with at least two *active* parts. To carry out this task, the non-IT staff needs methodical knowledge.

1 See for example: The Standish Group's CHAOAS Report; Engel & Quadejacob, 2008; Toth et al, 2009a & 2009b.

2 Indicators are e.g. the institutionalisation of certifications or an increasing number of congresses and publications.

This paper is structured as follows: first, the actors in the RE&M process are described. Second, the communication problems between these actors are discussed. The following section after that treats the potentials of training to overcome these communication problems and describes a case story at the Hamburg University of Applied Sciences (HAW Hamburg), where marketing students are trained in the main features of RE&M. The closing chapter presents aspects for further research.

ACTORS IN THE REQUIREMENTS ENGINEERING & MANAGEMENT PROCESS

Process Models and Textbooks

In project management process models the 'requirements engineer' is no indispensable role. For example, the RE&M process has been seen as subtask of project management (PMI, 2008). Typical textbooks about RE&M in IS projects address project managers and specialised requirements and software engineers (e.g. Cockburn, 2000; Pohl & Rupp, 2011; Robertson & Robertson, 2005; Robertson & Robertson, 2006). In these publications, engineers and managers work in a communication process with the end users and other stakeholders of the business departments (BD), in which the users have a more passive role and skilled requirements engineers control the communication process.

In an analysis of several process models (Fahney, Herrmann & Weißbach, 2007), a three-dimensional approach was described (figure 1). This model reflects the different organisations with different role models, and individual qualification of the persons. Tasks are categorised in different areas of expertise. The area of expertise 'requirements engineering' contains all tasks which are necessary in eliciting, documenting and verifying the requirements.

Using this broad understanding of requirements engineering as a task (and not only as a specific role), we see that many people in a project work and collaborate in the area of expertise 'requirements engineering'.

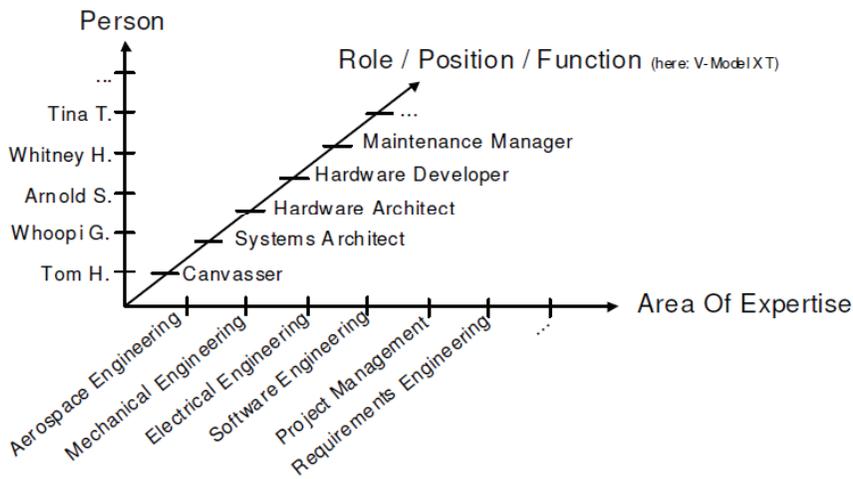


FIGURE 1. *Three dimensions: persons, roles, areas of expertise (Fahney, Herrmann & Weißbach, 2007).*

Empirical Research

Despite the importance of user participation in the RE&M process, the active performing of this task by the BD was no prominent research topic in the past.³ Currently at Hamburg University of Applied Sciences a research project concerning “Business Departments and the Requirements Engineering Process in IT projects”⁴ (FaPrAa) is conducted by the author. The study focuses on the question how BD staff is involved in the RE&M process for business IS. In this pilot study 25 companies, mainly SMEs, in north-western Germany are surveyed (semi-structured interviews, 30–90 minutes). The study will be completed in 2012.

3 See Cheng & Atlee, 2007.

4 German translation: “Fachabteilungen im Prozess der Anforderungsanalyse in IT-Projekten” (FaPrAa).

Some preliminary results are:

- Users in traditional business often have experience in process organisation.
- Only few companies are using formalised project models.
- Only few of the interviewed companies had established a defined RE&M process.
- None of the companies has established an explicit role of a 'requirements engineer'.
- The RE&M process is typically conducted without strict formal methods, caused by a lack of methodical knowledge and/or project management, which is based on the ad-hoc use of small time slots.
- Interviewed IT and BD managers assume a more formalised RE&M process in future.
- Interviewed IT and BD managers want a better qualified RE&M process.

The participation quality of the BD staff differs; the following scenarios are prototypical:

- Long term employed IT staff "knows the right things to do", BD staff is not involved.
- Long term synergetic co-operation of IT and BD staff, improving and upgrading the existing system.
- BD managers promote new IS while IT staff is only responsible for running the infrastructure.
- Top management decides about the introduction or upgrading of IS with external technical and process consulting.

The outsourcing of IS does not change this situation in principle: Concerning the legal aspect, the externalisation of IS services does not reduce the responsibility of an organisation for all its processes and for defining their requirements for these processes. Concerning the business aspect, BD will be more and more responsible for their processes and they will contract the outsourcing services. The results shown above are not statistically representative, but they show the variability of the RE&M reality.

COMMUNICATION PROBLEMS IN THE RE&M PROCESS

Following the textbooks a prototypical RE&M process can be visualised as follows:

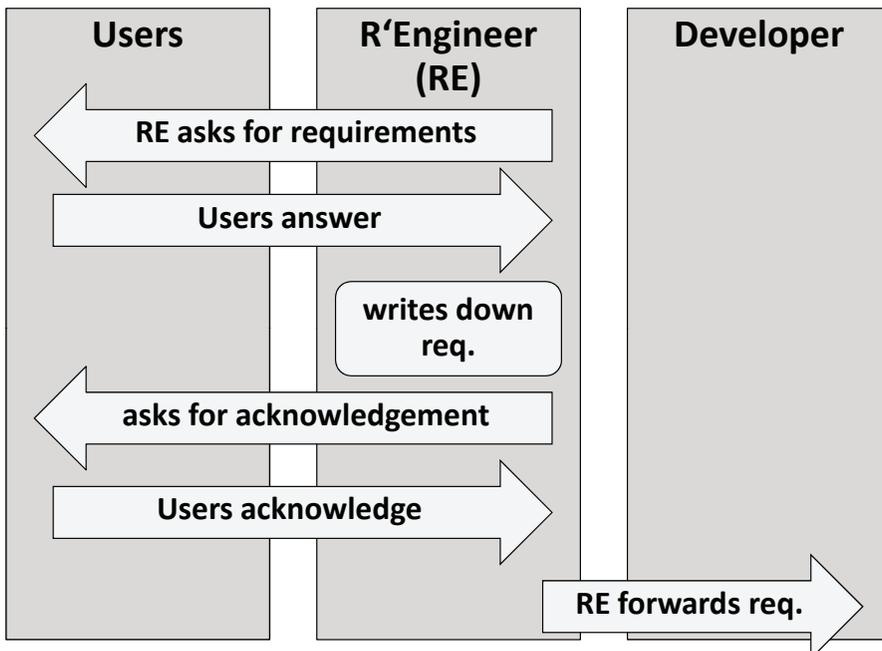


FIGURE 2. *Communication in the RE&M process.*

For successful RE&M the domain knowledge as well as methodological skills are needed. Whilst IT professionals often have only rudimentary knowledge about the application's subject, non-IT professionals are typically less trained in the methods. The resulting misunderstanding and *communication gap* is one of the reasons for the failure of projects.

Typical problems in this process are:

- Different terminologies and 'communication cultures' between users and software engineers.
- Users (=experts) and requirements engineers have wrong assumptions about the knowledge of the other group.
- Users are not able to clarify their tacit knowledge.

- Users are not trained in modelling languages.
- Experienced users might not be able to keep an analytical distance to their requests.
- Software engineers do not have (enough) domain knowledge.
- No experienced requirements engineers are available to moderate the process.

To improve the process quality it is important to reduce the communication gap between those persons who conduct the RE&M tasks and the BD staff. Reducing the communication gap does not mean that the BD staff should conduct the RE&M task on their own (even if this does happen). However, the IT and BD staff should be able to reduce the gap in collaboration.

HOW TO BRIDGE THE COMMUNICATION GAP

How IT Professionals Can Acquire Domain Knowledge

IT professionals will typically acquire domain knowledge by working in a project or in a long-term cooperation with a non-IT company. Additional methods for the qualification of IT staff are

- short trainings
- apprenticeships
- co-operation with on-site customers.

How to Train Non-IT Professionals

To support the participation of non-IT professionals in the RE&M process, the following artefacts will be valuable:

- a short and focused training curriculum
- lightweight (“agile”) methods and tools (using checklists, matrices etc.)
- tailored collaboration and knowledge management tools (e.g. wikis) for discussions.

A first important aspect in the training of IS users is the user’s *reflection on their own demands*.

The second aspect is the *training in describing the requirements*. Typically the BD users are not trained in formal description. Three methods appear simply adaptable to the user's experience:

- textual representations of single requirements as proposed by Rupp (Pohl & Rupp, 2011)
- templates for describing single use cases (Cockburn, 2000)
- use case diagrams as described in the Unified Modeling Language UML (OMG, 2011) to illustrate whole systems.

Furthermore, entity relationship models, class diagrams, process descriptions (e.g. ARIS) and state transition diagrams could be useful, depending upon the previous knowledge.

Agile development processes can have a special function in the awareness of communication problems, due to the institutionalised close communication cycle between users and developers, e.g. using the on-site customer. From the user's point of view, the learning possibilities of agile approaches are important. However, their quality depends on the concrete project and the people working in it.

Case Story: Hamburg University of Applied Sciences (HAW)

At the HAW's Department of Business in the programme "Marketing/ Business Studies" we organise in the last (seventh) semester a joint project in the disciplines Marketing (Prof. Dr. Andrea Zirm) and Business Informatics (the author). In this course the students work in a real-world project for eight weeks. Customers are the university, a company or a non-profit organisation.

The students have to work on a marketing related problem and to define their requirements for the IT support of the solution. Additionally they should conduct a market study, evaluate a software product or develop a prototype.

IS related topics are:

- specifics of IS projects and IS project management, agile methods
- requirements elicitation, analysis, documentation, management.

Students will get an introduction to textual representations for requirements and use cases as well as use case diagrams. (Entity relationship modelling [ERM] is taught in the third semester.) About 130 students have passed this program since the introduction in winter 2009–2010. A graduate destination survey on the usefulness of the RE&M training is proposed.

FURTHER RESEARCH

To bridge the communication gap in the RE&M process the methodical training of users is important, even if IS services will be externalised. In 2012 the results of the FaPrAa project will be analysed. These results will be discussed with the participants of the study with the intention of developing a training curriculum for BD staff, especially in SMEs.

Topics for further research are for example:

- evaluating the usefulness of general training of BD staff and training in specific methods
- the function of BD staff in RE&M processes in outsourcing scenarios
- cultural influences on the training programmes.

Furthermore, future research can be extended to the integration of end users in the RE&M process in the meaning of open innovation respectively of crowdsourcing.

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TARGETING INNOVATION COMPETENCIES WITH THE HELP OF DIVERSIFIED LEARNING PATHS

Liisa Kairisto-Mertanen

Turku University of Applied Sciences

liisa.kairisto-mertanen@turkuamk.fi

INTRODUCTION

Changes in the society call for not only changes in the competencies of employees but also in the industry. The mechanisms of creating competitive advantage are more complex than what they used to be. Value is now created via productivity and innovation. The current trend in education is to force the learners into creative and individual thinking and to bring the surrounding world with its complex problems into the classroom.

The purpose of this paper is to introduce the different learning paths which are possibilities offered for our future students, who need totally different kind of knowledge compared to the times when their teachers were graduates. Flexibility, innovativeness and liberality are key components when creating degrees for future society, where the requirements set for qualified employees change and where it is common that the employees themselves have to be able to define both their goals and the means to reach them.

Smart, sustainable and inclusive growth is set as the target in the communication from the European Commission “Europe 2020”. In Finland the activities needed to boost this development are defined in the innovation strategy given by the Finnish government. Improving the productivity and competitiveness of the national economy will only be possible if the innovation policy can be given a broader basis and made more efficient. Skilled and capable workforce as

well as research and development are essential in boosting innovation activities. Organisations wanting to be involved in producing successful innovations need employees who have the qualities that are essential for participating in the different innovation processes of their organisation. These individual qualities can be called innovation competencies.

When the Confederation of Finnish Industries (2011) speaks about the competence needs of learning networks in tomorrow's Finland, it uses two dimensions when defining the nature of work; one of them is related to the goal of work (end result) and the other in work methods. From this classification three types of work emerge: 1) work where both the goal of work and the methods used to reach it have been pre-determined; 2) work, where the goal has been defined but the methods and ways to reach the goal and the way the work is done are not carved in stone; 3) work where both the goal and methods of work are open; the desired end result is clarified or determined wholly as the work is being done. This can be called not-by-the-book type of work. The studies of university graduates should prepare them for category 2 and 3 type of work. This means that their studies should include elements which prepare them to work independently and tolerate insecurity.

INNOVATION PEDAGOGY IN TURKU UNIVERSITY OF APPLIED SCIENCES

The development work done in the Innovation Academy of Turku University of Applied Sciences is focused on finding the best ways to implement experiments leading to the goal of educating our students to become innovative players in the labour market after graduation. The concept of innovation pedagogy was born for the need of conceptualising the principles how education in the faculty should be designed and carried out in everyday life of the university. Innovation pedagogy is defined as *a learning approach that defines in a new way how knowledge is assimilated, produced and used in a manner that can create innovations*. Presently the concept of innovation pedagogy is adopted as a way to operate for the whole Turku University of Applied Sciences and mentioned also in the strategy of the university.

Traditionally, the role of education has been to give knowledge-based readiness, which later would be applied in practice to various innovation processes in working life. Innovation pedagogy introduces how the development of students' innovation skills from the very beginning of their studies can become possible. (Lehto, Kairisto-Mertanen, Penttilä 2011.) Innovation pedagogy contributes to the development of a new generation of professionals whose conceptions of producing, adopting and utilising knowledge make innovative thinking and creating added value possible. (Putkonen, Kairisto-Mertanen, Penttilä, 2010; Kairisto-Mertanen, 2011.)

The core of innovation pedagogy lies in emphasising interactive dialogue between the educational organisation, students, and the surrounding working life and society. In accordance to this its conceptual core can be divided, as figure 2 describes, into three different spheres in parallel to the three major actor groups benefiting from innovation pedagogy. (Penttilä, Kairisto-Mertanen & Putkonen, 2011.)

- Final learning outcomes, creation of innovations and produced capability to participate in diverse innovation processes – having primarily to do with students, who are expected to create innovations while affiliating with working life.
- Learning of innovation competences alongside with study programme specific knowledge, skills and attitudes – being mostly connected with working life, which provides students with ideal surroundings to acquire the competences needed in innovation processes and in future working life in general.
- Meta-innovations – referring to methods of learning and teaching utilised in the learning processes by the faculty members together with the students enhancing both the creation of innovations and innovation competence.

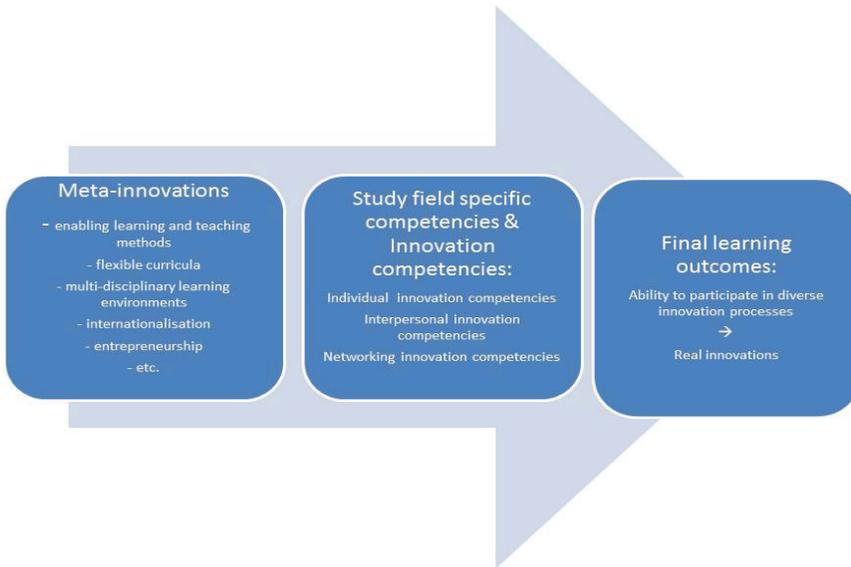


FIGURE 1. *The learning process according to innovation pedagogy.*

All the studies in every study programme should include a specified amount of individual learning, group-based learning and networked learning. Designing the curricula in such a way that it engages the student in all the mentioned types of learning becomes very important. The students' learning paths should be designed so that all the options lead the students through learning experiences where all three types of methods are applied at least in some proportion. Research indicates that networked learning using information and communication technology can support learning with regard to the development of higher-order skills such as scientific inquiry and critical thinking (Roschelle et al., 2000; Linn et al, 2003). The skill associated with searching, evaluating and understanding information sources to learn about complex and challenging science topics require regulation (Brand-Gruwel et al., 2009). Students end up to low learning outcomes if they are unable to perform metacognitive activities and regulate their learning (Azevedo et al., 2008).

THE OUTCOMES OF INNOVATION PEDAGOGY: INNOVATION COMPETENCIES

Learning outcomes are statements which are used to describe specifically what is expected from a learner in form of understanding, knowledge and know-how at the end of a certain period of learning. They are broad statements of what is achieved and assessed at the end of the course of study (Harden 2002; Buss 2008). They represent an approach to education in which decisions about the curriculum are driven by the outcomes the students should display by the end of the course. In outcome-based education, product defines process. The curriculum is being developed from the outcomes the students are wanted to demonstrate rather than writing objectives for the curriculum which already exists. A learning outcome is a written statement of intended and /or desired outcome to be manifested by student performance. (Spady 1988; Harden, Crosby, Davis 1999; Proitz 2010.) Guidelines for defining learning outcomes recommend that they should be clearly observable and measurable (Buss 2008; Kairisto-Mertanen, Penttilä, Nuotio 2011).

The outcomes cover both cognitive and practical skills (Davies 2002). The learning outcome is divided into components consisting of the to-be-achieved cognitive, psychomotor and affective domains of an outcome. They can be called knowledge or understanding, skills and attitudes, feelings and motivation accordingly. As Spitzberg (1983) points out, the distinction among knowledge, skills and motivation is important because performance can be enhanced or inhibited by any one or all of these components. Learning outcomes are also guaranteed achievements which can be institutionalised and incorporated into practice. The ownership of the outcomes represents a more student-centred approach. Students take responsibility for their own learning. (Harden 2002.) As it is argued that a learning outcome might not be suitable for every discipline of education, the literature also speaks of emerging learning outcomes and thus leaves room for emergent ones which differ from the predetermined intended ones and make unexpected, occasionally occurring learning possible. (Hussey & Smith 2008; Buss 2008, Brady 1996.)

Innovation competencies are the learning outcomes which refer to knowledge, skills and attitudes needed for the innovation activities to be successful. The methods applied and the way how teachers and students interact constitute a base for learning and thus enable the forming of innovation competencies. The methods used facilitate intuitive learning during the learning process and make

transmitting of tacit knowledge possible when dealing with working life. The core idea in innovation pedagogy is to bridge the gap between the educational context and working life. Learning and teaching processes are developed so that they provide improved competences for the students and enable personal and professional growth. Learning is deeper when the previously gained knowledge is continuously applied in practical contexts. (Penttilä, Kairisto-Mertanen, Putkonen, 2011.)

The requirement for the statements of learning outcomes to be measurable calls for developing ways to measure the outcomes – innovation competencies – of innovation pedagogy. The measurement could be done with the help of a to-be-developed measuring instrument, an innovation barometer. With the help of this tool it will be possible to assess the learning results concerning innovation competencies and this way also develop best possible learning and teaching methods for the creation of the same.

INTRODUCING DIVERSIFIED LEARNING PATHS

The foundations and structures of the traditional learning paths of our students must be reviewed and renewed for innovation pedagogy to become reality for every student of the university, and for it to really start impacting the surrounding environment of the university as well. New ways of combining student learning, working life assignments and research and development work of the university must be found. This is an urgent and significant need especially in engineering education as engineering in many cases and especially in the case of TUAS forms an essential base for the welfare of the economy surrounding the university.

When designing the learning paths we rely on the ideas presented in the latest report by the Confederation of Finnish Industries, according to which it is important to notice that learning is about creating information, not just adopting it. The report also emphasises the importance of being able to work in jobs which demand not-by-the book ability and where both the goal and the methods of work are open. The desired end result is clarified or determined wholly as the work is being done. Creating this kind of ability in the students requires a totally new attitude when designing what is to be learned in the university. (Oivallus 2011.)

Traditionally individual-centred learning has been the reality in university education. Individual learning is relevant when the purpose is to disseminate facts, concepts and information. However, it is not sufficient when trying to contribute to the formation of skills needed in not-by-the-book type of jobs. Group-based learning involves many individuals who all work with the same assignment or learning task. It is possible to learn from each other and achieve better results than by individual work. Typically externally funded R&D projects or entrepreneurial activities are based on group-based learning and require that several individuals with different backgrounds work together to solve a problem or execute a given task. Networked learning takes place when learners are connected to their environment. It is particularly relevant in professional education, where the relevant personal knowledge and regionally determined know-how are important. Information and communication technologies extend the traditional networked learning. Individual, group-based and networked learning are represented in the different learning paths provided for the student. The ultimate aim of innovation pedagogy is to produce such learning outcomes that the graduate students possess relevant study programme specific knowledge skills and attitudes and, in addition to that, also have developed innovation competencies ready to be used in the different innovation creating processes of their future working life possessions.

The learning paths handled in this paper are: 1) traditional learning path, 2) personally selected learning path, 3) innovative learning path (including entrepreneurship, service production and R&D) and 4) continuing learning path. The presentation gives rationale to a new experiment which adheres to the ideas of innovation pedagogy and which can change the everyday life of an average student.

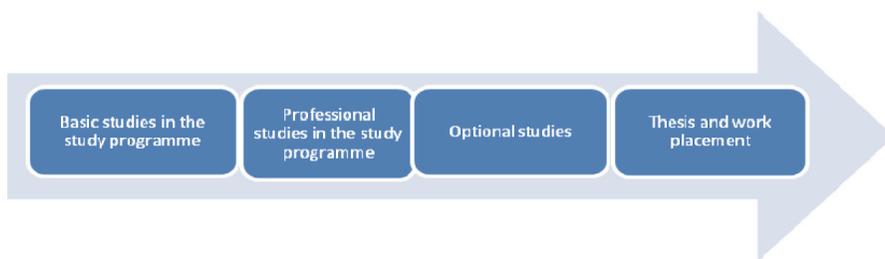


FIGURE 2. *The traditional learning path.*

The traditional learning path in figure 2 includes all the study modules which are designed in the curriculum for a specific study programme. When a student chooses this path he/she does not want to make any personal choices but rather follow the basic studies, professional studies and other activities planned for the programme in question.

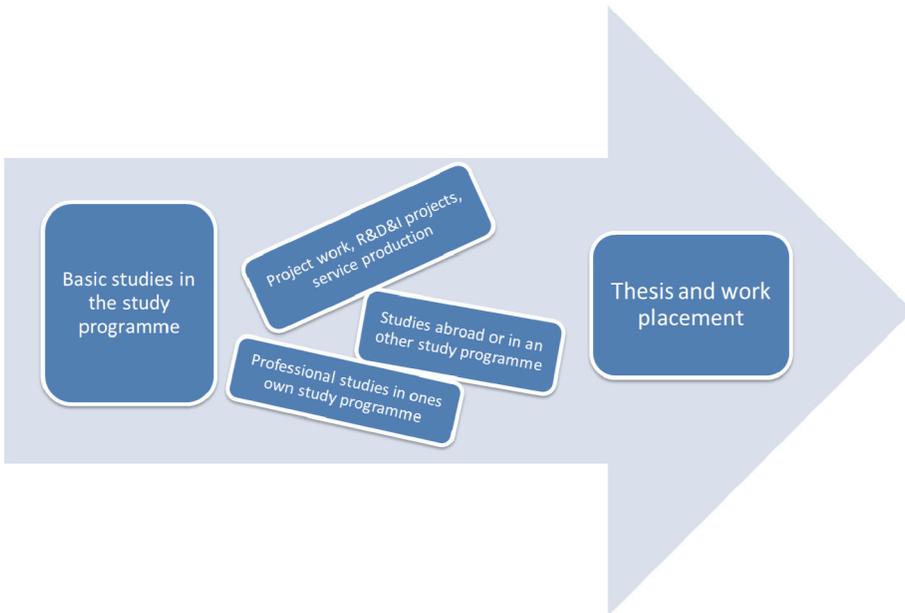


FIGURE 3. *The personally selected learning path.*

According to the principles of innovation pedagogy, students are active players in their own life and able to define their own goals. A personally selected learning path, figure 3, includes not only study programme specific study units but units from other study programmes as well. Personal choices can be included in optional studies and they can also replace some of the compulsory units. When a student chooses this study path, he/she is willing and interested in making choices. In addition to the chosen study modules the personal curriculum includes studies abroad, studies done in projects, entrepreneurship studies etc. The work placement and thesis work support the goals set by the students themselves.

The innovative learning path, figure 4, is formed by modules chosen by the student. The studies form a flexible and dynamic path during which the student is in close interaction with working life. The aim of the studies is to develop students' innovation competencies with the help of studies carried out in cross-disciplinary and varying groups. The innovative path is clearly different in comparison to the traditional way of learning as the study modules are not designed in advance but emerge as the learning progresses. The task of the university is to provide enough tutoring and guiding for the students so that they can start defining their goals by themselves. The students get used to working in a group based manner and they also start developing their networking skills already during their studies.

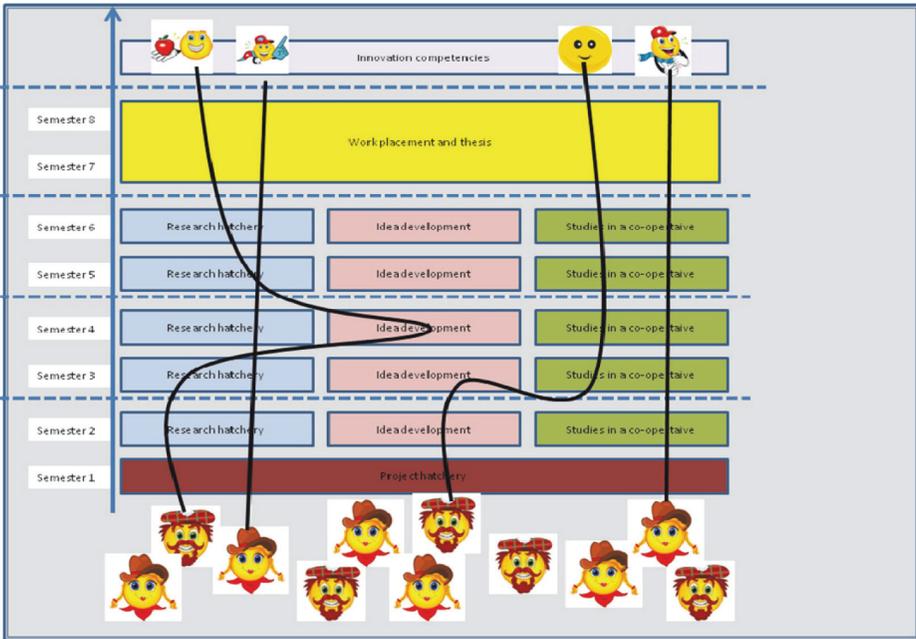


FIGURE 4. *The innovative learning path.*

Alongside with the work in research hatchery, co-operative or idea development teams the tutors must make sure that the theoretical foundations are learned. This can be done e.g. by including presentations made by the students about relevant theoretical topics in the studies. Another option is to include study modules in the field of basic studies for the students to learn. The aim in this

kind of studies is to develop the innovation competencies of the students and also teach them to cope with the changing working requirements of future working life. Students learn to define their learning goals by themselves and they also learn to use the expertise of the group and their fellow learners, which can also include university staff.

The continuing learning path, figure 5, is meant for students who have graduated from the university. The aim of these studies is to make it possible for the student to continue learning and at the same time participate in the research & development and service production activities of the university.

During these studies the students also tutor younger students and this way gain competence on leadership. The students are employed by the university for a short and in advance strictly defined period of time. One of their tasks is to look for a good employer while updating and increasing their knowledge. They are also obliged to look for a successor when their own time at the university is expiring.

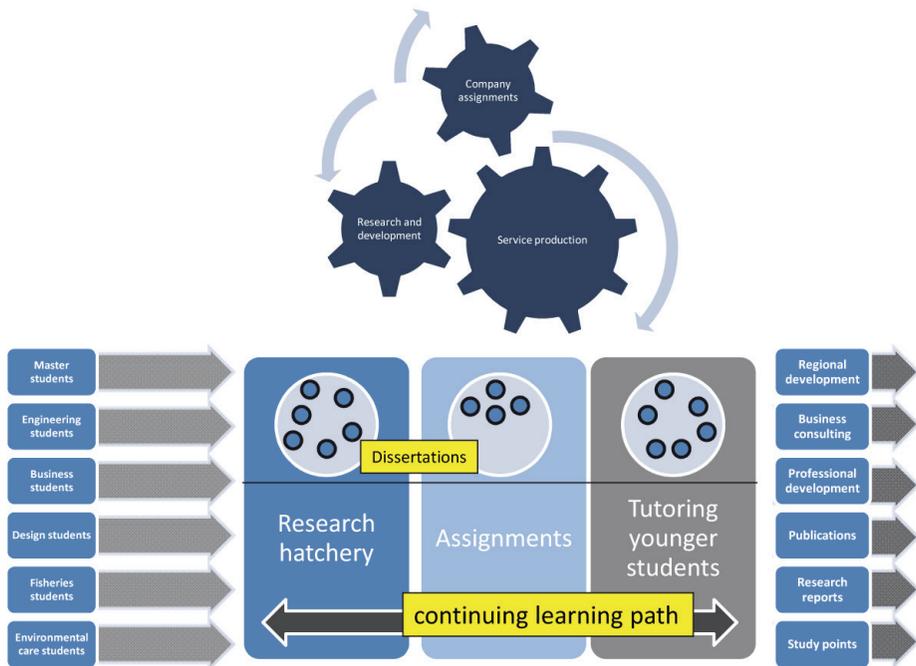


FIGURE 5. *The continuing learning path.*

CONCLUSION

The working life surrounding any European university changes in an increasing speed. New competencies are needed of the university graduates. This challenges the university to adopt and develop new ways to address teaching and learning.

It should be a constant process in the university to examine new ways of working. Traditionally the universities have concentrated on producing new knowledge about a clearly defined subject matter. What will be needed in the future is experts in many fields but as knowledge increases at a rapidly growing rate, there is a very urgent need for people capable of learning, combining and working together in a knowledge generating and increasing way.

The learning paths introduced in this paper are possibilities for our future students. They need totally different kind of knowledge compared to the times when their teachers were graduates. Flexibility, innovativeness and liberality are key components when creating the degrees for future society.

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DIGITAL COACH SUPPORTING THE CREATION OF A PROJECT PLAN (A.K.A. PID OR PLAN OF APPROACH)

S.A. Nijhuis

HU University of Applied Sciences Utrecht

steven.nijhuis@hu.nl

INTRODUCTION

A lot of curricula in higher education depend on Project Based Learning. This provides students with a setting which (slightly) resembles their future way of working: in teams, in projects. The projects increasingly have a real problem-owner, so students are highly motivated to perform and provide a solution. At Utrecht University of Applied Sciences (UUAS), one of the used methods for Project Based Learning is based on Design Research. This method has been developed in close cooperation with other institutes. During the development of the method a majority of the tutors involved noted that most students jump into the project, even when the problem or criteria for a solution are not clear (Nijhuis, 2007).

Teachers often notice that students struggle when creating a project plan. Students feel that creating a plan of approach is something which distracts them from their real tasks: producing results (Nijhuis, Earli 2008). This was considered a problem, especially as jumping into the project usually leads to troublesome project execution. One could argue that creating a project plan – that is carefully examine the problem, the view of the world around the problem, building criteria for the solution and creating a work break down structure – is something that could or should be done iteratively (Zitter 2010). On the other hand, the students need to be prepared for a real-life working

environment, and that environment does not allow such a course of action: a project plan is also a contract, which can only be changed with consent at both sides.

For this a digital coach has been created. It is a self-evaluating instrument that guides students through the process of reflecting upon the project. It structures this process. Structure leads to better quality (Paans, 2008, 2011) and teachers acknowledge this: the project plan highly benefits from using the digital coach.

In 2007 a small project was funded by the UUAS to find out if a digital environment could provide a solution. This paper describes in short the didactical framework of design research at UUAS and the creation of and the research around the Digital Coach. In addition, the text discusses the methodology used for testing the coach, and other solutions, and the results of these tests. After a brief description of the coach itself, this paper will draw some conclusions based on tests and will provide some suggestions for future research.

The Digital Coach has been carefully introduced in one of the institutes of Utrecht University of Applied Sciences, and is now compulsory for the students working on their bachelor theses. Some other institutes are beginning with the introduction, and other universities are also interested (Nijhuis et al, Surf 2010).

The coach is made under creative commons and can be found at:
<http://tinyurl.com/6mncfzx>

DESIGN RESEARCH

The method of Design Research used in projects at UUAS puts the students in charge. The assignments are of a professional nature: assignments students are likely to get when graduated and that enable them to enhance competences needed to become a professional. This is why the problem is a real-life problem: someone actually needs the solution. Furthermore, it is also a real-life working situation: the students (as a group or as individuals) are contractors, the assigner is pressed for time and experts will help the students – but only when asked and tutors are there to help the students without solving the problem for them.

In order to accommodate the process there are planned ‘regular’ sessions like kick-off, validating the project plan with the assigner, reviewing the project plan with experts, design validation, mid-term review etc. Ideally the students get three assignments: a problem, competence development and a knowledge question. This is graphically portrayed in Figure 1. Putting students in charge with the aforementioned consequences also means that students present their project plan for the assigner before it is reviewed by experts.

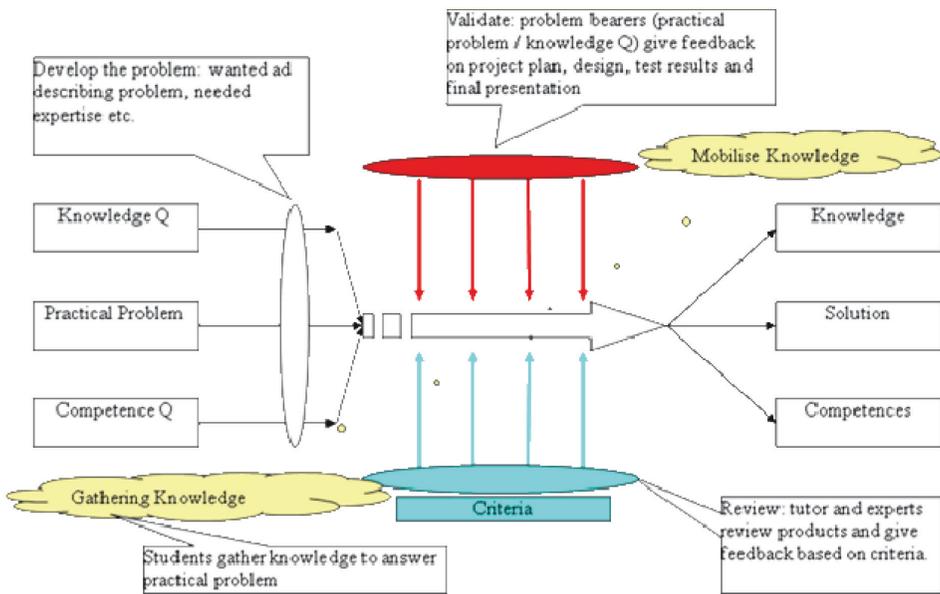


FIGURE 1. Graphical representation of didactical method.

Most project leaders would agree with the remark ‘life never follows the project plan’. But there is a strong sense that planning a project is an important aspect of project work (Project Management Institute [PMI], International Project Management Association [IPMA] etc.). It allows the project manager to foresee possible tracks, manage risks and, most importantly, discuss with the assigner when the end result is ‘good’. In the used method the project plan is used as basis for all the reviews. Research has shown that the planning stage of (research) projects is crucial in getting a successful result (Oost, 2002).

DEVELOPING THE COACH

The first step in development was a survey of what instruments were available. While a few instruments were available for experienced people in regard to their research orientation, there were no specific instruments found that specifically address this issue for first time projects (Nijhuis 2008). A promising instrument – already known at the start of the development – was Excellent Research, which was developed based on the research of Oost. This was promising because it was a complete package, and thus there was no need to develop our own tool with manuals etc. On the other hand, Excellent Research is not aimed at a novice level and it focuses on research.

In an effort to find other instruments we did find a lot of tools that were aimed at a supporting specific parts of the project plan like “The Five Why’s”, creating a work break down structure etc. We found no other ‘complete’ tools but one could argue that Excellent Research was no complete tool either. At this point the project had two alternatives: Excellent Research and a bundle of loose tools found on internet. A third alternative was needed and called for development.

Based on experience of our tutors (what questions do you ask when students get stuck?) and common literature (like Van Wijnen, Grit and the course material) a set of questions was created. These were logically bundled and validated by tutors, i.e. these questions were indeed the questions which should be answered in a project plan. The questions were informative (‘what is the current situation?’, ‘what parties are involved?’) or opinionating (‘can you show to others that you did a thorough literature search?’). The opinionating questions got four fields for answering: a yes/no field and three follow-up fields in the case of no, to aid the thinking process of the students.

The project now had three alternatives to test: a readily available package Excellent Research, a bundle of loose free tools and a developed tool which was called ‘The digital coach’. All these three were to be tested in practice.

METHODOLOGY

Testing took place in three steps: first a laboratory test with volunteer students was conducted. The aim of the first test was to determine which alternative(s) could be tested in live student projects without causing the student projects harm. For this we asked students with project experience to fill in at least two of the alternatives (with a circling order in order to prevent bias) for the project they had just finished. We then asked them whether the alternative would have helped them if they had used it in the beginning of the project, whether they would want to use it in their next project, whether they would recommend it to other students etc.

The next step in testing involved live student projects. Alternatives which made it through the first test would be available for use by students. Again on a voluntary basis, and with selected student projects. Lecturers would tell students the tools were available but not obligatory. No other introduction or support was given – the same as with the laboratory test. After finishing the project plan, students and tutors were surveyed on the results. The students were asked whether it helped (on a four point scale) and even if they didn't use it, would they want to use it in the next project? The questionnaire for the tutors focused on if they noticed it was used and if so how they noticed it.

The third step was a larger group of students, with an introduction to the whole group and a supporting workshop. This time the tutors were questioned (orally) on effects. Students received a digital survey. The majority of tests focused (by chance) on tutors associated with the Institute of Built Environment.

RESULTS

The results of the first test were very clear. Table 1 lists the results of the laboratory tests.

TABLE 1. *Results of laboratory test.*

	ER	Loose bundle	DC
This effort would be worth it (would have helped)	33%	50%	91%
I want to use this next time	17%	50%	59%
I would recommend this to others	17%	56%	77%
This should be available for everyone to use	33%	69%	91%
This should be obligatory (for everyone)	0%	50%	45%
This is only useful when you get stuck in the project	0%	63%	36%

Based on the results Excellent Research was dropped as an alternative. The students clearly didn't appreciate the abstract questions of Excellent Research, in contrast to a number of researchers who were using it to satisfaction. The results gave rise to a brief discussion whether the project should continue with two alternatives. Based on the high score of the last question (only useful when you get stuck), the loose bundle of free internet tools was dropped as well.

The second test (voluntarily use, no introduction) revealed that most lecturers did not notice whether or not the tool was used (which could be interpreted both ways). The students, who did use it, were positive: 75% said 'this helped me (much)'. Both student groups in majority said they would want to use the digital coach next time (67% 'will use it next time', even of the 50% who decided not to use it this time).

The third test involved an introductory speech which motivated students to use the method. About 90% indicated after the introduction that they intended to use the method. About 75% of the students present at the introduction attended the voluntarily workshop.

Tutors were unanimous in their judgment: the project plans students had produced were noticeably better than in the previous years. The students provided a mixed result. They were mostly enthusiastic, but a significantly large group was weary of the number of questions in the coach.

Based on the experience of the tutors the digital coach has been made a standard tool for students creating the project plan for their bachelor thesis at the Institute for Built Environment and the minors People Planet Profit and Urban Area Management. Currently the curriculum of HRM (part-time variant) is testing the digital coach for their bachelor thesis students.

WORKING WITH THE COACH

The coach is made in MS Excel under creative commons and can be found at: <http://tinyurl.com/6mncfzx>. Download a copy or open it, save as and it is ready to be used.

The coach consists of two main parts. The first part is inquisitive and asks questions like ‘what does the assigner want to accomplish?’ and ‘why hasn’t anything been done yet?’ When a question elaborates on a previous question, previous answers are shown throughout the coach. For example: question 16 ‘when is the assigner satisfied, when is its goal achieved?’ shows the answer to question 6 ‘why now, why did the assigner did not take action previously?’ The questions are logically grouped (problem, environment, approach etc.)

The second part promotes reflection with questions like ‘are you confident that you’ve gathered all possible information needed and can you prove this to others?’ The second part is also logically grouped (knowledge domain, clear problem, sturdy approach etc.). In the second part all relevant answers from the first part are given, so students see whether they have an elaborate and clear understanding or if they need to take action.

The relevant answers also can serve as a basis for the project plan itself. These answers contain the vital information for specific parts of the project plan. Since they are answers to specific questions, rewriting is necessary.

CONCLUSIONS

Part of this research confirms something we already know: structuring leads to better products. This is true for normal production – hence the standardized production – and for cognitive processes as well (Paans, 2008, 2011). The

effects of using the digital coach are no different: project plans do benefit from this instrument. But another result is that students don't always appreciate the digital coach. In current introductions this is mentioned to the students as is the resulting improvement in quality. A correlation between the two has not been researched nor has a correlation between reflective abilities and results or enthusiasm. In the case of improving project plans, this is hardly relevant (although it could be for various other purposes). A third result is that although the coach has been tested and found beneficial in 2008/2009, its use has not spread out rapidly.

There is some reluctance regards future research with the digital coach. Most of it would mean giving one group of students the digital coach and denying others. Apart from the ethical dilemma (denying a useful and free tool), there is a great deal of work involved in balancing the test groups: same kind of influencing factors like reflective abilities, project management skills etc. Nevertheless, two research questions are worth future research: 'the effect of the coach on tutor-student communication' and a more fundamental one: 'the effect of the coach on developing project management skills (especially skills involved in creating the project plan)'.

The first question will be discussed every time a new curriculum starts using the coach, since tutors can reflect on past experiences. It is not a bias free research method, but it does give an insight. The second question is derived from experiences with driving aids like GPS navigation. People that use GPS navigational tools are less able to find their way back or to recreate the route than people using maps. Will the same effect occur when using a 'navigational' tool like the digital coach? This is more fundamental research involving measurement of project management skills.

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NANOINFOBIO: A CASE-STUDY IN INTERDISCIPLINARY RESEARCH

Naomi Jacobs

Manchester Metropolitan University

Martyn Amos

Manchester Metropolitan University

m.amos@mmu.ac.uk

INTRODUCTION

The complex challenges facing 21st century society will require solutions that transcend disciplinary boundaries (National Academies, 2004). The convergence of informatics, engineering and biotechnology is widely predicted to lie at the heart of the next technological revolution (Carlson, 2008). Interdisciplinary science and technology has the potential to fundamentally transform healthcare, agriculture, energy, security, environmental science and many other areas of pressing concern (Endy, 2005; May, 2009).

Through reconciliation of knowledge across different disciplines, new and innovative forms of research may be stimulated both across and within disciplines (Frost and Jean, 2003, Wilson, 1998, cited in Rhoten, 2004). By encouraging interaction and exchange, the effective creation of new knowledge occurs via the 'cross-fertilisation of fields' (Crane, 1972 cited in Sanz-Menendez et al., 2001). 'Breakthrough' research is more likely to result from combining specialists and ideas from different areas (Carayol and Nguyen Thi, 2004). There may also be financial incentives for undertaking joint research, as novel funding pathways are becoming increasingly available to support such projects. (Cech and Rubin, 2004; Rhoten, 2004; Tadmor and Tidor, 2005).

It has long been recognised that traditional disciplinary boundaries can be limiting, and that these lines of demarcation often create artificial barriers that restrict the type of questions that can be asked (Frost and Jean, 2003). Staying within established boundaries fosters the development of unique worldviews, perceptions, and ways of framing knowledge (Kincheloe, 2001), which are all valuable and necessary. However, communication with those outside the group may become more difficult as a result. Individual researchers may seek to undertake interdisciplinary research (IDR) in order to overcome such limitations (Rhoten, 2004). The complexities of interdisciplinarity, however, are still poorly understood. Whilst IDR appears to have clear benefits, its implementation can offer significant challenges (Kafatos, 1998).

Attention has recently focused on overcoming these challenges, and notable successes include the creation of new interdisciplinary courses, research centres and programmes (Eagan et al., 2002; Aboelela et al., 2007), as well as new policies and funding structures at institutional, national and international levels. In what follows we use an established categorisation of impediments to examine different types of barrier and then illustrate how they have been addressed in the context of an existing research project.

CASE STUDY: THE NANOINFOBIO PROJECT

The NanoInfoBio (NIB) project¹ at Manchester Metropolitan University was funded by the Engineering and Physical Sciences Research Council (UK) for a period of 27 months, under their Bridging the Gaps programme. This programme aims to foster interdisciplinary research within UK higher education institutions by means of innovative and flexible research support. The NIB project brought together computer scientists, biologists, engineers, chemists, mathematicians and health scientists to work on problems as diverse as the fungal deterioration of film stock, wound repair using nanoparticles, and visual tracking of muscle contraction.

1 See the project website at <http://www.nanoinfobio.org> for further details.

The specific objectives of NIB were as follows:

- Encourage serendipity: encourage “happy accidents”.
- “Grow our own” researchers: create a sustainable research environment by developing students as researchers.
- Minimise barriers: remove impediments to effective inter-disciplinary work.

These have been achieved using a variety of methodologies, including seed-corn funding, support for interdisciplinary activities, and a number of initiatives designed to encourage a cultural shift towards more collaborative working across the Faculty of Science and Engineering. We now focus on how the third objective (Minimise barriers) was achieved.

Siedlok and Hibbert (2009) list a variety of factors that can contribute to the failure of IDR, grouped into four categories:

- (1) Disciplinary (e.g. cultural barriers)
- (2) Personal (e.g. lack of experience, time constraints)
- (3) Institutional (e.g. funding schemes, career constraints, authorship/ patenting issues)
- (4) Procedural (e.g. lack of access to evaluation tools).

NIB took a strategic approach to overcoming barriers to IDR. We now examine each of the categories listed above, propose ways in which they might be overcome, and then describe the implementation of these methods in the context of the NIB project.

DISCIPLINARY BARRIERS

The nature of disciplinary barriers

Boundaries can lead to the emergence of particular styles of thinking and approaches to research within a discipline. It may be argued that there are very good reasons why disciplines are the preferred/traditional method for delineating academic research. Boundaries set by disciplines define the parameters and scope of new information to be considered, whereas an “open-ended” framework could potentially overwhelm researchers (Bruce et al., 2004).

Researchers are often unwilling to move outside a personal perspective of their own discipline, a view which may have developed over the course of many years (Gooch, 2005). Participation in IDR may also be resisted due to a perceived tendency of individuals to discriminate against people from outside their self-defined category (the 'in-group') (Fay et al., 2006).

Even if an initial reluctance to move outside disciplinary barriers is overcome, there remain issues with combining the study methods of different disciplines. A lack of shared mental models, common language and assumptions may prove problematic, particularly when participants in a collaborative team have a particularly strong affiliation to their own groups. One of the reasons disciplines assist with concentrated study is that they create a shared framework of thought, through which all members of the discipline may share a continued cohesive frame of reference (Lattuca, 2002). However, if this framework is removed, or if two or more are merged (as is often the case in IDR), the lack of clear structures and rules for conducting research may prove a barrier to effective research (Bruce et al., 2004). For IDR to succeed, dialogue and common ground must be established and maintained between those who have historically sought to distance themselves from disciplines beyond their own.

Frost and Jean (2003) similarly note that disciplines (and institutions) each have their own patterns of attitudes, meanings, symbols and behaviours, and that the thoughts and behaviours of discipline members are influenced by the "knowledge traditions" in which they reside. These include categories of thoughts, common vocabularies and codes of conduct.

Building the wheel is difficult enough when one person builds the wheel; now try to have three to five people working on the wheel with different tools and different ideas about what kind of bike it will go on.

Here, Morse et al. (2007, p.9) quote a participant in their study using an analogy to describe the challenges they encountered.

There exists a significant body of literature devoted to discussing communication as a barrier to IDR (e.g., Wear, 1999). Disciplines create their own particular vocabularies in order to define and describe terms. These lexicons may not be transferable to other disciplines, and can cause comprehension issues even if the topic under discussion is simple and unambiguous (Jeffrey 2003, Massey et al., 2006). Researchers undertaking IDR have reported issues of this nature, where the same word can have very different meanings in the 'languages' of

different disciplines (Bruce et al., 2004). For example, Tadmor and Tidor (2005) describe how the concept of a 'model' differs greatly between biology and engineering, and that this difference must be addressed before effective collaborative work can be carried out. Pickett et al. (1999) note that issues of communication can arise even when terms are understood, due to differences in context, and because of assumptions. Therefore a 'common meaning' is just as important as a common language.

Overcoming disciplinary barriers

Fay et al. (2006) suggest ways in which projects can both avoid the previously-discussed discipline-based misinterpretations and facilitate the development of shared mental models and common ground. They emphasise the importance of building a cohesive project 'group' via methods such as frequent non-project-related interactions, and the creation of high level goals which are shared and supported by the entire project team. Communication issues arising from disciplinary differences must be addressed by implementing both formal and informal communication strategies (Morse et al. 2007). Others also highlight the importance of space for 'social time', and that strategies for overcoming disciplinary differences require shared space:

[There is little focus on] the creation of social spaces such as occasions, events, networks, hierarchies, roles and routines that provide opportunities for people to transform disciplinary boundaries, in addition to the creation of common physical spaces (e.g., office location and layout, physical resources, shared seminar rooms, foyers) to foster interdisciplinary objectives. Scott and Hofmeyer (2007, p. 492).

A study by Lee et al. (2010) establishes a correlation between physical co-location and impact of research (at least, in the biomedical sciences), further supporting the argument in favour of providing physical space for collaboration. Bruce et al. (2004) note that in order to overcome issues which may arise from the removal of disciplinary boundaries, defined project boundaries must still be set in order to provide structure and focus for researchers. However, these should be fluid and permeable enough to allow for re-engagement with discipline-based expertise that might initially be outside the project scope, should it be required later.

Implementation of methods for overcoming disciplinary barriers

The main methods identified in the previous section for overcoming disciplinary barriers were (1) shared, common language; (2) creation of shared goals; (3) physical (perhaps temporary) co-location.

Within NIB we implemented the following strategies for addressing these:

- (1) All requests for funding were assessed by an inter-disciplinary team, and applicants were required to phrase their proposals in language aimed at the educated non-specialist. This prevented the over-use of jargon, and encouraged participants to think about fundamental assumptions they held about their work.
- (2) Small-scale seed funding was offered for well-defined projects, with short-term objectives and end dates, and the requirement that grants be held by an interdisciplinary team.
- (3) Informal meetings were arranged to allow for nonspecific discussion, and to allow bonds to form between individuals and groups who may not otherwise interact. These were often held off-campus, in order to prevent distractions caused by the everyday working environment.

PERSONAL BARRIERS

The nature of personal barriers

In van Rijnsvoever and Hessels (2010), the authors investigate which personal characteristics are most closely-associated with successful interdisciplinary work. Individuals possessing certain personality traits appear to be more suited than others to interdisciplinary work, one example cited being a “concern with applications”. Bruce et al., (2004) list some qualities which are thought to be related to success as a manager or co-ordinator of interdisciplinary research, including willingness to accept alternative methodologies, the ability to learn rapidly, good leadership skills, an interest in “real-world” problems, and a clear vision of the project and what it is trying to achieve. They report a commonly-held view that such personality factors are at least as important as a participant’s discipline or specialisation.

There may also be key skills for IDR that are different to those required for discipline-focused studies. Palmer (1999) discusses different strategies of information gathering and knowledge acquisition, and asserts that a broader, more expansive approach to reviewing available literature ('information probing') is more applicable to interdisciplinary research. The aggregation of an appropriate set of project-relevant skills requires a certain level of diversity across participants, as well as complementarities of skills, and a common core of understanding regarding the central problem the project addresses. While these factors are important to all collaborative projects, they may be particularly elusive in those where the participants originate in different disciplines.

In an analysis of the factors affecting collaborative working, Amabile et al. (2001) list three categories of characteristics which impact on the success of collaborative projects: (1) collaboration skills; (2) project-relevant skills; (3) attitudes and motivation. The authors argue that the most important positive factor in the last category is trust, which is characterised by both an absence of hidden agendas and the existence of mutual respect in the collaborative group. Rowe (2003) identifies investigator-specific factors, which appear in the most part to fall under "attitudes". The factors listed include passion for the work, mutual respect between scientists in the team, complementary skills and knowledge, and the ability to develop a common language. From a negative perspective, personal disputes may arise over matters such as authorship, patenting and data ownership, which can obstruct effective collaborative research (Naiman, 1999, Gooch 2005).

Overcoming personal barriers

Jeffrey (2003) observes that the skills required for successful IDR are different from those necessary for individual research, and effort must be made to acquire the appropriate skills (such as the ability to integrate different perspectives and communicate effectively with researchers from other disciplines). As discussed above, there exist well-defined personal behaviours and attitudes which can affect the success of IDR (Aboelela et al., 2007, Bruce et al. 2004). The ability of collaborators to meet face-to-face is highlighted by several authors as being a key principle of successful collaborative research (e.g. Rowe, 2003; Maton et al., 2006), and it appears likely that personal interaction is an effective way to overcome many of the barriers discussed here.

It may be necessary for institutions or departments to provide support to help overcome personal barriers, especially to researchers at an early career stage. Additional support for this argument comes from the findings of Bruce et al. (2004), who observe that the degree of interdisciplinarity within a project group appears to increase over time, and increases in line with the learning experience of those involved. This implies that IDR-relevant skills can be acquired, perhaps by continued exposure to alternative disciplinary cultures and attitudes.

Putting into place graduate and postgraduate programmes that provide training in and exposure to IDR will foster these skills, and provide a strong basis from which to develop future interdisciplinary infrastructure (Tadmor and Tidor, 2005). Focussing on nurturing appropriate skills in early career researchers can be crucial in developing long-term IDR expertise.

Implementation of methods for overcoming personal barriers

The main methods identified in the previous section for overcoming personal barriers were (1) face-to-face contact, (2) support for early career researchers.

Within NIB we implemented the following strategies for addressing these:

- (1) Face-to-face interaction was encouraged through informal meetings and sandpit events.
- (2) Early career researchers were particularly encouraged to apply for funding, with career stage being a factor in funding decisions for several calls (that is, junior researchers were prioritised).
- (3) The involvement of undergraduates and Master's students in funded research projects was financially supported (through summer project bursaries) as part of the "grow our own" ethos of the project.
- (4) Special events for postgraduate students were organised in order to introduce them to the benefits and opportunities inherent to interdisciplinary research.

INSTITUTIONAL BARRIERS

The nature of institutional barriers

Within academia, the prevailing disciplinary-focused structures and general academic culture can often discourage interdisciplinary work, characterising it as “second-class research” (Siedlok and Hibbert, 2009) or as a “distraction” (Shinn, 2006). If reward structures and funding both within and outside the university are based on discipline-based divisions, they may actively discourage those wishing to engage in cross-disciplinary work. Nobel laureate Russell Hulse notes:

Just setting up interdisciplinary centers at universities doesn't get you where you want to go if you haven't changed the reward system. Goodman et al. (2006, p.1235).

Leshner (2004) notes that, since most universities are organised into discrete departments in order to promote scholarship within their particular ‘disciplinary silos’, they are not well-positioned to facilitate IDR, and may effectively penalise such work. This is particularly true if the individual disciplines do not regard the interdisciplinary areas of research as appropriate for engagement. For example, Cech and Rubin (2004) cite delays in the development of the now booming area of bioinformatics, mainly due to the fact that it was initially embraced by neither biology nor computer science departments. Postgraduate students wishing to engage in IDR may encounter problems such as finding a sympathetic supervisor, and having to spend additional time gaining mastery of potentially conflicting disciplines (Golde and Gallagher, 1999). At a more senior level, there exists a lack of understanding that impacts on tenure decisions, based on (for example) the fact that an academic’s position in the author list of interdisciplinary publications may not accurately reflect their level of contribution (Cech and Rubin, 2004).

The US National Academies (National Academies, 2004) outline ways to stimulate and encourage IDR, focusing mainly on improvements to institutional structures, and indicating that current systems are unsatisfactory. It reiterates the fact that many institutions claim to support IDR and see its value, but expect staff to take on IDR-related responsibilities as additional duties over and above their usual obligations. Time constraints are often cited by researchers as a significant barrier to successful IDR (see Morse et al., 2007).

Overcoming institutional barriers

Careful management and planning is crucial to the success of IDR projects. Carayol and Nguyen Thi (2004) find that, while recurrent public funding has no discernible effect on interdisciplinarity, contractual funding from private and public sources has significant positive effects. Organisational arrangements can also either support or obstruct IDR; therefore changes may need to be made at the institutional level in order facilitate IDR.

Detailed suggestions for the forms these changes might take are outlined in a report by the European Union Research and Advisory Board (EURAB, 2004). The main recommendations of the report are divided into five categories, the first of which focuses on ways to avoid unnecessary administrative barriers. The report suggests that a balance is needed between highly-specific funding mechanisms, and the ability to fund broad IDR. It also suggests that departmental and faculty divisions, and the associated employment procedures, should be examined to ensure that they do not create barriers to IDR. The development of shared research facilities is also discussed, and the provision of intra- and inter-institutional access to any newly funded major research infrastructure and facilities is suggested. The funding and management of IDR is also examined, and the authors make specific suggestions for changes to funding procedures and resource allocation methods to encourage interdisciplinary work, as well as proposing methods for both the dissemination of good practice, and the identification of new research fields.

Suggested changes to institutional and funding structures are described in further detail in a report by the US National Academy of Sciences (National Academies, 2004). This includes recommendations to funding organisations, suggesting that they should consider in their programmes and processes the unique challenges of IDR, with respect to risk, organisational mode and time. Recommendations are also offered to academic institutions, highlighting a need to remove barriers to IDR, with several illustrative examples from institutions that have successfully enabled necessary changes. The specific recommendations are detailed and extensive, but include the following:

- (1) Streamline fair and equitable budgeting procedures across department or school lines, to allocate resources to interdisciplinary units outside departments or schools.
- (2) Allocate research space to projects, as well as to departments.
- (3) Deploy a substantial fraction of flexible resources - such as seed money, support staff, and space – to support IDR.

(National Academies, 2004)

Because some of the issues described above result from a lack of understanding at the senior management levels of institutions (for example, lack of additional time provisions for IDR), the key suggestion is that organisational learning and change is required to successfully foster IDR, as well as individuals developing new skills and approaches (Lattuca 2002).

Implementation of methods for overcoming institutional barriers

The main methods identified in the previous section for overcoming institutional barriers were (1) support cross-disciplinary funding, focussing on specific projects, (2) provide appropriate infrastructure support, (3) encourage high-level institutional awareness of IDR and its benefits.

Within NIB we implemented the following strategies for addressing these:

- (1) Provision of small-scale, seed-corn funding to support start-up projects, as well as larger amounts for further development of successful ideas. This was particularly effective when used to “buy” short periods of time for postgraduate students and/or technical staff, consumables and small pieces of equipment. We initially proposed also using these funds to support teaching buy-out, whereby academic staff could have portions of their teaching covered by adjuncts / associate lecturers. However, this was less successful, as the administrative overhead involved in arranging buy-out often made it impractical.
- (2) A full-time administrator was appointed to run the programme on a day-to-day basis and deal with purchasing, travel, meetings, etc. Given the right appointment, the administrator can also have significant input into the strategic development of IDR within an institution.

- (3) The project was actively promoted, both within and outside the institution, via public lectures, a dedicated website, blogs, collaborative events and newspaper / magazine articles. This was vital in terms of gaining senior support for the project (at the level of Deans and above), as well as providing positive publicity for the institution. The project brand became increasingly important, and a “corporate identity” (logo, colour scheme, NanoInfoBio phrase) was used throughout in order to cement awareness.

PROCEDURAL BARRIERS

The nature of procedural barriers

Siedlok and Hibbert (2009) suggest that IDR can often develop in an unsystematic manner. Although such “emergent” research can be very productive, it may also result in a lack of structured processes for its management and practice, and ultimately lead to conflict.

Amabile et al. (2001) provide several examples of process-based issues in collaborative projects. These include frustration with initial project meetings that lack active discussion and decision making. The effective use of meeting facilitation skills at subsequent gatherings appears to address this issue. It may also be the case that different administrative processes are used in different departments or disciplines:

Determining the necessary criteria for accessing...resources was often a confusing and complex endeavour because our departments and colleges all had different policies and procedures regarding resource acquisition and allocation that often conflicted with each other. Koch et al. (2005, p.371).

Overcoming procedural barriers

Process-based barriers can be overcome by appropriate planning to ensure that potential issues are identified at the start of an interdisciplinary project, and by introducing measures to address possible problems. Morse et al. (2007) suggest that an accountability strategy, setting out interdisciplinary team timelines, requirements and responsibilities, is essential for integrated working.

Rhoten (2004) observes that the most successful IDR projects allow researchers to freely enter and exit short-term collaborations. It is important to avoid fixing long-term collaborations at the start of the project, based on a 'laundry list' of affiliates chosen to fill a specific number of positions rather than for their skills. Researchers report that when they are free to move between collaborations they make more progress with interdisciplinary projects and have greater overall satisfaction in their professional lives. Rhoten also finds that the size of interdisciplinary centres and networks is key to their success, and that small centres (or small bounded networks within large centres, with fewer than 20 affiliates) are found to generate more knowledge creating connections than medium/large centres.

The importance of research group size is also highlighted by Cech and Rubin (2005), who describe two examples of highly successful interdisciplinary research organisations (the Medical Research Council Laboratory of Molecular Biology [MRC LMB], and the former AT&T Bell Laboratories). They emphasise the fact that at both these centres, individual research groups are generally composed of fewer than six individuals, and that this small group size is considered a critical factor in promoting effective collaboration. To undertake larger projects, small groups would themselves collaborate.

Jeffrey (2003) highlights the important role facilitators can play in interdisciplinary projects, and describes ways in which facilitation assists in the process. These include maintaining a focus on collaborative aspects of the project, taking decisions which may be seen as unpopular without damaging the collaboration, and assisting in the development of common vocabularies.

While this suggests that planned learning is necessary to support the development of interdisciplinary teams, work by Lattuca (2002) indicates that informal patterns of learning may also be relevant. Those who participate in serendipitous interdisciplinary collaboration often find that this provides skills useful for further collaborative work, and that learning occurs 'in situ'. Participants in the study by Bruce et al. (2004) regarded the best collaborations as those which built upon existing links and contacts, supplemented by new contacts initiated either by direct contact with one of the members, word-of-mouth suggestions or via other informal contacts.

Successful interdisciplinary research projects must report methodologies and processes used, so that they can be replicated by subsequent projects. Although the nature of collaboration will differ, by necessity, for each collaborative project, explicitness allows for ease of evaluation and future learning (Robertson et al., 2003).

Implementation of methods for overcoming procedural barriers

The main methods identified in the previous section for overcoming procedural barriers were (1) ensure consistent accountability, administrative and reporting processes are in place, (2) keep collaborative groups relatively small, (3) make use of facilitators, where appropriate.

Within NIB we implemented the following strategies for addressing these:

- (1) By having a central administrator to oversee the project, there existed a natural first point of contact for administrative queries. This, in turn, made it easier to use consistent administrative processes for purchasing, auditing and project reporting. The administrator ensured a consistent “front” for the project by generating a set of forms (e.g. request for travel funds) for use only within the project, which were then mapped onto central university systems. Although this added an extra layer of complexity, it ensured that a complete and accurate audit trail was in place, and applicants had a uniform experience when requesting funding or other assistance.
- (2) Collaborative groups were kept small by virtue of the fact that the individual sums of money available via the project were relatively small. Project teams of size greater than three or four individuals were unusual.
- (3) The administrator often served as the project facilitator by bringing together people with common interests via meetings and introductions. Each funded project was required to hold kick-off meetings, and, for the larger projects, regular status update meetings. Where possible, these were attended by the administrator, whose presence was intended to ensure that misunderstandings due to differing uses of specialist terminology were avoided, since it was necessary to describe achievements and objectives in non-specialist terms.

CONCLUSIONS

In this paper we have emphasised the future importance of interdisciplinary research, and outlined some of the challenges to its effective implementation within universities. By describing ways in which a funded project has addressed these barriers, we hope to offer to the community tangible and useful examples of good practice, and contribute to a wider debate on the implementation of cross-disciplinary science and engineering.

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APPLIED ARTS

THEME SESSIONS ON APPLIED ARTS

Timo Tanskanen

Turku University of Applied Sciences

timo.tanskanen@turkuamk.fi

The aim of the Applied Arts sessions was to find out present and future needs of practitioners in creative and cultural industries and enhance vocational opportunities. The emphasis of the track was solutions where art can be combined with technology, business or well-being services. There were presentations about projects, solutions or research in different stages. It was proved that multi-professional collaboration opens up dimensions and platforms for new implementations of entrepreneurship and creative research. There were eleven compelling presentations which could be divided in three categories: art based solutions, research based learning and specific research areas. The discussion was vivid and the participants of the CARPE network provided an extensive and high quality approach in research and education.

The central idea in the presentations was to find out how and in what way art can be combined with technology or society. We were presented how computer science can be combined with dance and movement, how cross media and mobile devices can be used in museums and in preservation of cultural heritage. Further on we learned how art based methods and multi-professional teamwork act in enhancing well-being. A good example was how to use self-portrait as a tool to express yourself and process your identity.

The presentations focused on research based learning handled tradition and innovation in education, open society learning, how to motivate students to be curious, multicultural learning and truth in journalism. The presentations which concentrated on specific research areas introduced us two projects with the following titles: “Public Broadcasting Online Services in the European Single Market” and “A Discursive Analysis of Hidden Crises”.

In the track of Applied Art we were offered a number of interesting approaches to interdisciplinary research and collaboration in the CARPE network. We all shared the same target: to offer students a wider perspective and versatile ways to use art and creativity in all areas of life.

TRADITION AND INNOVATION

Basic Design as a Source of Innovation

Cristina Iranzo Reig

Universitat Politècnica de València

ciranzo@dib.upv.es

INTRODUCTION

This article attempts to highlight the close relationship that continues today among the basic fundamentals of design and innovation. This relationship has been observed over many years between basic design and the development of new products, bringing forth the hypothesis that *Basic Design is a constant source of creativity and innovation for developing new products*; in this case, in the ceramic industry, related to ceramic tiles or ceramic elements for architecture, but also in other industrial sectors. In addition, *Basic Design is also a methodology that leads to knowledge of form and to a certain experimentation resulting in original and unique solutions.*

The appearance of the machine in the 20th century brought major changes in the production of the object that gave birth to a new discipline: industrial design, and with it new pedagogical approaches that seek to establish the principles of this activity. In this way, the so-called preliminary or basic education courses arise. These courses constitute what we know now as Basic Design. After these first initiatives of elementary, fundamental or basic education, others have emerged later in order to clarify, organise and systematise the fundamental principles and their implementation. In addition to discussing the relationship between Basic Design and innovation, this article will look at ways certain design competitions can unearth and highlight these principles in a very practical way.

REDUCING BASICS

From a synthesis carried out below, we can establish the principles for the pedagogy and practice of such activity and its application to the design process as a basis for innovation. The basics can be reduced to six issues: Nature, Form, Structure, Texture, Material and Colour, keeping in mind that they respond to broader concepts and also to a scientific basis of design supported by the knowledge of the sciences. It will be necessary to take into account their adaptation to current environment, because “designers do not select forms but languages”, nor is creativity “in the originality of form, but in the appropriateness of language” as Chaves (2001) says.

A brief description of each of these items and their implications follows:

1. *Nature* as inspiration for the formal language, as well as the optimisation of resources and economy of means.
2. *Form* as optimal solution to the proposed use. Aesthetics and functionality must join together to achieve the optimisation of the form, easily achieved by understanding the basic elements of visual language and its basic shapes: triangle, square and circle, which grant formal purity and balance between form and function.
3. *Structure* as organisation or ordered arrangement of simple elements that build up a larger and more complex unit in which the sense of order in the repetition is essential for overall consistency.
4. *Texture* as the “sensitisation” of a surface. Texture gives a certain identity or individuality to the object through the rate and scale or light and shadow games derived from simple repetitive units.
5. *Material* as the close relationship that exists between matter and function. Knowledge of materials and their properties will give us the best solution for each case. Good use of the material will come from the reasoned and reasonable application of its properties.
6. *Colour* in its broadest sense, understood as a language. The chromatic language takes many different meanings depending on the context in which it is used. In this language, also the black/white contrast can acquire wider meanings; it is in this contrast a ratio in which it is understood that colour is shape and, as such, sets its own language with its own basic features.

The development of a visual language has definitely become more complex with the emergence of new expressive means, but these means are still based on the elements that the avant-garde analysis promoted. Michael Kroeger (2005) puts it this way:

The field of design education faces many perilous years ahead. The students encounter constant stress because of newer and higher technology. The pressure demands constant attention from the students. We must not forget that the basic design foundations the most valuable thing that we can give to beginning students.

The clear objective of Basic Design has been to provide students with basic language from which they develop their creative capacity, but within a rational approach. According to Marcolli (1978) it

is about recognising the basic elements of form, the constituent or primary elements. Those morphological and semantic elements, fixed and variable elements that give a specific and functional value to the essential form and, jointly organised in a certain way, through formal processes of composition, modulation, selection and modification of their relations, constitute a language, a vocabulary or, in other words, the communication of the contents of speech.

In this sense, the so-called Basic Course has remained faithful to the initial programs today. The main purpose of a course like this should be finding a suitable answer to reality, but it is necessary to understand the complexity of the functions that Design has reached in the advanced post-industrial society and create a synergy between the logic of industry and economy. This can be achieved through applied creativity which must be submitted to the conditions that society and environment dictate. Today, the new features of the socioeconomic system lead us to focus on cultural and ecological values alongside new technologies, and the emphasis is placed on innovation. The year 2009 was designated by the European Commission as the European Year of Creativity and Innovation under the theme “Imagine. Create. Innovate”. With this, the EU highlighted creativity and innovation as means of responding to social and economic problems facing Europe in a competitive and globalised economy.

Then, is Basic Design a valuable and useful source of innovation for project-related activity and professional practice? What do we mean by doing new things, and how do we create these new things? What is the sense of

innovation? To answer these questions, it is necessary to ask what we mean by innovation. According to the definition of this term in the dictionary, Innovation “(From Latin *Innovare*) is “to renew or change”, stemming from *in* “into” + *novus* “new”. That is, “the act of making a change or arrangement introducing something new”. The term *innovation* is associated with creation, development, discovery or invention, but in practice it must lead to application in the social environment. The third edition of the Oslo Manual (2005) defines *innovation as the introduction of a new or significantly improved product (good or service), process, marketing method or organisational method in the internal activity of a business, in the workplace or in the external relations*. However, innovation processes differ from one sector to another. For the purpose of this study, innovation means turning ideas into new or improved products that the market values.

The contribution of design thinking to generating innovative solutions is based on an understanding of known and latent needs of the user. The productive activity of design has been changing as society has evolved, and new needs and new challenges have arisen. Behind every product design is a reflection of reality, a reinterpretation of needs, tastes and desires of people. According to MacDonald (2004) “Design is acting as the bridge between technology and art, ideas and goals, culture and trade... “. According to Chaves (2002) “Innovation has been the unique and authentic cultural product of this century in which anything goes for the new mass society and consumerism”. But as Montaña (2004) says “users and consumers demand more than mere functions, they ask for values”, and Design has great potential to create and communicate values. In this sense, new issues have emerged: new materials, microsystems and nanotechnology; craft design; interactive design; emotional design; universal design or design for all; user-oriented design, co-design; ecodesign, design for sustainability or sustainable design. Each and every one of these issues affect, define and identify what is today considered as innovation. All of the above are new ways to add value to products, processes or services. However, *the communication of the object depends largely on its appearance, and that is based on fundamentals or basic design elements, which are a constant source of innovation*. So, the Basics knowledge is the basis for the exercise of creative thinking aimed at developing innovative products.

AWARDS AS AN INDICATOR FOR INNOVATION

Tiles, or any other ceramic coating, can be considered as a basic unit of repetition which is able to generate multiple and varied compositions. The fundamental principles of Design perfectly fit the requirements of a product like this and can be a source of innovation for the development of new products. In both the industrial and academic fields, a design can be considered innovative, if it corresponds to projects or products awarded in competitions, both national and international, and by its impact in the social media. These awards and the recognition of their prestigious juries can be seen as a guarantee of innovation. Below, we discuss some such awards.

In this article, the industrial sector is represented by the projects that have been rewarded in *Tile of Spain Awards of Architecture and Interior Design Competition-ASCER* and *ALFA Awards-SECV*. The academic world is presented through the projects developed at *ETSID-UPV* by the students of *Basic Design Course* and through the category *Ceramic Design Awards CEVISAMA-INDI/LAB*. These are the result of projects initiated in the classroom and recognised socially in such competitions.

The Tile of Spain Awards are organised and promoted by *ASCER*, the Spanish Ceramic Tile Manufacturers Association. The Awards recognise work in the field of architecture and interior design reflecting the versatility, characteristics and applications of ceramic tiles made in Spain to their best advantage or showing the best reinterpretation of the material in new and recent projects. The competition, which was initiated in 2002, changed its name in its fifth edition becoming the *Ceramics for Architecture and Interior Design Awards*, a broader designation to the concept of tile that suggests ceramics as the architectural and design covering material in all its amplitude.

The Spanish Society of Ceramics and Glass (*SECV*) organise annually, since 1977, the *Alfa Awards* in order to distinguish products, processes, machinery and equipment in Ceramics and Glass noted for their innovation (technological and artistic alike), functionality and utility. Therefore, many of the products or processes Alfa awarded in the international competition *CEVISAMA* are scientific or technological innovations derived from continuous research on material and technique. On the other hand, others surface from formal innovation that, in most cases, is due to the scientific or technological advances.

The projects developed in the classroom by the students of the Basic Design Course in *ETSID-UPV* meet the academic goals under which the students learn and practice processes of creation to propose, finally, solutions to the real world. This methodology of an inductive order, resulting from methodical and didactic experience, contrasts with the more classical deductive process having to do with a rational and functional interpretation of creation. However, the designer uses both, the deductive and inductive methods, whose purpose is to bring about innovations. Once the students have undergone different processes, techniques and formal methods of generating both bi- and tri-dimensional designs, a particular section of implementation will direct their proposals. Following market trends, the student must focus and adapt their formal solutions to make them more attractive, interesting and viable.

INDI deserves its name: Innovation and Design are their sources of inspiration. The INDI Young Designers event, organised by *CEVISAMA*, International Fair for Architectural Ceramics, Bathroom Kitchen Equipment, Natural Stone, Raw Materials, Frits, Glazes Colours and Machinery, is set to be a design laboratory from this year onwards. Cevisama Lab is its new name, a laboratory for new Design, a powerhouse of ideas for manufacturers that pursue added value and innovation. Among the activities composing the program is the international competition of industrial design and technological innovation in ceramic products used for architecture, which is suitable for students from Design, Architecture, Engineering and Arts, both from national or international schools. The Ceramic Design Awards pay special attention to projects with industrially rewarding aspects such as innovation, creativity, simplicity, versatility, functionality, the capacity to be reimplemented and further developed into pieces with new uses and applications as well as technological aspects that allow them to be produced through an environmentally friendly process.

CONCLUSIONS

By analysing the six basic features with the winning designs of these awards, one can see the considerable effect that Basic Design has on innovation. In the winning projects, the basics are mostly found in the definition of the problem. In all cases in recent years, the basic fundamentals of design and its influence on product definition can be well identified.

Looking at design that achieved these awards confirm that Basic Design is a constant source of creativity and innovation in developing new products; in this case, in the ceramic industry. Its influence is still significant today in the works that need order, logic and function, as seen in the most innovative architectural projects in recent years as well as on those that have emerged from the innovative effort by the industry. This statement has also been observed in teaching practice where *Basic Design is a methodology that leads to knowledge of form and to the particular experimentation with it, resulting original and unique solutions*. Innovation is not an end in itself but a means to create value, and Basics continue to offer answers to the current needs of society, continuing to drive innovation.

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BRINGING THE PAST TO THE PRESENT

The use of tagging and storytelling for the enrichment of digital cultural heritage

Erik Hekman

HU University of Applied Sciences Utrecht

erik.hekman@hu.nl

Harry van Vliet

HU University of Applied Sciences Utrecht

harry.vanvliet@hu.nl

INTRODUCTION

The growing impact of information technology and digitisation, ever since the beginning of the 1990s, has given cultural heritage institutions a fresh impulse to deal with the problem of accessibility of their collections (Van Vliet, 2009). Their efforts, however, are still mostly aimed at cultural preservation, and, for the time being, have done little to bring us closer to the dream of a Virtual Collection in the Netherlands. For instance, more than 30 million art objects were still not digitised in 2008 in the Netherlands (Veeger, 2008). Meanwhile, it has become urgent to further open the door. The Internet's dominant role in recent years has caused a change in the relationship between media producers, suppliers and consumers in the traditional media landscape. The cultural sector must therefore decide what to do with today's digital media in response to the general public's changing role, and for the purpose of improving accessibility. The use of multiple media resources and particularly resources like the Internet and mobile telephony seems to be inevitable. The only question that remains is: how? This paper addresses this question by focussing on social tagging and

storytelling, and reports the results of an empirical study on tagging behaviour using the social tagging platform www.ikweetwatditis.nl (see also Van Vliet et al., 2010).

Increase in accessibility

Searchability is crucial for the accessibility of our digital cultural heritage. The ability to find digital art objects begins with an effective description. Therein lies the problem. If a description can be found at all, it usually includes only a minimal amount of technical data focusing on object management issues such as documentation of the acquisition process, storage, and art-historical features. Often the same object descriptions are used when art collections are presented on the net. Consequently, any problems in describing the physical art collections are reflected digitally. E.g., as a result of strict annotation standards, the formal description of a painting with the image of a cow might not even include the word 'cow'. As a result, the painting cannot be found using 'cow' as a search term. The art object may become less appealing for the visitor's since it is taken out of context, and only a database record is shown (Trant, 2006a/b). In conclusion: art collections are available, but not accessible; descriptions have been made, but are incomprehensible.

Social tagging

The usage of social tagging could offer a possible solution for engaging the public and making object descriptions more public-friendly. Tagging entails assigning labels and/or keywords to a specific item, such as a painting. It is social tagging when multiple people are engaged in this activity, and tags are mutually visible. Various studies suggest tagging has a positive effect, on both the added value for art collections and visitor involvement with those collections (Marlow et al., 2006; Trant, 2006a/b; Trant & Wyman, 2006; Trant, Bearman & Chun, 2007). The frequently mentioned benefits associated with social tagging include:

- Tags provide access points that are closer to the idioms used by visitors than formal object descriptions.
- Tags add new information to art collections that is known to the members of the general public but that is not available to a particular institute (Trant, 2006a).

- Tagging increases people's involvement with art collections: taggers contribute meanings that may provide insight into visitors' perceptions of art collections.
- Tags can be used to personalise access to art collections by making suggestions, composing virtual expositions, route maps, or virtual meeting places for visitors (Van Setten et al., 2006; Trant, 2006b).

RESEARCH QUESTIONS

The question relating the useful deployment of social tagging can be formulated as: *what choices museums have to make for the deployment of social tagging?*

Two such choices have been identified for the purpose of this project. In similar research, researchers usually work with a dichotomy of professionals versus laymen. In doing so, there is little consideration of the different degrees of knowledge among visitors. In addition to the museum curator and the layman, there are 'well-informed' interested people including amateur scientists and retired professionals to be found among the visitors (see Wubs & Huysmans, 2006a). It is extremely relevant for museums to cater for and continue to involve this group in their collections. It may be more useful to deploy social tagging for a specific group of experts as opposed to a broad audience.

A second choice is whether or not to go beyond the limited power of expression of tags. No matter how powerful tags may be, they are still essentially keywords with a limited amount of information. It may therefore also be interesting to consider other forms of expression, such as digital storytelling. Stories offer a personal perspective and contribute to a personal interpretation of art objects (see further Van Vliet, 2009). We defined three possible effects of social tagging:

- *Enrichment*: tags enrich collections by way of adding information. Taggers make a statement about art objects and, as a result, tell us something about the relationship between visitors and art objects;
- *Accessibility*: tags can be used as search terms to find art objects;
- *Involvement*: the tagging process creates involvement. Through tagging the visitor is engaged in a process of viewing, analysing and describing the object. One can expect that these cognitive processes will arouse interest in art collections.

The analysis of the three possible effects gave rise to a multitude of research questions and hypotheses (see Van Vliet et al., 2010). Two of these questions will be addressed in this paper:

- 1) *Do laymen tag in different ways compared to experts?*
- 2) *Which way of presenting stories will lead to a higher degree of involvement?*

METHODOLOGY

A controlled research environment allowing the collection of tags and stories was of vital importance for our research. We set up this environment by creating a platform 'ikweetwatdits.nl' ('I know what this is') through which collections could be presented and where tags and stories could be added. The tagging tool tracked various types of information, such as the actions of users, and stored this information in a database for later analysis. This platform was launched in September 2008. Three collections were made accessible via this environment: 134 objects from the Dental Surgery collection at the Utrecht University Museum, 145 objects from the collection of drawings of Japanese internment camps at Museon and 100 photos from the beetle collection at Naturalis.

We collected data for more than one year, specifically from September 2008 through 31 December 2009. After a year of collecting tags a total of 3,592 tags were collected from laymen and experts. In total 62 stories in the form of video were collected through interviews at the end of 2008, two of which were used in our experiments on storytelling. For more about the selection, methodology, statistical analysis and other design choices we refer to the complete research report (Van Vliet et al., 2010).

FINDINGS & CONCLUSIONS

Analysing the tags shows that laymen did not add significantly larger numbers of tags than experts nor did they added larger numbers of unique tags than experts. In fact, these two groups added virtually the same proportion of unique tags to the entire collection of tags. Also, laymen did not add different

types of tags compared to experts. Both groups primarily added descriptive tags. The two other types of tags (self-reference and attitude) were virtually non-existent in our experiment. However, laymen used different words than experts. We discovered a considerable overlap (almost 50%) between the laymen tags and the expert tags. Only one of the four assessed cases showed a significant association in the ranking of words used by laymen and experts.

The question whether 'information' was added through tags by the two groups of laymen and experts has been assessed in two different ways. On the basis of objective measures in regard to the 'distance' of both tag clouds, no difference was found in the degree of 'informativity' between the laymen tags and the expert tags. The post-experiment research carried out among professionals did reveal, however, that the expert tags are considered to be 'more informative'. Having professionals examine the suitability of tags for retrieving the object in question assessed whether tags added by laymen are more useful for the purposes of object retrievability than the tags added by experts. Only in two out of the eight cases examined are the laymen tags considered to be better keywords for object retrieval than the expert tags. None of the other cases showed that the expert tags are considered to be better keywords for object retrieval.

The conclusions from the storytelling research are as follows: we discovered that story viewing/listening/reading changed the participants' attitudes towards museums in a positive sense after the experiment had taken place. There was a more positive attitude towards visiting the museum, museum website, and recommending the museum to friends and family. Furthermore, after the experiment, the human subjects indicated that they were more motivated to visit a museum for their leisure, and less motivated to plan a visit for their work or study. On the other hand, we saw no change in the emotions experienced before and after the experiment. The scores on the emotion pairs indicate that before and after, the human subjects were mainly at ease, calm, passive, and a little bored but happy nevertheless. Regarding the question on the relationship between the presentation of the story and involvement we used a 2x3 factorial design for measuring media experience. We did a full factorial analysis (MANOVA), which did not show any significant effect on separate factors and their interactions. Univariate analyses of the six dependent variables of media experience did not produce any significant result either. No significant difference in engagement was found in relation to the main effect of modality (video/audio/text) or the main effect of the story (good/poor); neither was there a significant difference found in the interaction effect (modality x story).

DISCUSSION

One contribution of this research to the discussion of the value of social tagging is the distinction made between different groups, i.e., laymen, experts, and professionals. Research findings show that there was no significant difference between laymen and experts in this respect. Even though there is a substantial overlap in the tags used by both groups, each group also added its 'own' words, words that were not mentioned by the other group. Moreover, there was a difference between the relevant weights assigned to the tags shared by both groups: one group mentioned those tags less often than the other group. This was also visible in the tag clouds, in the sense that the laymen did indeed use more 'common' words to describe the objects in the dental surgery collection, such as 'tooth', 'back tooth', and 'hole', while the experts used words such as 'dental caries' and 'dental prosthesis'. The most extreme examples were found in the beetle collection, where the experts used specialist terms, usually the Latin names of genera and species, to such an extent that there was virtually no overlap with the terms used by the laymen. Laymen's terms, such as 'beetle', 'bug', and 'black', were not used by the experts.

In a general sense, we may conclude that both laymen and experts provide their own contributions to digital collections through social tagging. The contributions from both groups are well matched in a quantitative sense, and are (partly) different in nature from a qualitative perspective. Based on this research, therefore, we cannot sustain the assumption that having experts engage in tagging is 'more productive' than having laymen engage in tagging. Both groups delivered their own, specific contributions, and the research indicates that the experts' tags contribute especially to informativity, while the laymen's tags tend to contribute to retrievability. Apart from the distinction between laymen and experts, we may further conclude on the basis of the research that tagging does indeed enrich collections, in the sense that it adds keywords that have additional value for collections or the disclosure of collections.

Another research contribution is the question pertaining to the role of storytelling in collection enrichment and its potential for eliciting visitor involvement. Not finding any significant results in the assessment of the story presentation was quite an unexpected outcome. We had at least expected that the experience of viewing the video presentation of a good story would be clearly distinguishable from the experience of reading the textual presentation of a poor story, to mention the two most extreme modalities in the manipulation

experiment. A simple explanation for this result is that the difference was just not large enough to emerge as significant with the measurement method used and the limited number of persons interviewed. Another possibility is that the two selected stories ‘meant nothing’, in an emotional sense, to the human subjects (students); in other words: they were simply indifferent.

However we did find a change in attitude towards museums after the experiment: the human subjects have a more positive attitude towards visiting the museum, the museum’s website, and recommending the museum to friends and family. We could discover the exact cause of this change, or to determine its precise relationship with a shift in motivation: from ‘for my work/study’ to ‘for my leisure’. This would mean that simple exposure to stories, by itself, has a positive effect on visitor involvement with museums. Whether this effect would hold in the longer term and whether it would actually lead to action has not been examined.

Taking into account all methodological caveats that we discussed only partially here (see Van Vliet et al., 2010), we may conclude that social tagging and storytelling are relevant tools for museums to enrich their collections. Our research has produced less unequivocal results for the two other aspects of the benefits of social tagging referred above, i.e. retrievability and involvement, but in any case, they do not contradict the assumption that social tagging and storytelling contribute to retrievability and elicit involvement. Hereby an essential aspect is to consider who is asked to do what: in addition to the museum professional, a distinction is made between laymen and experts, which has proven to be relevant for clearly interpreting the results. This is inextricably linked to the question of how to reach and influence these target groups in relation to the input they are required to deliver.

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PUBLIC BROADCASTING ONLINE SERVICES IN THE EUROPEAN SINGLE MARKET

A Conflicting Situation for the Public Management

Martin Gennis

Hamburg University of Applied Sciences

martin.gennis@haw-hamburg.de

Hardy Gundlach

Hamburg University of Applied Sciences

hardy.gundlach@haw-hamburg.de

INTRODUCTION

In this article, the authors describe their international research project examining how the public value of new public broadcasting services (hereinafter, PBS; in Germany: *öffentlich-rechtliche Rundfunkprogramme*) can be assessed. The authors of the research project recommend a comparison between the different public service broadcasters in Europe and their online and digital strategies. The comparison is used to explore the institutional solutions that work to solve the conflicting situation between the public service objectives of the PBS and the economic policy objectives of the European Union. In this article, the authors present the criteria by which they want to carry out the comparison. These criteria define the structure of the data, which should be made available through an informational database.

The PBS fulfils constitutional functions (public-service remit) in the member states of the European Union. The functions are directly related to the *democratic, social, and cultural needs* of each member state and to the need to preserve media pluralism (Protocol No. 29 TEU/TFEU). For example, the Broadcasting Communication of the European Commission emphasises the particular role of the PBS in the dissemination of information, the formation of opinions, democracy, and culture in Europe (European Commission 27.10.2009: no. 9–16).

Still, television is of outstanding importance: the policy assumes that television is an effective instrument in influencing the formation of public opinion. In line with this assumption, television is indeed regarded as the lead medium for the formation of public opinion. This thesis corresponds with this dynamic: we hold that television has a strong influence on the formation of public opinion in connection with elections or national crises. Due to media convergence this assumption has to be reviewed. Current examples of this include the questions of whether and the extent to which moving images and video on the Internet and the Internet Protocol television (IPTV) have similarly potential impact, as well as whether their efficacy and power of suggestion are similar to the same elements in traditional TV (e.g. Neuberger/Lobigs 2010).

Some digital *public broadcasting services* are drivers of innovation in online media. For example, new offerings, such as VOD services (Video-on-Demand services, i.e., catch-up TV, or Mediathek, or la télévision de rattrapage), regional information portals, news portals, programme guides, edited weblogs, and children's portals and mobile services (i.e. news apps for smartphones) intensify the dynamic of supply on the Internet. The new digital offerings of the PBS improve the scope and quality of online services for consumers because they allow the latter to enjoy more diverse professional information and media content with increasing media richness, compatibility, and convenience. Figure 1 shows using the example Germany that public service broadcasters have set up a third pillar besides their television and radio services.

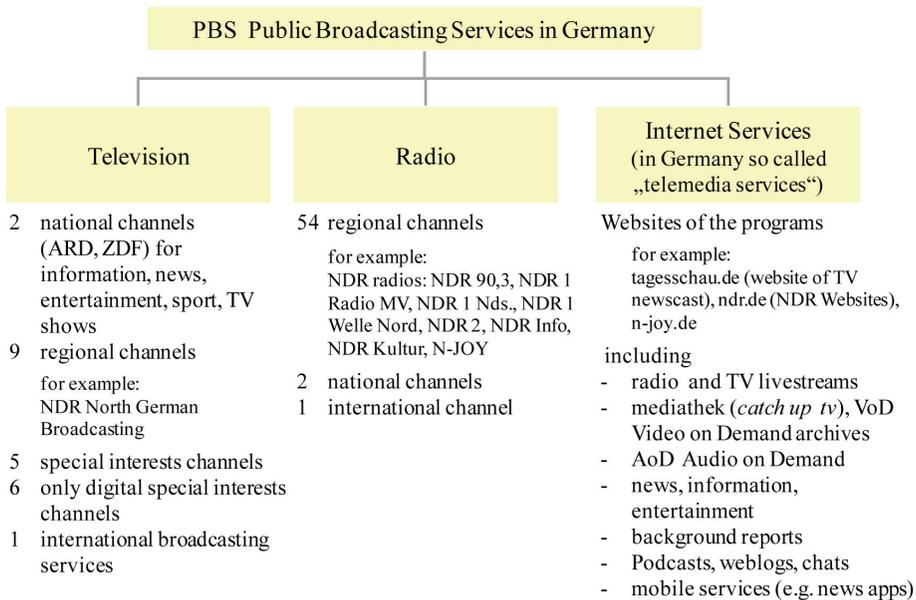


FIGURE I. *PBS Public Broadcasting Services in Germany.*

However, for the public to entrust public service broadcasters with new online and digital offerings, a special approval procedure is necessary (the so-called *ex ante Test*). According to the requirements of the Communication of the EU commission on the application of state aid rules to public broadcasting services, the test must include a Market Impact Assessment (European Commission 27.10.2009). This creates a conflicting situation with the EC competition policy.

THE EUROPEAN CONTEXT OF THE RESEARCH

The reason for the research project is the potential conflict that arises as a result of digital and Internet strategies of public service broadcasters and the competition policy of the EU commission. The public service broadcasters have introduced digital and Internet strategies in order to continue to appeal to Internet users in the future. The strategies are recommended because of structural changes in the media. The term *convergence* refers to structural change in the media. Such structural change takes place in the process

of digitalisation of the media and of the means of transmission, as well as through the development of the Internet. Concerning media convergence, the term labels a development process. Convergence is changing the markets as well as the value-added relationships between the companies of the so called “TIME” sector, that is telecommunications, information technology (computer technology), media, and entertainment (consumer electronics). The technology push due to media convergence, digitisation, and Internet development is connected with the market pull for social media and online media. The technology push causes a strong adjustment pressure and many innovations in the field of media.

In addition, structural change promotes the development of the European internal market for Internet applications, knowledge dissemination, e-commerce, and the free flow of information and services, as well as the media content and industry. An example is the “Digital Agenda for Europe”, which is part of the 2020 growth strategy of the European Commission. This is an example of how European economic policy-makers have recognised the economic importance of media convergence. Concerning advantages for households and businesses, the strategy emphasises the advantages of a single digital market, which may cause an acceleration of the speed of Internet access services (European Commission 3.3.2010: 23 et seq.). However, the authors’ research project stresses a further issue that should be added: because the media are concerned with technology and market development, this also increases the importance of European media regulation to guarantee the European values of *freedom of expression*, *media freedom*, and *pluralism of the media* (see Article 6 Paragraph 1 Subparagraph 1 TEU in conjunction with Article 11 Paragraph 1 and Paragraph 2 of the Charter of Fundamental Rights of the European Union; see also Dörr 2009).

Thus, one could suppose that the European Commission rates positively the digital and Internet strategies of the public broadcasting services. Such an assumption one could make, at least, insofar as the strategies contribute to the development of the digital and Internet economy and new online services. This view also indicates the priorities and key initiatives of the current 2020 strategy: regarding innovations through Internet applications and online services, the European Commission emphasises its objective of smart, sustainable, and inclusive growth. In addition, the commission emphasises the positive effects on the internal market. Moreover, the current strategic concept of the *Innovation Union* recognises the greater societal benefits that the public

sector can bring about. This applies for cases where the public sector can solve problems for which the markets have no satisfactory answers (European Commission 6.10.2010: 8, 25 et seq., 29).

However, with respect to the PBS, it is not certain that new PBS will be assessed positively by the European Commission. For example, the current 2020 strategy also emphasises the tasks of the competition policy of the European Commission. The tasks aim to create an open service market and favour trade across borders. Therefore, the Commission will propose measures to remove barriers in the internal market (European Commission 3.3.2010, p. 23 et seq.). This subject is relevant to the PBS in Europe, because the European Commission could assess the *public funding* of the PBS as an internal market barrier.

According to the European Commission, the financing of the PBS can lead to *mission creep*.¹ This concern of the European Commission refers mainly to the new digital PBS. Thus, there is potential tension between the digital strategies of the PBS on the one hand, and the targets of ensuring competition in and growth of the European single market on the other. The concern of the European Commission is based on the fact that the European member states finance the PBS through public funding (in Germany, for example, through license fees). This is not easily compatible with a market economy (see Article 107 TFEU). The state aid control by the European Commission has indicated in various cases that the financing method of the PBS is incompatible with the European internal market (for examples: European Commission 26.1.2010; 4.3.2011; 24.4.2007; Tosics et al. 2008). The member states are urged to ensure that public funding of new PBS digital and online services does not distort the trade and competition to an extent that is contrary to the common interest of the member states (European Commission, 27.10.2009).

1 Depypere/Tighelelaar (2004: 19) define *mission creep* as "[t]he process by which a mission's methods and goals change gradually over time." The term denotes the creeping expansion of a public service remitted by the contractors themselves.

RESEARCH PROJECT ON PUBLIC BROADCASTING SERVICES IN EUROPE

As the above overview should illustrate, there is a conflict situation in Europe that creates a need for research. It is appropriate to examine the impacts on the market caused by the digital and Internet strategies of the PBS and whether and the extent to which the digital PBS can be neutral in, and present obstacles to or drivers for the development of the European single market. If negative effects are expected on the market, they are considered in the context of a public value assessment. The public value assessment requires clarity about the objectives and contributions of the PBS relative to society. So an investigation of the institutions of Public Value Assessment is also necessary. The main focus is on the question of which institutions ensure a compliant European regulatory framework for the digital and Internet innovations of the PBS.

New audiovisual and online services for PBS

First, a description, analysis, and comparison of the digital service concepts for PBS in the European member states are necessary. Concerning the digital and online innovations of the PBS, one thesis is that growth and market dynamic are promoted by the PBS. They can do so through more innovations that enforce greater diversity and higher quality on the market. An additional hypothesis is that the competition between the PBS and privately operated online services can improve consumer welfare, insofar as socially relevant standards are ensured by the PBS in the markets. These standards must take private competitors into account if they want to be successful in the market. In addition, public broadcasting services promote the acceptance of education, democracy, and opinion-relevant content. They promote it if the majority of people, including younger people, are interested in the content.

The authors' research examines the thesis that the digital and Internet innovations for PBS are rather complementary offerings. In addition, the worse markets function as a result of market failures, market malfunctions, and societal objectives or journalistic standards, the more the possibilities exist for positive dynamic market effects of the new PBS.

Public value assessment

The term *Public Value Assessment* stands for the investigation of how the digital and Internet offerings of the PBS are regulated by objectives. In addition, we examine how the achievement of objectives is evaluated. We test the hypothesis that the objectives and operationalisation of the objectives are effective and efficient instruments to regulate the PBS (e.g. Bron 2010; Coppens 2006; 2005; Cox 205).

However, the possibilities for regulation of PBS by means of objectives and performance agreements should not be overestimated. The reason for this is that the objectives of journalistic quality are primarily relevant (e. g. Seufert/Gundlach 2012; Serong 2011; Künzler 2009; Zabel 2009; Ruß-Mohl 1994; Schatz/Schulz 1992). However, the journalistic objectives are multidimensional and difficult to operationalise. Moreover, the political independence of the public service broadcaster is desired. The independence also limits the possibilities of operationalisation of the objectives. Although, with respect to the objectives, the possibilities of control are probably very limited, there is a need to clarify what options exist for using the instrument of operationalising the objectives. Regarding this aspect, a comparative study proves very informative.

For example, to achieve a Public Value Assessment, politicians can make use of so-called *performance agreements* (also called *agreements on objectives and resources*). The study shows who is involved in such performance agreements. In addition, the study shows the function of the institutions that are involved in the performance agreements. A relationship analysis provides information about who rated the degree of objective achievement. Also, analysis of relationships is conducted within the framework of the comparison.

Editorial competition

Media are also a part of the political system of a democracy. This has important consequences for the institutional framework of the media business, which media management must take into account. For this reason the research project examined the hypothesis that due to the limited range of tools for the operationalisation of objectives, democratic procedures play a major role in ensuring the editorial and journalistic qualities. Therefore the project thus focuses on the procedures for ensuring editorial independence and journalistic

competition. With respect to PBS, we examined how the election of the supervisory body, board of directors, executive board, and editors of the public broadcaster are carried out in member states. Moreover, the hypothesis is checked that an external quality test (keyword: foundation for media tests) or an expert commission are institutional innovations. They are innovations, insofar as they can strengthen editorial competition on the Internet.

Market impact assessment

As outlined above, the European competition policy and state aid control has a very strong influence on the development of PBS. It is appropriate to examine the impacts on the market caused by the digital and Internet strategies of the PBS. Moreover and regarding European competition law, the hypothesis is that the market impact assessment is the central conflict issue. Therefore, the project investigates whether and the extent to which the digital PBS can be neutral, along with obstacles to or drivers of the development of the European single market. A comparison informs how the European member states deal with the market impact assessment. In doing so, the ratio of the market impact assessment to the public value assessment becomes a main topic. A further main topic affects the relationship between the exception area (public service sector) and the market area (commercial activities) of a PBS company (e. g. European Commission 29.7.2000).

METHODS OF RESEARCH

In order to carry out a comparison based on the above criteria, an interdisciplinary research is needed. In the framework of the interdisciplinary research, the findings and research methods of the economic sciences will be applied (theory of industrial organisation, structure-conduct-performance-paradigm, theory of competition and regulation), as well as those of public management (theory of public enterprises) and of communication science (standards for the quality of media) and information science (data model and database), also taking into account technical and legal aspects. The research thus compares the PBS concepts and the country-specific practice of regulation and procedures between the European member states.

DEVELOPMENT OF AN INFORMATIONAL DATABASE

The authors recommend a systematic, comparative research study on the PBS in Europe and its enterprises. The study should be based on an informational database, but how is the database built up? Each business domain consists of numerous things, activities and actors. The aim of modelling techniques is to recognise objects of relevance, group these objects to classes, describe these classes by their properties and uncover relevant relationships between them. The modelling process itself both supports the understanding of a business area and provides an input for a database structure.

During the first part of the project, we studied different types of expertise concerning online offerings of public broadcasters in Germany induced by the competition regulations of the European Union. We assume the existence of market-relationship models used by each expert. The understanding of the market-relationship model as the foundation of the argumentation of an expertise should make it comparable to others and offer a possibility to understand its relevance.

A market-relationship model consists not only of a set of markets. Mutual relationships of various types (e.g., adjoining, conjunct, upstream, part-of market) between single markets have at least the same importance for the relevance of such a model as the markets themselves.

Another important aspect of expertise in the context of the European competition rules is the study and comparison of offerings in the markets. The methods of market separation applied by the experts obviously become another aspect in the comparison of different kinds of expertise. A database structure was designed and implemented to store and manage the uncovered information in its structure and to make it accessible for further analyses. The aim of the second part of the project is to understand structures and processes of the public broadcasting systems on the level of nations of the European Union and to make them comparable. Political objectives, legal prescriptions and steering processes have to be uncovered and described in detail. An extended database structure to store the results is under development.

OUTLOOK

The study on the PBS in Europe and its enterprises will achieve information on the basis of the research, comparison, and exchange of information that supports independent and pacifying expertise for an area of society that is highly characterised by lobbying, conflicts of interest, and ideologies. For this purpose, a database will be developed, such that easy retrieval enables comparative information on service concepts and public value assessment, editorial competition, journalistic independence, and market impact assessment. At the present time, the project is proceeding with studying the structure of the European Member States' media systems. During this process, a generalised data model for media systems of European countries is created, implemented, and loaded with first data. The aim of the projected information base is to support the comparison of different media systems in the European Union. An important challenge is to merge it with the already mentioned database structure containing the market-relationship models.

On a European level, the project will lead to scientific information exchange, cooperation, benchmarking, mutual learning, and critical analysis of best practice examples. Therefore, the Consortium on Applied Research and Professional Education (CARPE) offers the opportunity for cooperation.

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MOTION CAPTURE

Art, Technology & Collaboration

Peter Twigg
Manchester Metropolitan University
p.twigg@mmu.ac.uk

Steve Hawley
Manchester Metropolitan University
s.hawley@mmu.ac.uk

INTRODUCTION

Dr Peter Twigg, a scientist/engineer, and artist Professor Steve Hawley, both from Manchester Metropolitan University (MMU), have been collaborating in the past year in the field of Motion Capture, the process of recording human movement via a suit fitted with sensors and transforming this into a computer useable form.

The possibility of a scientist/artist collaboration gives rise to new approaches which would be unlikely from a single perspective, and the aim of this paper is to explore these – the very form of the paper, with sections written by the artist and the scientist, reflects the disjunctions and synergies of the process. In particular the article explores the nature of the concept of the uncanny from the viewpoint of science and art. Masahiro Mori, the roboticist, saw the uncanny as a negative characteristic of lifelike machine forms, whereas artists, influenced by Freud's writings, on the contrary desire to exploit this aesthetic response.

Motion Capture has had many applications in recent years, but principally in the areas of video games and animated films where lifelike movement would be difficult and time consuming to accurately reproduce with traditional means;

the technology also throws up some other opportunities, for example in dance and performance as well as in sport and medicine. Interestingly, the history of Motion Capture predates the invention of motion pictures, and pioneering work was done in the late nineteenth century by figures who combined the interests of both the scientist and artist, inventing apparatus at the limit of available technology which look to us remarkably contemporary.

The origin of the collaboration was an approach from the Royal Opera House Covent Garden new media department, who were looking for ways of using new technologies to promote dance to a large audience of predominantly young women, engaged in or interested in classical ballet. The Royal Opera house is also the home of the Royal Ballet and we looked amongst other themes at some ideas involving motion capture, a specialism within the Science and Engineering Faculty. At that point Twigg and Hawley were looking at how motion captured dancing figures could be used to engage young female dance students who were also part of the videogame generation, to attract them as new audiences to the Royal Ballet at Covent Garden. It should be said that the idea of collaboration between two academics based in different Faculties in different buildings was unusual within the university, and had come about from informal contacts looking to see whether the technological resources available could be explored in an experimental way by artists and designers.

The first experimental results were obtained at the Northern Ballet School, which happens to be 200 metres from the main site of Manchester Metropolitan University, where Peter Twigg and his colleagues obtained capture data from a male and a female dancer engaged in a fairly extreme test of the capabilities of the motion capture suit. Looking at these results confirmed firstly that the capture suit could indeed cope with a range of extreme movement, and that this could be applied to other modes of performance.



FIGURE 1. *Recording motion capture data from one of the dancers, Nana.*

Steve Hawley's own background is as a video artist who has been making moving image work for exhibition in galleries and film and video festivals since the early 1980s, sometimes involving actors and performers. Seeing the ease with which performance could be captured but also translated in post-production to a variety of computer generated figures, suggested possibilities for an art video which used a performer/actor clad in a capture suit. Whilst artists and choreographers had used motion capture outside the Hollywood model of animated cinema, no-one else seemed to be utilising the captured performances of actors to exploit their uncanny presence in quite this way. At the same time this merging of art and science had echoes of the pioneers of motion capture in the latter half of the nineteenth century.

HISTORY

Étienne-Jules Marey was a physiologist and Edward Muybridge a photographer, but as the two key figures in the genesis of this field, their work was both an important precursor and a pointer to the future motion picture

camera and projector. Both these figures combined elements of the scientist/artist, but both had also had a profound influence on artists in the twentieth century.

Marey's work on human motion in particular was very influential on the art of the Cubists and Futurists who came after him. In 1882 he created his chronophotographic gun which was capable of taking 12 consecutive frames a second, where all the frames were recorded on the same picture. As well as conducting a famous study about cats always landing on their feet, he also studied human locomotion. In his earliest experiments the subjects wore black suits of metal strips or white lines as they passed in front of the black backdrops, and these have a remarkable similarity to the present day gyrosopic capture suit.



FIGURE 2. *Runner wearing Marey's capture apparatus.*

More or less at the same time, the British-born photographer, and later scientist Edward Muybridge, engaged in a series of photographic experiments, to settle a bet made by Leland Stanford the Governor of California and also a racehorse owner, as to whether all four horses' hooves were off the ground at the same time during a gallop. Up until that time most paintings of horses galloping showed the front legs extended forward and the hind legs extended to the rear.

Muybridge used a series of large cameras with glass plates placed in a line with the horse triggering the thread. The images were viewed in a machine called a Zoopraxiscope, which was another stage towards the film camera. Stanford won his bet with Muybridge's help, and later at the University of Pennsylvania Muybridge used banks of cameras to photograph people and animals to study their movement.

Muybridge's sequence of images was highly influential on the most ground-breaking artist of the last century Marcel Duchamp, who made an early series of paintings that were heavily indebted to Muybridge and Marey including *Nude Descending a Staircase Number Two* of 1912.

The present day technology of motion capture can be realised in several forms, which vary from commercial systems which cost several hundred thousand dollars, to newer systems which are much more affordable, and it is these newer systems which have made the techniques much more accessible to artists. The cheaper systems have limitations, but Twigg and Hawley's work with dancers has shown them to be capable of recording a wider range of movement than was they thought possible.

MOTION DATA CAPTURE

There are primarily two approaches to recording motion capture: electromagnetic sensors, and optical markers, which each have their benefits and constraints. With optical marker systems performers only have to wear reflective markers on their clothes. The optical approach does not provide real-time feedback, however, and the data from optical systems are error prone and noisy. The locating and extracting of a figure's motion directly from video when using optical systems is extremely problematic for various reasons, particularly due to occlusion of data points. Because orientation information is not directly generated, more markers are required than with magnetic trackers.

A subject whose motion is to be captured accurately, in real-world situations and in real time is typically instrumented in some way so that positions of key feature points can be easily detected and recorded. Electromagnetic tracking uses sensors placed at the joints that transmit their positions and orientations back to a central processor. To transmit their information, the sensors have to use either cables or wireless transmission to communicate with the central processor. The former requires that the subject be 'tethered' with some kind of cabling harness. The latter requires that the subject also carries a power source such as a battery pack. The advantage of electromagnetic sensors is that the three-dimensional position and orientation of each sensor can be recorded and displayed in real time.

Types of motion capture recording and analysis carried out using sensor based equipment has been generally limited to nondescript everyday movements such as walking and extracting dominant features of an actor's movements for application to a digital character. In this work, motion capture techniques were used to record, classify and analyse human motion of a more extreme nature: ballet. The motions of a subject were captured wirelessly by use of the Animazoo IGS-190 equipment which employs gyroscopic sensors about the body. The motion data captured is used: (i) to drive a realistic virtual character in real time, (ii) for analysis of motion features, and (iii) for development of performance design programmes. Conventional configuration of articulated body system is designed primarily for walking (for example see Coleman, Bibliowicz, Singh & Gleicher 2008 and Jain, Ye & Liu 2009). Application of the motion capture data for this project required the development of an extended character rig configuration and motion representation.

Data was collected using the Animazoo IGS 190 system and a virtual skeletal system defined from front and side photographs of the subject using Animazoo Autocal software. This produces a skeletal approximation that helps to eliminate positional drift in the subject when in motion. The skeletal system is a 26 joint system as defined within figure 1. The data is collected at a frame rate of 60fps or 60Hz. Translational data is extracted from 12 of the subjects' joints for the X, Y and Z axes. The translational data comprised of the left shoulder, left elbow, left wrist, left hip, left knee, left ankle, right shoulder, right elbow, right wrist, right hip, right knee and the right ankle, thus providing a 36 dimensional data structure containing the subject gait cycles.

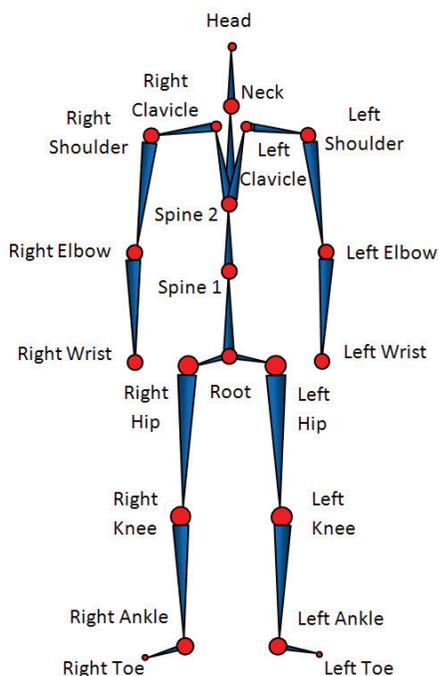


FIGURE 3. *Skeletal system for motion capture application.*

The motion capture suit is lightweight and flexible, but this was the most extreme movement that Twigg had attempted to capture with the suit and the initial concern was whether it would affect the dancer's movement in some way. After performing some test exercises though, the dancers reported that the suit was so non-restrictive that they were not aware of its presence.

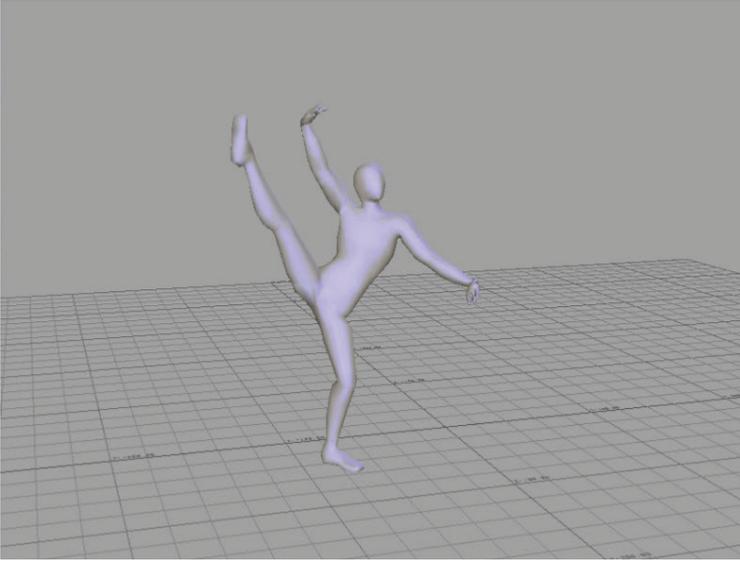


FIGURE 4. *Still image from real-time recording of one of the dancers, Nana.*

Viewing the results, above, led to Twigg and Hawley discussing the gulf between the real movement and that of the computer recorded avatar, which for the scientist Twigg was a problem to be overcome, but for the artist Hawley was an interesting possibility to be explored. Twigg then introduced Hawley to Mori's concept of the uncanny valley.

THE UNCANNY VALLEY

In 1970 the Japanese roboticist Masahiro Mori stated that as the likeness of a robot approached a real human being there was a sudden drop-off of the audience's acceptance of the humanoid shape and this changed to a powerful negative reaction, which he termed the Uncanny Valley (Mori 1970). But seven years after Duchamp had painted *Nude Descending a Staircase Number Two*, Sigmund Freud had published in 1919 his famous essay on the Uncanny, *Das Unheimliche*, which has become very influential on artists in the latter part of the 20th century, although was apparently unknown to Mori (Freud 1919).

There is something profoundly uncanny about a humanoid model which appears in many ways nonhuman, but whose movement is incredibly lifelike, which motion capture can achieve. The uncanny may be a deep instinctual reaction in the sense that it steers humans away from other humans who are dead or diseased.

Masahiro Mori's conjecture was that things that look very nearly human but not quite, such as a child's doll or a ventriloquist's dummy, can produce a highly negative response and for some reason the response is stronger with a moving object. However, this notion of the uncanny is not something that artists are seeking to reject, but in some ways are actively pursuing. For example in Ron Mueck's sculpture *Spooning Couple* 2005, he created two bodies at a half scale, which appear to be asleep but are actually profoundly eerie to us and produce a strong aesthetic reaction.

Motion capture has been utilised in many commercial motion pictures over the last 15 years, but the uncanny valley effect has been attributed to the failure of some of these, for example computer animated films like *The Polar Express* and *Beowulf* allegedly evaded success because the viewers found the dead eyed characters unsettling. In terms of the MMU collaboration, whilst engineers are interested in a perfected reality that is indistinguishable from real human motion and representational human appearance, it is precisely the marginal gulf between reality and the represented image that artists are interested in. It could be argued that up to the late nineteenth century the dominant viewer response sought by art was one of the sublime, whilst with contemporary art the desired reaction is the uncanny.

Freud explores the idea of the double – the doppelganger in all its nuances and manifestations. In Steve Hawley's video installation *Actor*, made with Peter Twigg and Andrew Brownridge, he created a doppelganger by putting an actor in a motion capture suit and "filming" him whilst he was reading a prepared text. At the same time an unseen director gives instructions to the actor to correct his performance. The text is from the final chapter in the UK edition of Manchester born author Anthony Burgess's book *A Clockwork Orange*, subsequently made into a film.

Stanley Kubrick based the film *A Clockwork Orange* on the American edition of the novel, which only has 20 chapters as opposed to the English edition which has 21. He omitted the final chapter, which is the redemptive chapter,

where Alex the ultraviolet droog decides that violence is not worth it and looks to the future and his unborn son. Actor is the film of the unfiled final chapter.

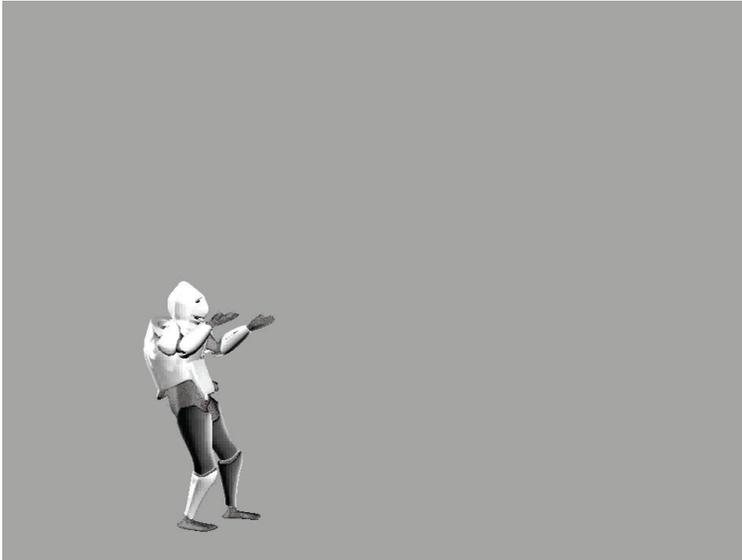


FIGURE 5. *Still image from Actor, Steve Hawley video installation.*

The effect of clothing the actor in the absurd knight in armour model whilst retaining lifelike human movement, as well as isolating the actor within an invisible grey setting, reinforces the sense of the uncanny. Having completed some tests, and one finished video piece for art exhibition, Twigg and Hawley were able to reflect on the nature of collaboration itself.

COLLABORATION

Collaborations between artists and scientists and engineers are not new – the Wellcome trust in England funded from 1996 a 10-year SciArt programme of collaborations between scientists and artists which involved 118 projects and £3 million funding. A review of the scheme found a number of lessons. Firstly that artists initiated and drove the majority of the projects, and that largely the artist produced the work with scientists in some way acting as patrons

(Glinkowski & Bamford 2009). It was true that the scientists and doctors were fascinated by the way that artists worked, but for the scientists professionally this SciArt scheme was seen as a marginal project – there were no instances of scientists initiating projects who would then get an artist on board.

It was difficult to make claims for any ongoing benefits to the scientists involved, or transformative effect on science, but where the collaborations had worked there tended to have been a lengthy period of familiarization and exchange over some years. Similarly the MMU collaboration has deepened and grown through Peter Twigg and Steve Hawley presenting at the CARPE conference together, as well as Steve Hawley's co-supervision of Peter Twigg's Ph.D. student. Both partners feel there is scope for future collaboration which explores this technology and which satisfies the needs of both scientist and artist whilst leaving an interesting space for exploration which is the liminal field between the two philosophies.

FUTURE DIRECTIONS

Possibilities include the classification of a specific vocabulary of ballet movements for dance choreography. Twigg and Hawley are looking at developing a 3D skeleton and human mesh with optimized real-time pipeline suitable for more extreme movement such as ballet. They could also make a comparison of dancers' motion data in real time with exemplar performance data for high level dance tuition.

Artists are already using motion capture in a variety of ways and have been doing since Duchamp painted *Nude Descending A Staircase*. For example within dance the technique has been used for the capturing of fleeting and unique dance or bodily movement performances e.g. Paul Kaiser and Shelley Escher of *Riverbed* with their work with the legendary dancer Bill T Jones in their piece *Ghostcatching*. Motion capture can translate human movement into music or abstract visuals, giving rise to synaesthetic performances: this was first done by the artist Oscar Fischinger with his *Lumigraph* in the late 1940s. More recently renowned U.S. choreographer Trisha Brown premiered "how long does the subject linger on the edge of the volume" in which music and visuals projected on a transparent screen reacted and responded to dancers in the piece.

In Steve Hawley's work in collaboration with Peter Twigg he intends to explore the uncanny by creating humanoid figures which are incredibly lifelike in terms of movement and yet cause dissonance in the viewer. This will include multiple human figures, human actors, who will be motion captured but interact in a subtle and undemonstrative way. But there is also the possibility to explore the idea of moving from that uncanny valley to a mythical resurrection and bringing to life the real substantive human body, as in Shakespeare's *The Winter's tale*, where at the end Hermione is presented as a statue to the court, then "magically" comes to life and walks down off her pedestal.

CONCLUSIONS

Collaboration between artist and scientist has been found to favour the former, but Twigg and Hawley are attempting to find a middle ground in the creative and technical exploration of motion capture, that is of equal value to both. The key issue of the uncanny is an interesting paradox, in that it is seen by the scientist as something to be overcome, but by the artist as a fertile field of aesthetic interest. Artists and scientists have different languages that often require simultaneous translation, and this paper is an attempt to meld these languages and still retain coherence.

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SHARING SIMILARITIES AND DISCUSSING DIFFERENCES

How Utrecht's international journalism students cross cultural borders

Els Diekerhof

HU University of Applied Sciences Utrecht

els.diekerhof@hu.nl

INTRODUCTION

The Utrecht School of Journalism has a long tradition in international higher education. The School's *European Culture & European Journalism* (EC&EJ) programme is an example of a pedagogical practice in higher education where advanced students learn how to perform in an international context. Journalism students from Moscow to Ottawa and from Helsinki to Bilbao learn alongside Dutch students. It is not only the content of the programme and the reporting for the Web Magazine that makes the EC&EJ programme an inspirational educational experience. The programme demonstrates the importance of sharing different professional and cultural values. This sharing and confronting of professional standards contributes to an important new qualification for all higher educated professionals: awareness of cultural differences and similarities.

CULTURAL AWARENESS

Internationalisation of the curriculum has become a standard in higher education. Since all professions nowadays operate in an international environment, universities of applied sciences know they have to provide professional knowledge and vocational training to prepare their students for

this international context. The 24/7 availability of the Internet and the increase of international professional communities on the social networks emphasises the globalisation of professions.

An important part of this international professional higher education is the concept of ‘cultural awareness’. Students have to understand the limits of their own cultural heritage and recognise the boundaries of their national professional practices. As professionals they will have to deal with international corporate cultures and therefore they have to develop an international mindset. ‘*Cultural awareness*’, not only an important professional competence to apply in the increasing international relations with foreign colleagues, is also useful in the national context, since most societies are becoming multi-cultural.

The curricula of higher education in journalism have always contained this international orientation, as it is the journalist’s job to report what is going on in the world. That includes foreign affairs and foreign reporting. To become a foreign reporter is a romantic dream for many journalism students. In the end, only a few students start a professional career abroad. However, education in foreign affairs, foreign reporting and cultural differences serves a broader goal than a job abroad. It contributes to key qualifications in journalism education, to fundamental journalistic attitudes: an open mind and curiosity about other people.

RESEARCHING AND REPORTING EUROPEAN CULTURE

The Utrecht School of Journalism of the Hogeschool Utrecht in the Netherlands offers several international courses and programmes: on foreign affairs and on foreign reporting for their own Dutch students, but also two international Minor programmes in English for young professionals and advanced exchange students from all over the world called ‘*Europe in the World*’ and ‘*European Culture & European Journalism*’.

The *European Culture & European Journalism* programme explores a variety of topics in journalism and culture. It provides skills for reporting on social cultural and cultural European issues and gives a solid knowledge base on important aspects of European culture from a journalistic viewpoint. First, the students take courses on subjects like ‘The European City’, ‘European Film & Fiction’ and ‘Europe and Islamic Cultures’. After six substantive courses,

the second part of the programme focuses on advanced journalistic skills. Workshops on Research, Photojournalism, In-depth Reporting and Writing Features prepare the students for an individual three-week reporting trip. The students then leave for a European city of their own choice, to gather information for three stories on cultural issues. The lecturers guide and coach them on the selection of their story ideas, their research and use of sources and, finally, on their articles and reportages. The final weeks of the programme the students produce and edit a Web Magazine.

The highlight of the programme is the presentation of the Web Magazine. The students have covered a broad range of cultural issues in the *European Culture Web Magazine*, from art in post-war Sarajevo, to a film festival on Palermo's beach, and from graffiti fights in Glasgow to French bakeries in Istanbul. Together, last year's students visited twenty European cities. The map on the front page of the multi-media Magazine shows which cities the students have visited for their reporting trips; clicks on the map bring the site visitors to the stories, pictures and audio reports.

STUDENTS FROM ALL OVER THE WORLD

The Utrecht School of Journalism has offered the *European Culture & European Journalism* programme for more than ten years now. What makes the programme special is that it has participants from all over the world. Approximately three fourth of the students come from preferred partners of the Utrecht School of Journalism in Canada, the US, Spain, Belgium and Germany. However, exchange and non-exchange students also come from other countries. Last year's group of 25 students counted eleven different nationalities: Dutch, German, Belgium, Finnish, Spanish, Basque, Russian, Mongolian, South Korean, Canadian and American. In earlier years, participants have also been e.g. Italians, Indonesians, Britons, Zimbabweans and Turks.

The programme is highly rewarding, but not only because of the courses, the lecturers and the foreign reporting trip. It is the international students themselves who add value to the professional learning. By sharing their beliefs and opinions, especially in the field of journalism, students learn about universal, international standards and cultural values, but also find out their liking for and attachment to their own, national, journalistic routines. They sharpen each other in the development of their 'cultural awareness'.

SHARING AND DISCUSSING

The booming of online media seems to have softened sharp differences in journalistic traditions and have created a more international journalism. But nevertheless, the different cultural and journalistic backgrounds the students bring along create an educational experience in journalism and culture you cannot learn from textbooks. This experience starts right from the beginning of the programme, when during the welcome meeting the students give their names, and notice that names are a cultural thing too. *Jin Di* from Mongolia has no other names and does not know the difference between a first and last name. And *Raquel* from Spain has two last names, one from her father and one from her mother. For future journalists, who more than other professionals know the importance of a remarkable name – since their name is their *byline and brand* – this is useful cultural knowledge.

Every country and culture has some behavioural aspects that seem ‘weird’ to others, and so has the Netherlands. During the first week of the programme, the Dutch students teach the other students how to ride a bike and explain to them this is the cheapest and fastest way of transport in the Netherlands. Bikes and biking are the conversation pieces in the first informal meetings and on the students’ *Facebook* page. Riding your own bike in Utrecht city becomes also an example of adapting to a foreign culture. Many stories the journalism students write about their first impressions in Holland are also about bike riding.

THE LANGUAGE OF SOURCES

A significant experience of the students is that not speaking correct English does not imply an intellectual or journalistic shortcoming. The students learn to understand the importance, and irrelevance, of language. During the first weeks of the programme, the workshop meetings are dominated by the contributions of the students from Britain, Canada, the USA and maybe one or two students from other countries who speak beautiful English. Of course, the lecturers stimulate all students to speak English and the native speakers are asked to speak slowly and articulate well. Nevertheless, in the beginning, students who are not so fluent in English are easily regarded as less smart and less advanced in journalism. By the time those students are acquainted with

the international atmosphere and dare to speak English with their own accent and errors, this opinion changes. The students discover that these advanced journalism students with moderate English language skills also have sharp journalistic observations, interesting presentations, beautiful story angles and so on. (By the way, the programme contains special workshops 'Reporting in English' for non-native speakers, so their English improves during the courses).

For those working in international groups with students from different continents, this observation might not be new or surprising. However, in the context of journalism practice this experience of a difference between language skills and intellectual level has a special meaning. The EC & EJ Minor programme also prepares for a career in international and foreign reporting. An important part of their reporting skills is to find the right and reliable sources for their news stories and features. If only correct English speaking sources are used in news stories, this leads to biased stories. Although it is obvious that when it comes to quick availability of sources, English speaking sources come first, the EC&EJ students are taught in this way to value the knowledge, opinions and experience of those who do not speak the reporter's language.

The students have showed this insight by preparing their reporting trips abroad professionally. They have arranged for somebody – mostly other students via *couch surfing* – who speaks both English and the national language to work as an interpreter during their interviews. Yet not all students immediately recognise the limited availability of 'understandable' sources. Last year a Spanish student only found out in Wroclaw, a large city in the middle of Poland, that even the highest officials in city hall did not speak English.

STYLE AND SPELLING

Guidelines for writing a feature article are another example of the developing of the awareness of different professional journalistic standards. It starts with a discussion about the format and content of a feature. The journalistic genre of the feature article is nowhere clearly captured, and every country seems to have a different opinion on feature writing. For example, in newsroom sessions the students discuss if and how personal a story may be (can you use the 'I' form?), if and how you add atmosphere to the stories and the use of straight facts.

A particular issue is the conversation about the differences between British and American English: do our student-editors have to correct 'harbor' to 'harbour'? For those talking and writing 'international English' this seems a minor issue, but journalism students from the United Kingdom, Canada and the USA have very strong opinions on this, which shows that word spelling is part of their cultural background and that spelling is important to future reporters. After these discussions on the differences, it is decided that the Magazine has an Anglo-Saxon based international feature format.

POWER DISTANCE

Dutch lecturers are used to Dutch journalism students who feel they know better and who dare to contradict their lecturers, to students who are critical and mostly alert. The used teaching methods promote that students have to think for themselves. One-way communication is avoided and students are challenged to ask questions. Dutch lecturers even take their students to the pub and have a beer together. However this open and approachable attitude of the EC & EJ lectures is confusing for students from those parts of the world that have more non-interactive lecturing and wider social distance. The Dutch score low on Hofstede's Power Distance Index, and so do Dutch lecturers. What journalism students also learn from this is that distance to other people and distance to more powerful people greatly differ per country. Again, this is not only important for developing a general sense of cultural awareness; this experience is very important for keeping the appropriate distance, which is a success factor in interviewing, a key activity in journalism practice.

FUTURE PROFESSIONALS

It is no news that the professional landscape in journalism has changed rapidly and enormously. Since most media are online now, all journalism students are taught practical skills and knowledge to produce cross media products, as for example the *European Culture Web Magazine* in Utrecht. Obviously all future professionals have to adapt to the 'digital age' and universities of applied sciences prepare their students for a changing, more international, labour market. As stated earlier, and illustrated by the example of the EC&EJ programme, this also brings along the need to develop cultural awareness, to

recognise the cultural and national aspects of professional values and customs. The international students of the EC&EJ programme have shown that meeting future colleagues in 'real life' really contributes to this important professional attitude.

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EDUCATION, CRISES AND COMMUNICATION

An interactional analysis of hidden crises

Annette Klarenbeek

HU University of Applied Sciences Utrecht

Annet.klarenbeek@hu.nl

INTRODUCTION

In which way can we create general awareness of a hidden crisis and try to understand the dynamic nature of interactions? Until now, this issue has been partially or insufficiently addressed. The hidden crisis is an interesting topic of study, because not much is known yet about this type of crisis in comparison with the acute crisis. Ambiguity conceals the hidden crisis, because the problem is difficult to define in view of the complexity and versatility of the different interpretations of hidden threats.

I will examine the ways in which a hidden crisis can be exposed from a communication point of view. Therefore, this examination of the concept of crisis entrepreneurship is also relevant to communication professionals. The article is in the form of proto-research and will shed light on the dilemmas experienced by crisis entrepreneurs and the interactional solutions they apply to cope with such dilemmas.

With the help of discourse analysis, I examine the interactional achievements of the founders of a social movement who expose a hidden crisis in the domain of education in the Netherlands. To be more precise, I analyse how crisis entrepreneurs use discursive practices

- to show *the factuality of the problem*
 - (is the presented problem too theoretical or not an actual problem?)
- to present *the credibility of the messenger* as an authentic, legitimate spokesman
 - (crisis entrepreneurs may be accused of wanting to attract attention to their own cause)
- to provide *a solution perspective*
 - (crisis entrepreneurs can be accused of nursing personal grievances or of drawing attention to the issue without actively attempting to solve it).

A crisis entrepreneur, i.e. a whistleblower or a social movement, throws a rock into a pond, the effect of which – creating commotion – is of particular interest. The visible effects generated as a result could be light ripples or a substantial splash. It requires considerable effort on the part of crisis entrepreneurs to succeed in drawing attention to a crisis. They have to make sure that people acknowledge the fact that crisis entrepreneurs do not act with their self-interest in mind, but aim for a solution to a particular crisis. Crisis entrepreneurs may be confronted with different interactional challenges and problems in their endeavour to expose a hidden crisis. My research question is the following: *What are the interactional problems encountered by crisis entrepreneurs who intend to bring forth a crisis and how do they solve these problems?*

A crisis is successfully addressed when the scope of the message's manifestations has been extensive and when the surroundings have, indeed, picked up the signal. In this article, 'scope' is, on the one hand, defined as a mediametic event during which media are taking over the signal. On the other hand, 'scope' is defined as a social diffusion phenomenon whereby surrounding groups respond adequately to the emergency.

THE BON CASE

In this paper I take a look at how people express their concerns about certain developments in the domain of education in the Netherlands. For this purpose, I have examined a specific form of expression by a social movement: a public statement from the Association for Better Education in the Netherlands (*de*

Vereniging Beter Onderwijs Nederland), hereafter referred to as 'BON'. In this manifest, titled 'Education is a sinking ship', Ad and Marijke Verbrugge claim that education innovations have caused a crisis in Dutch education as a whole.

BON was initiated in the beginning of 2006 with the purpose "to enhance and stimulate as effectively as possible the development and opportunities of pupils and students by means of profound subject-matter and general education" (BON, 2006). In their manifest, the authors Ad and Marijke Verbrugge criticise the implementation of innovations in education since the Dutch Education Act of 1968.

I will discuss which interactional concerns the BON association demonstrates in its manifest. What are the dilemmas that have arisen and what are the solutions that this movement applies in order to handle these dilemmas? Moreover, I have included responses from the media in order to examine whether they recognise the interactional problems encountered by crisis entrepreneurs, as well as the solutions that they have constructed.

BON claims to be independent and not involved with carrying out any political and/or ideological orientation. According to BON, its objective is to work around existing structures. Ad and Marijke Verbrugge's manifest plays an important role in the recent public debate on education innovations and 'the new learning phenomenon' as a didactic concept.

The manifest was published in June 2006 in *NRC Handelsblad*. It is remarkable that the authors of the manifest had plenty of exposure – half a page – in this Dutch quality newspaper for the integral print of their manifest (the original length consists of 4,565 words).

DISCOURSE ANALYSIS

The research was carried out with the help of discourse analysis, a method greatly advanced by Potter and W. Wetherell (Potter & Wetherell, 1987, 1993, 1994, 1995, te Molder, 1999, Potter, 2004). Discourse analytical research has defined the different rhetorical strategies that people apply in their interactions with others. In everyday conversation, people perform all kinds of actions with their language, such as creating and building identity, offering judgements and displaying neutrality. From a discursive point of view, the analyst examines

how psychological issues are made relevant in everyday interactions. Discursive psychology (DP) is concerned with the rhetorical and interactional features of discourse (Edwards, 1997; Edwards and Potter, 1992; Potter, 1996). Discursive psychologists analyse discourse as the social practice of everyday life rather than treating it as a result of mental processes (for a detailed discussion on talk and cognition, see te Molder and Potter, 2005). DP explores how psychological themes, such as identity, are handled and managed in discourse. Utterances are not explained in terms of underlying mental structures (for example attitudes or motives), but through analysing what people do with these utterances.

ANALYTICAL PROCEDURE

For the purpose of this research on the interactional achievements of crisis entrepreneurs, it is relevant to discover the dilemmas they encounter in their interactions.

1. Which opposing or alternative version is undermined or contradicted by the description in question?
2. How do recipients, in this case the newspapers, handle the message of the description?

“One of the most important features of descriptions is their could-have-been-otherwise quality” (Edwards 1997, p. 8). In other words, no description of something is the only one that is possible or reasonable, as “language is based on the choices a speaker or writer makes and all descriptions have certain implications thanks to the fact that there always alternatives” (Sneijder & te Molder 2010, p.10). As a consequence, the type of reality description a speaker or writer may ‘choose’ to give depends on the purpose behind his/her description (Edwards & Potter, 1992, Te Molder, 1999).

In reference to the second question, I have compared the source fragments with the responses given. The response is used to check whether or not the ‘strategy’ has been apprehended. For this purpose, I have examined the information that newspapers have collected from the statements made by the authors of the manifest.

It is important to use a combination of rhetorical analysis, in reference to the first question, and the meaning given to the message by its recipients, in reference to the second. The problems that writers encounter may give us inside information on their strategy; also, if we can identify the strategy applied by them (which might be reflected again in the responses), it would prove that we have been able to identify the correct problem: what do writers gain or lose in their interactions and which problems do they encounter in this process? Eventually, this should enable me to identify the authors' dilemmas in their manifest.

The analytical principles adopted in discursive psychology leave room for the fact that a crisis is not something that is 'out there' but is brought to relevance in an interactional way. I examine in the following excerpt the way BON deploys strategies to raise awareness of a crisis:

1. Public education fails to motivate, its effectiveness is too low and
2. a lot of money is spent in all the wrong places. That is why the education
3. innovations in the last years should be reversed: students
4. must study again, teachers must go back to teaching. A manifest
5. from the chairman of the Association for Better Education in the Netherlands.

...438 lines omitted until the end... (NRC Handelsblad 6 June, 2006)

The elucidation opens with a list of disqualifications: *Public education fails to motivate, its effectiveness is too low and a lot of money is spent in all the wrong places* (1st and 2nd line). This formulation consists of three parts that jointly compose the statement. This type of formulation is known as 'Three-part lists', a term defined by Gail Jefferson (Jefferson 1990 in Potter 1996). Such three-part lists are often used to present matters as generally occurring events; it is an example of something that is generally true. The authors therefore do not confine themselves to a single problem definition, but instead they describe the entire abominable state of public education. It already starts in the first line of the story, in which they describe the world as it is: a dramatic state of affairs. As a result, they present a complete and actual picture of the crisis in public education.

The authors use the formulation *a manifest from the chairman of the Association for Better Education in the Netherlands* (5th line). The role of chairman suggests that the matter has been intensively contemplated and discussed in a formal setting. It implies that these are the words of a chairman representing the range of thoughts from an association active in this field. It conveys the image of a chairman explaining matters on which consensus has been reached within the association and his willingness to work for better education on everyone's behalf, including the reader's.

The strategies the authors utilise indicate that they are struggling with wanting to position themselves as a group with a message, which also represents a widely felt problem. To be motivated as a receiver and a participator, it is also necessary that one can identify with the movement (Stekelenburg, 2006). It is therefore crucial that the writers are not placed above the situation, but that the collective is responsible for "teaching us" and gives voice to a mellow majority. Because the writers pose the problem as clear and relevant to everyone, they create their existence.

RELEVANCE TO COMMUNICATION PROFESSIONALS

It is interesting to examine the statements made by crisis entrepreneurs, because they are special players in public debates. They give signals to the authorities in charge and try to recruit supporters for their views. They seek publicity by giving interviews or writing letters to newspaper editors; on the one hand, they try to generate attention to a potential danger and, on the other hand, they also want to warn and convince others. However, because they are often ahead of the game, their signals are often misunderstood or not recognised at all. This is unfortunate, because crisis entrepreneurs can make important contributions to making problems transparent.

Crisis entrepreneurs can be considered positive and dynamic elements in society, because they present views from which organisations are able to learn. Taking their signals seriously enhances an organisation's ability to identify a crisis at an earlier stage. In addition, organisations should be able to see this type of crisis as an opportunity for innovation.

CONCLUSION

A communication professional is able to recognise a problem raised by crisis entrepreneur. A communication professional can therefore contribute to the recognition of crises by acknowledging that a crisis entrepreneur is someone who can have a strong hand in the public agenda, i.e. public affairs that are important to the authorities. In fact, we could consider crisis entrepreneurs to be part of the 'early warning system' of something that is possibly going to happen in the dynamics of public opinion. It would enable the authorities to anticipate events and possibly also to establish contact with crisis, which would make their responses more effective.

The problems of the definition of a crisis are not only about the content (is the crisis real?), but also interactional (how will I get people to accept the urgency of the problem?). For example, by presenting a problem urgently one can be accused of being too emotional or having an image problem, which would draw attention to the crisis entrepreneur and not the problem. Thus the signal can be lost and the crisis can go on. Communication professionals can learn by trying to understand these interactional dilemmas or help by picking up crisis signals earlier and by assessing their relevance and urgency. Therefore, communication professionals can be creative allies of crisis entrepreneurs, who themselves can be considered as dynamic elements in society.

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