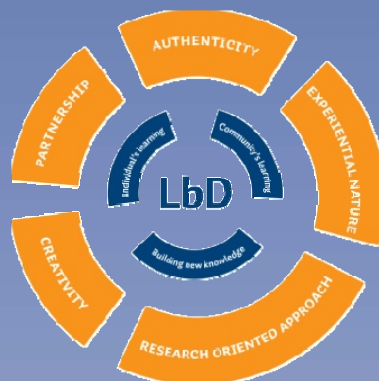
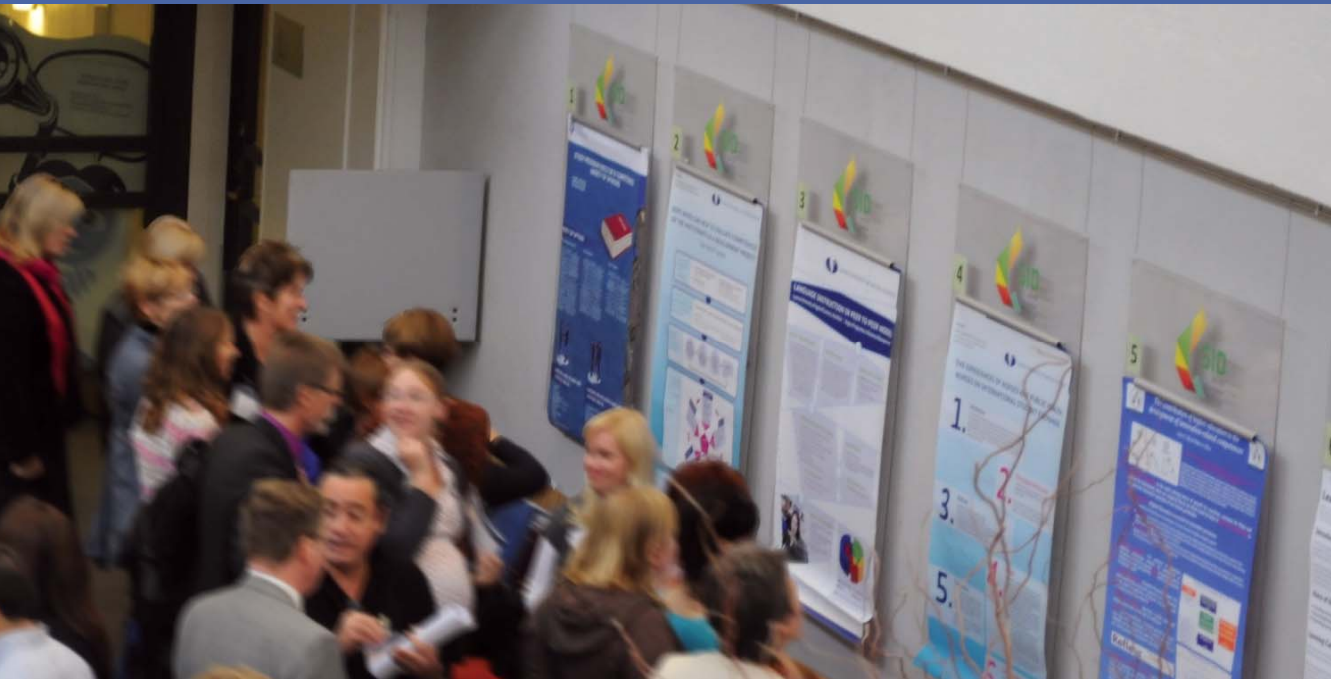


Outi Kallioinen (ed.)

# LEARNING BY DEVELOPING - NEW WAYS TO LEARN

Proceedings of the 3<sup>rd</sup> Conference  
on Future Expertise in Higher Education  
October 12<sup>th</sup>-15<sup>th</sup> 2010, Finland  
Laurea University of Applied Sciences



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2011 Vantaa

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# Foreword

The theme for the Learning by Developing (LbD) – New Ways to Learn Conference in 2010 was **Future Expertise in Higher Education**.

In the knowledge-driven global economy higher education is becoming the most important driver for economic competitiveness. In higher education institutions there is a strong and evident need to increase employment skills and produce more and more competent experts for future working life. Today's forward-looking society eagerly tries to determine what kind of employee qualifications and characteristics are of best value in building and developing organisations in times of effectiveness and great turbulence. However, the concept of expertise is changing rapidly and it is no more so clear to define who the expert is and on what grounds. Higher education institutions are focused on future-oriented curricula for the students and emphasize the assessment of learning outcomes in order to produce qualified and competent graduates. The key questions are: How to develop competence? How to assess learning outcomes? How to enable student-centric R&D&I? In order to co-create some answers it was extremely fruitful to meet with almost 170 colleagues around the world to disseminate research and development results and share their insight and perspectives in these challenging questions on the conference theme.

At the conference there were four thematic workshops, to which the 43 abstracts had been selected using double-blind review process. In the presentations the participants shared their ideas and research results followed by lively discussions. The workshop sessions addressed the following themes:

**(a) Competence Development:** Competence Development: The requirements and recruitment criteria of working life emphasises competences rather than contents of the graduate certificate. This shapes the curricula as well as teaching and learning methods of higher education institutions and the choices made by students in their studies. This session focuses on competence-based curricula, learning and teaching environments, methods and models concentrating on competence development.

**(b) Assessing Learning Outcomes:** Assessment and evaluation are important not only from the point of view of quality assurance of higher education, but also for the competence development of an individual student. In the modern ways of competence development learning takes place in various forms and learning environments. This sets challenges for uniform quality and equal assessment. How can we ensure that the set targets for learning outcomes are met - or assess how well they are met? This session focuses on different methods and tools for assessing learning outcomes and competence development, as well as evaluating the suitability and efficiency of teaching methods.

**(c) Multicultural Expertise:** Globalisation highlights the importance of multicultural expertise as a competence of a new graduate. Intercultural communication skills, knowledge of cultural differences and understanding the importance of



cultural background in behaviour, values and decision-making are needed in the working life increasingly. How can multicultural expertise be acquired or developed? This session focuses on delivery of curriculum, learning methods and environments developing multicultural expertise.

**(d) Student-Centric R&D&I:** Research, development and innovation are central and essential part of the activities of higher education institutions. Student-centric R&D&I, where students are in a central role generating and managing R&D&I and creating innovations and solutions, is still perhaps rare. The future vision is genuine student-driven R&D&I. This session focuses on student-centric R&D&I in producing new knowledge and competences.

As there were no articles for the workshop of multicultural expertise this conference publication is divided into three sections and in each section the articles will more profoundly open up the ideas and results that were presented in the short presentation or posters at the conference. The publication does not cover the entire workshop programme as we could only fit into this publication the articles that arrived by due date.

On behalf of Laurea University of Applied Sciences I wish to thank most warmly all the contributors of these conference proceedings and wish all the readers enjoyable moments with this publication. I believe that we all can find new thoughts and ideas to be further developed in our own context.

Vantaa, 2011

**Outi Kallioinen**

Development Director, Ph.D., Adjunct Professor  
Laurea University of Applied Sciences



# I COMPETENCE DEVELOPMENT

**Competence development:** The requirements and recruitment criteria of working life emphasises competences rather than contents of the graduate certificate. This shapes the curricula as well as teaching and learning methods of higher education institutions and the choices made by students in their studies. This session focuses on competence-based curricula, learning and teaching environments, methods and models concentrating on competence development.

# THE CONTRIBUTION OF HIGHER EDUCATION TO THE DEVELOPMENT OF INNOVATION-RELATED COMPETENCES: A GRADUATES' VIEW

Luis E. Vila & Pedro J. Pérez  
University of Valencia, Spain

## Abstract

This paper examines the relationship between the educational resources applied during study and the development of competences related to innovation by university graduates in Spain. The data comes from the European graduate survey REFLEX and includes about 5500 individuals. The inputs, combining with students' effort, are represented by the methods of teaching and learning used in higher education. The outputs are the development of four professional competences required to innovate productively. The research hypothesis is the presence of statistically significant relationships between the development of innovational competences by graduates and the methods of teaching and learning used. The relationships are modeled through a set of stochastic frontier equations with the development of each competence as the dependent variable. The input variables are the prevalence of diverse methods of teaching and the amount of time graduates devoted to study. The equations also include controls for programme and individual characteristics. Estimates show evidence of significant relationships between the development by graduates of competences to innovate and the methods of teaching and learning they were exposed to during their university years. Proactive methods in general, and problem-based learning in particular, appear as the most effective way to develop the competences required to innovate.

## Introduction

Productive innovation, broadly understood as the mobilization of newly-available knowledge into the production of goods and services, has become an essential mechanism to explain success in business and, ultimately, the growth of economies. Innovation appears as the major force behind productivity gains, and therefore behind increases in living standards, in developed countries during the last three decades. The improvement of productive efficiency, quantified in aggregate terms as TFP gains, emerges mainly as a result from continuously applying new technologies and more efficient modes to organize production. Consequently, it is worth to extend and to deepen the economic analysis oriented to obtain a better understanding of innovation processes, that is, of the procedures for the generation of new knowledge and of the mechanisms through which they spread and, finally, are applied to productive, market-oriented activities.

The education of the workforce, and particularly higher education, is at the root of the original ideas generated and applied in the economies from which the technological and organizational developments arise. The diffusion of innovation also appears related to the availability of a sufficient number of people suitably instructed and in possession of updated professional competences to apply newly-available knowledge (Knabb and Stoddard, 2005). The strategic nature of education regarding innovation processes, nevertheless, have been largely ignored by the economic theories on endogenous growth. The most remarkable exception is the model proposed and partially developed in a recent paper by Lucas (2009), where productivity evolves depending on the ability and effort individuals devote to seek for and to process new ideas, which in turn depends on their own educational investments, and on the average quality and diversity of ideas in the economy, which depends on aggregate educational investment.

The creation and transmission of knowledge is the main function of higher education systems. Individuals, and society at large, devote a substantial volume of resources to universities and other higher education institutions because they are thought to exert a decisive influence on the aggregate capacity to innovate and therefore in aggregate productivity. Universities and other higher education institutions influence productivity through innovation in two main ways. First, a substantial proportion of the effort in research and development, both basic and applied, is made within the higher education system. Second, higher education institutions instruct future workers for industry and services, including those that will professionally work on R&D activities.

The professional competences acquired by the flow of new graduates emerging from higher education institutions into the labour market each year can be conceived as an expression of the multidimensional output obtained from the resources devoted to the higher education system. New graduates bring into the market their human capital in terms of the competences developed during their studies, thus increasing the volume of resources that is used to generate economic output. Among other competences, new graduates bring in the specific capacity to generate productive innovation at the workplace by creating new knowledge, or adapting knowledge recently achieved by others, and using it to perform their tasks and responsibilities in ways that increase their productivity.

Our basic assumption is that the potential for innovation of higher education graduates is a key determinant both of their professional success and of total efficiency of the production system. Therefore, higher education, as far as it constitutes an individual and collective investment, can and should contribute to develop in students the specific competences related to their potential for productive innovation at the workplace. Higher education must contribute to equip graduates with the capacities required to gain productivity by generating or adapting new knowledge and making the decision to use it along with other resources, available but previously not used, in the daily development of their tasks and professional responsibilities.

Within this context, our research question is to identify the mechanisms that channel the contribution of higher education to the development by graduates of the competences specifically required to innovate productively while performing their job tasks and responsibilities. To do so, we examine particularly the relationships between the teaching and learning modes used in higher education and the level of development reported by graduates with respect to certain professional competences that promote their capacity to generate and continuously apply new knowledge while developing their professional careers. The results of analysis, carried out by means of the estimation of diverse econometric models, illustrate how the acquisition by graduates of the competences related to innovation depends crucially on which were the modes of teaching/learning they were more exposed to during his trajectory as students, keeping constant other relevant elements involved in the educative process.

The article is organized as follows. After the introduction, section two outlines a conceptual framework to model the acquisition of competences to innovate as an output of the process of higher education. Section three describes the data set, the selection of variables and the econometric procedures applied. Section four shows and discusses the main results. Finally, section five compiles some concluding remarks to the study.

## The development of competences to innovate as an output of higher education

Economic theory postulates that people reorganize constantly the allocation of the resources under their control as a response to the changes in the surrounding economic conditions. Under the so-called *disequilibrium theory*, formulated by Schultz (1975), the efficiency of such responses depends crucially on the *allocative ability* of individuals, which, in turn, is influenced by the education received and the experience accumulated by each one. The basic idea is that better educated individuals are more productive in their economic activities as a consequence of their higher capacity to perceive and to evaluate the changing economic conditions around them, so they are able to obtain advantages by recognizing earlier the situations where disequilibria, either in the markets of input factors or in the markets of final goods, take place. Earlier recognition of disequilibria allows educated people to be more efficient when reallocating their resources in the path to regain equilibrium.

According to this argument, the capacity for productive innovation is the main component of the *allocative ability* needed to evaluate accurately the economic conditions, generate advantages by using new knowledge in production and, consequently, to gain efficiency whenever they reallocate their resources. Productive innovation appears in this light as a process involving a sequence of activities that are undertaken continuously through the life cycle of individuals and may reach professional, economic and personal environments. To innovate productively, it is necessary, to accomplish a sequence of four different activities. First, to perceive the situation and realize the chance, or recognize the need, for improvement (detection); second, it is necessary to create, develop, or find out and adapt, a new idea that can tentatively solve the problem (acquisition); third, it is necessary to evaluate the new idea as a better solution compared to the old ways of doing things (evaluation); and finally, fourth, it is necessary to apply resources according to the new solution and, therefore, generate an increase in productivity (reallocation). In order to be able to perform these activities, individuals must possess the required capabilities. We believe that higher education contributes, up to an extent, to build up the competences required to detect chances, find solutions, evaluate them, and allocate their resources accordingly; further, we believe that the modes of teaching and learning used during studies are crucial to develop in graduates the competences required to innovate (CTIs).

Graduates' development of those CTIs by means of higher education can be understood as the result from combining the educational resources deployed at higher education institutions with the personal resources of the students, including their effort and dedication to study, and the skills acquired before higher education, as well as their natural talents (Hartog, 2001).

The amount of educational resources that higher education institutions provide to students may be evaluated through monetary measures such as the average expenditure per year per pupil. In this paper, however, we adopt a more qualitative approach by addressing the emphasis made on diverse teaching and learning modes during higher education after controlling for the type and length of the programme completed as main predictors for the volume of material resources applied to each student. The human capital resources students devote to their education are assumed to have two components following the literature on education production (Todd y Wolpin, 2003). The first one, historical, consists of the resources applied to the education of students in all stages prior to higher education; the second component, contemporary, consists of the behaviour deployed by students during their higher education years, and can be evaluated in terms of the time, effort and dedication they devoted to their higher education studies.

Finally, the choice of a specific functional form to relate input and output in the context of educational production is a relevant one because it establishes restrictions on the type of analyses that can be performed and, consequently, on the scope of the conclusions that can be reached and on the policy implications that can be derived from them (Worthington, 2001). In this paper we propose, first, the use of stochastic frontier linear models (Aigner, Lovell y Smith, 1977). Stochastic frontier equations with a composite formulation of the error term allow us to estimate the marginal effects of diverse input factors taken into account, and testing for, the possible in-

fluence of unobserved heterogeneity among individuals. Second, we replicate the analysis using variance components models (Moulton, 1987) to take advantage of the nested nature of data to clarify the effects of the type of programme completed.

## Data, selection of variables and econometric procedures

The data come from REFLEX (*The flexible professional in the knowledge society*), a graduate survey including some 40,000 individuals of fourteen countries who graduated from higher education institutions in 1999/2000 and who answered the survey questionnaire in 2005 ([www.reflexproject.org](http://www.reflexproject.org)). To analyze the production function relationship between the prevalence of diverse teaching and learning modes and the development of CTIs by means of higher education we use the information corresponding to some 5400 individuals who graduated from Spanish universities. REFLEX includes questions about graduates' higher education, transition to education to work, earlier career stages, and current professional situation. It also includes a chapter about competences where respondents were asked two questions regarding a list of 19 capacities:

- A. *"How do you rate your own competence level?"*
- B. *"What is the required level of competence in your current work?"*

REFLEX-Spain and PROFLEX questionnaires include an additional question:

- C. *"What was the contribution of the programme completed to your competence development?"*

Answers to the first question may be viewed as a self-assessed measure of the human capital accumulated, in terms of competences, by graduates at the time of the interview. Answers to question B inform us about graduates' view on the human capital requirements of their jobs in terms of competence. Answers to question C contain graduates' evaluation of the value added by their higher education to their human capital equipment in terms of competence. We use the answers to question C to evaluate the output of the education production function in higher education, where diverse combinations of teaching and learning modes are applied within diverse study programmes to students from varied backgrounds and who behave in different ways.

Figure 1. Contribution of study programme to competence development. Mean values.



From the list of 19 items, we focus on those competences directly required in order to perform the sequence of activities involved by the innovation process.

Activity	Competence directly required to perform it
Detection of chance	Alertness to new opportunities
Acquisition of new ideas	Ability to come up with new ideas or solutions
Evaluation of ideas	Willingness to question the own and others' ideas
Resource reallocation	Ability to mobilize the capacities of others

The relationships between input and output are modelled through a set of stochastic frontier production function models where the dependent variables are graduates' views about their development of each CTIs described above. The general model can be written as

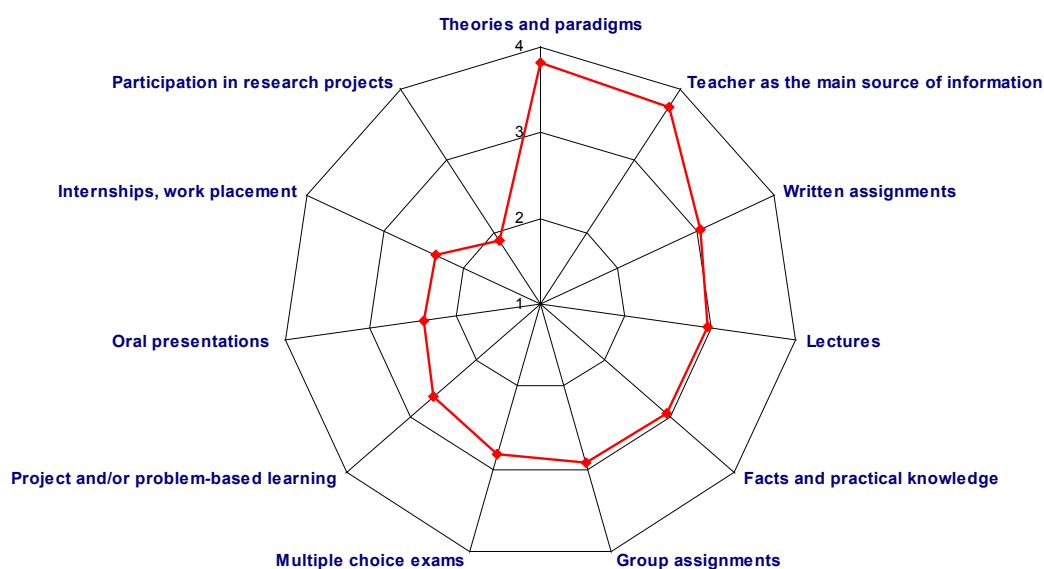
$$E_i = f ( M_{ik} , C_i , H_i , S_i , A_i ) + ( u_i - v_i )$$

where  $E_i$  expresses educational output in terms of the contribution of higher education to the development of a particular CTI by individual  $i$ ,  $M_{ik}$  is a vector representing the emphasis made on of each one of  $k$  teaching-and-learning modes during higher education,  $C_i$  stands for the type of programme completed,  $H_i$  represents the effort devoted by graduate  $i$  to higher education studies,  $S_i$  expresses prior educational investments, and  $A_i$  contains personal characteristics. The term  $(u_i - v_i)$  is an error term with two components: the first one,  $u_i$ , is a random noise term normally distributed, and the second one,  $v_i$ , is a term of unobserved ability with a positive, half-normal distribution; the distribution of the component reflects the notion that higher education students are selected from the right-hand side tail of the unobserved distribution of natural talent among the population.

Figure 2 shows the average value of Spanish graduates' responses to the question on the emphasis made in diverse teaching and learning modes used during higher education studies. Individual responses enter the models as explanatory variables representing the educational input in the production of competence in higher education.



Figure 2. Modes of teaching/learning used in higher education. Mean values.



As students are exposed to the different modes of teaching and learning within diverse study programmes, implying differences in the volume of material resources applied to educate them, the type and length of the programme completed by each graduates should also be included as explanatory variables in the equations. Descriptive statistics of the type and length of study programmes completed by graduates have be

Table 1. Length of programmes completed and fields of study (1 digit)

	Mean	Std. Dev.
Short cycle programme	0.43	0.50
<i>Field of study (ref. Education)</i>		
Economics & business	0.19	0.39
Education	0.12	0.32
Technical	0.19	0.40
Health	0.10	0.30
Humanities	0.10	0.30
Law	0.06	0.24
Science	0.11	0.31
Social science	0.11	0.32

To represent the effort devoted by graduates to higher education studies we select the number of study hours per week, a dummy for full-time students, and the answers in Likert scale (1-5) to two questions about graduates doing extra work above that required to pass the exams and about striving for the highest marks during higher education students. Prior educational investments are represented by the marks obtained in secondary education and the educational level achieved by the parents of each graduate. Table 2 summarizes these variables as well as the age and gender of graduates.

Table 2. Effort during studies, background and personal characteristics

	Mean	Std. Dev.
Average study hours per week	37.44	16.74
Full time student	0.83	0.38
I did extra work above that required to pass	3.44	1.00
I strived for the highest possible marks	3.79	1.01
Marks in secondary education	2.82	0.92
Father with higher education	0.24	0.43
Mother with higher education	0.17	0.37
Age	30.53	3.32
Woman	0.66	0.47

## Estimation results

The development of each CTI has been measured in three ways using the graduates' answers to question C: absolute level of competence development, development relative to individual-mean development of the other three CTIs, and development relative to the individual-mean development of the remaining 15 competences included in Reflex. By expressing the development of a given competence in deviations we mitigate the effects derived from subjective response. The three measures enter as dependent variables in three separate stochastic frontier equations with the explanatory variables, namely Equations 1, 2 and 3. Accordingly, we can estimate the marginal contributions of all input factors to the development of each CTI as well as the effectiveness and specificity of such marginal contributions. The main estimation results have been consolidated in the four panels of Table 3.

**Table 3.-**  
**Estimation results for the contribution of higher education to development of CTIs (z-values)**  
**Absolute contribution (Equation 1), relative to other CTIs (Equation 2) and relative to the rest of competences (Equation 3)**

	Alertness to new opportunities			Ability to come up with new ideas or solutions			Willingness to question the own and others' ideas			Ability to mobilize the capacities of others		
	Equation 1	Equation 2	Equation 3	Equation 1	Equation 2	Equation 3	Equation 1	Equation 2	Equation 3	Equation 1	Equation 2	Equation 3
Group assignments	0.80	-3.25 *	-0.93	4.54 *	1.15	3.26 *	3.08 *	-1.37	0.84	5.33 *	2.47 *	2.94 *
Lectures	2.22	1.81	1.37	-0.08	-0.98	-1.97	-0.99	-2.16	-1.99	1.06	0.95	0.78
Multiple choice exams	1.38	1.76	1.20	-1.32	-1.48	-2.78 *	-1.18	-1.64	-2.11	1.36	1.48	1.60
Oral presentations by students	2.00	-0.80	-1.48	1.14	-2.73 *	-2.90 *	3.53 *	1.46	0.30	3.86 *	1.04	1.84
Facts and practical knowledge	1.53	-2.62 *	-1.42	4.95 *	2.55	2.56	3.52 *	1.01	1.35	2.09	-2.13	-1.97
Problem-based learning	5.78 *	-0.47	1.38	9.87 *	3.96 *	6.30 *	6.97 *	-0.70	2.15	4.08 *	-2.95 *	-3.27 *
Research projects	4.77 *	1.51	3.14 *	2.55	-1.19	-1.14	1.36	-2.84 *	-1.69	4.72 *	1.57	2.12
Teacher was the main source of information	0.05	0.45	0.12	-0.13	-0.51	-1.05	-0.79	-1.61	-2.03	0.78	1.41	1.47
Theories and concepts	-0.49	-1.66	-2.07	2.34	2.64 *	1.23	3.04 *	3.27 *	2.24	-1.43	-2.95 *	-3.84 *
Internships and work placements	3.65 *	1.40	1.49	1.47	-2.10	-1.35	2.23	-0.02	-0.40	2.60 *	0.18	0.02
Written assignments	0.13	-0.96	-1.45	-0.14	-0.56	-1.79	1.06	1.01	-0.53	0.10	0.16	-0.05
Short cycle programme	-0.53	1.46	1.97	-1.88	0.73	0.17	-4.21	-3.46 *	-3.13 *	0.37	2.53	2.79 *
<i>Field of study (ref. Education)</i>												
Economics and business	3.75 *	3.18 *	1.94	0.75	-0.49	-1.35	-0.10	-1.31	-1.98	-0.36	-2.37	-1.97
Engineering	2.02	0.06	-0.84	3.79 *	4.38 *	1.67	0.91	0.05	-1.40	-1.63	-4.36 *	-4.42 *
Health science	-0.82	1.32	-0.10	-2.44	-0.32	-1.61	-2.46	-0.19	-1.52	-2.34	-1.12	-0.61
Humanities	0.06	1.64	0.45	-1.73	-0.94	-1.55	0.68	3.21 *	1.38	-2.55	-2.49	-2.66 *
Law	1.57	0.90	0.09	0.42	-0.34	-1.28	1.89	2.90 *	0.26	-1.41	-3.54	-3.44 *
Science	0.68	0.02	-0.23	2.42	3.93 *	1.88	0.90	0.92	0.11	-2.22	-3.18 *	-3.76 *
Social science	0.82	-0.87	0.90	0.40	-1.43	1.35	2.40	1.87	4.05 *	1.89	0.56	0.66
Average study hours per week	1.30	0.21	0.17	0.41	-1.46	-1.35	0.46	-1.38	-0.98	1.71	1.97	2.27
Full-time student	-0.24	0.43	-0.62	0.03	0.76	-0.29	-0.57	-1.46	-1.74	-0.62	0.16	0.17
Did extra work about that required to pass	1.09	-0.28	-0.43	2.70 *	-0.02	1.16	2.63 *	-0.07	0.94	0.73	-1.02	-1.17
Strived for the highest marks	1.37	0.52	0.36	1.05	1.39	-0.29	0.73	1.19	-0.17	-0.18	-1.68	-1.57
Marks obtained in secondary education	-2.88 *	-1.75	-3.28 *	-0.57	1.80	-0.30	-0.56	1.26	-0.79	-2.90 *	-1.06	-1.60
Father with tertiary education	-1.34	-1.23	-1.53	-0.16	-0.01	-0.01	-0.01	0.04	-0.04	0.08	1.75	1.60
Mother with tertiary education	1.37	1.06	1.52	0.82	-0.07	0.84	0.93	0.08	1.56	0.62	-0.58	-0.99
Age	1.09	0.34	1.37	0.91	0.20	0.82	1.00	0.78	0.66	-0.48	-1.16	-1.37
Woman	0.95	2.68 *	0.32	-2.24	-1.58	-3.70 *	-3.73 *	-3.56 *	-4.65 *	1.32	2.89 *	3.38 *
Constant	2.67	-0.62	-1.56	2.10	-0.30	-0.37	2.56	1.40	1.11	4.03 *	1.16	0.79
Sample size	4123	4075	3905	4149	4075	3917	4152	4075	3922	4149	4075	4075
Wald chi2	326.0	121.0	81.0	650.3	273.4	253.3	427.6	178.6	151.3	638.9	235.3	311.8
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Loglikelihood	-7426	-2149	-1032	-7613	-2739	-1333	-7821	-3692	-1909	-7549	-2609	-873

Note: \* indicates that  $P>|z| < 0.01$

In general, the results show that keeping constant the rest of elements included in the specifications, the panoply of teaching and learning modes deployed during university studies have a substantial influence on the acquisition of CTIs by graduates. Moreover, the influence of teaching and learning modes shows a characteristic pattern regarding each CTIs considered. Comparatively, the effects of the other input factors included in the models are weaker than those corresponding to the modes of teaching and learning used at university.

The contribution of higher education to the development of the competence *Alertness to new opportunities*, required to realize the chances of innovate, depends in absolute terms (Equation 1) on the use of problem-based learning, participation in research projects and the provision of internships and work-placements during university education. However, emphasizing group assignments and facts and practical knowledge contribute relatively less to the development of this competence than to the development of the other CTIs (Equation 2). The participation in research projects emerges as the most effective way to develop the *Alertness to new opportunities* expressed in relative terms to the mean development of the 15 competences not directly related to innovation (Equation 3).

Graduates' development of the competence *Ability to come up with new ideas and solutions* depends positively on the use of problem-based learning both in absolute and in relative terms, indicating that this method appears to contribute specifically to the acquisition of the competence. Group assignments also contribute to the development of the competence in absolute terms (Equation 1) and in relative terms regarding the mean of the competences not related to innovation (Equation 3), but no so regarding the mean of the other CTIs (Equation 2) The emphasis on facts and practical knowledge promotes the development of the competence in absolute terms only. Oral presentations show negative contributions in relative terms, suggesting that this mode of teaching/learning is less appropriate to develop this competence than to develop other competences. Multiple-choice exams display a negative contribution to the development of the *Ability to come up with new ideas* compared with their contribution to the mean development of competences not directly related to innovation, confirming that the assessment based on suggested answers does not promote the innovative capacities of graduates.

The acquisition of the competence *Willingness to question ideas* depends positively, in absolute terms (Equation 1), on the use of a number of teaching and learning modes: problem-based learning, oral presentations, group assignments, facts and practical knowledge and theories and concepts. Apparently, the development of the competence behind the evaluation of ideas requires the combination of several methods in higher education. Nonetheless, theories and concepts contribute to develop this competence more than they do to develop the other CTIs, while the contrary holds for the participation in research projects (Equation 2). Additionally, no method shows a higher specific contribution to the development of the *Willingness to question ideas* compared to the mean contribution to the development of competences not directly related to innovation (Equation 3).

The development of the *Ability to mobilize the capacities of others* depends positively on the use of group assignments both in absolute and relative terms. In absolute terms, it depends as well on the participation in research projects, and on the use of problem-based learning, oral presentations, and theories and concepts. However, both problem-based learning and theories and concepts show negative coefficients in relative terms regarding the development of the rest of competences, suggesting that these methods are not particularly effective to specifically develop the *Ability to mobilize the capacities of others*.

The estimation of stochastic frontier equations allows us to test whether or not the development of CTIs in higher education is contingent on the natural ability of individuals. The relevant tests, reported in Table 4, do not support such contingency: the values of the Chibar2 test with 1 degree of freedom lead to reject in all cases the presence of significant effects on the development of CTIs due to unobservable heterogeneity related to natural ability. Consequently, there is not evidence to support the notion that some individuals are naturally more efficient than others in the acquisition of CTIs during their university years.

**Table 4.-**  
**Estimation results for inefficiency terms in stochastic frontier equations for the contribution of higher education to competence development**  
**Absolute contribution (Equation 1), relative to other CTIs (Equation 2) and relative to the rest of competences (Equation 3)**

	Alertness to new opportunities			Ability to come up with new ideas or solutions			Willingness to question the own and others' ideas			Ability to mobilize the capacities of others		
	Equation 1	Equation 2	Equation 3	Equation 1	Equation 2	Equation 3	Equation 1	Equation 2	Equation 3	Equation 1	Equation 2	Equation 3
<i>Inefficiency (lambda)</i>												
coefficient	0.01	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.01
standard error	0.32	0.07	0.11	0.57	0.08	0.07	0.64	0.10	0.08	0.38	0.09	0.07
chibar2(1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
prob>chibar2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

In order to check the robustness of the results obtained so far, and taken into account that the inefficiency terms in the stochastic frontier equations are not significant, the analysis is replicated using variance components models to take advantage of the clustered nature of data according to the programme completed. By combining the type of credential obtained, determined by the length of the programme, with the field of study it belongs to, we define 35 groups of graduates and estimate the following equation

$$E_{ij} = g ( M_{ijk} , H_{ij} , S_{ij} , A_{ij} ) + (u_j+v_{ij})$$

where  $E_{ij}$  expresses educational output in terms of the contribution of higher education to the development of a particular CTI by individual  $i$  in programme  $j$ ,  $M_{ijk}$  is a vector representing the emphasis made on each one of  $k$  teaching-and-learning modes during higher education,  $H_{ij}$  represents the effort devoted by graduate  $i$  to programme  $j$ ,  $S_{ij}$  expresses prior educational investments, and  $A_{ij}$  contains personal characteristics. The error term  $(u_j+v_{ij})$  has two independent, normally distributed components:  $u_j$  represents noise emerging from the programme clusters whereas  $v_{ij}$  stands for individual noise. The estimation results, shown in Table 5, indicate that the marginal effects of teaching and learning modes are very close to those obtained under the stochastic frontier model. Additionally, estimates of intra-group correlations reveal that the influence of the programme completed in the development of some of the CTIs is substantial, particularly regarding the *Ability to come up with new ideas or solutions* and, to a lower extent, the *Willingness to question the own and others ideas*.

Table 5. Estimation results for absolute contribution of higher education to development of CTIs. Variance components model by type of programme completed

	Alertness to new opportunities		Ability to come up with new ideas or solutions		Willingness to question own's and other ideas		Ability to mobilize the capacities of others	
	z-stat	P> z	z-stat	P> z	z-stat	P> z	z-stat	P> z
Group assignments	0.99	0.321	4.33	0.000 ***	3.26	0.001 ***	5.96	0.000 ***
Lectures	2.05	0.040 **	-0.22	0.824	-1.14	0.252	0.99	0.321
Multiple choice exams	1.58	0.113	0.13	0.900	-0.81	0.419	1.79	0.073 *
Oral presentations by students	1.88	0.061 *	0.95	0.343	3.26	0.001 ***	3.73	0.000 ***
Facts and practical knowledge	1.12	0.264	5.09	0.000 ***	3.68	0.000 ***	1.89	0.059 *
Project and/or problem-based learning	6.10	0.000 ***	9.48	0.000 ***	6.83	0.000 ***	3.84	0.000 ***
Participation in research projects	4.87	0.000 ***	3.40	0.001 ***	1.93	0.054 *	5.33	0.000 ***
Teacher as the main source of information	0.18	0.859	0.16	0.869	-0.51	0.608	0.91	0.364
Theories and paradigms	-0.13	0.895	1.56	0.120	2.83	0.005 ***	-1.11	0.266
Internships, work placement	3.32	0.001 ***	0.80	0.425	1.89	0.059 *	2.82	0.005 ***
Written assignments	0.09	0.926	0.69	0.488	1.45	0.147	0.39	0.695
Average study hours	1.39	0.166	-0.01	0.993	0.15	0.879	1.14	0.255
Full time student	-0.14	0.889	-0.23	0.815	-0.82	0.412	-0.49	0.626
Did extra work	1.05	0.295	2.68	0.007 ***	2.79	0.005 ***	0.80	0.425
Strived for highest marks	1.15	0.248	0.92	0.359	0.32	0.752	-0.34	0.733
Secondary marks	-2.68	0.007 ***	-0.82	0.414	-0.55	0.581	-3.28	0.001 ***
Father higher education	-1.37	0.170	-0.16	0.874	0.04	0.972	0.14	0.887
Mother higher education	2.13	0.033 **	1.81	0.070 *	1.20	0.228	1.06	0.288
Age	1.29	0.197	1.45	0.148	1.52	0.129	-0.52	0.604
Woman	1.01	0.310	-1.84	0.066 *	-3.66	0.000 ***	1.65	0.099 *
Constant	3.12	0.002 ***	2.85	0.004 ***	3.29	0.001 ***	4.28	0.000 ***
<i>Variance components</i>								
$\sigma^2$ (programmes) & s.e.	0.021	(0.010)	0.211	(0.066)	0.118	(0.043)	0.023	(0.012)
$\sigma^2$ (individuals) & s.e.	2.148	(0.048)	2.236	(0.050)	2.516	(0.056)	2.227	(0.050)
Within groups correlation	1.0%		8.6%		4.5%		1.0%	
<i>Within groups correlation empty model</i>	1.3%		9.8%		5.4%		4.8%	
Number of individuals	4031		4056		4058		4055	
Number of groups by programme	35		35		35		35	
Log restricted likelihood	-7321		-7474		-7704		-7438	

Note: \*\*\* indicates that  $P>|z| < 0.01$ , \*\* indicates that  $P>|z| < 0.05$  and \* indicates that  $P>|z| < 0.1$

## Concluding remarks

We have analyzed the influence of the teaching and learning modes used in higher education on the acquisition by graduates of diverse competences required to innovate. The analysis, carried out in a framework of educational production, identifies the effects of the teaching and learning methods and those of the other input factors, either educational or of human capital, that enter in the production function of higher education. The estimation of stochastic frontier equations permits to control for a possible influence of unobserved heterogeneity among individuals on the outcomes of higher education expressed in terms of the acquisition of the competences required to innovate productively in the workplace.

The results point out that the panoply of teaching and learning modes deployed during higher education studies is a key determinant of individual progress regarding the development of competences required to innovate when the other elements involved are kept constant. Moreover, the results indicate that the influence of teaching and learning modes on the development of each competence considered has a characteristic pattern. Overall, the analysis suggests that the use during higher education studies of proactive teaching and learning modes promotes differentially the acquisition of CTIs. Project or problem-based learning and with group assignments appear as the single methods with stronger influence in the development of CTIs, which suggests that collaboration with other people improves the acquisition of innovation capabilities. It is possible, besides, to identify the most effective mode to develop each one of the competences required by the innovation process. Accordingly, the development of Alertness to new opportunities depends on the participation in research projects, the Ability to come up with new ideas or solutions is developed specifically by problem-based learning, the Willingness to question ideas is promoted by the emphasis in theories and concepts, and the Ability to mobilize the capacities of others is improved specifically using group assignments. Additionally, estimation results also show that the effects of the other factor inputs in the development of the competences considered are much weaker than those corresponding to the teaching and learning modes. Finally, the analysis did not find evidence of unobserved heterogeneity influencing the acquisition in higher education of those competences required to innovate at the workplace.

Nevertheless, it is worth noting that the implementation of changes or reforms in higher education studies can not be based only in estimations of marginal effects of diverse input factors included in a suitable education production function. Researchers and higher education institutions need to learn more about possible trade-off between diverse type of resources involved, on the one hand, and between the outcomes obtained, on the other hand, in their production process. Moreover, the resources should be examined in terms of their relative costs and the results in terms of their relative values to individuals and to society at large.



To obtain that type of knowledge would require deeper analyses using preferably longitudinal data sets at the appropriate level of aggregation. Collaboration between researchers and institutions is crucial to improve knowledge about the relationships between the resources allocated to higher education systems and the private and social outcomes generated through them.

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# ENHANCING ACTUARIAL EDUCATION WITH ONLINE COLLABORATIVE ACTIVITIES FOR THE IDENTIFICATION OF PROFESSIONAL COMPETENCES

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## **Abstract**

The actuary career has a highly professionalized profile, which is little known by the general public in Spain, as well as by our students in the first academic year. In addition, according to the new European Higher Education Area, learning and teaching methodologies must ensure the acquisition of professional competences; students should develop the necessary skills, academic contents, and attitudes to get an adequate accomplishment in the labour market. For these reasons, the teachers of several courses in the first year of the degree in Actuarial Sciences at the University of Málaga developed an online observatory of professional competences. The aims of the observatory are that our students identify the professional competences of the actuary, the specific competences in each course and their contribution to the acquisition of the actuary's competences; and to carry out these activities in a collaborative on-line environment. During the last three academic years, we integrated this online observatory in our general didactic strategy and obtained very positive results. Students perceived that these activities improved their learning process and helped them to put in context many of the contents of the courses.

## **Background**

According to the new European Higher Education Area, learning and teaching methodologies must ensure the acquisition of professional competences. Students should develop the necessary skills, academic contents, and attitudes to get an adequate accomplishment in the labour market. For this reason, an adaptation of the current didactic strategies in Spanish universities is needed in order to follow this path, and to support an integral instruction that encourages a continuous tuning of the future professionals to the changing conditions of the market and a permanent update of their knowledge.

In addition, the actuary career has a highly professionalized profile, which is little known by the general public in our country, as well as by our students in the first academic year of the degree in Actuarial Sciences at the University of Málaga. This fact makes the transit to a general competence-based didactic strategy in our courses more difficult.

For these reasons, in an attempt to ease the adaptation to a new learning and teaching paradigm focused on the acquisition and assessment of professional competences, the teachers of several courses in the first year of the degree in Actuarial Sciences at the University of Málaga developed an online observatory of professional competences. The aims of the observatory are that our students identify the professional competences of the actuary, the specific competences in each course and their contribution to the acquisition of the actuary's competences; and to carry out these activities in a collaborative on-line environment

The courses that implemented the online observatory of competences (Actuarial Statistics; Banking, Insurance and Securities Law; and Insurance Theory) are involved in an experimental project of innovation in teaching and learning methods since 2002<sup>1</sup>. In this project, we are following a blended strategy, combining traditional with e-learning and m-learning resources<sup>2</sup>, with an efficient integration of these components into a coherent learning and teaching process, and not as a simple addition of resources (Garrison & Kanuka, 2004). The objectives of the project can be summarized in two points: (i) encouragement of a more autonomous, participative and contextualized learning and teaching process, and (ii) an intensive use of information and communication technologies. Like in many other European countries, most Spanish universities, including University of Málaga, have recently adopted virtual learning environments, but in many cases these are being used merely to deliver electronic resources that were previously available in traditional formats (Bin & Munro, 2008). Our approach consists of exploring and using many of the available possibilities in the field of virtual learning environments, especially those instruments that allow collaborative learning, and encourage the autonomy of the learner, including Web 2.0 tools<sup>3</sup>. The online observatory of professional competences has been the last addition to our set of resources.

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<sup>1</sup> A detailed description of the project is available in Mayorga-Toledano *et al.* (2009).

<sup>2</sup> More information about the m-learning resources we use can be found in Mayorga-Toledano & Fernández-Morales (2003), and in Fernández-Morales & Mayorga-Toledano (2010).

<sup>3</sup> Fernández-Morales (2010) and Mayorga-Toledano (2010) include detailed descriptions of the activities and instruments used in the courses of Actuarial Statistics and Banking, Insurance and Securities Law, respectively.

## The online observatory of professional competences

Due to the importance of knowing the competences that every student must develop in our courses, the online laboratory of professional competences is carried out in the first weeks of the first academic year. Our intention with the activities involved in the laboratory is that students not only discover what are these competences, but that they discuss them and reflect on them, as a previous step in the process of developing competences.

The majority of the activities involved in the laboratory of professional competences are integrated in the virtual learning environment of our university, *Campus Virtual de la Universidad de Málaga*, which is implemented on a Moodle platform (figure 1 shows the laboratory in the course of Actuarial Statistics). We designed the laboratory as a set of activities with a very significant part to be carried out online, out of the traditional classroom, as e-learning activities. According to the philosophy of our project of innovation, we are encouraging the autonomous learning through the integration of e-learning and m-learning activities into the general didactic strategy of our courses. However, we are aware of the limitations of this approach. One of the main shortcomings of an intensive use of online activities is that virtual learning environments impose an intermediate level of mediation between the persons involved in the learning and teaching process (Johnson *et al.*, 2008; Sun *et al.* 2008), that is inexistent in the traditional face-to-face approach. In order to alleviate this effect, in the development of the online laboratory of competences, we decided (i) to follow a collaborative approach, (ii) to incorporate Web 2.0 elements whenever it was possible (Fiedler and Kieslinger, 2006), and (iii) to include a face-to-face complementary discussion session in the third stage of the laboratory.

The design of the online observatory is based on three stages, which we call 'proposals', 'evaluation' and 'integration'.

Figure 1. Online laboratory of competences integrated in Moodle.

In the first phase, *Proposals*, our students suggest, compare and discuss elementary skills defining the actuarial profession using a wiki. Teachers of the involved courses briefly explain to their students the relevance of the new competence-based learning and teaching strategies, the concept of professional competences and create a wiki in the virtual learning environment of our university, *Campus Virtual de la Universidad de Málaga*, implemented on a Moodle platform. Every student must contribute to the wiki with the definition of at least one elementary professional competence that an actuary must develop in the course, different from the previous contributions. The choice of a wiki for this activity has many advantages. First, students feel that they are creating this material collectively. In addition, there is a sense of positive competitiveness, since the first contributors have more choices, while the last ones find it more difficult to define a new and different elementary professional competence.

To facilitate this activity, our students are provided with a varied range of multimedia materials that are available online. The didactic resources are not only of the academic type, but also professional reports, news from the press, videos and podcasts. In order to organize these materials, that are accumulated year after year, we use the bookmarking service of Delicious. This service allows the teachers and students to tag every link, and produces a tag cloud, which makes easier the access to the resources, and also promotes the cooperative nature of the activity. An additional advantage of the Delicious bookmarking services is that its tag cloud, with all the active links, can be integrated in the Moodle courses as an additional block (see the right part of figure 1).

The second phase, *Evaluation*, consists of a peer-to-peer assessment of the competences obtained in the first step through online anonymous questionnaires. Once the first stage is closed, all the students assess every competence included in the wiki. This is done by an anonymous questionnaire relative to the relevance for the course and for the actuarial career of the competences, with a Likert scale 1-5. The most interesting feature of this activity is the necessity of reflection on the competences before proceeding to the voting, as the students themselves told us.

At the end of the second stage, the results of the voting (the averages) are made public on the Moodle page of every course involved in the project.

To finish, in the third phase, *Integration*, our students examine and use the results of the assessment obtained in the second stage of the laboratory. They check the relevance for their classmates of their own proposals in the first stage, and also compare their assessments with the results obtained by the collective. In order to obtain an integrated and collaborative proposal of the actuary's competences to be developed in the course, using the results of the previous phases, the teacher initiates in the classroom a discussion, which continues in a forum on the *Campus Virtual*. The results of the discussion are finally compared with the course syllabus, and constitute a guide for the acquisition and development of competences in every course involved in the project.

## Evaluation

A general survey was carried out at the end of the last academic year in order to assess the students' perceptions and satisfaction with the general design and performance of the courses involved in our project.

The main results related to the online laboratory of competences are summarised in figure 2, which shows the sample means obtained from the survey (we used a Likert scale from 1 to 5) of the items regarding the laboratory. The best-valued items (with sample means above 4) are 'ease of use' and 'usefulness for understanding and developing competences'. This fact confirms that this pedagogical instrument, as perceived by the students, can improve our didactic strategy from the point of view of competence development, with the added value of an easy to use implementation.

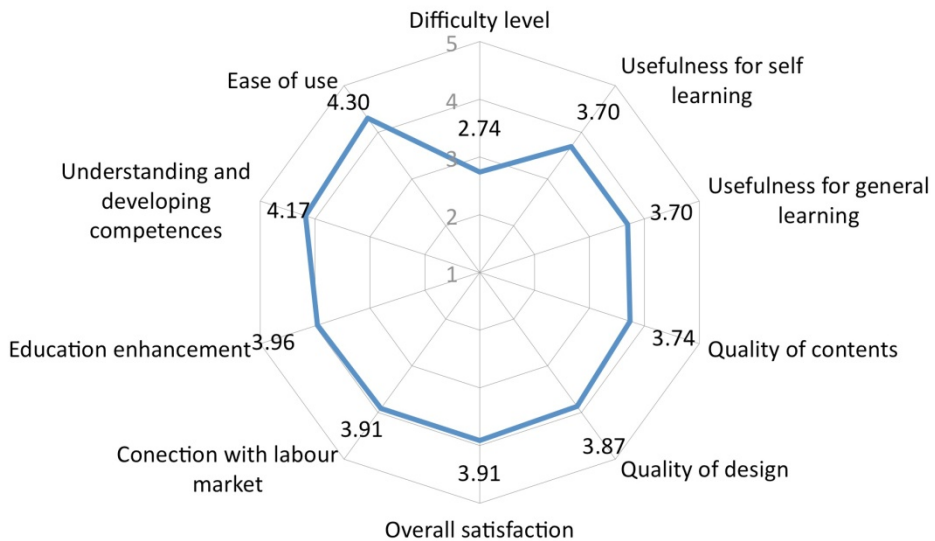


Figure 2. Students' evaluation of the online laboratory of competences.

Other items like 'education enhancement' and 'connection with the labour market' were also well valued on average, with means above 3.9, as well as the two quality items: quality of contents and quality of design, with means of 3.74 and 3.87, respectively. We consider these results very positive since our students show a clear perception of the laboratory as a set of activities that can enhance their education, noticeably connected with the professional market, with a satisfactory level of quality. In addition, the items 'usefulness for general learning' and 'usefulness for self-learning' were also valued on average above the centre of the scale, reinforcing the positive perception of the laboratory within our students. The level of difficulty shows an average of 2.74, indicating that this is the least difficult set of activities of our courses. This fact was a further incentive for the good acceptance of the laboratory.

Some opinions of our students about the online laboratory of competences that strengthen the previous comments were also obtained from an open-answer question in the survey:

*'It is of a great utility to develop applied knowledge and it get us closer to the work in real companies'.*

*'Focused on the actuarial labour market and the acquisition of applied skills'.*

*'To use Moodle in a stimulating way and to be able to check the opinions of my classmates'.*

*'Eliminates the fact of not knowing the utility of what I am studying'.*

Finally, our students valued their overall satisfaction with the online laboratory of competences on average with a mean of 3.91, that is, in our opinion, a very good result.

## **Concluding remarks**

The necessary and almost unavoidable (Beerkens, 2008) adaptation of Spanish universities to the European Higher Education Area requires many changes to the traditional teaching methods used in our country. One of the most challenging ones is the adoption of a new paradigm based on learning and teaching by developing competences.

The learning and teaching strategies we are following in the courses of the degree in Actuarial Sciences at the University of Málaga are heavily based on the development of professional competences and on the authenticity of the activities and the assessment. A key element for this orientation is that our didactic resources incorporate contents, skills and attitudes very closely related to the real actuarial profession. But, this effort in the design on the teacher side must be complemented with a correct perception on the student side. The students must perceive that the activities they are carrying out are representative, relevant and significant (Gulikers *et al.* 2004). And a critical element, indispensable to achieve this objective, is that our students recognize what are the professional competences of the actuary. As we have noticed that this is not the case for the students in the first academic year, the online observatory of professional competences was created as a set of activities necessary to ensure the correct development of our whole project.

Within this context, the online laboratory of professional competences has facilitated many students a correct understanding of the required learning objectives and their relationships with the professional market. On one hand, our students stated that the observatory made easier the developing of competences and acquisition of contents, and on the other hand, they considered that it was a very positive motivating instrument. Furthermore, the collaborative nature of this set of activities at the beginning of the first academic year generated a greater sense of cohesion within our students.

To conclude, our experience in the design and putting into practice the online laboratory of professional competences can be considered as a good example of how to combine collaborative learning and virtual learning environments with learning by developing competences, obtaining positive results supported by the survey results and the students and teachers opinions.



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# **AN ACTIVE LEARNING APPROACH WITH A COMPETENCE-BASED CURRICULUM FOR THE TEACHING OF STATISTICS IN ECONOMICS**

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## **Introduction**

The 19th of June 1999, the date of the signature of the Bologna Declaration, signalled the starting point towards the convergence towards the creation of a common European Higher Education Area (EHEA). In Spain, the Ministry of Education established the year 2010 as the deadline for Spanish university degrees to be adapted to the new learning and teaching environment.

In order to reach the goal of convergence and the 2010 deadline, the University of Valencia introduced a pioneering plan for methodological experimentation and innovation in 2003-04, which was developed by the Calls for Educational Innovation. In the first phase, the aim was to give institutional support, give advice and evaluate the initiatives coming from the different degrees in order to develop activities related to educational innovation in line with the recommendations arising from the creation of the EHEA.

Under this first Call, the Faculty of Law and the Faculty of Economics at the University of Valencia designed and implemented a Double degree in "Business Administration and Law", as an Educational Innovation Project (Proyecto de Innovación Educativa, or PIE in its Spanish acronym), linked to the introduction of the new ECTS credit system and the construction of the EHEA.

During the year 2005-2006, and funded by the Ministry of Education and Science, a second innovation project (PIE) was launched at the Faculty of Economics: a Degree in Economics. To choose this degree was not casual, as the ultimate goal was to experience this innovative type of educational project in degrees with high student demand, where groups were large and could not be reduced given with the current resources, both human and material.

The aim of this paper is to describe the competence-based curriculum designed for *Statistics I*, a mandatory core subject in the first year of the new degree in Economics, which has started to be taught in September 2010, the moment

when the Faculty of Economics has begun to implement its various degrees adapted to the EHEA: Degree in Economics, Degree in Business Administration, Degree in International Business, Degree in Finance and Accounting and Degree in Tourism.

In order to describe the competence-based curriculum, the paper concentrates on an essential element common to all Innovation Projects, that were the origin of the new approach to teaching and learning, namely, to design a detailed Teaching Guide to enhance student's learning by introducing new active teaching methodology, together with alternative assessment systems and the incorporation of ICT in the learning process.

Thus the paper is structured as follows: first, a brief discussion about the importance of the Teaching Guide; then a reflection on the role that competence development plays in the new learning environment and, finally, some practical examples from the actual teaching practice of Statistics I are presented, so as to show how the new methodological approach, with its shift from being teacher-centred to learner-centred, can be achieved.

## Relevance of the teaching

The *Teaching Guide* is a basic tool of the new teaching and learning environment, with the objective of promoting European cooperation with quality assurance through the development of comparable methodologies and criteria. It consists in a detailed planning of a subject based on the principles that guide the process of convergence in the creation of the EHEA.

At the Spanish university level, there is no single model for the design of the Teaching Guide, therefore each university must design its own, but taking into consideration some key issues. First of all, the explanation about the broader context where each subject fits in the grade as a whole, both as the content and the timing is concerned; and secondly, the specification of the intentions of the subject, the methodology and the evaluation system (Parcerisa, 2004).

Nevertheless, in the Valencian Community, the Conselleria d'Empresa, Universitat i Ciència of the Generalitat Valenciana promoted a joint-action program to lead Valencian public universities towards European convergence, which resulted in a publication, entitled *Document for the Design of ECTS Teaching Guides*<sup>4</sup>. Likewise, the Office for Teacher Training of the University of Valencia published the document called *Development of the Teaching Guide for European Convergence: Principles for Design* (Salinas and Cotillas, 2005), which has been the framework for the development of the Teaching Guides for all the de-

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<sup>4</sup> The five Valencian public universities cooperated in the creation of this document: Universitat Jaume I (coordinator), Universitat de Valencia, Universidad Politécnica de Valencia, Universidad de Alicante and Universidad Miguel Hernández de Elche.

grees of the University of Valencia. This document covers the core issues to be addressed in the design of a Teaching Guide for the planning of a new subject and it is structured as follows:

1. Identifying the subject.
2. Introduction.
3. Competences.
4. Learning outcomes.
5. Learning/Teaching methodology.
6. Contents.
7. Workload and timetable.
8. Learning assessment process.
9. References.

The objective of these guidelines goes beyond the mere programming of the subjects. Fundamentally, the Teaching Guide is a tool for improving the teaching and learning process around three axes: (i) a selection of content, skills and competences to be developed, (ii) a structure of tasks and activities to facilitate learning, and (iii) a realistic view of what students can do.

Therefore, the Teaching Guide could be understood as the culmination of the teacher's planning effort in relation to the issues addressed in the course, activities, sequencing tasks, etc. (Benito and Cruz, 2005); so, it should act as a tool, "guiding" the students' learning by providing clear information not only on what (content) but also on how (methodology) they are expected to learn. The Teaching Guide should also reflect the core principles of the new teaching-learning paradigm for the creation of the EHEA.

Each Teaching Guide covers a wide range of topics, but in the following sections we will only concentrate on two aspects for the subject *Statistics I*: (i) competence development and (ii) methodological issues.

## **Competence-development for the core module statistics/ in the economics degree**

Taking into account, on the one hand, the fundamental axes of the PIE (Dasi *et al.*, 2007) and, on the other, the structure of Teaching Guide designed by the University of Valencia, the general objective of the subject Statistics I is to endow future graduates with the ability to interpret statistical information generated in the economic and business environment, as well as to provide learners with basic skills for making statistics applied to management.

But how can this objective be achieved? Education has for a long time been focused primarily in the teacher; but nowadays student has become the true focus of the teaching-learning process, which must necessarily involve changes in teaching strategies and designs, which should be directed to the development of

competences (knowledge, skills and attitudes), emphasize the active role and responsibility of students in their learning process and less emphasis on the transmission of knowledge by the teacher. As an exemplification of the type of basic learning students should attain, we can highlight the following:

- To be able to characterize statistical data according to its nature, distinguishing between qualitative and quantitative data, to calculate the main descriptive statistics to summarize the information contained in a series of data (measures of central tendency like mean, median, mode, measures of dispersion, asymmetry) and interpret the results.
- To be able to investigate the relationship, linear and nonlinear, between two variables, with the appropriate graphical representation and the most appropriate model estimation. Also, students must be able to interpret the meaning of the theoretical model parameters obtained, to evaluate the goodness of fit made and applied to predict the behavior of a variable for a given value of the other, the ultimate objective of regression analysis.
- To understand what is a random variable, know a definition based on randomized experiments daily and distinguish between univariate discrete probability distributions and continuous and the functions that characterize them: the role of size, density and distribution, and who know the characteristics principal of the probability distribution of a random variable, expectation and variance and are able to calculate and interpret.
- To be able to design the strategy for solving problems of calculating probabilities of the models studied, applying and interpreting the results.

At the same time, this type of learning allows to develop instrumental skills associated /related with the subject Statistics I (see Table 1), such as the ability for planning and organization, analysis and synthesis, problem solving and decision making, basic ICT and information management skills (i.e. ability to retrieve and analyze information from various sources, etc.).

The Framework Document on the University System Integration EHEA (MECD, 2003) states that:

*the educational objectives of the official degrees will, in general, have a professional approach, i.e. they must provide a university education in which to integrate harmoniously basic generic competences, together with transversal competences related to the integral training of individuals and specific skills that will offer vocational guidance to enable the integration of graduates into the labour market.*

Following the philosophy and principles of the EHEA, knowledge remains a significant component to learning, but it is not sufficient to ensure the integral training of the student, so competence development is required. The educational objectives of the new degrees are, thus, defined in terms of skills and competences. The concept of competence is broader than the notion of knowledge as it also includes the student's ability to know what to do with this knowledge.

However, without adequate knowledge, other skills can not be developed effectively; as Perrenoud (2005: 29) states, *the possession of certain knowledge is the condition for effective action.*

The Tuning project states that competences represent a dynamic combination of knowledge, understanding, skills and abilities and that fostering competences is the object of educational programmes. It also classifies skills into *generic* and *specific* (Gonzalez and Wagenaar, 2006). On the one hand, *generic* skills are classified into: (i) *instrumental* (they measure skills and training of graduates and therefore can use knowledge as an instrument; i.e. cognitive abilities, methodological abilities, technological abilities and linguistic abilities); (ii) *interpersonal* (social relationship skills that measure the level of integration into certain groups and can be divided into individual and social; i.e. individual abilities like social skills, as in social interaction and co-operation) and (iii) *systemic* (skills concerning the understanding of whole systems prior to the acquisition of instrumental and interpersonal competences; i.e. combination of individual qualities and motivation to work). On the other hand, *subject-specific competences* are particular for each degree or profession; these refer to the methods, techniques and application of knowledge from different disciplines<sup>5</sup>.

In order to select the appropriate competences for each degree, the Committee on Curriculum Development (CEPE, in its Spanish acronym) for the degree in Economics, taking into account the recommendations of the Libro Blanco (AN-ECA, 2005, Chapter 7), produced a list of competences –both general and subject-specific- that students should develop throughout their studies in order to obtain their degree.

In the case of the subject *Statistics I* the competences expected to be acquired by learners in the Economics degree and the learning outcomes are shown in Table 1 and Table 2.

<b>Competences</b>
Ability to search and analyse information.
Ability to make decisions and apply knowledge to practice.
Ability to learn and work autonomously.
Ability to use ICT.
Identify a problem, design a solution and solve it by using statistics and economic knowledge acquired.
Knowledge and understanding of the quantitative basic tools for the analysis, diagnosis and economic perspective.

*Table 1. Competences for Statistics I in the Economics Degree.*

<sup>5</sup> <http://tuning.unideusto.org/tuningeu>.

<b>Learning Outcomes</b>
Finding information and knowledge of statistical sources. Data management and statistical databases for the study of economics.
Abstraction and information processing for later use in software packages.
Identification, classification, reasoning, argumentation and interpretation of the relationships between economic variables.
Recognition of an economic problem from the observation of economic reality.
Increased ability to use logical reasoning / strategy to address real business world situations.
Management of basic quantitative tools and their application to the economic environment.

*Table 2. Learning outcomes for Statistics I in the Economics Degree.*

As it has been mentioned above, it is needed to undertake methodological changes in order to achieve these objectives. In the next section we describe some of the teaching/learning methods incorporated to improve the students' learning process by means of developing competences and achieving the expected learning outcomes.

## **Teaching/learning methodology**

When defining the methodology applied to deal with the subject, Statistics I, we must start by taking into consideration the nature of the teaching session -either theoretical or practical-, as it will determine the organization of the class and the choice of teaching methods, mainly due to the number of students per group in each case.

### **Methodology for theoretical sessions**

It goes without saying that the number of students in class conditions the methodology applied, especially with large classes. Therefore, in the theoretical sessions, lasting 2 hours, the contents of the units are taught emphasizing their methodological importance, the conceptual relationship among the topics and their practical usefulness.

During the session, particular attention is paid to key statistical concepts and also to more complex ones. Given the nature of these studies emphasis is laid not only on the technical side on the conceptual process and implementation to apply in solving problems, but on the interpretation of the results obtained by the students from an economic and/or business perspective.

The predominant teaching method in the theoretical sessions is what is known as "participatory lecture". The participatory lecture allows better interaction bet-



ween teacher and students in large groups, offering the advantages of a traditional lecture together with those of students' participation in a two-way interaction. The advantage of this method over pure traditional lecturing is that students are offered the floor, this is, they get the right to speak and to interact with the teacher throughout the lecture. It also encourages participation and discussion in the classroom; in order to do so, the participatory lecture is used together with other teaching-learning methods, such as "guided" discussions in small groups where students are presented with real life problems, pieces of news, or illustrations that the teacher brings in, in order to offer the student a direct involvement with the topic. The final aim is to encourage students' involvement and participation in the class development and to avoid the passive attitude that some students may adopt in the situation of listening to a traditional lecture.

In order to facilitate the teaching/learning process, the teacher may make use of other tools to reinforce his/her lecture, such as case studies, power point presentations, etc.

- **Case studies** are mainly used to exemplify the main concepts explained in class, with the aim of addressing a particular topic from every-day life, with up-to-date materials (e.g. a piece of news talking about a decrease in GNP) and analysing it using statistical methods.
- **Dynamic graphs** in Excel are created to facilitate the comprehension of statistical concepts, such as the convergence of Binomial and Poisson distributions to the Normal distribution. In general, the concepts which are explained by means of these dynamic graphs are conceptually complex, but with the help of the visual aid they become much easier to interpret and understand.
- A **power point presentation** of each unit is used in the theoretical sessions to facilitate comprehension, by means of the visual and written messages. This, together with reading the recommended literature, will allow students first to understand and then to study in depth the various topics covered during the course.
- Previous **reading of recommended literature**: at the end of each lecture, the teacher introduces the content to be studied in the next session and selects from the basic literature the materials learners should work on before the next theoretical session. All supporting materials for each unit are posted on the Virtual Classroom ([www.aulavirtual.es](http://www.aulavirtual.es)) time ahead for the students to be able to read and work before the start of the next lecture. Thus, it is expected that the student attends the lesson having some basic knowledge about the topic to be explained. For, if the student does not know anything about the conceptual content being explained in a given session, it will probably be hard for him/her to feel confident enough to participate actively in the development of the session. Moreover, the individual work done by the student to prepare for the theory session is carefully chosen by the teacher, so that it concentrates on those aspects that the learners usually find more difficult to grasp; it is then expected that learners will make questions about these concepts, so that they will be dealt with more thoroughly during the lesson, thus further optimizing the time devoted to each point.

## Methodology for practical sessions

In practical sessions students enrolled in the main group are split into two sub-groups, of about 30 or 40 students each. The practical sessions, with duration of 2 hours, are developed using different teaching strategies depending on the content discussed in the corresponding theoretical session. Here is a list of the strategies most frequently used in these sessions:

- **Problem-solving activities:** It seeks to complement the concepts discussed in the theoretical sessions, applying them to solving exercises and problems. The teacher presents several basic problems so that students become able to identify the key aspects related to how to pose and solve problems: (i) reading comprehension of the problem, (ii) identification of the variables under study and information available, (iii) formulation of the problem, (iv) revision review what learners already know and the knowledge they may use to solve the problem defined, (v) develop and apply the strategy for solving the problem and, finally, (vi) provide an economic and/or business interpretation of the result.

From this moment, students become active players, as they must solve problems of similar nature to those explained before and some with a higher degree of difficulty by following the procedure described above. The role of the teacher in this phase is to guide and supervise the work that students do in solving the proposed problems.

- **Peer Assessment:** Within the practical sessions we try to promote debate and discussion among students concerning the processes of solving problems and interpretation of the results attained. This may be achieved by assigning different models of problems for students to work on. Students, on an individual basis first, solve the problem set to them and, after a reasonable time, they swap exercises to check results. In this phase students solve the second problem adopting now the role of reviewer or assessor: in such a role they make the necessary corrections and comments and evaluate the second exercise, this is, the work performed by his/her partner by means of a brief report and also using a marking scheme from 1 (poor) to 5 (very good). To perform this evaluation process the students can make use of all the class materials they may need.

The final step consists on the teacher solving the problems on the board with the whole group in order to detect errors and stimulate discussion about the evaluation of the learning process. To conclude the activity, the teacher collects the work done during the session for reviewing and final evaluation.

- **Practical activities in the computer lab:** During the course, several practical sessions are held in the computer lab. The calculations necessary to get many statistical measures can be tedious and in real life they would be performed, either using specific statistical software or a spreadsheet. Since the

latter is available to any student, the statistical practices designed to be done by means of a computer are based on Excel spreadsheet:

*The spreadsheet can be a powerful tool to create learning environments that enrich the representation (modelling), understanding and problem solving (...) and offers features that go beyond the tabulation, calculation formulas and graphing of data, allowing you to create and use simulations that allow students to make representations that build a bridge between the intuitive ideas and formal concepts (Lopez et al., 2006).*

In the initial presentation of each topic, the teacher devotes a section, called *Application with Excel*, to show learners how to use this tool to make operational the calculation procedures presented in the lessons. Two workshops are held throughout the semester with the aim of making students more efficient with the use of Excel: an introductory session about the management of spreadsheets and a training session about all statistical functions and data analysis that Excel provides related to the contents of *Statistics I*. These workshops seek to enhance competences and skills associated with the subject, as the ability to use ICT and to manage information. Eventually, the use of Excel spreadsheet will allow more time for the planning process required to solve economic problems and for the interpretation of results and, therefore, less time to the manual process of calculation, which in many cases is too tedious.

- **Video for Problem-based learning:** Video extracts are used to illustrate some statistical problems; for example, to demonstrate the concepts of regression and probability, students will watch fragments of two episodes of the popular television series *Numb3rs* (i.e. “How to solve Monty Hall problem”). After viewing the selected sequences of the episodes, the problem is defined and some activities are performed in accordance with the methodology proposed in the episode to solve the problem.
- **Tutorials:** Tutorials are, from a traditional point of view, a space that allows the student to ask questions related to the subject by means of a direct contact with the teacher, usually on a one-to-one basis. Throughout the course it is emphasized the convenience of making use of these tutorials to discuss issues arising in relation to the content studied. In order to encourage a closer teacher-student interaction, several exercises are proposed for the students to evaluate their learning process. In any case, these follow-up exercises are set up for the last part of a practical class and mark the end of a topic, and they are done on a voluntary basis.

## Resources

Together with the development of the Teaching Guide and the enhancement of student learning by introducing new dynamic teaching and evaluation systems, incorporating new technologies into teaching is a key issue in educational innovation. In this sense, the incorporation of ICT in the teaching of *Statistics I* has

taken place primarily through the frequent use of the e-learning platform of the University of Valencia called “Virtual Classroom”. Various teaching materials designed to support independent learning and student self-assessment have been prepared; these consist on classroom materials for each topic, videos using screen captures, self-assessment questionnaires done with HotPotatoes, etc. This work has been compiled in a website entitled *Multimedia Guide for Descriptive Statistics and Probability*, accessible at [www.uv.es / ticstat](http://www.uv.es/ticstat).

## Virtual Classroom

The e-learning platform of the University of Valencia, “Virtual Classroom”, allows the use of new technologies in educational processes. Among its advantages we may highlight that it facilitates the organization of the teacher’s work, the frequent updating of content and it allows continuous monitoring of student progress and their evaluation.

This platform has many tools (Servei de Formació Permanent, 2006), but we will only discuss those that are more generally used in our teaching practice, for its potential and ease of application. Among them we may mention the following:

- **Information Tools:** Its main purpose is to provide information about the subject and about the students’ enrolled in the group (personal data and academic profile).
- **Tools for storing documents:** The electronic storage of files for students to download and work with, both in their own time and also in class, is one of the most widely used tools in the Virtual Classroom platform. It has become an easy and fast way to make materials accessible to students (e.g. subject slides, Excel files with problems solved, etc.) The Teaching Guide is also uploaded here by the teacher responsible of the subject
- **Communication tools:** Virtual Classroom incorporates communication systems, both synchronous and asynchronous, that allows a rapid and efficient communication between teacher and students, either individually, to a specific group (e.g. teamwork), or to the whole class (mass mail). Other options available, such as forums and chats, are not widely used in our subject, although we do believe that it would be desirable to implement a forum to discuss current issues in which Statistics plays a fundamental role.
- **Assessment tools:** Virtual Classroom offers two tools to assess and evaluate learners’ work: *Students’ Cards* (useful to distribute tests to check knowledge) and *Questionnaires* (a tool for generating questionnaires for self-evaluation).

## Multimedia Guide to Descriptive Statistics and Probability

Multimedia materials are an excellent educational tool, both for its flexibility and for its attractiveness and accessibility (Perez *et al.*, 2003). Cano (1994) defines educational software as a set of computing resources designed with the intention of being used in teaching-learning contexts. Their use has important advantages such as the following (Perez *et al.*, 2003):

- The software usually has many elements that are responsible for maintaining student's attention and interest; besides the simple fact of working with computers has a playful connotation for many people.
- The use of various channels of communication to display information increases the effectiveness of teaching-learning process. Moreover, many of these programs often include self-assessment sections that give users feedback on their learning process.
- Its flexibility promotes autonomous learning. In addition, it only requires a computer and an Internet connexion and it can be accessed by anybody, anywhere, anytime.

All these aspects considered, to facilitate and guide the student's autonomous work regarding the preparation needed to attend our theoretical lessons, we have designed a *Multimedia Guide to Descriptive Statistics and Probability* (Figure 1).

We are aware that students of this subject will use Statistics as an analytical tool, as they will do with other sciences and techniques; due to this fact, we have developed teaching resources with which we intend to promote learning and students' self assessment but we have omitted some mathematical generalizations (though not all) either because they can be difficult or for they are not essential for our students' careers, future professionals in the world of Economics and business.

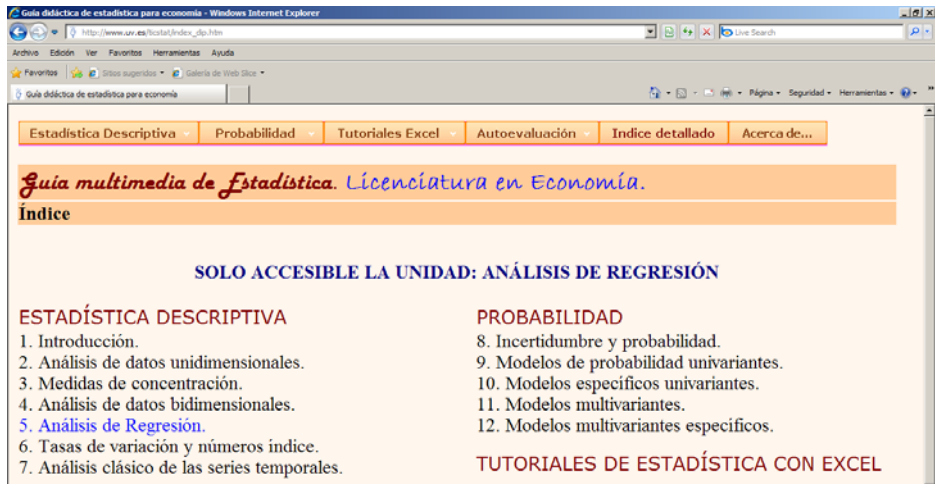


Figure 1: Structure of the Multimedia Guide to Descriptive Statistics and Probability.

The *Multimedia Guide to Descriptive Statistics and Probability* has been made using Frontpage and it has a web page format. When a student accesses the multimedia guide of a particular degree a window appears showing the structure of the course and its contents (Figure 1); and Figure 2, for example, reproduces the data sheet for item 5, on the Regression Analysis (“5. Análisis de Regresión”).

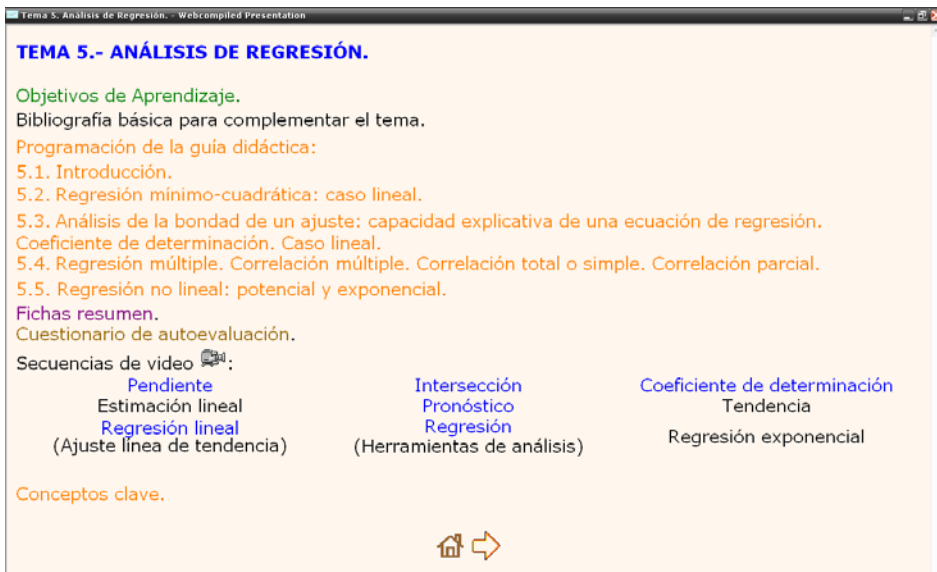


Figure 2 . Technical Regression Analysis.

## Conclusions

The current academic year, 2010/2011 has been a cornerstone in the Spanish university system, as the converge towards the European Higher Education Area (EHEA) has become a fact, and the new degrees have been implemented in the Faculty of Economics of the University of Valencia.

This paper is inserted into this new environment and its aim is to give a description of the active learning approach taken in the subject *Statistics I* for Economics, with a special emphasis in the methodological changes towards an active learning approach.

This new methodological approach implies various changes: Reduction in the number of students per group; interactive teaching methods, participatory lecturer (case studies, powerpoint presentation, ...); students are the centre of the learning process and teachers role goes from mere provider of information to adviser and guide; flexible learning methods, (autonomous work, pair work, group work, continuous assessment, ...) with the aim to promote a higher level of interaction.

The object of educational programmes in the new degrees is fostering competences together with the methodological changes they bring about. Thus, probably the core component in this new scenario is the design and implementation of competence-based curricula, where competence-development will play a central role, for competences are becoming *more and more relevant for preparing students well for their future role in society in terms of employability and citizenship* (<http://tuning.unideusto.org/tuningeu>).

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# **TO KILL TWO BIRDS WITH ONE STONE – USE OF PEER-LEARNING IN TEACHING OF INNOVATION AND ENTREPRENEURSHIP AT AKERSHUS UNIVERSITY COLLEGE**

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## **Abstract**

This article is a comparative longitudinal study of the students' learning of innovation and entrepreneurship at Akershus University College's bachelor programs in Facility and Service Management and in Food and Catering Management. The amount of formative assessment of the students was significantly increased in 2007. The students' learning outcomes improved significantly, but so did the teachers' workload. Introduction of systematic use of fellow students' response (peer learning) in 2008 as formative assessment made a difference. The students' learning improved, even if the students' demand for counseling went down compared to 2007. Another very interesting observation was that assumed weak students seemed to perform better than expected, while assumed strong students still performed excellent. A very interesting side effect is that fellow student response may improve the students' managerial skills. This is very beneficial for students aiming for managerial careers. Statistical analyses of the Facility and Service Management and the Food and Catering Management students' marks revealed that introduction of fellow student response actually made a positive difference for medium to low performing students.

## **Introduction**

Innovation and entrepreneurship are currently part of most study programs in business administration. These subjects can also be understood as practical skills as well as a mindset. How to improve the students' learning of innovation and entrepreneurship which are skills useful in most walks of life?

Since 2000 two reforms significantly have affected Norwegian higher education. The first is the 2000 Competence Reform (Realkompetansereformen), which made undergraduate profession oriented studies an option for a large number of possible new students. Access to higher education in Norway had until then been based on so-called "formal competence"; i.e. completed upper secondary education and in some instances two years of relevant work experience. The Real Competence Reform established that persons aged 25 or more could be

admitted into profession oriented study programs based on so-called “non-formal” and/or “informal competence”; i.e. no or only partially completed upper secondary education and/or competence acquired through recognized relevant work experience (Holmesland et al. 2001). The non-formal or informal competence is currently established through a so-called real competence screening of applicants who lack formal competence. The 2000 Competence Reform thus implemented the idea about life-long learning in Norwegian higher education.

The second reform affecting Norwegian higher education was the so-called Quality Reform, an implementation of the Bologna process. Former Norwegian structures for higher education were from 2003 replaced by a standardized 3+2+3 structure with Bachelor, Master and Ph.D. degrees. Several former Norwegian grading scales were similarly replaced by a standardized ECTS grading scale (Ministry of Education and Research 2009). However, the Quality Reform was not only an administrative and structural reform. It was also a teaching reform, because “Priority is to be given to a combination of teaching methods involving a high level of student activity, new forms of assessment and regular feedback that promotes learning” (Ministry of Education and Research 2001).

This article presents a longitudinal study from 2006 until 2010 concerning the students at Akershus University College’s bachelor programs in Facility and Service Management and in Food and Catering Management learning of innovation and entrepreneurship. The teaching and assessment methods in these study programs’ common course in Innovation, Entrepreneurship and Project Management (15 ECTS) have gradually been altered to fulfill the Quality Reform’s requirements and to improve the students’ learning outcomes. The two research questions discussed in this article are: First, have introduction of systematic use of fellow student response affected the students’ learning of innovation and entrepreneurship? Second, how has introduction of systematic use of fellow student response affected different categories of students’ learning of innovation and entrepreneurship? This study is based on statistical analyses of the students’ performance before and after introduction of systematic fellow student response.

## **The bachelor programs in Facility and Service Management and in Food and Catering Management**

Akershus University College’s current bachelor programs in Facility and Service Management (Husøkonomi og serviceledelse) and in Food and Catering Management (Kostøkonomi, ernæring og ledelse) are both interdisciplinary undergraduate profession studies established in the 1950s. The Bachelor in Facility and Service Management is designed for students aiming for managerial positions responsible for operating and maintaining large buildings with content and services. The Bachelor in Food and Catering Management is similarly designed

for students aiming for managerial positions in large households and food service organizations.

There were no requirements for formal competence for access to these educations until 1995, when Norway's revised University and College Act (Universitets- og høyskoleloven) established minimum formal competence requirements for access to higher education. The revised University and College Act also established vocational training as ticket to some of the higher educations. From 1995 access to the Facility and Service Management and the Food and Catering Management educations required a minimum of upper secondary vocational education and a trade certificate (fagbrev), or a minimum set of formal competence from upper secondary school (generell studiekompetanse). The trade certificate could be substituted with two years of relevant work experience.

Akershus University College's educational programs in Facility and Service Management and in Food and Catering Management were from the fall 2003 expanded from two years candidate to three years bachelor programs. These changes were a direct consequence of the Quality Reform. Another important change was abandoning the requirement for a trade certificate (hotellbrev) or two years relevant work experience for applicants to the new Bachelor in Facility and Service Management. Applicants with formal competence only, for instance acquired through three years upper secondary or high-school education (allmenfaglig studieretning), could thus from the fall 2003 become students at the Bachelor in Facility and Service Management. The 2003 reforms revived the Facility and Service Management education, which then struggled with diminishing number of applicants. The Bachelor in Facility and Service Management now has many applicants, among others because many service companies specialized in Facility Management and public sector organizations and non-profit organizations have recognized that persons with this education are well equipped for a wide range of managerial positions.

The Food and Catering Management education was also from the fall 2003 expanded from a two years candidate to the current three years bachelor program. However, the requirements for a trade certificate (fagbrev) and relevant work experience either as a dietary cook (institusjonskokk) or as a chef (restaurantkokk) were upheld. The requirement for a trade certificate together with structural reforms within Norway's healthcare sector which significantly reduced the number of kitchens in hospitals and elderly homes have effectively constrained the number of applicants to the current Bachelor in Food and Catering Management. Even those with a Bachelor in Food and Catering Management are well equipped for a wide range of managerial positions in private enterprises, public sector and in the so-called third sector (voluntary organizations).

## Can use of particular teaching methods improve the students' learning?

Marton et al. (1977) and Marton and Säljö (1986) established the distinction between surface and depth learning. Surface learning means the ability to reproduce textbook answers in tests and exams. Depth learning means the ability to reason about what, why and how one learns, and develops the students' skills for so-called higher order learning; i.e. metacognitive skills (See for instance Askerøi 1999:204-210). Activating the students is one of the teachers' most important means for facilitating the students' learning according to Bjørke (2006), particularly if the aim is depth learning.

How to activate and motivate the students in order to promote depth learning? Assessments are one method. It is common to distinguish between diagnostic, formative and summative assessments (CLDP Resource Centre 2008; Lauvås 2003; 2006:92 ff.). Diagnostic assessments are usually used before or early in a learning process, to map the students' actual knowledge and skills levels, in order to facilitate adaptation of the teaching to the students' actual needs, given the study unit and/or the students' learning goals. Formative assessments are feedback during the learning process, to further facilitate the students' learning. This feedback can either be given by the teacher, by other students (peer learning) or through combinations of teacher and fellow student response. Summative assessments are used after the learning process has been completed, to verify the students have reached their learning goals, and to rank the students.

Research has shown that formative assessments may improve the students' learning. The teaching at some of the worlds' most well known universities is permeated by liberal and frequent use of formative assessments (Gibbs & Dunbar-Goddet 2007, Lauvås 2003). Formative assessments, such as mandatory exercises, student presentations, writing of reaction and term papers, etc., can thus be very useful means for teachers to establish learning situations that actually improve the students' learning outcomes.

However, increased use of formative assessments usually increases the teachers' workload. But systematic use of peer-assessments (peer-learning) instead of or as a supplement to teacher assessments may increase the students' amount of formative assessment, but not the teachers' workload (Topping 1998). Systematic use of peer-assessment may thus expose the students to far more formative assessments, without excessive increase of the teachers' workload. Social pressure from fellow students can also be an unintended and in many instances positive side effect from peer-assessments. Peer-learning is commonly used at Norwegian university colleges in teaching of teacher, nursing and social worker students, but has so far not been very commonly used in teaching of business administration and similar academic disciplines.

Fellow student response or peer learning may also have other side effects (Døving et al 2001, Lauvås 2003:10-11), which can be of particular relevance for students aiming for managerial positions.

First, peer-learning or fellow student response trains students in providing feedback to others. Peer-learning or fellow student response thus provides training in practical leadership. The ability to provide constructive feedback to fellow workers and subordinates is a crucial managerial skill.

Second, peer-learning or fellow student response also trains the students' skills in receiving feedback. Many Norwegian students are not used to direct feedback about their work performance, particularly not negative feedback. Fellow student response or peer-learning may thus make the students more susceptible to negative feedback about their own work performance (Topping 1998). The ability to receive negative feedback in a constructive manner can be the difference between future professional success and failure.

Third, peer-learning or fellow student response may also improve the students' community of learning. Systematic use of fellow student response or peer-learning increase the students' involvement in their fellow students' learning, compared to situations where the students only receive feedback or response from the teachers (Topping 1998). Increased involvement in the other students' learning is well known among students who have managed to establish functional colloquium or study groups, where they present and discuss the required reading with each other, and even provide feedback to each other based on their presentations of the required reading. Systematic use of fellow student response can establish a similar environment in large groups of students.

Fourth, peer-learning or fellow student response may also improve the students' skills in communication, negotiations and conflict resolution (Topping 1998). These are all skills necessary for those dependent of cooperation with others to reach their own and/or their organization's goals. Many employers currently look for team players when hiring.

Finally, systematic use of peer-learning or fellow student response may result in more concerted learning in a large group of students. Peer-learning require the students to work in almost the same pace. This also facilitates involvement of more students in the learning process. Organized and systematic use of fellow student response or peer-learning, combined with requirements about the quality of the students feedback makes it thus more difficult to rely on hard work only a few weeks before exams or other kinds of summative assessments. Systematic work during time facilitates most students' learning as well as their depth learning. Fellow student response may improve the students' learning without an excessive increase in the teacher's workload. There are also a number of side effects that provides very strong arguments for use of fellow student response or peer learning, particularly for students aiming for a managerial career. These side effects make it possible to kill two birds with one stone.

## Research questions and methodology

The research questions in this article are: First, have introduction of systematic use of fellow student response affected the Facility and Service Management and the Food and Catering Management students' learning of innovation and entrepreneurship? Second, how has introduction of systematic use of fellow student response affected different categories of students' learning of innovation and entrepreneurship?

This article is based on literature studies about pedagogic and didactic and analyses of qualitative and quantitative data about the third year students at Akershus University College's Bachelors in Facility and Service Management and Food and Catering Management. The literature studies established the foundation for how to adapt the teaching in order to improve the students' learning outcomes, and also inspired this article's research questions.

The qualitative data have been collected through observation of these students in auditoriums and classrooms, through counseling, and through informal coffee-break discussions with many of the students. The qualitative data have first and foremost been used as a background for understanding and interpretation of the quantitative data.

The quantitative data about these students (N = 158) and their performance in the mandatory course in Innovation, Entrepreneurship and Project Management have first and foremost been collected through Akershus University College's administrative systems. The quantitative data include the students' gender, whether they are formal or non-formal competence students, their study program, their initial motivation; i.e. whether their study program was their first choice or not, whether they were subject to systematic use of fellow student response, and their marks in the course in Innovation, Entrepreneurship and Project Management, and their marks in the first year mandatory course in Accounting and Managerial Economics. The marks in Accounting and Managerial Economics were used as a proxy for the students' skills level.

The data concerning the students' gender, competence, study program, initial motivation and whether they were subject to systematic use of fellow student response were dichotomized (0 and 1). The students' marks in Innovation, Entrepreneurship and in Accounting and Managerial Economics were represented by a scale from 0 to 5 (F to A). The students' marks in Innovation, Entrepreneurship and Project Management were also dichotomized in the initial analysis (A and B vs. lower marks).

The initial analysis was a causal analysis based on the so-called "Effect Change Design" (Valen & Katz 1964:177 in Hellevik 1988:70-81). This first analysis revealed the data was ridden with interaction. Interaction means there are different effects on the dependent variable given the same value on one independent variable and different values on another independent variable (Hellevik 1988:122 ff.; 1991:244 ff., Eikemo & Clausen 2007:68 ff.). Interaction is thus a threevariate phenomenon. Linear multiple regression (OLS) was therefore chosen for the fi-

nal analysis (Newbold 1991:457 ff., 667, Hair et al. 1998:141 ff., 170-171, Eikemo & Clausen 2007:52 ff.).

There were also tendencies to multicollinearity in the data because of correlation between some of the independent variables (Hair et al 1998:143). It was significant correlation (Pearson's Rho) on the 0,01 level (two-tailed) between the students' motivation and competence (0,246), between the students' competence and study program (0,370) and between the students' mark in Accounting and Managerial Economics and fellow student response (-0,225). These tendencies to multicollinearity were taken into consideration during interpretation of the regression analyses.

## **The course in Innovation, Entrepreneurship and Project Management**

The course in Innovation, Entrepreneurship and Project Management were first carried out in 2006, when the first hatch of students at Akershus University College's Bachelors in Facility and Service Management and in Food and Catering had reached their sixth and final term. The course's main learning goals since 2006 have been that groups of two to five students should develop their own business idea, write a business plan and figure out what it takes to establish a firm for realizing this business idea.

Most of the formative assessment during the 2006 course in Innovation, Entrepreneurship and Project Management was given as teacher response, either in plenary sessions or during counseling of each group. The summative assessment was a combination of an oral exam during a plenary session, where each group presented their business idea and plan for how to realize it for the teachers and their fellow students, and a written exam consisting of each group's project report with a business, marketing and financing plan. The project report accounted for 60 percent and the oral presentation for 40 percent of the mark. It was thus less emphasis on the formative than the summative assessment in this first version of the course, even if the pedagogic literature claim that formative assessments are more important for the students learning than summative assessments (cf. Gibbs and Dunbar-Goddet 2007; Lauvås 2003).

A number of modifications were introduced in the 2007 version of the course. First, the students' final presentation was converted to a competition, where the students voted for the best presentation. The students' vote was a kind of direct fellow student response or peer-learning. The group receiving most votes was awarded with books about innovation and entrepreneurship. Second, the students also had to plan, organize and arrange a public conference for promoting Akershus University's Bachelor in Facility and Service Management and Bachelor in Food and Catering Management as well as themselves. The target audience was possible employers in private enterprises, public administrations and the third sector. The students had to develop the program, and invite external

lecturers, audience, etc. The 2007 conference took place in the afternoon after the students' oral presentation of their business plans. The 2007 conference was very well received by those employing Bachelors in Facility and Service Management and Bachelors in Food and Catering Management. Finally, the amount of formative assessment was increased significantly compared to 2006. Each group of students had to submit draft versions of the business plan's chapters. The students received written and oral teacher response, either in the plenary, or through counseling of groups or individual students. The students also received direct response from the conference's audience.

There is no doubt the increased amount of formative assessment improved the students' learning outcomes, such as claimed in the literature (cf. Gibbs & Dunbar-Goddet 2007). The students' feedback after the course had been completed was unambiguous. But increased amount of formative assessment was rather demanding for the teachers involved (cf. Lauvås 2006). The teachers' workload increased significantly compared to 2006.

How to solve the problem that increased use of formative assessment is beneficial for the students' learning, but often less beneficial for the teachers? The solution came through Oslo University College's course in elementary pedagogic 2007-2008. Fellow student response or peer-learning was here introduced as a possible remedy for how to improve the students' learning without drowning the teachers in work.

The syllabus for the Bachelor in Facility and Service Management and the Bachelor in Food and Catering Management's common course in Innovation, Entrepreneurship and Project Management was slightly modified in 2008.

First, the lectures were more evenly distributed. The lectures were initially concentrated in the first part of the course. The conference was similarly moved from week 11 to week 9, to provide the students with more time for the final papers. The 2008 conference was carried out during daytime instead of during afternoon such as in 2007. The conference participants could also taste one of the student group's business ideas during the lunch break. An individual paper was also introduced as a supplement to the group paper, in order to prevent free-riding.

However, the most important modification was introduction of a number of mandatory plenary sessions with systematic and organized fellow student response. Each group of students had to provide written and oral comments to another group's business idea, market analysis and marketing plan, budget and financing plan, etc.

The students were also taught about different kinds of assessment and how to provide written and oral fellow student response. This was also how the students agreed about the rules of the game for the fellow student response. The students were also taught how formative and summative assessments can be used as managerial tools (cf. Døving et al. 2001). Each session with fellow student response was governed by questions made by the responsible teachers and a detailed plan that had been handed out to the students well in advance of each



session. The groups providing fellow student response had to submit one page of written comments in addition to their oral comments delivered in plenary. The groups also received the teachers' written and oral response, in addition to the plenary discussion entailing each group's presentation.

One important experience in 2008 compared to 2007, was significantly reduced demand for counseling. This may indicate that fellow student response actually substituted traditional teacher counseling, such as indicated by Gibbs & Dunbar-Goddet (2007) and Lauvås (2003).

Another important modification in 2008 was introduction of a written midterm evaluation. This midterm evaluation made it possible to make adjustments in the second half of the course, and revealed that most students were fairly happy with how the teaching was organized. The students also claimed that increased use of formative assessments, hereunder fellow student response, increased their learning outcome. Another important side effect of mandatory fellow student response in plenary sessions, was that many students became rather good in debate and presentation techniques.

An important modification of the mandatory course in Innovation, Entrepreneurship and Project Management took place in 2010, when the course was kicked off by a two days so-called Entrepreneur Camp (Gründercamp) together with Akershus University College's design students. During this Entrepreneur Camp about 150 students in 20 groups, each consisting of students from the Bachelor in Facility and Service Management, the Bachelor in Food and Catering Management and the Bachelor in Product Design, solved problems for a business sector organization. The best concepts developed by the groups of students during this Entrepreneur Camp were awarded by the business sector organization who owned the problems.

An interesting observation is that assumed strong students performed well in this course in Innovation, Entrepreneurship and Project Management. This was as expected. Strong students are here defined as those who performed excellent (A or B) in the mandatory course in Accounting and Managerial Economics. Weak students are here those who performed poorly or not satisfactory (E and F) in the same course. Many of the students who performed poorly or not satisfactory in the mandatory course in Accounting and Managerial Economics performed excellent (A or B) in this course in Innovation, Entrepreneurship and Project Management. Increased use of formative response, hereunder fellow student response, may thus have improved assumed weak students' learning results.

This observation was largely replicated in 2009 and 2010, when the course was carried out almost as in 2008. However, in 2010 a group of assumed strong students took the easy way through the course in Innovation, Entrepreneurship and Project Management. This group chose deliberately a very simplistic business idea. They got a lower mark than what had been common among similar students. On the other hand, a group of students in 2010 who barely had passed the course in Accounting and Managerial Economics came up with a rather advanced business idea and wrote an excellent business plan. Students from this group also wrote some excellent bachelor theses. This last observation indicates

that some learning actually had taken place during three years at Akershus University College.

## **Does introduction of fellow student response make a difference for the students' learning of innovation and entrepreneurship?**

This statistical analysis is an attempt of answering this article's two research questions. First, have introduction of systematic use of fellow student response affected the Facility and Service Management and the Food and Catering Management students' learning of innovation and entrepreneurship? Second, how has introduction of systematic use of fellow student response affected different categories of students' learning of innovation and entrepreneurship?

A stepwise regression analysis of the entire dataset for all students from 2006 until 2010 (N = 158) with the students' marks in Innovation, Entrepreneurship and Project Management as dependent variable, where the independent variables were added one by one (the students' gender, formal/non-formal competence, study program, motivation, subject to fellow student response and marks in Accounting and Managerial Economics), revealed that fellow student response made no significant contribution to the students' marks in Innovation, Entrepreneurship and Project Management. The only significant independent variables were study program in three of the models and the students' motivation in one model.

However, fellow student response became a significant independent variable when the dataset was split and the different categories of students were compared against each other. When the dataset was split according to competence (102 formal competence and 56 non-formal competence students), then introduction of fellow student response made a difference for the formal competence students. The average mark in Innovation, Entrepreneurship and Project Management in this model was 2,833 (constant). Introduction of fellow student response improved the mark 0,389 ( $t = 2,410$  and  $sign = 0,018$ ). Study program (Bachelor in Food and Catering Management) improved the mark 0,982 ( $t = 5,139$  and  $sign = 0,000$ ). The students' motivation (first choice) improved the marks 0,338 ( $t = 2,200$  and  $sign = 0,030$ ). This model's  $R^2$  was 0,269, a very good result. However, here we have to take into consideration that motivation and competence were significantly correlated with each other. The same was the case for competence and study program. This finding, that introduction of fellow student response improved the formal competence students' marks in Innovation, Entrepreneurship and Project Management, partly answered the first research question.

However we also have to find out how introduction of fellow student response has affected different categories of students' learning of Innovation, Entrepreneurship and Project Management. To answer this question the dataset was

further split according to study program combined with gender, competence, and motivation.

A stepwise regression with the dataset split according to study program (105 Bachelor in Facility and Service Management students and 53 Bachelor in Food and Catering Management students) and gender (116 female and 42 male students) revealed that fellow student response made a difference for male students at the Bachelor in Facility and Service Management. The average mark for these students was 2,895 (constant). Introduction of fellow student response increased their mark 0,657 ( $t = 2,119$  and  $sign = 0,045$ ). Non-formal competence and motivation (first choice) similarly increased the mark 0,186 and 0,379, but these variables were not statistically significant. This model's  $R^2$  was 0,223. Even here we have to take into consideration the independent variables correlation, and this model's high  $R^2$  can be somewhat misleading.

A stepwise regression with the dataset split according to study program and competence (102 formal and 56 non-formal competence students) similarly revealed that fellow student response made a difference for formal competence students at the Bachelor in Facility and Service Management. These students' average mark was 2,702 according to this model (constant). Introduction of fellow student response increased their mark 0,444 ( $t = 2,313$  and  $sign = 0,023$ ). Gender (male) increased the mark 0,068 (not statistically significant). Motivation (first choice) increased the mark 0,423 ( $t = 2,322$  and  $sign = 0,023$ ). This model's  $R^2$  was 0,143, which seem to be rather realistic.

A stepwise regression with the dataset split according to study program and motivation (105 first choice and 53 less than first choice students) similarly revealed that introduction of fellow student response made a difference for students at the Bachelor in Facility and Service Management which not had this study program as their first choice. The average mark for these students was 2,878 (constant). Introduction of fellow student response increased their mark 0,635 ( $t = 2,043$  and  $sign = 0,050$ ). Gender (male) increased the mark 0,032 (not statistically significant) and non-formal competence increased the mark 0,788 (not statistically significant). This model's  $R^2$  was 0,130, which also seem to be rather realistic.

## Summary and conclusions

This article has been an attempt of answering two research questions. First, have introduction of systematic use of fellow student response affected the Facility and Service Management and the Food and Catering Management students' learning of innovation and entrepreneurship? Second, how has introduction of systematic use of fellow student response affected different categories of students' learning of innovation and entrepreneurship?

Why bother with these questions? Because research has found that increased use of formative assessments all other things equal may improve the students' learning (cf. Gibbs & Dunbar-Goddet 2007, Lauvås 2003). However, increased

use of formative assessments usually increases the teacher's workload. One workaround that increases the students' exposure to formative assessment without increasing the teacher's workload excessively is use of fellow student response (peer learning). Fellow student response - all other things equal - is claimed to improve the students' learning outcomes, and to have several beneficial side effects (cf. Lauvås 2003 and Topping 1998). Some of these side-effects are of particular interest for students that aim for managerial careers. Introduction of fellow student response thus makes it possible to kill two birds with one stone.

Regression analysis with the students' at Akershus University College's Bachelor in Facility and Service Management (N = 105) and the Bachelor in Food and Catering Management (N = 53) marks in the mandatory course in Innovation, Entrepreneurship and Project Management as dependent variable gave the following results:

First, introduction of fellow student response significantly improved the formal competence students' marks in Innovation, Entrepreneurship and Project Management. This finding answered this article's first research question. Introduction of systematic fellow student response has improved the students' learning of innovation and entrepreneurship.

Second, introduction of systematic fellow student response has also significantly improved the male students at the Bachelor in Facility and Service Management learning outcomes, the formal competence students at the Bachelor in Facility and Service Management learning outcomes, and finally the learning outcome for students at the Bachelor in Facility and Service Management who not had this study program as their first choice. Thus, the answer to the second research question is that introduction of systematic fellow student response seem to be particularly beneficial for students with medium to low motivation. High motivation and high achieving students seem to be far less dependent of systematic use of fellow student response than medium to low motivation and achieving students. Introduction of fellow student response may thus improve low to medium performing students' achievements, without harming the high performing students' achievements.

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# CREATIVE ACCOUNTING IN THE ACCOUNTING CURRICULUM AT THE UNIVERSITY OF ECONOMICS IN KATOWICE

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## Abstract

The aim of the study is to obtain answers to the following questions:

- Whether, according to students, information concerning creative accounting can be useful?
- What information about creative accounting is provided at the University of Economics in Katowice?
- What students know about creative accounting techniques and their detection?
- Whether future accountants and financiers deem creative accounting acceptable?

## Introduction

We happen to live at the time of increasing importance of knowledge, as a source of potential success. Knowledge is the basic component of learning and teaching, as well as of innovation, invention, competence, and creativity. According to A. Toffler (1995), knowledge is the basic resource, which is decisive in terms of competitive edge, and is the driving force of the economy. P. Drucker (1999, p.14 and p.40) points out to the fact that knowledge is not only yet another factor in the production process, but becomes a basic economic resource. It is believed that three factors are decisive for the advantage of one entity over another one: clever positioning, resources, and obsession for knowledge (G. Stonehouse, J.D. Pemberton, C.E. Barber, 2001). In the previous century, accounting, information, and knowledge gained particular importance, it is said that the 21<sup>st</sup> century is the century of knowledge and information, as well as competence related to them.

In the accountancy education, one can look for a double importance of information and knowledge:

- we are to teach by means of passing the knowledge about accounting, and to enhance the competencies of potential accountants,

- we are to teach about how to properly pass the information about the functioning of enterprises, as such is the role of accountancy.

In recent years some questionable accounting practices have been disclosed; several of those commonly known as creative accounting were taken to court. Creative accounting should be understood as organizing and presenting balance sheets in a way that makes a company look better than it really is. This is usually done within the letter of the law, and relies on the selection of particular accounting methods or legally justified freedom of action. Also referred to as kiting, it is a highly valued skill of a good accountant. However, there have also been fraudulent practices which threaten public interest as well as the interest of company owners. Creative accounting tricks, recently made public, were used in several enterprises including e.g.: Enron, Elan.

This article presents education problems – competence development - about creative accounting for example University of Economics in Katowice.

## **Competence and competence development for example accounting education**

In the context of the European Qualifications Framework, competence is described in terms of responsibility and autonomy as one of learning outcomes. Learning outcomes means statements of what a learner knows, understands and is able to do on completion of a learning process, which are defined in terms of knowledge, skills and competence, where:

- knowledge' means the outcome of the assimilation of information through learning. Knowledge is the body of facts, principles, theories and practices that is related to a field of work or study. In the context of the European Qualifications Framework, knowledge is described as theoretical and/or factual
- 'skills' means the ability to apply knowledge and use know-how to complete tasks and solve problems. In the context of the European Qualifications Framework, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools and instruments),
- 'competence' means the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development.

The purpose of education in the field of accounting (International Federation of Accountants, 2009) is, first of all, to have the students acquire certain competencies. Those competencies are defined as the ability to perform a work in accordance with standards proper for given work conditions. The competencies of



a professional accountant are demonstrated by having certain capabilities, for which the following are indispensable:

- professional knowledge
- professional skills
- professional values, attitudes, and ethics.

Learning and development in the context Proposed Framework for International Education Standards for Professional Accountants is an ongoing process of acquiring, maintaining and renewing competence at an appropriate level throughout a Professional accountant's Career. The extent to which each of the different forms of learning and development are used may vary. For example, in the early stages of development as a professional accountant, education may be emphasized. Over time, the balance may shift to learning and development through practical experience. The appropriate level of competence will vary depending upon such factors as the complexity of the environment, the complexity of tasks, the variety of tasks, required specialist knowledge, influence on the work of others, reliance on the work of others, level of autonomy, and required level of judgment (International Federation of Accountants, 2009). As an example of the desired final competencies of an accountant, the Proposed Framework for International Education Standards for Professional Accountants (International Federation of Accountants, 2009) provides the ability to generate a set of accounting rules for a given company, in full compliance with International Financial Reporting Standards and the national regulations of Accounting Law. One should also keep in mind the different career paths in accounting, and the competencies and capacities at each level of professional development related to that; for example the competencies required from people admitted for the first year to audit team or accounting department, from people who themselves keep the accounts of companies, or from chartered auditors will differ.

Among the competencies being the result of the education process in accountancy, the following can be listed:

- familiarity with the accounting system, the principles of its functioning, and legal regulations,
- preparation of financial reports,
- recognition of individual entries in financial reports,
- understanding the role of accountancy in the management of an enterprise,
- pricing of reporting entries,
- ability to meet the requirements of reporting duties,
- understanding the principles and standards of accountancy,
- accounting for respective transactions in the ledgers,
- differentiating between costs, and making their calculations,
- determining the influence of costs and revenues upon the financial result,
- analyzing costs, revenues, and financial results,

- assessment of the enterprise achievements, presented in financial reports,
- preparation of management reports, as well as taking managerial decisions on their basis,
- preparation of financial plan.

In Poland the especially resolution determined the principles of certification of the profession of accountant by the Association of Accountants in Poland as part of the education activities it has been conducting. Certification of the profession of accountant is understood as attestation of the qualifications, verified by means of exams, of people preparing for professions connected with accountancy. The certification of the profession of accountant within the framework of education path comprises four levels of education, the completion of which with a positive result constitutes the basis for confirming the qualifications at a definite level, and issuing a document for holding the title of (Association of Accountants in Poland , 2009):

- level I - assistant in accountancy,
- level II - independent accountant,
- level III – specialist in accountancy,
- level IV – certified accountant.

The scope of qualification requirements at specific levels of education is determined by the Presidium of the Board of the Association of Accountants, in the “Organization and Programme Assumptions” being passed as a resolution. On every level there are different requirements. If a graduate specializes in accounting, they are at level 2. To go to level 3 they should pass on exam and fulfil additional requirements for example: represent moral attitude and take on oath. After 2 years of practice they will reach level 4. But there are also different routes – when we don’t have higher education or when we don’t have higher education in accounting.

An important task for the system of education on accountancy seems to be the assumption of suitable responsibility for information, on the part of future accountants, which is manifested by the fact that they should be able to generate high quality financial reports, including also the compliance of the reports with true and fair view. The responsibility of the accounting professions is important because of:

- the capacity of the accountant profession and of accountancy, which is a service in providing reliable and credible information, that cannot be biased, incompetent, or dishonest,
- the necessity of making professional judgment and choices in the profession practiced.

That is why it is considered that a person who deals in accountancy should be characterized by being conscientious, honest, professionally-minded, systematic, responsible, loyal to the owner and management board, credible, objective,

kind, and respectful (Association of Accountants in Poland , 2007, p. 20-24). It should be assumed that responsibility for the accounting kept will not be avoided by a person that has the proper knowledge, abilities, and high moral standards.

Also important is the so-called “intellectual honesty” which means, that the person dealing in accounting cannot make the impression of having the knowledge and experience, that in fact s/he does not have. An accountant should only take up such duties/ work, for the execution of which s/he has the suitable competencies respectful (Association of Accountants in Poland , 2007, p. 24). The ethical problems of the accountant profession have recently seemed of particular importance, because:

- a world-wide moral crisis can be observed,
- ethics is pushed to the peripheries of human value system,
- ethics in accountant profession may often be an uncomfortable restriction for possibilities of acting,
- private and commercial interests influence the construction of standards of acting, in which the principles of ethics are not followed (A. Karmańska, 2005, p. 139).

## **Creative accounting versus aggressive accounting**

The adjective “creative” has positive connotations, in most of the cases. A creative person is one who is fluent in her/his profession, qualifications, intelligence, has ideas and does act in conventional manner. One of the few exceptions where the adjective “creative” is perceived negatively applies to the notion of a “creative accountant” or “creative accountancy” kept by such an accountant. Being crude, many people think that a creative accountant is a cheater, a liar, a criminal, a forger or even a thief (secretly taking money out of the company). Creative accounting also has bad connotations. After a series of financial scandals, especially from 2001 onwards, and after the collapse of Enron, the confidence in information provided by financial statements dwindled. Those who use financial statements and reports are skeptical about the achievements presented in them. If we deal with a creative financial statement, we are not sure what is behind it. Is the disclosed profit of 100,000 Euro perhaps not a loss, in real terms, of the same amount? The issue is that it proves difficult to foresee the range of deviations from actual achievements. Yet, does such a thing as a real achievement exist at all? Is it possible to talk about an objective reporting by entities/ individuals that follow the principle of subjectivity?

We have to do with creative accounting, when the principles, customs, and accounting policies permitted by means of legal regulations, are selected in such a way as to present the most desired picture of the company, in the given circumstances.

The main reasons for applying creative accounting include:

- The necessity to disclose a financial result expected by the “market”, that is with reduced losses or increased profit, of particular importance for companies listed on stock exchanges,
- Minimizing the profit to be taxed (before taxation). Examples here include substitution methods of stock valuation, which may lead to differences in the taxable amounts,
- Convincing others about one’s own credibility,
- Controlling/ regulation of the achievements of managers, in order to obtain the performance-related bonus or the bonus for management board, depending upon the profits generated,
- Requirements of the dominant entity, concerning the definite minimum return on investment to be achieved by the dependent entity,
- Hiding of financial risk,
- Enabling to obtain external capital for financing of further activities,
- Manipulation with indicators, which may be used in the analysis of financial reports, for example reduction of debt ratios,
- Expected substantial slump in the economic development in future. A known practice in that respect is provisioning/ building up reserves when the result is better, while in future, when the management board expects worse results, the reserves may be dissolved.

There are also numerous other reasons for creative accounting. In extreme cases, that may lead to the situation, in which the view/ picture of the enterprise presented in the financial report does not constitute a reliable rendering of reality, while the difference in the presentation is so huge, that it grossly strikes the interests of users of the financial statements/ reports. That is why the opinions concerning creative accounting are divided. For that reason, I differentiate three levels of widely understood creative accounting. These are:

1. Conscious use of accounting policy, to render the individualism of processes in a given entity, and to present them in accordance with the true and fair view principle,
2. Conscious application of balance sheet policy (making use of the right to choose and freedom of activity) to achieve the temporary goals (to obtain a credit/ loan, to get the bonus, to increase the value of the enterprise) – mainly over short periods of time, that proves most often impossible over longer time (a few or several years),
3. Breaking the law and fraudulent accounting.

Level one is generally accepted and desired. The International Financial Reporting Standards assume that an entity would consciously choose proper tools of balance sheet policy, in order to present a true and fair view of the enterprise. It

is thus assumed that this principle cannot be implemented using identical techniques in each entity.

Level two is generally doubtful. That level is where the borderline lies, between creative and aggressive accounting, that borderline being thin indeed. Achievement of temporary goals may increase to the level of data manipulation in such a way as to induce the users of financial report/ statement for behaviour contradictory to their own interest, which they would not take up in the condition of a different (more proper) reporting information, while due to assuming a definite position they reduce their economic profits. In such cases I am of the opinion they we have to do with aggressive accounting, even when legal regulations do not indicate explicitly that some specific actions are prohibited.

The third level of creative accounting cannot be tolerated, of course, that is aggressive accounting as such.

Among the reasons why aggressive accounting occurs, the following are mentioned:

- Nature and level of human education, which comprises lack of competence, absence of professional ethics, lack of responsibility, loyalty conflict,
- Dependence of accounting firms and auditors upon their customers,
- Capacity of legal regulations, which provide freedom of choice concerning accounting and reporting solutions,
- Complex, structured products and services, which are hardly legible in interpreting, and even less so in the accounting and reporting approach,
- Globalization of markets, which led to the formation of multi-tier and vertically-structured capital groups, the reporting of which is not always transparent and understandable (A. Kamela-Sowińska, 2003, p. 56-57).

In order to provide the picture of the enterprise, expected, by management boards, usually the following kinds of manipulation in financial reports/ statements are applied:

- Overstated revenues on sales, by disclosing revenues not achieved and by manipulating the end of year date,
- Overstated profits on sales, by reduced obligatory costs, by postponing costs for a later period, or by hidden reserves,
- Overstated assets (receivables that are un-collectable, stock that cannot sold, incorrect valuation of fixed assets),
- Underestimated payable. It is worthwhile to examine the off-balance-sheet items – conditional liabilities,
- Transactions with dependent entities, such as e.g sale of fixed assets,
- Establishing new entities (assets brought in as contribution)
- Provisioning (reserve establishment) policy,
- Juggling with equity, for example accounting for losses by means of changes in the ownership capital.

# The teaching about creative accounting at University of Economics in Katowice

The teaching about creative accounting may be considered in the following aspects:

- Legal and organizational,
- Ethical and moral.

Both issues may be presented in the following education tasks:

- Development of creative thinking through teaching a generalized content, providing possibilities of multi-variant solutions, as well as practising the adaptation of those solutions to a particular scenario,
- Provision of correct ethical attitudes and development of proper customs in ethical behaviour against the professional and general social background. It is worthwhile to quote here one of the statements from The International Education Standard for professional accountants IES 4 Professional Values, Ethics and Attitudes namely: program of education in the field of accounting should provide the future professional accountants with conceptual assumptions concerning professional values, ethics, and professional attitudes necessary to use professional judgment as well as to take ethical actions, serving the best interests of society and the profession (International Accounting Education Standards Board, International Federation of Accountants , 2004).

When explaining the first type of education tasks, it should be pointed out that accountancy as science, practical activity, and the sphere of didactics is composed of:

- Meta-theory,
- Theory with methodology,
- Practice.

In the didactic process the focus is mainly upon theory with methodology. The primary principles of accountancy are discussed, along with the financial reports, assets and liabilities are classified, ledgers are discussed, along with accounts, specific processes, and their rendering in the ledgers, necessary settlements are made, and the financial result of an entity is determined, as well as the statements of cash flow, financial statements are analyzed, balance sheet policy is discussed. Separate issues are the reports provided for managers – as management accounting and audit. We try to demonstrate the practical side of the activities on examples from real economy, still the most full implementation of that part is via student apprenticeships. Most often, there is not enough of meta-theory. That can be explained by the overloaded minimum scope of the didactic program and the number of hours devoted to the accounting-related subjects.

We focus mainly upon the tools for obtaining qualifications to perform specific tasks in the accounting profession. That results in a situation that the graduates are perceived by employers as a somehow not sufficiently flexible by employers, and less able to adjust to changes in the regulations, especially those changes that are 'revolutionary', they also demonstrate potentially less creativity. The above is indicated by the external reports from meetings with employers, yet besides that the graduates from the University of Economics in Katowice as assessed positively indeed.

Students of the University of Economics in Katowice are familiar with International Financial Reporting Standards and their contents, they know the Act on accounting, they are aware of the fact that we have a system of regulations based on general principles (although most often many of them have a problem with discussing them), they know a host of detailed accounting solutions pertaining to book-keeping, valuation of reporting entries and their inclusion in financial reports, they are familiar with the rights of choice and freedom of action, which have the aim of reflecting the individual type of the given entity's activity. Students know, in general terms, that accounting regulations may differ from country to country, especially the accounting regulations binding in the USA. But that is it, apart from students who take part in international exchange and get to know the accountancy in a given country. Besides such exceptions, the students generally do not know the accounting system in the United States is based upon detailed legal regulations for each type of transaction, they do not know the hierarchy of GAAP, they are not aware of the fact that GAAP regulations are based upon an accounting method that first determines the value of assets and liabilities, and then, on the basis of changes in those entries/items generates information about financial results. At the University of Economics people study how to identify revenues and costs, how to determine the financial result on their basis, as well as the profit and loss account, following two methods: by comparison and by calculation. It is a pity, as the familiarity with other theoretical solutions provides a wider perspective in the thinking about accountancy, and helps develop creative thinking.

In the questionnaire survey comprising 400 students of the final year of the MA studies at the Faculty of Finance and Insurance at the University of Economics the information obtained indicate that over half of them think that the, existing in the accountancy legal regulations, freedom of activity and rights of choice are indispensable, due to the specificity of enterprises and contracts (agreements) concluded in the economic practice. The others are generally of the opinion that the existing freedom of action concerning the preparation of financial statements/ reports is too big, and that enterprises manipulate with the information generated, cheating the capital providers, contracting parties, and other users of the financial statements, of that group a bit over 7% have no opinion in that matter. It should be stated, that the same sample of students stated that some 30% of them encountered the problems of creative accounting in professional work, while over 60% during studies.

That may be the evidence of the following circumstances:

- Not trusting too much in men and in keeping values,
- Poor understanding of the issues of creative accounting (fear of the unknown),
- The need to introduce to the programme content the issues concerning creative accounting and ethics in accountancy.

A majority of the students interrogated (over a half) is of the opinion that the problems of creative accounting are not presented in a sufficient way (that is, they fail to appease the basic curiosity), while only some 35% of the students are satisfied with the discussed issues related to creative accounting.

The other aspect of education, having ethical and moral character, seems important in the present times. It seems to me that the overall tendency for education at universities is to focus upon issues demanding detailed solutions and upon problems concerning a given subject, with less and less content of ethical, philosophical, or otherwise universal character, which constitutes the system of values and attitudes. Coming back to the field of education on accountancy – we do not happen to have a separate course related to the ethics of the accountant profession, although, for example, the following exist:

- Framework for the International Education Standards approved for exposure by the International Accounting Education Standards Board and International Federation of Accountants in December 2008, and
- Proposed Framework for International Education Standards for Professional Accountants, International Accounting Education Standards Board and International Federation of Accountants, January 2009,
- International Education Standard for Professional Accountants No.4: "Values, ethics, and professional attitudes", International Accounting Education Standards Board and International Federation of Accountants, 2004,
- Code of Ethics in Accountancy, developed by the Commission for Ethical Principles and Professionalism of the Accountant Profession of the Scientific Board of the Association of Accountants in Poland, 2007.

Strengthening of education on the ethical dimension of accountancy seems indispensable for the following reasons:

- Reinforcement of ethical attitudes of students and potential accountants,
- Necessity of making independent judgment in the professional activity, resulting among others from
- The fact that international and domestic regulations are based upon general principles, to which we make reference in case of absence of regulations, or in case it is possible to choose detailed techniques, and



- The necessity of making independent estimates, for example determination of fair value in case of absence of an active market for given financial instruments.

We attempt to develop such ethical attitudes and proper ethical competencies on individual basis, within the framework of diploma and master seminars, as well as during the meetings of the Students' Science Club active at the Chair of Accountancy.

Among the 400 students of the final year of the MA studies at the Faculty of Finance and Insurance at the University of Economics in Katowice that were approached with the questionnaire, there was no strong differentiation concerning the response to the question: "Do you consider the application of creative accounting practice a blameworthy thing?". The biggest group of students (over 40%) opted for the answer: "no", while only over 30% replied "yes". Some 30 % of the people asked had no opinion in that respect.

The question: "Do you assume in the professional work (present or future) a possibility of applying creative accounting yourself?", the negative answer was chosen by some 40% of students, the positive answer by less than 30%, while more than 30% had no opinion in that respect. None of the students interrogated provided any condition for the answers provided.

The results of the questionnaire survey taken confirm the necessity of strengthening education by introducing the problems of ethics in accountancy, as well as problems of creative accounting.

It's a result from my investigation, that:

1. The students know creative accounting insufficiently, and
2. The students assume in the professional work (present and future) a possibility of applying creative accounting themselves.

A problem follows from the connection of these results. I think that accounting education has very important tasks:

1. To broaden accounting education about creative accounting,
2. To shape students' ethical attitude.

The first task isn't very difficult to realise. The second task is a problem. Ethical attitudes are a component of future accountants' competences. But how to measure ethical attitudes? Can one assess ethical attitude of a student? In Poland minimal curricula don't contain the subject of accounting ethics. He does not have in the program minimums of the object of the ethicist in accountancy, on University of Economics in Poland such object is not here and so it is also not formally included in the curriculum. Ethics and moral aspects are discussed during various classes, especially balance policy. The problem lies in the fact that ethical questions are immeasurable, difficult to assess and frequently treated as if they were of secondary importance.

The following questions and problems can be drawn:

1. Educational programme in the speciality of accounting is overloaded. Is it then justified to introduce ethics in accounting as a mandatory subject?
2. Is the discussion of some selected ethical issues provided during other accounting's subjects sufficient?
3. How would accounting ethics curriculum affect the attitudes of residential and nonresidential (working) students? Would there be any differences in teaching results?
4. Should we measure the student's ethical standards or require theoretical knowledge?

## Conclusions

The following conclusions can be drawn concerning education:

1. Accounting should be taught from the perspective of the so called meta-accounting so that the students could be oriented in multivariant accounting solutions, and could select optimum techniques for a given entity. In practice, however, new employees tend to be 'absorbed' by the already functioning accounting system of an enterprise, and are not necessarily capable of verifying its correctness. Our aim is that the graduate should be able to select appropriate accounting solutions and assess their pertinence.
2. More examples of multivariant accounting techniques should be presented including contract valuation methods or financial statements (elements of business policy) as well as their consequences for enterprise owners and environment.
3. Presentation of unworthy accounting tricks as well as the consequences thereof should be incorporated into the accounting curriculum.
4. Education should convey ethical ideas.

Unawareness or lack of knowledge concerning unethical practices is risky and cannot stop fraudulent behaviour. Presentation of unworthy accounting tricks, explanation of public and economic consequences of liberal and dishonest practices, and emphasis on ethics and social responsibility should be incorporated into the accounting curriculum. Education should convey ethical ideas, and thus help prevent the manipulation of financial reporting, and moral decline. Development of moral reasoning and sensitivity is, after all, a concern of all university teachers.

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# STUDENTS AT GLANCE IN AUTHENTICATING REGIONAL OPPORTUNITIES

## Enhancing Dynamic Capabilities through Motivating and Appraising Students R&D&I Competitiveness

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### Abstract

This article is based on practical development and observation that has been carried out in the SID lab International at Laurea Leppävaara. It elaborates the importance of student centric methods of working through intensive research, Development and Innovation (R&D&I). The engaging of students in the R&D&I labs has been emphasised as the best method to enhance a prosperous student centric R&D&I. This is because, by having enough time to concentrate on a challenge, students or junior researchers can manage to find solutions to the specific challenges they are faced with.

Dynamic capabilities in the teams working in R&D&I has as well been mentioned as important whereas ways of working and sharing expertises from different cultures and international collaborations can enrich a project with multidimensional solutions. In the article, the integrative model of the project and its support system has been presented as an example of the newly tested model of integrating different internal capabilities in the International R&D&I lab; also the model for the ongoing testing of the international project collaboration has presented.

In association with different theoretical works, this article verifies that a well equipped research work environment, joint and meaningful long term international and innovative projects or tasks and effective management support are some of the simple tools that can enhance a true student centric R&D&I with the solution applicable to solve regions' challenges. Regional development in this article refers to all actions that can support the development in the social-economical sector in different companies, cities or other public organisations.

From an operational level, working on finding challenges that affect the regions, enhancing internationalisation of knowledge and viewing business as a possibility in all fields has been emphasised as important. Motivation from both students and lecturers were addressed as vital in enhancing a culture and passion for students centric R&D&I.

# Introduction

The World today is characterised by accelerating development and increased global competition. Research development and innovation (R&D&I) are becoming ever more important starting points to achieve different goals of regional development's demands. Internationalisation and globalisation strategies for example, have been vital core competences, crucial to enhance regional success.

In order to cope with the age of new- and competitive knowledge, it is imperative for Universities to both expand and share their competences and knowledge. Universities will need to reposition themselves as a knowledge company in order to continue adding value to their regions. Further collaboration with institutions that have similar scope and intentions will enhance effective competencies to students, positive effects to the regions, and internationalisation of knowledge and practices will take charge.

This article is partly derived from an ongoing experience of developing further the International research and development laboratory (SID lab International) into an active Laurea hub for various international R&D&I research and business activities. In this regard, two main aspects have been considered as main strengths that need to be addressed:

1. Research and Development environments need to be emphasised as vital elements to students competence building
2. Enhancing dynamic capabilities within R&D&I environments is vital for creative solutions needed by different regions

The above mentioned aspects will enhance the production of hands on experiences for the university students. This is a fundamental demand for the success of the companies in many regions (Lyytinen, 2009). In addition, the role of the university may fail to fulfil the current demands of the regions since solutions and further developments are among the things that can be developed within the universities.

## Why student centric R&D&I?

It is obvious that students are current and have multi-perspective ways of thinking. They possess tacit knowledge and are exposed to explicit knowledge which they can use in unique ways (Smith, 2001, 313). This knowledge assists in bringing new perspectives for good practices towards regional development activities.

As it is done in the SID lab International research environment, lecturers and professionals offer knowledge and experiences that will support students' thinking and their implementation of the tasks. When the two parts intersect, competence develops not only from the student but for the experts as well. This is especially obvious in challenging projects situations.

Due to the drastic change in operative environment, companies are forced to address their growing importance of multidisciplinary research to the universities. In addition, universities address their demand for new curricula emphasizing issues related to entrepreneurship and commercialization of new technologies as well as the increase of continuing professional education. (Chakrabarti and Lester, 2002, 6). These demands from both ends (companies and universities) verify the needs for cross functional collaborative work whereby most of the capabilities for research, for example, can be found in the universities.

It is important to address freedom and the ability to comfortably share one another's thoughts in the research and development environment; however the freedom itself has to be addressed in line with task responsibilities. Students can work in groups and brainstorm on ideas, challenge the cultural thoughts with time enough to deal with a single problem and, with the help of the lecturers, reach the concise expected aim. This type of quality development time cannot be found in normal working life.

## **An effective student centred R&D&I**

As stated earlier, it can be noted that, the intrinsic part of creating regional benefits is through R&D&I work. The unique position of the modern university is to find and allow networks of actors from public and private business spheres. The universities would act as a development and research body which in turn harmonizes good practices for the companies and organisations in the region. These experiences may not necessarily be possible if there is not time enough for the students to think, relate issues and derive useful solutions. From the experiences of the research laboratory (SID lab international), the student centric method of working is enhanced through various ways, which act as possible solutions. These are: a well equipped research work environment, Long term international and innovative projects or tasks, and effective management support.

**Firstly, well equipped work environment** is an important part in enhancing effective learning and functioning. The diversified talent of two to four students working together in a SIDlab International project task is normally integrated into the students' undertaking of their ordinary classes. Since it is new, the international research laboratory and research interns (known as junior researchers) do not only solve companies' problems: they also speculate, analyse and present the problem which they have realised on a specific context. When a problem is proven certain by the working life organisation, it is then a starting point for the

collaboration with external organisations. These creative working models are possible with researchers who are passionate and willing to take initiative in problem solving.

As it is in many companies, dynamic capabilities (Eisenhardt & Martin, 2000) are important for the product development and long term competitive advantage in competitive markets. Since the product of the universities is knowledge, the usefulness of the cross functional team capacity, brainstorming and team work in sharing different knowledge (Eisenhardt & Martin, 2000) is implemented in the International research laboratory. The mixing of diverse cultures in a group can be challenging, however it brings new ideas and working models that are useful for ideation and multi perspective solutions. In this way, the Learning by Developing is enhanced and hands-on experiences are generated.

**Secondly, long term international and innovative assignments** are those which have impact on the region. Despite this type of assignment being bigger, they can produce useful and tangible results. With international R&D laboratory work for example, universities are in a key position to leverage this capacity through partnership management and through students-centred R&D&I work. Some of the more important aspects that revolve around the emerging management paradigm are value creation and closer interaction and partnering with a wider range of stakeholders (Alesandro, M. and Secudo, J. 2008). It can be seen that to enhance the dynamic resources of an innovative project, the work done by the student researchers in an R&D&I environment needs to associate different capacities. In the SID lab International, for example, these results are produced starting from the university level where the project's dynamism is resulted from retrieving extra quality from non research students, with close collaboration and supervision from experts and other management bodies in all levels (see figure 1).

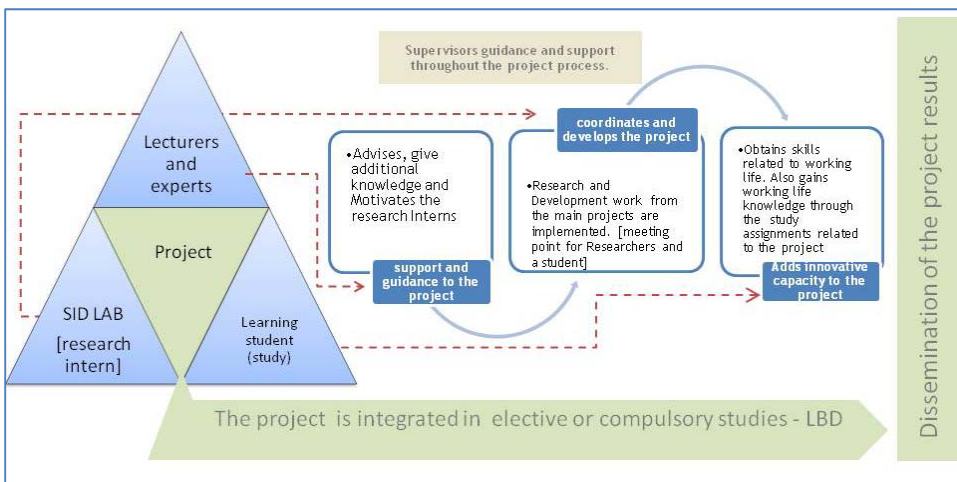


Figure 1 An example of project development through different stakeholders in the SID lab International

In an alternative perspective, long term research tasks will benefit companies more from the university when they bring forward those projects that are in a pre-competitive stage. These projects will need a substantial amount of further development before they can be implemented commercially (Chakrabarti and Lester, 2002). The universities can be the best place for these kinds of responsibilities since they have the time and resources, and also they are the hubs for development capabilities through learning current issues.

The dynamic resources in the SID lab international are also considered from the international collaboration point of view. With regard to the transition economy and high technological demands, universities need to stand at the core to create connections among companies in the regions.

Through the work of the case R&D&I laboratory, the junior researchers are working in finding current challenges in the operative environment and present them to a vast amount of the universities outside the world to seek for collaboration interests. When the interests arise, a maximum of three partners are chosen, each from a different part of the world, to work in the project. The project problem is then discussed by all partners in order to work towards the result that will fit the needs of each stakeholder and their regions. In this regards, the emphasis of collaborating with the working life representatives (companies, organisations and other institutions) is enforces, and hence arising awareness of new processes in operations and possibly international investments, joint ventures or business collaborations in different ways (see figure 2).

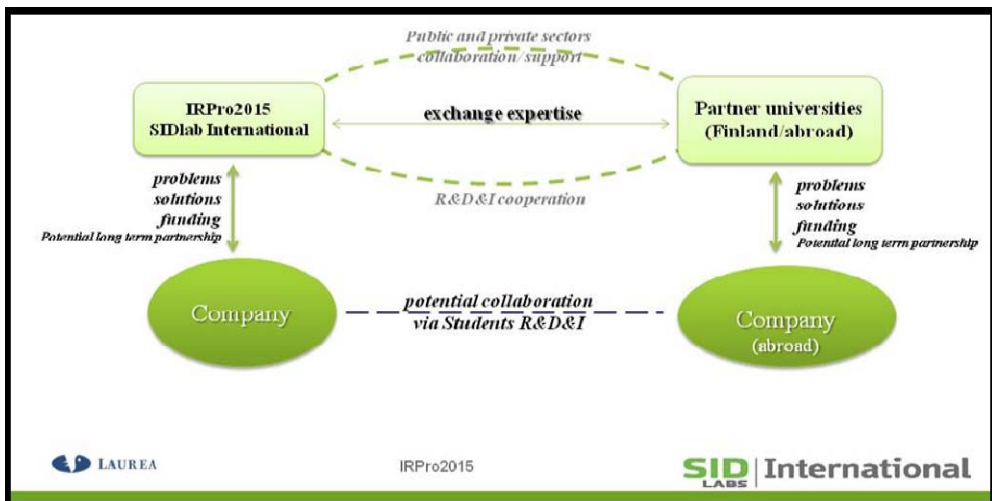


Figure 2 An example of the dynamic capabilities through International joint project work as developing in IRPro2015 at the SIDlab International.

The above process is in its very early stages, however, the preliminary testing of the process showed positive responses. The most required matter in this devel-



opment is trust, honest and commitment, - something that may leave the process in challenges. Saginova and Belyansky (2008) spoke about the need to enhance flexibility in the higher education systems of the transition economies as a way to provide high quality services. It is in this article argued that for the high quality services of the student centric international joint project work, all parties, no matter the standards of economy they have, need maximum flexibility in the project implementation in order to come up with successful, useful and high quality results as well as new innovations. The “process of innovation is dictated by random combinations of different concepts. Individuals and teams who often break new ground know this and therefore maximize their chances of finding intersectional ideas. They do it by introducing diversity into their occupations, teams, and encounters” (Johansson, 2004)

Aspects that have been presented earlier regarding the importance of well equipped work environments- as well as the effective management support, also to the partners are the core of the internationalisation of R&D and the regional development from the perspective of the university. In SID labs, we do not necessarily prefer to top level players in the world, the focus is given to the most interested and willing to take initiative in the project process.

**Thirdly, effective management support** is a key to all development aspects. In this article this is as well considered as a fundamental element to the effectiveness of the results. Alesandro, M. and Secudo, J. (2008, 938-941) have outlined concept, context, processes, purpose, actors and processes as the dimensions of management (figure 2). Although these were generally mentioned management dimensions, they clearly can be useful in management of student centric R&D&I.

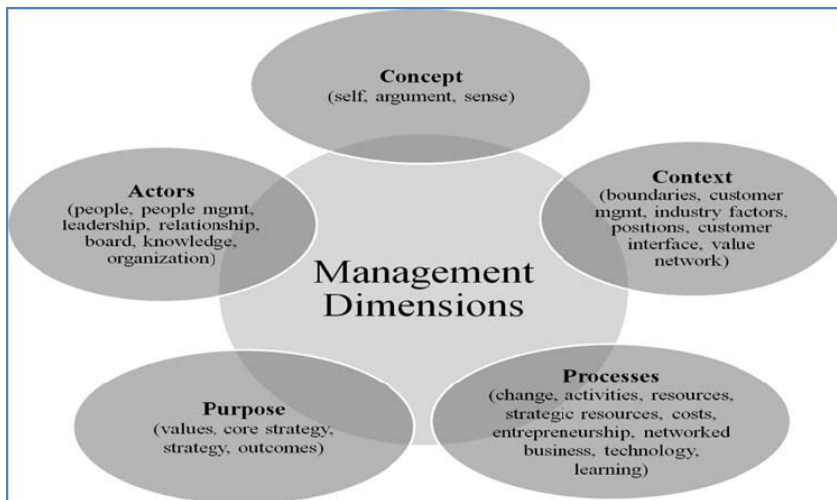


Figure 3 Five-dimension management model and key issues (Alesandro, M. and Secudo, J. 2008)

In this article four dimensions have been chosen with an emphasis on those aspects that best suit the management of a student centred R&D&I. The facts on these elements have all been presented by Alesandro, M. and Secudo, J. (2008).

With regard to management **purpose**, the ability to spread a culture of continuous innovation, organisational learning and the increase of values for stakeholders are the key competencies for the management. Additionally, management must focus on the **context** of cooperation and trust, envisioning business opportunities at a global level as well as optimising knowledge flows and sharing.

Management **actors'** competencies are to develop cross-disciplinary and multi-faceted teams, leverage and cultivate individuals' talent, nurture lateral thinking and innovative ideas, and value cultural differences and habits. Considering management **processes'**, the needed competencies are to apply real time business intelligence and developing entrepreneurial attitude.

Of those mentioned competencies can assist in paving the way to the knowledge of the opportunities available to both university students and companies and organisations locally and internationally. The vast knowledge of the university needs a very clear infrastructure-and-management determination for success. Nevertheless, the students' individual motivation is vital.

## Conclusion

This paper signifies the development practices in SID lab international of Laurea Leppävaara. The goal is for Laurea and interested partner universities to benefit from multi-regional learning, sharing of good practices and networking expertises for the larger goal of regional development in multidimensional areas of business expertises.

The approach is student-centred, with lecturers, university staff and working life experts acting as a board of advisors for the challenges to be met. Intensive supervision is not a major requirement as the basis of the project is shared learning and discussion, which facilitates independent and effective learning development. Management of the project directs the best ways and enhances innovative ideas within the project. It also enhances creative collaboration with multi-perspective institutions around the world.

The student-centric process of learning through real life experience will equip the universities with competencies needed by both regional organisations and private sectors. This will result in the spread of tangible international expertise and knowledge to the companies and organisations in the regions, through leveraging the potential of the valuable networks that universities possess. With the exception of resources, the most important points for success are determination,

project work environment, useful challenges and supportive management structures.

It is obvious that “universities are playing significant roles in local and regional economic development”. Finnish national policies and governmental agencies for example do emphasise the university industry collaborations. (Chakrabarti, and Lester, 2002). This clarifies that, there are opportunities for students to intensively work with companies and support regional development activities. There is a need to further address the challenges of enhancing motivation from students and lecturers, creating passion at work and increasing intensive working life attention with regard to internationalisation of businesses and other socio-economic activities among the spheres of university R&D&I actors.

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# **COMPETENCE DEVELOPMENT IN UAS – BRIDGING CORE TASKS AND ORGANIZATIONAL LEARNING IN THE PROCESS OF DEVELOPING UAS IDENTITY**

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As a University of Applied Science (UAS) University College Lillebaelt in Denmark is addressing education, knowledge production and professional development in the perspective of life-long and life-wide learning. It is our basic assumption that internal competence development – individually and organizationally - among UAS educators should be based on the same learning concepts as used in professional development to avoid parallelism: Do for yourself, what you preach for others. Second, competence development of faculty is a central element in the transformation of our institutions from schools of higher education to universities of applied science (UAS). Competence development strategies should thus include objectives for the institutions ability to contribute to knowledge production.

## **Institutional transformation**

The institutional structure of Higher Education in Denmark has been transformed since year 2000. Merging a high number of rather small colleges – somehow later than other European reforms of Higher Education – a binary University structure has now been established organized as independent institutions. The first University Colleges in Denmark saw the light of day through processes of accreditation from 2004 based on Acts of Centres of Further Education (“Centre for videregående uddannelse – CVU”). Not all Centres of Further Education in Denmark applied for or completed accreditation for University Colleges and for a short period a diffuse picture of these institutions and there profiles appeared. From 2008 the 24 Danish Centres of Further Education was by a new law transformed into 8 University Colleges with the Danish institutional term “Professionshøjskoler”. The description in the new Act of “Professionshøjskoler” has strengthened the objects of the institutions to manage educational tasks, to ensure professional development in schools, hospitals and institutions and to provide knowledge production connected to educational and professional development for teachers, social workers, health care workers etc. (editor’s translation and emphasizing):

***A "professionshøjskole" must ensure the foundation of knowledge for educations defined as profession- and development-based***<sup>6</sup>

*"Professionshøjskoler" must develop existing and new professional bachelor educations and further educations connected to professional bachelor educations, carry out developmental assignments and manage the tasks of knowledge centres.*<sup>7</sup>

**Knowledge production - a vital task**

The visions for the sector of university colleges – organized in the Rectors' Conference - are defined as:

*Contribute to reaching the national aim of Denmark being an attractive educational nation*

- *Increase quality and innovation in professions through education*
- *Be an important actor and collaborator as knowledge institutions within development and provision of professionally oriented higher education*
- *Contribute to creating coherence in higher education*
- *Provide relevant and up-to-date education to the satisfaction of employers and students in Denmark and internationally*<sup>8</sup>

From the foundation both the individual institutions and the sector of university colleges in Denmark has given much attention to questions of knowledge production as this is seen as a core task for supporting professional learning and development. One of the first strategies of the Rectors' Conference was a strategy for knowledge-basement and here the mission of the institutions was described:

*If the sector of welfare professions should be able to fill their very important community role – addressing relevant needs of the citizens, being innovative and supporting work-integrated learning and development – it is of vital importance that professionals and organizations keep progressing user orientated. In this aspect educations and knowledge production in university colleges – and as a part of this continuing knowledge production and implementation - plays a vital role.*<sup>9</sup>

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<sup>6</sup> (Lov om professionshøjskoler, par. 3, stk. 3.: En professionshøjskole skal sikre, at uddannelsernes videngrundlag er karakteriseret ved professions- og udviklingsbaseret).

<sup>7</sup> ( Lov professionshøjskoler, par. 5, stk. 1: Professionshøjskolen skal udvikle eksisterende og nye professionsbacheloruddannelser og efter- og videreuddannelser i tilknytning hertil, udføre udviklingsarbejde og varetage videncenterfunktioner)

<sup>8</sup> <http://www.uc-dk.dk/da/infoeng/whoarewe.html>

<sup>9</sup> (Hvis velfærdsprofessionerne således skal kunne udfylde deres meget betydningsfulde rolle i samfundet - en rolle som handler om både at kunne imødekomme de aktuelle borgerbehov og være innovativ og praksisudviklende – bliver det altafgørende, at professionernes medarbejdere og organisationer hele tiden udvikler sig brugerrelateret. Her spiller professionshøjskolernes uddannelser, videnudveksling, og ikke mindst deres fortsatte videnproduktion og videnbaseret en afgørende rolle.)

"Professionshøjskoler" of Denmark are in the beginning of a process of transformation from educational institutions to universities of applied sciences, and the sector has chosen to connect to The European Network for Universities of Applied Sciences (UASNET).

As a general process of development the most important resource is the competences of the participants, and the development work of a competence strategy presented in this paper should be seen as an element of this transformation process.

## **Qualification framework and Lifelong learning for UAS educators**

This paper shall introduce an ongoing institutional process from 2009 onwards to construct and implement an UAS competence strategy. Aiming at describing the many competences of all educational employees in a "professionshøjskole" as well as objectives for future development and learning processes in our institution, a development group in University College Lillebaelt has been assigned to formulate competence objectives for various functions related to teaching, consultant work, knowledge production (strategic research & development) and educational administrative work.

The strategy has been raised on two main platforms:

- A. The construction of a UAS educator framework based on further development of the Bologna Qualification Framework to address both levels above cycle 3 (PhD.) and learning facilitated in a life-wide perspective as an UAS Lecturer.
- B. Integration of a variety of competence development concepts and programmes addressing UAS Lectures life-long and life-wide. All concepts addressing learning objectives on both an individual and an organizational level.

From a traditional main focus in further educational institutions on teaching the important contribution in the competence strategy and competence objectives is to word and value these broader aspects of educational activities in order to support professional development in education as well as in professional practice. Many teachers in our institutions have thorough experience with educational activities as well as with developing educational programs and methods inside the educational setting.

Targeting professional consultancy functions brings tasks and responsibility towards the professional practice in schools, institutions and hospitals outside the walls of the University College into the assignment of the educational staff. Con-

sequently it opens and widens the teachers' as well as the institutional frame and focus.

## **Education and knowledge production**

The other important contribution from this developmental work is bringing knowledge producing tasks into the assignment of the University College and its educational employees.

As we saw it in the question of consulting work also this perspective challenges the traditional understanding of teachers' jobs. The competence development description puts four perspectives of educational work to the same footing and in doing so develops a new understanding of the educational tasks.

As further educational institutions we have during the years had many developmental projects and have developed new and emerging knowledge in many professional areas, but this equality in the description of tasks and objectives marks a shift from teaching as the main job towards comparable tasks as well as marks an ambition for research and developmental projects as a University of Applied Sciences.

## **How will a Qualification Framework support the transformation of a UAS?**

A fundamental quality in a UAS QF is the fully recognition of both formal – scholastic – based competence and of learning based on practice and experience, when this can be validated. The framework represents a taxonomy structure which may help give form and language when tacit knowledge shall be transformed into competence in perspective of life-long and life-wide learning as an UAS educator.

Second, plans of competence development may be structured and targets set on the basis of the UAS QF, thus avoiding the risk of reducing competence planning only to academic forms. A life-wide perspective of learning is for the benefit of all styles of learning avoiding life-long meaning all life in school. This should be implemented in UAS as well as in other sectors of society.

Third, this more broad and diverse perspective of learning may be applied not only on an individual level, but may be used in a perspective of organizational learning as well. It may be applied when work groups are structured – novice, competent and expert each learning from their specific role in a common process. The non-formal learning may be supported by portfolios which may be of

use not only for individuals but for teams, departments and trans-institutional organizations as well.

The defined levels in UAS QF are closely related with the Bologna process as they are based on the Danish QF, but both learning fields and levels are expanded. A) The UAS QF includes a competence level above level 8 which formally are at use in university tradition i.e. positions as professor. B) The UAS QF helps widening the life wide perspective, which should be fully in compliance to Bologna process addressing validation of prior learning to make use of all educational resources avoiding waste of time and money, when people are asked to have formal education in fields, where they have already learned and achieved a relevant competence.

European Qualifications Framework (EQF)	QUALIFICATION FRAMEWORK UAS EDUCATORS				
	Expert <sup>10</sup>	Student related assignments	Consultancy assignments	Research & development	Organizational assignments
Above level 8 (12+5+4+? years)					
	<b>Knowledge</b>				
	Field of knowledge <sup>11</sup>				
	Level of understanding and reflection				
	<b>Skills</b>				
	Type of skills				
	Judgement and decision-making				
	Communication				
	<b>Competence</b>				
	Space for action				
	Collaboration and responsibility				
	Learning				
Equivalent to level 8 (12+5+4 years)	<b>Competent</b>				
Level 7 (12+5 years)	<b>Novice</b>				

<sup>10</sup> By inspiration of Dreyfus, H L and Dreyfus, SE (1986) Mind over Machine: the power of human intuition and expertise in the age of the computer, Oxford, Basil Blackwell

<sup>11</sup> Based on the Danish Qualification Framework for Further Education. Ministry of Education. 2008



By using EQF structure the UAS QF may be applicated similar to other sectors and other academic levels i.e. professionals in schools, hospital etc.

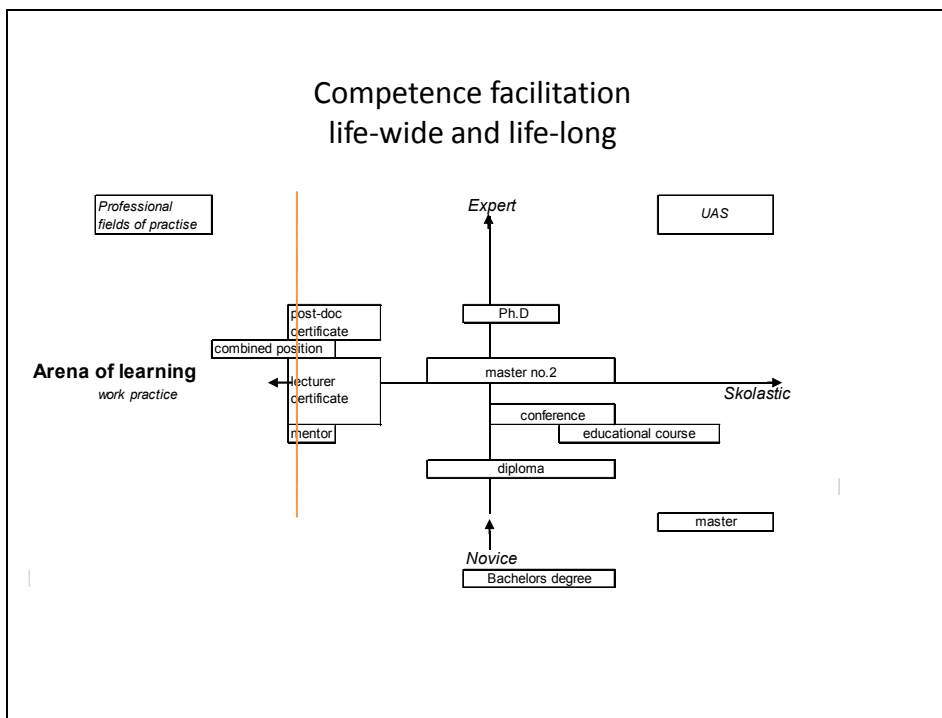
## **Competence facilitation life-wide and life-long for UAS Educators**

To give an overview of how competence facilitation as UAS is provided a model may clarify covering all levels of expertise and making use of all arenas of learning.

In model 1 form and programs of competence facilitation in perspective of life-long and life-wide learning are shown. The Y-axis - from Novice entering UAS to expert - representing the life-long perspective. The x-axis represents a life-wide perspective, covering the arena of learning from work practice over blended forms to scholastic learning in forms of an academic degree.

As entrance level, in general, UAS educators in Denmark must hold a masters degree and – preferable – a bachelor degree in a professional field of education. Further education is compulsory in form of a 4-year portfolio-based lecturer certificate, which in UC Lillebaelt is part of a program addressing educational tasks both in specific subjects, in a specific profession and in the general perspectives of UAS education. Combined positions – work at UAS and in a profession – may represent another frame of learning bridging theory and professional practice on a more advanced level. The highest level – in a work practice related form - is being planned as a portfolio based post-doc certificate. A pilot has shown strong learning results – close to working practice - even among highly qualified educators.

More academic forms of facilitation are being offered. A PhD strategy has been developed to interlink PhD programmes at Research University with the competence needs as UAS, where knowledge of strategic R&D (mode 2) is more needed than basic research. Thus each PhD. is educated based on a specific contract between a UAS and a University making sure that not only the research project but other related assignments for the PhD. student are supporting the educational needs as UAS. Lectures may qualify through a second Master specializing for new educational tasks. This second master may be utilized in an organizational perspective where the UAS master student combines master thesis with an analysis assignment as educator. Or UAs staff may participate in UAS diploma programs offered for a group of soon-to-be project innovators.



Model 1

Each form of competence facilitation mentioned above is addressing an individual need – compulsory or optional – but at the same time aimed at organisational learning. Different learning strategies – academic, work place oriented or blended - are supported, giving career opportunities for all educators. Through a well planned combination of much diversified programs UAS educators are practising the life-long learning perspective recommended for the professional development UAS should serve.

### Implementation – status April 2010

The educational programs and the main elements of the strategy has been developed and negotiated with staff 2008-9 and decided by the Board in 2010 as part of a broad institutional strategy for 2015. A program for lecturer certification and PhD programs were implemented from 2009. The implementation to come in 2010-12 shall include transformation of the Extended Qualification Framework into all relevant fields of professional competence: Starting with digital competences for all educators, where descriptors are ready and next we shall continue with Education, Nursing, Social Work, etc.

The Extended Qualification Framework will be used for measuring and aiming educational and developmental activities and it is expected to be part of future employee personal development review in our organization.

# **The wider perspective: Understanding the agenda of competence development as a central discourse in the process of creating an UAS identity**

How can the ambition of knowledge production in an UAS interfere with the traditional agenda of educational institutions? What is the perspective of replacing the concept of education with the concept of education and knowledge production as nodal points in the UAS discourse?

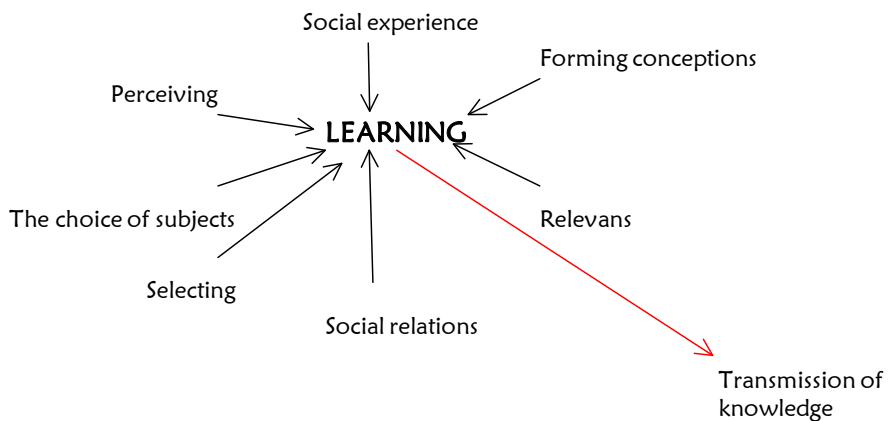
Describing competence objectives not only forms part of a competence development strategy, it can also be seen as a contribution to the emerging UAS identity among employees within the organization and a contribution to a long term attempt to manifest the 'professionshøjskole' as a University of Applied Sciences.

In a discourse perspective social practice is affected by articulating social phenomena. Discursive practice constitutes an important social action of moulding our social world, social relations and social identities and discursive practice contributes to social reproduction as well as social change (Fairclough, Norman paraphrased in Winther Jørgensen and Phillips, 1999).

A discursive parallel can be drawn to the conceptions of learning processes that has been challenging the traditional concept of teaching during the last decades. The discourse of education in the sense of teaching as a transmission of knowledge has been pushed and changed by emerging understanding of the learning subjects' perception and conceptualizing as fundamental in educational activities of all kinds.

## **Nodal points**

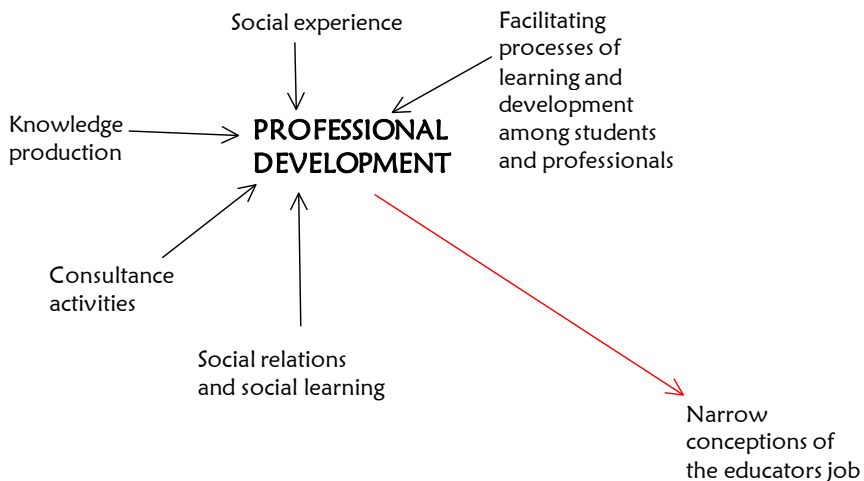
The process of nodal points pushing the discourse and the social practice of teaching can be shown as



Model 2

The nodal point of the discourse is the understanding of learning (processes) and this privileged sign arranges relevant concepts as 'social experience', 'perceiving' and 'social relations' as closely connected. These concepts are drawn to the focus of the discourse where as other dimensions can be pushed further away or out of the discourse. In this example 'transmission of knowledge' is the excluded sign.

In the formation of UAS identity within the 'professionshøjskole' the concept of knowledge production related to professional practice is challenging the more traditional identity of the educational institution and the competence development descriptions and objectives constitutes a contribution by setting a discourse of professional development. The nodal point here can – roughly - be sketched like this



Model 3

Here the nodal point of 'professional development' arranges the discourse of the 'professionshøjskole' by attracting concepts of 'knowledge production', 'consultancy' and 'facilitation processing' etc. into focus while excluding the narrow concept of the further education institution and the conception of an educator traditionally seen as simply a promoter of knowledge.

No discourse alone makes a social practice but the formulation of competence development objectives for the educational staff of the 'professionshøjskole' marks an important contribution to the discourse activity of our institution. It is in this discourse activity the competence development strategy may contribute to the development process of a UAS identity.

## Discussion

1. Relationship between UAS and profession in relation to competence development: Is there a risk in creating too close an interaction, weakening the necessary academic distance and reflection needed to address the professional challenges of tomorrow?
2. Relationship of UAS and academic universities: To what extent will a broader Qualification Framework including competences accomplished in working life weaken UAS as an excellent provider of Lifelong learning based on academic and professional practise?
3. Understanding the agenda of competence development as a central discourse in the process of creating an UAS identity: How can the description of competence objectives in the UAS affect the process? Among the UAS' users and in the outside world surrounding the UAS? Among the employees of the UAS?

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## II ASSESSING LEARNING OUTCOMES

**Assessing learning outcomes:** Assessment and evaluation are important not only from the point of view of quality assurance of higher education, but also for the competence development of an individual student. In the modern ways of competence development learning takes place in various forms and learning environments. This sets challenges for uniform quality and equal assessment. How can we ensure that the set targets for learning outcomes are met - or assess how well they are met? This session focuses on different methods and tools for assessing learning outcomes and competence development, as well as evaluating the suitability and efficiency of teaching methods.

# ASSESSING LEARNING OUTCOMES FROM THE INDIVIDUAL STUDENT'S POINT OF VIEW

A case from Academy of Physical Education  
in Katowice, Poland

**Justyna Maciąg**

*Academy of Physical Education in Katowice, Poland*

## Introduction

Contemporary higher education faces new challenges such as: global competition, increasing role of knowledge and intellectual capital in the economy, changes in labour market structure, increasing cost of education, changes in youths' behaviour etc. Figure 1 presents the frameworks of action and expectations formulated currently in relation to universities. Global competition, universalisation of higher education and changes in behaviour among youths generate new challenges for managing universities. These challenges apply to issues related to the scope of knowledge and skills, which are to be provided to students, obtaining resources indispensable for execution of the process of education (human, information, tangible, and financial resources) as well as coping with the weakening motivation of students for learning. Contemporary higher schools face new requirements concerning the quality of education services.

The assessment of education services quality is made in three dimensions:

- Importance and adequacy of knowledge in relation to changes resulting from the progress made by science, development of both economy and society,
- Efficiency and effectiveness of quality of education provisioning,
- Efficiency and effectiveness of the teaching process.

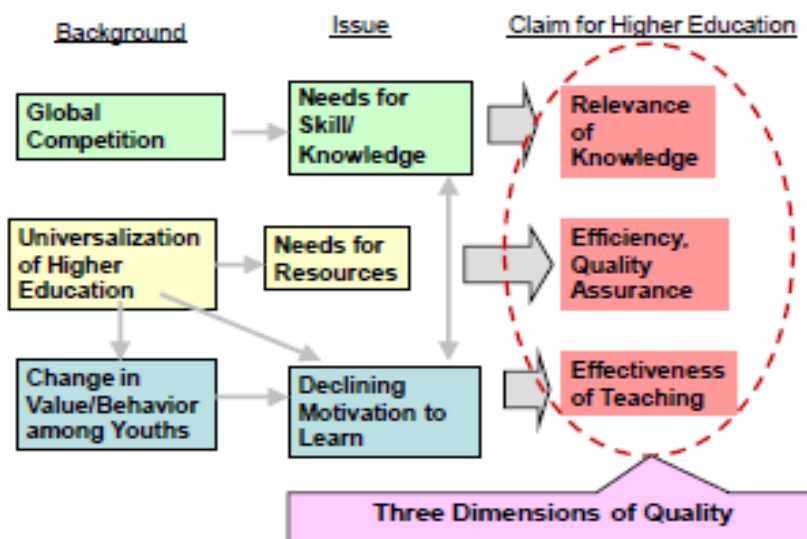


Figure 1. Background, Issue and Claim for Higher Education.

Source: Kaneko M., *Beyond the Politics of Competence. Balancing the Social Claim and Core of Higher Education*. OECD/IMHE General Conference on Quality, Relevance and Impact of Higher Education, 8-10 September 2008; Paris. [www.oecd.org](http://www.oecd.org)

Thus, the assessment of education services quality provided by universities requires a multi-dimensional approach, considering the requirements of<sup>12</sup>:

- Students and employers (better informed choice),
- HE's departments or faculties (comparative strengths and weaknesses),
- Policymakers (stocks/flows high-level skills, impact of policy decision).

At present a lot of activities is being undertaken to construct universal methods and measures to assess results of educational process.

The aim of the paper is:

- To present the measure of education services quality in higher schools – which is learning outcomes.
- To test one of the learning outcomes measurement methods – a student's self-assessment questionnaire
- To present the results of the research performed on students of the Academy of Physical Education in Katowice, Poland, in aspect of measuring the learning outcomes.

The thesis is: Student's self-assessment questionnaire is a useful method of learning outcomes assessment.

<sup>12</sup> Tremblay K., *OECD Assessment of Higher Education Learning Outcomes (AHELO) Feasibility Study* OECD/IMHE General Conference on Quality, Relevance and Impact of Higher Education, 8-10 September 2008; Paris. [www.oecd.org](http://www.oecd.org)



## Theoretical framework

A definite level of quality education services is expressed in a graduate, who possesses a profile of knowledge and skills that are usable in the economy and expected in the labour market. Thus, the mechanism of the system for managing quality of education services may be presented as follows:

1. Optimal adjustment to the environment requirements,
2. Effective, efficient, and flexible education process,
3. Continuous improvement of the education process by creating new values for the student.

The essence of the mechanism for managing quality of education services is presented in the figure 1.

The value generated for the student is cumulated in the quality of education service. The process of education may be considered as a chain of values expected in the economy<sup>13</sup>. Value-Added is an analytical strategy to determine the degree to which students change from the beginning to the end of a program<sup>14</sup>. The value of education service may be defined as the – perceived by the client – set of advantages, tangible and intangible ones, which meet her/his requirements in just time, efficiently and effectively<sup>15</sup>. It may be considered and measured in the following aspects<sup>16</sup>:

1. didactic,
2. economic,
3. marketing,
4. organisation.

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<sup>13</sup> cf. Conti T.: *Building Total Quality. A guide for management*. Chapman&Hall London, 1993, p.40; Rummler G.A, Brache A.P.: *Podnoszenie efektywności organizacji*. PWE, Warszawa 2000, p.75; Makkar U., Gabriel E., Tripathi S.K. *Value chain for higher education sector-case studies of India and Tanzania* „Journal of Services Research”, Special Issue, February 2008, p. 183

<sup>14</sup> Keston H. Fulcher, *Value-Added: Some Clarification* Christopher Newport University Virginia Assessment Group, 3/2/2007

<sup>15</sup> Makkar U., Gabriel E., Tripathi S.K. *Value chain for higher education sector-case studies of India and Tanzania* „Journal of Services Research”, Special Issue, February 2008, s. 183

<sup>16</sup> Lisiecka K., Maciąg J., *O jakości usług edukacyjnych w szkołach wyższych*. Uniwersytet Jagielloński Kraków 2010 (in edition).

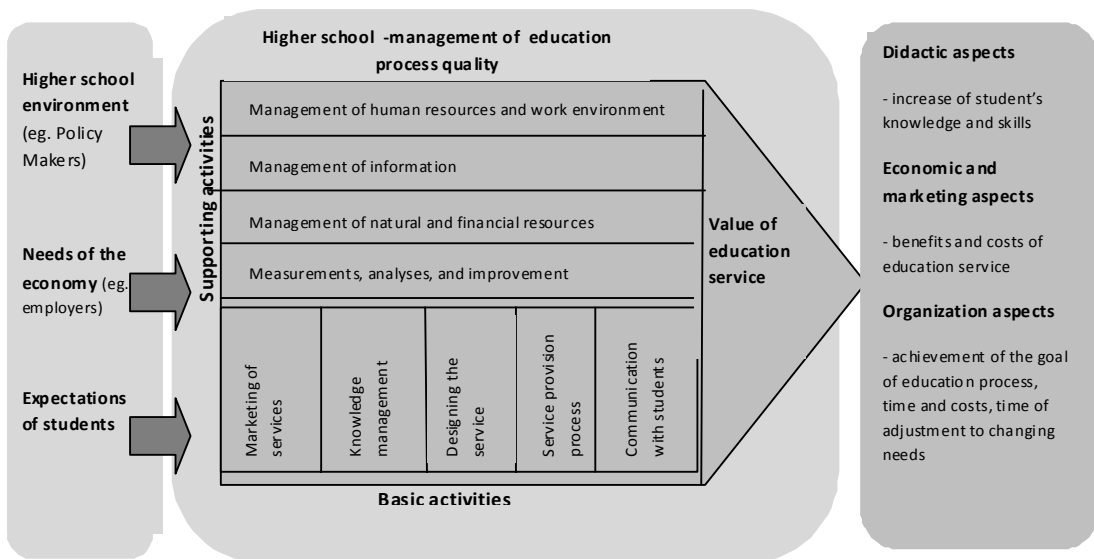


Figure 2. The mechanism for managing quality of education services

Source: developed on the basis of: Lisiecka K., Maciąg J. *O jakości usług edukacyjnych w szkołach wyższych* UJ Kraków 2010 (in edition)

In the didactic aspect, the value of education service is defined by<sup>17</sup>:

- the scope, level, and permanence of knowledge gained understandingly (knowledge should be complete, deep, systemic, coherent, operative, flexible, specific, durable, it should also have a general, developed, and conscious character),
- the time of gaining knowledge,
- the skills of practical knowledge application.
- 

Thus, the value of the service is a function of the education curricula, factors related to the teacher and student. It should be stressed that students are customers – partners in the process of education<sup>18</sup>. Their attitudes determine the effects of the education process, that is why the key role in the process of value genera-

<sup>17</sup> Developed further in: *Efektywność technologii kształcenia*. ed. by F. Januszkiewicz. PWN, Warszawa 1983, p.48 and following; *Efektywność kształcenia zawodowego*. Red. Jeruszka U., IPiSS, Warszawa 2000, p.26

<sup>18</sup> Developed further in: Sirvanci M.: *Are students the true customers of higher education?* "Quality Progress" 1996, No. 10, p. 99; Wallace J.B.: *The Case for Student as Customer*. "Quality Progress" 1999, No. 2, p.50

tion is played by proper motivation for learning. It is the effect of a well organized education process<sup>19</sup>.

In the economic aspect the value of education service constitutes the information about the outlays and results of the education process, and is identified with price of the service<sup>20</sup>. The added value is defined as the difference between the value obtained by the student, and the costs of studies paid by that student<sup>21</sup>. Direct application of the quantitative formula for value appraisal of the education service in the economic aspect encounters numerous difficulties – there is no scalability, and at the same time it is widely recognized as doubtless measures of advantages gained in the process of education<sup>22</sup>.

In the marketing aspect, the added value of education service is defined as the increasing positive relation between the advantages and costs of studies for a school client, connected with sufficiently long period of maintaining a lasting competitive advantage on the market<sup>23</sup>. In such approach the dynamics of changes in the development of added value is stressed, which is a consequence of expectations of clients and stakeholders of the university, including the labour market subjects, as well as social and economic conditions affecting its activities.

In the aspect of organization the value of education service is determined by efficiency, effectiveness, and flexibility of the process<sup>24</sup>.

## Methods and measures of learning outcomes

In the didactic aspect measures of learning outcomes may be applied for measurement of the added value of education service. The problems of measuring and appraisal of learning outcomes have recently become the subject of interest

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<sup>19</sup> Rodgers T. Measuring Value Added in Higher Education: A Proposed Methodology for Developing a Performance Indicator Based on the Economic Value Added to Graduates. *Education Economics*; Mar2007, Vol. 15 Issue 1, p. 59

<sup>20</sup> Chłodnicki M. *Usługi profesjonalne*. Wyd.Naukowe Akademii Ekonomicznej w Poznaniu, Poznań 2004, p. 93

<sup>21</sup> Added value is also defined as net value. Makkar U., Gabriel E., Tripathi S.K. Value chain for higher education sector-case studies of India and Tanzania „*Journal of Services Research*”, Special Issue, February 2008, p. 184

<sup>22</sup> Developed further in: *Efektywność funkcjonowania zachodnioeuropejskich instytucji akademickich*. Red. R.Z.Morawski, Instytut Spraw Publicznych, Warszawa 1999, pp.7-8; Morawski R.Z.: *Kryteria efektywności instytucji akademickich*. [in:] *Model zarządzania publiczną instytucją akademicką*. ed. J.Woźnicki. ISP, Warszawa 1999, p.136

<sup>23</sup> *Zarządzanie wartością firmy* Collective work ed. by A. Herman and A. Szablewski, Poltext Warszawa 1999, p. 9

<sup>24</sup> Lisiecka K., *Kreowanie jakości*. Wydawnictwo Akademii Ekonomicznej w Katowicach, Katowice 2002, s.242

of numerous organizations worldwide. Activities in that respect are undertaken, among others, by OECD (the AHELO programme - *Assessment of Higher Education Learning Outcomes*), European Union (Bologna Process, Tuning Project, *European Qualification Framework*), USA<sup>25</sup> (*CHEA Award for Outstanding Institutional Practice in Student Learning Outcomes, The Collegiate Learning Assessment CLA*).

In the Recommendation of the European Parliament from the 18<sup>th</sup> of June 2009 'learning outcomes' means statements of what a learner knows, understands and is able to do on completion of a learning process and which are defined in terms of knowledge, skills and competence<sup>26</sup>. CHEA defined students' learning outcomes in terms of knowledge, skills and abilities that a student has attained at the end (or as a results<sup>27</sup>) of his or her engagement in a particular set of higher education experiences<sup>27</sup>. In the Recommendation of the European Parliament on the establishment of the European Qualifications Framework for Lifelong Learning.<sup>28</sup>

'Knowledge' means the outcome of the assimilation of information through learning. Knowledge is the body of facts, principles, theories and practices that is related to a field of work or study. In the context of the European Qualifications Framework, knowledge is described as theoretical and/or factual.

'Skills' means the ability to apply knowledge and use know-how to complete tasks and solve problems. In the context of the European Qualifications Framework, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools and instruments).

'Competence' means the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development. In the context of the European Qualifications Framework, competence is described in terms of responsibility and autonomy.

The assessment of learning outcomes may be conducted in two aspects – generic skills strand (generic outcomes associated with all holders of a qualification) and discipline strand (specific outcomes associated with disciplines and

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<sup>25</sup> Developed further in: CHEA. The CHEA Chronicle. Vol. 11, No.1, February 2010; Value-Added: Some Clarification Keston H. Fulcher, Ph.D.Christopher Newport University Virginia Assessment Group, 3/2/2007

<sup>26</sup> RECOMMENDATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 June 2009 on the establishment of a European Credit System for Vocational Education and Training (ECVET)

<sup>27</sup> Statement Of Mutual Responsibilities for Students Learning Outcomes: Accreditation, Institutions, and Programs. CHEA September 2003, [www.chea.org](http://www.chea.org), p.5

<sup>28</sup> RECOMMENDATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 April 2008

on the establishment of the European Qualifications Framework for lifelong learning

fields of learning and their particular qualifications), which together would embrace a wide spectrum of learning outcomes<sup>29</sup>.

Learning outcomes have applications in many locations: an individual higher education institution, nationally (for qualifications, qualifications frameworks and quality assurance regimes); and internationally (for wider recognition and transparency purposes).

The learning outcomes may be considered and measured from the point of view of a higher school, process of education, or a student. Depending on the assumed measure, different methods as well as different measures of assessing learning outcomes at a university are applied (figure 3).

Figure 3. Methods and measures of learning outcomes.

Source: Ewell P.T, Accreditation and Student Learning Outcomes: A Proposed Point of Departure CHEA Occasional Paper, September 2001, p. 8, [www.chea.org/award/StudentLearningOutcomes2001.pdf](http://www.chea.org/award/StudentLearningOutcomes2001.pdf)

Evidence of students' learning can take many forms, but most involve a direct examination of students' level of attainment. A useful form of evidence is survey self-reports related to learning, focus groups, interviews and student satisfaction studies. The problem of using the learning outcomes as measure of value added of educational process is the fact that some of outcomes are not the effects of

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<sup>29</sup> Developed further in: Roadmap for the OECD Assessment of Higher Education Learning Outcomes (AHELO) Feasibility Study. [www.oecd.org/edu/ahelo](http://www.oecd.org/edu/ahelo); *A Framework for Qualifications the European Higher Education Area* [www.bologna-bergen2005](http://www.bologna-bergen2005)

didactic performance of higher schools. Students can take some activities outside the school, i.e. attending an additional programs or employment.

The key problems in learning outcomes assessment are:

- To identify an adequate method to measure learning outcomes.
- To identify a good evidence of students' learning outcomes.

## **Results of the research project**

### **Data and methods**

The results of studies presented in the paper constitute a part of the research project implemented at the Jerzy Kukuczka Academy of Physical Education in Katowice, Poland, in the years 2003-2009. The Academy of Physical Education is a public university educating specialists for the sectors of sport, tourism, recreation, and physiotherapy. The school has four faculties: physical education (studies of level I and II), physiotherapy (studies of level I and II), tourism and recreation (studies of level I) and management (studies of level I). Students may study in the full-time studies or part-time studies. At present the Academy has about 5000 students.

Since 2003, systematic studies have been conducted in the Academy, with the aim of assessing the efficiency and effectiveness of the system of quality assurance. The paper presents the results of research conducted amongst students of the Academy in the years 2003, 2007 and 2009. The aim of the research was the assessment of education service quality in the Academy. One of the major objectives of the research were measurement and evaluation of the learning outcomes in the context of preparing the student for active functioning in the economy and labour market.

The following research questions have been formulated in the study:

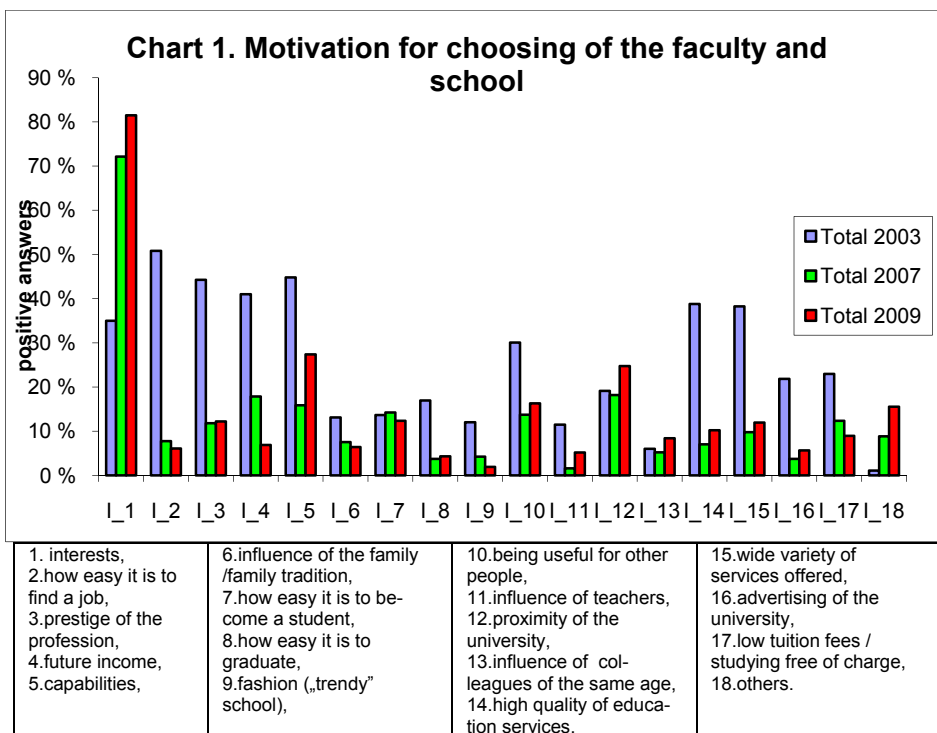
- How changed the motives driving students to take studies over examined period?
- How changed students' professional aspirations in examined period?
- Were the students provided by their university with knowledge, skills and competences congruent with their professional aspirations and expected by employers?
- Did the university prepare the students for active prospecting and taking the job in learnt profession?

The research has been performed in the form of a questionnaire. In 2003 117 students participated in the study, in 2007 – 960 students, in 2009 - 3035 students. Results of the study are presented below.

## Motivations for taking up studies, aspirations and professional activity of students.

The obtained results demonstrate dynamics and direction of changes in students' motivations and professional aspirations over the years being subject of analysis.

In the research, students have been asked to indicate three main prerequisites, which they followed when selecting the faculty and the university. The obtained results of research indicate a change in the motivations of people when selecting the studies, as well as the university (chart 1).



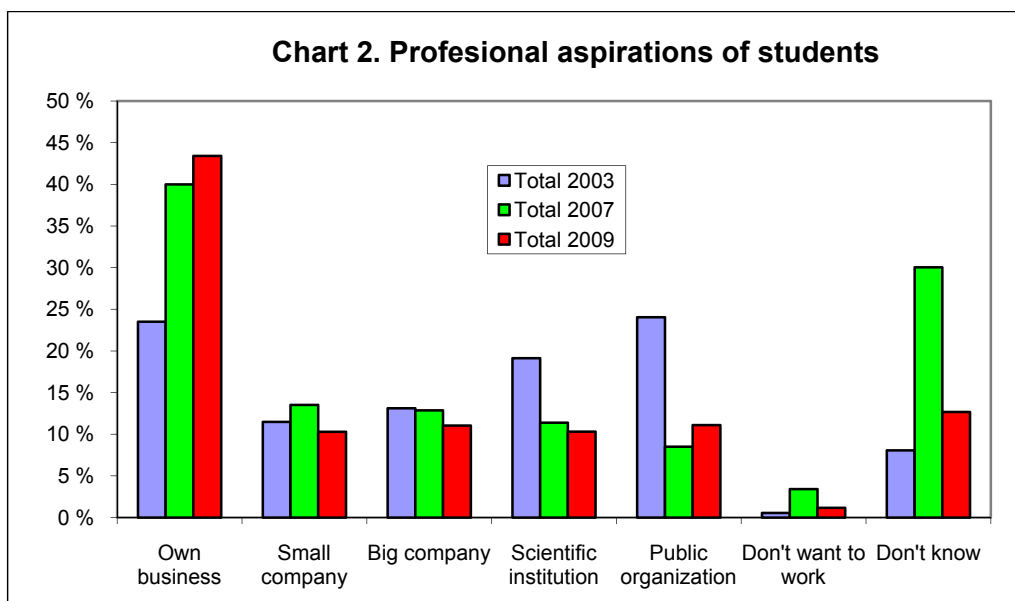
Source: Own research results

In 2003 the students, when choosing to study in the Academy, mainly took into consideration such motivations as: how easy it is to find a job, capabilities, prestige of the profession, future income, high quality of education services, as well as wide variety of services offered. The results of studies conducted in 2007 indicate a change in the hierarchy of motivations. The most important ones, indicated by students, contain: interests, future income, proximity of the academy, as well as capabilities. The studies conducted in 2009 indicate increase of importance for such motivations as interests, capabilities, and proximity of the academy.

The obtained results of studies indicate that students consciously make the decisions concerning choice of studies and university, following mainly their capabilities and interests. Some practical aspects when making the decision are of importance as well, namely proximity of the academy. Over the years, such motivations as how easy it is to find a job, the prestige of profession, future income, high quality of services, as well as the wide variety of services offered are definitely declining. Such a situation may be the result of changes in the labour market, as well as steep competition between universities in the region.

Over the examined period, also the professional aspirations of students changed. The results of studies in that respect are presented in chart 2. Students participating in the research have been requested to stipulate their professional plans, and to indicate the type of organization they would like to work for, or they have already been working for, among the following:

1. own business,
2. small private company,
3. big international company,
4. university, scientific institution,
5. public organization (administration, education, etc.),

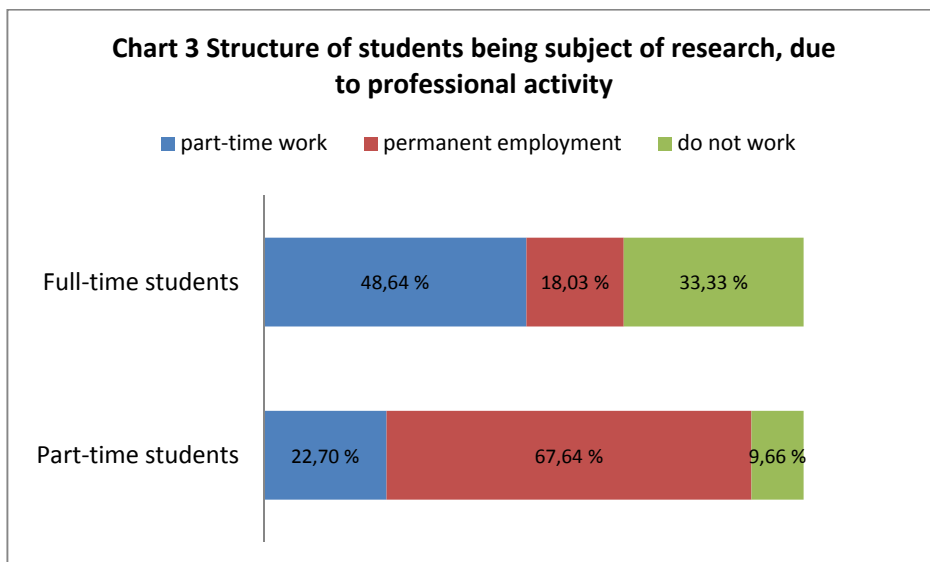


Source: Own research results

Comparative analysis of study results indicates a change in the professional aspirations of students of Academy. Systematically, since 2003, the percentage of students who planned to start their own business activity has increased. On the other hand, the percentage of students willing to work in the public service sector (administration, education) and scientific institutions has decreased. Some

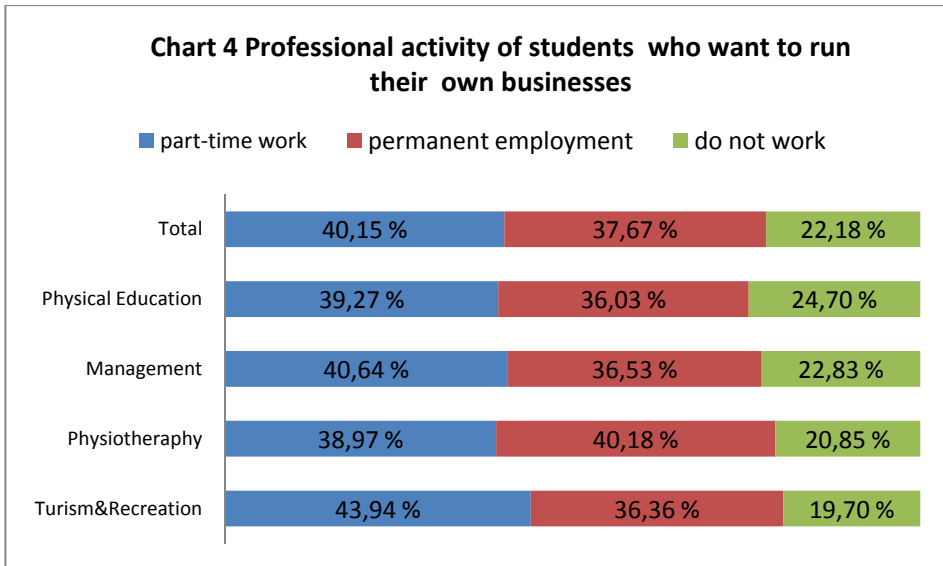


14% of the students questioned do not have, as yet, definite professional plans. A decisive majority of the students taking part in the research had been taking part-time or permanent employment during studies. The structure of those students, due to their professional activity, is shown in chart 3. Among the full-time ones, over 66% of the subjects worked, among the part-time students, over 90% of the subjects, of whom 67% of the students had permanent employment.



Source: Own research results

Having in mind the above results of research, the professional activity has been examined for the students who want to run their own business (chart 4). The results obtained from the research indicate a high level of entrepreneurship and professional activity among the students of all faculties. Over 77% of the students in the study, who want to run their own businesses, have been taking casual employment during studies (over 40% of students) or have had steady employment (some 37% of students).



Source: Own research results

### Assessment of learning outcomes

The assessment of the learning outcomes has been conducted in reference to the obligatory education standards at specific faculties, as well as requirements of the labour market. The research in respect of assessment learning outcomes has been conducted only among students in their final years of studying.

The measures of learning outcomes were:

- Education aims achievement degree assessment, defined in graduate's profile,
- Evaluation of knowledge, skills and competencies expected by employers,
- Evaluation of preparation for searching and taking up a job in the profession learnt.

Results of education were evaluated by the students in three aspects. In the first one they evaluated realisation degree of presumed for given major education aims. In the second one they evaluated their own knowledge, skills and competences as seen by employers' demands. In the third aspect the students evaluated preparation for job prospecting and taking in the profession learnt.

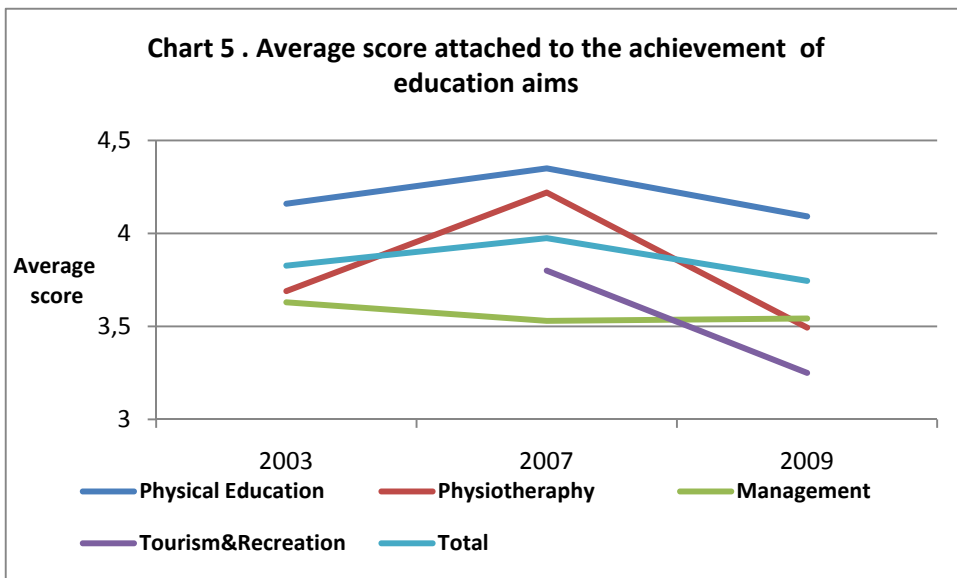
## **Assessment of the realisation degree of education aims defined in the graduate's profile**

In compliance with the education standards valid in Poland, for each faculty the so-called graduate profile is determined. This is a document, which stipulates the legally required level of knowledge, skills, and competencies for a graduate at a given level, from a specific specialty.

- Education aims at the faculty of physical education comprise: possessing the knowledge and skills indispensable for programming, planning, and executing the obligatory physical education and moderating sports activities as an instructor, preparation for pedagogy and developing the attitude of animator of physical education and promotion of healthy life-style.
- Education aims at the faculty of physiotherapy comprise: possessing the knowledge and skills indispensable for developing and maintaining the physical performance and efficiency of man, in order to prevent disability, developing and maintaining the physical performance and efficiency of disabled persons, restoring the physical performance and efficiency of man, problem solving capacity, related to the planning, execution, and supervision of medical rehabilitation processes.
- Education aims at the faculty of management comprise: possessing the knowledge and skills indispensable for management and marketing in sport, tourism, hotel trade, and the catering business, possessing the abilities of solving specific problems related to the establishment and running of business and practical analyzing and creative solving of operational and strategic problems in running a business.
- Education aims at the faculty of tourism and recreation comprise: possessing the theoretical knowledge and skills, which enable professional activity in the organization and practice of tourism and recreation, the competence to organization and lead tourist events, preparation for work in travel agencies, hotels, rest houses, sanatoria, and – first of all – in sports and recreation centres, as well as preparation for work in state and self-government institutions, in the units dealing with tourism, sport, and recreation.

During the research, students, on the basis of self-assessment of their knowledge, skills, and competencies, evaluated the degree of achievement of the de-

defined education aims, in the scale of 1-6, where the score of 1 stood for low level of achievement of education aims, whereas the score of 6 meant very high level of achievement of education aims. The results of the studies in that respect are presented in chart 5.



Source: Own research results

The results of research indicate a decline in the average score attached to the achievement of education aims for the faculties examined. Also, a statistically significant differentiation of score occurs, depending on the faculty. The comparison of research results done in the years 2003, 2007, and 2009 has been made applying the confidence interval method (confidence intervals were established on the basis of studies carried out in 2009). The results of analysis are presented in table 1.

Table 1 Average scores for the degree of achievement of education aims.

Faculty	Average score 2003	Average score 2007	Average score 2009	Confidence interval -95.00%	Confidence interval 95.00%	Assessment of degree of achievement of education aims (working students)
Physical Education	4.16	4.35	4.09	4.03	4.15	4.09
Physiotherapy	3.69	4.22	3.49	3.41	3.58	3.49
Management	3.63	3.53	3.54	3.46	3.63	3.55
Tourism&Recreation	-	3.8	3.25	3.09	3.41	3.22
Total	3.82	3.97	3.75	3.70	3.79	3.73

Source: Own research results

On the basis of research results one can state that in the years 2003-2009:

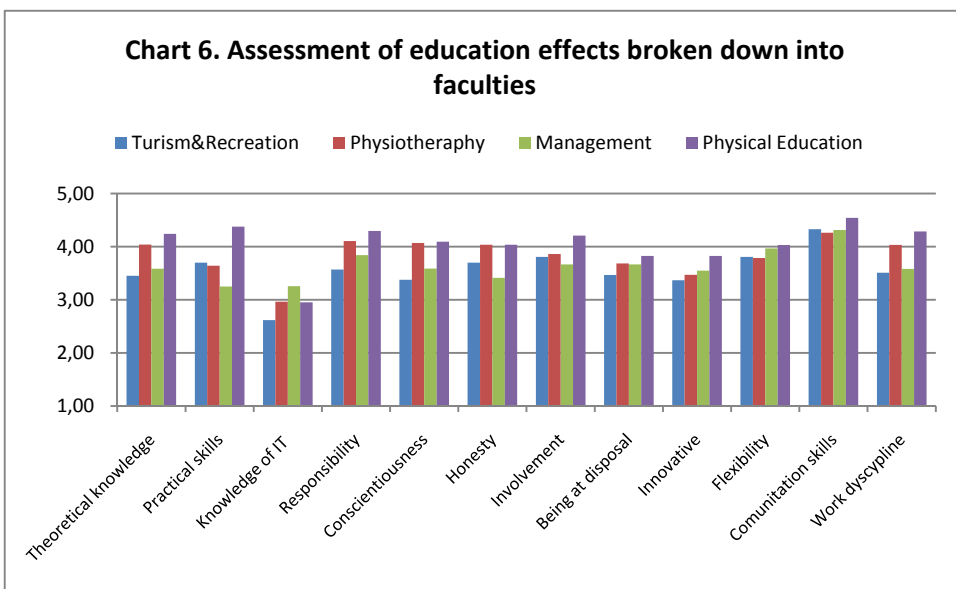
- The average score for achieving of education objectives dropped in the faculties of physical education, physiotherapy, and tourism & recreation,
- The average score for achieving of education objectives in the faculty of management did not undergo substantial changes,
- Assessment of achieving the education objectives does not differ between the total students and the group that has had part-time or permanent employment.

The drop in the average score obtained for the degree of achievement of education objectives indicates that students value less the effects obtained in the process of education, in the form of knowledge, skills, and professional competencies. That may be caused, among other things, by a slow process of adjusting the study plans and curricula to changed motivations for studying, and professional aspirations of students.

## **Evaluation of the knowledge, skills and competencies that are important and expected by the employer**

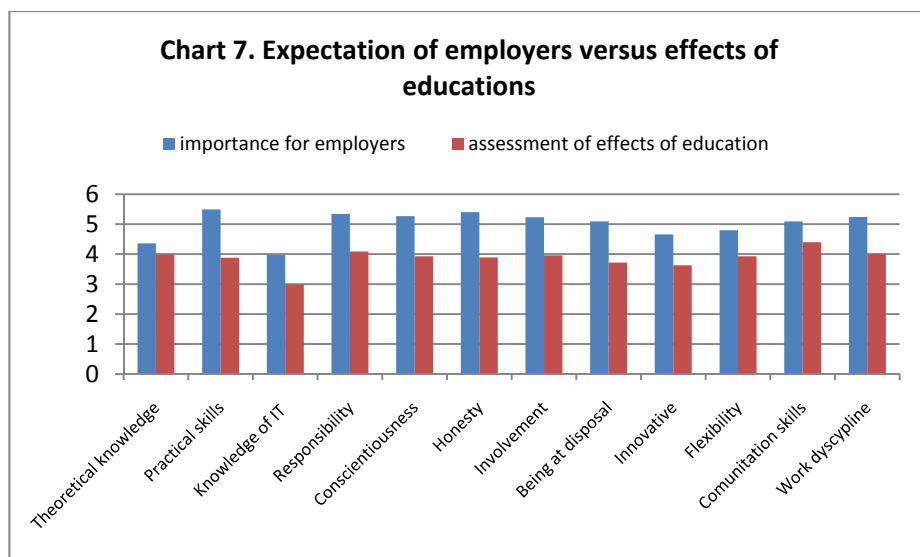
The effect of the education process is the "generation" of a graduate with such a profile of knowledge, skills, and competencies, that is expected by the economy and by employers. The studies performed among students allowed to determine the profile of an "ideal" candidate for employment and the level of development

of qualities expected by employers and students (in the analysis of research results, only the opinions of working students have been taken into consideration). The evaluation was scaled 1 - 6, where 1 meant the lowest note and 6 – the highest. Among the effects of education process in the academy, those which got the highest ranking among the students include: ability to establish contacts, responsibility, discipline, practical knowledge and involvement. The results of studies are presented in the chart 6. The results of statistical analysis indicate that there is a substantial difference in the assessment of education effects because of the faculty and due to the fact whether students took employment during studies.



Source: Own research results

On the other hand, in the opinion of working students, the most important qualities demanded from an employee are: practical skills, honesty, responsibility, conscientiousness, and work discipline. Knowledge of IT technologies and theoretical knowledge were at the bottom of the list. A comparison of results of research is presented in the chart 7.



Source: Own research results

The analysis of research results allow to make a conclusion that the greatest discrepancy between the assessment of importance of requirements of employers and the assessment of education effects applies to such features as practical skills, as well as responsibility, conscientiousness, and honesty.

Test of verifiability and reliability of students self-assessment is placed in table 2.

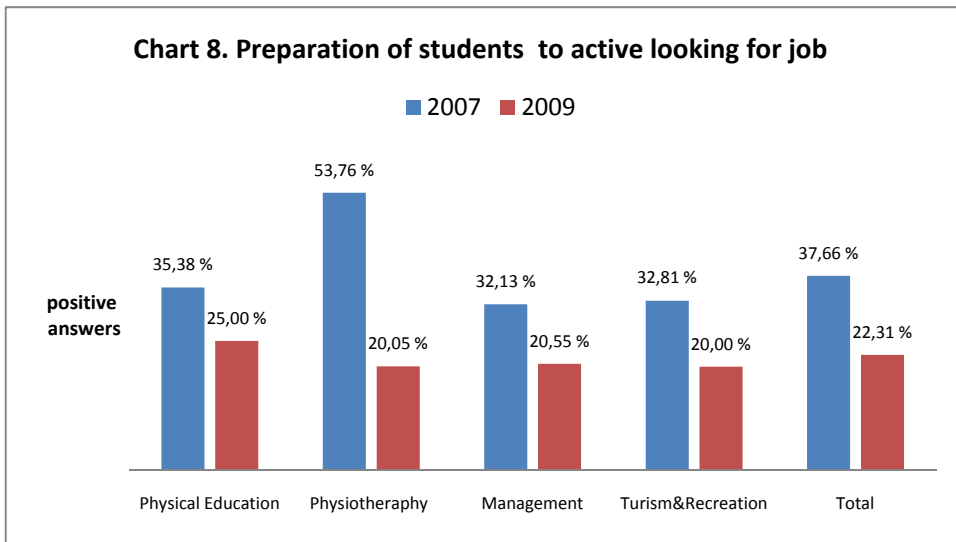
Table 2. A list of average scores for degree of attaining education objectives and the assessment of learning outcomes, broken down into faculties

Faculty	Assessment of the achievement of education objectives (working students)	Confidence interval -95.00%	Confidence interval 95.00%	Assessment of learning outcomes (working students)
Physical Education	4.09	4.03	4.15	4.06
Physiotherapy	3.49	3.41	3.58	3.83
Management	3.55	3.46	3.63	3.64
Tourism&Recreation	3.22	3.09	3.41	3.56
Total	3.73	3.70	3.79	3.87

The obtained results indicate that regardless the method applied, the assessment of learning outcomes in the sphere of knowledge, skills, and competencies gained by the student in the process of education does not differ substantially.

## Assessment of preparation for prospecting and taking up a job in the profession learnt

One of the important learning outcomes is the preparation of students to active job prospecting. The results of assessment are presented in the chart 8.

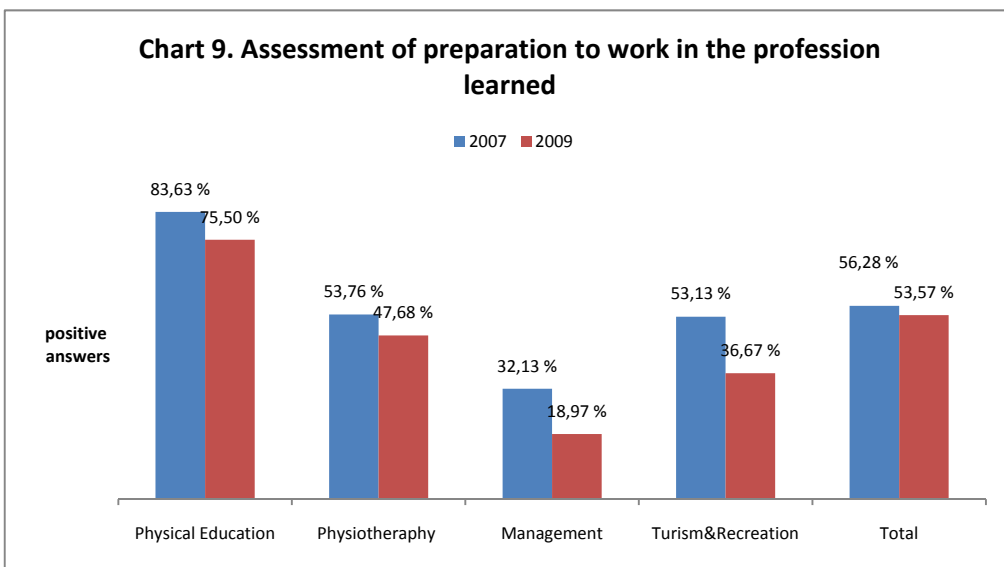


Source: Own research results

The number of positive answers in the area studied is lower in comparison with 2007, no statistically significant differentiation occurs due to faculty or due to the fact whether a given student works or not.

The research results obtained indicate also a drop in the results of assessment of preparation to work in the profession learnt (chart 9).





Source: Own research results

The assessment of preparation to work depends on the faculty – it has been the highest for the physical education faculty, the lowest for the management faculty. The assessment of preparation to work also depends a lot on the fact whether a given student works or not. Only 50.27% of students with permanent employment and 52.3% of students with part-time employment confirmed that the academy prepared them well for taking a job in the profession learned.

## Discussion

The results presented indicate that students studying at the Academy are, in most of the cases, people with specific interests, entrepreneurial, and professionally active. Despite the fact that the Academy of Physical Education has taken numerous actions in recent years, with the aim of enhancing the quality of education services, they seem insufficient in the light of the research results obtained.

The main conclusions drawn from the studies are as follows:

- The academy does not react flexibly enough to changes in the expectations of students, the labour market and the state,
- The study plans and curricula do not provide the students with suitable qualifications required in the contemporary economy,
- An ever - increasing gap concerning knowledge, skills, and competencies and the learning outcomes provided by the school emerges bet-

ween the expectations and aspirations of students, expectations of the labour market and the state,

- There is a substantial differentiation in the results of assessment by students from individual faculties, which leads to the conclusion that the implemented system of quality assurance does not provide an equal standard of education services (other factors which may influence the differentiation of results should be subjected to analysis, e.g. the quality of academic staff, the number of research projects conducted, equipment in the form of didactic aids, etc.).

Due to the results of the research the Academy should take some activities like:

- Reorganisation of quality assurance system in Academy of Physical Education to increase schools managers (rector, deans and others) involvement in improvement of curricula on faculties,
- Continuing research among employers,
- Following up graduates.

## Conclusion

The obtained results of research indicate that the student's self-assessment becomes a useful tool in measurement of learning outcomes at the university. Because of students' professional experience students become an important link in the process of assessing the quality of education services, their opinions permitting a credible assessment of learning outcomes in the form of knowledge, skills, and competencies the higher school provide them with. In the face of much turbulence in the environment of a given school, and the ever-increasing demands of students and the labour market, it allows for assessment of the degree of education plans and curricula adjustment to the requirements of contemporary economy, including the labour market and knowledge-based society.

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# **A PARTICIPATORY WORKING METHODOLOGY FOR DEFINING A COMPETENCY-BASED ASSESSMENT MODEL AT THE URV**

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## **Abstract**

In 2003, the Rovira i Virgili University made a firm commitment to improving the teaching and training of graduates under the parameters of the European Higher Education Area. This commitment was formalized in the Strategic Plan for Teaching.

In this article, we present the project that was undertaken to determine a competency assessment model at the URV. We first describe the origins of the project. Then we present the objectives and working methodology. And finally we discuss the principal findings and conclusions.

Defining a general competency assessment model is one of the needs that has arisen from the deployment of the Strategic Plan for Teaching. In particular, it aims to define a model in conjunction with the teaching staff that respects the needs and characteristics of each faculty. For this reason, the URV Competency Group was set up, in 2008, with the objective of designing the model for evaluating competencies at the URV on the basis of group discussion.

The URV model for competency-based assessment provides a general framework for programmes to specify how to carry out the competency-based monitoring and assessment of students.

Competency-based assessment means adopting a collective, shared approach. It implies making structural, organizational, curricular and cultural changes. If all these changes are to be made, it is important to consider lecturers as agents and promoters of change and students as active agents in the teaching-learning process.

# Background

At present we are immersed in a changing society characterized by the democratization of access to information and knowledge, largely as a result of the generalized use of the information and communication technologies.

In this regard, the parameters that measure the development of society focus on generating and transferring knowledge so competency-based lifelong learning has become essential.

The European Higher Education Area (EHEA) regulates the role of universities in lifelong learning and, in particular, implements a series of measures that aim to improve the quality of teaching<sup>30</sup>.

In 2003, the Rovira i Virgili University made a commitment to improve the teaching and learning of graduates under the parameters of the EHEA. This commitment was set forth in the Strategic Plan for Teaching<sup>31</sup>, the objectives of which are:

- to implement a learning-oriented teaching model focusing on the student;
- to increase the effectiveness and the efficiency of the URV in learning processes; and
- to enable the university to integrate in the process of European harmonization.

These objectives have led to strategies and lines of action that are subjecting the URV to a process of institutional change and improvement at both the instrumental and cultural level. This process requires the implication of the whole university community and that the university be provided with a teaching-oriented structure.

The Strategic Plan for Teaching defines a teaching model that focused on the student and competency-based learning. This model regards learning to be a dynamic process in which the students no longer play a passive role, mere receivers of content and knowledge, but become actors with assigned roles and functions.

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<sup>30</sup> ANECA 2006. Criterios y directrices para la acreditación de enseñanzas universitarias conducentes a títulos oficiales españoles de grado y máster. Madrid: ANECA.

<sup>31</sup> URV 2003. Pla Estratègic de Docència. Tarragona: Publicacions URV.  
[http://www.sre.urv.es/web/pled/modules/pla/web\\_doc\\_marc/pled.htm](http://www.sre.urv.es/web/pled/modules/pla/web_doc_marc/pled.htm)

The Plan also specifies a model of competency. Based on Le Boterf (1996)<sup>32</sup>, Bunk (1998)<sup>33</sup> and Sarasola (2000)<sup>34</sup>, the University defines competence like “people are regarded as being professionally competent if they have the knowledge (knowing and understanding), skills (knowing how to act) and attitudes (knowing how to be) necessary to practice their professional activity, solve problems autonomously, actively and critically, and also have the ability to collaborate with their working environment and the organization of work”.

As shown Farrús & Gisbert (2006)<sup>35</sup> although this model essentially understands competencies in an integral fashion, it puts them into categories so that their components can be analyzed. Delors (1996)<sup>36</sup> and Echeverría (1996)<sup>37</sup> propose the following classifications: knowing and knowing how to do, knowing how to act and knowing how to be. Tuning project (González, J. and Wagenaar, R. 2003<sup>38</sup>) has classified the skills in instrumental, interpersonal and systemic. Instrumental are those that they refer to oral and written communication and skills in ICT. Interpersonal are those that they refer to individual abilities to express feelings, skills of critical thinking and self-criticism as well as social skills as teamwork and / or social and ethical commitment. Systemic are those that they refer to skills and abilities that they refer to the systems as a whole, such as the ability to learn or to be able to adapt to the new situations).

At this point the URV defined his competency model:

- Specific competencies (type A): These competencies include those of knowing and understanding and knowing how to act that permit competent performance as part of a particular educational programme.
- General competencies (type B): These competencies are those of knowing how to be, which are not exclusive to a particular discipline but are

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<sup>32</sup> Le Boterf, G.; Barzucchetti, S.; Vincent, F. 1996. *Cómo gestionar la calidad de la formación*. Barcelona: Gestión 2000-Aedipe.

<sup>33</sup> Bunk, G.P. 1994. La transmisión de las competencias en la formación y perfeccionamiento profesionales de la RFA. *Revista Europea de Formación Profesional*, 1, 8-14.

<sup>34</sup> Sarasola, L. 2000. La competencia de acción como nuevo referente profesional: Ajustes terminológicos, conceptuales y funcionalidad del concepto. Proyecto docente. *Leción Magistral. Unidad 1. Universidad del País Vasco*.

<sup>35</sup> Farrús, N. i Gisbert, M. 2006. Definició de les competències específiques, transversals i nuclears. *Jornades en xarxa sobre l'espai europeu d'ensenyament superior. Universitat Oberta de Catalunya*.

[http://www.portal.uoc.edu/forums2/eees/files/E\\_1Ponencia\\_Gisbert.pdf](http://www.portal.uoc.edu/forums2/eees/files/E_1Ponencia_Gisbert.pdf)

<sup>36</sup> Delors, J. 1996. *La educación encierra un tesoro*. Madrid: Santillana / UNESCO.

<sup>37</sup> Echeverría, B. (coord.) 1996. *Orientació Professional*. Barcelona: Universitat Oberta de Catalunya.

<sup>38</sup> González, J. i Wagenaar, R. (Coord) 2003. *Tuning Educational Structures in Europe*. Informe final. Proyecto Piloto Fase 1. Bilbao: Universidad de Deusto.

common to many different ones. For example, teamwork, creativity, sensitivity to the environment, etc.

- Core competencies (type C): These competencies are defined by the institution as those that all URV graduates should have. For example:
  - Use the information and communication technologies
  - Be able to manage information and knowledge
  - Have an intermediate mastery of a foreign language
  - Be able to express themselves correctly
  - Be committed to ethics and social responsibility as citizens and professionals
  - Be able to define and develop their academic and professional project

The different degrees at the University have been working to adapt their studies to this model and designing the learning project for undergraduates. It began with the pilot projects of the Catalan Government and was carried out under the title *Methodological Exercise: The URV towards the EHEA* between 2003-2004 course and 2007-2008 course<sup>39</sup>.

Royal Decree 13/93/2007 and the processes defining the new degrees established a legal frame of reference. This frame, together with the accumulated experience, made the URV reconsider some aspects of the methodological exercise and the need to define an institutional model for evaluating competencies.

In this article, we describe the working methodology used by define a competency-based assessment model at the Rovira Virgily University, the results obtained and the conclusions drawn.

## Objectives

In 2008 the URV Competency Group was set up with the objective of designing the model for evaluating competencies at the URV on the basis of group discussion and the characteristics of each faculty or school.

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<sup>39</sup> Cela, J.M. i Gisbert, M., Legarreta, J., Montserrat, S., Farrus, N., Esquirol, A. 2008. La URV cap a l'EEES: Procés d'adaptació de les titulacions de la URV cap a l'EEES. Tarragona: URV Publicacions.



## Participants

During the academic year 2008-09 the group consisted of 21 lecturers representing all the faculties, two representatives of the Educational Resources Service (SRE) and the Vice-rector of Teaching Policy and EHEA (VPDEHEA).

The participants were contacted by sending an e-mail to all the Deans of the URV, explaining the objective of the project and requesting the collaboration of one or two lecturers.

## Methodology

The University wanted the model for evaluating competences be made as a collaborative manner. For this reason the methodology used was participatory, dynamic and open.

The approach of this methodology is based on participatory research (Hall, BL & Kassan, 1988<sup>40</sup>). Typically this methodology has been used in social research in the interpretative-critical paradigm, while looking for improvement of situations and contexts involving all the agents of the context.

From Bartolomé, M. (1990)<sup>41</sup> contributions we believe that this methodology is essential to the construction of projects with a shared vision because it can lead not only to instrumental change but also to the cultural change that competency based assessment requires. We also believe that a shared vision improves the efficiency and effectiveness of processes.

One of the important features of this methodology was how the different roles and functions of the members of the group were defined. These are:

- The teaching staff in the Competency Group played the role of experts, providing opinions, creating discussion and reaching consensus.
- The members of the Educational Resources Service organized, coordinated and vitalized the group. They also prepared all the working materials necessary for the group to run smoothly.

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<sup>40</sup> Hall, B. L. & Kassan Y. 1988. Participatory Research. In J.P. Keeves (Ed.) Educational Research, Methodology & Measurement. An International Handbook (p.p. 150-155). Oxford: Pergamon.

<sup>41</sup> Bartolomé, M.; Anguera, M.T. 1990. La investigación cooperativa: vía para la innovación en la universidad. PPU: Barcelona.

- The vice-rector for Teaching Policy and European Convergence led the group and ensured that its work was given due credit.

The use of ICT as collaborative and participatory tools was also very important for the methodology because group members could work continuously and in a participatory fashion without the need to attend constant face-to-face meetings. The group used the URV's virtual campus (Moodle) and created its own forum.

The face-to-face meetings were given a strategic role and set the rhythm of the group work. They were held once a month and were used to synthesize the work done virtually, to discuss those features of the assessment model that were being defined and to reach agreements on proposals.

The methodology described above consisted of three phases:

- Phase 1. The Educational Resources Unit planned the work to be carried out by the Competency Group (September-November 2008):

This phase consisted of listing the objectives of the group, specifying the working methodology to be followed, making proposals and designing materials. Finally the Management Team of each faculty or school were asked to provide two representatives to be members of the Competency Group.

In this phase, the Educational Resources Unit had the assistance of an expert in competency-based assessment from the University of Lleida, consulted other universities with similar experience and referred to reference documents.

- Phase 2. Group work from December 2008 to July 2009:

During the academic year 2008-09 four face-to-face meetings were held and members worked by means of the URV's virtual campus. During this phase, agreement was reached on the URV's competency assessment model and two guides were designed for assessing general and core competencies.

During this phase the group's work plan was the following:

- In the first face-to-face meeting agreement was reached on the workflow and the lines of work that would be developed.
- Before each face-to-face meeting was held, members of the group were notified by means of the forum of the virtual campus, and all the material to be discussed was uploaded onto the virtual campus so that it could be consulted.

- During the face-to-face meetings, the first item on the agenda was to approve the minutes of the previous meeting. Subsequently the objectives of the meeting were stated, the documentation sent was presented, checked with the group and discussed. Finally, agreements were reached.
  - Once the meeting had finished and before another one began, the SRE published the minutes on the URV's virtual campus. The material was also modified to coincide with the decisions taken and published on the campus. Forums for discussions were opened for group members, who contributed with their opinions, experience and ideas. The SRE coordinated the contributions and took them into account for the design of the URV's competency-based assessment model.
- Phase 3. Transfer of results:

The transfer of results is a very important phase if agreement is to be reached and the awareness of the university community is to be raised on the issue of competency-based assessment. It is also important because it makes it possible to share knowledge and experience so that the model can be improved. For this reason, results have been transferred at two different levels: internally and externally.

Internally, the URV has undertaken the following actions:

Before the last meeting with the competency group, the SRE and the vice-rector for Teaching Policy and European Convergence held a meeting with the management team of each faculty and school. The competency-based assessment model was presented and the contributions of the management teams were collected.

Subsequently, the SRE offered to organize workshops for lecturers and six were actually provided for a total of 122 lecturers. The aim of these workshops was to present the work carried out by the competency group and give support to the competency-based assessment model of each of the degrees.

Externally, two members of the competency group attended two symposia in Spain and presented papers. In particular, at the *2<sup>nd</sup> National Symposium on University Studies: The new degree qualifications: challenges and opportunities* organized by the Jaume I University and at the *First Seminar of the Bologna Expert Team: Learning outcomes, description, development and assessment* organized by the Castilla-La Mancha University.

# Results

The results obtained were the following:

## A collaborative web space was created for the work group and its work

The structure of the group's space on the virtual campus can be seen below:

The screenshot shows the Moodle interface for 'EP:ETDAC' at 'UNIVERSITAT ROVIRA I VIRGILI'. The main content area is titled 'Esquema per temes' and displays a hierarchical structure of four blocks:

- 1 Reunions: En aquest espai podreu consultar el acords presos en reunions mantingudes.**
  - Acta reunió 1/12/08
    - Documentació lliurada
  - Acta reunió 4/2/09
    - Documentació lliurada 1: doc de decisions
    - Documentació lliurada 2: exemple de fibra activitat
  - Acta reunió 2/3/09
    - Documentació lliurada 1: doc de decisions v2
    - Documentació lliurada 2: fibra completa de la C3
  - Acta reunió 17/04/09
    - Documentació lliurada
  - Fòrum sobre acords presos a les últimes reunions
- 2 Preses de decisions a nivell institucional i de centre o titulació**
  - Proposta: "Decisions a prendre v1"
  - Decisions a prendre v2
  - Decisions a prendre v3
  - Fòrum sobre document de treball "Decisions"
- 3 Descripció d'escenaris**
  - Model Avaluació per competències FMCS (Actualitzat)
  - Fòrum sobre definició d'escenaris
- 4 BLOC ACTUALITZAT EL 30/06/09**  
**Rúbriques Currículum Nuclear (VALIDADA la versió 1.0)**
  - C1. DOMINAR A NIVELL INTERMEDI UNA LLENÇUA ESTRANGERA, PREFERIBLEMENT L'AI
  - C2. Utilitzar de manera avançada les tecnologies de la informació i comunicació.

Image 1. Structure of the group's virtual space

As can be seen, it was organized in four blocks:

- The first block, entitled "Meetings" contained the minutes and the documentation that had been provided.

- The second block, entitled “Decision taking at the institutional, faculty/school or course level” was created in response to a decision to draft a document that clarified which decisions needed to be taken about competency-based assessment on the institutional, faculty/school or course levels. This document was the necessary first step on which the URV’s model for competency-based assessment was to be based.
- The third block, entitled “Scenario description” was also set up in response to a group request. The aim of this block was for the courses to respond to the decisions that were taken at the faculty/school level. In this way, then, it could be seen whether the general model was appropriate to the needs of each faculty/school.
- The fourth block, entitled “Rubrics” contained the documents that had been generated as a result of the agreements reached. It provides the instruments by which competencies are assessed. The rubric is a versatile tool that can be used for various purposes: sharing assessment criteria between lecturers and students, grading student work, and qualitatively assessing the extent to which the expected learning outcomes have been achieved.

## **The URV model for competency-based assessment**

As a result of the work done by the group about the “Decision taking at the institutional, faculty/school or course level” the principal features about the model for competency-based assessment were established.

The general model for competency-based assessment provides a general framework for programmes to specify how to carry out the competency-based monitoring and assessment of students.

Below we describe the main features of the model:

- Assessment is understood to be the systematic process of collecting and interpreting information in order to be able to take decisions about student learning and improving the teaching-learning process.
- The reference in competency-based assessment can no longer be the subject: an overall approach is required, involving several subjects, if a competency is to be developed and assessed. In this regard, teaching coordination is a key factor in the design of the subjects, the monitoring and tutoring and the assessment of students.
- Competencies develop progressively and must be planned, courses not only have to define at which points a particular competency will have been acquired but also the points at which progress towards the acquisi-

tion of a competency can be seen. Therefore, continuous and formative assessment is proposed.

- Competency-based assessment must be planned. So guarantees must be given that during a particular course all competencies will be assessed by means of learning outcomes and that sufficient evidence will have been provided that students have acquired the appropriate academic and professional profile.
- The learning outcomes are used to set the milestones that students should meet by the end of the teaching-learning process. They are a set of intentions aimed at competency-based learning that will guide assessment. Correctly defining learning outcomes gives students essential information about what they really need to learn, and enables lecturers to reflect on what knowledge, abilities and attitudes need to be learned and assessed.
- Uses the rubric and portfolio as an instrument to monitoring and tutoring the students.
- The model has to assure transparency.

At this point the general model has to be specified by each degree. This is why each degree has to take several decisions

- To describe the student's academic and professional profile
  - Describing competencies and learning outcomes that the student has to acquire.
- To set the curricular structure according to competencies
- To describe the competency-based monitoring and tutoring of students.
  - The degree has to specify in which moment a particular competency level has to be obtained.
  - To establish agents and mechanisms that will be used.
  - To specify how professors will explain the assessment criteria
- To establish teaching coordination mechanisms.

In order for the general model to be adapted to the reality of each faculty, various technological tools have been designed to assist in organizing, structuring the information, and facilitating teaching coordination and a share vision.

One of these tools is the **Competency map** of each course. The competency map is the instrument that is used to determine which subject works on and assesses a particular competency-based learning outcome. Producing this map requires a prior effort of teaching coordination.

The map also identifies those lecturers that will need to be coordinated to assess a particular competency, because one competency can be worked on by more than one subject throughout a degree course.

Let us look at an example:

Study programme:

Learning Competence outcomes		First Year										Second Year				
		15224001	15224002	15224003	15224004	15224005	15224006	15224008	15224101	15224103	15224104	15224007	15224009	15224010	15224105	15224106
A1	L01															
	L02															
	L03															
	L04															
	L05															
A2	L01															
	L02															
	L03															
	L04															
	L05															
A3	L01															
	L02															
	L03															
	L04															
	L05															
A4	L01															
	L02															
	L03															
	L04															
	L05															
A5	L01															
	L02															
	L03															
	L04															
	L05															
A6	L01															
	L02															

Image 2. Competency map

On the basis of this map, the lecturers plan the teaching-learning and assessment process that they will carry out with students using a technological application known as DocNet.

In the next figure we can see how Medicine degree has adapted to the model. They have established three moments during the degree in which students have to demonstrate that they have reached the required level of the competency. Their model is based on Three competencies cycle model Harden et al. (1999)<sup>42</sup>:

<sup>42</sup> Harden, R.M.; Grant, J.; Buckley,G.; Hart, I.R. 1999. Best Evidence Medical Education. Medical Teacher, 21(6), 553-562.

### Model of the 3 competency cycles

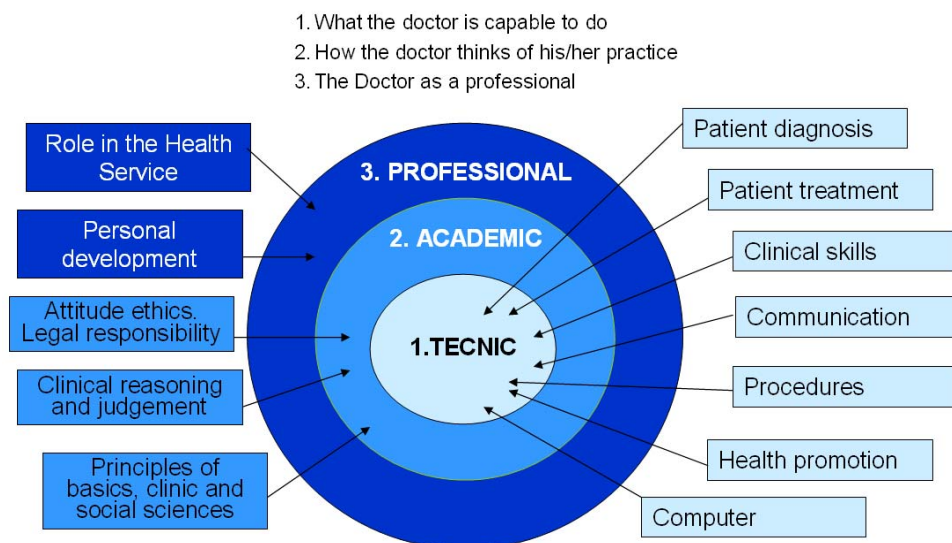


Image 3. Competency model of Medicine Degree

In Medicine Degree, the curricular structure is organised in 5 modules. Each module has several subjects. Medicine Degree uses different strategies for monitoring and tutoring the students:

- Every student has an academic tutor.
- The academic tutor guides and monitoring students through their portfolio.
- An evaluation committee assesses the students in second, fourth, fifth and sixth course.

## Guides for working on and assessing competencies

Two guides have been produced from all the work carried out: *Guide for working and assessing the general competencies of degree courses* and *Guide for working and assessing the core competencies in degree courses*.



The process of drawing up of these guidelines takes as a reference Dublin Descriptors and the European Qualification Framework and also provided with different experiences from several universities

The transversal competencies guideline is based on Villa, A. and Poblete, M. (2007)<sup>43</sup> and "Notebooks to work generic competencies in the subjects' by the Institute of Education Sciences at the Polytechnic University of Catalonia (2008)<sup>44</sup>. They made a very detailed analysis of the generic competencies and propose a model to assess them.

**Title of the competency:**

**General description of the competency:**

**General description of the level of mastery of the competency:**

**Learning outcomes:**

LEVEL OF MASTERY	LEARNING OUTCOMES	Descriptors		
		Not competent	Competent	High competent

In nuclear competencies guidelines several European official documents directly related to the content of the competencies were consulted. At this point, Specialists from several university services and lecturers from a variety of departments took part in writing the guides. The group was responsible for checking the rubrics proposed and suggesting improvements. Below there is an example of the structure that the guide used for each of the general and core competencies:

<sup>43</sup> Villa, A.; Poblete, M. 2007. Aprendizaje basado en competencias. Una propuesta para la evaluación de las competencias genéricas. Bilbao: Ediciones Mensajero.

<sup>44</sup> Quaderns per treballar les competències genèriques a les assignatures (Versió 28/10/08). Institut de Ciències de l'Educació de la Universitat Politècnica de Catalunya, 2008. Barcelona.  
[https://www.upc.edu/eees/guia\\_disseny/competencies/competencies-generiques-upc-1/copy\\_of\\_competencies-generiques-upc/](https://www.upc.edu/eees/guia_disseny/competencies/competencies-generiques-upc-1/copy_of_competencies-generiques-upc/)

First, the competency is given a title. Secondly, it is briefly described, in order to define the meaning expressed by each competency, and the level of mastery required by the URV is stated. Then the learning outcomes that students must achieve are made explicit. And finally the level of mastery, the learning outcomes and the descriptors associated to each result are presented in the form of a rubric.

The next figure shows an example of a rubric designed by a professor in the Nursing degree at the URV. It is a guide for assessing competencies in the clinical practice. The degree establishes the axis, the competencies and learning outcomes. The professor specifies the evaluation methodology and assessment criteria according to the level of mastery required.

<b>NURSING: CLINICAL PRACTICE 2nd Nursing course.</b>			
<b>Guidelines for the student assessment. Author: Sagrario Acebedo</b>			
AXIS 1: Personal, relational, ethical, social and cultural development			
COMPETENCIES	LEARNING OUTCOMES	EVALUATION METHODOLOGY	ASSESSMENT CRITERIA
A1. Keeps an ethical commitment following the deontological and legal principles in the professional context	Identifies and analyzes ethical and legal values in clinical practice Recognizes autonomy as a fundamental ethical principle	Dossier: Practicum Sessions: Observation and communication on the part of the professor	<ul style="list-style-type: none"> <li>•Respects the vital space that the person occupies (knocks, greets, introduces self, explains his/her role..).</li> <li>1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/></li> <li>•Keeps and respects the information obtained (confidentiality of data)</li> <li>1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/></li> <li>•Identifies judgements of value</li> <li>1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/></li> <li>•Carries out activities with the patient's consent.</li> <li>1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/></li> <li>•Questions whether the patient has the information that he/she needs.</li> <li>1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/></li> <li>•Asks questions with respect</li> <li>1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/></li> </ul>
B.1. Learns to learn	Develops responsibility and commitment during the learning process.  Takes active part in the programmed learning activities	Dossier: adaptation objectives Practicum: Observation on the part of the tutor Sessions: Communication on the part of the professor	<ul style="list-style-type: none"> <li>•Fulfils the fixed agreements in relation to personal objectives</li> <li>1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/></li> <li>•Is organized in the work presented.</li> <li>1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/></li> <li>•Contrasts thoughts and own ideas with others and takes it as an opportunity to learn</li> <li>1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/></li> <li>•Transmits relevant information in the work sessions.</li> <li>1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/></li> <li>•Knows how to reply to questions that are formulated in relation with the work demanded.</li> <li>1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/></li> <li>•Assumes the consequences of what he/she does and uses the mistakes to learn</li> </ul>

Image 4. Example of an assessment guide

## Conclusions

The assessment of competencies is both important and complex, and the university system must be able to cope with it.

Thanks to the work done so far, the university is ready to determine the competency-based assessment model for each Faculty or School. In this regard, the work carried out by the competency group has driven change and encouraged team decision making. We have also observed that the group members have promoted joint reflection among the teaching staff of all the faculties involved.

Competency-based assessment means adopting a collective, shared approach. It involves taking decisions at different levels (institution, faculty/school, course) and it implies making structural, organizational, curricular and cultural changes. If all these changes are to be made, it is important to consider lecturers as agents and promoters of change, so part of institutional strategy must be to train and prepare them for this role. It is also necessary to break with traditional work dynamics because competency-based assessment requires coordination and lecturers to work together.

The role of students must also change: they must be active agents in the teaching-learning process and they must be involved as one more assessment agent in the competency-based assessment processes. Therefore, it is essential for teaching staff to design learning scenarios that guarantee the acquisition and assessment of competencies.

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# ASSESSMENT OF e-LEARNING OUTCOMES IN AN INTERUNIVERSITY CLIL PROGRAM

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## Summary

E-learning has become an educational tool to facilitate student learning process and to adapt it to the social and professional reality. In this regard, assessing and evaluating the results of e-learning activities becomes a must. In our paper, we assess the outcomes of Content and Language Integrated Learning (CLIL) program. It is an online project based on a multicultural, interdisciplinary and bilingual collaboration developed between two European universities through the free-access academic platform Moodle. In this project, students have worked linguistic aspects, economic and managerial contents as well as other social competences. Students had to do several tasks such as individual written reports, oral presentations and group research projects. In order to assess the outcomes, both qualitative and quantitative approaches were considered. Qualitative results allow us to conclude that this collaboration online project enable students of different institutions, disciplines and cultures to get to know themselves, to discuss, as well as to obtain and to process information on other realities and to improve their language skills. Besides, after statistically processing data on participation, motivation and satisfaction, we obtain evidence supporting the relevance of this project in the teaching-learning process and its positive implication in students results in both universities.

## Introduction

The convergence process towards the European Higher Education Area has fostered the development of collaboration agreements between universities in the European Union. Within this frame, the London School of Economics and Political Sciences, LSE (London, United Kingdom) and the University of Valencia, UV (Valencia, Spain) signed a bilateral agreement to collaborate in teaching and researching tasks. To do so a multidisciplinary, bilingual and online project was designed and developed as a first step.

Thus, the objective of this paper is to analyze the impact of this collaborative experience between two European universities through the Moodle platform. Specifically, we aim at analysing overall student participation, motivation and satis-

faction and comparing between students from this two institutions. Although positive results have been obtained in the previous edition of this project (Cuadrado and Ruiz, 2008; Cuadrado, Ruiz and Coca, 2009; Cuadrado and Ruiz, 2009), it was necessary to replicate the experience for other courses. In this sense, the present paper refers to the experimental implementation of the project in the subjects of Marketing Research for students of the University of Valencia, and Spanish Language and Society for students of the London School of Economics.

In order to introduce our experience, we first review the main teaching-learning methods that are suitable for interuniversity collaboration. Next, the interdisciplinary and bilingual project developed by the two higher education institutions is described and the main results regarding student motivation, participation and satisfaction are discussed. The last section summarizes the main conclusions.

## **Learning on electronic environments**

Peer-to-peer learning activities on virtual environments have proved to be more efficient, effective and satisfactory for students in comparison to alternative activities and/or environments (Rada, 1998). This type of activities is based on active and cooperative learning, that propose a set of educational strategies through which students learn from others (Slavin, 1990). In particular, intrinsic value and equality in interactions play important roles in student satisfaction with the use of e-learning resources and, therefore, in students intention to continue using virtual learning environments (Chiu, 2007). Additionally, the creation of active learning environments, in comparison to traditional classrooms, has been related to a greater student motivation (Garcia and Pontrich, 1996; Stipek, Salmon and Givven, 1998), thus contributing to self-regulated training (Young, 2005). To assume the responsibility of learning requires student active participation to initiate and to control his/her own learning process, along with learning support strategies (Loranger, 1994).

In order to actively imply students in their learning process, several learning activities and environments have been used in Marketing education such as group management by students (Lilly and Tippins, 2002), documented class participation (Peterson, 2001), experiential learning exercises (Gremier et al., 2000), student-operated Internet businesses (Daly, 2001) and Web-based projects (Siegel, 2000). In order to effectively encourage student participation in this type of activities, different approaches about student motivation should be considered. On one hand, the cognitive theory sustains that student performance is influenced by the will to reach certain academic objectives, that can be oriented towards learning or towards a specific goal (Dupeyrat and Mariné, 2005). On the other hand, social student motivations have also been pointed out as antecedents of academic student achievements (Humphrey, 2004). Thus, social acceptance, academic self-esteem, as well as peer and lecturers assessment, can play an

important role in students involvement in their learning process (Cuestas et al., 2006).

Student motivation is closely related to his/her participation, as literature has widely informed (Martin, 2007). Nevertheless, for achieving students involvement in collaborative learning activities, it is not enough with providing technologically advanced environments (Cecez-Kecmanovic and Webb, 2000), and special attention to student satisfaction with the virtual learning environment should be paid, since it may be influenced by socio-cultural factors (Hannon and D'Netto, 2007).

## **The e-learning project**

The project e-learning was designed to introduce new pedagogical resources in two different courses of two universities in different countries. In this way, an interdisciplinary collaboration was held in order to facilitate student knowledge and experiences interchange in two different languages through an electronic learning environment. Thus, the collaboration was developed in Spanish for the topics proposed by LSE students, and in English those related with market research tasks of UV students, respectively.

In particular, the activity was held for LSE students taking an optional course such as Spanish Language and Society, which is oriented to non-Spanish-speaking students, and for students at UV taking a core course of the Business Administration degree (i.e. Marketing Management) in English, which is not the native for most students.

The specific objectives of this interdisciplinary project are, among others, to engage learners in activities that contribute to develop their linguistic skills in the target language, raise awareness of the attitudes, values and beliefs of the target cultures and to promote cooperation and exchange of ideas and information on economics, management and social issues (Byrne et al., 2007).

In its two first editions (2005-06 and 2006-07), the project started in February and was developed throughout six weeks. In the two last editions (2007-08 and 2008-09) the duration was also six weeks, although the project began in November. During this time, the students had the possibility to take part in several oral and written activities and discussions moderated and supervised by the lecturers in charge of coordinating the project, who are specialized in the respective subjects. In the two first editions, the exchanges were effected through WebCT, the virtual learning environment used by the LSE at that time, having access to it students of both institutions. However, in the last two editions it was decided to use the course management system Moodle.



Students had to do several tasks (written reports, oral presentations or individual research projects) in groups. In particular, concerning the course edition 2008-09, 23 UV students of Marketing Research (core course in the seventh semester), and 22 LSE students of Spanish Language and Society (outside option) took part in the proposed activities, exhibited in Table 1.

Complementarily, some LSE and UV students visited the collaborating university during two study trips organized by both institutions. During their respective visits students had the possibility to get to know personally their classmates and lecturers in the other university, to attend several classes and conferences, and to take part in extracurricular activities such as meetings with political representatives, journalists, and visits to political and cultural institutions.

	<b>UV</b>	<b>LSE</b>
Tasks	<ul style="list-style-type: none"> <li>- Profile and forum building</li> <li>- Acquaintance of forum colleagues in LSE</li> <li>- Supervision and pre-test of questionnaire items by LSE colleagues</li> <li>- Data analysis: LSE students are to collect 12 surveys in London and UV students are to analyse data.</li> </ul>	<ul style="list-style-type: none"> <li>- General introductory questions</li> <li>- Questions on social topics to investigate</li> <li>- Wiki collaborative essay using the information obtained from UV students.</li> </ul>
Language of communications	English	Spanish
Contribution to final grade	Online activities are voluntary and do not have direct influence in the final grade, but through "mini-points" based on class participation and involvement	These three tasks are compulsory and are part of the approximately 40 tasks to be completed for continuous assessment (20% of the final grade).

Table 1: Proposed tasks and contribution to final grade depending of university

Once the course is finished, the lecturers responsible for the project collected the information about participation from Moodle statistics and processed all the resulting data. In particular, data is gathered regarding student participation, i.e. duration of the connection period (number of days between the first and last login); number of logins; profile, resources, blog, forum and wiki view; comments sent to forum and wiki, and number of uploaded documents.

Additionally, students fulfilled a short questionnaire including questions related to their motivation and satisfaction with the activity. This took place the last once the project was over.

# Results

## Participation

Student participation in the project was high for both institutions, so that apparently students are very interested in this type of activities (Table 2). In addition, upon the assessment of the different assignments delivered, students show to be able to use and to structure the information provided by their collaborators in the co-participant institution. Table 2 exhibits mean values, standard deviations and F value for the ANOVA test to check the presence of significant differences in the analyzed variables between both institutions.

Variables	UV		LSE		F
	Mean	Stand. Dev.	Mean	Stand. Dev.	
Duration of the connection period (days)	29.86	11.35	69.52	26.39	40.52 <sup>a</sup>
Number of logins	7.10	3.90	10.52	3.85	8.60 <sup>a</sup>
User profile views	9.14	10.43	7.48	4.70	0.48
Resource views	0.76	1.04	5.09	3.95	23.59 <sup>a</sup>
Blog views	0.48	0.17	0.75	0.49	2.55
Forum views	30.00	15.73	37.17	21.24	1.60
Wiki views	1.71	4.12	17.13	10.76	37.93 <sup>a</sup>
Comments sent to forum	6.71	4.14	6.04	2.06	0.48
Comments sent to wiki	0.00	0.00	2.00	1.62	31.80 <sup>a</sup>
Uploaded documents	0.48	0.60	1.65	1.85	7.73 <sup>a</sup>

<sup>a</sup> Statistically significant at  $p < 0.01$

Table 2: Participation depending on university

Significant differences between UV and LSE students are observed in some of the analyzed variables. In particular, LSE students display a longer login period, as well as a higher number of login days. This fact may be due to the characteristics of the last task entrusted to LSE students, i.e., a wiki collaborative essay using the information obtained from UV students, as a kind of summary with LSE students' interactions with their Spanish classmates.

Additionally, there are significant differences regarding resource and wiki views, as well as in the number of comments posted in the wiki and uploaded documents. These differences may also be explained by the type of tasks assigned to students of both institutions, being LSE students asked to elaborate a collaborative test through wiki but not the UV students.

Regarding other variables of student participation, in spite of the unequal contribution of the project activities on their final grades and the differences in the tasks obligatoriness between LSE and UV (online activities are compulsory for LSE students but not for UV students), no significant differences are observed

for the rest of variables. Thus, this result is in contrast with the expected superior participation of LSE students in comparison to their UV colleagues, since Moodle activities were compulsory and had a direct contribution to the final grade for LSE students, whereas the corresponding Moodle tasks were voluntary and lacked direct influence on the grades of Spanish students. These results seem to support the positive influence of this interdisciplinary activity in the UV student involvement in the Marketing Research course.

## Motivation

Since participation of UV students in the project does not directly contribute to the student grade in this subject, we understand that students involvement in the activities proposed by this project may be explained in terms of their intrinsic motivation. Therefore, we measured student intrinsic and extrinsic motivation to take part in this e-learning activity through two scales of four items each, adapted from Young (2005) and ranging from 1 (total disagree) to 10 (total agree) based on the degree of agreement with each suggested sentence. Descriptive and *F* statistics for the items of these scales are shown in Table 3.

As it can be observed from Table 3, although three of the four items of intrinsic motivation show higher values for UV students in comparison with their LSE classmates, there is only a significant difference for the item “I have the satisfaction of improving my personal knowledge and skills”, where indeed LSE students are those who show higher scores. This evidence can be explained by the possibility that LSE students perceive the tasks to be developed as more related to their learning process, in comparison with Spanish students.

Item	UV		LSE		F
	Mean	Stand. Dev.	Mean	Stand. Dev.	
<i>Intrinsic motivation</i>					
1. I have the satisfaction of improving my personal knowledge and skills.	6.59	1.47	7.43	1.59	3.41 <sup>c</sup>
2. I have a sense of personal accomplishment.	6.82	1.68	6.43	1.90	0.51
3. I have completed exciting and challenging class activities.	7.05	1.76	6.22	1.81	2.42
4. I enjoy learning about an interesting subject.	8.18	1.53	7.96	1.82	0.20
<i>Extrinsic motivation</i>					
5. I think that the required time will have a negative effect on my social life and other grades.(*)	2.32	2.34	2.31	0.48	0.85
6. I will have simply completed a required course, nothing more.(*)	3.45	1.99	5.00	2.63	4.91 <sup>b</sup>
7. I will receive a good grade that will help my Grade Point Average.	7.18	1.82	6.52	1.97	1.36
8. I will make other people proud of me.	4.77	2.79	5.09	2.64	0.15

<sup>a, b, c</sup> Statistically significant at  $p < 0.01$ ,  $p < 0.05$  and  $p < 0.10$ , respectively.

(\*) Inverted item

Table 3: Motivation depending on university

Regarding extrinsic motivation, significant differences have been observed only for the item “I will have simply completed a required course, nothing more”, where LSE students show higher scores. Generally, all the items show scores near or over the midpoint of the scale. Therefore, we understand that the proposed e-learning activities are valid to motivate students of both institutions intrinsically and extrinsically.

## Satisfaction with the e-learning platform

Finally, we analyzed the degree of satisfaction with the online learning environment. With this purpose, we measure student satisfaction with the electronic learning environment through a 10-item scale adapted from Hannon and D’Netto (2007). Items were ranked through a 5 point-scale ranging from 1 (totally disagree) to 5 (totally agree). As in previous analyses, Table 4 shows mean values, standard deviations and the F test for ANOVA.

Variables	UV		LSE		F
	Mean	Stand. Dev.	Mean	Stand. Dev.	
1. I had no problems using the online technology	4.41	1.01	4.50	0.60	0.13
2. Online activities in the program are useful and relevant	4.14	0.83	3.73	0.93	2.34
3. I need to ask for the lecturers advice often during the course*	3.00	1.19	2.73	0.88	0.74
4. The rules and expectations in using online discussion are clear to me	4.36	0.85	4.14	0.71	0.93
5. I sometimes need help using the online software and finding my way around*	2.23	1.07	2.18	1.18	0.02
6. I usually write long posts to online discussion	3.09	0.87	2.50	0.80	5.50 <sup>b</sup>
7. I find easy to use an informal style in an online discussion	4.27	0.83	3.36	1.05	10.19 <sup>a</sup>
8. I find difficult to write in an analytical or critical style*	2.32	1.04	2.09	0.87	0.62
9. Technical help is available and helpful	3.64	0.90	3.82	0.96	0.42
10. I found online communication a friendly experience, not a lonely one.	4.18	1.10	3.77	0.92	1.79

<sup>a, b, c</sup> Statistically significant at  $p < 0.01$ ,  $p < 0.05$  and  $p < 0.10$ , respectively.

\* Inverted item

Table 4: Satisfaction depending on university

Consistently with previous results, satisfaction with the learning environment is high for the students of both institutions, since for all the items of the questionnaire, excepting the inverted items, scores exceed the midpoint of the scale (3). Notwithstanding, there are significant differences between the students of both institutions with regards to two items. In particular, UV students declare to write long posts to online discussion and to find easy to use an informal style in an on-

line discussion at a greater extent than their classmates in the LSE. This result may be explained by the different level of language skills development by both groups of students. In this sense, whereas UV students attending the so-called International Group have a good command of the English language, since this is the language of instruction in all the courses during their studies, the LSE participants are students of Spanish as a foreign language, and may experience more difficulties than their Spanish colleagues when interacting in the online learning environment.

## Conclusions

Taking into consideration both the quantitative and the qualitative results obtained, we find support to the positive influence of interdisciplinary e-learning activities through Moodle on student participation, motivation, and satisfaction with the electronic learning environment and, therefore, with the use of education methods that facilitate active and cooperative learning by means of audio-visual didactic resources.

In particular, it is observed that regardless the incentive offered to students for their participation in the proposed activities, the impact in terms of student involvement, and intrinsic motivation as well as extrinsic motivation is overall positive. Additionally, students of both institutions show high levels of satisfaction with the learning environment created by the instructors, and declare not to find great difficulties as far as the use of the electronic resources. Differences in participation and use of some online resources between UV and LSE students, as well as in motivation and satisfaction with some specific features of the virtual learning environment seem to be due to differences in the task definition (incentives for task completion and compulsoriness).

All in all, this collaboration project allowed students of different institutions, disciplines and cultures to get to know themselves, to discuss, as well as to obtain and to process information on other realities and to improve their language skills through a motivating online learning environment. In general, results seem to confirm the positive contribution of this interdisciplinary, bilingual and online activity to the teaching-learning process.

Nevertheless, this evidence is not conclusive, since this experience should be replicated in other courses to guarantee its validity. Additionally, we understand that this research is not free of limitations. As far as the quantitative data is concerned, the obtained results may be biased due to the reduced number of students in these courses.

Furthermore, the causality between participation, motivation and satisfaction with the virtual learning environment has not been explored. In this sense, we

wonder if motivated students are those that take part at a greater extent in the online activities of the project, or “best” students (heavy participants) are those declaring to be more motivated by this type of activities and more satisfied with the electronic learning environment. Alternatively, satisfaction with this environment may increase student motivation and, in this way, student involvement in the proposed tasks. Therefore, the estimation of a structural equations model may shed additional light on the sense of the interrelations between student participation, motivation and satisfaction in this type of online activities.

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### III STUDENT-CENTRIC R&D&I

**Student-Centric R&D&I:** Research, development and innovation are central and essential part of the activities of higher education institutions. Student-centric R&D&I, where students are in a central role generating and managing R&D&I and creating innovations and solutions, is still perhaps rare. The future vision is genuine student-driven R&D&I. This session focuses on student-centric R&D&I in producing new knowledge and competences.



# USER CENTRIC RESEARCH IN THE MOBI-PROJECT

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## Abstract

This study takes a look at the output from 2009 autumn's student centric research work concerning Mobile Object Bus Interaction (MOBI) project and looks at the methods the students used. Then the output and methods will be looked at from the point of action research and how action research can improve the output of Laurea's future projects.

The MOBI project was started in Laurea in multiple fronts as different kinds of research projects. These projects include subjects like biometrics, taxonomical research on services, CAN-bus etc. Laureas LbD (Learning by Developing) model gives its students a great level of freedom to conduct research and the same goes for the MOBI project. Laurea provides the students a subject, resources, guidance and a level of standards that they need to reach. And in exchange for this freedom, students produce a wide variety of innovation made with genuine interest.

## Introduction

The MOBI-project is a three year joint project between the Finnish law enforcement authorities (eg police, border guard), fire and rescue departments, equipment and system suppliers (EADS, Insta, Sunit, Ajeco), new types of service providers (Airlex, Air-l) and research and educational institutions (Laurea, PTK, PoIAMK, PeO). This project is partly TEKES funded and partly corporate funded, the overall budget of the project is 800 000€.

The purpose of the project is to look at the current state of the Finnish police forces concept vehicle, the Volkswagen Transporter, collect data from it, analyze this data and make improvements on the vehicle based on this data. The final output of the project should consist of a more comprehensive documentation of the entire system, finalized modular build of the entire platform that can be easily customized for different vehicles, and a service design model that will enable and motivate a third party vendor to take control of the future development and manufacturing of the system.

There are several points that made this project a necessity. Finnish police cars have about 40 different user interfaces (radio, navigation, command and control systems, radar, alarm lights etc these interfaces need over 170 A of electric power. In cold weather conditions, police vehicles are not creating enough electricity for intensive operations. Also, wiring and ergonomics are problematic. However, the annual delivery amount of emergency vehicles is so low that traditional business models being made up of selling of devices and systems do not inveigle suppliers into doing remarkable developing work. So, other business models, such as digital service concepts, are needed also for security services.

And because of these points that were previously mentioned the project firstly gathered all of the information that it could on the concept vehicle and it's different systems like wiring, devices used and previous documentations on the whole. This first step of the project proved crucial because of the scattered nature of all previous documentation. There are currently multiple subprojects going on in Laurea that are tackling different aspects of the project. These projects are proving to be fruitful and are giving the project new tools to address the different difficulties that have presented them self in the current system. Like the research on multi-channel routing is providing tools to provide better quality and reach for the data communications of the concept vehicle. And the research on service design is giving the project promising results on how to motivate a third party vendor to make a profitable business model from the entire package.

Laureas agenda in this project is to define user requirements for a single user like a constable or a fireman. And to produce organization specific user requirements for example the police or fire department. The system providers working in the project will build the required equipment according to the gathered requirements.

Laurea also aims to prepare ground for the export of government and emergency vehicle concept. And to start the standardization development of the business with like-minded-countries and EUROPOL.

This study's objective in all of this ongoing research was to be in the middle of the first action research cycle that took place in autumn 2009. And to provide feedback and data from the cycle that could be used to improve Laureas current methods of conducting research and projects. And also to prepare good documentation that could be used in the next action research cycle.

## **Laureas integrative model**

The process that guides all of the learning in Laurea is the LbD model a.k.a. Learning by Developing. LbD is a highly recognized model that has been developed in Laurea. Learning by Developing (LbD), is development-based learning that is based on authenticity, partnership, experience and research and its pur-

pose is to be a creative approach that creates new. Development-based learning is based on real work related projects that are innovative and requires teachers, students and experts cooperating together and these projects at their best produce new knowledge-based information.

When learning and teaching is approached with LbD the outcome is much more professional than with more traditional methods where students are left with one or two example works to choose from that are done on the same course every time. This kind of an approach leaves too much room for plagiarism and unmotivated output. The traditional methods do help to ease some of the teachers workload as the work that needs to be evaluated is of some standard and also previous references are provided. The LbD model differs from these traditional approaches quite a lot because in LbD the goal is to find new projects from Laureas partners in work and university environments. The outcomes of these projects are usually much more fruitful and give a much more motivated output from the students. But at the same time these projects increase the teachers' workload on the course because every project has a different agenda and output and the constant search for new projects can also be a time consuming effort. Some of this workload has been moved to Laureas SIDlab environments.

The need for real work life related projects spawned a need for environments that could create, manage and find these projects. That is why the SIDlab environments were created. There are currently 8 different labs located in Laurea. All of these environments are based on different aspects like IT, security and economics.

The current labs operating in Laurea Leppävaara are:

1. SIDlab Business  
Marketing, business services and social responsibility
2. SIDlab Balance  
Economic control
3. SIDlab Networks  
Web2 and network technologies, distributed computing, and indoor positioning
4. SIDlab Red  
Development of Laureas IT and services, the development of innovative software, safety management and risk management
5. SIDlab Neon  
Information systems, data mining, open source software, the Oracle Academy and the Sun Academic Initiative (SAI) for Java
6. SIDlab Bar Laurea  
Service business and service systems research and development projects, product testing, alternative production methods, recipes,

product development, system testing, training and training materials, marketing materials

7. SIDlab Security  
Security related research
8. SIDlab International  
International research projects with different universities and other parties.

The lab environments also offer a wide variety of services and support for students, teachers and personnel that work in Laurea and also its partners. But one of the main duties of the labs is to offer students a place that simulates a real work life environment as accurately as possibly so that the students can fulfill their internship and in most cases get a meaningful subject for their thesis. The other responsibilities of the labs employees can be anything from technical support to teaching.

Laureas integrative action model is also a strong force that guides the projects done in Laurea. This process is something that helps to bring out the best parts of exploratory and creative learning and at the same time implement and integrate the three prescribed functions of Finnish universities of applied sciences. The integrative action model is a linear development framework that creates cyclic innovation activity with a quality perspective. The model is not supposed to be something that forces innovation but rather it liberates its users to a more free innovation environment that still gives a clear set of steps to follow. The models learning cycles do not follow a particular order and this gives the integrative model more of a supporting than a managing role. The action model is shown in figure 1.

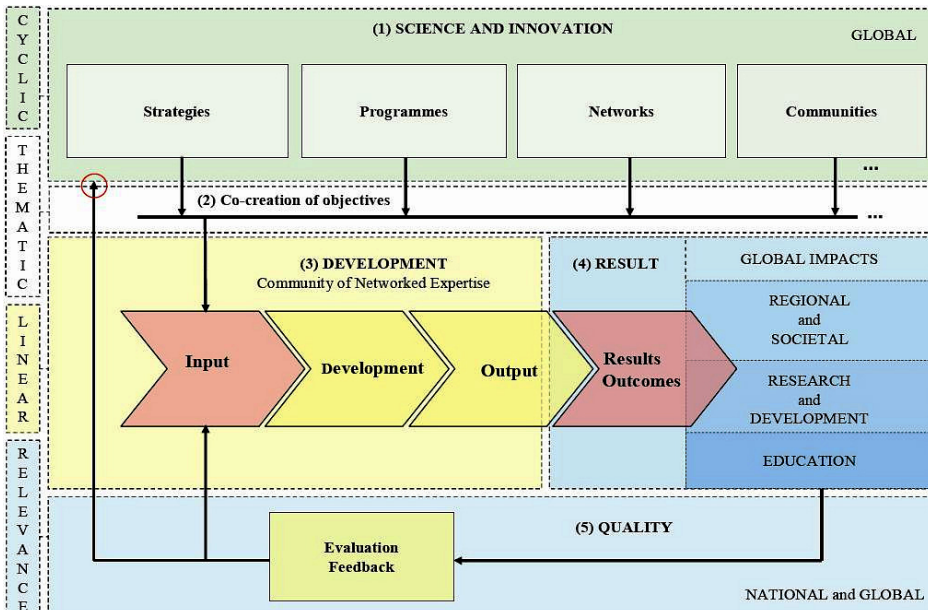


Figure 1. Laureas Integrative Action Model [4]

There are five different parts in the integrative action model. And the starting point for the implementation process can be anywhere from part one to five. The main factor that sets the starting point for the process is the objective and perspective of task at hand. The five parts of the model are the following: (1) science and innovation (cyclic); (2) collector of co-creative objects emphasizing on full duplex transformation functions (thematic); (3) development (linear); (4) result; and (5) quality (relevance).

## The content of this study

The purpose of this study is to find out what kind of new knowledge planning science research can give projects like the MOBI-project and especially how can the entire project benefit from exploratory research that is conducted at the start of the research by students. This study will also open up concepts like LbD (Learning by Developing), AR (Action Research) and how they can contribute to research projects as powerful tools. Also other ways of improving student centric research and project work are presented in this study.

This paper is divided into four different chapters. The first chapter is the introduction which sums up the basics of this study, like what is the MOBI-project and why was there a need for such a project. The first chapter also tells about Laureas LbD model and the different environments that utilize it and lastly the chapter tells about the content of this study.

The second chapter methods, discusses about action research and how it was used in the MOBI-project, and all of the research that was conducted during the project.

The third chapter 1<sup>st</sup> action research cycle describes the 1<sup>st</sup> action research cycle of the MOBI-project that was conducted on the autumn of 2009 and what kind of output did this cycle provide for the project.

The fourth chapter discussion & conclusions sums up the findings of this study and some thought on how to improve the current methods in use and streamline the entire research process.

## Methods

### Action Research

The research method used in the MOBI-project is action research. Action research has proven to be a valuable tool in different projects because of its cyclic and flexible nature. Action research is a widely used method that has a long history behind it. It is uncertain as to when action research was first used and when it took its current form but it is discussed that its earlier forms were used in the late nineteenth century. [3] Since then action research has been used in many different scientific fields such as aesthetics, philosophy, psychology and education. And in this process Kurt Lewin constructed a theory on action research that stated that action research is "proceeding in a spiral of steps, each of which is composed of planning, action and the evaluation of the result of action". The work done by Lewin in the mid 1940s finally made action research a method of acceptable inquiry.

The thing that makes action research so usable in universities of applied sciences is its flexibility and usability in different situations. Stringer describes action research as a non-traditional form of research which is often community-based and carried out by a practitioner in the field. [8] Also Kemmis and McTaggart add to this portrayal the following thoughts, The linking of the terms 'action' and 'research' highlight the essential feature of this approach, which involves the testing out of ideas in practice as a means of improvement in social conditions and increasing knowledge.

Action research offers a lot of different variations of its self for different uses. But they all have a common factor, the continuity of the research process. The action research process is often described as a circle or a spiral depending on the variation used. This spiral has four steps that form a continuous loop.

This loop starts with the first step that is called a planning stage; in this stage you develop a plan of critically informed action to improve current practice.

In the second stage that is the implementation stage, participants act to implement the plan which must be deliberate and controlled.

The third stage observation stage is where the participants observe the actions taken and collect data from it for a more thorough evaluation.

And in the last stage called the reflection stage, the action taken and data collected are discussed amongst the participants of the project. This reflection can lead to a reconstruction of the meaning of the social situation and provides a basis for further planning of critically informed action, thereby continuing the cycle. These steps are carried out in a more careful, systematic and rigorous way than that which usually occurs in daily practice.

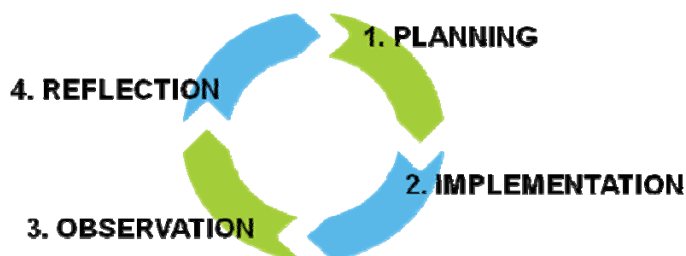


Figure 2. Action Research model

### **How was action research applied in the projects?**

Action research has been an important part of the MOBI-project and all of its different parts. The project lasts at least three years and courses in universities of applied sciences usually only last for four months, this leads into a situation where the people who work on the project change on a frequent basis. Because of these frequent changes in the project groups, it is really important to use well known methods that allow continuity of the project with reasonable effort.

The cyclic nature of action research is perfect when a project needs to be taken into smaller parts because of time or resource issues. Then the smaller parts can be treated in three different ways. They can be put on hold, if for example the part in question is dependent on another part. Or a single part can be given to more than one group to work on, this is an efficient way to approach a project when a multitude of ideas on the subject are required for example during the start of a project when exploratory research is conducted. The last way to handle a part is to send it to a second round on the action research cycle, this approach is usually used in important projects or in projects that have a lot of time and need a deeper insight on the part in question and in some cases a part needs to be sent on a second cycle because the project group failed on their objective for some reason.

Action research can also be seen as a poor man's project management model. Currently many universities of applied sciences use real company commissioned projects as teaching opportunities and are actively thriving to get more of

these projects that have corporate funding and are diverse in nature. However proper project management tools and models are rarely used in these projects leaving the outcome of these projects unpredictable. This serves as a dilemma to the companies who would like to use students as a resource for projects more often and to the universities of applied sciences that would like to get these projects.

This is where action research can work as first aid for the lack of project management tools and models. As action research like many other research methods have in them steps that have to be taken in order for the method to work, these steps give projects phasing and other characteristics that they should have. But as mentioned earlier this only as first aid. Proper project management tools, models and processes should be used to give additional

In this paper action research and its steps also played a vital part. During this research the action research cycle was started over many times. In the planning stage the outlines for this research were determined and the four chapters that were to be presented were selected.

When the planning was done the research moved into the implementation stage where the writing of the paper was started. The writing took place in cycles and each cycle was first limited to one chapter of the paper and in the last cycle on the entire paper.

In the observation stage of the research different sources and data were collected to support the information presented in the research. The data that was collected was the output from the 1<sup>st</sup> action research cycle of the MOBI-project. This first cycle provided ample amounts of data to analyze as there were five groups and 28 people working on different parts of the project during the first cycle. Also there is a large amount of literature that talks about the different aspects of action research that the research can support its self on.

In the last step, the reflection step, the output for each chapter was checked and put under harsh criticism and questioning as each chapter had to answer at least one of the following questions: Is this approach creative? Does it offer something new? Does it increase knowledge and improve current practices? Does it invoke a need for further planning? After this the cycle was repeated at least ones per chapter.

### **1<sup>st</sup> Action Research Cycle**

There were three courses that participated in the 1<sup>st</sup> action research cycle of the MOBI-project that took place in the autumn of 2009. There were all together 28 students that formed five different groups and 27 of these students were students of business information technology and one student was a student of security management. All of the students that took part in the project are second or third year students. As the project had just started the nature of the research done was exploratory and the role for this exploratory research was to help



guide the rest of the project and find the problems that needed to be addressed during the project.

These are the course descriptions for the courses that took part in the 1<sup>st</sup> cycle:

Course 00104 - Computer-network development

This course gives students a more in depth look at networks and the technologies behind them. The students also create a project that has something to do with information technology and net working.

Course 00018 - The development of service innovations

This course aims to give students the proper tools to create a targeted development project and develop it as far as possible.

Course 00108 - Building and managing service systems

This course is designed to give students extensive knowledge on information systems so that they can develop and maintain information systems. The students also develop an information system at least on a documentation level.

The output of these projects had some overlap due to poor information exchange between project groups but still the groups were able to produce good research results that the client approved of.

On the course 00104 there was one group of six people working on the project and the group produced a paper that had a vocabulary which gave background on the terms, technologies and protocols that are in use in the current system and also that were to be discussed in the groups paper. They had two major topics that their paper discussed. The first one was on how to integrate alarm systems to CAN-bus and the second topic discussed which would better serve as the systems primary data bus, CAN-bus or industrial Ethernet.

On the course 00018 there was one group of six people that also worked on the same project on the course 00108 as group 3. This group also made a similar vocabulary to the groups paper as the group on the course 00104 and their paper also had two other topics. The first topic was on taxonomical research for the project that discussed how the PTK could outsource all of its research and development to a 3<sup>rd</sup> party vendor. This topic about taxonomy also produced a research paper "Designing emergency vehicle ICT integration solution" that was published on a later time. The groups other topic was about notations that were build based on the Finnish police forces operational methods.

On the course 00108 there were three groups that all had four people on them. The first groups paper focused on solely on exploratory research and especially on networking solutions like CAN-bus and VIRVE. The second groups paper discussed biometric identification methods and the databases used in the identi-

fication. And the third group worked on the same paper as the people on the 00018 course.

One trainee from the SIDlab Networks environment was also involved in the project and first worked on the “Designing emergency vehicle ICT integration solution” paper and also made the second research paper on the subject called “Creating a service oriented architectural model for emergency vehicles”. Later on the paper from the course 00018 was finalized by the labs efforts and sent to the client for evaluation. The two published research papers spawned an idea of one more research papers that would be published at a later time. This paper would reflect on the 1<sup>st</sup> action research cycle and the research methods used in it the research paper was named “User centric research in the MOBI-project”.

The 1<sup>st</sup> action research cycle and all of its output provided really fruitful and the client was very pleased with the results that were provided. The cycle also proved to be a real learning experience on how to improve the methods that are being currently used. These improvements will be discussed in the fourth chapter discussion & conclusions.

## Discussion and conclusions

When the outputs from the projects were analyzed several suggestions and ideas came up on how to improve methods and practices used in projects. Because it became evident that in the current situation the projects were not instructed thoroughly enough for the students, the used methods had not been taught to them enough and most of the time they didn't have the proper tools to exchange information between courses or even groups. The current situations could be described as “research anarchy”.

There should be a workshop or a course to new students where they would be taught a standardized method for working on projects.

These standards should include predefined worksheets for all of the paper work done during the project. Also the papers that need to be returned and filled during a project should be standard to some extent. Every project should at least have the following papers filled and returned for grading:

- Project paper
- Project plan
- Action point excel sheet
- Time table of the project
- PowerPoint presentation of the project
- At least three minutes of the project (start, middle and end meeting)

This would greatly help the grading of the projects and the individuals working on them as everything is documented. The reusability of projects would also increase because the next project groups would have all the necessary informa-

tion they need and they would know where to find it. Standardizes documentation also become very important because of projects like OIBS (Open Innovation Banking System) where all of the new ideas and innovations developed in Laurea are supposed to be gathered at some point. A mess of documents of varied kind would make the organizing of information nearly impossible or at least increase the administrators workload exponentially.

Also when the same documents would be filled during every project then the time to make them would decrease over time as the students would get more accustomed to documenting their projects properly. Proper documentation of projects is also something that will be greatly valued in real work environments.

The startup course should also teach student about the different research methods that can be used in projects and especially research methods like action research that seems to fit the needs of universities of applied sciences that do a lot of project based working. These kinds of methods would greatly increase the student's morale and confidence as they wouldn't have to guess everything at the start of a new project or invent the wheel every time again when starting a project. Also it is important to teach the students about research cycles and how to properly reflect on their own work and with that how to improve their work.

Currently the lab environments at Laurea are also a resource that has not been properly exploited. The labs could be a great asset as support for the projects that are done in Laurea. And also currently the collaboration between the labs is nonexistent.

The labs at Laurea do host some events together but these events only aim to get everyone to know each other, not to work with each others. This leads to a situation where the labs really can't specialize to their specific areas of expertise because they need to recruit their own IT or marketing specialists for every project that needs one, instead of just asking for a specialist from a different lab. There are ways to lower the threshold.

The labs could create information banks that hold information on the lab assistant's skills and current projects. This information would not be publicly available but for the use of lab coordinators only. This way the lab coordinators could manage their resources with more ease and plot cooperative projects that would take advantage of different labs and their know-how.

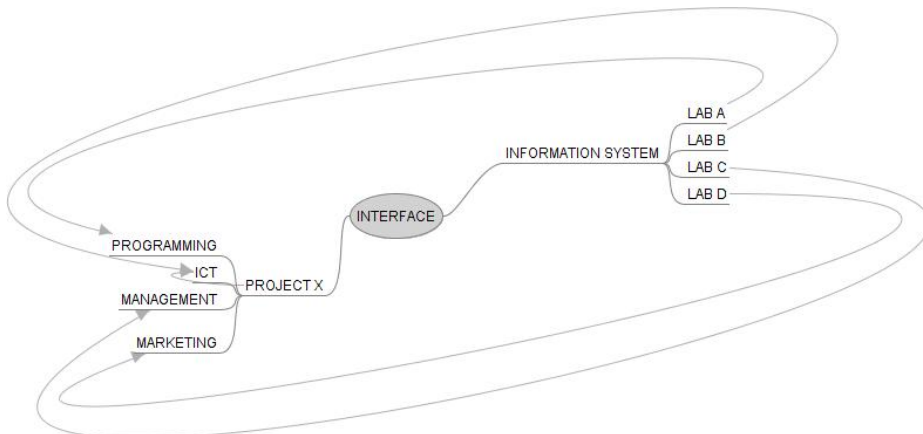


Figure 3. Action idea of the information bank

There should also be another part for the information system that would be open to all of the people who work in the lab environments. This part could be a web based portal that would hold information on current projects and the skills needed in them and also information on project suggestions. This way the lab assistants would activate them self's to find interesting projects that would increase their skills in their areas of interest. This web portal could also be used by teachers to find tutors for specific student projects. This would even out the work load in some lab environments where tutoring work is handed out to the first lab assistant that walks by.

How do these methods benefit Laurea and the projects? More standardized projects would bring much more value to all of the projects as their reusability would increase drastically. As every project would have the same basic built finding of information would come much easier and also the evaluation of projects would come much easier. Also the use of different kinds of information systems like OIBS would come much easier because of standardized information that is much easier to categorize and tag.

The proper use of research methods will also give more value to the projects that are done when the students know the most efficient ways to address problems and find the correct methods to find answers to them.

With the use of properly built information system the distribution of know-how will greatly increase. And this information system will help the labs to take full potential out of their projects and lab assistants contributions to projects. This kind of evolution would bring the labs closer to the rest of Laurea as an supporter of the entire organization instead of the current situation where most of the labs are more like independent islands inside of Laurea.

In conclusion Laurea needs to provide projects with tools that can help collaboration between labs and also streamline the entire project process. With tools like action research, standardization of documentation and information system

that can easily link correct skills with correct projects. Streamlining will provide ease to projects and better tools for the students to use in the working life.

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# **ADDING VALUE TO SERVICES IN A UNIVERSITY FACULTY BY EMPLOYING STUDENTS**

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## **Abstract**

During 2008 a pilot scheme was initiated at Coventry University's Faculty of Engineering and Computing that involved employing students in different roles to enhance services and support to available to other students. At the centre of this initiative was the Faculty's Student Experience Enhancement Unit (SEE-u), founded in September 2008, with the appointment of Student Advocates. The Faculty also employed students in other roles, including a number of Graduate Interns for teaching support duties.

During 2008-9 about seventy students were employed by the Faculty. The scale of the operation was increased substantially from summer 2009, when the process began for appointing about one hundred and fifty student employees. As a result the requirement emerged for a more systematic approach to recruitment, appointment, training, supervision and management of the student employees.

Various studies have been conducted into how similar student employment schemes operating elsewhere were managed. Particularly influential information was collected through visits to several universities in the USA.

This paper reports on the strategy and experience so far of establishing, developing and managing SEE-u. There is an account of the on-going difficulties encountered, for example relating to the dual role of staff/student and perceptions of some permanent staff to employing students to work in sensitive areas. An evaluation is included of feedback from staff and students about the perceived value to all stakeholders of the enhanced services. The report concludes with a forward-looking view of plans for development of SEE-u and the graduate internship scheme over the next five years.

**Keywords:** Student employment, student advocacy, student experience enhancement, employability, soft skills development

## Background, context, recent history

The English higher education sector has many external factors that influence priorities, including the introduction of “home” student tuition fee contributions from 1998 and various league tables that rank different institutions according to a range of metrics, mostly from publicly available data, with weightings decided by the league table compilers. The comparison with other institutions and the shift in perception of “students as customers” has increased the focus on the “student experience” and led to greater attention to factors such as “employability” that were not hitherto seen as critical to on campus provision. The term “student experience” has different meanings depending on context and although it somewhat overused, it serves well for this paper in its broadest sense, referring to students’ overall vision of their life as a university student.

Like other UK universities Coventry University has been compelled to respond to external pressures and to ensure that public data about the University accurately represent the best viewpoint. This has generated an empowering effect for student experience issues and in turn influenced policy for student support at faculty level. From about 2005 the decision was taken by the Faculty of Engineering and Computing explore ways to improve all aspects of student life within its sphere of influence. Part of the strategy was to make effective use of students’ skills by employing them in various student-facing roles.

## Student employment

There is evidence from a recent study of UK universities that peer support and mentoring schemes are being widely adopted as an effective way of enhancing student learning (Hampton and Potter 2009). Sullivan suggested that UK universities can learn from other parts of the world, particularly the USA about other roles for student employees (Sullivan 2008).

Typically full-time students are required to study for about forty hours each week during term time, but the number of formal classes varies greatly across countries and cultures. In most UK universities students are only required to attend between 10 and 15 hours of formal tuition each week, which may be lectures, tutorials, laboratory work or seminars. Additional study activities may include reading and research, using library resources or on-line materials and undertaking practical exercises either working in groups or individually. Students organise the remainder of their study time to suit their other commitments.

Almost all students studying in English universities are required to pay tuition fees. The more fortunate students can rely on parents or sponsors to cover at least some of their fees and living costs. Student loans are available for UK and EU students to help to defer these expenses. However many students have to



supplement their available funds by taking part-time paid employment during term time. At Coventry University it was estimated from surveys in recent years that roughly 70% of students have some form of paid employment and other reports (Sullivan 2008) suggested that about 60% of English students work part-time.

Most term-time student jobs are hourly paid casual work in bars, restaurants and shops, often at evenings and weekends. Pay rates are usually at or just above the UK minimum wage (£5.93 per hour in October 2010). However the recent economic situation in the UK has reduced the amount of casual work available for students, because they are in competition for such vacancies with rising numbers of unemployed people.

## **Creating a customer service ethos**

In common with many universities, students are employed on campus at Coventry University in various roles, for example working in the Students' Union bars and catering services, helping with open days in the role of Student Ambassadors. However the number and range of internal appointments and roles for student employees have grown substantially in recent years. As a result of this trend, student employees are making an increasingly important contribution to the University's operational effectiveness.

When the Faculty of Engineering and Computing began employing students to help in various duties, these were often European exchange students typically involved in marketing and recruitment activities, earning much needed extra cash to support themselves during their year in the UK. Their hours were fitted around their study time and the hourly pay rate was set comfortably above the statutory minimum pay rate. It soon became clear that this workforce was a potentially very valuable resource than could allow additional services to be provided to benefit the Faculty and could be deployed to enhance support for other students.

The Faculty's Debt Officer, one of the authors of this paper, was appointed in 2005 to try to recover some of the £1 million of unpaid student fees due to the Faculty. However his duties rapidly evolved to encompass a more general support role for Faculty students. Having initially consulted him about financial problems, if their funding had not arrived from a sponsor or if an invalid fee invoice had been received, they would then ask him for support with other problems, or refer friends, sometimes from other parts of the University. Within one year the debt was reduced to £0.5M and has been steadily decreasing since, but in addition many students also received helpful advice far beyond their financial concerns.

At about the same time it became apparent through other factors, including the external pressures such as league tables and student empowerment mentioned earlier, that there was need and desire to improve the support services provided for Faculty students. On reflection it became apparent that many of the systems

across the University and Faculty had been designed and were being operated for the convenience of University staff, with little acknowledgement of any need for “customer” service ethos. It was agreed that changes were needed.

Several student employee roles were created, including graduate interns (GI), student advocates and student assistants. Their purpose was to add value to the Faculty by offering new services or support not previously possible, or by supplementing existing services at times of peak loading. GI appointments were for postgraduate students, employed on fixed-term salaried contracts of either 2 years (master’s students) or 4 years (doctoral students). The associated duties involved teaching support functions and payment was through a combination of contribution to course fees and salary. At the date of this paper there are approximately sixty GIs employed in the Faculty. The advocate and assistant roles were hourly paid and appointees could be undergraduate or postgraduate students. These roles are described in detail below.

The idea for a Faculty-based Student Experience Enhancement Unit (SEE-u) emerged from the debt recovery activities described earlier. The SEE-u team initially consisted of the Academic Manager for Student Experience (academic support), Debt Officer (finance support) and Assistant Registrar (admin support), reporting to an Associate Dean (senior management support). When SEE-u became operational from September 2008 they were joined by a team of hourly paid student advocates and assistants. The two student roles have since been consolidated as student advocates (SA). The initial cost of setting up the Unit and employing the SAs was more than covered by the savings through the debt recovery operation. It is anticipated that the on-going costs will continue to be justified by keeping Faculty debt to a minimum, plus increased student retention resulting from improvements generated by SEE-u to the student experience.

SAs receive significant training, where possible in advance of their appointment, followed by on-going seminars and workshops to add new skills and knowledge as opportunities and needs arise. At the date of this paper there are about 50 SAs actively employed by SEE-U in various roles and duties within the Faculty. Some SAs are designated to very specific roles, for example finance or marketing assistants and others have more general duties, for example supporting the departmental administrative teams in the Faculty’s Registry.

The major visible difference to the Faculty is that SAs now operate the main student/staff interfaces by running the reception desks in Faculty buildings, liaising with the back-office staff as required to answer queries and provide relevant information to students. All advocates are trained in customer service skills and receive regular updates through workshops, aiming for a culture of continuous improvement to the service provision. The permanent administrative staff were supportive of this policy to remove them from service duties at the reception counters, because this allows them to focus more on their core activities with less distraction.

SEE-u also operates a student advocacy service managed by a team of student advocates. This is currently based in a designated office within the main Faculty building, but with the long term plan of integrating this service with a central

Faculty reception when more space becomes available. The advocacy service allows for one-to-one guidance for students with complex issues that can take considerable time to resolve. The aim is not to duplicate existing University services, but rather directing, connecting, advising and mediating as appropriate to help the student “client” to reach a conclusive outcome for all aspects of their concerns.

SAs often operate in teams to conduct research and investigations surrounding student experience issues, which may emanate from requests by staff or may be initiatives generated internally by the Unit, perhaps in response to concerns being identified through student representatives or SEE-u activities. Recent survey themes include exploring reasons for low achieving students and finding how to improve communications within the Faculty. The collected evidence is then available for developing and justifying process and service improvements.

A small number of GIs and postgraduate student proctors are engaged in senior roles such as supervision and training for SAs, coordinating disabled students’ learning support services and supporting academic staff teaching disabled students.

Based partly on the successes experienced in the Faculty of Engineering and Computing, other faculties and service divisions across the University are being encouraged by senior management to employ more students in similar roles. Several other universities both in the UK and internationally have consulted the Faculty about the strategy and operation of SEE-u.

## **Lessons from elsewhere**

The concept and organisation of SEE-u was greatly influenced by good practice observed in Universities in the USA. They provided great inspiration and key evidence to inform the establishment and later refinement of the Unit. Visits to Boston University in 2008 and Northwest Missouri State University in 2009 provided excellent examples of students advocating on behalf of other students. Both universities entrusted their student employees with serious responsibilities, for example controlling campus safety, and allowed them to work in areas requiring high confidentiality, including financial services and handling results and assessment. However it was made clear at a meeting at San Francisco State University in 2009 that tight restrictions were placed on the locations where their student employees were allowed to operate and the duties they could undertake.

At PACE University in New York City in 2008 there was an interesting management regime with more senior student employees supervising other students. They had very efficient systems for handing over duties and intelligence between student shifts. San Francisco State University’s “one stop shop” for student services demonstrated highly effective collaboration across administrative divisions of staff and student front-line employees, resulting in an almost seamlessly joined-up set of student support services.

Many innovative practices were observed through studying the management of Northwest Missouri State University's (NWMSU) student employees, particularly their Career Pathing Program (McLain 2006), which developed through feedback from a student employee satisfaction survey. There is further evidence of the effective management practices at NWMSU in Sullivan's paper, including a description of their Talent Development Center (Sullivan 2008).

In all the USA universities that were studied during the visits in 2008 and 2009 the excellent practices were successfully implemented because of commitment from the highest level of management. At NWMSU in particular the President Dean Hubbard was one of the first people to employ students. His success in employing students to help run his own office set an example for the whole University. The NWMSU publicity states that "approximately 1000 [of the 7000] students have jobs on campus or in the Maryville community" (Hubbard 2009).

Many useful ideas observed at the USA campuses were directly applicable or could be adapted for use in our Faculty-based SEE-u. Some of these have already been applied, particularly ideas for training student employees, and others are being considered for forthcoming enhancements.

## **How value is added**

The policy of employing students in our faculty aimed to supplement the existing workforce to enhance the provision through adding to existing services and support as required or by providing new services. It proved difficult to provide convincing reassurance to permanent staff (academics and administrative staff) in the short term at least that employing students was not a serious threat to their job security.

In the first year only a small number of students were employed in specific roles. It was also a time of major changes to the permanent administrative staff in terms of personnel, structuring and roles, which resulted in many of the immediate benefits being negated by the impact of the upheaval. However after more than two years' operation the gains are now beginning to emerge and people are becoming increasingly more comfortable about the new regime.

One of the key factors in building an effective student workforce is through the recruitment and selection process. Formal job descriptions were established for all posts and evaluated through the standard human resource management procedures at the University. At our most recent recruitment round in June 2010 the SA vacancies (to replace some graduating SAs) were advertised through our student portal. These appointments were restricted to students who would be enrolled on courses in the Faculty during the period of their appointment. The short-listing criteria included an excellent academic record and good personal motivation as evidenced through the personal statement on their written application. From about 130 applicants 20 candidates were shortlisted and formally interviewed. The quality of the selected candidates was remarkable and all were offered employment.

Even after careful selection of student employees, delivering a broad and appropriate range of training and development was critical to ensure they could be useful and productive. However, particularly with front-line roles, confidence is another essential ingredient that needs to develop gradually as a result of familiarity with the necessary knowledge and processes. For the SAs one week's training was scheduled in late August, in order to avoid any conflict with study commitments and also to allow some time for job shadowing and further specific duty experience during September. As a result there was a skilled workforce ready by the start of the academic year on 27<sup>th</sup> September 2010.

Newly appointed GIs received training from their academic mentor and also were required to enrol on a postgraduate level module Introduction to Teaching in Higher Education, carrying 10 ECTS credits. Depending on study programme, this could be taken either as part of their scheduled studies or as an extra-curricular study module. In addition this module could provide credit towards a professional teaching qualification and professional body membership.

There are many valuable aspects of employing postgraduate students as graduate interns to enhance the experience for Faculty students and staff, for example

- Improvements to learning by having a graduate intern supporting students in academic support can mean smaller teaching groups and more personal learning support, even one-to-one mentoring is possible with less time pressures than academic staff would have.
- If well organised, academic staff assigned support from a graduate intern should be able to free more time for their research or course development activities

Student Advocates have important roles to play for making sure the services within the Faculty are operating well, including the following

- Student Advocates enhance services and support at a local level for resolving both simple and complex queries. This is particularly important for a large campus, where students will difficulties can feel isolated and unsupported. The local subject knowledge can help to set context; Student Advocate support can seem less threatening than approaching permanent staff. Patient SAs well-trained in listening skills can aid greatly in understanding and advocating on behalf of another student, providing connections to existing services and expert help.
- SAs can capture important information and intelligence from other students that permanent staff would find more difficult to reach, for example by running surveys and focus groups.
- As SAs involved in front-line duties are also customers receiving the services, they have a clear understanding of what level of service is acceptable, but understand that the target is excellence. They learn from, but also input a great deal to, the regular customer service training and development activities.

## Costs and benefits

Table 1 lists the many benefits of employing students, considering different perspectives. This list was collated from information collected from staff and students through surveys and interviews. It is clear that all parties involved have some advantage from a well conceived student employment policy: the student employees, permanent staff, the student community, university management within the faculty and centrally and ultimately future employers.

<b>Table 1: Benefits of employing students</b>
Freeing permanent staff for other activities, including research
Emergency cover for absence and at busy times: less need to employ temporary staff
Student employees often need very little additional training compared to temporary staff
Able to introduce new or improved services that were not cost-effective previously
Available resource for conducting fact-finding and surveys of students or staff as required
Increased loyalty of students employed: they are more likely to reenrol for further study
Improved interpersonal skills and other soft skills in students employed
Additional useful expertise developed in other areas, eg teaching support, mentoring, leadership
Student employees are more likely to recommend the University to friends and family
The possibility of convenient paid employment during study is an incentive to recruitment
Convenience for student employment location and flexibility of hours, fitting around study and other commitments
Greater financial stability of students helps to reduce personal debt and secure income to the University
Improved student retention through better services and more responsive approach to helping students with problems
For international students, experience of working in the UK, improved language skills etc
Interesting and varied duties, leading to insight into higher educational processes and systems
Great personal satisfaction from undertaking such useful roles and duties
Making friends from different countries and cultures
Learning to work effectively as part of a team
Asking reliable permanent junior clerical staff as team leaders for teams of SAs can provide very useful personal development opportunities
There is potential to award academic credits for the learning associated with student employment duties, subject to the assessment of suitable evidence

Normally the first questions when briefing other parties interested in the operation of SEE-u or on the GIs are about costs and how to sustain these activities in the longer term. The costs are not insignificant as close examination of Table 2 indicates. A serious and long-term commitment is needed to ensure that sufficient budget and time is allowed acceptance of ideas and maturing and refinement of operational arrangements. The expenses and resource requirements are likely to rise over time as the schemes expand. However the costs may be offset by corresponding reductions in many areas, including some, such as improved retention and lower student debt, which may not be perceived to be directly linked to the initiatives.

<b>Table 2: Costs, overheads</b>
Costs of promotion of vacancies, interviewing and appointment of student employees
Payroll costs for student employees, set against savings through less use of temporary staff
Training and development
Management and supervision responsibilities
Assigning duties, monitoring activities and outputs
Resources and space to work
Performance review,
Holiday pay, sickness costs

Introducing a relatively large number of extra staff can be seen by the existing workforce as a direct threat to job security. It is important to manage the process carefully and ensure that staff are fully consulted beforehand about the reasoning behind the changes. If resentment and insecurity persists it can affect the integration of student employees and make their deployment less effective. Since the Faculty's policy was not to directly replace any permanent staff with student employees, this should have been relatively easy to manage, but despite this some staff were initially resentful and unhelpful. Even if the changes are managed well productivity and efficiency gains may not be realised for some time, because part-time employees naturally will take longer to assimilate into their roles than full-time staff.

## Evaluation, reflection

Staff surveys were conducted in July 2009 to capture observations and opinions about the value of introducing student employees. The anonymous results contained largely positive and supportive comments, which reflect the evidence presented earlier in this paper. However the survey also revealed several strongly worded negative statements. This was very useful knowledge, which motivated the drive to ensure perceived problems were addressed and misconceptions were challenged. A second staff survey is planned shortly, after which a detailed analysis will be conducted to ascertain any possible changes in attitudes arising from the experience of the second year of operation.

Looking back on the first two years of the Faculty's experience of introducing student employees there are many lessons to share with other people interested in adopting this type of initiative, some are common sense but others perhaps less obvious.

- Start with small numbers and gradually expand;
- Training is vital for both role preparation and team cohesion;
- Plan some training in advance and schedule this outside term time;
- Identify and carefully manage risks associated with this activity;
- View this as a long-term strategy, it will take time to see the full benefits;
- Investment is needed, it should not be perceived as a cost-cutting measure;
- Ensure that permanent staff understand how they will be affected;

- Try to ensure that most of the permanent staff support this change;
- Put in place day-to-day management and supervision arrangements in advance;
- Allow and plan for workspace and resources to accommodate the extra part-time employees;
- Follow normal selection and appointment procedures when appointing student employees
- Use standard employment terms and contracts if possible;
- Require student employees to sign confidentiality statements and reinforce through training;
- Set up disciplinary and dismissal procedures and ensure these are understood;
- Carefully consider and manage the at risk areas for conflicts of interest in student/staff roles;
- Manage working hours of student employees, ensuring study commitments are prioritised;
- Plan for succession and regular turnover of student employees.

## Future plans

The number of GIs has been maintained for the 2010-11 academic year. In addition over 20 early career post-doctoral academics are being recruited as Teaching Assistants (TAs). The longer term plan is for every academic in the Faculty to have a GI or TA working with them to help to support their teaching duties and allow them to focus on their research activities. The mandatory teacher training module bearing academic credits has been introduced for GIs and TAs from September 2010.

Towards the end of the 2009-10 academic year there were about 70 SAs employed in SEE-u. Although this was a suitable number of employees at peak times during terms, at other times and particularly during the summer months when SAs had more time available to work, it proved impossible to provide enough resources or activities to match the availability of the appointed SAs. The decision was taken to control the replacement of SAs for the start of the 2010-11 academic year in order to reduce the overall number of SAs to about 50, but keeping the option to expand slightly if necessary during the year. The hourly rate of pay was increased from £6 per hour to £7.09. This ensured that each SA had a viable income and number of working hours each week, normally between 10 and 20, to make it worthwhile working for the Faculty. The formal supervision of SAs was consolidated to provide a single line manager for all SAs, supported by local team leaders. This helped with day-to-day management, including duty rotas and timesheets, and ensured that requests for activities were handled effectively. At the time of writing this paper SAs are being deployed widely across the Faculty's operations and are locally supervised on a day-to-day basis by team leaders (an experienced student advocate or a permanent staff member) according to where they are based.



SEE-u has been supplemented by a team of staff from across the Faculty, known as Diversity Champions. Currently the Champions are all academics, but the plan is to recruit some non-academics to join the team. Champions received training during 2009-10 covering a range of issues surrounding the diversity of the Faculty student population and, with the help of the student employees, they are developing ideas for how to more effectively support the range of different types of student categories in our midst. These individuals will provide a two-way channel for the five academic departments and other administrative areas of the Faculty, about the work and values of SEE-u in improving the student experience. This initiative is only just beginning and all the student employees have key roles to play in helping to bring about some important cultural and practical changes.

Student advocates are subject to regular individual performance reviews, in line with normal practice for University employees. The outputs from this process include personal action plans for activities and personal development, but these reviews are not linked to remuneration. The advocates have agreed to their review feedback being made available anonymously to contribute to the Unit's research into student employment and student experience matters. Analysis of this data will be the subject of a future paper.

Although SAs do not currently have the option to gain academic credits as a reward for the significant learning that results from their employment experience and training, there are plans to investigate this option for the future. This has been on the agenda since the foundation of SEE-u, but it is quite a complex problem to find a neat way to deal with the study fee costs and integrate new credit-bearing options into all levels of the Faculty's study programmes.

The activities of SEE-u and the role of the GIs have been confined mainly to the early and central stages of the "student journey" as defined in an earlier paper (Glendinning, 2008). There is evidence from some recent research by SEE-u that there could be great benefit from exploring how to improve services and support for former students, graduates and alumni, at the far end of the student journey. There is currently a strong focus employability of students, highlighted by results from the UK National Student Survey of Student Satisfaction (<http://www.thestudentsurvey.com>). A team of SAs is now working on procurement of placements and also investigating the needs of Faculty students in different types of placements for study or work experience.

In 2012 most of the Faculty's staff and students will move into a new £55 million purpose-designed building. This will provide suitable accommodation and resources for all the student employees. As explained by Medhurst-Wilson and Glendinning (2009), the establishment of SEE-u and the integration of the student employee workforce, including GIs, is part of the Faculty's overall strategy in the transition to a culture of Activity Led Learning in the Faculty.

SEE-u will continue to work with other interested parties from within the University and elsewhere, who have similar ideas, cultures or interesting student support and employment models. We would welcome contact from anyone inter-

ested in finding out more about our approach to student empowerment through employment and development.

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# **TERVEYSTORI (Health Market) -A LEARNING ENVIRONMENT FOR THE NURSE OF THE FUTURE AT LAUREA LOHJA**

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## **Abstract**

Terveystori is a learning environment which offers a place of practice that promotes professional skills and acts as a regional producer of welfare research and welfare development services at Laurea Lohja. Terveystori is customer-oriented environment. Terveystori has been created as a learning environment because of the need to have more specific opportunities to practice health care skills of nurse student in an authentic environment with real customers.

The forms of activity of Terveystori are the integration of study units into the nursing work carried out at Terveystori, R & D operations in the projects of the campus with dissertations and smaller development projects and different health and welfare-related events carried out by students.

The follow-up and the evaluation were carried out by collecting feedback during the school year 2009- 2010 from the students, customers and stakeholders. The students (n20) estimated development of their competence at level 4 (good) in the assessment, identification and counselling of health needs of the individual. However, the corresponding distributions of a family and group health needs were on level 3 (average), identical with perception of needs which threaten the customer's mental health. Different measurements and health tests have been the most popular services. Generally clients have been satisfied with Terveystori services.

The vision of Terveystori is to be the acknowledged pioneer within its field and area, an innovative advocate for the promotion of the health, a researcher, a developer and a partner in Western Uusimaa.

## **Background and objectives**

Terveystori is a learning environment which offers a place of practice that promotes professional skills and acts as a regional producer of welfare research and welfare development services at Laurea Lohja.

Terveystori is customer-oriented, learning is carried out by studying and developing (LbD Learning by Developing) in interaction with different actors in the surrounding community (Learning by Developing Raji 2007). Over the last decade the competence requirements of public health staff have changed. Some doctors' duties, e.g. the need to provide short sick leave, have been transferred to nurses. Therefore the public health service requires that nurses possess robust clinical competence, are capable of independent decision-making and manage versatile patient education methods. (The Social And Health Review, KASTE Programme 2008, The Social and Health Review of 2010.)

The aim of Laurea Lohja is to become an active innovative partner for the regional actors that actively and flexibly generates creative solutions for developing tasks. Regional influence is visible through action via versatile networks, and within the campus, in the customer contacts and corporate cooperation at Terveystori and Yrityslabra learning environments.

Innovative partnership refers to the mode of operation by Laurea Lohja to develop services and marketing in a customer-oriented fashion, acting caringly, creatively and quickly (CCQ). At Terveystori, CCQ method enables a new kind of interaction with working life and mastering of skills by the health care professionals of the future. Nursing of the future requires a creative approach and the ability to react to changes and challenges quickly. At Terveystori, the learner is allowed to hone the most important skills of the future health care professionals: caring (social responsibility and communality), creativity (the ability to see matters from a new perspective, to cross one's borders) and quickness (a mode of action, in which the changes and challenges are confronted in a flexible and bold manner. (Laurea Lohja Strategy 2009.)

The objective is to produce a variety of study units promoting and furthering health, high quality services in the health field and R & D projects. Furthermore, the objective is to test and to pilot new eHealth and eWelfare services and products. The planning of the study units and projects takes into consideration the objectives of the curriculum and in addition, local, regional and, in the future, international development needs and perspectives. The curriculum and practice at Terveystori facilitate the adoption of anticipatory nursing, independent nurse consulting, welfare entrepreneurship and the learning based on LbD during nursing studies.

## **Forms of activity and services**

The strategies of Laurea and the chosen areas of focus have guided the development of operations and services at Terveystori.

Laurea University of Applied Sciences UAS is the expert of welfare, business, information technology and communication technique and sustainable development in wide metropolis area of Helsinki. Laurea is UAS of service innovations

which produces new competence which carries out education, regional development and R & D on operations model Learning by Developing (LbD). (Laurea Pedagogical Strategy 2007, Laurea Strategy 2010.)

Strategic focuses of Laurea are starting points for the vision of the Terveystori. The first strategic focus of Laurea is business management. The health student learns and increases service business competence at Terveystori. Learning is based on the strong integration of learning and developing at Terveystori.

The second focus is the expertise on the nursing and independent coping at home which a part of General Nurse Education. The Nursing degree programme has objective of professional expertise, which includes extensive practical nursing knowledge and skills. Students will practice at Terveystori - they can increase their skills of independent decision-making and problem solution and critical thinking when they are supporting customers on the process of the health choices and self-care. The expertise in nursing is shown in preventive health care, in supporting the independent coping and self-care of the customer. The focus of the Nursing expertise is completely congruent with the public health objective of Terveystori. The public health objectives are to offer to the customer welfare services which promote health and support the prevention of illnesses. Nurse students practise the nursing expertise at the independent nurse's reception at Terveystori. The objective of the Terveystori is to develop new ways of actions of health promotion which are connected with Laurea's second strategic focus, the teaching and studying of service business. (Laurea Strategy 2010.)

The third focus is safety and society responsibility. Ethical competence and sustainable development emphasise the ethical value of the nursing at Terveystori. It is good to emphasise value based competence, because safety and the social responsibility are competitive advantages and operational bases for Terveystori.

The fourth focus is the development of the student entrepreneurship. New innovative cooperation is developing at Terveystori between working life and education with the purpose to increase the entrepreneurship and welfare competence. The purpose is to provide the learners with a genuine partnership with working life. The objective is to join study units, via Terveystori and campus cooperation, solidly with working life (Figure1).

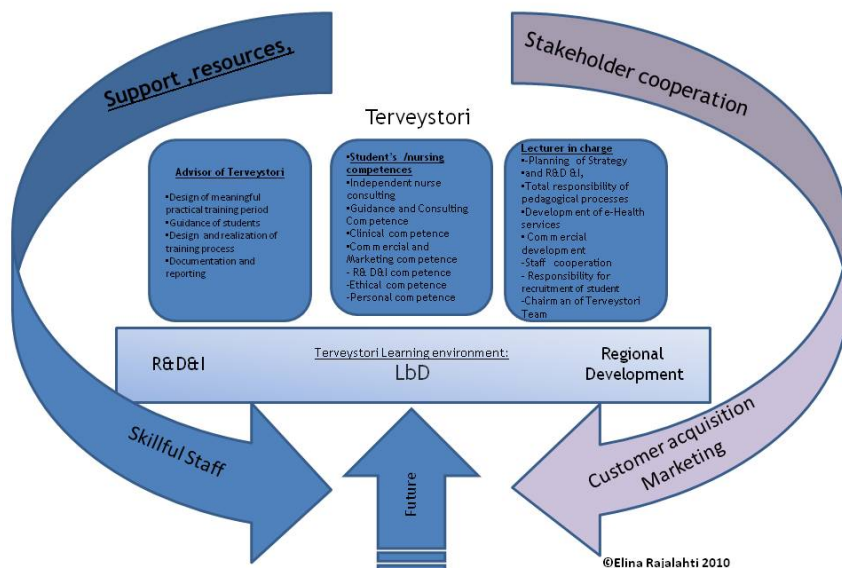


Figure 1. Terveystori as learning environment

Terveystori's activities and the development of the learning environment have taken into consideration the Lohja campus curriculum reform and its implementation. The curriculum allows for more proactive and independent nurse reception knowledge development. Independent nurse reception is a very important knowledge area in the future, because lifestyle counselling, and an increase in transfers require robust clinical skills, independent decision-making and extensive counselling skills from a nurse. The development of Terveystori offers advanced skills building during the studies.

Student's competence descriptions and accomplishments have been included in the objectives. Description of the objectives and evaluation of practice is included in the NQF's (National Qualifications Framework) required competencies. (Auvinen et al, 2010, Opetusministeriö 2009, 13). Competencies have been included and integrated into Laurea Lohja competence-based curriculum objectives. These objectives will be assessed in the process of learning with e-questionnaire. The assessment criteria have been prepared in relation to NQF nursing competence. Competences and levels to achieve are defined in the projects and study units (Figure 2).

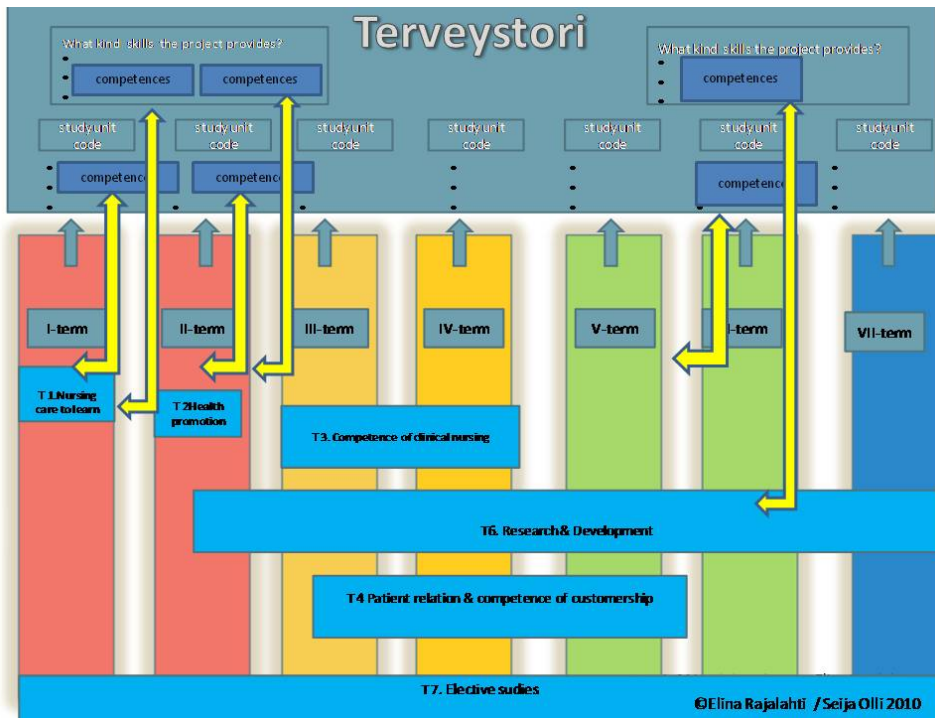


Figure 2. The defining the competences and skills of the study units to the project of Terveystori.

Students learn in a real-world customer relationship. Learning is based on personal experiences, reflection and integration of theory and practice. An authentic situation motivates students to work in a correct way and coaches them for the challenges of health care work of the future. Students are directed by current nurse educator

Customer would be able to discuss his health, receive counselling on various health risks and receive rapid diagnostic tests at nurse independent reception. Students lead groups which have focused on lifestyle changes and peer support. Group counselling is utilized in the existing group counselling models and developed further through the thesis work (Pessinen 2010). Health Kiosk is a low threshold place to test the state of ones health, discuss with the experts and receive further guidance and support on health promotion and maintenance. Terveystori Health Kiosk changes place weekly to the facilities of various associations, pharmacies, shopping malls and service homes.

Guidelines and patient handouts for health promotion, disease prevention, self-care and self-care support have been drawn up. The development work is continuing with the web-based guidelines learning environment.

Terveystori has organized a variety of events on health and wellness, including heart week and World Diabetes Day with associations and other regional actors. Every second month a Doctor's Question Hour is held for general public in collaboration with Lohja health center.

## **Follow-up and evaluation completed**

The operation and development of Terveystori have been carried out with due attention paid to the Campus profile of Lohja and the curriculum of nursing. The development is directed by the Terveystori Team, which consists of students and staff. The follow-up and the evaluation were carried out by collecting feedback during the school year 2009- 2010 from students, customers and stakeholders. There were about 1400 customer calls, a total of 2226 different health tests were performed during the school year.

### **Methods**

The data was obtained by a www/e- questionnaire in December 2009. The questionnaire is based on the national frame of reference of the competence of the professional skill of the nursing (NQF), based on the European criteria of Universities of the Applied Sciences degrees. Items of the questionnaire are customership competence (2 question), health promotion competence (8 question), clinical competence (4 question), decision-making competence (5 question) and tuition and guidance competence (9 question). In addition, the questionnaire had three background questions and two open questions for individual feedback and development suggestions. Lisäksi lomakkeessa oli kolme taustakysymystä ja kaksi avointa kysymystä vapaata palautetta ja kehittämissuhteita varten. The competences were estimated on the scale of 1-5 (not at all, poor, average, good, excellent). A total of 20 students (from 37) answered the questionnaire 15 student from youth education and five from adult education.

The customer feedback was collected with five open questions during autumn 2009 and spring 2010. The customers could fill up a feedback schedule during their Terveystori visit. Altogether 50 feedback schedules were carried out. The feedback of stakeholders was collected with structured open questions by the telephone interviews (n11) during May 2010.

The quantitative data was analysed by statistical method using frequencies and percentage. The qualitative data was analysed by content analysis. All the analyses were done during spring and autumn 2010.



## Results

Most of the students (70 %) estimated their competence to assess the individual health needs of the customer as good (level 4) (Figure 3).

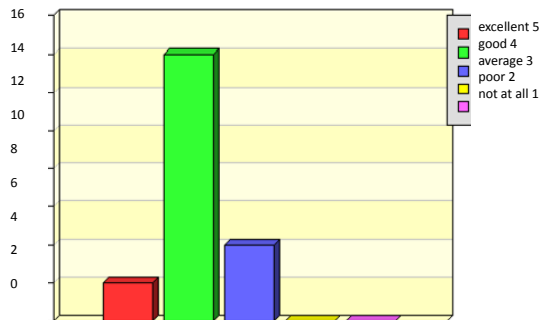


Figure 3. Students competence to assess the individual health needs of the customer

Also 70% of students also estimated their competence to manage customer based nursing service as level good, 20% of them as level excellent. None of them estimated their competence poor or not at all (Figure 4).

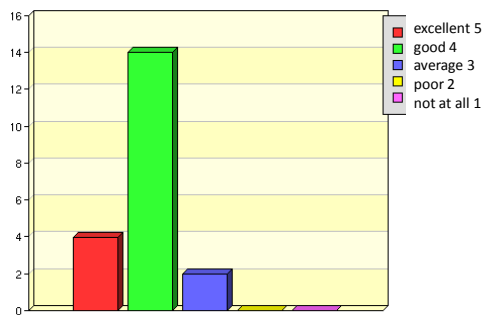


Figure 4. Students competence to manage customer based nursing service

However, the corresponding distributions of a family and group health needs were on level 3 (average), by more than half of the students 55%. Six students

(30%) estimated their competence as good and only one student as excellent (Figure 5).

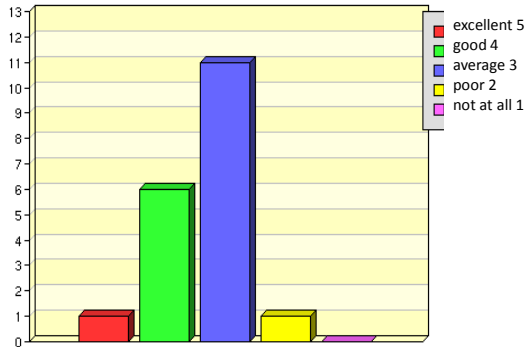


Figure 5. Students competence to assess the health needs and problems of the groups and families

The results were mostly identical with perception of needs which threaten the customer's mental health, figure 6. Most of the students 70 % estimated the competence to notice and to assess the mental health needs of the clients' as average level 3.

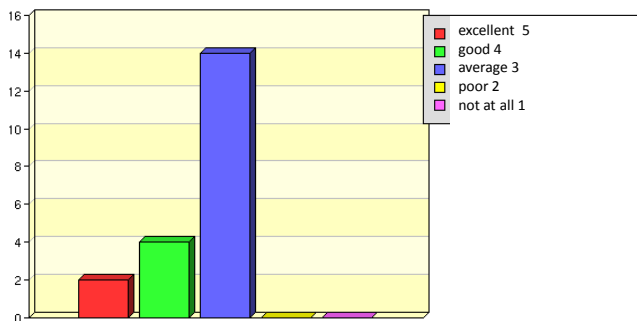


Figure 6. Students competence to notice and to assess the mental health needs of the clients'

The results show that students can manage individual patient education and counselling better than using the group education methods and group counselling. The frequency distributions were mostly at level 4 (good) in counselling the individual (Figure 7) corresponding to group counselling methods at level 3 (average), (Figure 8).

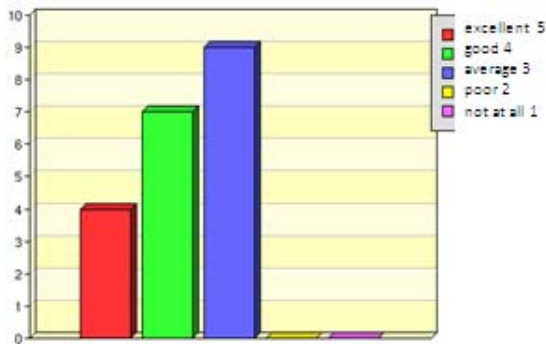


Figure 7. Students competence to manage individual counselling and patient education methods

Most of the students 65% estimated their competence to manage group education methods and group counselling as average (level 3). Only one considered group counselling methods good or excellent and three students estimated their competence to manage group education as poor.

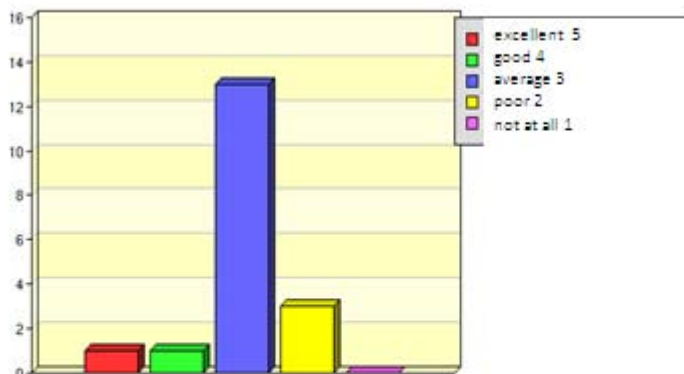


Figure 8. Students competence to manage group education methods and counselling

According to the customer feedback results, the clients' are satisfied with the service supply, customer treatment at Terveystori and the lifestyle counselling received. The customer were satisfied with the service supply and nurses reception carried out by students

Based on the feedback of stakeholders on the results, the customer relationships have lasted from six months to a year. Different measurements and health tests have been the most popular services. Clients have been satisfied whit Terveystori services. The stakeholder wishes for more health tests and Health kiosk services.

## Examination of the results

According to this study the students considered their skills to identify the client's individual health needs better than their skills to identify the health needs of families and groups. Also their capability to identify mental health problems of clients has room for improvement. Kvist and Vehviläinen-Julkunen(2007) assessed graduated nurse's competences in teaching and counselling and health promotion as inadequate. According to this survey, students assessed their competence to manage individual counselling as good but group counselling as poor. Kääriäinen (2007) and Lipponen et al. (2008) have received similar results in their study. Advantages of group counselling have not necessarily been rec-

ognized and capabilities to counsel a group are considered inadequate. Nurses wish for more training and administrative support to organize group counselling.

Based on the questionnaire, the students' opportunity to carry out group counselling has been improved. In order to enhance the competence to identify mental health threats, persons and groups who are either in danger of displacement or face a crisis will be recruited to Terveystori as customers. For development proposals, both the customers and the students presented the intensification of the marketing and practice of services among customers.

Terveystori searches for its place as an acknowledged and flexible, low threshold service model solution producer, integrated into the regional health services. The strategy for Terveystori 2010-2015 has been drawn up. With the help of the strategy, the operation is given systematic and visible direction. The challenge on the future is to reach the position of an established functionary. The vision of Terveystori is to be the acknowledged pioneer within its field and area, an innovative advocate for the promotion of the health, a researcher, a developer and a partner in Western Uusimaa.

Terveystori will be in the future developer, operator and researcher. The roles and competences of Nurse's of the future are changing according to the national, regional requirements. Terveystori learning environment has to face these challenges and needs. Laurea Lohja approach CCQ (Caring, Creative and Quick) enables a new kind of interaction with working life and mastering of skills by the health care professionals of the future.

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# **CLIENT-LED HOUSING SERVICE IN A LIVING LAB ENVIRONMENT**

## **A story of a young man moving, with an intellectual disability**

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### **Abstract**

The case study refers to a young adult with an intellectual disability moving away from his hometown and previously supported housing to a one-room flat in Finland's metropolitan area. This change took place regardless of laws (Finnish nationality law, kotikuntalaki) and structures that limit the choices of living places for people with intellectual disabilities within Finland to secure human rights. The client and his network were able to set agreements that by-passed this barrier. This case study provides an example of client-led housing service in real life. It aims toward developing a further conceptualization of housing environment through data gained during the case study's process. The following focuses on methodology, the hybrid model combined with action research, content analysis supported with a qualitative approach. The results and discussion depict outcomes of the client-led service process.

### **Background of the ASUKE-project**

The case study refers to a young adult with an intellectual disability moving away from his hometown and previously supported housing to a one-room flat in Finland's metropolitan area. This change took place regardless of laws and structures that limit the choices of living places for people with intellectual disabilities within Finland. The ratification of the signed UN Convention on the Rights of Persons with Disabilities (United Nations, 2006)<sup>45</sup> implicates discussions about the need to change the law at hand (Finnish nationality law, kotikuntalaki) to secure human rights. The client and his network were able to set agreements that by-passed this barrier. This case study provides an example of client-led housing service in real life, in a living lab. It depicts an individual housing solution and aims toward developing a further conceptualization of housing environment through data gained during the case study's process.

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<sup>45</sup> United Nations (2006a) Convention on the Rights of Persons with Disabilities and its Optional Protocol. <http://www.un.org/disabilities/default.asp?id=161> (10/2010)

My personal interest in housing environment and related services for people with intellectual disabilities originated from professional activities, and was further stimulated during a specialization study of Health Promotion, Family Nursing in Laurea, Applied University of Sciences. The association called Helsinki's Short-Term Home Lyhty ra (Helsingin lyhytaikaiskoti- ja työpaja Lyhty ry) (Lyhty) initiated the ASUKE-project, *Researching the housing environment of people with intellectual disabilities in various environments and developing housing service (Kehitysvammaisten asuinympäristön tutkiminen eri ympäristöissä ja asumispalvelun kehittäminen)* in the year 2008. The project was also financed by the Finland's Slot Machine Association (RAY) and supported by Applied University of Sciences, Laurea through educational and project guidance. The following focuses on methodology. The results and discussion depict outcomes of the client-led service process. Portions of what follows have been taken from my Master's Thesis (Schiemer, 2009)<sup>46</sup>, part of the ASUKE-project.

During the past century institutions were built for people with intellectual disabilities leading to institutionalized care. During the 1980s a process of de-institutionalization began, emphasizing inclusion and equality. Recently, recommendations have been made, and quality criteria and an ongoing reformation of laws have been established in Finland and elsewhere. Among other factors the Convention on the Rights of Persons with Disabilities (United Nations, 2006)<sup>1</sup> enforces Europe-wide changes within disability laws. This development aims to ensure the rights and values of people with intellectual disabilities as citizens and further promotes the need for more individual housing solutions and housing environments. These changes in services require client-leadership, suggesting a reassessment of service definitions and structures, in particular, housing services and housing environment.

The Short-Term Home Lyhty is a non-profit association which provides housing-, educational-, and day activity- services for adults with intellectual disabilities. Lyhty is located in Helsinki, Finland, and was founded in 1993. The basic idea of Lyhty was to provide services for people with intellectual disabilities within the mainstream of Finnish society. When the original planning took place, the founding members studied the history and future prospects of care in general, and researched national and regional trends in this area. In addition, they took a close look at the life and social standing of people with intellectual disabilities in various societies (Liimatta, 1993)<sup>47</sup>. The aim was to create a high-class home environment. Today, Lyhty provides services for approximately a hundred individuals plus their families in five buildings. The employees consist of sixty professionals, who provide nursing expertise and multi-professional service around the clock. Additional civil servants and volunteers are included in the daily happenings and work.

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<sup>46</sup> Schiemer, C. 2009. An activating housing environment for people with learning disability: From Perspective of Lyhty's service users and their families. Laurea University of Applied Sciences. Otaniemi. Espoo.

<sup>47</sup> Liimatta, H. 1993 *Hoitotyö kehitysvammahuollossa*. Teoksessa *Hoitotyön vuosikirja* 1994. Tammer-Paino Oy. Tampere.



# Living Lab

The movement of Living Labs began in Europe, most actively in northern countries due to traditions of usability, participation, innovation and advanced information technology. In 2008 more than 100 European Living Labs joined the established European Network of Living Labs ENoLL (European Commission 2008)<sup>48</sup>. In the beginning of the year 2010 ENoLL received 118 membership applications from 36 countries. (Open LivingLabs 2010)<sup>49</sup>.

The European Commission (2008)<sup>4</sup> defines Living Lab as a user-driven open innovation ecosystem. The ecosystem is based on a partnership of business, citizens, and government (European Commission 2008)<sup>4</sup> and includes a network of participating collaborators (Halinen 2009)<sup>50</sup>. Open innovation implies that research, development, and innovation are only a part of the organisation's activities. The user is living a normal everyday life in his/her own environment (Halinen 2009)<sup>6</sup>. Halinen (2009)<sup>6</sup> defines user-driven as user-participation and empowerment, the user as subject not object. The user is enabled to actively participate in research, development, and innovation processes aimed to gain knowledge of new and emerging behaviours and user patterns (European Commission 2008, Halinen 2009,<sup>4,6</sup>.

The collaborators of the ecosystem are classified into four parts, the enablers, users, utilizers and developers (Halinen 2009)<sup>6</sup>. Infrastructure, praxis, cases and projects, working tools, methods, needs and wishes are part of the interaction of the collaborators. The co-creation of this particular case took place within the one-room-apartment of the citizen with an intellectual disability. Throughout the process some potential co-creators were chosen not to get involved, and some data-collection had to be adjusted from diary to tape-recorded meetings with co-creators. The apartment as a living lab formed a test-bed for a unique situation of co-creation within the field of disability; a young man moving from his municipality, receiving support from family, housing service and the social board of his previous home municipality.

## Client-leadership and co-creation

In a Living Lab the user is at the centre of the innovation lifecycle. The European Commission (2008)<sup>4</sup> discusses the user-driven innovation and co-creation process of new services. People with intellectual disabilities have been previ-

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<sup>48</sup> European Communities. 2008. Living Labs for user-driven open innovation. An overview of the living labs methodology, activities and achievements. Directorate-General for the Information Society and Media. Belgium.

<sup>49</sup> Open LivingLabs. The European Network of LivingLabs <http://www.openlivinglabs.eu/> (10/2010)

<sup>50</sup> Halinen, K. 11/2009. Living Lab Innovations Vol 3. Helsinki Living Lab. CEO Art and Design City Helsinki Ltd. Helsinki.

ously referred to as idiots, patients, and only later as clients. Services today claim to be client-centred, i.e., service processes which are client-driven.

Perceiving the user as the centre of the innovation life-cycle and as a co-creator of a service process, we chose to describe the user as leader of his/her life and the service as client-led (user-led). The used and created service is led by the client, and developed in partnership between business, citizen (user) and government. In this case the man with intellectual disability had leadership over his housing within the possibilities surrounding him and within himself. His active family members were further considered as the user, applying a family dynamic approach. Further co-creators are the hometown city, the city of Helsinki and Lyhty. Caring-TV was initially a potential co-creator, and Skype was considered as a working tool in communication. The client chose not to integrate this partner and tool as part of his living. Figure 3 in the chapter *Results* depicts the involved co-creators.

## Hybrid model combined with action research

The following describes the combination of the hybrid model and action research. It offers insight into how the case was realized within these methodological structures.

### Action research

Action research aims to solve conflicts and initiates change by combining theoretical and experience-based knowledge using techniques of research (Paunonen & Vehviläinen-Julkunen 1997)<sup>51</sup>. Kuula (1998)<sup>52</sup> states that the focus of action research is the practical work. Turunen, Tossavainen, Sormunen, Saarinen (2008)<sup>53</sup> discuss participative action research and underline that action research aims toward creating knowledge which concerns practice and conceptualization of operational practice (Turunen et al. 2008)<sup>9</sup>. Action research thus contributes to the praxis and the science.

Lewis points out the importance of the professionals' involvement and their conviction that the change to come is needed. He names cooperation, group decisions and a dialog including theory and praxis as important factors to succeed. (Paunonen & Vehviläinen-Julkunen 1997)<sup>11</sup>. Kuula (1998)<sup>8</sup> describes the researchers as active participants in the process of change and research. The interaction of the researcher and the researched is based on cooperation and con-

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<sup>51</sup> Paunonen, M., Vehviläinen-Julkunen, K. 1997. *Hoitotieteen tutkimusmetodiikka*. WSOY. Hometown.

<sup>52</sup> Kuula, A. 1998. *Toimintatutkimus. Vastapaino*. Tampere.

<sup>53</sup> Turunen, H., Tossavainen, K., Sormunen, M., Saarinen, T. 2008. *Osallistuva toimintatutkimus terveyden edistämässä – lapsen terveysoppiminen kodin ja koulun tukemana*. *Hoitotiede* 6. HTTS ry. Turku.

tribution. The research process is described in cycles, through a planning phase, action phase and evaluation phase (Kuula 1998)<sup>8</sup>.

## Hybrid model as a method for concept development

According to Madden (1990)<sup>54</sup> research tasks have been approached in two ways, either theoretical or empirical. Schwartz-Barcott & Kim (2000)<sup>55</sup> developed the hybrid model for concept development to combine these approaches. Rodgers & Knafl (1993)<sup>56</sup> discuss one of the strengths of the hybrid model in refining diagnostic concepts. As illustrated in Figure 1 the hybrid model of concept development involves three phases; the theoretical, empirical and analytical phase. To develop concepts the hybrid model combines theoretical with empirical approaches in a final analytic phase that produces a synthesis of fieldwork findings, re-examined in the light of the initial theoretical focus (Madden 1990)<sup>10</sup>. Through the method of the hybrid model one can research information about concepts, the concepts characteristics (Schwartz-Barcott & Kim 1986)<sup>11</sup> or identify concepts to create a theory (Lauri & Kyngäs 2005)<sup>57</sup>.

The first phase, the theoretical, is grounded in literature research. The concepts to research are chosen and considered from a literature perspective. Through the literature research a preliminary definition of the concepts, the keywords, is done. The second phase includes the planning of stage setting, negotiating the entry of the selected cases and the collecting and analyzing of the data. Phase three, the analyzing part, includes a reflection of both the empirical part and the theoretical part. Found conceptualizations in the theoretical part are compared to the findings of the second phase. The findings are reconsidered with respect to the values chosen in the theoretical part.

A concept is an idea or complex mental image of a phenomenon (object, property, process, or event), and are often taken to be major theoretical components (Rodgers & Knafl 1993)<sup>12</sup>. Morse, Mitcham, Hupcey & Tason (1996)<sup>58</sup>, writing about concept evaluation, define concepts through their anatomy, referring to five structural features of a concept. The *definition* labels and gives meaning to the concept. A concept can be identified, recognized, communicated and referred to, based on the definition. Thereby the label is an indicator of collective actions. Consistency on cohesion defines the clarity of a concept. According to Steen (1993b) in Morse et al. (1996)<sup>14</sup> concepts are referring to present characteristics rather than absent ones. The *characteristics*, as the second feature, are also named as attributes that define the concept and therefore distinguish one

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<sup>54</sup> Madden, B.P. 1990. The hybrid model for concept development: Its value for the study of therapeutic alliance. *Advances in Nursing Science*, 12 (3), 75-87.

<sup>55</sup> Schwartz-Barcott, D., Kim, H.S. 2000. An expansion and elaboration of the hybrid model of concept development.

<sup>56</sup> Rodgers, B.L., Knafl, K.A. 1993. *Concept Development in Nursing. Foundations. Techniques and Applications*.

<sup>57</sup> Lauri, S., Kyngäs, H. 2005. *Hoitotieteen teorian kehittäminen*. WSOY. Porvoo. Helsinki.

<sup>58</sup> Morse, J.M., Mitcham, C., Hupcey, J.E., Tason, M.C. 1996. Criteria for concept evaluation. *Journal of Advanced Nursing*, 24, 385-390.

concept from the other. Their presence exists throughout the concept, yet the characteristics' association and form might differ. Characteristics have to be abstract enough to define a concept in different contexts. Characteristics have to be unique to define and differentiate. The *boundaries* are identified by the characteristics that are part of the concept. Aiming toward a mature concept (Morse et al. 1996)<sup>14</sup>, concepts should have clear boundaries and not overlapping characteristics. Each concept has *preconditions* that give rise to the behavior that distinguishes the characteristics. The *outcome* is described as the result of the concept.

## The combination

The hybrid model and action research are combined through three phases in this project. This combination aims toward developing housing service processes and concepts of housing environment. The project data originated during the action research process through two cases. Figure 1 depicts the phases of the project and the combination of the hybrid model and action research. Case studies are used to apply the research method. Each case study has planning-, theoretical-, action- and empirical-, analytical and evaluation phases aimed towards further concept development and knowledge about service processes.

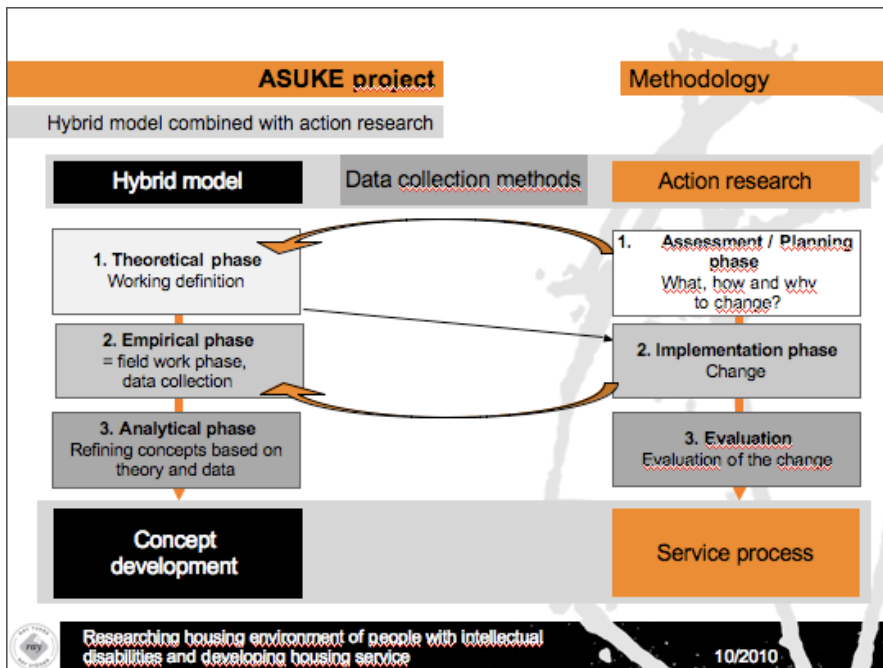


Figure 1. Service development and research methodology.

After planning/theoretical- and implementation/empirical phases meetings were initiated to reflect on the service process and housing environment with the co-creators (evaluation phase) and plan future processes (planning phase). Two meetings were recorded and gave data for the analytical and evaluation phase, in other words for concept and service process development. Based on the meetings an implementation phase followed. During the project the case went through 3 circles. In addition to the meetings with co-creators, a project steering group met three times to reflect on the on-going service processes.

## Qualitative content analysis

Content analysis is a generic name for a variety of means of textual analysis that involves comparing, contrasting, and categorizing a corpus of data. In other words content analysis means a transformation of the inquired data into findings, and words are organized into fewer content related categories. (Patton 2002<sup>59</sup>, Cavanagh 1997<sup>60</sup>, Schwandt 1997<sup>61</sup>). According to Mayring (2000)<sup>62</sup> the qualitative content analysis aims to transfer the advantages of quantitative content analysis to the qualitative content analysis. Content analysis as a qualitative process is a method of analyzing data systematically and objectively, which includes to a certain extent subjective interpretation and the approach of the researcher (Burns & Grove 1997)<sup>63</sup>. Yet it is an empiric, methodological and controlled analysis of a textual body in context to its communication (Mayring 2000)<sup>18</sup>. Referring to Cormack (1996)<sup>64</sup> and Patton (2002)<sup>15</sup> the implementation of analysis is adapted to the data, therefore rules do not exist, and strategies are only suggested. Mayring (2000)<sup>18</sup> refers to quality criteria when talking about the trustworthiness and reliability of this method. He suggests that the analyzing process has to take place through rules. The goal, the variable of the participants (text-producer), the formation of the material should be defined and illustrated.

Graneheim & Lundman (2004)<sup>65</sup> accept in their work eight concepts in qualitative content analysis, based on the literature: manifest and latent content, unit of

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<sup>59</sup> Patton, M.Q. 2002. *Qualitative research & evaluation methods*. Sage Publications, Inc. Thousand Oaks. California

<sup>60</sup> Cavanagh, S. 1997. Content analysis: concepts, methods and applications. *Nurse Researcher*, 4 (3), 5-16.

<sup>61</sup> Schwandt, T.A. 1997. *Qualitative Inquiry*. Sage Publications. Thousand Oaks

<sup>62</sup> Mayring, P. 2000. *Qualitative Inhaltsanalyse*. *Forum: Qualitative Sozialforschung*, 1 (2).

<sup>63</sup> Burns, N., Groove, S. 1997. *The practice of nursing research: Conduct, critique and utilization*. Third Edition. Philadelphia. Saunders Company

<sup>64</sup> Cormarck, D. 1996. *The research process in nursing*. Blackwell Science. Oxford and Cambridge. Mass. USA

<sup>65</sup> Graneheim, U.H., Lundman, B. 2004. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today*, 24, 105-112.

analysis, meaning unit, condensing, abstracting, content area, code category and theme.

The manifest content takes into consideration the visible and obvious components of the text, answering to the 'what' question. Both deal with interpretation differing in the depth and the level of abstraction. The latent content refers to the underlining meaning of the text, considering the relationship aspect and aims to answer to the 'how' question. During analytical phases within the beginning of the project it appeared to be impossible to capture the described interdependences and the complexity of the data based on Graneheim & Lundmans eight concepts. Emerged from the data back then the analysis also focuses on 'what for' content and 'why' content that is capturing values. The question 'what for' entices the aims of the manifest and latent content and their interdependence. (Figure 2).

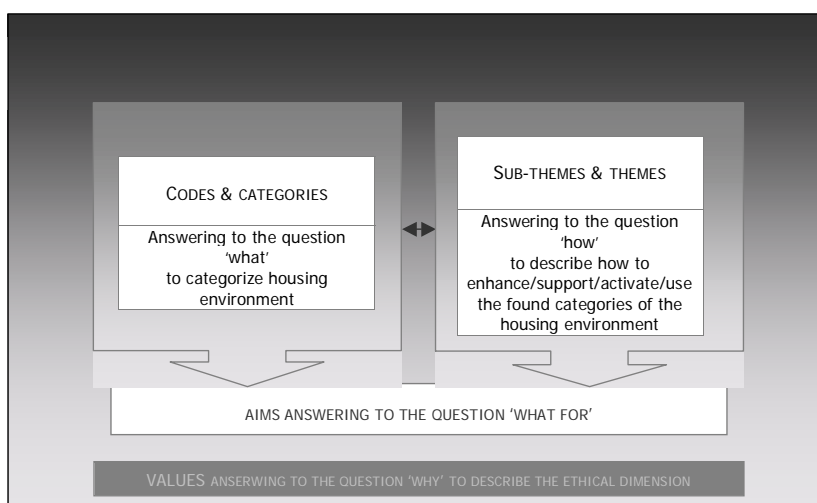


Figure 2. Analysis.

The concept of the unit of analysis deals with the object of study. The unit size aims toward being large enough to be considered as a whole, and small enough to be understood in the context of the meaning unit. The unit of analysis was formed by two tape-recorded evaluation- and planning sessions. The meaning unit stands for words, sentences or paragraphs, which include relating aspects through their content or context. Synonyms in other theories are e.g. content unit, coding unit (Baxter 1991)<sup>66</sup>, idea unit (Kovach 1991)<sup>67</sup>, textual unit (Krip-

<sup>66</sup> Baxter, L.A. 1991. Content analysis. In: Montgomery, B.M., Duck, S. (Eds) Studying Interpersonal Interaction. The Guilford Press. New York. London. 239-254.

pendorff 1980)<sup>68</sup> and keyword and phrase (Lichtstein & Young 1996)<sup>69</sup>. Codes are related to the meaning unit, understood in contextual relation. A code originates from meaning units and condensed meaning units. Condensing deals with shortening the text but preserving the core information. Reduction and distillation are terms used in other theories to represent equal processes. Abstraction relates to the process named also aggregation. The term abstraction underlines the 'descriptions and interpretations on a higher logical level' (Graneheim & Lundman 2004)<sup>21</sup>. Content area sheds light on a specific explicit area of content identified with little interpretation. Processing to categories aims to create a descriptive level of the content, often through sub-categories. It is an 'expression of the manifest content of the text' (Graneheim & Lundman 2004)<sup>21</sup>. Sub-categories can be abstracted into categories and categories divided into sub-categories. According to Krippendorff (1980)<sup>24</sup> in Graneheim & Lundman (2004)<sup>21</sup> a category answers to the question of 'what'. A theme is related to the latent content. It answers to the question of 'how' and deals with the underlining meaning. Themes are based on the condensed meaning units, codes or categories on an interpretative level.

The process of finding a meaning unit, condensing the meaning unit and abstracting, is seeking for codes, categories, themes. Eventually themes are created through meaning units and sub-themes. This process differs from the coding and categorizing in that it is the underlining meaning through condensed meaning units, codes or categories on an interpretative level.

## Results of client-led housing service process

The co-creators in the depicted housing service process were the citizen – a young man with an intellectual disability, his family members, a project worker and two nurses from Lyhty and a social worker from his hometown. Caring-TV was suggested as a co-creator, but did not join due to a decision of the citizen. The man along with his family members initiated the process of moving from one municipality to another one. They found support from his city of origin to overcome legal barriers of the Finnish nationality law (Kotikuntalaki) and the service provider Lyhty. When they got to the ASUKE-project they had already planned the man's moving for a while as depicted in Figure 3.

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<sup>67</sup> Kovach, C.R. 1991. Content analysis of reminiscences of elderly women. *Research in Nursing & Health*, 14 (4), 287-295.

<sup>68</sup> Krippendorff, K. 1980. *Content Analysis. An Introduction to its Methodology*. The Sage Commtext Series. Sage Publications. London.

<sup>69</sup> Lichtstein, P.R., Young G. 1996. My most meaningful patient. Reflective learning on a general medicine service. *Journal of General Internal Medicine*, 11 (7), 406-409.





## Discussion

The developed method was a combination of the hybrid model for concept development and action research to gain knowledge based on practical work (see Figure 1). The method offered a constant reconsideration and further development of the concepts at hand through new data arising from each case study through a cyclic process. It aimed towards a constantly growing awareness and body of knowledge through concept development. The method also enabled an individual service approach, since each change in service initiated a new cycle from which to gain data. Additionally, this supported taking into consideration each citizen's uniqueness with personal and varying needs.

Based on this case study, the phases the family initiated were often ahead of the planning and theoretical phase of the project's methodology, e.g., the client was already implementing his plans when the project interacted with this process. Yet the structure offered by this research approach set appropriate steps to form knowledge out of real life (LivingLab) and practice. The combination of action research and living lab, and the focus on change and real life processes, supported an open-minded approach toward new solutions throughout the project process.

Future steps include a further concept development by applying a triangulation of the project's data that was gained from a second case and the first phase of the project (Schiemer 2009)<sup>2</sup>. A future vision is to further elaborate research context in practical working environments to extract existing knowledge into scientific formats, and to further develop knowledge and share experience.

## Ethical considerations and trustworthiness

The ethical considerations evolved from the research project's purpose and question. The discussion further leans on the ethics of qualitative research discussed by Richards & Schwartz (2002)<sup>70</sup>. Their ethical guidelines gave a framework to consider the wellbeing of the participants and further ethical decisions of this project. The participants were informed about conditions and processes concerning this project. The participants voluntarily agreed to be part of the project and could co-create the process. They were also informed about being able to stop their participation at any point of the project. Informed consent, identification, misrepresentation and exploitation were taken into consideration. Leadership was given to the client as much as possible. Co-creators offered expertise verbally or through concrete testing of Caring-TV and Skype.

Trustworthiness in qualitative research is commonly described through credibility, dependability and transferability (Graneheim & Lundman 2004)<sup>21</sup>. Paula Leh-

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<sup>70</sup> Richards, H.M., Schwartz, L.J. 2002. Ethics of qualitative research: are there special issues for health services research? *Family Practice*, 19 (2): 135-139. Great Britain.

to, a principal lecturer of University of Applied Sciences, Laurea with expertise in nursing science, nursing, wellbeing, innovations and research methods, offered guidance when needed. A Finnish native speaker transcribed the tape recordings. The description of the project process and the research allow the reader to follow the procedures and to decide upon the findings' applicability in another context.



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# **VERCCO – AS A LEARNING ENVIRONMENT**

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## **Abstract**

We attempt to develop an innovative pedagogical model for combining R&D&I with modern pedagogical methods in an authentic development project of retail and consumer services business in a real life context of an e-commerce research centre. The aim is to attain competences in an experiential environment through learning and sharing of relevant skills, values and knowledge. Cross-disciplinary (ICT, marketing, business communication) research is carried out as a joint research group within InnoMajakka ('Inno-Lighthouse') project the aim of which is to strengthen and improve innovation processes of local companies and municipal organisations, and also to develop work life oriented teaching. We experiment with different pedagogical methods through case research, action research and design science by overlapping different types of competences with experts, students, municipal officials and researchers working collaboratively together. The case provides an 'out-of-school' developmental context for learning of skills, values (ethical considerations) and knowledge. To develop work life oriented teaching and learning in the context of e-business requires a cross-disciplinary approach: teachers' collaboration across schools within OUAS and across universities in the Oulu region, and joint development work with different stakeholders in the region. We are on the road to developing a new model for learning.

## **Introduction**

We present work in progress of an authentic development project of retail and consumer services business in a real life context of Vercco. The project as a research & development & innovation (R&D&I) project in e-commerce is unique in that it will provide a physical, virtual and mobile space for technologies, logistics, marketing and other business service activities for future and existing e-business companies. Within this context we attempt to develop an innovative pedagogical model for combining R&D&I with modern pedagogical methods. The aim is to attain competences in an experiential environment through learning and sharing of relevant skills, values and knowledge; they form a holistic learning experience (see Raji 2007). The main research question is: How to develop work life-

oriented instruction and learning in the context of universities of applied sciences?

## Methodology

Currently, cross-disciplinary (ICT, marketing, business communication) research is carried out as a joint research group within InnoMajakka ('Inno-Lighthouse') project (with a link to Center for Internet Excellence (CIE), the aim of which is to strengthen and improve innovation processes of local companies and municipal organisations, and also to develop work life-oriented teaching. We experiment with different pedagogical methods through case research, action research and design science by overlapping different types of competences with experts, students, municipal officials and researchers working collaboratively together (Figure 1).

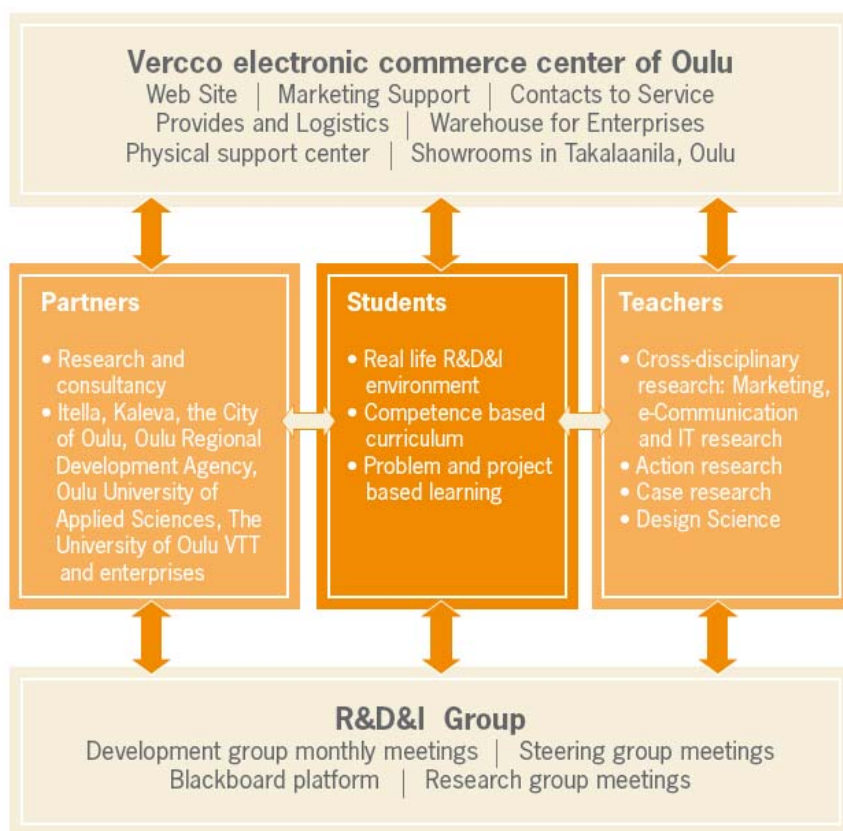


Figure 1. The Vercco learning environment.

## Results

The case provides an 'out-of-school' developmental context for learning of skills, values (ethical considerations) and knowledge.

### **Vercco as a knowledge-forming context**

The theoretical contexts of the following fields will be used to solve the assignments provided by different companies and organisations: IT business, marketing, (digital) service provision, e-business and e-commerce (including ERP systems), (international) communication and culture, logistics. Relevant themes are discussed and studied in teaching/learning. Several research papers will be published in 2010-2011. More than 10 students analyze the research material of the project. We work as an interdisciplinary R&D&I group across different schools, degree programmes and universities with the help of the Blackboard platform.

### **Vercco as a context for learning skills**

The students learn, inter alia, following skills: creating e-business and e-marketing plans; designing and building virtual e-shops, relevant business communication skills and communication strategies of social media, international business and team work. Of the 30 students engaged in 'InnoMajakka', several complete their work placement as trainees of SMEs within the context of the project. Also, different assignments are being processed during teaching – virtual and physical.

### **Vercco as an environment for learning work life (ethical) values**

Vercco involves learning about the relevant legislation (laws and regulations) and ethical code related to business in general and e-business in particular. Also, students become acquainted with the general social code of behaviour of work life: e.g. the importance of gaining trust through timely delivery of tasks and assignments and meeting of agreed deadlines.

## Conclusions

As a conclusion it can be stated that to develop work life-oriented teaching and learning in the context of e-business requires a cross-disciplinary approach: teachers' collaboration across schools within OUAS and across universities in the Oulu region, and joint development work with different stakeholders in the region. During this development process, IT students have acquired more in-depth business know how and business students ICT skills. We have succeeded in forming a cross-disciplinary R&D&I group. We need to extend this way of working to other fields of work life. Another further development of the project in-

volves increasing e-learning competence from virtual tools such as Blackboard to immersive virtual environments (e.g. Second Life). We are on the road to developing a new model for learning: Learning through R&D&I: L@RDI.

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# FACING FUTURE EXPERTISE

## a dialogue between President Pentti Rauhala and Director Katariina Rajj

**Katariina Rajj:**

The Learning by Developing - New Ways to Learn 2010 conference on Future Expertise in Higher Education aims to present, discuss and develop the ways of preparing students to meet an unexpected future and an ever changing world of work. The starting point is in future oriented higher education and its possibilities to have an active role in guiding future building processes.

**Pentti Rauhala:**

The pedagogical conferences arranged by Laurea have attracted year by year more international conference guests which is a sign that reforming higher education pedagogy is an actual theme all over the world.

**Katariina Rajj:**

Economical situation in a global form and the need for new kinds of solutions and service innovations challenge also higher education institutions. We can ask of how to coach our students for their future, which can be seen as an ever changing world of work and unexpected new situations. It is clear, more than earlier, that the present solutions are not good enough and the world, as it has been described in study books, does not exist tomorrow any more. Students should be prepared to create new ways of habits and to have a possibility to see how the world changes around them.

**Pentti Rauhala:**

It has been the tradition that higher education has not been able to build close contacts with the working life around it. HE institutions have even feared that this would limit their independency. But the world has changed. In Finland the founding of the new Aalto University represents the new way to combine world-class research, applied sciences and education to bring something new to the society and business life.



**Katariina Raji:**

Learning the process of discovery and self-sufficiency, as Ardan has pointed out, it is also evident in the Laurea's Learning by Developing action model, in which real changes in the world of work and new habits of action are the expected outcomes as it is in a pragmatic learning theory. In the LbD action model a real doubt as an identified problem or a discovered new idea is a starting point for an inquiry which leads to form new beliefs and new habits of action, and learning can be seen as a tool in this process. This is also in line with Pihlström and Kivinen & Ristelä. The LbD model follows the ideas of Dewey, who regards inquiry as an attempt to solve a problematic situation arisen by an experience. Learning consists of restructuring and building experiences, handling new situations and acting in a purposeful way. Dewey's view of learning and knowing as an affair of doing and learning as formation of new habits of action can be related to the present topic of future expertise.

**Pentti Rauhala:**

Laurea made its first pedagogical strategy among the first universities of applied science in 2002. The learning and knowledge concept of the strategy was based largely on the research made by Katariina Raji. The newest pedagogical strategy was made in 2007 and then the concept of LbD was formulated as the main starting point of the strategy. The development of LbD has based both on research activities of several people of Laurea and the practical implementation of many pioneers. It has been disseminated to all units of Laurea and forms now the central basis of the learning and research activities of Laurea. It has made possible the integrating of learning and research and made possible the research work of students as part of their studies. We think that it thus gives to our graduates the competences they need in the future working life.

**Katariina Raji:**

We can look at the concept of future expertise by following the analysis of *competence in use* carried out by Per-Erik Ellström. According to him an individual's competence level is formed of school education and the competences demanded by working life as well as formal exams and formal qualification requirements. If we have an authentic working life related research and development project as a learning environment, as it is in the LbD model, acting together with students by developing can be assumed to lead to competences needed in future working life. Future expertise also challenges the development of curricula in higher education. Formal exams should be based on competences, which make it possible to develop new ways of action and competences, which in higher education lead to situation management

in an ever changing world of work. The challenge forms of formal qualification requirements. They should also be flexible and more generic competence oriented. Recently t the group of graduated students (n=30) who already had working experiences told that they value the achievement of generic competences and they see them most important for their future.

**Pentti Rauhala:**

One evidence concerning the validity of LbD is the excellent employment of graduates. It has in many years been the best of all Finnish universities of applied sciences. The graduates have also got jobs which correspond well to their education.

# CLOSING REMARKS

**Katariina Raij**

*Laurea University of Applied Sciences, Finland*

We have spent a few days in the Learning by Developing – New Ways to Learn Conference by dealing with Future Expertise in many different ways. Our president Pentti Rauhala pointed out in his warm welcome speech the meaning of developed pedagogy in higher education institutions. He told us that also in higher education institutes, in OECD countries, learning outcomes will be assessed and the methods of assessment will be developed as a worldwide project work.

Based on the European Qualification Framework learning outcomes also in higher education institutes are described as competences. Graduated students should be able to act not only now but also in an ever changing world of work. Therefore it is necessary to rely on the qualifications which are largely useable as president Rauhala also mentioned.

In his inspiring and colorful keynote speech Dr. Arthur Lindemanis gave us an example of how to enhance students' creativity and innovativeness. He pointed out that people do not buy products, they buy experiences. To his question if we help our students to become entrepreneurs, we certainly answer yes we do. But the question is how to do it. I suppose that by giving space to our students and by trusting more on their skills and abilities we can do a lot. Also by giving them space to make mistakes and turn them into meaningful learning experiences we can support our students' professional growth so that they will dare to take risks and go forward in their future life.

Docent Matti Kampainen, another interesting keynote speaker, pointed out how future oriented human beings actually are. We very often live in the next moment; however it usually concerns our near future. Following docent Kampainen's ideas we can argue that in order to be able to influence on our future and to be part of building it we need to be more aware of our own interpretations of the world and our orientations toward the future. What we see depends on how we see it. He also pointed out the importance of concepts. According to him the mastery of complex conceptual systems sets us apart from other animals but these systems also alert us to the importance of concepts. He gave us some very interesting examples from Amazonian folk medicine.

He also described of how our western medicine utilizes different concepts, theories and practices based on the development of experimental medical sciences. The integration of theories and practices (e.g. experiments) opens a fascinating discussion floor. It could mean that when we produce new innovations we, at the same time, should create new concepts which, in turn, help us to deal with the new phenomena we also have created. Could the new defined concepts also

help us to “sell” our innovative products better and in a more understandable way? We can test it.

Our today’s keynote speaker, professor Koichi Ogasawara, who is the very good and highly valued friend of Laurea, took into account many important issues. One of them is the increasing number of elderly people. We can see them as a challenge but should we also look at them as a huge possibility in our future. If we organized meeting places, in which students and elderly people with their valuable competencies would work together in different research and development projects, would it lead to the development of new innovations which have added value in applying them into practice? Professor Ogasawara also gave us an interesting picture of how learning has been developed in his university. He also pointed out the importance of cooperation between Japan and Finland using Caring TV as an example. Many warm thanks to our entire keynote speakers.

During many parallel sessions, poster presentations and workshops we have had an opportunity to listen to many interesting presentations and share our own experiences. Reflecting on the meaning of new ideas, in turn, can lead to the new ways of action. I also have noticed how much we are dealing with the same kind of challenges and face the same kind of problems in higher education institutes. One example is discussion at universities of applied sciences concerning the role of research work and research methods. We need to be more aware of the scientific and philosophical assumptions that underlie a particular study not only relative to the method but also to the phenomenon as the object of interest. Networking is very important but should we already do something more. We could form e.g. different interest groups and do a lot more international research and development work. We thank all of our presenters and all of you as participants.

We certainly all believe that conferences are important but conferences also need to be organized. We are very grateful to Ms. Jia Xu and Mari Pohjola and the Laurea Events Team. You have shown your expertise in organizing all the conference days and all the practical things and in taking good care of us. Many thanks also to Laurea staff and students for your valuable contribution to the conference. You did it again.

I wish you a safe journey where ever you are going to! I hope that we will see again. The next Learning by Developing – New Ways to Learn Conference will be held in spring 2012. Now I have to add, if the Mother Nature allows. Looking forward to seeing you!





The theme for the Learning by Developing (LbD) – New Ways to Learn Conference in 2010 was **Future Expertise in Higher Education**. In the knowledge-driven global economy higher education is becoming the most important driver for economic competitiveness. The key questions are: How to develop competence? How to assess learning outcomes? How to enable student-centric R&D&I?

In order to co-create some answers it was extremely fruitful to gather almost 170 colleagues around the world to disseminate research and development results and share their insight and perspectives in these challenging questions on the conference theme.

At the conference there were four thematic workshops, to which the 43 abstracts had been selected using double-blind review process. The workshop sessions addressed the following themes: Competence Development, Assessing Learning Outcomes, Multicultural Expertise, Student-Centric R&D&I.

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