Keeping High Quality in Higher Education with Less Funding: Possible?

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1. INTRODUCTION

The quality of the education is one of the key areas universities and universities of applied sciences should focus on (Ministry of Education Finland 2003). The focus of all development actions should clearly be on quality and impressiveness of operations as well as in strenghening internationalization (Opetusministeriö 2006). Quality of education is also emphasized in the development plan of the Regional Council of Southwest Finland (Varsinais-Suomen liitto 2005). While focusing on quality the institutes should take care of that also national and international compability remains and gets better (Ministry of Education Finland 2005). Globalization and competition have led to a situation where the trust into your own national higher education quality is not enough rather in every country the higher education should be understandable and trusted also internationally (The Finnish Higher Education Evaluation Councill 2005).

At the same time as quality is emphasized more duties are presented to Universities and Universities of Applied Sciences. In Finland, for example, in 2003 applied research and development was introduced as the third main duty in the new act of Universities of Applied Sciences (see Figure 1). The other two main duties are higher professional education and regional development. Despite these new duties the funding was not increased. In addition to new duties also requirements to provide even more high-cost hands-on-training and working life related education have increased. (Ministry of Education Finland 2005) This places Universities of Applied Sciences in a very challenging position; how to maintain quality and correspondence to working life in education?

Ministry of Education understands that unfortunatelly these cannot be provided at the moment due to tight costs and suggests that combining research- and development and services with education might be the solution and a source for additional funding (Ministry of Education Finland 2005). Using R&D to serve also education is a natural way to increase working life focused education. This focusing on working life requirements in education is constantly mentioned in different reports and publications. For example the president of European University Association writes that higher education institutes have to educate experts to working life requirements (Winckler 2006). Also many Finnish future evaluation reports define that it is essential that expert resources match with the working life positions (Ruokanen 2004; SITRA 2005; Wikström, Haikkola et al. 2005). Universities of Applied Sciences should focus on educating professional experts capable of really doing things. The aim of Universities of Applied Sciences should not be in producing new knowledge rather in using and applying it (Ruokanen 2004). In addition, Ministry of Education has stated that more and more quick changes in our environment and working life requires that interaction between education, research and working life should be further promoted (Ministry of

Education Finland 2003). Will this be also the solution for the funding problem and the quality matter as well?

This paper presents a case study. We present the actions and ideas that the faculty of Telecommunication and e-Business at Turku University of Applied Sciences has taken to survive with the funding. We start with the research methodology and describe our current environment we are operating in. In section 3 we introduce our solutions. In section 4 we talk about the challenges we still have to tackle. Finally, section 5 is for discussion.

2. RESEARCH METHODOLOGY

This paper uses qualitative approach and is a descriptive single case study. In general, a case study aims for in depth-understanding of the context of the phenomenon (Cavaye 1996). Furthermore, a descriptive case study presents a complete description of a phenomenon within its context (Yin 2002). A case study is well-suited to capturing the knowledge of practioners and to document the experiences of practice (Benbasat, Goldstein et al. 1987). This paper follows interpretitive tradition of the case research. It means that there is no objective reality, which can be discovered by researchers and replicated by others (Walsham 1993; Broadbent, Darke et al. 1998). During the period this paper is about (2004-2006) the researcher acted like action researcher (Walsham 1995) as he was a member of the case organization.

The unit of analysis in this research is the faculty of Telecommunication and e-Business at Turku University of Applied Sciences. Universities of Applied Sciences are normally regional higher education institutions providing higher professional education with close connection to working life. In Finland there are in parallel with Universities of Applied Sciences traditional Universities that focus more on scientific research and provide higher education in connection with it.

The faculty of Telecommunication and e-Business operates in two cities and has eight different degree programmes. Four of the programmes are arranged in Turku and rest four in Salo. We educate both bachelors of engineering and bachelors of business administration. Optimal study time for engineering students to study their 240 ECTS (see http://ec.europa.eu./education/programmes/socrates/ects/index_en.html) is four years whereas optimal study time for business administration students is three and half years as their degree program is 210 ECTS. The faculty has approximately 1500 students of which roughly 550 study in Salo campus and 950 in Turku campus. Our degree programmes are listed in the Table 1.

The main research question in this paper is: **How to keep up high quality in higher education with less funding**? The basic idea is to describe the actions and solutions we have introduced to solve the challenging funding situation. The first thing we must understand is the basic structure of the funding; how funding is defined; from where the funding is coming; why there are less funding available.

Figure 2 shows the overall structure of the funding. Ministry of Education gives the basic funding to the administrator of the University of Applied Sciences. In our case the ministry funding is paid to City of Turku. The city is expected to forward the same amount to the University of Applied Sciences. However, there aren't any regulations about what will happen if this is not happenning.

Earlier the funding based only on number of students present at certain moment. There were two so-called calculation days when the number of students was calculated. Only students studying within the normal study time were accepted. If someone has exceeded his normal study time he was not accepted to the count of the students. The new 2003 act changed the funding structure significantly. Now 70% of the funding is defined by the number of study places and 30 % is based on number of graduates within two previous years.

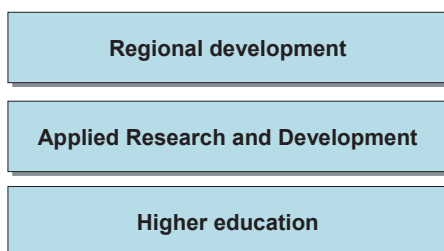*Figure 1. Main duties of Universities of Applied Sciences*

Regional development

Applied Research and Development

Higher education

Table 1. Degree programmes in telecommunication and e-business

Degree Programme	Credits ECTS	Discipline	Students
Library and Information Services	210	Information Services	85
Business and Administration - English/German - Finnish	210	Business	176
Business Information Technology - English - Finnish	210	Information Systems	196
Information Technology - English - Finnish	240	Information Tech- nology	727
Electronics	240	Computer Engineer- ing	259

Figure 2. Funding process at Turku University of Applied Sciences
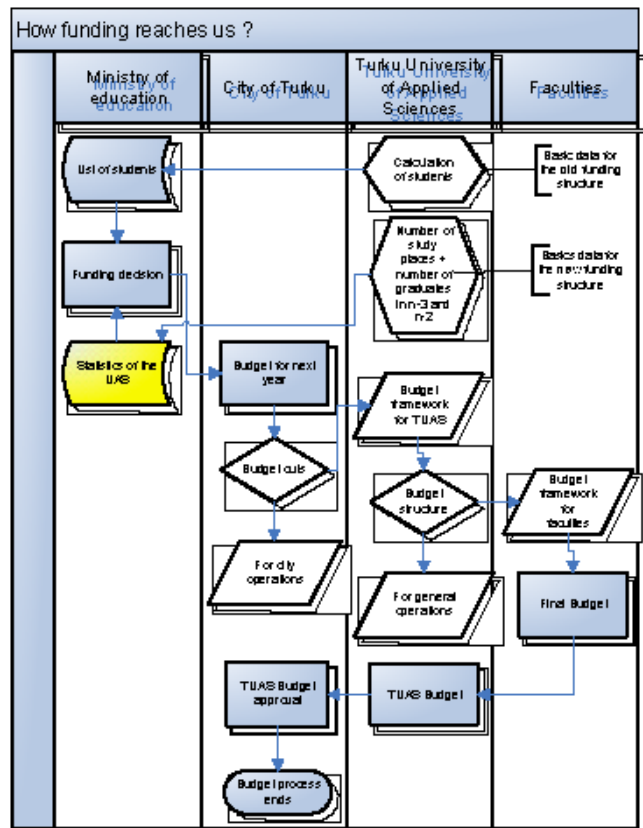
The basic funding that City of Turku receives for Turku University of Applied Sciences has steadily increased, but the problem is that they do not forward all of the funding to the university. For example in 2007 the sum that we receive is about 4.4 million Euros smaller than the original funding from the Ministry of Education. Another problem is that the budget framework has been almost the same for many years and not even index revisions have been done. However, at the same time salaries have raised 2 to 3 percentages per annum.

Data for this paper is collected through active observations, own experiences and active involvement in daily operations of the faculty during 2004-2006.

3. OUR SOLUTIONS

Basically there are two ways to survive when funding is decreasing. You have to cut your costs and you have to increase your income. Table 2 lists solutions that we have taken during recent years when our basic funding has not increased.

Most of our costs come from salaries and side costs. Teacher resources are expressed in working hours. The more resources we give for some task the more expensive it is. An obvious target for cost cutting was therefore number of contact hours that are the most typical item in teachers' yearly working hours. However, we wanted to do this cost cutting in a controlled way. Therefore we defined quite precise guidelines how to define resources for different tasks. We needed an exact guideline that defined for example what the basic resource is for a teacher per one credit in a course/project. This basic resource may then rise if certain circumstances are fulfilled, but it may also drop if other circumstances are fulfilled. The circumstances that raise the resource are for example

- first time implementation of a course
- foreign language
- new pedagogigal method will be introduced in the course.

The circumstances that lower the resource are for example

- pedagogigal methods used
- same course is delivered many times.

Altogether, the basic starting resource per one credit is now lower than it used to be.
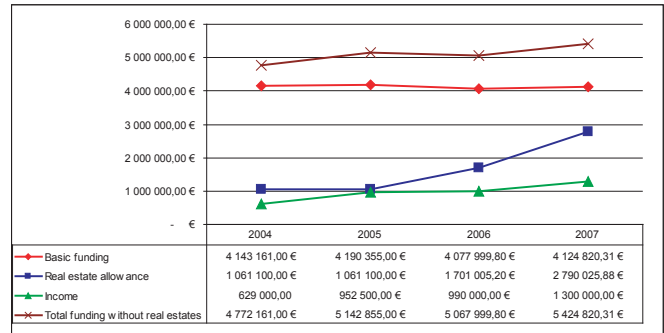
At the same time students own responsibility was increased. This reducement did not lower the quality rather it helped us to improve the quality because we had to think more carefully how we implement our courses.

In practical level we have done many other reforms as well. We have used a lot of time redefining and improving our general processes and actual study process as well. We have increased co-operation between degree programmes and disciplines. Different degree programs have more common studies than earlier. At the same time we have introduced different pegagogigal methods to make studying more interesting. We have introduced for example problem based learning in topics like entrepreneurship and computer architectures. In addition we have more learning-

Table 2. Solutions to survive

Solution	Cut costs	Increase income
Reduce salary costs	X	
Improve your processes	X	
R&D-manager		X
Applied R&D		X
Connect R&D and teaching	X	
Connect R&D and International partner network		X
Structural arrangements	X	
Teaching arrangements	X	

Figure 3. Funding during 2004-2007

	2004	2005	2006	2007
Basic funding	4 143 161,00 €	4 190 355,00 €	4 077 999,80 €	4 124 820,31 €
Real estate allowance	1 061 100,00 €	1 061 100,00 €	1 701 005,20 €	2 790 025,88 €
Income	629 000,00	952 500,00 €	990 000,00 €	1 300 000,00 €
Total funding without real estates	4 772 161,00 €	5 142 855,00 €	5 067 999,80 €	5 424 820,31 €

by-doing projects with real-life assignments. Altogether we have enabled multi-disciplinary learning (Kontio 2006). The goal of these reforms was to provide necessary amount of high-quality courses with reasonable costs.

The most important solution to keep up the quality was the decision to determinedly increase our income. For this purpose a R&D-manager was hired and assistants to her. The R&D-manager is responsible to follow all kinds of funding sources and to help setting up project and funding applications to various financiers. The expertise for the project contents comes from our teachers, but the project management is helped by R&D-manager and/or the assistants. The teacher expertise is essential for our applied R&D-projects and therefore we have to make room for this work in teachers' yearly working hours.

Figure 3 shows that our efforts have been successful. Our income has risen since 2004 very rapidly and is now over two times more than in 2004. The main financers of our income are European Union, National funding agencies and companies participating in different projects. This income increase has provided us additional resources and a way to develop our operations.

An essential idea of our project proposals is that there is some connection to our higher education process. This means that students earn part of the needed credits in R&D-projects. Making this possible requires that the project proposals always have some connection to the curriculum. However, even more important is that the proposals have working life partners and other partners as well. The connection to curriculum is either made through a large R&D-module, a single course or thesis. The connection requires that the curriculum is flexible and these things can be done within the education.

Thesis is the most typical way how students earn credits in R&D-projects. Thesis topics are part of the projects and supervisor resources come from the the project funding not from the basic funding. Another typical way to connect R&D-projects and teaching is to provide our processes as pilot environments. This way teaching serves the R&D-project and pilots the developed results or provides a test bed for developing something new. Examples these kinds of projects are for example

- SEM-to-SME: The goal was to progress teaching of entrepreneurship in participating institutes by applying Student Entrepreneurship Model developed in Turku University of Applied Sciences.
- CIP Worklab: The goal was to study how working life expertise in library and information services could be collaborated with the higher education of the same field.
- Mobile TV: The goal was to study different technologies of digital video broadcasting according to the goals set by the collaborating companies.
- AMK-WLAN: The goal was to study wireless networks in Finnish Universities of Applied Sciences and to provide suggestions how to build a nation wide wireless network.

Another example of supporting income increase is creating connection with our international affairs and R&D. Traditionally our international affairs have concentrated on managing student and teacher exchange. We wanted to benefit from this existing partner network more and we created a network of R&D-peoples with our partner institutes. Now our R&D-coordinators can easily look for possible partners to different project proposals; they have the contacts and knowledge of the key interest areas in different institutes.

We have also done structural arrangements in our faculty to decrease costs and to improve quality. We close down two of our English degree programmes and join them to equivalent Finnish degree programmes. This way the basic student group size of a degree programme is getting bigger. We have also sharpened our degree programmes and defined clearer focus for each of them. We have for example reduced the number of specializations in each degree programme. We have also screened out overlapping programmes. For example we screened out our Finnish internet technology programme and concentrated this field in our English programme. Similarly we defined that IT programme in Salo campus focuses on software engineering instead of embedded systems that is one of the focus areas in Turku campus.

4. CHALLENGES

We have done quite a lot to survive with the budget where the basic funding has stabilized in a certain level. These introduced new methods and arrangements provide us the necessary growth and playground, but there are still challenges that we need to focus on.

A big challenge is to get more and more of our teachers involved with R&D-projects. At the moment there are only limited numbers of active teachers taking part in R&D. Usually these teachers are also the most wanted in teaching courses. The work load of some teachers is getting too heavy and we need to find additional personel in our R&D-projects. The problem is not that there is lack of R&D or project skills among the rest of the teachers rather quite many have come to our institute especially because they want to teach! Our idea of combining teaching with R&D-projects hopefully also eases this fundamental problem. Usually these projects also give additional resources to teacher compared to a normal resource defined in a normal course.

The previous figure (Figure 3) showed that our income has constantly rised. The second challenge is to keep the responsibility of making income relatively equal within our eight different degree programmes. However, we cannot spread the income goal just by dividing it into eight parts and defining it as the income goal for a degree programme. We must understand and know the differences of our degree programmes. In some degree programmes the R&D-readiness is higher than in others i.e. there is for example stronger working life knowledge and they might have more teachers with a post-graduate degree. Our solution to support this is that we have a R&D-team where every degree programme has own representatives. This team coordinates and plans our R&D-actions and therefore the role of the representatives is very important. A representative is like a messenger for the rest of the degree programme. As R&D-projects provide natural learning environments it is important that the messages from R&D-team are understood in the degree program.

Our third challenge is quite near to the second one. The challenge is that we have defined a goal for 2007 that in every degree programme there should be a large 2-3 years R&D-project worth at least 120000 euros per year. If we succeed in this challenge degree programs have additional resources through there projects and better opportunities to arrange the education. This challenge automaticly defines our fourth challenge i.e. we need people that are fluent in writing and generating good and realiable applications to the funding sources. At the same time we need people who know different funding possibilities and the content and focus areas of these funding programs. Our R&D-manager and her assistants have actually offered these services, but the more projects and applications there will be the less time they can offer for one application/proposal.

The fifth challenge we are facing is the fact that part of our basic funding bases on the number of graduates. Therefore it is essential that the number of drop-out students stays low and majority of the students graduate. Our challenge is to provide as interesting and versatile education that students stay with us. Introducing problem-based learning and learning-by-doing have both been answers to this way. However, we must constantly gather feedback and develop our study methods better. The majority of our basic funding is based on number of study places in our degree programmes and there we are facing a challenge that we cannot really interact any more. Statistics Finland has produced a statistics about young generations entering higher education between 2006 and 2025. The statistics show for example that in our region the number of young people is first rising but drops until the end of the period. This is just a fact that will influence higher education in Finland, but there is not much to do about it. A possible way to tackle this challenge is to concentrate even more on R&D. While less teachers are needed in actual teaching there are more teachers for projects.

Final challenge is the need for additional structural changes that are in connection with the statistics mentioned above: less young people need less study places. We need to alter our structures into more cost efficient direction and focus on providing high quality education in our special fields. An additional possibility is to collaborate with tradional universities and take advantage of the best practices in both systems.

5. DISCUSSION

The idea of this paper was to describe how to keep up high quality with less funding. Quality of education is very essential for every higher education institute. For us the quality issue has concreted because our basic funding has kind of stabilized into the level where it currently is. While the cost are all the time raising we needed to take actions to keep the educational level and to improve the quality of it. Of the two choice strategies for surviving with descreasing budgets we have built our solution more based on the increasing income. The increasing income does not alone solve our challenges with the quality of education but it gives us the opportunity to develop our operations and take advantage of the increased

funding. For example the new pegadogial methods (problem-based learning and learning-by-doing) are both direct answers to the quality issue. They are both also answers to the requirements that we should educate experts that are capable of really doing things.

The combination with R&D and education has proven to be a success story. However, we must emphasize that this has not meant that basic education is paid with R&D-funding. Our curricula have clear places for R&D-projects and our students work on these projects like normal developers and researchers. Students' work has thus very clear development or research targets. Now that some of the total credits are financed through R&D-projects we have actually more resources to arrange the rest of the courses and credits. We have turned the new additional duties into our victory. A good example is one of our small degree programmes Library and Information Services. Year 2006 was the first ever in the history of the degree programme when the budget is in balance. The reason is obvious; there are two quite large R&D-projects that cover part of the credit production.

R&D-projects provide us also a natural way to increase working life based education. R&D-projects themself provide us information what is happening in working life but they are also concrete examples of the working life for students. Students' commitment to real-life projects is also much better than in dummy projects. It is not only the students who gain from R&D-projects. These projects benefit our teachers as well. Being part of these projects a teacher gets up-to-date feeling and observations what are the challenges companies are working on at the moment. This information serves again education when the teacher is planning his/her teaching. Altogether we have ideas to further strengthen the relationship between education and working life. There is a worldwide innovative initiative that aims to bring engineering education and real-world demands on engineers closer to each other (CDIO 2006). Our aim is to start own development project based on the CDIO ideas in 2007.

In our case the individuals have been in a central role. We have very motivated and open-minded degree programme managers and a R&D-manager who share this common idea about creating relationships between teaching and R&D. Everyone has understood that R&D is giving us new opportunities; it is not cutting the teaching resources rather vice versa. The positive atmosphere feeds new R&D-initiatives among our teachers and is generating kind of avalanche among R&D. Increasing income leave more and more money for teaching. We have introduced versatile teaching methods that would have not been possible without additional funding.

Finally, our experiences are very encouraging and we see that there are ways to keep high quality even when the basic funding mechanism is not increasing. We also see that the solution is not to downsize operations rather look for new opportunities and new ways of doing things.

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