# QUALITY COSTS IDENTIFICATION OF HIGHER EDUCATION TEACHING PROCESS

**Asta Daunorienė[1], Alma Žekevičienė[2]**

[1]*Kaunas University of Technology, Lithuania, asta.daunoriene@ktu.lt*
[2]*Kaunas University of Technology, Lithuania, alma.zekeviciene@ktu.lt*
crossref http://dx.doi.org/10.5755/j01.em.17.3.2141

## Abstract

A review of literature on higher education quality assurance priorities shows that there are a lot of ways to discuss on this topic. There were analyzed quality costs elements in higher education teaching process in this article. There were determined teaching process elements and quality costs elements into this process. Quality costs were analyzed from two points of view. Firstly there were determined failure costs; secondly quality costs were analyzed from the prevention actions in order to assure teaching process quality. Higher education teaching process quality costs elements analysis shows that the total quality costs could be expressed as a percentage of teachers working hours which could be converted into cash.

*Keywords:* quality costs, higher education funding system, quality costs system.
*JEL Classification:* M29, K23.

## Introduction

Higher education is becoming more massive. Commercialization and industrialization processes lead to the fact that the market of society needs gradually has an increasing impact on university funding, curriculum development, study quality assurance (Eriksen, 1995).

According Pūraitė (Pūraitė, 2011) higher education in Lithuania over the next few decades due to social, economic, demographic and cultural reasons will face serious challenges, which would overtake the main reform question for the higher education financing, management and quality assurance topics. Some foreign experts say that in 2020 research-based masters and doctoral studies will dominate in the north and west of Europe, and in the south - east of Europe – undergraduate studies (Pūraitė, 2011). It means that design of national higher education systems must be pan- European.

Increasing the number of students in the world is not only higher education "democratization" and massification feature, but also increases the higher education system in the intellectual and financial resources. States are analysing funding resources problem in accordance with their national environmental features (Čekanavičius *et all*, 2008). In state-funded European universities the students have twice - to five times as less university funding as the collection of tuition fees in the U.S. universities (The Economist, 2005). 34 out of 46 European higher education areas students (all or part) contribute to the financing of their studies (Galkutė, 2012). The trend to reduce public funding of higher education institutions is observed in the other countries, such as the United States: „Most of higher education institutions have to do more with less. Higher education institutions needs to behave like the private sector by embracing concepts that brings about increases in quality that result in higher satisfaction, higher revenue, and lower costs. Universities have been under pressure by constituent groups who urge them to behave like the private sector and respond to the needs of its consumers" (Shan, 2009).

Summing up the different experiences of dealing with higher education financial funding problem, could be distinguished by two main trends: first, an increasing number of countries, which are unable or unwilling to allocate more budgetary resources to finance higher education, making promotions of student participation in the funding mechanism of their studies, second, gradually increasing students contributions and implications are recognized as the main beneficiary of the future education is the student (Čekanavičius *et all*, 2008).

It is possible to predict that with the current economic situation in the European Union and global trends, the state of Lithuanian higher education funding in the nearest future will not be increased. Therefore it is important to use effectively public funds.

According to Bologna International documents there were formulated the two main instruments of higher education quality assurance models: internal and external quality assurance. Internal quality assurance is one of the three priorities of the Bologna process, which has direct correlations with the other - two levels of study system implementation and the system of academic recognition development. Internal (institutional) quality assurance level requirements are to establish and enforce internal self-assessment procedures. Internal quality assurance procedures purposes are to ensure all stakeholders (students, teachers, administration,

government institutions, social partners) participation. Internal quality assurance usually implies the curriculum, teaching excellence, research performance evaluation. Curriculum evaluation usually includes study objectives and the results revision, curriculum of the study's results requirements conformity assessment, review various forms for training needs, analysis of student results, feedback from students, graduates, assessment of the social partners (Pūraitė, 2011). For the most part these activities ultimate results depend on the quality of the teachers' work. The main problem is that priority of higher education service quality requires more teachers' activities. Higher education funding mechanism gaps requires finding new ways how to balance direct government financial resources for higher education services and quality assurance activities.

For internal quality assurance and improvement the efficient use of funding higher education, there are other missed opportunities. One of them - quality costs accounting.

**The object of this article** - higher education quality costs and the **purpose of article** to identify the quality costs of higher education institutions teaching process.

**Research methodology***:* a logical, systematic analysis of scientific papers.

## The role of higher education quality in economic growth

In 2011 September the European Commission presented a reform strategy to increase the number of people attained higher education, to improve the quality of teaching in higher education and to maximize the higher education institutions contribution to the EU economy after the economical crisis. This is a part of the creation of new work places and growth strategy.

Strategy "Europe 2020" has extremely strong focus on education system. Strategy program provides measurements to improve all levels education accessibility, to increase youth employment, to improve mobility and performance results and to ensure higher education quality requirements.

"Europe 2020" expressed the desire that by the end of this decade 40 percent will get higher education diplomas (in 2010 gained 33.6 percent population higher education institutions).

One of the planned reform priorities is to improve the quality of higher education and the relevance of the curriculum students, labour market and their future professional needs, to promote higher education teaching and research quality;

Strategy "Europe 2020" expressed priorities require higher education institutions to improve the quality which will give influence results ensuring state economic well-being. This situation is called a win - win, win at all the quality assurance process interested parts (see Table 1).

**Table 1.** The relationship between quality and economic performance

| | | **Benefit of quality improvement** | |
|---|---|---|---|
| | | Private | State |
| **Costs** | Private | The prospect of higher education institutions – to remain in the market and ensure the number of students | |
| | State | | State perspective - economic growth of the welfare |

Higher education quality assurance system is a complex mechanism set, which include higher education institutions operational details, such as: administration quality, education quality, teaching quality, research quality and so on.

Otherwise existing European universities practise shows, those quality assurance systems frequently focus on the accreditation of specific programmes based on minimum quality thresholds, rather than actively seeking to stimulate continuous improvement in the programmes that meet the minimum standards. Studies have highlighted an ongoing perception of variation in the quality of higher education between countries, which undermines the effective functioning of the EHEA20; (Recent developments in European higher education systems). Lithuania example shows, that quality assurance perception is based only on study programs evaluation results (see Figure 1).

ISSN 2029-9338 (ONLINE)
ISSN 1822-6515 (CD-ROM)

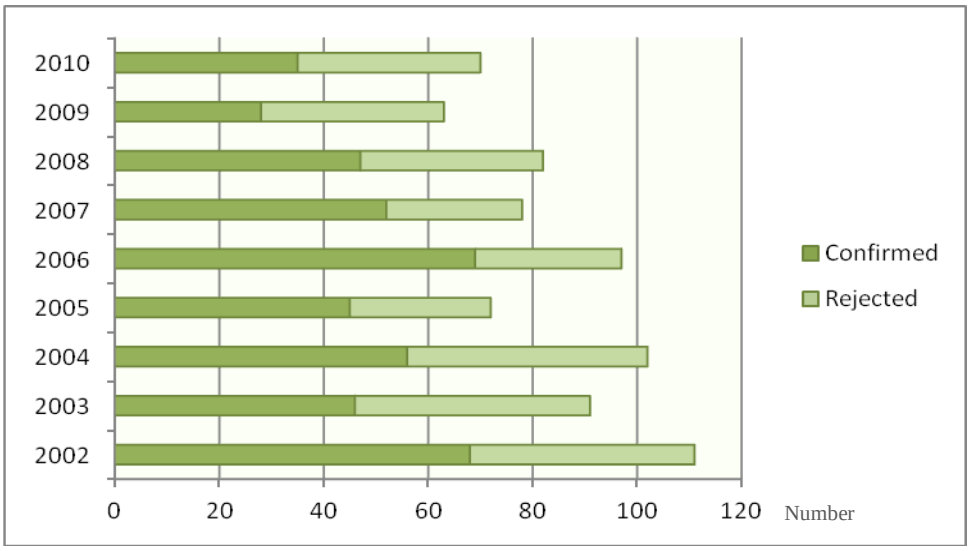


**Figure 1.** New developed study program assessment results 2002–2010 years (*Lithuanian higher education numbers, 2010*)

Such examples show that quality problems are not paid sufficient attention. Implementation of the strategy "Europe 2020" requires not only a good wish of higher education institutions to implement quality assurance systems, but their real funding.

Higher Education Law provides that quality ensuring costs could be included only into the not government funded study price, while the total study carrying cost consist of:

1) teaching, research and other studies related to employees wages;
2) to buy goods and services related to their studies;
3) to encourage students.

It can be assumed that the general governmental structures thought that quality assurance is an ongoing process in itself, non paid attention and additional funding. A priority of higher education service quality and the gaps of higher education funding mechanism require finding new ways how to balance the state's financial resources for higher education services and the substantiality of higher education institutions quality assurance.

From the higher education funding perspective, trying to find the main quality improvement priority it is necessary to evaluate existing situation and to evaluate the main costs of quality. One of the ways to evaluate quality costs – is to develop and implement quality costs system.

## Quality costs management assumptions at higher education institutions

In order to implement a quality costs program for the higher education institutions it is important to understand the essence and management features of the quality costs. Various authors take different approaches of the costs of quality (see Table 2).

Thus, the definition of costs of quality in higher education institutions is problematic because of the existing heterogeneity in the definition of the concept of quality in higher education, both in determining what is a higher education product, consumers, stakeholders, and so on.

This article in general compliance with the provisions of that quality costs in higher education - costs incurred from the failing that provide the service in the required most efficient and effective way.

The main purpose of quality management is to improve quality, reduce directly related costs. Quality costs management strategy for higher education institutions could seek to reduce the costs of failure to invest in the "right" preventive actions to ensure quality, to reduce assessment costs by the results of continuous assessment and to target prevention efforts to ensure further improvement actions.

Actual quality costs could be counted and reduced after the cause – effect analysis. Practical and objective quality costs calculation and analysis shows the quality improvement and quality costs reduction ways, which could safe some financial funds (Campanella, 1999).

**Table 2.** Definitions of quality costs

| Author, year | Quality costs definition |
|---|---|
| Machowski & Dale, 1998 | Quality costs are perceived as non-compliance and compliance costs amount when the cost of compliance includes prevention, to prevent poor quality, and assessment of costs and the costs of non-compliance - failure of the product (or return processing) costs. |
| Campanella, 1999 | Quality costs - the cost of quality is the amount which includes investments in the prevention of non-conformance, product or service compliance assessment costs and failure costs. |
| Dale & Wan, 2002 | Quality costs are considered costs incurred by the quality management system development, implementation, management and maintenance, costs associated with the continuous improvement of product or service failures, and all the other costs and activities without creating added value, but needed for a product or service quality. |
| Sandholm, 2010 | The costs of poor quality are defined as the total losses caused by the products and processes of a company not being perfect. |
| AS 2561-2010. Guide to the determination and use of quality costs | Costs of quality are those additional costs and over and above actual costs making the product or providing the service that would disappear if the organization‘s system, processes and products were perfect, with the provided product meeting or exceeding statutory or customer expectations. |

Today there is a possibility to find a variety of techniques that offer quality costs elements to group according to certain categories of classification models. The trouble is that higher education institutions quality costs elements are different, for example, from manufacturing organizations. Therefore, each organization should individually develop quality costs elements as a guide through the quality costs categories and detailed definitions of quality costs elements.

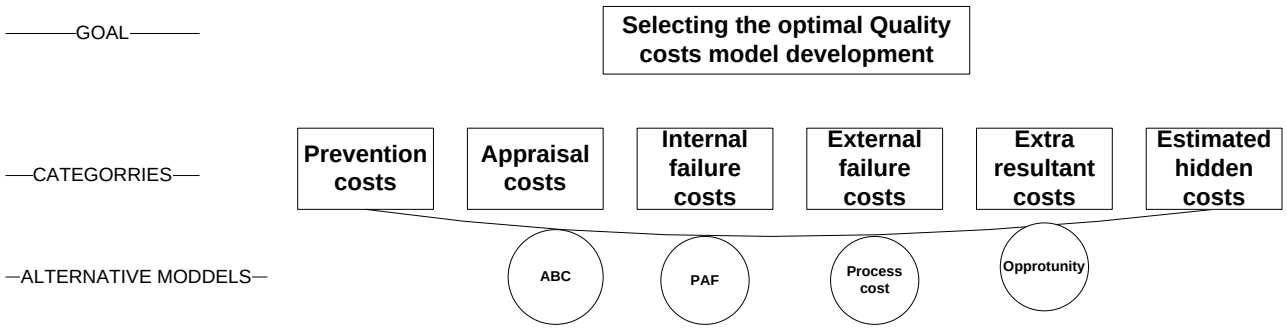


**Figure 2.** Quality costs goal, categories and alternative models

Recent studies Yang (2008) offers a costs-quality split into six categories (see Figure 2):

- Prevention costs – the costs of actions designed to prevent defects and discrepancies, and to minimize the failure costs and costs related to inspection and testing.
- The appraisal costs – costs which incurred in evaluating products and processes of the state to determine whether these requirements are met.
- Internal failure costs – costs of mistakes, which can arise inside of organisation and don’t affect the customers.
- External failure costs – costs of the errors and defects that directly affect customers.
- Extra resultant costs – indirect and extra losses caused by errors or defects of operations, materials or systems. These costs can be quantified by collecting all the wastes of the reworks, materials, inventories, compensations and re-treatments indirectly caused by failures in the process.
- Estimated hidden costs – losses related to decrease of consumers loyalty and considerations to use the same product or service again, losses due damage to reputation.

The most common and useful for quality costs measurement is prevention, assessment and non-conformance costs model (PAF). Many authors (Schiffauerova & Thomson, 2006; Akkoyun & Ankara, 2008; Sharma *et all*, 2007) defining quality costs are using PAF model quality costs categories, which amount are overall quality costs. PAF model is widely used in various industries, service sector,

administration and other economy areas. Based on this model, there are distinguished three main categories of quality costs: prevention, appraisal costs and failure costs. Appraisal and prevention costs are usually referred to as the compliance costs and failure costs are divided into internal and external costs.

Process quality cost model was developed by Ross (1977). It emphasizes only the importance of the process quality costs measurement. Process quality costs are defined as costs, which consist of the specific process of compliance costs and the amount of non-compliance costs (BS 6143:1990). Process cost model significantly changes the definition of the costs of compliance and form a new quality costs review method.

Activity-based costing (ABC) is a dynamic approach to determine costs by assigning them to the principal activities performed within an organization.

ABC model differs from traditional accounting approaches in that it allocates, or traces, indirect costs to products and services by first defining the main activities on which personnel in an organization spend their time. ABC considers primary activities as the main functions performed by a department or an organization.

ABC model (Cooper & Kaplan, 1988) object costs are attributed to the causal operating expenses and operating costs - the costs objects. This is an alternative approach, how quality costs can be determined, classified and evaluated. Tsai (1998) proposed an integrated quality cost and ABC system that provides a wide range of quality costs financial and non-financial information to the appropriate control methods. In the analysis discussed here, these activities are also known as "production activities" when they perform services or produce products. In general, the ABC procedure:

1. Defines the main activities on which personnel in an organization spend their time.
2. Traces the cost of financial and human resources to these activities.
3. Traces secondary activities (related to support and administrative activities) to the primary activities they serve.
4. Groups these activities by service.

ABC model long-term goals - is to eliminate the process which does not generate added value and continuous improve processes, activities, and quality (Schiffauerova & Thomson, 2006).

The literature review of the quality costs accounting methods shows that they are complex. The ABC method helps to assess the quality costs in the different process steps; it is good to analyze part of quality costs system at higher education institution processes. Beside the possibility to reflect and analyze the specifics of the quality costs added value will be created on the analysis of the main higher education institutions process activity. It is a good way to clarify higher education institution processes and to find the main problems caused by bad quality.

The cost of quality system in higher education should include all needed information from accounting, operations, evaluation, marketing and etc., for the main purpose to calculate useful and functional information for the planning significant operational and strategic goals. Quality cost system can facilitate the identification and elimination of organizational non – value – added activities.

For the quality costs elements analysis by ABC method it is important to identify the main processes of higher education institutions, which can be divided into several broad categories.

HE institution core processes:

- learning and teaching processes;
- research and graduate studies processes.

Other HE institution processes:

- enabling processes (that support realization of core higher education processes);
- planning processes;
- governance processes.

Consequently, higher education process modeling and analysis are needed to identify the major functions required to guarantee higher education quality.

## Detailed quality costs items of higher education institution teaching process

A reputation for quality of teaching and service to students must be an important factor in attracting the best students and in attracting additional funding.

According to the fact that general study costs supporting by Lithuania's government's are mainly committed for teaching and research staff salaries, authors were analyzed only quality costs related to the process of teaching. Quality costs may arise at any element of teaching process. With the aim to investigate

the items of quality costs of teaching process there were detailed teaching process elements (see Table 3) and items of quality costs (see Table 4). According to literature review of studies of El-Sharef & El-Kilany (2011), Henard & Leprince-Ringuet (2008), Wild (1995), Eriksen (1995) there were identified elements of teaching process.

**Table 3.** Teaching process elements

| Preparation to accreditation | Preparation to teaching | Course teaching implementation | Improvement of teaching process |
|---|---|---|---|
| Preparation of study programmes.<br>Preparation of new modules<br>. | Formation of individual teaching loads.<br>Preparation of teaching strategy.<br>Preparation of learning materials and facilities. | Lecturing, consultations, mid - term test)<br>Checking of students' works, review of results.<br>Organizing of exam retaking<br>Cooperation with students (in scientific activity of students).<br>Preparation of practice tasks, checking of practice surveys.<br>Participating in preparation of students' final work (guidance, evaluation). | Participating in self-assessment process.<br>Improvement of modules and programmes. |

For each element of teaching process there were determined quality costs items. In all teaching process elements almost all quality costs to assure quality are considered as major prevention costs. In an imperfect situation prevention activities may not always prevent quality failure, so it is necessary an early detection of quality failure. For example, time spent to repair review of new programmes and modules prevent of future failures during programmes accreditation process. Internal failures are failures of faculty in delivering high quality education process. For example, teacher's time spent for failed students extra consulting and reassessing their knowledge can be determined as internal failure costs. In this case quality costs are incurred because the value-added service was not applied properly the first time. The estimation of quality external failure costs in teaching process elements can be done by analysing student's and other stakeholders' surveys. External failures are failures of faculty in delivering high quality education process which are related to customers' dissatisfaction. For example, teacher's time spent for analysis of complaints of students or other stakeholders can be determined as internal failure costs. Costs related with the mistakes of work time planning can be determined as extra resultant costs because they are indirectly caused by failures in the process. Hidden costs, such as damage to the faculty reputation due to the wastage of students can be only estimated. These costs are not "visible".

The process of allocating time spent by faculties on preventive and detective activities or on activities to eliminate mistakes will determine the faculty's teaching hours for all activities. The faculty's teaching hours will be multiplied by salary rate per hour and the prevention, detection and failure costs associated with faculty's teaching process can be estimated.

**Table 4.** Deployment of quality costs

| Process elements | Category of quality costs | Items of quality costs |
|---|---|---|
| 1 | 2 | 3 |
| Preparation to accreditation | Prevention costs | • Costs of market evaluation and review<br>• Costs of design of study programmes<br>• Costs of training teachers |
| | Appraisal costs | • Costs of repair review of new programmes and modules |
| | Internal failure costs | • Costs of corrections of new programmes and modules<br>• Costs of delay of giving study programs accreditation request |
| Preparation to teaching | Prevention costs | • Costs of preparation of teaching strategy<br>• Costs of preparation of teaching materials<br>• Costs related with formation of individual teaching loads |
| | Appraisal costs | • Costs related with review of individual teaching loads |
| | Internal failure costs | • Costs related with delay of information<br>• Costs of strategy correction actions |
| | Extra resultant costs | • Costs related with the mistakes of work time planning |

| 1 | 2 | 3 |
|---|---|---|
| Course teaching implementation | Prevention costs | • Costs of planning of lecturing<br>• Costs of preparation of lecturing<br>• Costs for rising of qualification of lecturers (seminars, conferences, etc.)<br>• Costs of additional learning facilities<br>• Costs related with the revelation of best practical sides of modules (trips to enterprises, the partnership with top management of companies, etc.) |
| | Appraisal costs | • Costs of organization of med terms and final works<br>• Costs of revision and renewal of teaching materials<br>• Costs of revision and renewal of information to students |
| | Internal failure costs | • Costs of revision and renewal of teaching materials after failures<br>• Costs for failed students' extra consulting and reassessing their knowledge<br>• Costs of teaching students, which are studying the course repeatedly |
| | External failure costs | • Costs of analysis of complaints of students or other stakeholders<br>• Additional training costs of lecturers |
| | Extra resultant costs | • Waste of labour hours due to the poor quality in process<br>• Penalties of customer damage caused by poor quality of service |
| | Estimated hidden costs | • Costs of damage to the university reputation due to the wastage of students<br>• Loss of income of university<br>• Government subsidies wasted on university failures<br>• Decrease the students goodwill |
| Improvement of teaching process | Prevention costs | • Costs of improvement of modules and programmes |
| | Appraisal costs | • Costs of self-assessment<br>• Costs of analysis of student assessment<br>• Costs of analysis and handling of students complaints |
| | Internal failure costs | • Extra cost due to the poor communication with students |
| | External failure costs | • Costs of students dissatisfaction<br>• Costs of research issues why students lose the commitment to follow through courses |
| | Estimated hidden costs | • The opportunity costs of lost students loyalty<br>• Loss-of-reputation costs |

Listed teaching process quality costs elements help to identify all the detailed costs of quality items. Quality cost analysis makes easier to assign responsibility for improvement actions.

## Conclusions

Quality cost system can facilitate the identification and elimination of organizational non-value-added activities which do not provide or enhance quality from customers' perspective. It is believed that translation quality assurance problems into money language can help to evaluate importance of these problems and identify preventive actions for failure quality costs. The article's authors offer to the higher education institutions to identify quality costs in accordance with the process approach, which partly reflects the ABC cost accounting method. In this way has been identified one of the higher education processes quality costs - the teaching process. Based on pilot study suggestions there are some of the higher education institution faculty salaries relative losses of quality resulting from the non-compliance costs. It may also lead to other losses, including the intangible (estimated hidden costs), which consist of the losses of consumer and higher education institution image losses. Higher education institutions should be careful in defining quality costs into the categories. Identification the quality costs elements of teaching process remains challenging. It is not easy to define quality costs from teachers' daily activities costs (especially, in case of appraisal costs). Future studies should include additional analysis to verify and ascertain the validity of the findings.

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