

THE ISSUE OF COSTS IN TEACHING ECONOMIC COURSES IN INFORMATICS

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Abstract: The teaching process involves a content and procedural aspect at every level of education. The content of higher education in study programme of Informatics should reflect practical requirements. The graduate will be applied to the labour market, if s/he has knowledge of several disciplines and the ability to view the solution to the problems in the enterprise in terms of technology and economy as well. The costs are the basic economic category, along with revenues and economic result. The article gives reasons for the justification of the incorporation of the costs to the content of education within economic courses in Informatics. The article also points to the need to maintain dynamics in teaching, even though the prevailing form of teaching in higher education – lecture – is based on the description and explanation. The dynamics can be achieved using a combination of changing work methods, namely lectures, scenarios, discussion, question brainstorming, activating exercises, etc. applied to the issue of costs.

Keywords: Teaching process, teaching methods, costs, lecture, scenarios, discussion

Introduction

The graduates of the study programme of Informatics will be applied in practical professional life on the positions of analysts, designers, constructors, programmer, system designers and specialists. They will find the application in various areas of informatics itself, but also in all areas of information systems and information technology applications. The knowledge acquired will allow them to operate at different stages in the management in software companies, industrial enterprises, education system, both in the public and private sector, banking, transport, healthcare, ecology etc. They will be able to design, develop, implement, expand, adapt and locate extensive information systems. Considering each working positions, in addition to the programmer, they have to evaluate their activities economically, that is, to compare the costs and benefits. The result of the comparison is to assess whether the implementation of activities will bring a profit or a loss.

When teaching students in Informatics, it is possible to come across a barrier to the reluctance to learn economic information. Many students take the view that they came to study programming. The task of a higher education teacher is the right motivation for the students. A graduate able to solve tasks interdisciplinary has a higher rate of application in the labour market. It is possible to achieve it using the content and teaching methods, attractive to young people.

Definition of the Substance of the Cost

Each enterprise activity is immediately associated with the emergence of costs and revenues. Characteristics of the concept "cost" depends on the definition of the relevant point of view, as shown in Figure 1. The economic sciences define costs and their structure in terms of the subject of their examination. The understanding and therefore their definition vary depending on the purpose it is used for. In general economic theory, costs are defined wider than in the enterprise economy and accounting.

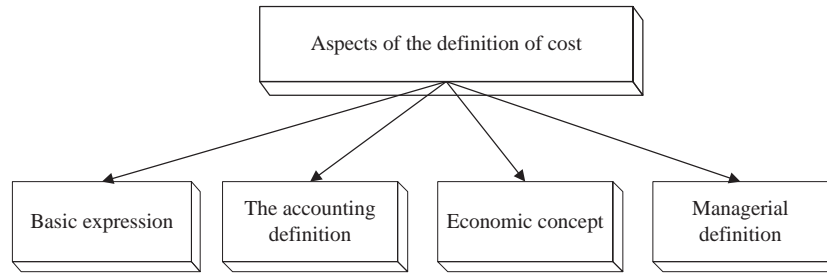


Figure 1: Aspects of the definition of cost

Basic (General) expression is an expression of corporate cash cost of factors of production and other expenses associated with its assigned activity. The essence is made up of various types of costs, for example, material consumption, energy, wage costs, depreciation, services, repair, and interest.

The accounting definition of cost represents a decrease of economic benefits of the accounting entity in the accounting period. It means that if there is a cost in the accounting period, at the same time there is a decrease in an asset or an increase in obligation.

The economic concept of the cost comes from the fact that the costs are not real, but the estimated costs for the individual variants of the solution. They originate from the limitation of the economic resources, which does not allow producing all of the products and services. They are expressed as explicit and implicit costs, relevant and irrelevant costs, and alternative and opportunity costs. Under the explicit costs of the enterprise we understand the costs associated with specific payments of enterprises in the past and the presence of entities that are not owners. Thus, they are actual costs, considered to be objective quantity. Implicit costs can usually be estimated; therefore they are less objective quantity. Economic theory considers implicit costs alternative, which represent the value of an alternative use, thus opportunity sacrificed.

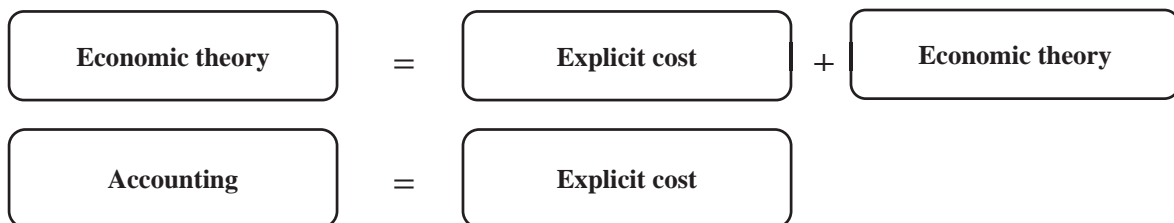


Figure 2: Comparison of the definitions of explicit and implicit costs

The relevant costs are the costs necessary for the implementation of specific activities in the future. Their amount will change when carrying out a variety of options. Irrelevant costs will remain unchanged in different variants of the solution. Alternative costs represent the value of the property, or services we have given up on the basis of the decision (unrealised revenue). Opportunity cost represents the maximum loss of effect as a result of the use of the economic resource to another alternative (maximum revenue was reached among the alternatives of choice of products). They do not represent real economic resources consumed or used, but the measure of efficiency made by choice.

The managerial definition of cost is a value expression of effective investment of economic resources of the enterprise, associated with economic activity. Value expression of the cost means that they are expressed in the parameters that are valid at the moment. They reflect the consumption of economic resources under the conditions that exist at the time of implementation of processes. Financial expression of the cost is their expression in parameters that applied at the time of the acquisition of economic resources. The evaluation is at historical costs, based on the application of money form of property cycle. Efficient use of economic resources is of rational and adequate to the result of the activity. The purpose of the resource lies in the fact that the cost is always associated with a specific performance. The point of the implementation of economic resource (cost) is its evaluation, i.e. there is to create a component of property, which brought greater economic effect as initially consumed component. Considering managerial understanding of costs, there are used marginal and incremental costs. Marginal cost represents the increase in the cost of producing an additional unit of performance. (The part of the cost, which is added with each the following product to the total costs allocated to the previous number of production units). Incremental cost is associated with larger volumes of production growth.

Traditional and New Teaching Methods Applied in Teaching the Issue of Costs in Informatics

There are many teaching methods and they are distinguished according to several points of view (according to the source of knowledge, degree of activity of the students, thought operations, etc.). They transform the content of education to a specific teaching process. Higher education in the Slovak Republic has traditionally been interpreted in the professional and lay public, so that teaching methods and forms are combined. Lecture, description and explanation are primary used. The current development trends of building a knowledge-based society and the use of the principles of knowledge management are bringing changes to higher education. There are gradually promoted participatory methods, methods of experiential learning. "The main obstacle to the use of the principles of knowledge management in Slovak institutions is the unwillingness of people to share knowledge and undergo changes in their procedures and methods." (Sujová, 2012, p. 96) Teaching method is primarily characterised as the procedure for achieving the objectives of the teaching. "Teaching method is a coordinated system of teaching activities of teacher and learning activities of students, which is aimed at achieving the objectives for students, set by teachers and accepted by them". (Maňák, 1990, p. 14)

A student can adopt the knowledge on the basis of the active approach. The rate of its active approach is proportional to the chosen teaching methods of the teacher, which fundamentally affects success in achieving its objectives. Teaching method is the way of activity of the teacher affecting the way of the activities of the student in the acquisition of knowledge. "There is no clear instruction for choosing the most appropriate and most effective methods". The appropriate choice will depend on the circumstances. It is advisable to change teaching methods, it can be part of a common cultural change, but there must be considered the impact of teaching methods on the content (Vodák, Kucharčíková, 2011, p. 111).

Considering the study programme of Informatics, students meet with the definition of costs only in terms of economic theory and microeconomics. There is absence in the general definition of the costs, i.e. the definition from the perspective of the corporate economy; therefore we propose to incorporate them in teaching content. In terms of procedural aspect, we propose to combine traditional teaching method of lecture, which is based on the description and explanation and complete it to the teaching methods of questions and answers, discussion, scenarios, brainstorming of questions, activating exercise.

In the lecture, it is necessary, when transferring knowledge, to take advantage of the power of the art of speaking, to avoid monotony and to make efforts to attract the emotions. It is necessary to describe and explain the issue of costs on the basis of examples from practice, based on the costs in household and use the analogy to the enterprise. There is an insignificant role in effective lecture formed by the explanation of the importance of the issue of costs, because there is no business activity without them. Cost assessment has an impact on the resulting effect of the business activity, that is, whether the business will be profitable or loss-making.

The method of questions and answers is based on the effect of questions. "Questions have enormous power. Using them we manage what participants will think of. When placing the question, the focus of our mind is immediately changing." (Miklovič, 2013, p. 64) There are questions asked in the introduction, which will determine the level of knowledge on the issue of costs. Using questions it is possible to examine the understanding of the topic during training. The conclusion of education should include questions that encourage thinking and the other dealing with the topic of costs. Figure 3 contains specific questions.

Questions in the course of education		
Introduction	Introduction	Introduction
<ul style="list-style-type: none"> • Have you already met with the concept of cost? • If yes, in personal life, in other lessons, in mass media? • Do you think that it is necessary to handle the issue of costs in personal life, or are you going to meet up with them in the next job? 	<ul style="list-style-type: none"> • Have you already met with the concept of cost? • If yes, in personal life, in other lessons, in mass media? • Do you think that it is necessary to handle the issue of costs in personal life, or are you going to meet up with them in the next job? 	<ul style="list-style-type: none"> • Have you already met with the concept of cost? • If yes, in personal life, in other lessons, in mass media? • Do you think that it is necessary to handle the issue of costs in personal life, or are you going to meet up with them in the next job?

Figure 3: Method of questions and answers applied to the issue of costs

Regarding higher education, discussion is used as a supplementary method of lecture during or at the end, to a lesser extent than the main method. The essence of this teaching method is that students ask questions. The precondition for the discussion is that the students have already had a certain degree of knowledge on the issue of costs. Even though there are students who mainly ask questions once a teacher does not miss one. Using questions s/he can open discussion, deepen its contents, encourage the students to the activity of asking questions and keep it in the right direction. The advantage of discussion as a teaching method is that students can change the view on the issue of costs only from dry theory to practical applications, discover new points of view and there is a possibility to get a confirmed their hypothesis and conjectures. Discussion is a valuable source of information for the teacher, because s/he can find the level of perception of the costs on the part of students and may adapt its content during the next lecture or teaching methods.

Scenarios are the simplification of reality through a variety of means of expression. There is a teacher who is active in the introduction of scenario, who explains the assignment, procedure how the entire activity will be in progress and s/he is a key person in determining the roles of the individual students (activists, observers). When implementing, individual students are active and teacher is just an observer and evaluator. The scenario in the area of cost can be represented by decision-making of enterprise management, whether we will continue to carry out internal in the enterprise or the enterprise will purchase transport services. Teacher will divide students the positions of Director, the Head of the Transport, Manager and Economist. The other students are observers. The scenario can run through the relevant costs (fuel consumption, driver wage including insurance, dispatcher wage) and irrelevant costs (depreciation of the garage where the car parked, administrative expenses, cancellation of transport will not be noticeable at the level of the administrative expenses, phone when ordering an external transport, consumption of paper to fill orders, etc.

Question brainstorming is based on the substance of the brainstorming, which is the expression of the greatest number of ideas from students. According to Miklovič, rules that must be respected when brainstorming are as follows: "The rule of banning the evaluation of your ideas or ideas of others. The rule of the greatest number of ideas – its principle is that quantity raises quality – the more ideas, the more likely that there will appear the one we use in real practice. As a rule, the best ideas will appear at the end. The rule of mutual inspiration – if people work together, inspire and help each other, they produce more ideas than when working on an individual basis, and the results of their work are counted together. The rule of full equality of participants lies in the fact that there are no relations of superiority and subordination during brainstorming. All participants are equal, and therefore they should also behave accordingly". (Miklovič, 2013, p. 104) Question brainstorming is mainly based on the formulation of rhetorical questions and their answers. However, questions that suggest a response in the form of a variety of questions are the motivator of answers.

Activating exercises are used for the application of the knowledge acquired on problem tasks, or fixing and review. Classical forms of exercises are the solution of specific tasks, for example; calculate the amount of the costs of the enterprise from the following items.

?	Item	Amount in €
1	Depreciation of machine	1
2	Payment of the invoice for the purchase of a commercial vehicle	2
3	Material consumption	3
4	Payment of invoice for the material	4
5	Payment of short-term bank credit	5
6	Gross wages paid to employees	6
7	Payment of wages to employees	7
8	Invoice for products	8
9	Invoice for the sale of the machine	9
10	The customer has paid the invoice for the products on a bank account	10
11	Payment of invoices for mobile phones	11
12	Invoice received for the consumption of electricity	12
13	Depreciation of software	13

Activating exercises are close to the game, which to a certain extent unties the student from the reality of the acquisition of knowledge. For example, they include a memory game, pyramid game. Playing a memory game, there are questions on the short cards and answers on the longer. The students, who are divided into groups, assign correct answers to the questions. The student with the greatest number of answers is the winner. Pyramid game is based on the correct answers of students, who are divided into two groups. After each correct answer of the student, his/her group will move to the next step above. Students choose questions according to the number and there is a question following some number without a point, with a negative point and bonus point. The winner is the group that will be on the top. For a teacher, activating exercises are challenging because s/he must prepare thoroughly the entire course of the game and even during the game, s/he is organiser, regulator, motivator and objective evaluator. Questions must be prepared in an intelligible form, and with the possibility of only one unambiguous answer. Teaching the issue of costs in Informatics, there are applied traditional and new teaching methods. The advantage of traditional methods includes a wider range of teaching subject a teacher can convey to students, refer to the mutual connections, and explain the essential parts. The advantage of new teaching methods is the emphasis on the active approach of the student and the acquisition of knowledge in a playful way. For the efficiency of the teaching process, it is recommended to combine traditional and new methods.

Conclusions

The issue of the cost in teaching economic courses in Informatics constitutes added value for its graduates. The graduate will be able not only to apply the knowledge of Informatics in practice, but also economically evaluates his/her project or its part. In any enterprise, including informatics, achieving profit is one of the objectives. There are compiled cost budgets for the individual projects. The article focuses on the issue of costs through their applications in teaching methods – lecture, questions and answers, scenario, discussions, question brainstorming, activating exercises. The use of several teaching methods affects to maintain the attention of students in the acquisition of knowledge and the process is more efficient.

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