

# A MODERN ECONOMIC APPROACH TO E-DUCATION

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## SUMMARY

The article provides a modern approach to the economic aspects of e-ducation. According to the authors' opinion the conditions of methodological improvements and of other pedagogical researches are the existing and continuously expanding of e-ducation. However, it definitely raises economic questions. The answers to these questions refer deeply to the field of the innovation and competitiveness of education. All stakeholders of e-ducation confront the market expectations, and cost of education, and realize the individual and the social benefits as well. The article presents economic relations between ICT applications and the safety of knowledge transfer, where it narrows the gap between the pedagogical and economic approach in the framework of a self prepared geometric model. The results show that the same level of safety of knowledge transfer can be achieved at a certain rate of ICT application like at a 100% classroom education, but prospectively at lower costs.

## ECONOMIC ASPECTS OF LEARNING IN GENERAL

Analyzing the processes of education from the economic point of view sounds like an unusual perspective, because most of the analyses approach the field under discussion from the side of the human sciences. Shortage occurs also in the processes of education, forcing economization, as it is valid in the case of other target areas of economic sciences as well. It confirms the justification of the economic approach. In addition, the economic analysis is limited by the fact, that the object of the education is a human factor. A constant uncertainty factor has to be calculated with at the development of the simplified economic models, which in this case is the human factor.

Popular instrument of general economic analyses is the cost-benefit analysis, which can serve as a suitable starting point of the evaluation of the education processes. „As any investment, the investment in human capital requires initial costs, in terms of direct spending and the opportunity costs of students' time, which are taken on

in the hope that the investment will create future benefits in terms of higher productivity, higher wages, lower risk of unemployment, and so on.”[1] Regarding the applied resources, capital in a wider sense and time factor can be observed. The benefits of the education processes can be dismantled, in the framework of this simplified approach, to numerable and non-numerable elements. A numerable element is the direct economic product of education: the improvement of labour skills. „Education is expected to enhance knowledge and skills, which in turn affects productivity and income, which is beneficial for the individual as well as for the society.” [2] Among the non-numerable (indirect) elements, firstly the individual experience of learning, the indirectly utilized value of education on the labour market and other positive externalities can be counted. Externalities in this case are the effects of the education processes, which remain without any market consideration in the present economic system.

The above mentioned economic relations are valid much more intensively in the case of the education supported by electronic instruments (simplified further as: e-learning /e-ducation/), thereby the performing of such analyses can increasingly draw more attention.

## THE MARKET OF E-DUCATION

According to the experience of scientists doing research on e-learning, the application of electronic instruments in education indicates more than the simple modernization of a knowledge-transfer medium. Regarding the above mentioned facts the authors accept, that the application of these instruments cause qualitative and also other, multiplicative changes in education processes. Accordingly, a new segment called e-ducation starts to appear on the widening and global education market, where the analysis can grant a background to the expansion of e-learning methods and to the infiltration to education systems.

The authors of the present study recommend, that the application of the e-learning term should be changed to e-education (briefly: e-ducation)

in economic sense, because the application of electronic instruments in education causes changes for all participants of the education process, while the expression e-learning is likely to emphasize only the aspects of the objects (students) of education.

At the present stage of development the most exciting questions in the focus of the scientific debates are the aspects of the students and the education providers (most of all education institutions), but the effects on the community (society) and on the state have to be mentioned too. These effects will be discussed later in a separate chapter of the article (The externalities of education).

The global e-ducation market is clearly extending and it is not surprising because of the economic advantages of e-ducation. In general, the application of e-learning in education can result in an improved cost-efficiency at all participants. Economies of scale can be achieved because of the easier access. It generates profit increasing opportunities from the institutions' point of view, which can be strengthened by the expansion of the e-learning market [3].

Most of the authors of international scientific literature agree, that one of the most, and increasingly important factor of economic growth is the human capital. „Investment in the development

of human resources has a direct impact on productivity growth and is also an attractive form of investment on both a microeconomic and a social level.” [4]. „Education must be considered as a key investment in modern economies because...within the framework of a knowledge-based economy there are strong and positive complementarities between economic activity and education in the explanation of economic growth.” [5]. According to the conventional definition the human factor means the aggregation of physical and mental skills, which make someone capable for value creation. It can be expected, that mental skills will increasingly represent the labour-market value of human capital in the future, as physical skills will be utilized more and more indirectly. It has to be underlined at this point, that healthy physical organism is the condition of the utilization of mental skills. After examining the economic growth of the developed countries in the last few years (in this article the statistical survey is limited on EU-27) it can be determined too, that for example the primary sector accounts decreasingly for the value creation (Figure 1.). Furthermore, the available adequate statistical data do not demonstrate the opposite correlation between the decreasing rate of the contribution of the primary sector and the economic growth.

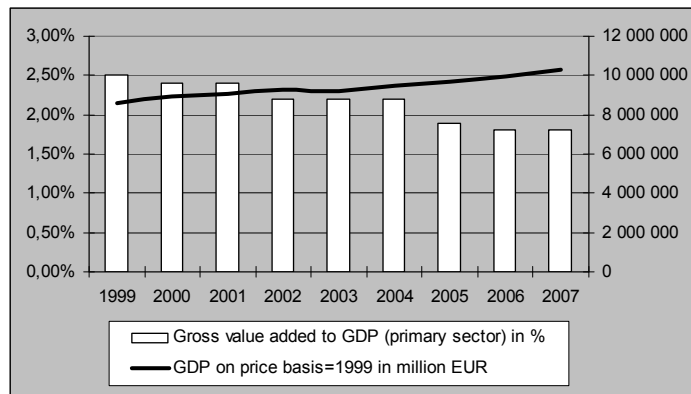


Figure 1. GDP on prices of 1999 and the share of gross value added of the agricultural industry of GDP in % (EU-27) [6]

According to the importance of education all the statements mentioned above confirm, that the qualification of human capital plays a key role regarding to the conventionally (in the example with GDP) measured economic growth. In fact, the receiver market of conventional human capital (first of all physical skills) is declining, so it accounts decreasingly for the macro-

performance. It is assumed, that the primary sector is the larger receiver market for unskilled workers.

The same can be recognised by the statistics of the unemployed in the EU-27, because there are twice as much unemployed people with primary graduation than those with tertiary graduation (Figure 2.).

Furthermore, nowadays 15% of new jobs are for unskilled workers while 50% will require highly qualified staff [4]. It has to be mentioned, that the statement above – the primary sector is the larger receiver market for unskilled worker – is not valid vice versa, as this field also requires higher qualified professionals, who can provide knowledge on a dynamic (sustainable developing) way. The repositioning of the focal point of the usage of human resource to the mental achievement means not only the rising of work/capital ratio, but also the increasing value percentage derived from the usage of the more

and more qualified workforce in the value creation. If the modern instruments of the performance-evaluation are chosen, the same result will be achieved. Then the raised and preferred immaterialization appears in the expansion of human and firstly mental contribution. The immaterialization means avoiding and decreasing of resource-usage and waste-emergence by changing consumer behaviour of a lifestyle, which orientates after the purchasing of indispensable goods on the demand for services in the field of culture, health, education, social services and other leisure activities [8].

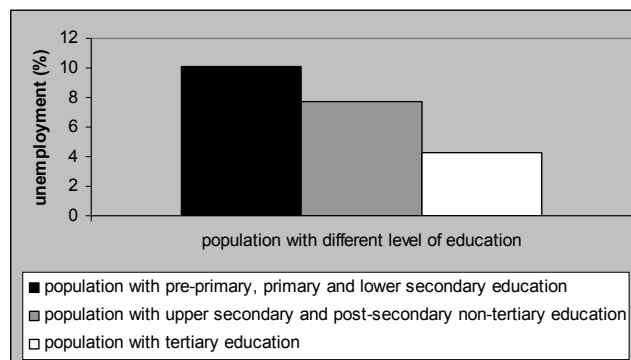


Figure 2.

Unemployment rates of the population aged 25-64 by level of education in the EU 27 (average of 2000-2007) [7]

The increasing role of human capital in the economic growth can be confirmed from the side of the labour market too. If productivity growth is the reason for the wage enhancement, it can be stated, that the evolution of working skills stands in the background, which can, among others (for example the increase of experience can be mentioned as an other factor), lead back to the

increase of the qualification level. The theory is illustrated in Figure 3. by the example of Hungary. It can be considered, that the increasing ratio of the employees with higher qualification appears behind the wage enhancement, where it significantly exceeds the improvement of productivity.

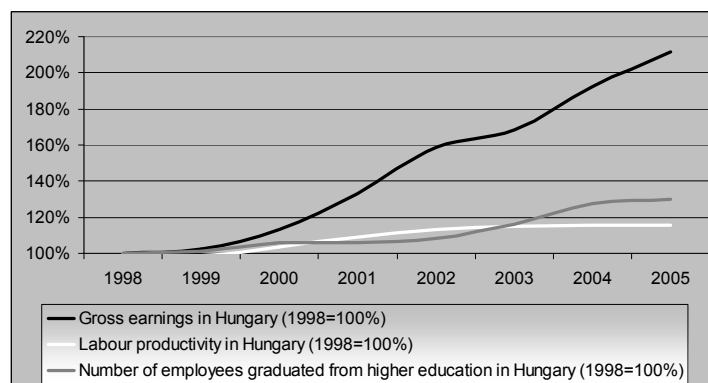


Figure 3.

The macro-relation between earnings, productivity and education [9] [10]

E-education opens a new era from the aspect of access in the case of the mental based economic growth. „There is a widespread belief that technology has resulted in greater opportunities for accessing learning in general” [11]. Access is a key factor regarding the widening of mass-education and the constantly appearing demand for knowledge modernization caused by dynamic market changes. So e-education can get a key role in reaching an economic growth supported with the spreading of education, as the expanding (inside a given generation and also for several generations) would be very hard or impossible with the conventional education systems.

### ECONOMIC ADVANTAGES OF E-DUCATION

For an article dealing with the economic aspects of e-education is almost obligatory to discuss the collected and explained economic advantages, besides all other introductions and interpretations. Perhaps the stakeholders (students, institutions, state) of e-education are mostly interested in these facts.

It is necessary to group the economic advantages due to the above mentioned sectoral classification, which are actually strongly concatenated and are in close interaction with each other. In addition the authors distinguished the advantages on micro-, and macro-level.

Micro-level advantages occur as utilities of the participants of the e-education process. In the simplified model those are the students and the education institutions (supplier of e-education services). The benefits of the students are quite easy to recognise. First of all they occur from the reduction of the required school-attendance. It can result in a remarkable, one-two thousand euros save considering the whole training period of an average course. After comparison the adequate regular and ICT supported distance courses in Hungary and summing up the discounted cashflows, the net present value of savings amounts to 1-2 thousand EUR [12] [13]. The general recognition of these can turn to a serious factor of the prospected demand increase in the future emerging for the e-education services. But in the same time it should not be forgotten, that the numeric economic benefits mentioned above will be reduced by the increased (not at school spent) time demand of self-learning, necessarily caused by choosing of an e-learning education form. However, this activity (mainly carried out in the free time) has prospectively lower opportunity costs, than the

strictly scheduled classroom learning pursued during work-time. So the advantage mentioned above does not disappear completely, it will only be reduced. Finally, the assumption used as the basis of the above logic has to be mentioned anyway; accordingly the knowledge (degree) acquired in e-learning form has the same value, as the one obtained in conventional (classroom learning) form.

The substance of economic benefits of the students represents the real challenge for the institutions providing e-education services. Namely, they can save costs, in other words the economies of scale can be reached, if the number of contact lectures can be decreased. However, costly developments (investments in human and tangible infrastructure or learning material improvement) have to be realized to reach and afterwards to exploit the economic benefits.

In the opinion of the authors in this case, the intensifying of ICT application in the education process results automatically in the reduction of the safety of knowledge transfer. This can be explained with the declining of the systems' forcing strengths of provoking for learning (because of the continuously reducing teacher-student contacts), besides, according to the methodological improvements, the students have the opportunity to obtain the same level of knowledge with the same market value. This statement of the authors is confirmed in the international scientific literature, which investigate the effectiveness of the conventional and e-learning methods or in the researches measuring the students' performance. „On average, there is no difference in student grades between classroom learning and distance education....Students in distance education are much more likely than those in classroom learning to not finish the course.” [14].

The development of education systems can bring a solution for the problem above. If a pupil (from the age of 6-7 years) entering in the education system becomes acquainted – also through the partly application of ICT elements - with the world of self-learning, the negative effects appear less intensively.

In the following the relation between the ratio of e-learning elements in education, total cost and the safety of knowledge transfer (SKT) are examined. In Figure 4. it is shown, that at a constant number of contact lectures the strengthening of ICT application raises the SKT indicator and also the costs in a degressive way. After a special level of ICT application ( $E_{SKT=max}$ ) is pos-

sible to decrease the number of contact lectures. It leads also to the degressive decrease of the costs and to the progressive decrease of the SKT.

It is necessary to discuss the frequently case, as the education institutions – first of all due to the unavoidable ICT revolution – build in their courses some ICT elements. It only results in a cost (and so SKT) rise in this starting phase, when the reduction of the number of contact lectures is not (can not be) possible. But after the  $E_{SKT=max}$  level of ICT application with a contact lecture reduction, it leads to better SKT at the original cost level ( $E_{min}$ ). This ratio represents the minimum and in the same time the efficient level of ICT application after the authors' opinion. In this way the cost structure can keep back the institutions from additional investments in ICT tools, until the ratio does not exceed  $E_{min}$ . Above the ratio  $E_{min}$  the selection of ICT share depends on the institutions' decision only.

Due to the argumentation above it could be defined, that it is satisfactory to apply the ICT at  $E_{SKT=max}$  level, illustrated in Figure 4. On the contrary, the macro-advantages of e-education suggest the enhancing of the ICT ratio, because the improving of the workers' qualification is the precondition of the human-based economic growth, discussed in the former chapter of the article. However, this cannot be realised within the framework of the present education system. So in any case it is necessary to implement innovation. The spreading of the e-education services could represent an obvious solution. Furthermore after the additional increasing of ICT ratio over a special level ( $E_{SKT=100\%}$ ) drops the SKT to the initial level, but it will be carried out on lower costs, than in the case of the full classroom training. The positive social effects of e-education can be integrated also into the macro-advantages, which in the following chapter will be discussed.

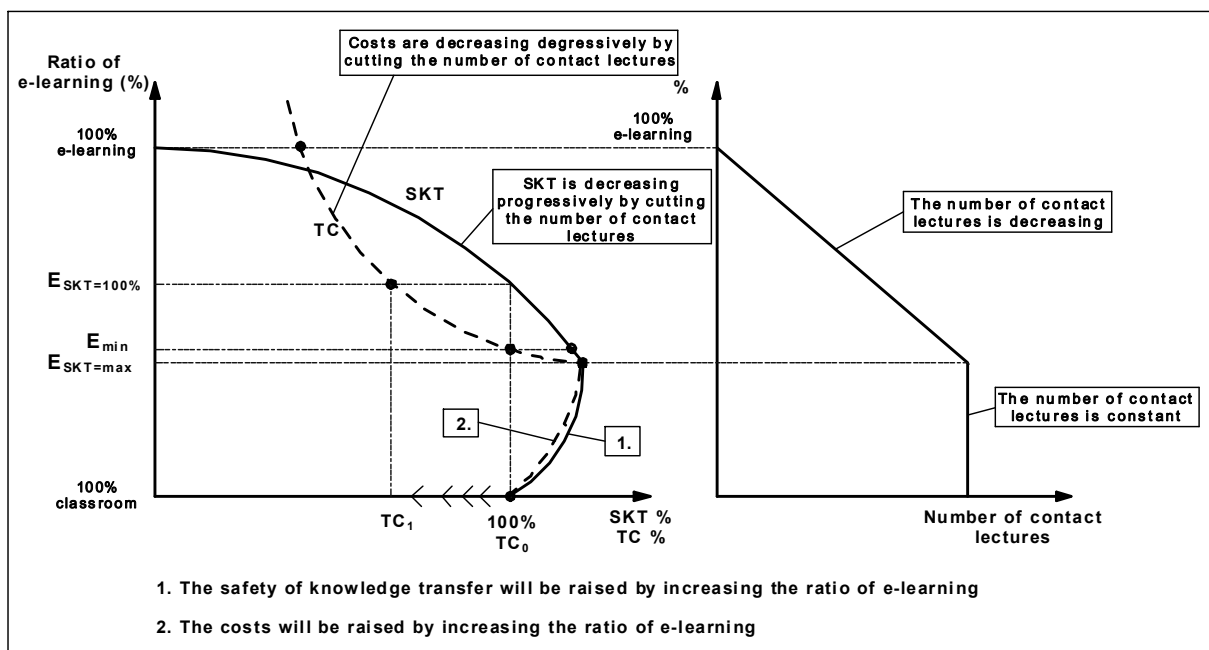


Figure 4.

The relation between the ratio of e-learning elements in education, total cost and the safety of knowledge transfer

### THE EXTERNALITIES OF E-DUCATION

The positive effects according to e-education mentioned above influence firstly (in the narrower sense) the process involved two most important participants, the receiver and provider of education services, however other positive impacts to the environment can not be neglected too. It is important to stress, that there is a con-

tinuous interaction between the participants and their environment, as the individually preferred optimisation could influence the public sector and the whole society as well. The varieties of educational services provided by the institutions are extending continuously. It means, that more students have the opportunity to be involved in education than before. The higher number of

students raises the profitability of course of the institution, which encourages them to improve the education quality. The rising of the education quality can lead overall to the further increasing of the students' number, which has again an effect on the quality of the institution. The positive effects on the environment of the education process can be classified to the positive externalities of e-ducation in a wider sense. The increasing of consumption and the additionally tax incomes and other contributions coming from the increasing of the wage level, based on the improved working skills can be mentioned among the positive effects on the state. The participation in public tasks of individuals and communities can become more active through the higher qualification, which can lead to the strengthening of the political stability.

The expansion of quality and quantity of public goods and services can be sorted under the positive effects on the society, as the additional state income is ploughed back also into these fields. In this sense the decreasing of unemployment can be driven back to two main reasons. On one hand the improvement of the individuals' willingness for taking a job and on the other hand new jobs are created through the increase of consumption. The higher qualification can result not only in the increase of consumption, but also in the change of consumption behaviour into a positive direction (for example the preferring of clean technologies and bio-products at purchasing). It depends on the psychical condition of the individual, if the occasional additional burdens of working or solving of more difficult tasks, lead to more or less stress situations. The deepening stress situations and the overwork can result in the increase of health problems and expenses, which extends the duties of the health care system. The expanding of e-ducation can also give a solution to the migration potentially higher qualified workforce from rural areas, because it is unnecessary to move near to education providers mostly lying at urban areas.

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