

THE VOCATIONAL EDUCATION AT SELECTED SECONDARY SCHOOLS IN THE CONTEXT OF HUMAN CAPITAL DEVELOPMENT

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Abstract

The economic performance of each country is closely linked to quality of human capital. Supporting the development of human capital and its potential positively affects all sectors of the national economy. In particular, schools and other educational institutions are involved in the development of human capital, thus forming the basic framework for improving the quality of human capital. The aim of the society should be to create such an educational system that will reflect the changing requirements of the labor market and ensure quality and sustainable development of human capital. The paper focuses on selected secondary schools joined in IT, Telecommunications, Insurance, Postal Services and Logistics High Schools Association. The aim of the paper is to analyze the structure and scope of vocational education at selected secondary schools in the field of transport and logistics and to make a comparison between selected schools. The results will provide basic information for further research and adaptation of educational plans in the field of transport and logistics in relation to changing labor market requirements. Mathematical and statistical methods will be used for the analysis, in particular the method of quantitative content analysis and comparison will be based on Z-scores.

Key words: human capital, vocational education, secondary schools, logistics, transportation

JEL Code: I25, O15

Introduction

As one of the basic production factors, human capital represents an important aspect of the development of the labor market and, together with it, it is important aspect of the economic development of the state. Its role can be perceived not only as a tool to ensure growth of individual companies, but also as a tool to ensure growth of whole society; from the perspective of states at the national level and from the perspective of membership in integration groups at the supranational level. Ensuring a sufficient number of quality and qualified workers

represents a significant competitive advantage in the market. However, the concept of human capital must be seen in a broader context. It is not only the work activity of a given person, but it is shaped by knowledge, skills and experience. Schools play an important role in the development and cultivation of human capital, especially secondary schools and universities, which prepare future graduates to enter the labor market. The goal of the educational process should be to prepare students for the successful entry to the labor market; ideally in their field of study. Schools should bring them the basic skills and students should have possibilities to develop them during their occupation.

The presented article deals with the analysis of vocational education of secondary schools joined in an association in the field of logistics and transportation. The aim of the paper is to analyze the structure and scope of vocational education at selected secondary schools in the field of transport and logistics and to make a comparison between selected schools. The comparison of the scope of teaching professional subjects will be performed using mathematical and statistical methods.

1 Theoretical aspects of human capital

Although human capital is a commonly used term today, there is no precise definition. Gerry Becker, the founder of the theory of human capital, defined the term as a set of ability, skills and adequate incentives these abilities and skills applied (Becker, 1994).

When Schultz (1961) used the combination of human labor and productive capital in his work, in the first moment it provoked contradictory reactions. Up over the time permeated human capital theory in most disciplines and perception of human labor as capital was identified with the idea that it is an investment improving affairs, knowledge, skills, and health and thus increase cash or psychic income.

From a general point of view, human capital can be included in the emerging discipline of intellectual capital (Sollosy, McInerney & Braun, 2016), in addition to human capital, it also includes customer capital, organizational capital and others. The importance of human capital and its impact on economic growth has been talked about since the early 1980s. The importance of intellectual capital as a tool for sustainable growth has already been mentioned in Coleman (1988). He argues that building trust and loyalty among members of a group is an absolutely essential prerequisite for achieving societal goals in any field. Impact the quality of human capital for economic development with regard to the qualifications is mentioned in the study by Matousek & Tzeremes (2019).

The theoretical definition of human capital is closely related to its concept. The access to human capital from the point of view of education is paramount for the purposes of this article.

Research in the field of human capital from the point of view of pedagogy as a scientific discipline is very often carried out in order to search for causal relationships within the educational process. For example, it is a search for a relationship between educational attainment and GDP growth or an examination of the development of the average wage according to the highest educational attainment.

Burgess (2016) defines human capital as a determinant of economic growth of individual states. Human capital is primarily formed in the process of educating individuals and is also one of the main tools for expressing the level of social integration of individuals or groups of individuals in any enterprise. Cooray, Mallick & Dutta (2014) point to the differentiation of the influence of human capital on market development in South Asian countries in terms of gender differences (positive effect of primary education on secondary education was confirmed among men; but in a group of women, the effect of primary education does not have a significant impact on the secondary education process). The authors point out that ensuring the stability of the society-wide education system in a given group of developing countries as a necessary prerequisite for overall economic growth. Lovaglio, Vacca & Verzillo (2016) approach to human capital as a variable that determines the financial income of each individual through his investment in education and gaining practical experience. Behrman (2011) in his study deals with the question of how and whether the length of schooling can alleviate poverty in society. The research was conducted in Latin America.

2 Methods and data

The theoretical framework shows that investment in human capital has undeniable importance for the economic development of society as a whole. Scholar education and the cultivation of human potential should reflect current changes and requirements given the development of society, economic development and the changing needs of the labor market. The purpose of this paper is to analyze vocational education in the field of logistics and transportation. It represents a very dynamically developing sector and its importance grows with the process of globalization and scientific and technological progress. The teaching of logistics should thus play an important role in the education system (Lutz & Birou, 2013, Sun & Song, 2018).

The analysis will be performed at vocational schools, which are associated in an association of secondary schools - IT, Telecommunications, Insurance, Postal Services and Logistics High Schools Association (henceforth the Association) and involved in the project *System Design to Align Education with Labor Market Needs in the Transport and Communications Sector*. Nine secondary schools from the Association that provide education in the field of logistics and transportation sent to us basic materials and data for analysis. Schools are located throughout the Czech Republic. The analysis will be performed using quantitative content analysis, mathematical and statistical methods. The aim is to find out the degree of differentiation in the teaching of vocational subjects between individual schools. The results will provide basic information for further research in adapting educational plans in the field of transport and logistics in relation to changing labor market requirements.

The data used for the analysis are based on the curricula of school educational fields of secondary schools, it is the field Logistics and Financial Services, or its modifications, and the Operation and Economics of Transport or its modifications. Information about curricula was sent to authors by various schools. Based on the information, main vocational subjects dealing with logistics and transportation were identified using quantitative content analysis. The analysis was realized based on data 2019. The subjects were divided into two groups – theoretical and practical. Theoretical subjects included mainly logistics, transportation, logistics and postal services. Practical involved internships, teaching of practices or practical activities. For the subjects included in the analysis, we were interested in the hourly subsidy of the subject for the entire period of study, regardless of the year in which the subject is taught.

For a more detailed comparison, the fields of study were analyzed using a Z-score. It is a method by which it is possible to compare the analyzed elements with each other and determine the degree of differentiation in a given group. This is a method used in education also. The method was used for example by Brown & Nicholas (2012) to compare the study results of individual students. The results of this coefficient make it possible to compare schools with each other and to distinguish whether a given school set more or less emphasis on a given area in comparison with others schools. The Z-score coefficient u is given by the following relation (1) (Chráska, 2007):

$$u = \frac{x_i - \bar{x}}{s} \quad (1)$$

where x_i represents the value of the given quantity, \bar{x} is the average of the values of the quantity and s is the standard deviation. Z-score was used for comparison of vocational subjects, practical subjects and for all selected subjects by the field of study.

3 Results and discussion

The results of the analysis are shown in the following tables and graphs. As these are two different fields of study with different specializations and an emphasis on selected subjects, the analysis was performed for each field separately. The Tab. 1 a) presents the results of the analysis for field of study Logistics and Financial Services. This field is taught at eight schools of the Association. The Tab. 1 b) compares the teaching of subjects within the field of Operation and Economics of Transport, which is taught at five secondary schools of the Association. Each school is marked with the appropriate code and numbered for the purposes of graphic presentation.

Tab. 1: Results of Z-score of education according to the selected parameters and field of study

a) Logistics and Financial Services

	Secondary School	Z-score ¹	Z-score ²	Z-score ³
1	SS1O1	-0.02	-1.97	-1.42
2	SS2O1	-0.22	-0.72	-0.64
3	SS3O1	0.33	-0.30	-0.04
4	SS4O1	-0.22	-0.67	-0.60
5	SS5O1	0.84	1.26	1.36
6	SS6O1	-2.08	0.45	-0.81
7	SS7O1	-0.26	1.08	0.63
8	SS9O1	1.64	0.87	1.51

b) Operation and Economics of Transport

	Secondary School	Z-score ¹	Z-score ²	Z-score ³
1	SS1O2	1.07	0.30	0.83
2	SS3O2	0.23	0.10	-0.87
3	SS6O2	0.70	0.86	1.00
4	SS7O2	-0.19	0.67	0.54
5	SS8O2	-1.81	-1.93	-1.50

Z-score¹ - for education of vocational subjects

Z-score² - for education of practical subjects

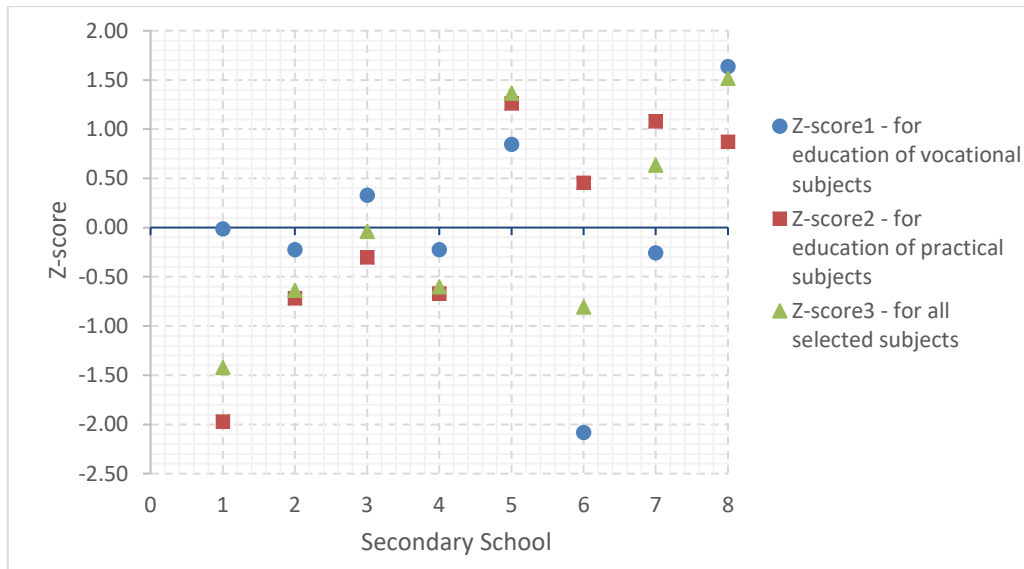
Z-score³ - for all selected subjects

Source: own processing based on data from secondary schools (authors)

In the graph in Fig. 1, there is shown the degree of differentiation between individual schools which provide education in the field of Logistics and Financial Services. The results show that differences can be identified between schools. The differences are in the number of taught hours of vocational subjects and in their hourly allowance also. Schools SS2O1, SS3O1 and SS4O1 represent a certain average in comparison with other schools. Schools SS5O1 and SS9O1 are schools that significantly exceed the average in the number of hours that are devoted to selected vocational subjects. School SS1O1 is characterized by a lower level of focus on subjects related to practical skills. And in the opposite way, secondary school SS5O1

devoted to practical lessons highest attention. School SS6O1 focuses on practical teaching, but in comparison with others it has the least involvement of teaching vocational subjects.

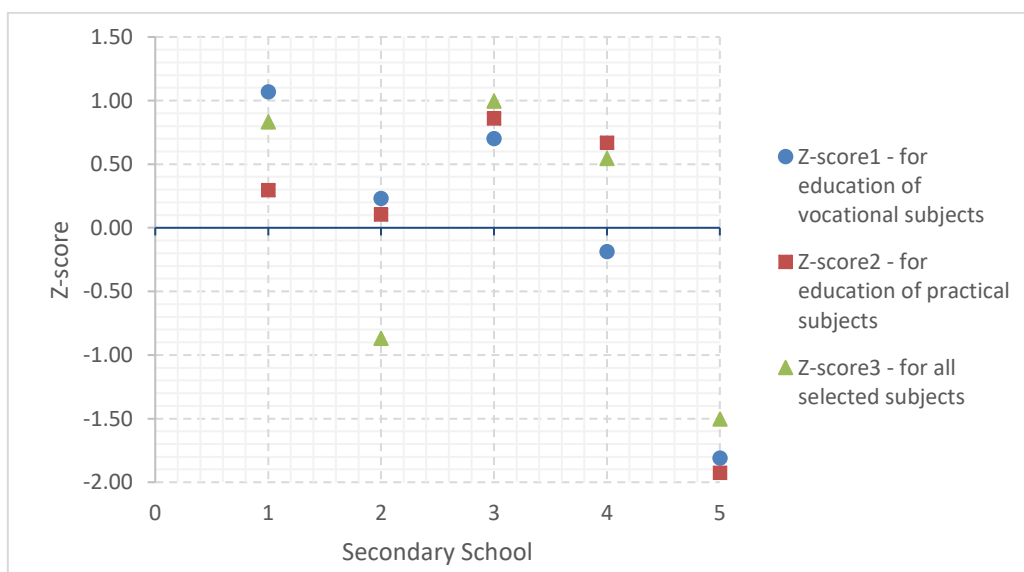
Fig. 1: Graphical presentation of results of Z-score results (Logistics and Financial Services)



Source: own processing based on data from secondary schools (authors)

Operation and Economics of Transport is taught at five schools of the Association. The results of the analysis are shown graphically in Fig. 2.

Fig. 2: Graphical presentation of Z-score results (Operation and Economics of Transport)



Source: own processing based on data from secondary schools (authors)

The results show that the school SS6O2 places great emphasis on the teaching of vocational and practical subjects, the school SS1O2 focuses mainly on vocational subjects. In the opposite way, the school SS7O2 is focused on practical teaching. The school SS8O2 was the worst in the comparison. In this school, there is the emphasis on other than selected subjects.

The analysis also shows that there are large differences in the teaching of selected subjects between individual schools. It is also due to the fact that the share of vocational subjects on the total education is different (see Tab. 2).

Tab. 2: The share of selected subjects on education according to the field of study

a) Logistics and Financial Services

	Secondary School	α (%)	β (%)
1	SS1O1	40.60	20.37
2	SS2O1	39.23	23.53
3	SS3O1	40.77	37.74
4	SS4O1	35.16	35.56
5	SS5O1	49.60	48.39
6	SS6O1	43.41	26.79
7	SS7O1	43.18	43.86
8	SS9O1	46.56	50.82

b) Operation and Economics of Transport

	Secondary School	α (%)	β (%)
1	SS1O2	40.60	51.85
2	SS3O2	40.77	32.08
3	SS6O2	43.75	51.79
4	SS7O2	42.42	46.43
5	SS8O2	51.56	19.70

α – share of vocational education on total education
 β – share of selected subjects on vocational education

Source: own processing based on data from secondary schools (authors)

The average number of hours that students devote by the teaching of vocational subjects in the field of Logistics and Financial Services is 42 %. The school SS4O1 deviates significantly from this average, the average is only 35 %. In the opposite way, there is the school SS9O1, share for this school is 46 %. In the field of Operation and Economics of Transport, there is the average of vocational subjects on the total education 43 %. The differences between individual schools are not so marked. The school SS8O2 deviates significantly from the average with 51 %.

Schools also differ in the share of taught hours devoted to the teaching of selected vocational subjects on the total vocational education. For the field Logistics and Financial Services, there is the result of this parameter in average 35 % and there are big differences between individual schools. The comparison shows that while at school SS9O1 is the share of teaching selected subjects 50 % on the total vocational education, at the school SS1O1 it is only 20 %. Large differences are also evident when we are comparing the field of Operation and Economics of Transport. Out of the total number of hours devoted to vocational subjects,

an average 40 % of hours are devoted to selected subjects. The schools SS1O2 and SS6O2 exceed the average. They considerable emphasis on selected objects. On the contrary, the lowest percentage was recorded at the school SSO2, where only less than 20 % of the time is devoted to selected subjects. It could be said based on the results of the analysis that significant differences exist between schools in teaching of logistics and transportation. Necessary it must be considering the fact that the schools are not focus only on logistics and transportation, but also on economics, accounting or financial services. The emphasis is therefore also on these subjects. The main field of interest is thus different for each school. Although the teaching of logistics and transportation is not uniform in selected schools in the Czech Republic, this fact gives to students the opportunity to choose a school more focused on its closer area of interest. However, this fact is counteracted by the fact that schools are located throughout the Czech Republic and the primary role in the student's choice of school will be the distance from the place of residence.

The subject of the article was to analyze the differences in the teaching of selected subjects at secondary schools, which are joined in to the IT, Telecommunications, Insurance, Postal Services and Logistics High Schools Association. Teaching in secondary school is a basic source of knowledge from fields of study for students who are heading to universities or the labor market. It turns out that the level of teaching of subjects that come to the forefront of today's society is not uniform and there are significant differences between schools. As this is an initial analysis, it is not possible to deduce the consequences of this fact, such as the impact on the employability of graduates in the labor market, the success of the admission procedure to the university or its studies.

Conclusion

Today, human capital and its level is an important production factor and the possession of quality human resources means a significant competitive advantage for the company and for society as a whole also. The positive effect of investment to human capital on economic development has been demonstrated in many studies. It needs to be developed in line with the changing demands of society and the labor market. In the age of globalization and rapidly advancing scientific and technical progress, the importance of logistics and transportation is growing. In this context, changing requirements also need to be implemented in the education system. The article dealt with the comparison of selected secondary schools in the scope of teaching logistics and transportation. There are large differences between individual secondary

schools in the scope of teaching the given subjects and the time devoted to the subjects. The results of the analysis will be used for improvement of education of vocational subjects at selected schools.

Acknowledgment

The article was supported by Technology Agency of The Czech Republic grant – project: System Design to Align Education with Labor Market Needs in the Transport and Communications Sector, no: TJ02000093.

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