

Journal on Efficiency and Responsibility in Education and Science



Table of Contents

Gina Cristina Dimian

THE ROLE OF EDUCATION IN EXPLAINING YOUTH LABOUR MARKET
IMBALANCES IN CEE COUNTRIES 105

Petr Procházka, Luboš Smutka, Michal Steininger

ANALYSIS OF DIVERSIFICATION EFFORTS IN AGRICULTURAL
EDUCATION 116

Zuzana Pacáková, Andrea Jindrová

INFORMATION BENEFIT OF GRADUATES FOLLOW-UP SURVEYS 129

Jan Bartoška, Radka Svobodová, Martina Jarkovská

IPMA STANDARD ELEMENTS AND FEEDBACK IN PROJECT MANAGEMENT
TEACHING 142

Klára Margarisová, Kateřina Šťastná, Lucie Kvasničková Stanislavská

COMMUNITIES OF PRACTICE AT UNIVERSITY: A PRELIMINARY STUDY
154

An international peer-reviewed journal
published by
Faculty of Economics and Management
Czech University of Life Sciences Prague

contact: editor@eriesjournal.com
www.eriesjournal.com

ISSUE 3

JOURNAL ON EFFICIENCY AND RESPONSIBILITY IN EDUCATION AND SCIENCE

Aims and Scope

The Journal on Efficiency and Responsibility in Education and Science aims to publish perspectives of authors dealing with issues of efficiency and/or responsibility in education and related scientific disciplines. The focus is on topics such as:

- theory and methodology of pedagogy and education;
- theory and methodology of science;
- human resources and human relations management;
- knowledge management and knowledge engineering;
- systems engineering and information engineering;
- quantitative methods.

The journal accepts quantitative, qualitative and experience-based full research papers, short communications or review studies. Applications and case studies introducing and describing impacts of new theoretical approaches in real conditions of practical case are also accepted.

All papers passed a double-blind peer review process.

© Faculty of Economics and Management, Czech University of Life Sciences Prague

©Authors of papers

Published by the Faculty of Economics and Management, Czech University of Life Sciences Prague

ISSN 1803-1617 (electronic version)

Editorial Board

Editor-in-Chief

Jaroslav Havlíček,
Czech University of Life Sciences Prague, Czech Republic

Members

Peter M. Bednar,
University of Portsmouth, United Kingdom

Peter Fandel,
Slovak University of Agriculture in Nitra, Slovak Republic

Jana Hančlová,
Technical University of Ostrava, Czech Republic

Irem Kizilaslan,
Dokuz Eylul University, Turkey

Luděk Kolman,
Czech University of Life Sciences Prague, Czech Republic

Stanislava Mildeová,
University of Economics, Prague, Czech Republic

Eva Milková,
University of Hradec Králové, Czech Republic

Zdeněk Molnár,
Czech Technical University in Prague, Czech Republic

Antonín Slabý,
University of Hradec Králové, Czech Republic

Tomáš Šubrt,
Czech University of Life Sciences Prague, Czech Republic

Milan Turčáni,
Constantine the Philosopher University in Nitra, Slovakia

Eva Vaněčková,
University of South Bohemia, Czech Republic

Roman Zuzák,
Czech University of Life Sciences Prague, Czech Republic

THE ROLE OF EDUCATION IN EXPLAINING YOUTH LABOUR MARKET IMBALANCES IN CEE COUNTRIES

Gina Cristina Dimian

Bucharest Academy of Economic Studies
ginadimian@gmail.com

ARTICLE INFO

Article type

Full research paper

Article history

Received: September 15, 2011

Accepted: September 22, 2011

Available on-line: September 30, 2011

Abstract

The main aim of this paper is to investigate the determinants of youth labour market performances and their influence on the future economic and social development of a country. The objectives refer to the assessment of demographic and labour market trends for young people, the analysis of the factors responsible for increasing youth unemployment and for the differences between skilled and unskilled young people concerning unemployment rates.

To achieve the paper's objectives several statistical and econometric models (descriptive statistics, correlation and regression analysis) have been used. The main interest was to look for the key drivers of youth labour market sustainable performances.

The degree of originality is given by our choice to analyse youth labour market dynamics from an interconnected perspective (demographic trends, youth unemployment, education) and to apply the model for 10 CEE (Central and Eastern Europe) countries (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia, and Slovakia) in order to compare their performances.

Key Words

Demographic trends, labour market, youth unemployment, education, skill mismatch, economic crisis

Introduction

In recent years, a large body of research has been dedicated to youth labour market problems, especially since the global economic crisis has proved once again that young people represent a vulnerable category and their increasing unemployment can lead to the loss of a generation (International Labour Organization, 2010). Specialists of the same institution pointed out that long term unemployment can be a real threat especially for those young people 'who lack general or vocational education and work experience', but, at the same time 'many young people employed and overqualified for the job they perform' can become unsatisfied and discouraged (Torres and Tobin, 2010).

In this respect, the "Youth - Investing and Empowering" EU strategy for youth policy for the coming decade (Commission of the European Communities, 2009) 'acknowledged that young people are one of the most vulnerable groups in society, especially in the current economic and financial crisis, and in our ageing society, young people are a precious resource'. Thus, according to EUROSTAT, during the last decade, in the EU-27 youth unemployment rate was almost two times higher than the rate for total population and, more than that, after 2008 this situation has become common even for euro area (EUROSTAT, 2011).

Taking into account all these remarks, the interest for this topic, shown by the pile of theoretical and empirical studies focused on describing and exploring the determinants of youth unemployment, is not surprising.

O'Higgins (1997) suggests that among the main causes of youth unemployment a key role is played by aggregate demand, while

Caroleo and Pastore (2007) point out to the youth experience gap as one of the main drivers of young people unemployment.

In their paper *Regional differences in labour market participation of young people in the European Union* Green et al. (2001) emphasize the importance of those factors related to demographic and economic context, labour market configuration, education and training system, the role of the state and of the family. In fact, these drivers differ from country to country and the measures for reducing youth unemployment depend on the national or regional particular conditions.

In this respect, analysing the transition from school to work of a cohort of 3000 young Hungarian people, Audas et al. (2005) demonstrate that two conditions are of particular importance in ensuring successful integration in the labour market: initial labour market circumstances (those who have made good initial choices are more likely to succeed than those who started their careers as unemployed) and academic achievement in a selective educational system.

Regarding Bulgaria, Ribarova (2010) points out to three categories of factors that have put their mark on the youth labour market situation: 1. Education, vocational training and qualifications; 2. Lack of work experience and misguided career choices; 3. The values of the younger generation.

According to Lithuanian Confederation of Industrialists (the largest employers' organization in Lithuania) among the reasons for youth unemployment in this country are included: the mismatch between the qualification of young people and labour market demands, the lack of practical experience and the low wages offered in the labour market (European Commission, 2010).

In Czech Republic, even though youth unemployment is higher than total unemployment, this fact is considered as being a natural feature taking into account the job search process particularities of this category of population: lack of work experience and past labour market credentials (Münich and Jurajda, 2010). Education remains instead for young Czech people the key factor of success in finding a job on the labour market.

Considering the intense debate related to the youth unemployment drivers, one should not neglect the problem of appropriate skills for the labour market requirements.

The skills theme has been addressed in a holistic manner by Elias and McKnight (2001) in the paper *Skill measurement in official statistics: recent developments in the UK and the rest of Europe*. The authors emphasize the direct link between the nature and structure of skills and economic and technological evolution. Among the criteria that make the difference between skilled and unskilled people the authors recall education and work experience but also the level of the earnings.

Other researches were focused on the relationship between educational mismatches and skills mismatches. Allen and Van der Velden (2001) point out to the idea that not only higher education raises productivity, but also the match between job characteristics and educational level, while Allen and de Weert (2007) consider over-education, overutilisation and underutilisation as main consequences of the mismatch between the required and available skills.

In this context, the aim of this paper is to analyze the main factors responsible for increasing youth unemployment in 10 new member states and for the differences between skilled and unskilled young people concerning unemployment rates.

The next section focuses on differences and changes in youth unemployment rates across the 10 emerging countries.

Section 3 is dedicated to the econometric approach by which we study the impact of determinant factors on youth unemployment. Section 4 is devoted to the discussions of model results. Main conclusions are subject to section 5.

Material and Methods

Descriptive empirical evidence

In all European countries, young people have become a vulnerable category and their situation on the labour market has worsened with the global economic crisis.

In some of the 10 analyzed countries, even though during last decade youth unemployment rates have significantly decreased (Bulgaria, Poland, Slovenia), they remain more than double compared to the unemployment rates of people aged 25-64 years (Fig. 1 and 2).

In Estonia, Hungary, Latvia, Lithuania, Romania, unemployment rate among young people increased in 2009 compared to 2000 and in 2009 was three times higher than adults' unemployment rate (Fig. 1 and 2).

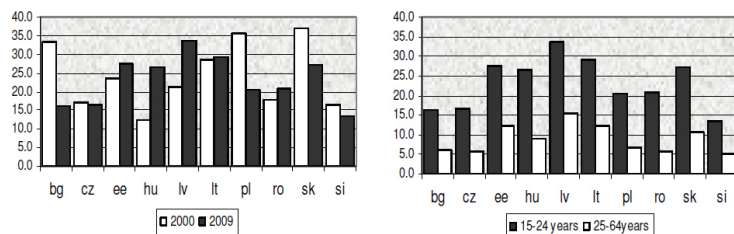


Fig. 1: Youth unemployment rates (YUR) (%)

Fig. 2: Unemployment rates by age groups (%)

Source: EUROSTAT 2011, General and regional statistics

Though, more interesting to study are differences between countries related to unemployment rates for skilled and unskilled young people (In this paper, skilled are considered those people aged 15-24 years who completed at least upper secondary and post-secondary non-tertiary education - levels 3-4 (ISCED 1997), while unskilled are those who completed preprimary, primary and lower secondary education - levels 0-2 (ISCED 1997)). In this respect, a special case is represented by Slovakia that, according to EUROSTAT data, experience the highest unemployment rates for young people with the lowest education level (64.6% in 2009, a decrease by 16% compared to 2000) (Fig. 3).

At the opposite pole we can find Romania and Slovenia, with the lowest unemployment rates among unskilled young people (19.4%, respectively 18.9% in 2009) (Fig. 3).

In Romania's case, differences between unskilled and skilled young people unemployment rates are very small: 19.4 compared to 20.9, in 2009, while for all the other countries young educated people have more chances to find a job on the labour market (Fig.3 and 4).

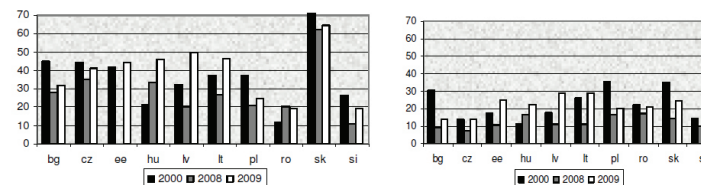


Fig. 3: YUR - unskilled (%)

Fig. 4: YUR - skilled (%)

Source: EUROSTAT 2011, General and regional statistics

Even though the sample analysed contains 10 new EU member states with almost similar economic and social features, as is confirmed by the box-plots in Fig. 5, the differences between performers and those with poor performances remain high, especially when assessed in terms of unskilled youth unemployment. Moreover, if in terms of skilled youth unemployment rate last years have shown a decreasing tendency of these differences, regarding unskilled young people unemployment the difference between the smallest and the highest rate remained almost the same during 1999-2008. In 2008, skilled youth unemployment rates ranged from 7.1% (in Czech Republic) to 17.5% (in Romania), while the difference between the lowest unemployment rate for unskilled people (10.9% in Slovenia) and the highest (62.5% in Slovakia) was of 51.6 percentage points, a decrease by 1.4 percentage points compared to previous year.

The same reality is emphasized by the k-density graphs, namely, the tendency of polarization and formation of two groups of performers, more obvious in terms of unemployment rates for young unskilled people (Fig. 5).

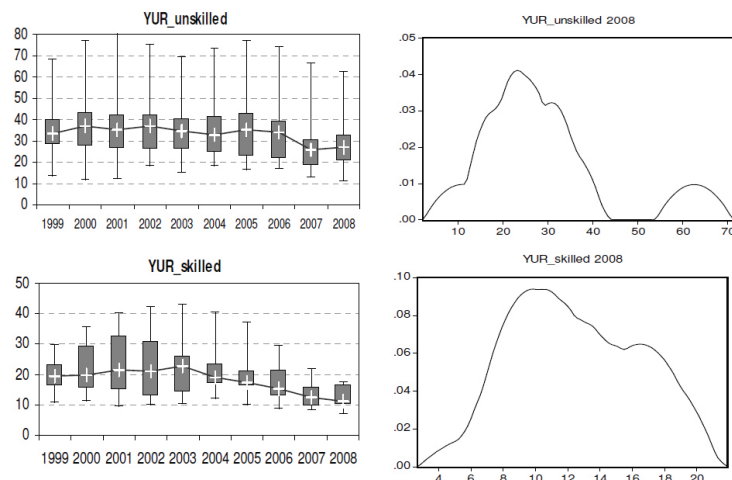


Fig. 5: Box plots and k-density estimates of unemployment rates for skilled and unskilled young people in 10 new EU member states

Source: EUROSTAT, 2011; own calculations

When assessed from a temporal perspective, graphs show that examined phenomena are persistent over time even though Spearman coefficients are in some cases very low (Fig. 6). Spearman's rank correlation coefficient:

$$s = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$
, where d_i are differences between the ranks of each observation of the variables x and y .

In this sense, the rank correlation coefficient recorded for unskilled youth unemployment rate ($S=0.539$), means that, on the whole, most of the countries kept in 2008 their positions from 1999. Among them, in 2008, only Poland, Slovenia and Bulgaria improved their performances, going up four or three places, while Hungary felt six positions.

With respect to unemployment rate for skilled young people, countries changed their positions, in some cases quite significantly: Hungary and Romania (worsened their performances), Bulgaria, Latvia and Slovakia (improved their positions).

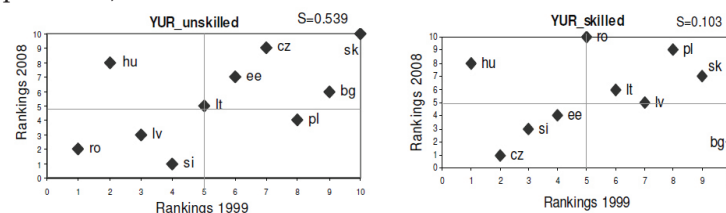


Fig. 6: Ranking of unemployment rates for skilled and unskilled young people in 10 new EU member states

Source: EUROSTAT, 2011; own calculations

Regarding the positioning of countries according to GDP per capita and youth unemployment, two different situations can be distinguished (Fig. 7):

- Top ranked countries in terms of GDP per capita (Czech Republic, Slovakia, Estonia), except Slovenia do not experience the same situation as regards unemployment among young unskilled people. Rank correlation coefficient has a negative value: $S=-0.385$.
- Instead, countries economic results (high GDP per capita) seem to be directly correlated with labour market performances concerning skilled youth employment (low skilled youth unemployment rate).

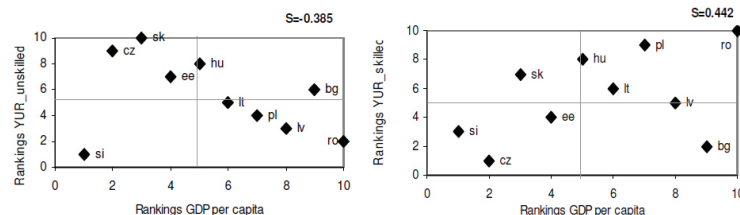


Fig. 7: Ranking of unemployment rates for skilled and unskilled young people in 10 new EU member states

Source: EUROSTAT, 2011; own calculations

Variables and models

In the literature existing on the determinants of youth labour market performances, demographic, structural, institutional and cyclical factors emerge as the most significant.

To achieve the paper's objectives i.e. to study the determinants of youth unemployment and assess their impact an econometric model based on combining statistical and econometric methods (descriptive statistics, correlation and regression analysis) is designed. This is one of the best ways to capture the influence of determinant factors and to decide which labour market policy measures are more appropriate for a specific group of countries.

So, looking to create a general overview of the factors determining youth unemployment an econometric analysis based on panel data for the 10 new states that recently joined the EU was preferred. The period under analysis was 1999-2008 for which data were available for all eleven variables and 10 countries taken into account.

The nine factors representing the independent variables have been grouped in four categories: demographic factors (female share, part time employment), structural factors (employment in agriculture, industry and services), institutional factors (monthly minimum wages, tax wedge on labour cost, unemployment benefits) and cyclical ones (GDP per capita), while the dependent variable is in turn unemployment rate for unskilled young people (defined as people aged 15-24 which have attained only pre-primary, primary and lower secondary education) and unemployment rate for skilled young people (defined as people aged 15-24 which have upper secondary and post-secondary non-tertiary education).

The econometric model has the following form:

$$\ln u_{it} = \beta_1 + \beta_2 \ln u_{it-1} + \beta_3 X_{it} + \beta_4 Z_{it} + \beta_5 W_{it} + \beta_6 GDP_{it} + \varepsilon_{it}, \quad (1)$$

where X_{it} is demographic factor: young female share in total population at time t for country i (%), the share of part time youth employment (%), Z_{it} structural factors: employment in agriculture, industry respectively services (% of total employment), W_{it} institutional factors: monthly minimum wages (EURO PPP), tax wedge on labour costs (% of the total labour costs of the earner), unemployment benefits (% of GDP), GDP_{it} is GDP per capita (PPP, constant 2005 international \$). For all variables, except *the share of part time youth employment* and institutional factors for which the source of data has been EUROSTAT, data series have been extracted from World Bank DataBank.

In general, it is expected that the four categories of factors selected to have a differentiated influence on youth unemployment (Dimian, 2010):

- *Demographic factors* (young female and part time youth employment shares) tend to have an effect of increasing the efficiency of the labour market functioning, considering the willingness of these groups to accept other types of jobs (e.g. part-time or contacts on determined period). At the same time, part time employment is often seen as a factor which contributes to reducing unemployment, especially for vulnerable persons.
- *Structural factors* impact on labour market performances differs according to the share of each type of activity. If agriculture is considered by many authors (e.g. Perugini and Signorelli, 2010) a 'buffer against unemployment' for the most vulnerable groups of people, top industries require in most cases skilled and experience work force.
- *Institutional factors* proved to have a significant influence on unemployment. Monthly minimum wages, unemployment benefits and tax wedge on labour costs tend to contribute to the increase in unemployment, the latter, for example, by lowering the net pays.
- In times of economic boom, *business cycle factor* (GDP per capita) is expected to reduce labour market imbalances conducting to unemployment decrease as economy is at a point when can sustain job creation.

Results

Before estimating model's coefficients we run a correlation analysis and computed variance inflation factor (VIF) in order to test for the existence of multicollinearity.

$VIF = 1/(1 - R_j^2)$, shows how the variance of an estimator is inflated by the presence of multicollinearity. When R_j^2 approaches 1 (perfect collinearity), VIF approaches infinity. The inverse of the

VIF is called tolerance and approaches 1 when is no collinearity (Gujarati, 2004).

The results show that there is multicollinearity in some variables' case (between structural factors, respectively GDP per capita and monthly minimum wages) (Tab.1).

Variables	Collinearity Statistics			
	Tolerance	VIF	Tolerance	VIF
GDP per capita (PPP, constant 2005 international \$)	0.074	13.486	0.079	12.594
Employment in agriculture (% of total employment)	0.001	1443.484	0.001	1435.552
Employment in industry (% of total employment)	0.003	343.110	0.003	345.376
Employment in services (% of total employment)	0.001	921.950	0.001	921.411
Young female share in total population (%)	0.543	1.842	0.580	1.725
The share of part time youth employment (%)	0.185	5.400	0.211	4.734
Monthly minimum wages (EURO PPP)	0.077	12.910	0.083	12.087
Tax wedge on labour costs	0.588	1.700	0.585	1.710
Unemployment benefits (% of GDP)	0.463	2.159	0.464	2.155
Dependent Variable	YUR_unskilled		YUR_skilled	

Tab. 1: Multicollinearity analysis results

In order to tackle this problem we run factor analysis so that the three structural variables to be reduce to a single one (Tab. 2) and eliminated the variable monthly minimum wages that proved to be correlated with GDP per capita.

Variables	Component
Employment in agriculture (% of total employment)	-0.998
Employment in industry (% of total employment)	0.668
Employment in services (% of total employment)	0.856

Tab. 2: Component Matrix (Extraction Method: Principal Component Analysis, 1 component extracted)

The results of regression analysis for the two categories of young unemployed people are presented in Tab. 3.

Dependent variable: log youth unemployment rate		
	Unskilled	Skilled
Log youth unemployment rate (t-1)	0.739 (0.069)***	0.838 (0.052)***
Log GDP per capita	-0.332 (0.080)***	-0.143 (0.064)***
Factor 1 (scores)	0.149 (0.0340)***	-
Young female share in total population	0.051 (0.021)***	-
The share of part time youth employment	-	-
Tax wedge on labour costs	-	-0.014 (0.007)***
Unemployment benefits	-	0.197 (0.098)***
Constant	3.335 (0.833)***	2.388 (0.731)***
Observation	90	90
R-squared	0.862	0.810
F-statistic	132.4***	904.5***

Regression coefficients: *** significantly different from zero at the 0.01 level of significance (standard errors are in brackets)

Tab.3: Panel country analysis

Discussion

Regression outcomes prove that selected variables (available for all the countries) explain only a part of the variation in youth unemployment rates. It means that other important determinants of youth unemployment remained to be explored. This is the case for factors such as: labour market regulation, active labour market policies or youth labour mobility and level of education.

In addition, not all the factors have been shown to have a significant impact on unemployment. For both dependent variables (youth unemployment for unskilled people and youth unemployment for skilled people) the significant factors are: lagged youth unemployment rate and GDP per capita. Youth unemployment for unskilled people proved to be also related to: structural factor and female share, but not to unemployment benefits. Youth unemployment for skilled people seemed to be significantly influenced by institutional factors: unemployment benefits and tax wedge on labour costs.

The results obtained for the variables included in the model are consistent with other empirical studies on this topic.

As expected, regression coefficients show that youth unemployment is negatively related to GDP per capita and positively with lagged unemployment rate. For example, if GDP per capita goes up by 1 percent, on average, youth unemployment rate goes down by about 0.3 percent for unskilled people and 0.1 percent in the skilled people case.

Still, it is interesting that for unskilled people this negative relationship exists even related to employment in agriculture: countries with a high share of people employed in primary sector seem to have lower youth unemployment rates. The regression coefficient obtained for this group of people indicates

that young unskilled people are more expected to be employed in the primary sector. This result was already explained in the literature by “the role of agriculture as a buffer against unemployment by providing some employment, food and income to the most vulnerable groups in society” (Perugini and Signorelli, 2010).

The other factor with significant influence on youth unemployment for unskilled people proved to be young female share in total population. Regression coefficient is significantly different from zero at the 0.01 level of significance and indicates that if young female share in total population increases by 1 percent, on average, unskilled unemployment rate increases by 5.1 percents. This factor seems to have a negative impact on unemployment even though the inverse linkage would have been expected.

The explanation of this result can be related to the fact that female role in reducing unemployment is not always possible because it depends on the level of education and the particularities of each labour market.

Institutional factors proved to have a significant impact on skilled unemployment rate. For example, if unemployment benefits are increased youth unemployment among skilled people also raises. This situation specific only in skilled young people case can be explained by the fact that, in many cases, educated youth prefers unemployment benefit instead of an inappropriate job and a low salary.

Conclusions

The aim of this paper was to analyze the main factors responsible for increasing youth unemployment in 10 new member states and for the differences between skilled and unskilled young people concerning unemployment rates. In the first part we provided some theoretical background related to the most important drivers of youth unemployment, how they influence labour market performances and what is the role of education in this framework.

The basic descriptive statistics show that in all 10 analysed countries youth unemployment has remained very high during the last decade, being more than double compared to unemployment rates of people aged 24-64 years. Significant differences between countries exist in terms of unemployment rates for people with low and high level of education. In addition, youth unemployment is a persistent phenomenon over time, especially for unskilled young people. So, even in times of economic boom, for this category finding a proper job is a more difficult task than for those more qualified.

Unskilled and skilled youth unemployment rate determinants are then studied using panel data for the period 1999-2008 and Regression Model. Only a few of the youth unemployment determinants factors proved to have a significant influence. Among them, factor 1 (negatively correlated with employment in agriculture) seems to have an important impact only on young people with low level of education. Primary sector is often considered a buffer against unemployment, especially for vulnerable categories.

As for the variables related to institutional and policy settings, they didn't emerge significant than in the case of skilled young people. One explanation of this result may be the fact that active

or passive labour market policies, especially focused to solve unskilled youth unemployed problems, are not in many cases available. But, as Bell and Blanchflower (2010), in their paper *Youth Unemployment: Déjà Vu?* emphasize: "there is a strong case for policy intervention now to address the difficulties that the current cohort is having in finding access to work".

In this respect, it is widely recognized that facing recent economic downturn consequences involves more than ever investments in skills. This process has become more complicated nowadays when companies are looking not only for knowledge and skills but also for aptitudes to apply them effectively (Frey et. al 2009).

Thus, a step forward in the research of the youth unemployment theme can be made by applying new modelling techniques in order to analyze the effectiveness of labour market policies. One of them is Data Envelopment Analysis, which may be used for efficiency and performances evaluation of decision making units (Jablonsky and Dlouhy, 2010).

Acknowledgements

This work was cofinanced from the European Social Fund through Sectoral Operational Programme Human Resources Development 2007-2013, project number POSDRU/89/1.5/S/59184 „Performance and excellence in postdoctoral research in Romanian economics science domain".

References

- Allen, J. and van der Velden, R. (2001) "Educational mismatches versus skill mismatches: effects on wages, job satisfaction, and on the job search", *Oxford Economic Papers* vol. 53, no.3, pp.434-452, Oxford University Press.
- Allen, J. and De Weert, E. (2007) "What do educational mismatches tell us about skill mismatches? A cross country analysis", *European Journal of Education*, vol. 42, no.1, pp.59-73.
- Audas, R., Berde, E., Dolton, P. (2005) "Youth unemployment and labour market transitions in Hungary", *Education Economics*, vol. 13, no. 1, pp. 1-25.
- Bell, D.N.F. and Blanchflower, D.G. (2010) "Youth Unemployment: Déjà Vu?", *IZA Discussion Paper* no. 4705.
- Caroleo, F.E. and Pastore, F. (2007) "The youth experience gap: explaining differences across EU countries", *Quad Dip Econ Fin Stat* no. 41, University of Perugia.
- Commission of the European Communities (2009) An EU Strategy for Youth Investing and Empowering. A renewed open method of coordination to address youth challenges and opportunities.
- Dimian, G.C. (2010) „A quantitative approach of the labour market imbalances", *Management & Marketing*, Vol. 6, Special Issue/2011, Summer, pp. 43-56.
- Elias, P. and McKnight, A. (2001) "Skill measurement in official statistics: recent developments in the UK and the rest of Europe", *Oxford Economic Papers*, vol. 53, no. 3, pp. 508-540, Oxford University Press.
- European Commission (2010) "Youth employment measures", *European Employment Observatory Review*.

Froy, F. et al. (2009) "Designing Local Skills Strategies", OECD *Local Economic and Employment Development Series*.

Green, A. E. et. al. (2001) "Regional differences in labour market participation of young people in the European Union", *European Urban and Regional Studies*, vol. 8, no.4, pp. 297–318.

Gujarati D.N. (2004) *Basic Econometrics, fourth edition*, West Point Military Academy, The McGraw–Hill Companies, pp. 350-353.

International Labour Organization (2010) "Global Employment trends for youth", *Special issue on the impact of the global economic crisis on youth*.

Jablonsky, J. and Dlouhy, M. (2010) "Solving DEA and MCDM Decision Problems in Spreadsheets" *Proceedings of the 7th International Conference on Efficiency and Responsibility in Education (ERIE 2010)*, Prague, pp. 126-136.

Lazar, M. and Lazar, C. (2005) *Socio-demographic statistics*, Bucharest: Corint Publishing, pp. 225 - 229.

Manacorda, M. and Petrongolo, B. (1999) "Skill Mismatch and Unemployment in OECD Countries", *Economica*, vol. 66, no. 262, pp.181-207.

Münich, D. and Jurajda, Š. (2010) "EEO Review: Youth Employment Measures, 2010" *European Employment observatory*.

O'Higgins, N. (1997) "The challenge of youth unemployment", *International Social Security Review*, vol. 50, no. 4, pp. 63-93.

Perugini, C. and Signorelli, M. (2010) "Youth labour market performance in European Regions", *Economic Change and Restructuring*, vol. 43, no. 2, pp.151-185.

Quintini, G. and Martin, S. (2006) "Starting well or losing their way? The position of youth in the labour market in OECD countries", *OECD Social Employment and Migration Working Papers*, no.39.

Ribarova, E. (2010) "The integration of young people into the labour market in Bulgaria" in *Labour Productivity, Investment in Human Capital and Youth Employment. Comparative Developments and Global Responses*, Ed. Blanpain, R. et al., Bulletin of Comparative Labour Relations, Kluwer Law International.

Torres, R. and Tobin, S. (2010) *Youth employment in crisis: Questions and answers on the situation of youth on the labour market*, ILO article, July 14, 2010.

ANALYSIS OF DIVERSIFICATION EFFORTS IN AGRICULTURAL EDUCATION

Petr Procházka, Luboš Smutka, Michal Steininger

Czech University of Life Sciences Prague
pprochazka@pef.czu.cz

Abstract

The study of agriculture continues to become less popular in most developed countries, including Canada and the Czech Republic. The analysis in this paper provides some interesting findings about activities of agricultural universities to increase enrolment into their programmes. While the study is focused on Canada, it is possible to draw implications also for the Czech Republic as many of the characteristics pertaining to the education and agricultural sectors are similar.

Enrolment into educational programs in agriculture in North America has been steadily declining in recent years. While the overall share of agriculture on the national gross domestic product has also been falling, the need for qualified people in agriculture is still important as the shift to sustainable agriculture appears to be one of the key priorities of governments in the US and Canada. One of the ways to stimulate the interest of prospective students in agricultural studies is to diversify the programmes by offering more major options. It is important to study the motivation and other stimuli for the choice of major in order to adapt the educational programmes to attract more students. In the paper, factors influencing the choice of major are studied by analysing survey data from the only agricultural college in Atlantic Canada. The results show significant differences in the socio-economic background among the prospective students, based on the choice of major. For example, students interested in the social sciences consider choices of major much more than students in the biophysical fields. Based on the findings from the analysis, several recommendations are made. It is suggested, for example, that for students interested in the biophysical sciences, sport plays an important role and thus, an appropriate promotional campaign about recreation and sport facilities of post-secondary agricultural educational institutions should be conducted. Analysis in this paper may

ARTICLE INFO

Article type
Full research paper

Article history

Received: April 1, 2011
Received in revised form: August 31, 2011
Accepted: September 13, 2011
Available on-line: September 30, 2011

interest many educational institutions in agriculture as a guide on how to deal with existing or potential decline in enrolment by diversifying their major portfolio using appropriate promotional campaigns.

Key Words

Agricultural education, choice of major, socioeconomic factors, Canada, Czech Republic

Introduction

Education is one of the top priorities of governments around the world. Europe and North America are both regions that put a high value on education, while at the same time their universities rank among the best (Kehm, 2006). The provision of education is based upon the needs of a society and is, therefore, related to many economic industries. It is clear, given the current structure and needs of an economy, that the highest emphasis is put upon education aiming at the consumption [or, consumer?] and processing industries (United Nations, 2010).

Nonetheless, education for a primary sphere of an economy cannot be neglected. One of the sectors of this sphere that requires highly skilled professionals is agriculture. The importance of the role of education in the agricultural sector is mentioned in papers published by many local and foreign authors (e.g. Slavík, 2004; Spiertz, Kropff, 2011; Tamini, 2011)

Higher levels of qualifications are important for the operation of this sector, given the advanced technologies implemented into current agricultural processes that are needed to increase efficiency in order to offset problems of population and purchasing power growth, etc. (Gebreselassie, 2006).

As the capital substitutes for labour to an ever larger extent in the agricultural industry, emphasis in agricultural education must shift from quantity to quality. Therefore, modern agricultural universities have to adapt to these processes and trends in society, and put stress on high quality agricultural education.

Agricultural universities have, so far, implemented several measures to offset the declining interest in agriculture, such offering a wider range of degrees, study fields, majors, and specialisations (e.g. MEYS, 2011)

This paper studies one of the ways to adapt to new conditions in agriculture by education institutions through an analysis of the position of agricultural education in Canada and the Czech Republic. The agricultural educational institution in Atlantic Canada, analysed in this paper, struggles with decreasing enrolment by offering new major options. The main results of the analysis suggest what important measures should be taken in order to enhance enrolment.

While the main focus of this paper lies in the analysis of one of the educational institutions in Canada, important implications are drawn for the Czech Republic, as the Czech educational system is currently being reformed (2011) to correspond more closely to other OECD countries, including implementation of tuition fees (MEYS, 2011).

Agricultural sector in Canada and the Czech Republic

Agriculture in Canada as well as in the Czech Republic contributes to the national economy by only a small share of roughly 2%. This can be seen in Table 1, where the structure of economies is presented for 2010.

Canada	the Czech Republic
GDP composition	
agriculture: 2%	agriculture: 2.2%
industry: 20%	industry: 38.3%
services: 78% (2010 est.)	services: 59.5% (2010 est.)

Table 1 – The structure of GDP in Canada and the Czech Republic in 2010, Source: WB, 2011

From the demographic standpoint, the share of the rural population in the total population, as well as the share of economically active population in the agricultural sector, are on a similar level in both countries as seen in Table 2.

Total Population - Both sexes (1000's)	2007	2009	2011
Canada	32945	33573	34208
Czech Republic	10268	10369	10443
Share of Czech population in relation to Canadian population	31.17%	30.88%	30.53%
Rural population (1000's)	2007	2009	2011
Canada	6495	6555	6604
Czech Republic	2724	2748	2756
Share of rural population in total Canadian population	19.71%	19.52%	19.31%
Share of rural population in total Czech population	26.53%	26.50%	26.39%
Agricultural population (1000's)	2007	2009	2011
Canada	670	642	616
Czech Republic	695	662	628
Share of agricultural population in total Canadian population	2.03%	1.91%	1.80%
Share of agricultural population in total Czech population	6.77%	6.38%	6.01%
Total economically active population in Agriculture (1000's)	2007	2009	2011

Canada	346	336	325
Czech Republic	353	334	316
Share of economically active population in agrarian sector in total population in Canada	1.05%	1.00%	0.95%
Share of economically active population in agrarian sector in total population in Czech R.	3.44%	3.22%	3.03%

Table 2 – Selected parameters of population development in Canada and the Czech Republic, Source: FAO, 2011

Based on the aforementioned numbers, it is clear that there are similar characteristics related to the position of the agricultural sector in the individual economies of Canada and the Czech Republic. While there are some similarities, the agricultural sectors also have many differences. These are especially prevalent in the agricultural output, agricultural production frontiers, and position of each country's sector in global trade, as well as the perception of agriculture in the societies of each country.

As the efforts of both countries in the field of agriculture focuses on environmental protection to an ever larger extent, it is necessary to increase the number of highly educated professionals through the university education, as it is the only way to maximise agricultural output while minimising environmental degradation (NRPPZARV, 2009).

Studies of enrolment into agricultural universities show, however, a decrease in attractiveness of agricultural education to the young generation (Esters, 2005). Thus, in order to maintain or increase enrolment into agricultural programmes, governments in developed countries must act. In the following

two sections, the peculiarities of university-based agricultural education in both countries are introduced.

Characteristics of Tertiary Agricultural Education in the Czech Republic

Between 2002 and 2008, the total number of students at all levels of university education increased to 370 thousand. In the studied period this was an increase of almost 50% (CZSO, 2011) as demonstrated in Table 3.

	2002	2003	2004	2005	2006	2007	2008
Number of students	248 756	272 192	298 196	269 435	323 765	344 180	369 619

Table 3 – University students in the Czech Republic, Source: CZSO, 2011

The analysis of the numbers studying in the different fields of study in the Czech Republic shows that highest proportion of students are studying in the field of social and behavioural sciences and law. Table 4 shows that this study field accounted, in 2008, to more than 130 thousand students, which represents approximately one third of all students enrolled in all educational programmes.

Number of students	2002	2008
Education	30 644	46 802
Humanities	22 857	39 556
Social and behavioural sciences and law	61 360	131 289
Physical and life sciences and technologies	23 351	37 037

Architecture, engineering and related technologies	53 692	69 024
Agriculture, natural resources and conservation	8 873	15 261
Health, parks, recreation and fitness	17 669	28 245
Services	8 729	15 137

Table 4 – The number of students attending the main fields of study in the Czech Republic, Source: CZSO, 2011

Between 2002 and 2008, enrolment in this study field more than doubled (114%). This rise is twice as much as compared to the rise in the total number of students. The least attractive, measured by the number of students, is the study field of Technical science, production and construction, which saw an increase of only 29%, whereas in total, the share of students in this study field has declined by 8%. All other fields have risen by 50 to 70%, thus following the general trend in the rise of total enrolment. Agricultural education, while following a general increase, is the second least popular study field as of 2008.

Characteristics of Tertiary Agricultural Education in Canada

While Canadian tertiary education also enjoys an increase in the number of enrolled students, the increase is not as dramatic as in the Czech Republic. Between 2001 and 2007, the number of enrolled students has increased by approximately 15%, which is 35% less than in the Czech Republic.¹

¹ Statistics Canada

	2001/2002	2003/2004	2006/2007*
All instructional programs	886665	993768	1069703
Personal improvement and leisure	66	51	234
Education	69492	76875	77452
Visual and performing arts and communications technologies	27915	33858	37524
Humanities	133149	158115	160521
Social and behavioral sciences and law	138552	162972	187302
Business, management and public administration	141534	161235	174714
Physical and life sciences and technologies	78255	87261	93564
Mathematics, computer and information sciences	46035	43977	43390
Architecture, engineering and related technologies	74847	85785	85755
Agriculture, natural resources and conservation	14943	14769	15501
Health, parks, recreation and fitness	80991	92397	108450
Personal, protective and transportation services	1185	1299	2238
Other instructional programs	79698	74832	83058

Table 5 - University enrolment, by instructional program, 2001/2002 to 2006/2007m, *) official data and own estimation, Source: Statistics Canada, 2008

While the total number of students enrolled in agriculture in the analysed period is constant, the share of the agricultural students in total enrolment decreased. This is apparent from Table 5 above.

Comparison of Agricultural Education in Canada and the Czech Republic

Given the analysis of post-secondary agricultural education in both countries, there are many similarities. Total enrolment in agricultural programmes is similar, while the share in all study fields is low and showing no tendency to rise. For a more detailed analysis of agricultural education, two specific agricultural institutions are chosen from both countries. The Czech University of Life Sciences (CULS) is the biggest agricultural university in the Czech Republic. For Canada, the Nova Scotia Agricultural College (NSAC), the biggest agricultural education in Atlantic Canada, is chosen as a good representative of general trends in agricultural education. According to materials from each institution, they are both attempting to broaden their education in agriculture into other fields by extending the number of majors (NSAC), or by extending the number of study fields (CULS), to attract more high school students into their undergraduate programmes.

This paper tries to analyse this attempt to attract high school students into their programmes by analyzing their decision making process of how a major of studies is chosen.

Materials and Methods

In this paper, significant factors influencing the choice of major (educational institution) are analysed in order to identify proper marketing efforts in order to enhance enrolment. The analysis is carried out on data of prospective high school students entering the university programme. This analysis is helpful in providing insight to offset a decrease in enrolment by making study programs more attractive.

After a general overview and descriptive analysis of agricultural educational sectors in both countries, based on the data availability and inference opportunities, econometric modelling of choice of majors at NSAC is conducted using the limited dependent variable approach.

Post-secondary agricultural educational institutions in North America have been experiencing an overall decline in the number of enrolments (Russell, 1993; Blank 1998). Russell (1993) argues that "growing pressures during the 1980s for youth in the public schools to pursue rigorous academic tracks to meet increasing college entrance requirements has reduced the pool of secondary age youth who study agriculture and have interest in studying agriculture in college ...and so...with fewer youth going into agriculture, the long-term future of the agricultural industry is in question" (Russell, 1993, p13).

In recent decades, many agricultural colleges in the US have changed their name from "College of Agriculture." (Iowa State University, 1999). In Europe, many of the agricultural universities have changed their name and organization such as the University of Copenhagen, Faculty of Life Sciences (formerly Royal Veterinary and Agricultural University in Copenhagen) or Czech University of Life Sciences (formerly Czech University of Agriculture in Prague). In Canada, where

agriculture still plays an important role in national policies and among the general public, a similar trend of changes in the names of programmes and institutions may be observed. Of all the universities and colleges offering agricultural education, one of the few institutions keeping "Agriculture" in its name is the Nova Scotia Agricultural College (NSAC). Even though the name of the institution remains unchanged, it is true that the Nova Scotia Agricultural College, an agricultural educational institution in Atlantic Canada, has shown an increase in the overall enrolment, thus contradicting the trend of declining number of students enrolling into the food and agricultural sciences programmes (Uberoi, 2007). Blank (1998) argues that, on average, colleges of agriculture which increased their total enrolments did so by diversifying their programmes. It is therefore likely that one of the possible explanations as to why NSAC has attracted more students into its academic programme is a relatively large portfolio of majors. It is important to study what drives the motivation of high-school students to choose a particular major. The traditional biophysical agricultural majors should be compared with majors in social sciences. Understanding the motivation for choosing a major can help agricultural colleges to conduct better targeted promotional campaigns. Econometrics provides a powerful set of tools to analyse these marketing decisions.

Based on these facts, this paper tries to confirm whether factors that traditionally play an important role for people who choose agriculture as their major, also influence people who choose a different major such as economics or business within the agricultural sector. In addition, it is important to identify any differences in the motivation of students who want to pursue four years BSc in social sciences versus bio-physical sciences.

Finally, new marketing policies based on research findings are proposed.

The outline of this paper is as follows. Firstly, literature relevant to the choice of major is reviewed. Secondly, a model is developed based on utility maximisation. Thirdly, data and factors influencing the choice of major are introduced. Fourthly, some improvements for NSAC promotion campaign policies are recommended. Lastly, conclusions are made.

Choice of Major

Education is understood to be a means of overcoming handicaps, achieving greater equality and acquiring wealth and status for all (Sargent, 1994). Those, who want to pursue post-secondary education in particular, face a number of different choices. These choices, including choice of university, selection of degree, declaration of major or choice of study length, have been subject to a number of studies by both economists and sociologists.

For example, Cebula and Lopes (1982) examine in their study the effect of different monetary and non-monetary characteristics influencing the choice of major. Their study suggests that "earning differentials among fields and differences in the rate of change in earnings among fields are the most important factors in the student's decision" (Cebula and Lopes, 1982). Another study by Simpson (2002) deals with racial differences in the factors influencing choice of academic major in the US among European Americans, Asian Americans and African, Hispanic and Native Americans. Simpson tries to identify the different processes that influence a racial group's choice of major such as mother's influence, high-school characteristic and others. The author's main finding is that "differences in choice of major that previously existed between racial groups are no longer evident". Simpson recommends further investigation into why

students choose different majors. A different study deals with a specific major choice. Wildman and Torres (2002) identify five principal factors that influence the choice of major in agriculture: 1) exposure to agriculture, 2) family and friends, 3) recruitment activities of the college of agriculture, 4) professionals and 5) job considerations. Turner and Bowen (1999) study the differences in choice of major between men and women. One of the conclusions is a gap between the life sciences and mathematical/physical fields of study. The authors argue that "differences in SAT scores² account for only part of the observed gap, and an array of residual forces - including differences in preferences, labor market expectations, and gender-specific effects of the college experience-account for the main part of today's gender gaps in choice of academic major" (Turner and Bowen, 1999).

During the literature review no study has been revealed that would specifically deal with choice of different majors within agricultural colleges or universities. Hence, the purpose of this study is to analyse the choice of majors at NSAC, a prominent agricultural college within Atlantic region.

Data

The cross-sectional data for the year 2007 is analysed in this study. The data were obtained during promotional events at different high schools within the Atlantic region in Canada for 2007. A total of 504 high-school students were asked several questions such as about their prospective careers and post-secondary study interests.

For the purposes of this study, the choice of major has been chosen as a dependent variable. Fifteen different options were grouped into three categories i , where $i=1$ are the students

² SAT scores: "Scholastic Assessment Test" – a standardised test for college admissions in the USA and Canada

interested in Business/Social Science studies at BSc. level, $i=2$ are those student interested in Biophysical studies at BSc. level.

The dataset included invalid records with nonsense or missing values. After deleting the invalid records, the dataset consists of 424 observations, which is a relatively large sample size.

Factors Influencing Choice of Major

Different socio-economic characteristics of students are believed to play an important role when choosing a major. Unfortunately, based on the literature review the data from the survey lacks factors that influence the choice of major in agriculture. Thus, findings in this paper about factors influencing the choice of major at NSAC may be used as a pilot study for future comparison among all post-secondary agricultural institutions in North America.

Based on the data available we can examine the differences in three identified categories of majors i , $i = 1$ social science, and $i = 2$ biophysical science. During data examination, it was possible to extract more information from the data set and thus expand our analysis options. Ten different explanatory variables were chosen to explain the motivation for choosing a particular major. These are provided below and grouped into two categories: 1) Socio-economic background and 2) Study field and career expectations. However, some of the important groups of explanatory variables such as academic aptitude or family background are missing. It is therefore, necessary, to include questions pertaining to these factors in future research questionnaires.

Socio-economic Background

Number of extracurricular activities is denoted as *extrac* and takes a value from 0 to 9. This indicates the overall involvement in

the extracurricular activities. It is hard to make any *a priori* conclusions as to how this could influence the choice of major. The more active the students are, the better grades they could have.

Number of non-sport (social science based) extracurricular activities such as writing, drama, music, involvement in voluntary activities, or desire to get involved in student government, should be more prevalent among business and economics students than by the others. These activities are denoted as *nonsport* in the model and take a value from 0 to 3 based on the number of activities of each individual.

Province of residence is an important consideration with respect to choice of university. Here, *province* takes a value from 1 to 4, where 1 is Nova Scotia, 2 are all Atlantic provinces except Nova Scotia, 3 are all other provinces within Canada, and 4 is out of country location. This is denoted as the *province* variable. Historically, *gender* equity has played an important role in education. In the last century various policies were aimed at increasing the number of females pursuing post-secondary education, lately an adverse effect in some of the fields was observed (Turner and Bowen 1999). Gender takes a value of 1 if the individual is female and 0 if the individual is male, and is denoted by *gender*.

Although the Nova Scotia Agricultural College offers a set of majors, it is reasonable to assume that due to the college's strong agricultural background these factors will play an important role in choosing any major offered. As indicated in the study by Simpson (2002), rural background is one of the factors that motivate people to pursue studies in agriculture. Unfortunately the only information in the dataset that could confirm this hypothesis is the *hometown* identification that is denoted as *town*. For the purposes of the study, the variable *town* takes the value

1 if the person indicated a city as a hometown and 0 otherwise. Urban areas with more than 100,000 people were considered to be cities.

Geographic location influences the choice of university (Bratti, 2001). It is interesting to look at its influence upon choice of majors. For the purposes of this study the variable *geoloc* takes a value of 1 if hometown is Truro and surrounding or 0 otherwise.

Study Field and Career Expectations

Number of majors chosen can explain students' behaviour in different ways. Students that are determined and focused would tend to choose a lower number of majors. On the other hand, this indicator can be also perceived as some kind of risk decision process. Students who want to spread the risk would choose more majors. This variable is denoted as *majors* and takes a value from 0 to 9.

The information about the *planned years of study* could point at differences between categories Bio and Social. This variable is denoted as *years* and ranges from 0 to 5.

Number of career fields considered, denoted as *fields*, is an indicator that tells us about the determination of students. The less career fields are chosen by students, the more the students are determined. It is also true that the more different career fields a student considers, the more "universal" a student might be perceived by university recruiters.

Since one of the questions enables identification of people who think about *post-graduate studies*, it was chosen to be one of the explanatory variables and is denoted as *grad*. Including this variable provides valuable information about which group is

more likely to pursue post-graduate studies and thus enables one to target better that group within the recruitment process.

Results

Choice of base is an important consideration in the estimation process. Even though the choice of base is arbitrary, its choice is crucial for interpretation of the results. In this study, students interested in bio-physical sciences were chosen to be a base. This implies that social science students are compared to students in the bio-physical field. Estimation results for social science students are summarised in Table 6. Out of 10 explanatory variables, 5 variables are either significant or close to being significant in at least one comparison at the 5% level.

Social science students			
Y=1	estimate	t-value	prob.> t
const	-3.406	-4.625	0.000
majors	0.406	2.723	0.003
nonsport	0.670	1.548	0.061
years	0.352	2.209	0.014
fields	0.191	1.201	0.115
province	-0.024	-0.109	0.457
gender	-1.042	-2.501	0.006
town	-0.080	-0.098	0.461
geoloc	-0.060	-0.084	0.467
extrac	-0.196	-1.539	0.062
grad	-2.888	-2.027	0.022

Table 6 - Estimation results with biophysical science students base,
Source: own processing, 2011

The results of the estimation are explained further in the Discussion section below where the intuitive interpretation of variables that are significant is provided.

Discussion

Based on the estimation, several recommendations can be made. For the purposes of broader analysis, it is suggested that more questions need to be asked in future surveys. For example, up until now, students' scholastic abilities or their financial background have not been examined. This is the main drawback associated with the survey from 2007.

However, the results from this study can contribute to targeting the promotion campaign at the prospective students more efficiently. For example, while looking at the left part of Table 6 (*majors*), students interested in the social sciences are more likely to choose more majors (have more possibilities). This could imply that people interested in social sciences would consider a bigger choice of major possibilities. More options could possibly increase their enrolment rate. Although not largely significant, it is not surprising that people interested in social sciences are involved more in "art-type" extracurricular activities (*nonsport*). Departments dealing with social sciences at tertiary agricultural educational institutions can target the students using this information and better tailor its campaign. Estimate by *years* suggests that students interested in business and economics plan, in general, to study longer than students in the biophysical sciences, even though biophysical students are much more likely to pursue post-graduate studies (*grad*). This is an interesting result, which suggests strengthening graduate programmes. The estimation results also (estimate by *gender*) suggest that female high-school students are less likely to pursue studies in social sciences than in the bio-physical study

field. In order to follow the gender equity philosophy not only on the university level, but also within individual study fields, it seems desirable to change the promotion campaign to attract more women into the social science programme. Furthermore, the results (estimate by *extrac*) suggest that people with more extracurricular activities (primarily sports) are less likely to choose a social science background. This offers a number of interpretations, for example, biophysical students would be more likely to come to agricultural college if it offers and more promotes its sport activities.

Based on the study of both the Canadian and Czech agricultural educational system, it can be argued that Czech universities are subject to the same trends as the Canadian ones. When the results of the analysis are generalised, the following recommendations can be made for the Czech agricultural educational institutions. Particularly, students in the high schools with social science orientation should be targeted by promotional campaigns. Among many other factors, it is important to stress the factors such as the number and structure of offered study programmes.

Conclusions

The Nova Scotia Agricultural College (NSAC), an agricultural educational institution in Atlantic Canada has shown an increase in the enrolment (Uberoi, 2007), thus contradicting the overall trend that "...enrolments in colleges of agriculture have suffered in recent years, despite growing opportunities for college graduates in the food and agricultural sciences" (Russell, 1993). In 2007, 504 high school students were surveyed to answer questions not only about their future plans such as choice of major, but also about their personal preferences such as sports, or their social background like their hometown location. In this study, multinomial logit was used to analyse how the choice of major is driven by various socio-economic characteristics of the surveyed high-school students.

Unfortunately, some of the desired questions about students' academic abilities or financial background have not been answered. Nonetheless, interesting findings were made in the identification of differences between prospective social science BSc. students and biophysical sciences BSc. students. For example, students interested in the social sciences are more likely to choose more majors (have more possibilities) than biophysical students. This could imply that people interested in social sciences would consider a larger choice of major possibilities. Furthermore, students interested in business and economics plan, in general, to study longer than students in the biophysical sciences, even though biophysical students are much more likely to pursue post-graduate studies.

Based on the available data, further research could be done for lucrative/non-lucrative fields of long-term career interests. Also, the background of students (ranking of high-schools) or distance from the college could be estimated. If more data is available in the future, the analysis could be significantly

strengthened and thus, provide necessary information for future promotional campaigns at high schools not only for the Nova Scotia Agricultural College across Atlantic Canada, but given the data availability, for any agricultural post-secondary educational institution in the world.

Although the Canadian educational system differs from the Czech one, some of the outputs of the analysis can be applied to the area of post-secondary education in the Czech Republic. These can help in maintaining and increasing the position of Czech agricultural educational institutions among the competing universities. As new changes, such as tuition fees, or the reform of Bachelor and Master studies, etc., are introduced into the Czech system, it is important to learn from countries that traditionally successfully operate within a similar system, and adopt some of their strategies in order to enhance competitiveness of Czech agricultural post-secondary education.

Acknowledgement

This study has been partially funded by the grant solution MSM 6046070906 (MEYS, Czech Republic) "Economics of Czech agriculture resources and their efficient usage within the framework of multifunctional agri-food systems".

References

- Blank S.C. (1998), A Decade of Decline and Evolution in Agricultural Economics Enrolments and Programs, 1985-96. *Review of Agricultural Economics*, 20, 155-167.
- Bratti, M. (2001), *Does the choice of university matter? A study of the differences across UK universities in life sciences students' degree performance*. Warwick economic research papers. Department of economics. Warwick, UK.
- Cebula, R.J. & Lopes J. (1982), Determinants of Student Choice of Undergraduate Major Field. *American Educational Research Journal*, 19, 303-312.
- Czech Statistical Office (CZSO) (2010), *Studenti a absolventi vysokých škol v ČR celkem*, [online], available at: http://www.czso.cz/csu/redakce.nsf/i/studenti_a_absolventi_vysokych_skol_v_cr_celkem, retrieved: 03/03/2011.
- Esters, L. T. (2005), *Factors Influencing the College Choice of Urban Agricultural Education Students*, AAAE, [online], available at: <http://aaae.okstate.edu/proceedings/2005/Articles/061.pdf>, retrieved: 03/02/2011.
- FAO (2011), FAOSTAT Database, [online], available at: <http://faostat.fao.org/default.aspx>, retrieved 06/04/2011.
- Gebreselassie, S., (2006), *Intensification of Smallholder Agriculture in Ethiopia: Options and Scenarios*, Paper prepared for the Future Agricultures Consortium Meeting at the Institute of Development Studies 20-22 March 2006, [online], available at: http://www.future-agricultures.org/pdf%20files/SG_paper_3.pdf, retrieved: 05/03/2011.
- Huffman, W. E., (2001), Human capital: Education and agriculture, *Handbook of Agricultural Economics*, Volume 1.
- Kehm, B. M., (2006), Doctoral education in Europe and North America: a comparative analysis, [online], available at: <http://www.portlandpress.com/pp/books/online/fyos/083/0067/0830067.pdf>, retrieved: 02/03/2011.
- Národní rada poradenství pro zemědělství a rozvoj venkova (NRPPZARV) (2011), Dokument č. 1 - č.j.: 9882/2009-10000, [online], available at: http://www.agroporadenstvi.cz/attachments/Statut_a_JR_Rady_.pdf, retrieved: 05/04/2011.
- Russell, E.B. (1993), Attracting youth to agriculture. *Journal of extension*, 31, 4.
- Sargent, M. (1994), *The New Sociology for Australians*, Third Edition, Longman Chesire, Melbourne.
- Simpson, J.C. (2001), Segregated by Subject: Racial Differences in the Factors Influencing Academic Major between European Americans, Asian Americans, and African, Hispanic, and Native Americans. *The Journal of Higher Education*, 72, 63-100.
- Slavik, M. (2004), Changes and trends in secondary agricultural education in the Czech Republic, *International journal of educational development*, Volume: 24 Issue: 5 Pages: 539-545 DOI: 10.1016/S0738-0593(03)00041-5.
- Spiertz, J. H. J., Kropff, M. J. (2011), Adaptation of knowledge systems to changes in agriculture and society: The case of the Netherlands, *NJAS-Wageningen journal of life sciences*, Volume: 58 Issue: 1-2 Pages: 1-10 DOI: 10.1016/j.njas.2011.03.002.
- Statistics Canada (2011), *Education statistics*, [online], available at: <http://www.statcan.gc.ca/pub/11-516-x/sectionw/4147445-eng.htm>, retrieved: 03/03/2011.

Tamini, L. D. (2011), A nonparametric analysis of the impact of agri-environmental advisory activities on best management practice adoption: A case study of Quebec, *Ecological economics*, Volume: 70 Issue: 7 Pages: 1363-1374 DOI: 10.1016/j.ecolecon.2011.02.012.

The Ministry of Education, Youth and Sports CR (MEYS) (2011), *Pravda a mýty v Bílé knize*, [online], available at: <http://www.msmt.cz/bila-kniha/ohlasy-v-tisku-pravda-a-myty-v-bile-knize>, retrieved: 04/04/2011.

The Ministry of Education, Youth and Sports CR (MEYS) (2011), *Vysoké školství čeká zásadní reforma*, [online], available at: <http://www.msmt.cz/bila-kniha/ohlasy-v-tisku-vysoke-skolstvi-ceka-zasadni-reforma>, retrieved: 27/04/2011.

Turner, S.E. & Bowen W.G., (1999), Choice of Major: The Changing (Unchanging) Gender Gap. *Industrial and Labor Relations Review*, Vol. 52, No. 2 (Jan., 1999), pp. 289-313.

Uberoi L. (2007), *Personal communication*, Nova Scotia Agricultural College, retrieved 04/04/2011.

United Nations (UN) (2010), *Education*, [online], available at: <http://www.unesco.org/new/en/education/>, retrieved: 02/02/2011.

Wildman, M.L. & Torres R.M. (2002), *Factors influencing choice of major in agriculture*. North American Colleges and Teachers of Agriculture Journal.

World Bank (WB) (2011), *WDI database*, [online], available at: <http://data.worldbank.org/data-catalog/world-development-indicators>, retrieved 05/05/2011.

INFORMATION BENEFIT OF GRADUATES FOLLOW-UP SURVEYS

Zuzana Pacáková, Andrea Jindrová

Czech University of Life Sciences Prague
pacakova@pef.czu.cz

Abstract

The article aims to evaluate the benefit of follow-up surveys which are a useful tool to get feedback from university graduates. Questionnaire surveys are of irreplaceable sources of information from students and graduates, but several rules have to be taken into account when conducting such survey. The questionnaire is then one of the most often used tools for data collection in such types of surveys. The article presents not only the essential methods and principles of data collection and analysis, but it also evaluates the surveys efficiency and their impact on the quality of the educational process.

Various methodological principles are presented within the context of large questionnaire survey of CULS graduates that was held in 2008. In connection with the survey, the process is presented from the very beginning (list of questions, data matrix) through the introduction of the most often used statistical methods up to the analysis of the survey profit.

Key Words

Graduates, follow-up survey, information efficiency, data analysis, statistical methods

ARTICLE INFO

Article type

Full research paper

Article history

Received: August 22, 2011

Received in revised form: September 18, 2011

Accepted: September 29, 2011

Available on-line: September 30, 2011

Introduction

With growing amount of graduates, the universities have realized the necessity of relationship between the university and its graduates. There are several studies (Lambert et al, 2006; Brew, 2008; Liu et al, 2008; Rymešová, Kolman, 2010) presenting results of surveys among graduates, usually carried out in order to reflect the quality of studies and career development of students, generally to get a feedback from the graduates. A timely collection of feedback on the quality of studies from graduates is very important. However, it is difficult to collect the feedback, when the graduates are no more in contact with the university.

Students who have left the university are called alumni of the university. „Alumni are counted as pillars of universities' greatness. They play many critical roles for the university – returning to teach and to learn, counseling graduating students, serving on advisory boards, providing financial resources for programs to execute the university's mission” (Střížová, 2009). An alumni system is a social system connecting (not only) graduates having the same field of interest according to the universities' programme structure. Alumni system includes both forward (to the alumni) and backward (to the university) communication, mostly supported by IT/ICT. To get the students' feedback, various alumni systems, supported either by the university or published as a separate websites, were published.

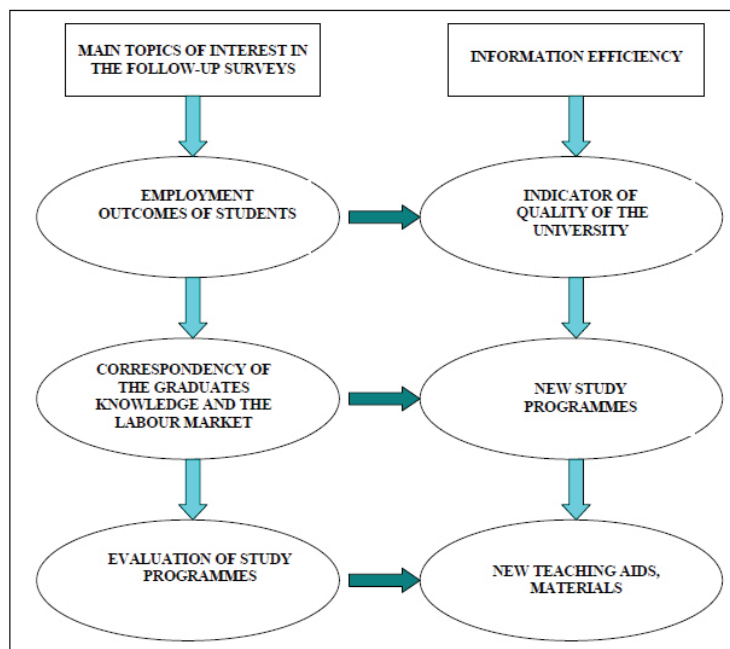
Questionnaire surveys (follow-up survey) are an essential tool for getting graduates' feedback. Follow-up surveys in education are those carried out after students have left the university by the administration of questionnaires to graduates and/or their employers (according to Liu et al, 2008). In practice, follow-up

surveys are widely used. For example, Queensland University of Technology explored the employment outcomes of its students (Powell, Partridge, 2010). The survey aimed to find out where the graduates live, work and what type of position they hold. Efendiev and Balabanova (2010) investigated careers of graduates of the management faculty at the Higher School of Economics State University.

They wanted to determine the extent to which the graduates are in demand on the labour market and the degree to which the content and the level of their education are in keeping with labour market needs. They also outlined some problems often occurring with follow-up surveys. Firstly they mentioned the problem that the graduates are often not connected to the institution they have graduated from. Too small samples and not representative „qualitative” research methods are then other often occurring limitations.

A large study of medical graduates in the United Kingdom was performed in 2002 (Lambert et al., 2006). It aimed to report the specialty choices of UK medical graduates and to compare the results with those from previous surveys. This is an example of a large study (2778 respondents) focused not on graduates from a particular university but on graduates with the same specialization.

The scheme 1 summarizes the main topics of interest of follow-up surveys and their information efficiency.



Scheme 1: Information efficiency of follow-up surveys (own working)

The questionnaire is a type of research technique that provides various types of information in accordance to its subsequent manipulation (data analysis). The data can either be in form of a text, qualitative or quantitative variables, based on questions formulation. For all that, the most common data are type of qualitative variables, resulting from questions with predefined or partly predefined answers.

Questionnaire surveys are the most common survey tools to be used for the data collection in various researches activities.

Questions formulation, their type and the variety of answers are the basic problems to be solved when constructing a questionnaire. An incorrectly presented questionnaire can discourage respondents from completing it, an unprofessional data analysis can lead to misinterpreted results and the aim of the study does not have to be fulfilled.

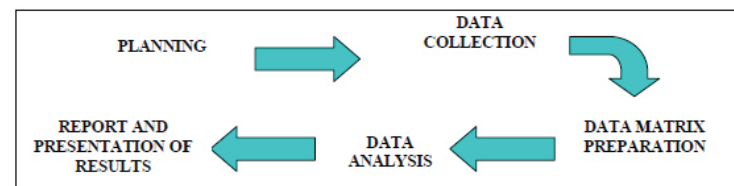
The next chapter aims to present techniques of statistical analysis, especially the analysis of qualitative variables. Valid results cannot be obtained on the basis of incorrect data, that's why not only the data analysis techniques, but also the whole research process from planning to presentation of results, is introduced in the chapter.

Material and Methods

Properly prepared data are the basic for good-quality and correct results of the data analysis.

During the data preparation phase it is necessary to focus on: cleaning the data, quality assessment, missing values analysis or weighting the data.

The scheme 2 illustrates the follow-up survey process.



Scheme 2: Follow-up survey process (own working)

Planning

Planning is the first step of survey during which following problems have to be solved: aim of the survey, time schedule, funding and the target group. In case of using data stored in a database, the sample size and variables to be analyzed have to be stated. But if the data are to be collected through survey (e. g. questionnaire) the planning process has to encompass also a selection of proper data collection technique.

Data collection

The next step which is closely connected with planning is the data collection phase. The questions have to be formulated in accordance with the previously stated hypothesis and the aim of the study. The structure of the sample should be in accordance with the structure of population the sample is selected from, so the representativeness of the sample is another important aspect. Data collection can be realized using different principles and methods, e. g. personal interview, telephone survey, internet based questionnaire and others.

Data matrix preparation

After finishing the data collection phase, the next step is the data matrix preparation. In the following text basic procedures connected with the data matrix preparation are presented.

The data collected within a questionnaire survey has to be transformed into a data format suitable for analysis by the statistical software. Some questions in the questionnaire are represented by one variable in the data matrix only, but some questions are represented by several variables. Let's imagine a question "educational attainment" with possible answers: primary school – high school – university degree. While one

answer only is to be selected, the question can be transformed into one variable with three possible values. But imagine the question "Which information sources do you use for your study?" with offer of answers: presentations - textbooks – internet – scientific books – other materials. In this case several answers can be selected. For this question more variables, in the concrete five, have to be created in the data matrix. Each variable can only reaches one of two values, e. g. 0 – not selected, 1 – selected. The use of simple codes (usually numbers) as it is shown in the last example (0; 1) is called coding. This step makes the data analysis using SW much easier. If the data are collected from different sources, the aggregation of the data has to be accomplished. Common statistical software offers both possibility to aggregate variables and units (cases).

The process of the quality adjustment and the data cleaning focuses on identification of extreme values and outliers. The one-dimensional approach to outliers identification consists in graphical analysis mainly. In case of multidimensional data, values that are extremely different in the viewpoint of one variable and also values that do not reflect the overall structure of the data have to be investigated. Johnson and Wichern (2007) propose following steps for outliers detection: graphical analysis of separate variables, graphical analysis of paired variables, examination of standardized values and squared distances.

Missing values analysis aims to identify and substitute missing values by the use of suitable method. The main sources of missing values are: non-response, unreliable or uncertain data. There are two basic approaches to handling missing data: elimination of the data (either object or variable) or substitution of missing values using imputation methods. For missing values analysis of categorical data, so called mining methods can be used (see e. g. Batista, Monard, 2003).

To balance the structure of the sample to make sure it reflects the structure of the population, weights should be estimated. While stratification weights are projected together with the design of the study to handle the unequal probabilities of selecting units, post-stratification weights adjust unbalances detected after the data are collected.

To meet the presumptions necessary for the use of selected statistical methods, transformation of variables is sometimes needed. Most often the transformation is made to ensure the normality of data. While the presumption of normal distribution refers to quantitative variables which are not as often collected through questionnaire surveys, detailed information is not presented in the article. For details it is possible to see e. g. Heřák et al. (2005) and Johnson, Wichern (2007).

Data analysis

The fourth phase of the follow-up survey process is data analysis. The procedures of statistical data analysis are mainly determined by the type of the data. Quantitative variables are numerical information often expressed on a scale (percentage, thousands crowns). Qualitative variables take verbal values (e. g. gender: female-male). There are two types of qualitative variables: values of ordinal variable can be sorted (educational attainment: primary school – high school – university degree), while the values of nominal variable cannot. By the use of questionnaire mostly qualitative data are collected. The basic principles to deal with qualitative data are based on frequency tables: one-dimensional, two-dimensional or multidimensional.

Univariate data analysis is based on description of separate variables using descriptive characteristics, graphic techniques or frequency tables. These characteristics provide basic information about the data. Measures of central tendency are

measures that represent with a proper value the tendency of most data to gather around this value. In case of nominal variable a proper measure of central tendency is the mode \tilde{x} . For ordinal variable

the tendency is often described using the median \tilde{x} . Median is the fiftieth quantile, it is the middle value of sorted data, it cuts the sorted data into two halves. For quantitative variables arithmetic mean \bar{x} is often a suitable characteristic to express the central tendency of values. When using the arithmetic mean one should consider the presence of extreme values, because the arithmetic mean is a measure which is sensitive to extremes.

Based on two qualitative variables the data can be sorted into a contingency table. Contingency table is then a basic setting for hypothesis testing and computation of measures of association. The basic statistical test for evaluation of relation (symmetric) between two qualitative variables is the chi-square test. The chi-square test can only be used if the presumptions about expected frequencies (frequencies expected under the null hypothesis about independency) are fulfilled. The expected frequencies have to take values 5 or more in at least 80% of cells and in other cells the values have to be equal at least 1. In case of not fulfilling the presumptions for the use of chi-square test, exact tests are to be used. Fisher's exact test is used in case of 2x2 table.

There are various measures of strength of association. Classical measures of relationship between two nominal variables, which are based on the chi-square statistic, are Pearson's and Cramer's coefficients. The coefficients take values between 0 and 1, or between -1 and 1, while zero indicates no relation between the variables.

In addition to the symmetric measures mentioned above, it is possible to construct asymmetric measures for evaluation of

one-sided dependency. Coefficient Sommers's d which takes values from interval $<-1,1>$ is an example of these asymmetric measures.

For selected tables of 2x2 dimension it is possible to describe the relationship between two factors by the use of odds ratio (OR) and relative risk (RR). The odds ratio ranges from 0 to infinity. When OR equals 1, there is no association between the row and the column variable. The odds ratio is a useful measure of association regardless of how the data are collected. The relative risk is the risk of developing a particular condition for one group compared to another group. (Stokes et. al, 2000)

Example of the use and interpretation of OR and RR is given further in the article. For details about the computation see e. g. Stokes et. al (2000) or Řezanková (2007).

For detailed analysis of differences of frequencies in the contingency table, sign scheme is a very helpful graphical tool. The scheme is based on the differences between observed and expected counts. If there is no significant difference between the observed and expected count, the appropriate cell in the table is labeled "0", in case of statistically significant difference the cell is labeled "+" or "-" depending on the difference (the observed value is above or below the expected). For $\alpha=0.05$ one sign is used, for $\alpha=0.01$ two and in case of statistically significant difference at $\alpha=0.001$ three signs.

Another graphical method for representing associations in a table of frequencies or counts is correspondence analysis (see e. g. Johnson, Wichern, 2007 or Manly, 2005).

When considering one dependent variable only or when analysing the relationship between more than two variables advanced multivariate modelling techniques are to be used. Logistic regression is a suitable method when analysing the

impact of both qualitative and quantitative variables on one qualitative variable - both alternative and multinomial (see Field, 2005).

Presentation of the results

The last step of the process is report and presentation of the results. The results presented have to be understandable, presented using suitable graphical outputs and the outputs should be exported so that they are readable by commonly used software tools.

Results

Follow-up survey held in 2008 at Czech University of Life Sciences Prague The data were collected through an internet-based questionnaire. The information about the survey was distributed by email, while there were two sources of the email addresses used. The first source included CULS graduates registered at public servers such as www.absolventi.cz, www.spoluzaci.cz or www.facebook.com. Second source of email addresses was the database of graduates of the Faculty of Economics and Management (<http://www.pef.czu.cz/dotazniky>). Based on the second source of addresses the rate of return was estimated, it was about 30%.

921 graduates participated in the study, most of the respondents were FEM graduates ($n=696$), then FAFNR (Faculty of Agrobiological Sciences, Food and Natural Resources) graduates ($n=98$), Faculty of Engineering ($n=73$). The rest ($n=36$) were students of other faculties and institutes of CULS. There were also twenty students who studied more than one faculty at CULS. In the study 54.7% of women and 45.3% of men participated. The mean age of respondents was 36 years (median 32 years).

While not all questionnaires were totally complete, all the analysis are based on the real number of answers. That is the reason why number of respondents for different questions can differ.

The data were analysed using the statistical software IBM SPSS, v. 17. Data were automatically saved into a database. The first step then was to identify the invalid questionnaires. We set down number of criteria to identify invalid questionnaires:

- IP address,
- more than twenty percent of the items incomplete,
- questionnaire without key information,
- misleading data.

First criterion that was checked was the IP address. In case of similar IP addresses, other aspects were further investigated (agreement in sex, date of birth, etc.).

Questionnaires with more than twenty percent of missing values were set aside. Also some basic logical structure among the answers was evaluated, e.g.:

- year of graduation > year of birth + 22,
- length of study ≥ 3 (bachelor degree),
- etc.

Following these criterion 25 questionnaires were taken out.

To optimize the process of data preparation the data collection process was made in order to automate some procedures. The data matrix was schemed out along with the on-line questionnaire so that as many steps as possible were realized together. Following steps of data matrix preparation were realized along with the questionnaire preparation:

- projection of the questions into the variables,

- variables coding,
- variable types of measure,
- etc.

Though, there were still many steps of data preparation to be done. At first, invalid questionnaires were identified and taken out following the criteria mentioned above. The data were provided with value labels. Basic graphic and descriptive techniques were then used to clear the data. Each qualitative variable was firstly described separately using simple frequency table or bar graph which allows detection of unusual or senseless values.

It has already been mentioned that most of the follow-up surveys among the graduates aims at either:

- employment outcomes of graduates,
- correspondence of graduates knowledge and labour market needs,
- evaluation of study programmes.

The first and the second points are those probably studied most often. One of the indicators that are monitored in order to assess the quality of universities, is the ability to find a suitable position on the labour market. The unemployment among university graduates is generally not as high as it is among other employees. In the Czech Republic the unemployment rate among the graduates has decreased since 2004 (7.7%) to 2008 (2.5%). In 2009 (3.1%) there was a little increase (Úlovcová, H. et al., 2010).

Although the unemployment rate is not high, it is necessary to investigate the structure of graduates unemployed. Follow-up surveys bring information on position and specialization of graduates. Based on these information, the management of

the university can create new study programmes in accordance with the labour market demand.

The employability of graduates or let say the ability of university sector to provide graduates with such skills that employers need, was since 1990's studied by many authors (e. g. Tomlinson, 2007; Mason et. alter, 2009).

In our survey a set of questions to this topic was oriented. The respondents were asked several questions on their present, but also previous work: specialization (work in field) - employee/ employer/sole trader - management position - satisfaction with work and others.

In table 1, results on consistence between current specialization of graduates and their study programme at university are presented.

Work in field	Frequency	Percent
yes	330	35.8
partly	253	27.5
other specialization, use knowledge	209	22.7
other specialization, do not use knowledge	129	14.0
total	921	100.00

Table 1: Current specialization of graduates according to their study programme

Our analysis showed that almost 36% of graduates work in field they have studied. But 129 graduates (14%) do not use the knowledge they have got during university studies. This answer is more often by women (60.5%) than men (39.5%). We can also indicate that working without using the university knowledge is much more often by young graduates; more than 50% of them have maximum the second work after graduation. What is also

interesting is the fact that almost 50% of those 129 graduates mentioned that the graduation does not have an impact on their salary.

Next results are connected with the graduate's management position. The results are shown in table 2.

Management position	Frequency	Percent
top management	113	12.4
middle management	204	22.3
lower management	120	13.1
specialist	363	39.8
ordinary employee	113	2.4
total	913	100.00

Table 2: Management position of graduates

Most of the graduates stated that they work as an independent specialist (39.8%), the second most frequent position is in the middle management (22.3%).

More detailed analysis confirmed that there are large differences between men and women in the consistence of their current specialization and their study programme. For the next analysis the original variable was transformed into two categories only (consistent – not consistent). Current specialization is consistent with the study programme much often by men than by women ($p=0.006$; $n=921$).

In table 3, there are odss ratio and relative risk describing the relation between sex and work in field.

Characteristic	Value	95% confidence interval	
OR	1.33	1.1	1.74
RR	1.11	1.1	1.22

Table 3: OR a RR – work in field in relation to sex of the respondent

By men there is 1.33 times higher chance (OR=1.33) of being employed in consistence with the study programme. Probability of being employed in consistence with the study programme is by men 1.11 times higher than by women.

When comparing the probability of work in field of younger and older graduates, graduates after 2001 are more often employed in consistence with their study programme than those who graduated earlier ($p<0.0001$; $n=920$).

Characteristic	Value	95% confidence interval	
OR	1.79	1.37	2.35
RR	1.25	1.12	1.38

Table 4: OR a RR – work in field in relation to graduation year

Following the results in table 4, by graduates after 2001 the chance of work in field is 1.79 times higher (OR=1.79) than by older graduates. The probability is then 1.25 times higher (RR=1.25) by graduates after 2001.

In recent years it is a common praxis that employers look for their future employees at universities and they deliberately search for specialist from certain field. The universities also try to adjust the offer of study programmes so that it is in agreement with requirements of labour market. These could be the reasons why current graduates can easier find work that is consistent with their study knowledge.

When studying the success of CULS graduates on the labour market, we were also interested in a fact whether the later work in field is affected by students' interest of the university and its study programme. That is whether the student is interested in the field of study/work already before studies. The analysis is based on a set of questions on motives to study at the CULS Prague. One of the questions was interest in the field/study programme. For the purpose of this analysis the variable was recoded into two categories: yes, I was interested – no, I was not interested. There is significant relation between the interest in field and later employment in the field ($p<0.0001$; $n=921$).

Characteristic	Value	95% confidence interval	
OR	2.13	1.61	2.82
RR	1.35	1.1	1.52

Table 5: OR a RR – work in field in relation to interest in the field before studies

As it is obvious from table 5, students who were strongly interested in the field already before starting the studies have 2.13 times higher chance of working in the field.

Czech University of Life Sciences Prague consists of five faculties and two institutes. Further analysis focuses on different chances of graduates from the faculties on the labour market. It was found that there is significant difference between the students from various faculties and their ability to find work in consistence with their study programme ($p<0.0001$; $n=896$). For example when comparing two largest faculties in the study, FEM (Faculty of Economics and Management) graduates are often employed in consistence with their study programme, FFWW (Faculty of Forestry and Wood Sciences) graduates assert in different fields also.

The graduates were also asked how many jobs they passed after the graduation. When concerning only those graduates who are more than five but maximum ten years after graduation, most of the students (more than 40%) answered that the job they have is still the first after graduation. More than 80% had maximum two previous job experiences. It can be pointed out that young people maximum 10 years after they had graduated, have very small work fluctuation. Tomlinson (2007) realized a qualitative study upon 53 final-year undergraduates to examine the way students, making the transition from higher education into the labour market, construct, understand and begin to manage their employability. His outcomes are somewhat different. His work pointed out that students realized the necessity of changing jobs. *„The evidence of this study suggests that fewer students are anticipating their careers to be played out within the secure confines of single jobs and organisations which would form the basis of their long-term career progression. Movement between jobs and organisations was seen by some students as an inevitable reality.“* (Tomlinson, 2007, pp 288).

The second part of our analysis is connected with the student's evaluation of quality of study at the university –availability of study materials, possibility to study abroad and other aspects.

While in our study also students who graduated before 1990 were participating, our results provided us to make a retrospective study.

Set of questions was connected with the evaluation of availability of study materials including availability of IT. Availability of selected study supports was evaluated on a one-to-five scale (1-excellent; 5-unsufficient). Although lot of Czech and foreign literature is available today, no significant difference was found in evaluation of study materials availability and quality in relation to the graduation period ($p=0.266$; resp. $p=0.286$). We can

then assume that materials available for various periods were sufficient for students. Unfortunately, lot of present students are not very interested in other literature than common textbooks, so they do not see the availability of literature (especially foreign) helpful.

On the other hand there are wide differences in evaluation of availability of information technologies ($p<0.0001$).

The differences in evaluation in relation to the graduation period are to be obviously seen from the table 6. The results are presented using the sign scheme.

		Availability of IT (1-5)				
		1	2	3	4	5
Graduation period	untill 1990	---	---	+++	+++	+++
	1991-2000	---	0	++	0	-
	after 2000	+++	+++	---	---	---

Table 6: Sign scheme – evaluation of availability of IT in relation to the graduation period

The results that today's graduates evaluation of IT availability is better, is not to very surprising (especially due to overall (un)availability of IT before 1990), but when studying the results more deeply, we can see that there are significant differences between the two groups of graduates after 1990 also.

Another result that seems to be interested at the present time, is connected with the evaluation of student team and its cohesion. No difference was found in relation to the graduation period ($p=0.802$). While most of present students work regularly during their studies, it was expected that they would evaluate the student team worse than their older colleagues. However, the evaluation of student collective is very positive across all

graduates. Especial campus of CULS Prague and intensive use of various modern communication tools such as email, Facebook, Twitter and so on could be the reasons.

Next set of questions was aimed on student's evaluation of benefit of their study on CULS Prague. Various statements on this topic were evaluated on a scale: agree – rather agree – rather disagree – disagree. There is no difference in evaluation of graduates from different periods in case of development of communication skills ($p=0.583$) or ability to speak foreign language ($p=0.065$).

Very positive is the improving evaluation of team work and presentation skills. Today's students mention that university studies have improved their ability to work in team much more often than it was by older graduates ($p<0.0001$). They also have better presentation skills ($p=0.005$).

The changes within the graduation period are depicted in figure 1.

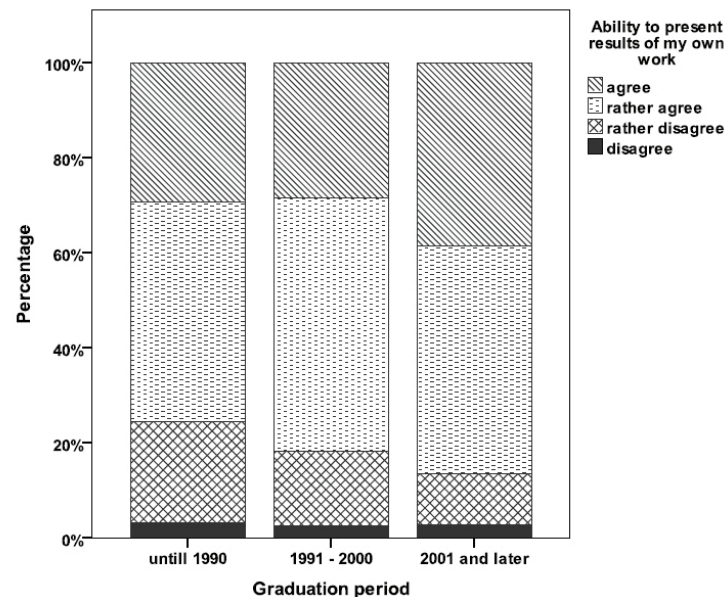


Figure 1: Level of agreement with the statement "During the studies at CULS Prague I have learned to present and argue for the results of my work in relation to the graduation period"

Discussion

The follow-up survey data enable detailed analysis of graduate's position on the labour market. It is possible to find out a proportion of graduates that work in the field of interest, what is their position in the management structure and it is also possible to identify factors that influence graduate's ability to find an appropriate work. Our results turned out, that FEM students can easier find work in the field of interest than students of some

other more specialized faculties. The largest differences were than between FEM graduates and FFWS graduates. Rymešová and Kolman (2010) who studied the differences between the FEM graduates and FAFNR (Faculty of Agrobiological Sciences, Food and Natural Resources) graduates found that in both groups of graduates the percent of those who work in the field reaches almost 70 %.

Our analysis presented a new trend also: younger graduates work in the field of interest they have studied more often than those who had graduated earlier (in 2000 and earlier).

The interest in specialization and study programme is one of the key factors of later employment of graduates. Students who were really interested in the field of study are often employed in the top management. Younger graduates can easily find work in the field than graduates a decade ago. This trend is in consistence with the active approach of today's companies looking for later employments already at universities.

What seems to be surprising with students' evaluation of different aspects of study is the fact that no difference was found in evaluation of availability and quality of study materials among younger and older students. We have expected younger students to appreciate possibilities to use foreign literature or online databases providing foreign studies and articles.

The authors have also expected that there are differences in evaluation of student team and its cohesion. While most of today's are employed and do not visit the campus regularly, we expected them not to evaluate the student team much positive. However, both younger and older graduates evaluate the collective of student very positive. We suppose that today the face-to-face communication is widely substituted by various modern communication tools such as Facebook. Also another result that shows positive evaluation of team work

and improvement of team work abilities during studies is in agreement with the finding of "good team".

Conclusion

Modern technologies provide various useful tools to organize an extensive follow-up survey.

Manipulation and analysis of large datasets is easily realizable by the use of statistical programmes also. However, the quality of study and its results is primarily defined by the quality of the whole survey process starting with a properly stated aim of the study, followed by the quality of questionnaire and the data itself. No good and valid results can be obtained upon incorrectly prepared data. No valuable data can be obtained without proper aim and hypothesis stated. To get valid information on the basis of follow-up survey all phases of the process have to be implemented with attention.

Acknowledgements

The authors gratefully acknowledge the support from the Faculty of Economic and Management, Czech University of Life Sciences, via IGA grant, No. 11170/1312/3142 – „Questionnaire survey on employability of CULS graduates”.

References

- Batista, G. E. A. P. A., Monard, M. C. (2003) An analysis of four missing data treatment methods for supervised learning. In *Applied Artificial Intelligence*, No. 17, pp 519-533.
- Brew, L. S. (2008) „The role of student feedback in evaluating and revising a blended learning course”, *Internet and Higher Education*, Vol. 11, pp 98-105.

Efendiev, A. G., Balabanová, E. S. (2010) „The Professional Careers of Graduates of a Management Faculty“, *Russian Education and Society*, Vol. 52, No. 9, pp 47-68.

Johnson, R. A., Wichern, D. W. (2007) *Applied Multivariate Statistical Analysis*, New Jersey: Pearson Prentice Hall.

Hebák, P. et al. (2005) *Vicerozměrné statistické metody* [3], Informatorium, Praha.

Field, A. (2005) *Discovering Statistics Using SPSS*, London: SAGE Publications.

Lambert, T. W., Goldacre, M. J., Turner, G. (2006) „Career choices of United Kingdom medical graduates of 2002: questionnaire survey“, *Medical Education*, Vol. 40, pp 514-521.

Liu, D., Chang, F., Yin, S., Zhang, F. (2008) „Collecting feedback on the quality of distance education: a follow-up survey of China Central Radio and TV University graduates and their employers“, *Open Learning*, Vol. 23, No. 3, pp 215-229.

Manly, B. F. J. (2005) *Multivariate Statistical Methods: a primer*, 3. vyd. Boca Raton: Chapman & Hall/CRC.

Mason, G., Williams, G., Cranmer, S. (2009) „Employability skills initiatives in higher education: what effects do they have on graduate labour market outcomes?“, *Education Economics*, Vol. 17, No. 1, pp 1-30.

Powell, T., Partridge, H. (2010) „Life in the “real world”: a profile of Queensland University of Technology library and information science graduates“, *Australian Academic & Research Libraries*, Vol. 41, No. 2, pp 113-128.

Rymešová, P., Kolman, L. (2010) „A Reflection on University Studies and further Career development of Chosen CULS Faculties' Graduates“, *Journal on Efficiency and Responsibility in Education and Science*, Vol. 3, No. 2, pp 42-53.

Řezanková, H. (2007) *Analýza dat z dotazníkového šetření*, Profesional Publishing, Praha.

Stokes, M. E., Davis, C. S., Koch, G. G. (2000) *Categorical Data Analysis Using The SAS System*. North Carolina: SAS Institute Inc.

Střížová, V. (2009) „University Communication and Responsibility Tools Strengthening their Efficiency“, *Journal on Efficiency and Responsibility in Education and Science*, Vol. 2, No. 2, pp 1-12.

Tomlinson, M. (2007) „Graduate employability and student attitudes and orientations to the labour market“, *Journal of Education and Work*, Vol. 20, No. 4, pp 285 – 304.

Úlovcová, H. et al. (2010) „Uplatnění absolventů škol na trhu práce – 2009“, Praha: Národní ústav odborného vzdělávání.

IPMA STANDARD ELEMENTS AND FEEDBACK IN PROJECT MANAGEMENT TEACHING

Jan Bartoška, Radka Svobodová, Martina Jarkovská

Czech University of Life Sciences Prague
bartoska@pef.czu.cz

Abstract

The paper proposes the concept of project management teaching including the International Project Management Association (IPMA) standard. The concept of teaching is theoretical and derives from the notion of competence, which the IPMA standard is based on. The paper presents a brief description of the IPMA standard and endeavours to define the notion of competence. The competence is worked with in respect to hierarchical recognition. The proposed teaching concept works with the concepts of information, knowledge and skills. The teaching proposal stems from the structure and contents of the IPMA standard elements. Furthermore, the paper elaborates the issue of embedding the elements of the IPMA standard competences into training courses. In the article, the eye of the IPMA competences is further enhanced with possible training courses and specialist areas in which the standard elements can thematically be included. The paper states that the competence elements and training courses cross one another and overlap in a manifold way. The authors also propose a way which could verify into what extent the students have actually acquired taught IPMA competence elements. The paper contains the proposal of feedback quantification for the IPMA standard and project management teaching. The results of the paper can be used as a starting premise for future research. Both the verification proposal and the embedding of the elements into teaching are derived from on-going academic experience of the authors of the article.

ARTICLE INFO

Article type

Short communication

Article history

Received: August 30, 2011

Received in revised form: September 22, 2011

Accepted: September 30, 2011

Available on-line: September 30, 2011

Key Words

Project management; competence; teaching; IPMA standard; feedback

Introduction

In project management practice we can find a number of failures from the point of view of extending the project financial budget, extending the deadline or not meeting goals and objectives of the project. To meet the deadline, budget and project objectives, responsible and competent workers are necessary. False steps or wrong assessment leading to losses are the results of insufficient or missing competence. Söderlund, Vaagaasar and Andersen (2008) write about the need of sufficient competence, competence defined and with determined content, which will during project planning or its realisation be "at the right time at the right place". In their articles the authors focused on the question whether companies are able to define and develop their competences while managing their projects. Bedrnová (2000) writes about competence as a dynamic relationship between man and his or her work. In her article she deals with interconnection between work competence and qualification. Teaching in specialist courses as well as at basic education level should lead to creating and acquiring competences. The need for creating and developing competences not only in educational institutions is supported by research results carried out by the American organisation "Partnership for 21st Century Skills". The organization associates employers and school workers, and its goal is enforcing changes in American education objectives. The research results (Michelman, 2007) revealed an insufficient reflexion of schools to global changes which are increasingly demanding development and greater emphasis on competences in many areas. The issue of competences and possible ways of their development is dealt with in more detail for example in Knecht et al (2010). Project management teaching has already been part of university education in the world for several decades. The project management is usually

lectured in the form of a one- or two-semester course as part of economic and managerial study fields and programmes. At some universities or colleges project management even exists as an independent Bachelor or Masters field of study. However, not always do such courses and fields of study embody at least one international standard of project management in their curricula. Therefore, it is rather unsuccessful to find a direct connection between selected standard and particular seminars whose teaching curricula would be defined by the standard content. The development of project management teaching is dealt with for example in Dixon (2011), whose article focuses on the possibilities of experimental project management teaching and compares the alternative approaches with traditional ones. Continuous improvements in training future specialists are and will always remain a current issue for discussion.

The aim of this paper is to create a concept for project management teaching with a direct implementation of the International Project Management Association standard, with the course structure referring to the content of individual elements of these standard competences. The paper also aims at proposing a way that would verify to what extent the students have actually adopted the taught elements of the IPMA competences, especially for training course purposes. The propositions drawn by the paper should outline the possibilities of future research in project management teaching.

Material and Methods

International IPMA standard

The international standard for project management, referred to in its abbreviated form as the IPMA, is issued and certified by the International Project Management Association (IPMA), based in the Netherlands. At present the IPMA has more than 45 branches at particular national levels responsible for manager certification in their own countries. In the Czech Republic the standard is represented by Project Management Association (Společnost pro projektové řízení, SPŘ, o. s.), residing in Brno. In 2008 the Czech branch issued the translation of the international competencies standard for project management "ICB – IPMA Competence Baseline" in version 3 from 2006 entitled "National competency standard for project management" (Pitaš et al, 2008). Both the original standard in English (Caupin et al, 2006) as well as the national standard in the Czech language is based on defining and analysing competencies necessary for project management. Following the first part dealing with general part of certification examination and certification system, the IPMA standard text is divided into three main competence areas. The IPMA standard distinguishes project management competencies as technical, behavioural and context competencies. There are 20 elements in technical area, 15 in behavioural area and 11 in contextual area. The competencies for particular competence areas are always described in a detailed and structured way.

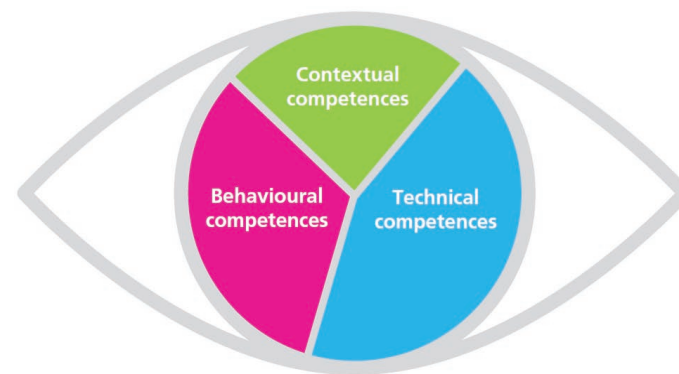


Fig. 1: The IPMA standard competence "eye" (Caupin et al, 2006).

The IPMA standard defines competence as follows: "The set of knowledge, personal approach, skills and related experience altogether needed in order to achieve success in a particular position." Further, the IPMA standard defines skills for project management as competences decomposable into separate elements and describable using particular points. In the IPMA standard, the element of each competence is created by text further divided into the following parts:

- **The description** of a particular area.
- **Possible procedural steps**, which may be recommended for processing.
- **Specialist or professional topics**, related to competence.
- **Key competence**, which the manager should know and master.
- **Relations to the surroundings in the area linked with competence.**

The area description is the introduction to the issues and related topics and parts. The procedural steps are presented as lists of tasks and activities, emphasising action with the use of imperative verb forms. The specialist and professional topics are submitted in a brief list of technical terms and entries referring to a professional, specialist or scientific discipline. The key competence can be regarded as the requirements and conditions necessary for meeting the IPMA standard certification grades. The relations to the surroundings and other standard elements, although mentioned in the list of references, can also be understood as a following description of adjacent areas. The overall structure of each IPMA standard element is presented in the form of instructions, entries and references. The full acquisition of project management competences, thanks to the IPMA standard elements, will always be conditioned by a continuous study of the topics as well as training and individual experience.

The meaning of competence

Competencies can be described as “the set of knowledge, skills, abilities, attitudes and values essential to one’s personal development and his or her application in society”. Today, and especially in the Czech Republic, there are understood two meanings of the competence. The first meaning expresses the competence as power or permission granted by the authority or belonging to the authority. The second concept of competence takes the form of abilities to carry out certain activities or be able to carry them out. According to Bedrnová (2000), it is possible to regard competence as optimal harmonization of one’s work competence for his or her tailor-executed profession and the particular work position.

The concept of competence can be classified into the hierarchy of knowledge and structuring the world as follows:

- **data,**
- **facts,**
- **information,**
- **knowledge,**
- **know-how,**
- **skills,**
- **competence.**

The competence does not stand the highest in the hierarchy because the meaning of competence consists of composing the previous concepts. The mentioned concepts can be found in many specialist disciplines and professional approaches, and in different contexts. For purposes of this article the mentioned concepts are mainly looked upon as system approach aspects. Therefore it is possible to simplify the list of concepts only to those which can be applied to class. The above-mentioned list of concepts can be condensed as follows:

- **information,**
- **knowledge,**
- **skills.**

Information, i.e. data and facts presented in context, are included in study texts and literature which can be mentioned during a lecture or recommended to students for their self-study. As knowledge we regard such information communicated to the students in a personal contact with the possibility of a dialogue, in the context of stories and examples. As skills we regard the knowledge which the student acquired on his or her own and which s/he practically verified and tested. Therefore, the skills creation will be determined by a practical specialisation of the

course. Combining the student's acquired knowledge and skills, the basis for the formation and development of the competence is prepared.

The second, in the Czech Republic widely used concept of competence which claims the ability to execute a certain activity or being able to execute it, is close to the original meaning of the English word competence. Another word close to the English word competence is competitiveness which is crucial for understanding the nature and role of competence in class and for the individual. The competence acquisition should lead to his or her competitiveness at work and in life. The competence acquisition at the level of primary school should prepare him or her for a successful personal and family life in a society. Therefore, the selection of competencies that are or are not essential or crucial is highly specific and based on the society in which s/he lives and receives education. The competence acquisition in the area of professional life should prepare him or her for solving professional and specialist tasks as well as for the competition in his or her job and career. That is why the competence can be explained as one's particular behaviour leading to expected and desired results. The students' acquisition of competition advantage will present the main criterion whether the information transfer, knowledge acquisition and skills verification has been successful. The testing of students' competitiveness can in no way be regarded as an easy task. It can be expected that the students' competitiveness is a class objective and not a verification object of class outputs.

Project management competence in present-day courses

Project management has been lectured and taught at the Faculty of Economics and Management (FEM), Czech University of Life Sciences Prague (CULS Prague) as a part of Bachelor and Master Courses and most study fields since the 1990's of the 20th century. It concerns especially the following courses: Project Management, Project Management Methods, Creating and Software Support of Projects and Software Applications of Operations Research Methods. The courses also involve critical path method, creation and work with directive and topical project plan and the analysis of project sources. These three latter topics may be included in the IPMA standard technical competence "1.11 Time and project phases" and "1.12 Resources". Although the mentioned topics follow certain IPMA standard elements when lectured in the courses at the university, they are neither taught in a wider context of the standard nor are they lectured in sequence with other standard competence elements.

At FEM CULS Prague, the IPMA standard is taught independently, without any links to the topics related to technical or other standard competence. The students adopt the knowledge from the project management field separately, irrespective of the standard principles and recommendations. The verification of the students' acquired knowledge is carried out through seminar works and tests. However, the verification is not linked to the IPMA standard at all. This leads to a situation when the students, who graduate from the university courses and acquire professional skills in the field of project management, do not have the opportunity of a full and thorough acquisition of the IPMA competence elements and the IPMA standard as such. However, in a current state of project management, only specialist knowledge or skill without any knowledge of project

management standards nowadays used world-wide, is rather insufficient.

Results

The IPMA standard competence element structure

The international IPMA standard, applied to project management, consists of 46 elements, each representing particular competence. By the element we understand a structured text which defines topics and knowledge areas for project management. The text of the element always begins with the area description which connects other areas of the element into a common framework. The element area description does not only introduce the issue but also connects and completes the following four parts. The remaining parts are nearly always presented as the list of activities, concepts or references. Each element part in the IPMA standard can be defined in terms of hierarchical learning as follows:

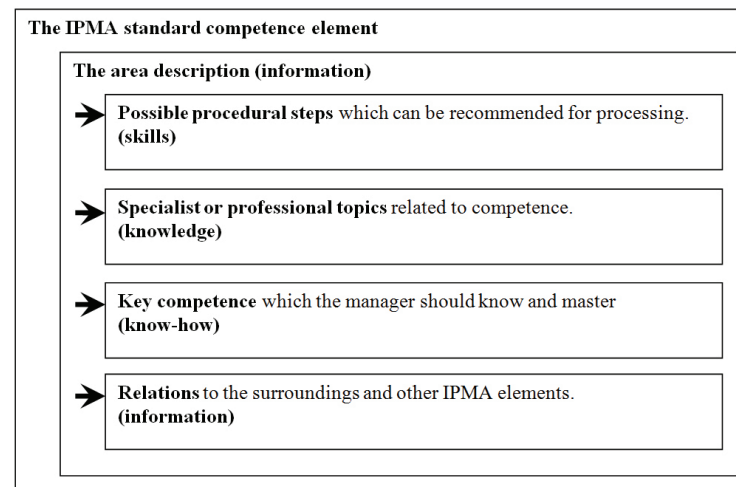


Fig. 2: Classification of the IPMA element description.

The structure of the IPMA standard element in school courses

For the purpose of students' education, the structure needs to be modified. Some parts of the element can be applied to class, some cannot. Those parts that are referred to as know-how cannot be conveyed to students in a direct way. The know-how in the element text can be expected to be conveyed to students implicitly, by means of other parts. The course content will consist of those element parts which are composed of information, knowledge or skills. However, even the skills cannot be transmitted to students directly. The student forms his or her own skill applying his or her knowledge to practice. Therefore, the skills are presented in class in the form of

practical exercises and students' individual work. The structure of teaching the IPMA elements can be described as follows:

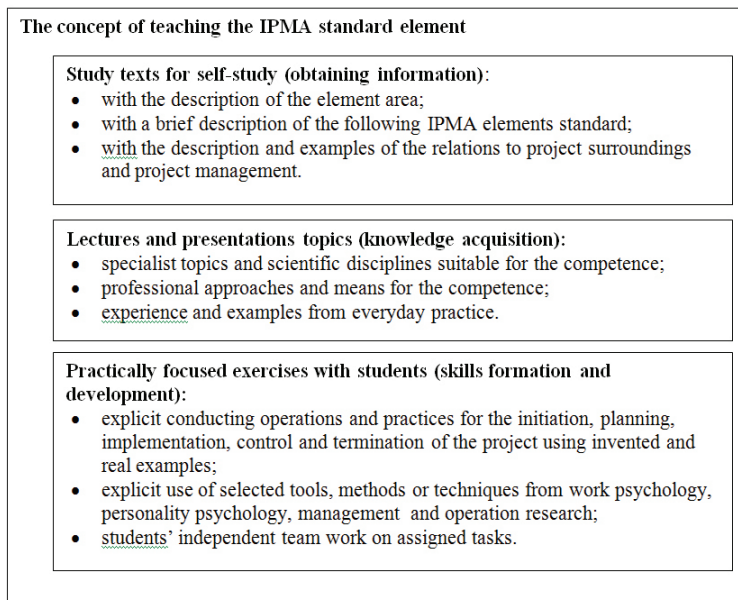


Fig. 3: The teaching concept of the IPMA standard elements.

The class structure which, beside study texts for self-study also presupposes lectures and seminars can be from the hierarchy of learning classified as follows:

- **study texts** for self-study will include **data, facts and information**;
- **lectures and a dialogue** with students will result in **knowledge acquisition**;
- **practically focused exercises** with the students' active

participation will lead to the formation of skills.

Here we deal with the system approach application while modifying the structured text for course needs. At this point the mentioned information, knowledge and skills can be regarded as partial aspects for the composition and formation of competencies.

Teaching the IPMA standard competence elements

Due to its vast range, it is impossible to teach the whole IPMA standard during one course. The IPMA standard comprises many specialist areas, such as: Operations Research, Finance, Personnel Management, Psychology, Ethics etc. For the training of the whole IPMA standard range it is also necessary to take into account training courses that would thematically follow and meet the standard competence elements. The IPMA standard elements are thematically well articulated and fall into several specialist areas at once. Only a small amount of the standard elements could be included in one training course without any further links in follow-up courses. Specialist areas and courses suitable for training and covering the complete IPMA standard can be related to the elements as follows:

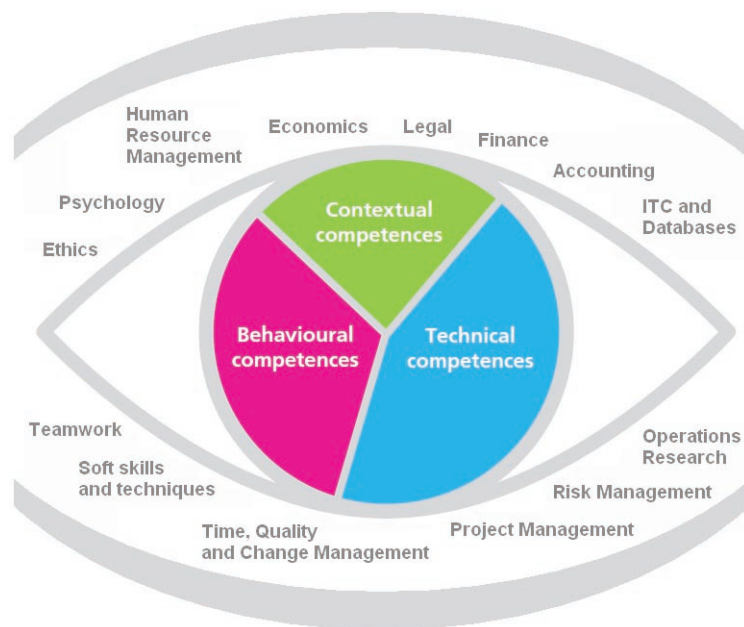


Fig. 4: The IPMA standard competence “eye” (Caupin et al, 2006) and related specialist areas and courses.

Figure 4 presents specialist areas surrounding the eye of competence that would absorb the scope of the IPMA standard competence elements and that could create further training courses. The specialist areas in Figure 4 are placed around the eye in correspondence to a particular competence scope. Behavioural competences may belong among specialist areas or courses like Psychology, Ethics, Teamwork, Soft skills and techniques, Time Management, Quality Management, and Change Management. Contextual competences will be most represented in courses or specialist disciplines such as Human

Resource Management, Economics, Legal, Finance, Accounting. Technical competences can be found especially in Operations Research, Risk Management, Project Management, ITC and Databases. Operations Research and Project Management exceed the IPMA standard in respect to their scope and therefore more courses need to be considered for them. Yet for the teaching of the IPMA standard only some topics from the field of Operations Research can be recommended, and these are mainly Game theory, Graph theory, Decision analysis, and Simulation. For the purposes of the IPMA standard it is necessary to teach Project Management in its complete range. Project Management will become a unifying and central topic of the course.

Acquiring and testing the IPMA standard competence in teaching

Any purposeful human activity should have its feedback. Without the feedback it is impossible to assess the contribution and effect from the carried-out activity. In education process, the feedback between a student and pedagogue is vital. Project management training can lead the students to the acquiring a number of habits, for instance: structuring a problem in time and space, systematic approach to problem solving, critical thinking during conflict solving and so on. The majority of principles and approaches in project management are generally valid and widely applicable.

The IPMA standard training, in the framework of project management training, should contain feedback in the manner of a test which would reveal whether the student has acquired the IPMA standard competence elements fully or only partially. The manner of the test can be proposed as the check of semester works according to derived control points. The control points

should be derived from possible and recommended process steps (see Figure 2) of regarded elements. The semester works can be assigned to the students at the beginning of the semester and carried-out throughout the semester. The assessment - whether or not the work has met the IPMA standard - should be done after its submission at the end of the semester. The students can work on the content of their work gradually as individual topics from the field of a particular course are being introduced and discussed. Whether the students work on their works alone or in small teams is up to the teachers to decide. It is advisable that the assignments of individual semester works vary and differ from one another. The students should be left with certain freedom as to which method or approach they use. The principal parameter of the assignment should be that the students strictly follow the IPMA standard and they apply particular course approaches according to their own consideration. By assigning the students this type of work, the pedagogue creates a teaching simulation game. During this simulation game it is suitable for the pedagogue to enter into partial results of the students any time during the semester and propose unexpected changes and conflicts according to the nature of the original assignment. Thus it is possible to achieve higher extent of interactivity in a teaching process and proximate the training to real project management experience.

The nature of semester work assignments and the selection of tested competence elements will vary for different courses. In their works, the students should make a certain number of recommended process steps according to the standard in order to meet formal as well as material side of the observed competence elements. Each IPMA standard element has a certain number of recommended and possible process steps (Caupin et al, 2006), which can be studied by students and yet in

their semester works remain incorrectly identified. The correct identification must be made by a pedagogue who thus derives necessary control points, so far unfamiliar to the students (see example in Figure 5). The occurrence and range of each control point in a submitted semester work can determine the level of the acquisition of a particular competence element by the student. Therefore it can be assumed that a complete number of control points in a semester work may express a total level of the acquisition of tested competence elements. For each control point a specific level of importance or a specific number of points can be considered. Or, it is possible to assume a value scale for each control point as follows:

- 0 points (no control point is present in a semester work),
- 1 point (a control point is only partially present in a semester work),
- 2 points (a control point is fully present in a semester work).

The sum of values for every control point from submitted works can be further used for a total assessment of the students in the semester because the number of researched competence elements will be firmly stated in each training course. For the training course feedback purposes it is also possible to consider a percentage expression of control point occurrence in semester works. A total control point occurrence in a semester work would express a 100% acquisition of competence elements. Conversely, this total extent would be reduced by each missing control point occurrence in a semester work either evenly (i.e. about $100/N$, where N stands for a number of control points), or according to its significance which will be determined by the pedagogue him/herself.

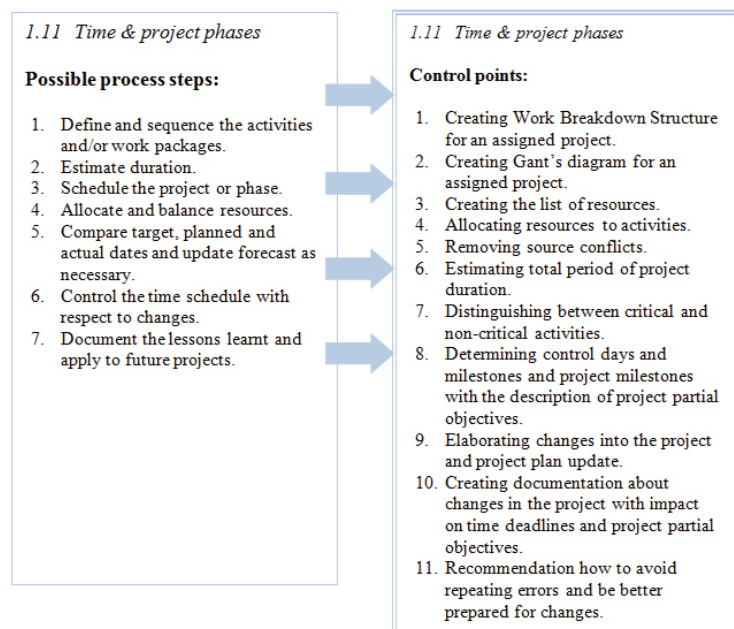


Fig. 5: Derivation and particularisation of process steps for a selected IPMA standard competence element.

For demonstration purposes we can consider control point identification (see Figure 5) according to the process steps of 1.11 IPMA standard elements. These control points can be used for example as feedback in project management training at the FEM CULS Prague, where the experience of semester works already has a long tradition but testing the IPMA standard competence elements in teaching is still lacking behind.

In order to verify the competence element of the 1.11 IPMA standard, 11 control points, analytically following recommended

process steps of an element, can be identified. Whether there exist 11 control points for one element is a matter of discussion and needs of a pedagogue, or it is determined by the nature of a course. The proposal presented in Figure 5 is an own proposal of the authors and it is determined by the character of the training courses at the FEM CULS Prague. If the students in their semester work do not meet the required 11 control points, i.e. the control points are not present in the submitted work, then the students have not acquired the 1.11 IPMA standard competence element to a full extent. Missing control points can lead the pedagogue to a weak point of the training course.

Discussion

The project management teaching cannot be performed without practical demonstration, example or a practical use of tools, approaches or methods. In teaching project management and its standards it is essential to put emphasis on students' active participation. The students' active participation, which can be initiated by assigning team or individual work deepens our knowledge and forms skills. We are not certain whether the knowledge and skills will subsequently deepen as far as the competence; however, it depends on each student's individual attitude.

The task of international standards in project management is irrefutable and still growing. Project management teaching should comprise at least one international standard. The range of the international standard training in project management is often very low. In university courses preference is rather given to basic surveys through which students are acquainted only with project management structure, approaches and project management standard principles, i.e. with basic information about a standard. A more profound and complex approach

to the standards in project management training collides especially with the problem of time dotation for the course. However, if project management and international standard training is approached through several follow-up courses of different expertness, it is possible to reach deeper knowledge of the students.

The proposal presented in Figure 5 may serve as a starting premise for future research in project management teaching at the FEM CULS Prague. The research could result in testing the above proposed student assessment, i.e. verifying the above proposed way of feedback quantification. The future research which would follow the results of this paper could further outline possible means of deriving control points from process steps of individual IPMA standard elements. For a quality derivation of control points from element process steps a notion of competence will become a central concept.

Conclusion

The topic of the article concerns project management teaching, taking into a significant account a current development and present international standards in the field. The innate contribution of the article is based on work with the concept of competence which presents a central concept and principal of the selected IPMA standard. The IPMA standard implementation into teaching where the teaching content is structured and formed by the IPMA standard content and structure corresponds with the latest trends and needs in future manager and project team member training. The project management teaching concept with the IPMA standard implementation can be regarded as fully applicable for the needs of teaching in Bachelor and Masters Courses. The teaching concept for an arbitrary IPMA standard element can be applied to the formation of course syllabi. The

content of each seminar or lecture can be based on the content of one or even two elements. For the number of 46 elements in the IPMA standard we can expect the establishment of a two-semester course with the same number of lectures as seminars. The lectures will result in students' knowledge acquisition. Nonetheless, the success of the IPMA standard element acquisition will depend on practical nature of the seminars.

The article is further concerned with the fact that, with regard to a number and range of specialist areas and disciplines, the IPMA standard teaching will be a complex structure of mutually related study courses with competence elements being taught in more than one course at a time. Individual IPMA standard competence elements can be lectured independently in a particular course with links to other preceding or following courses, thematically contributing to the element. Competence elements and courses cross one another and overlap in a manifold way. The teaching process, which would fully cover a specialist range of the IPMA standard, would be demanding in respect to specialist course syllabi as well as study material preparation.

What is more, the authors of the paper propose a way of feedback quantification in the IPMA standard teaching. They propose the derivation of control points for an individual competence element and their application in assessing student semester works. The control points should be derived from recommended and possible process steps, presented for each IPMA standard element. The derivation means particularisation and specification of a competence element in project management in respect to its load and process. Last but not least, the authors of the paper propose this latter contribution of the paper to be used as a starting premise for future research which would test and follow the results obtained in this article.

Acknowledgements

The following paper was supported by a grant project of the Ministry of Education of the Czech Republic, University Development Fund (Fond rozvoje vysokých škol), No. 923/2011 – “Subject innovation for project management teaching” („Inovace předmětů pro výuku projektového managementu”).

References

Bedrnová, E. (2000) „Kompetence jako zdroj a základní projev optimálního uplatnění člověka v životě a práci“, *Psychologie v ekonomické praxi*, Karolinum, Praha, vol. XXXV, no. 1-2, pp. 7-15, ISSN 0033-300X.

Caupin, G. et al (2006) „ICB – IPMA Competence Baseline“, version 3.0, International Project Management Association, ISBN 0-9553213-0-1.

Dixon, G. (2011) „Service learning and integrated, collaborative project management“, *Project Management Journal*, vol. 42, no. 1, pp. 42–58.

Knecht et al (2010) „Příležitosti k rozvíjení kompetence k řešení problémů ve výuce na základních školách“, *Orbis scholae*, vol. 4, no. 3, pp. 37-62, ISSN 1802-4637.

Michelman, B. (2007) „U.S. Students Need 21st Century Skills to Compete in a Global Economy“, [online], The Partnership for 21st Century Skills, <http://www.p21.org/>.

Pitaš, J. et al (2008) „Národní standard kompetencí projektového řízení“, Společnost pro projektové řízení, o. s., ISBN 978-80-214-3665-7.

Söderlund, J., Vaagaasar, A. L., and Andersen, E. S. (2008) „Relating, reflecting and routinizing: Developing project competence in cooperation with others“, *International Journal of Project Management*, vol. 26, pp. 517–526.

COMMUNITIES OF PRACTICE AT UNIVERSITY: A PRELIMINARY STUDY

Klára Margarisová, Kateřina Šťastná,
Lucie Kvasničková Stanislavská
Czech University of Life Sciences Prague
margarisova@pef.czu.cz

Abstract

A lot has been written about the benefits of Communities of Practice (CoP) at university. The benefits of Communities of Practice have been described with respect to lecturers' qualifications and teaching competencies influencing students implicitly, as well as to areas related to the students themselves. Many studies have proved the fact that the process of learning is of a social character (e.g. Lave, Wenger, 1991). That is why Communities of Practice present a suitable environment for collaborative learning, which makes the processes of generating, sharing and storage of knowledge easier. The present paper defines the concept of Communities of Practice on a theoretical level and moreover, provides a brief overview of the latest research on Communities of Practice with regard to education. Another part of the article focuses on pre-research into the Communities of Practice at the Faculty of Economics and Management (FEM) of the Czech University of Life Sciences Prague (CULS). Although the authors conform to the opinion that Communities of Practice are a natural feature and spontaneously develop wherever there is a need for sharing implicit or tacit knowledge, the pre-research focused on the verification of this premise in order to continue with research of a quantitative nature. The existence of the Communities of Practice was verified on the basis of fundamental characteristics following Wenger's model. Other characteristics considered significant in relation to Communities of Practice by McDermott were also investigated. Based on a group interview, the existence of

ARTICLE INFO

Article type

Short communication

Article history

Received: August 8, 2011

Received in revised form: September 28, 2011

Accepted: September 29, 2011

Available on-line: September 30, 2011

Communities of Practice of the students at FEM of CULS was verified and a conceptual model created. The determined work prerequisites will be investigated in another phase of the research.

Key Words

Communities of practice, education, knowledge sharing, students, CULS, FEM

Introduction

Many authors pay attention to the concept of communities in the area of education. In recent years, studies have focused both on teachers and students.

He An (2009) focuses on language teachers. She explores the theme of brokering as a situational factor which contributes to learning in a multi-party learning community. By means of empirical study, He An (2008) responds to the call for a more detailed probe into the collective learning experiences in communities of language teacher education and shows that the greater the knowledge gap among participants, the more brokering is needed.

Hezemans and Ritzen (2004) identify the benefits of Communities of Practice for individuals and educational organisations. They demonstrate these in the case of the University for Professional Education and Applied Science, Utrecht. They identify 15 benefits divided into 4 main categories: optimisation of the learning environment and educational innovation (related to organisation), raising the quality of work and innovation by the profession (related to community members). Andrew et al. (2009) confirm one of the benefits identified by Hezemans and Ritzen (also mentioned by Wenger, McDermott, and Snyder, 2002). They emphasise the importance of Communities of Practice in the process of developing professional identity. Andrew et al. (2009) focus their attention on the role of Communities of Practice in the process of developing a professional identity for nursing academics.

Vescio et al. (2008) deal with the impact of professional learning communities on teaching practices and student learning and prove that well developed professional learning communities have a positive impact on both teaching practice and student

achievement. Learning communities are also examined by Wilson and her co-authors (2009), but they focus on the community of students. They investigate whether keeping Baccalaureate nursing students together in the same learning community throughout their entire clinical rotations (four semesters) is more or less helpful in fostering student satisfaction and team effectiveness. But they can find no correlation there. It is necessary to add that, in its approach, a learning community is not the same thing as a Community of Practice. It is more like a class which has been established by the university, not by student preferences, but according to different factors. There is the possibility that this class could become the Community of Practice, but it is not necessarily so. As stated by Wenger, McDermott, Snyder (2002), Communities of Practice are a most natural phenomenon and they appear spontaneously. Therefore, it is not necessary to create them artificially.

Chang et al. (2008) propose the construction of a journal-publishing community in a web-based coursework environment, designed to improve the efficiency of knowledge-sharing for a programming course, by endowing learners with roles. They indicate that the analysed journal-publishing community can effectively promote knowledge-sharing, improve the quality of students' coursework, and accordingly advance learning performance. Thrysoe's et al. (2010) also focuses on students. Their empirical study examines the influence of participation by final-year nursing students in a CoP. The results show that the students' membership in a CoP depends on what both the students and the members of staff do to make participation possible. Student participation is strengthened by the students and nurses showing an interest in getting to know each other professionally and socially and also by the students having the opportunity to contribute their knowledge. Thrysoe et al. (2010)

state that participation in CoP can become an essential factor in the clinical phase of nursing education.

The aim of the paper is to propose a conceptual model of Communities of Practice at FEM of CULS in Prague and to define work prerequisites as a starting point for further research.

To obtain a general overview of the investigated issues, the literature focusing on the concept of Communities of Practice in general and studies dealing with Communities of Practice in education were surveyed. Further, by conducting a group interview, we investigated the existence and basic characteristics of the students' Communities of Practice at FEM of CULS in Prague. Based on our findings, we determined work prerequisites for subsequent research and we compiled a conceptual model.

Material and Methods

Definition of explored concept

The framework for the concept of Communities of Practice is based on a publication by Etienne Wenger and his co-authors, considered to be the most recognised authors in this field. The articles used for the introductory part of this paper were found in the Scopus database, which ensures the quality of these sources.

Etienne Wenger (2004) defines three basic characteristics of Communities of Practice, i.e. domain, community and practice. He defines the sphere of action as a field of knowledge which interlinks the members of the community and thus creates the community identity. Communities are groups of people who are concerned with the sphere of action, with the quality of mutual relationships and also with the line of demarcation

between the internal and external environments of the specific group. Wenger argues that experience constitutes the fundament of knowledge (methods, instruments, biography, events and documents) which is shared and further developed by community members. He assumes that, by combining these three elements, Communities of Practice are able to manage knowledge (Wenger, 2004).

Richard McDermott (1999) also uses three important attributes. He considers as crucial the type of knowledge (explicit information, tacit know-how, and thinking) that is shared by the community. Furthermore, he considers the level of involvement and identification of the members of a community (individual, community) and also the closeness of the ties between the shared knowledge and everyday work of the employees (special events, integrated into work). Every community shares both explicit and tacit knowledge. In each community there are both individual as well as collective relationships and each community takes into consideration the everyday work of its members. The only difference is in the importance assigned to the one or to the other option (McDermott, 1999).

Chris Collinson and Geoff Parcell (2004), argue that Communities of Practice are meant to bring together people with similar interests and experiences, who subsequently share their know-how, either in order to increase the qualifications of each individual, enabling them to do their job better, or to attain a common goal. Wenger (2005) also emphasizes similar interest and defines them as groups of people who share a common interest in something that they are already acquainted with, interacting with each other on a regular basis, in order to learn more about it. Leader and Strock (2001) also mention common interest and regularity of meetings. They speak of Communities

of Practice as groups based on a common interest, with members who regularly share information and learn from one another.

Hasanali et al. (2002) find that communities “can be a highly structured group that follows well-defined procedures for sharing practices or a very informal, loose collection of individuals sharing ideas.” Communities of Practice have emerged as a potential theory of knowledge creation (Roberts, 2006) in recent years. McDermott (2000a) considers Communities of Practice to be “ideal vehicles for leveraging tacit knowledge because they enable person-to-person interaction and engage a whole group in advancing their field of practice. As a result, they can spread the insight from that collaborative thinking across the whole organisation.” According to Krogh, Ichio and Nonaka (2000), communities offer an environment in which members of an organisation feel at ease, and thus, without fear, can discover unexplored regions.

Group interview

According to Tharenou (2000), interviews are usually conducted for the purpose of asking questions to discover the respondents’ thoughts about and feelings towards issues, events, behaviours etc. The aim of the interview is to ascertain the interviewees’ feelings and thoughts about a topic, rather than the interviewer influencing them.

Tharenou (2000) mentions several categories of interviews, such as structured, unstructured and semi-structured ones. Tharenou (2000) describes the group interview as an interview conducted of groups, where the group of people is the analysed unit.

The group interview took place according to a prepared scenario:

- a) A group of 2nd-year students of Systems Engineering was chosen (the group consisted of 13 students plus one moderator);
- b) The interview took place during the Summer semester in the academic year of 2010/2011 as part of a lesson on the subject of Knowledge Management SYI;
- c) The session was divided into two parts - in the first part, students were introduced to the concept of Communities of Practice (definitions, basic characteristics, development models, community roles, typology of communities and their benefits and costs). The second part was dedicated to the group interview - the moderator developed basic fields of discussion (perception of the membership of a community; basic characteristics of the community based on Wenger’s model and the three-dimensional model as defined by McDermott (as mentioned below) – members and their relations, focus, shared contents, interaction and identity). The moderator asked the question and then let students to discuss the topic. When one area had been covered moderator brought another question;
- d) A written record of the interview was created;
- e) Results were evaluated - information gained were sorted according criteria (Community, Practice, The kind of knowledge, Community interaction and identity and The relation of shared knowledge to studies) based on work of Wenger and McDermott;
- f) Assumptions for further research were set.

Results and Discussion

Based on a group interview of 2nd-year students in the Master's study programme majoring in the field of Systems Engineering, we carried out the pre-research into the Communities of Practice at FEM of CULS. As a domain (Wenger, 2004), we advisedly selected issues connected with the studies at CULS. Other parts of Wenger's model (community and practice, see Materials and Methods) were subject to discussion. Further, the discussion focused on determining the individual elements of the model (see Materials and Methods) as defined by McDermott (1999).

Community

The students confirmed their awareness of belonging to a particular community and of sensing the borders of the community, i.e. the notion of the internal and external environments of the community. Members of the class of the same year are perceived as the core of the Community of Practice. In the case of this field of study, the year of class coincides with the study group, which is not always the case for other fields of study at CULS. Students in lower year classes are perceived as peripheral members.

With regard to these members, the students spontaneously expressed their frustration, as described by Wenger, McDermott and Snyder (2002). This is caused by the unequal engagement of individual members and, consequently, by their contribution to enlarging and maintaining the knowledge base of the community.

Even though the students were not able to determine their role within the community, they clearly identified their community coordinator whose role, according to Wenger, McDermott and Snyder (2002), is crucial for the community functioning. He/she

is the main organiser of community events. His/her tasks include securing communications, stimulating interest and enthusiasm in the community and organising personal meetings.

Except for the students of lower year classes in the same field of study, the students described the community as closed, without members from other fields of study. However, students admitted that a connection exists with other study fields (specifically with Informatics and Economy and Management), because they have some similar subjects. They usually share study materials, tips and information about lecturers. They ruled out the membership of students from other universities. As an explanation, they mentioned the prejudice existing among students in similar fields of study at different universities.

This closeness may be conditioned by the very essence of the field of study which, unlike other fields of study at FEM, tends to be greater and more technically oriented. In other fields of study with a higher number of students and similarly in regard to their specialisation (e.g. Economy and Management and Business and Administration), we can expect the closeness not to be so intense.

Practice

As regards shared experience, this concerns the specialist knowledge necessary to pass exams successfully. Furthermore, it includes lessons learned, stories, tips and study materials. The students admitted that, within these areas, they also share with students in other study fields who took similar courses.

The sharing is done by means of personal communication as well as by ICT. The community runs web pages which serve both for sharing knowledge and storing it. This can again be determined by the specialisation.

The kind of knowledge

As was mentioned above, students share explicit knowledge in the form of study materials (e.g. lectures, lesson notes, information about lecturers, sample tests, essays etc.) and knowledge of an implicit nature in the form of lessons learned, stories, tips.

Community interaction and identity

The 2nd-year Master's study programme students majoring in Systems Engineering in most cases expressed a strong feeling of belonging to the community under discussion. However, if we had also included in our discussion students in lower years, we could assume that, with respect to the nature of their membership, their identification with the community would be weaker.

The relation of shared knowledge to studies

The group interview revealed that the community shares both the knowledge related directly to studies as well as the knowledge which is instead related to the students' social life as such. Although the latter knowledge does not lead to the deepening of specialist knowledge, it has its own significance. It supports the development of the informal and friendly atmosphere which is essential for the life of the Community of Practice.

Based on the presented findings, we have compiled a conceptual model of the SE students' Communities of Practice at FEM of CULS (see Figure 1).

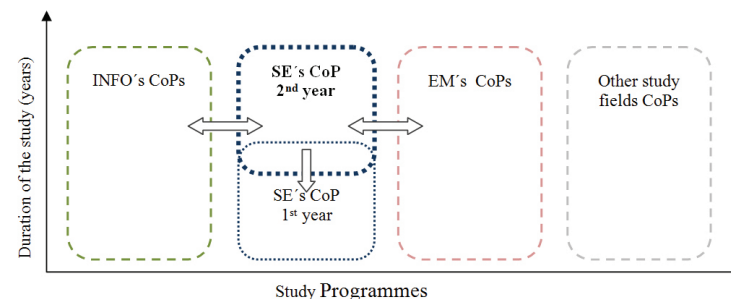


Fig. 1: SE Students' Communities of Practice at FEM of CULS

Figure 2 describes the 2nd-year SE's Community of Practice, which is composed of core members (2nd-year students of SE) and of peripheral members. The core members foster knowledge and share the knowledge with the peripheral members.

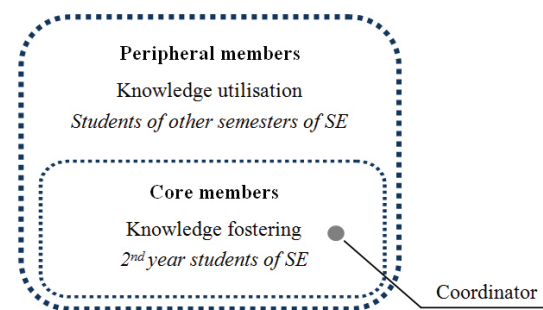


Fig. 2: Communities of Practice of Systems Engineering Students in the 2nd year

Conclusion

On the basis of the group interview results, we defined the prerequisites which will be verified by further research:

- Students' Communities of Practice are a common part of studies at FEM of CULS.
- Students' Communities of Practice at FEM of CULS mainly develop within individual study groups.
- Students of other universities do not belong to the students' Community of Practice at FEM of CULS.
- The students' Communities of Practice at FEM of CULS share lessons learned, stories, tips and study materials.
- Connections exist among study fields at FEM of CULS.

The nature of these links will be explored through subsequent research. Further research will also focus on the influence of Communities of Practice on students' success in their studies at FEM and on the benefits provided to their members.

Acknowledgements

The paper was elaborated in the frame of solving project "Modern Management Approaches in the Field of Higher Education in the Czech Republic" and project of the Ministry of Education of the Czech Republic No. 6046070904, "Information and Knowledge Support of Strategic Management".

References

- Andrew, N., Ferguson, D., Wilkie, G., Corcoran, T., Simson, H. (2009). 'Developing professional identity in nursing academics: The role of communities of practice', *Nurse Education Today*, vol. 29, no 6, August, pp. 607–611.
- Chang C.K., Chen, G.D., Li, L.Y. (2008) 'Constructing a community of practice to improve coursework activity', *Computers & Education*, vol. 50, pp. 235-247.
- Collinson, CH.; Parcella, G. (2004) *Learning to fly*. Chichester: Capstone Publishing Limited. ISBN 1-84112-509-1.
- Fontaine, M. .F. & Millen, D. R. (2004) Understanding the Benefits and impact of Communities of Practice. Chapter to be in *Knowledge Networks: Innovation through Communities of Practice*. Eds. Paul Hildreth and Chris Kimble. Idea Group Publishing.
- Hasanali, F., Hubert, C., Lopez, K., Newhouse, B., O'Dell, C., Vestal, W. (2002) *Communities of Practice*. APQC, ISBN 1-928593-48-8.
- He An E. (2009) 'Bridging the gap between teacher educator and teacher in a community of practice: A case of brokering', *System*, vol. 37, pp. 153–163.
- Hezemans, M., Ritzen, M. (2005) 'Communities of Practice in Higher Education, Information and Communication Technologies and Real-Life Learning', *IFIP International Federation for Information Processing*, 2005, Volume 182/2005, 39-46, DOI: 10.1007/0-387-25997-X_5.
- Jančaříková, K. and Scholleová, H. (2010) 'Methodology for team member selection for the need of work in course of daily and distance learning education', *Proceedings of the 7th International Conference on Efficiency and Responsibility in Education (ERIE 2010)*, Prague, pp. 94-101.

Lave, J. And Wenger, E. (1991) *Situated Learning: Legitimate peripheral participation*. New York: Cambridge University Press.

Lesser, E.L.; Storck, J. (2001) 'Communities of practice and organizational performance', *IBM SYSTEMS JOURNAL* [online], 4 [cit. 2009-01-02]. Available from www: <<http://www.research.ibm.com/journal/sj/404/lesser.pdf>>

McDermott, R. (1999) 'Nurturing Three Dimensional Communities of practice: How to get the most out of human network. The Dimensions of Community' [online]. 1999 [cit. 2009-01-02]. Available from www:<http://www.impactalliance.org/file_download.php?location=S_U&filename=101431089400PDimensions.pdf>

McDermott, R. (2000) 'Knowing in Community: 10 Critical Success Factors in Building Communities of Practice', *IHRIM Journal*, vol. IV-1.

Roberts, J. (2006) 'Limits to communities of practice'. *Journal of Management Studies*, vol. 43, no. 3, pp. 623-639.

Tharenou, P., Donohue, R., Cooper, B. (2000) *Management research methods*, New York: Cambridge University Press.

Thrysoe, L., Hounsgaard, L., Bonderup Dohn, N., Wagner, L. (2010) 'Participating in a community of practice as a prerequisite for becoming a nurse e Trajectories as final year nursing students', *Nurse Education in Practice*, vol. 10, pp. 361-366.

Vesico, V., Ross, D., Adams, A. (2008) 'A review of research on the impact of professional learning communities on teaching practice and student learning', *Teaching and Teacher Education*, vol. 24, pp. 80-91.

von Krogh, G., Ichijo K., Nonaka, I. (2000) *Enabling Knowledge Creation*. New York: Oxford University Press.

Wenger, E. (2004) 'Knowledge management as a doughnut: Shaping your knowledge strategy through communities of practice', *IVEY BUSINESS JOURNAL* [online]. [cit. 2009-01-02]. Available from www: <<http://home.att.net/~discon/KM/CoPOverview.pdf>>

Wenger, E. (2005) 'Communities of practice a brief introduction', *Communities of practice* [online]. [cit. 2009-01-05]. Available from www: <<http://home.att.net/~discon/KM/CoPOverview.pdf>>

Wenger, E., McDermott, R., Snyder, W. M. (2002) *Cultivating Communities of Practice*. Boston: Harvard Business School Publishing.

Wilson, B.L., Wilson, J., Peluso, C., Priest, J., Speer, T. (2009) 'Student satisfaction and team development outcomes with preassigned learning communities', *Journal of Professional Nursing*, vol. 25, no. 1, pp. 15-22.