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EDITORIAL

We are glad to present you the third issue of the year 2016 (Vol. 9, no. 3). In this third issue, which you hold in your hands, we would like to introduce four articles from diverse group of authors covering The College of Polytechnics Jihlava, Masaryk University in Brno, University of Economics in Prague, and Thompson Rivers University in Kamloops, British Columbia.

The first article from authors Zámková, Prokop and Stolín analyses exam success rates in subject Mathematics 1 at the College of Polytechnics in Jihlava. The authors used primary data taken from the school information system that covers years 2006-2015. The analysis is based on several criteria, such as form of study, reason for termination of studies and gender. The results of the analysis show that the success rate in Mathematics 1 has been decreasing over the course of the monitored period of time. The success rate of full-time students is higher compared to parttime students. Moreover, female students have higher success rate than male students. Last but not least, the analysis concludes that that mathematic subject may not always be the cause of a complete termination of studies.

The second article from authors Lipovská and Fischer provides analysis of talented students. The authors try to identify who the talented students are, which background they did come from and how the family background influenced them. The analysis is based on the survey Talent 2016 that was conducted as an on-line questionnaire between January 24 and 31, 2016, among talented students in the Czech Republic. The results show a clear evidence of human capital intergenerational transmission, vertical immobility in the same generation, as well as the vertical mobility between generations. Most of the talented students came from the complete highly educated families with tradition in their field of interest. On the other hand, the role of the teachers in the support and guidance is negligible. Last but not least, the authors discover that there is a close relation between the talented children premature reading ability and the accumulation of the human capital in their families.

The third article from collective of authors Gonzalez, Erogul and Barragan provides comparative case study using curriculum and in-depth interview analysis in order to illustrate not only the similarities and differences in the Corporate Social Responsibility (CSR) programs, but how social responsibility is taught in a Mexican and Canadian University context. The main findings of the analysis show that the CSR program in Mexico is perceived as a strategic management tool that adds value to the organization and does not pay any special attention to the globalization phenomena. On the other hand, in Canada, social responsibility is based on ethics. Moreover, an attention to the different stakeholders in a globalized environment is also emphasized. In addition, the analysis provides academics and researcher insight into exploring how universities can further facilitate students as stakeholders in considering social responsibility as important and necessary to ensure CSR sustainability in practice.

The last article from authors Berková and Krejčová analyses motivational potential of teachers' abilities in a connection with students' level of intelligence. The results show that the expertise of teachers has the most important influence in the groups of both the above-average intelligent and the average intelligent students. Nevertheless, the authors found other differences in preferences of the both groups. Apart from the teachers' expertise, the average intelligent students are mainly motivated by exposition of curriculum and ability to develop thinking. On the other hand, the above-average students are only motivated by the exposition of curriculum (apart from the teachers' expertise). Last but not least, the both groups of analysed students differ with regard to amount of time that students spend on preparation to school.

By the end of this editorial, we would like to thank to all reviewers as well as to all authors who have contributed to this third issue of the ERIES Journal. Further, we hope that all our readers will find this third issue of the year 2016 interesting. Last but not least, we also hope that the ERIES Journal will continue contributing to the field of efficiency and responsibility in education with new insights, research methods and analyses as it has contributed so far.

Sincerly,

Martin Flégl Executive Editor ERIES Journal

THE FACTORS INFLUENCING THE MATHEMATICS EXAM SUCCESS **RATE IN THE STUDY PROGRAMMES TAUGHT AT THE COLLEGE OF** POLYTECHNICS JIHLAVA (2006–2015)

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Highlights

- At our school the exam success rate in the course Mathematics 1 had been steadily decreasing
- Decreasing trend was observed in all of the offered study programmes
- Female students and students enrolled in the economic programmes tend to achieve better results

Abstract

This paper addresses the exam success rates in Mathematics 1 at the College of Polytechnics in Jihlava (CPJ). Primary data taken from the school information system cover the years 2006-2015. We carried out a success rate analysis based on several criteria (form of study, the reason for termination of studies, gender). We observed the dependence of the success rate on the aforementioned criteria and time. Plus a detailed analysis of the success rate with respect to the study programme was conducted. The contingency tables analysis and correspondence analysis were used to assess the dependencies. The research showed that the success rate in Mathematics 1 has been decreasing over the course of the monitored period of time. The success rate of full-time students is higher compared to the part-time students. Women have higher success rate than men. The respective study programmes showed equivalent results. Technical study programmes show lower success rate in mathematics. The research furthermore implies that mathematics may not always be the cause of a complete termination of studies. To reverse the trend of the growing failure rate we introduced an entrance test of high school basic mathematics followed by a course for those who fail at this test. As a part of our currently running project, our school have been

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innovating the e-learning modules and working on the textbooks for Seminar in Mathematics that may be completed in a form of an intensive summer or winter school in mathematics. This project's objective is an overall improvement of students' mathematical knowledge and skills.

Keywords

College of Polytechnics Jihlava, mathematics, students' knowledge, success rate

Zámková M., Prokop M., Stolín R. (2016) "The Factors Influencing The Mathematics Exam Success Rate in The Study Programmes Taught at The College of Polytechnics Jihlava (2006-2015)", Journal on Efficiency and Responsibility in Education and Science, Vol. 9, No. 3, pp. 52-59, online ISSN 1803-1617, printed ISSN 2336-2375, doi: 10.7160/eriesj.2016.090301.

Introduction

This article is an extended version of the paper presented on the 13th International Conference on Efficiency and Responsibility in Education (ERIE 2016) (Zámková, Prokop and Stolín 2016).

It is often said nowadays that the level of mathematical knowledge is decreasing. The objective of our research was, therefore, to assess the development of success rates in Mathematics 1 at the College of Polytechnics in Jihlava over the past 9 academic years. A detailed success rate analysis based on several criteria (study programme, form of study, the reason for termination of studies, gender) was carried out. The success rate of students in mathematics during the monitored period of time was evaluated with regard to the criteria. We used contingency tables analysis and Pearson's test of independence to test the dependency of the success rate on the aforementioned criteria and time. Row relative frequency and the graphic output of correspondence analysis (correspondence maps) were used to test the character of dependence.

A paper by Zámková and Blašková (2014) focused on similar issues. The paper's objective was to assess the Mathematics-1 exam success rate at the Faculty of Business and Economics of Mendel University in Brno. Another article (Fonteyne et al, 2015) assesses the impact of mathematical knowledge and skills on Ghent University students' success rate in a statistics course. Similarly Kučera, Svatošová, and Pelikán (2015) analysed the

relationship between the admissions mathematics test results and the success rate in Mathematics, and Mathematical Methods in Economics.

A publication by Sonnert, Sadler, and Bressoud (2015) deals with the students' attitude toward mathematics in relation to the introductory calculus course and other relevant influential factors. The research shows that a positive attitude is strongly related to professors who offer clarity in presentation and answering questions, useful homework, fair exams, and help outside of class. The positive impact of technologies, such as graphing calculators, was not confirmed. The same applies to the usage of modern pedagogical methods. Majovská and Friedrich (2014) from the Technical University of Ostrava proved that the usage of simple study materials and (contrary to the findings of the previously mentioned paper) modern technologies improved students' success rate and their attitude towards mathematics.

The impact of the decreasing quality of high school mathematical education on university success rates in mathematics was addressed by Kučera, Jindrová, and Vydrová (2013). Universities are accepting less talented students due to the fact that there are fewer eligible candidates. This is a result of decreased population. The authors examined the success rate on courses that require mathematical skills (statistics, operations research) via a questionnaire survey. The survey showed no link

between the high school type and the success rate. Kouřilová and Bebčáková (2015) concluded that the mathematical knowledge of students coming from high schools is decreasing each year. They analysed the success rate in mathematics with respect to various factors (high school type, students' behaviour, and overall study results).

Uysal (2007) compared the success rate in mathematics at selected schools in Turkey. The link between entrance mathematics and English language exams was analysed by Doucek and Maryška (2015). A psychologically oriented paper (Simzar et al, 2015) focused on the association between students' motivation for mathematics and their test results. Ulrychová (2015) addressed the relationship between the knowledge of mathematical theory and the ability to solve exercises among the students of University of Economics. The results lead her to question what the ideal ratio of theory to practise is in mathematics courses at non-technical universities.

Materials and Methods

Primary data was taken from the College of Polytechnics information system. The categorical data include students' success rates in Mathematics 1 for the years 2006–2015 and relevant identification variables. Mathematics 1 is supposed to provide students with basic knowledge of mathematical analysis and linear algebra.

Contingency tables present an easy way of displaying relations among categorical data. Depending on the character of the data we then used applicable tests of independence. According to Řezanková (1997), for the case of a contingency table of the $r \ge c$ type (r is the number of rows, c is the number of columns) we most often use the test statistic:

$$\chi^{2} = \sum_{i} \sum_{j} \frac{\left(n_{ij} - e_{ij}\right)^{2}}{e_{ij}},$$
(1)

where e_{ij} is the expected frequency and n_{ij} the observed frequency. We use the statistic χ^2 in Pearson's chi-square test with asymptotically $\chi^2_{(r-1)(c-1)}$ distribution. The null hypothesis of the test assumes independence. For further details see Hindls (2003). The condition that maximum 20% of the expected frequencies are less than five must be met in order to use the Pearson's chi-square test, see Hendl (2006) and Agresti (1990). We use Fisher's exact test in other cases or we calculate the simulated *p*-value of χ^2 statistic, see Anděl (2005).

Correspondence analysis that was used for this study is a multivariate statistical technique, which allows the display and summary of a set of data in two-dimensional graphic form. It is traditionally applied to contingency tables – correspondence analysis decomposes the chi-squared statistic associated with this table into orthogonal factors. The distance between single points is defined as a chi-squared distance. The distance between *i*th and *i*'th row is given by the formula

$$D(i,i') = \sqrt{\sum_{j=1}^{c} \frac{(r_{ij} - r_{i'j})^2}{c_j}},$$
 (2)

where r_{ij} are the elements of row profiles matrix *R* and weights c_j are corresponding to the elements of column loadings vector c^T , which is equal to mean column profile (centroid) of column

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profiles in multidimensional space. The distance between columns j and j' is defined similarly. The aim of this analysis is to reduce the multidimensional space of row and column profiles and to save maximally original data information (Hebák at al., 2007). The total variance of the data matrix is measured by the inertia, (see, e.g., Greenacre, 1984), which resembles a chi-square statistic but is calculated based on relative observed and expected frequencies. Unistat and Statistica software was used for primary data processing.

Results

In the surveyed period of time there were more women (60.8%)than men enrolled in the CPJ study programmes that include maths courses. The majority of students in 2006-2015 studied Finance and Management (FM) (57.8%), followed by the Travel and Tourism (TT) programme (24.4%). The lowest number of students enrolled in the technically oriented programmes of Computer Systems (CS) and Applied Computer Science (ACS) (approx. 9%). These were mostly fulltime students (70.9%). Row relative frequencies (see Tab. 1) show that women have higher success rates in Mathematics 1 than men (47.7% to 35.5%). The detected *p*-value is less than 0.001, which implies strong statistical dependence. Tab. 2 shows that the success rate of full-time students is higher compared to the success rate of the part-time students (47.7% and 31.3%). Again, the detected p-value is less than 0.001, which implies strong statistical dependence. Hence it is clearly easier to study the demanding full-time course, since this form of study offers students more opportunities to practice solving exercises during seminars.

Row relative frequencies	Succeeded	Failed
Women	47.65%	52.35%
Men	35.48%	64.52%

Tab. 1: Contingency table: Gender and success rate in Mathematics 1, 2006–2015

Row relative frequencies	Succeeded	Failed
Full-time	47.65%	52.35%
Part-time	31.27%	68.73%

Tab. 2: Contingency table: Form of study and success rate in
Mathematics 1, 2006–2015

Furthermore, row relative frequencies (see Tab. 3) show that the lowest success rate is in the technically oriented programmes (CS and ACS) – about 32%. The success rate in the economic programmes (FM and TT) is higher (around 45%). The observed p-value is less than 0.001, which implies strong statistical dependence between the success rate and field of study.

Row relative frequencies	Succeeded	Failed
Finance and Management	44.99%	55.01%
Applied Computer Science	32.15%	67.85%
Computer Systems	32.24%	67.76%
Travel and Tourism	45.70%	54.30%

Tab. 3: Contingency table: Study programme and success rate in Mathematics 1, 2006–2015

Tab. 4 shows that those studying at the moment or those who passed the final state exam have significantly higher success rate in mathematics. Roughly 18% passed the mathematics exam after repeating the course once. Interestingly 20% of expelled students and 14% of drop-outs passed the mathematics exam, therefore mathematics was not the reason of their overall failure, p-value is less than 0.001.

Row relative frequencies	Succeeded	Failed
Did not comply with internal regulations / Expelled	20.66%	79.34%
Studying at the moment	70.96%	29.04%
Passed the final state exam / Graduated	82.38%	17.62%
Dropping out of college / Drop-out	13.90%	86.10%

 Tab. 4: Contingency table: The reason for termination of studies and the success rate in Mathematics 1, 2006–2015

Row relative frequencies	Succeeded	Failed
2006/2007	72.22%	27.78%
2007/2008	58.47%	41.53%
2008/2009	41.51%	58.49%
2009/2010	46.60%	53.40%
2010/2011	42.84%	57.16%
2011/2012	41.23%	58.77%
2012/2013	35.09%	64.91%
2013/2014	31.88%	68.12%
2014/2015	31.91%	68.09%

Tab. 5: Students' success rate in Mathematics 1, 2006–2015

The frequency table (see Tab. 5) and the graphic output (see Fig. 1) show that the success rate has been continuously decreasing over the course of the monitored period. The initial values of the success rate (70%) drop to 30%. The largest decline occurred in 2008 and 2009. The observed *p*-value is less than 0.001, which implies strong statistical dependence between the success rate and the monitored period.



Fig. 1: Students success rate in Mathematics 1, 2006–2015

Row relative frequencies	Succeeded	Failed
2006/2007	72.22%	27.78%
2007/2008	58.47%	41.53%
2008/2009	39.59%	60.41%
2009/2010	49.69%	50.31%
2010/2011	47.05%	52.95%
2011/2012	49.35%	50.65%
2012/2013	39.96%	60.04%
2013/2014	35.69%	64.31%
2014/2015	34.97%	65.03%

Tab. 6: Full-time students – Students' success rate in Mathematics 1, 2006–2015



Fig. 2: Full-time students – Students' success rate in Mathematics 1, 2006–2015

Row relative frequencies (see Tab. 6) and the figure (see Fig. 2) show that at first, the success rate in mathematics of full-time students maintained values around 70%. In 2008, the success rate dropped considerably to 50%. Since 2012, the success rate has been decreasing and it maintains the values of around 40%. The detected p-value is less than 0.001, which implies strong statistical dependence.

Row relative frequencies	Succeeded	Failed
2008/2009	53.98%	46.02%
2009/2010	40.07%	59.93%
2010/2011	35.10%	64.90%
2011/2012	28.93%	71.07%
2012/2013	25.89%	74.11%
2013/2014	24.78%	75.22%
2014/2015	28.71%	71.29%

Tab. 7: Part-time students – Students' success rate in Mathematics 1, 2006–2015



Fig. 3: Part-time students - Students' success rate in Mathematics 1, 2006–2015

As for the part-time form of study it is clear according to the the row relative frequencies (see Tab. 7) and the figure (see Fig. 3) that the success rate in mathematics of part-time students has been gradually decreasing from approx. 50% to about 25%. However, in 2014, the success rate started to improve and the values almost reached 29%. The detected *p*-value is less than 0.001, which implies strong statistical dependence.

Row relative frequencies	A	В	С	D	Е	F
Finance and Management	3.21%	3.65%	9.39%	7.58%	16.45%	59.72%
Applied Computer Science	2.03%	1.60%	5.81%	6.83%	14.39%	69.33%
Computer Systems	3.26%	2.85%	4.48%	5.16%	14.27%	69.97%

 Tab. 8: Final grades in Mathematics 1, 2006–2015

In addition to that, we have assessed the results in the respective study programmes. Row relative frequencies (see Tab. 8) show that the most distinctive differences may be observed with regard to the F (failed) grades, where students of FM prove to have better success rate. This applies also to the A–E grades, only the difference is not that distinctive.

Plus, the observed *p*-value is less than 0.001, which implies a strong statistical dependence between the final grades in Mathematics 1 and the study programme. The correspondence map (see Fig. 4) demonstrates that the success rate of FM students is placed approx. in the middle of the graphic output, between the grades. This means that the students' grades are evenly distributed on the scale A–F. The most frequent grade for the ACS and CS students is F (failed); the correspondence map shows that the F grade is placed near these two programmes. The biggest distance is separating the ACS students from A and B grades, which means that they are the ones who achieved good grades the least frequently.



Fig. 4: Correspondence map: Study programme and final grades in Mathematics 1, 2006–2015

Row relative frequencies (see Tab. 9) show that full-time students achieved more A–E grades compared to the part-time students, who have most frequent F grades. The detected p-value is less than 0.001, which implies strong statistical dependence.

Row relative frequencies	Α	В	С	D	E	F
Full-time	3.30%	3.88%	9.45%	8.00%	17.69%	57.68%
Part-time	2.57%	1.98%	5.71%	5.31%	11.95%	72.48%

Tab. 9: Contingency table: Form of study and final grades in Mathematics 1, 2006–2015

A strong statistical dependence (*p*-value is less than 0.001) was confirmed with regard to gender and final grades in Mathematics 1. Row relative frequencies (see Tab. 10) show that women achieved more A-E grades compared to men, who have the majority of F grades.

Row relative frequencies	А	В	С	D	E	F
Women	3.51%	4.05%	9.85%	8.33%	16.96%	57.30%
Men	2.56%	2.40%	6.46%	5.79%	14.66%	68.12%

Tab. 10: Contingency table: Gender and final grades in Mathematics 1, 2006–2015

The correspondence map (see Fig. 5) shows clearly a significant increase in the number of students graded with F, especially in the years 2012–2015. Conversely, the beginning of the monitored period of time saw students closer to the rest of the grades. Students from 2006 achieved the best grades.



Fig. 5: Correspondence map: School years and final grades in Mathematics 1, 2006–2015

Furthermore we have conducted a detailed analysis focusing on the Finance and Management programme.

Row relative frequencies	Α	В	С	D	Е	F
Full-time	3.46%	4.48%	10.96%	8.58%	18.83%	53.69%
Part-time	2.74%	2.11%	6.47%	5.69%	12.02%	70.98%

Tab. 11: Contingency table: Finance and Management – Form of study and final grades in Mathematics 1, 2006–2015

Row relative frequencies (see Tab. 11) show that the values of the full-time students are higher as for all of the grades except for the F grade. The detected *p*-value is less than 0.001, which implies strong statistical dependence.

Row relative frequencies	Α	В	С	D	Е	F
Women	3.58%	4.18%	10.18%	8.42%	17.48%	56.16%
Men	2.36%	2.44%	7.56%	5.61%	14.07%	67.97%

Tab. 12: Contingency table: Finance and Management – Gender and final grades in Mathematics 1, 2006–2015

Further row relative frequencies (see Tab. 12) indicate that the values of the female students are higher as for all of the grades except for the F grade. The detected p-value is less than 0.001, which implies strong statistical dependence.

According to the table of the row relative frequencies (see Tab. 13) the values of the E grade especially (and partially of the D grade too) are decreasing in time, while the proportion of F grades is increasing. The detected p-value is less than 0.001, which implies strong statistical dependence.

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Row relative frequencies	Α	В	С	D	Е	F
2006/2007	8.67%	5.10%	21.94%	14.29%	35.20%	14.80%
2007/2008	4.04%	2.53%	15.66%	10.61%	27.27%	39.90%
2008/2009	3.77%	2.69%	6.46%	3.59%	17.06%	66.43%
2009/2010	4.21%	2.43%	8.43%	3.73%	22.04%	59.16%
2010/2011	3.80%	4.12%	5.55%	8.72%	14.58%	63.23%
2011/2012	1.08%	3.42%	9.35%	10.43%	14.75%	60.97%
2012/2013	1.12%	2.70%	9.66%	9.66%	17.53%	59.33%
2013/2014	2.43%	6.09%	10.55%	6.90%	7.71%	66.33%
2014/2015	3.11%	4.40%	10.10%	6.99%	6.99%	68.39%

Tab. 13: Contingency table: Finance and Management – Monitored period of time and final grades in Mathematics 1, 2006–2015

Similarly we have conducted a detailed analysis focusing on the Applied Computer Science programme. This programme has been attended only by full-time students, see Tab. 14.

Relative frequencies	A	В	С	D	Е	F
Full-time	2.03%	1.60%	5.81%	6.83%	14.39%	69.33%

Tab. 14: Frequency table – Applied Computer Science – Form of study and final grades in Mathematics 1, 2006–2015

Row relative frequencies	Α	В	С	D	Е	F
Men	2.28%	1.63%	6.36%	6.69%	15.82%	67.21%
Women	0.00%	1.33%	1.33%	8.00%	2.67%	86.67%
Men Women	2.28% 0.00%	1.63% 1.33%	6.36% 1.33%	6.69% 8.00%	15.82% 2.67%	67.2 86.6

 Tab. 15: Contingency table: Applied Computer Science – Gender and final grades in Mathematics 1, 2006–2015

The table of the row relative frequencies (see Tab. 15) shows that as for the Applied Computer Science, the success rate in Maths is not considerably dependent on the gender. The only more significant difference is apparent in the relative frequencies of the F grades – these were achieved more frequently by women. The detected *p*-value is less than 0.01, which implies strong statistical dependence.

Row relative frequencies	А	В	С	D	Е	F
2007/2008	4.71%	1.18%	5.88%	7.06%	21.18%	60.00%
2008/2009	1.20%	2.41%	9.64%	7.23%	18.07%	61.45%
2009/2010	2.33%	3.49%	16.28%	8.14%	13.95%	55.81%
2010/2011	4.30%	0.00%	5.38%	6.45%	23.66%	60.22%
2011/2012	3.57%	3.57%	5.36%	19.64%	14.29%	53.57%
2012/2013	1.41%	1.41%	1.41%	2.82%	5.63%	87.32%
2013/2014	0.00%	1.63%	2.44%	2.44%	8.13%	85.37%
2014/2015	0.00%	0.00%	1.10%	6.59%	10.99%	81.32%

Tab. 16: Contingency table: Applied Computer Science – Monitored period of time and final grades in Mathematics 1, 2006–2015

An increasing trend may be observed mainly regarding the values of the F grades (see Tab. 16). The Pearson's chi-square test was not carried out due to the low values of the expected frequencies

Now let us take a look at the analysis of the programme called Computer Systems.

Row relative frequencies	Α	В	С	D	Е	F
Full-time	4.28%	3.83%	6.08%	6.31%	15.99%	63.51%
Part-time	1.71%	1.37%	2.05%	3.42%	11.64%	79.79%

 Tab. 17: Contingency table: Computer Systems – Form of study and final grades in Mathematics 1, 2006–2015

The full-time students tend to get better grades than F, (see Tab. 17). The detected p-value is less than 0.001, which implies strong statistical dependence.

Row relative frequencies	Α	В	С	D	Е	F
Women	4.88%	0.00%	2.44%	2.44%	7.32%	82.93%
Men	3.17%	3.02%	4.60%	5.32%	14.68%	69.21%

 Tab. 18: Contingency table: Computer Systems – Gender and final grades in Mathematics 1, 2006–2015

The row relative frequencies (see Tab. 18) show that as for the best grade (A) the success rate of women is higher than the success rate of men, but the same applies to the F grade and the differences are not that significant. The Pearson's chi-square test was not carried out due to the low values of the expected frequencies

Row relative frequencies	Α	В	С	D	Е	F
2006/2007	8.20%	3.28%	9.02%	8.20%	18.85%	52.46%
2007/2008	3.39%	6.78%	8.47%	0.00%	23.73%	57.63%
2008/2009	2.27%	2.27%	5.68%	7.95%	19.32%	62.50%
2009/2010	2.56%	1.28%	3.85%	10.26%	19.23%	62.82%
2010/2011	3.45%	3.45%	4.60%	4.60%	16.09%	67.82%
2011/2012	3.45%	6.90%	1.72%	8.62%	10.34%	68.97%
2012/2013	1.75%	1.75%	3.51%	1.75%	5.26%	85.96%
2013/2014	1.06%	2.13%	1.06%	2.13%	6.38%	87.23%
2014/2015	1.08%	0.00%	1.08%	1.08%	7.53%	89.25%

Tab. 19: Contingency table: Computer Systems – monitored period of time and final grades in Mathematics 1, 2006–2015

The relative frequencies of the F grades are increasing with time. The table of the row relative frequencies (see Tab. 19) indicates that as for the A grades, there was a decrease in the success rate. This also applies partially to the C grades and (apart from the first year) to the E grades. The Pearson's chi-square test was not carried out due to the low values of the expected frequencies.

Travel and Tourism was the last programme that was analysed.

Row relative frequencies	course credit granted	course credit not granted		
Full-time	50.29%	49.71%		
Part-time	31.90%	68.10%		

 Tab. 20: Contingency table: Travel and Tourism – Form of study and final grades in Mathematics 1, 2006–2015

The full-time TT students achieved better success rate (50% compared to 32%), (see Tab. 20). The detected p-value is less than 0.001, which implies strong statistical dependence.

Row relative frequencies	course credit granted	course credit not granted
Women	47.20%	52.80%
Men	36.06%	63.94%

Tab. 21: Contingency table: Travel and Tourism – Gender and final grades in Mathematics 1, 2006–2015

According to the row relative frequencies (see Tab. 21), female TT students achieved better success rate (47% compared to 36%) The detected p-value is less than 0.001, which implies strong statistical dependence.

Row relative frequencies	course credit granted	course credit not granted
2007/2008	81.58%	18.42%
2008/2009	79.80%	20.20%
2009/2010	69.23%	30.77%
2010/2011	63.68%	36.32%
2011/2012	44.02%	55.98%
2012/2013	32.46%	67.54%
2013/2014	35.25%	64.75%
2014/2015	35.07%	64.93%

Tab. 22: Contingency table: Travel and Tourism – Monitored period of time and final grades in Mathematics 1, 2006–2015

The TT programme saw the success rate gradually decrease from approx. 80% to about 35%, where the decline stopped and these values have been maintained for roughly 3 years (see Tab. 22). The detected *p*-value is less than 0.001, which implies strong statistical dependence.

Discussion

The article by Zámková and Blašková (2014) suggests that the most frequent grade obtained in mathematics at the Faculty of Business and Economics of Mendel University in Brno is F, and the same applies to our college.

Authors Kučera, Svatošová and Pelikán (2015) analysed the success rate in mathematics with respect to various factors. One of our objectives was to trace the factors influencing the students' success rate. Our findings show that gender, the form of study, and the study programme all have an impact on the success rate in Mathematics 1. While Uysal (2007) did not confirm the influence of gender, Kučera, Jindrová and Vydrová (2013) proved that there is a correspondence between gender and the success rate in maths. Our research implies strong statistical dependence between the success rate in mathematics and gender. A paper by Kučera, Jindrová and Vydrová (2013) suggests that the type of high school attended does not have any impact on achievement in mathematics. Similarly, Kouřilová and Bebčáková (2015) examine the impact of high school on the success rate in mathematics and they do find a certain dependence - the impact is therefore not positively confirmed.

As it was dealt by Ulrychová (2015) we are also looking at to what degree theory should be integrated into mathematical education, and our experience indicates that as much theory as is indispensably needed for solving the exercises should be taught.

In accordance with Sonnert, Sadler and Bressoud's publication (2015) students are more likely to accept traditional educational methods based on high-quality professors, rather than special technologies and modern practices. Modern methods are, in

our opinion, more efficient in other fields of study, such as the humanities, social sciences etc. We share the idea of the paper by Simzar et al (2015) that the students' motivation matters. Our next research could focus on the comparison of results achieved in maths with those achieved in different courses (Doucek and Maryška, 2015). Should there be proof that good grades in mathematics tend to go hand in hand with good grades in other courses, students might see a verification of the fact that mathematics can be learned through diligent studying just as other subjects. Students are sometimes scared of mathematics beforehand and the findings of such analysis could be used to motivate them to study mathematics. There is an ambiguity of the research results: Majovská and Friedrich (2014) confirmed the positive impact of modern technologies while Sonnert, Sadler and Bressoud (2015) did not. In our opinion personality, educational methods, the motivational skills of individual teachers and the overall attitude of students is what matters most with regard to the improvement of students' results. The cause of good results acquired in the city of Ostrava (see Majovská and Friedrich, 2014) may be mainly the simplification and clarification of study materials. The College of Polytechnics is following the same path, including the restricted use of modern technologies where they prove to be effective. This concerns the creation and ongoing improvement of elearning modules for mathematics where everything is explained in a simple and clear way, plus the offer of a number of examples of exercises and opportunities to practice.

Based on our long-time experience it is evident that (when considering those students who actually want to study) there are two major factors causing their very high failure rate in mathematics nowadays. Factor number one is their insufficient knowledge and skills of secondary mathematics. Factor number two is students' unawareness of factor number one. For a long time we have been trying to eliminate factor number one, at least partially, by repetition of chosen parts of secondary mathematics (at the expense of higher mathematics) at the beginning of each semester. Currently, however, the lacking knowledge of secondary mathematics is so appalling that its repetition is not a matter of weeks, but at least months. Therefore we decided to focus on factor number two firstly. During the first seminar of Mathematics 1 the students are obliged to undergo an entrance test. The test verifies the fundamentals of secondary mathematics mastery. The students who pass the test can stay and continue with the course Mathematics 1. The unsuccessful students may repeat this entrance test once during the next week and those who fail again may drop the course Mathematics 1 without losing their right to repeat this course in the future. Moreover, those who fail can attend a special compensatory course called Seminar in Mathematics to practice secondary mathematics. Its content includes simplification of algebraic expressions, absolute value of real number, solving linear and quadratic equations, including equations with absolute value, logarithm, solving logarithmical and exponential equations, elementary functions and their basic properties (drawing graphs included), summary of goniometric problems, goniometric formulas, simplification of goniometric expressions, goniometric equations, summary of trigonometric problems, vectors and vector operations, equations of line in different forms, conic section equations and their graphs, mutual position of a line and a conic section, summary of combinatorics, binomial theorem. The students that successfully pass the Seminar in Mathematics may afterwards enrol in the course Mathematics 1 without being obliged to pass the entrance test. The reason for this is that the aforementioned entrance test

is equivalent to the final exam of the Seminar in Mathematics. Those who fail to pass even the Seminar in Mathematics have one other option – to participate in the intensive summer or winter school in mathematics, which takes place shortly after the exam period. Yet again, the final exam at the end of this intensive summer or winter school is a valid equivalent of the entrance test for the course Mathematics 1. By the way a similar approach is mentioned in Fonteyne et al (2015), where a basic mathematics entrance test targeting potentially struggling students and offering them alternatives is recommended.

The measures described in the last paragraph are part of an internal project aimed at improving the success rate in Mathematics 1. In this project new textbooks for Seminar in Mathematics are now being created and the e-learning module is being updated and it shall include new test and question banks matched with the topics taught.

Conclusion

The analysis showed that the success rate in Mathematics 1 has been decreasing in course of the monitored period of time. The success rate of full-time students is higher compared to the parttime students, it is thus clear that full-time studies bring better results in mathematics; the success rate of full-time students has been decreasing in the course of the monitored period of time from approx. 70% to under 40%. While at the same time, the success rate of part-time students went down from about 50% to fewer than 30%. This is obviously caused by the fact that part-time students are missing on the opportunity for a thorough practice with their professor. The research confirmed that women have higher success rate than men. Technically oriented programmes (ACS and CS) showed lower success rate in mathematics. Roughly 18% of the students passed the mathematics exam after repeating the course. This research also shows that mathematics may not always be the cause of complete termination of studies, about 26% of the students who failed their studies had different reasons (they dropped out or failed other courses). Detailed analysis of grades showed that F grades are more frequent among students enrolled in technically oriented programmes (compared to FM), among part-time students and among male students. The correspondence map of changes in time over a certain period of time shows clearly that there has been a significant increase in number of students graded with F in the past years, especially in years 2012–2015. The beginning of the monitored period of time saw students obtaining better grades more frequently. Students in the academic year of 2006/2007 achieved the best grades.

Thorough analysis of the respective programmes implies that as for the Finance and Management programme, all grades (except for the grade F) are obtained more frequently by the full-time students. The same dependency is implied as for the female FM students. Applied Computer Science was attended only by fulltime students. The success rate in ACS is not strongly dependent on gender. The only more significant difference is apparent in the relative frequencies of the F grades – these were achieved more frequently by women. As for Computer Systems, all grades (except for the grade F) are obtained more frequently by the full-time students. When it comes to the best grade (A) the success rate of women reached higher numbers, but this applies also to the F grade. In all of these programmes the frequency of F grade occurrence is increasing in time. In the Travel and Tourism programme, the students are only granted credits when finishing the course successfully. Full-time students and female students of TT achieved better success rate. The success rate of these students gradually decreased from approx. 80% to about 35%, where the decrease stopped and these values have been maintained for roughly 3 years.

The efficiency of suggested measures is to be reviewed and further development of the success rate in mathematics at the College of Polytechnics in Jihlava will continue to be observed in the framework of the ongoing internal project.

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GIFTED STUDENTS AND HUMAN CAPITAL ACCUMULATION

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Highlights

- The level of the human capital is influenced by the intergenerational transmission
- *Gifted students came from the families with high level of the human capital*
- Families play more important role than schools in the gifted student's development

Abstract

The economic growth and well-being of the nation increasingly depends on the human capital. In our study we offer original findings based on our survey Talent 2016. We try to identify who the talented students are, which background they did come from and how the family background influenced them. Our paper provides clear evidence of human capital intergenerational transmission. The vertical immobility in the same generation as well as the vertical mobility between generations was observed. Most of the gifted students came from the complete highly educated families with tradition in their field of interest and long positive attitudes toward accumulating the knowledge. Contrarily, the role of the teachers in the support and guidance is negligible. We have shown that there is close relation between the gifted children premature reading ability and the accumulation of the human capital in their families. The same is valid for the attendance of the 8-years grammar schools. Based on our dataset, we do not observe the Galtonian regression toward the mean. For the future economic growth there must be offered a helping hand for the talented children with less educated family background.

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Introduction

The economic growth as well as well-being of the nation depends increasingly on the human capital (e.g. Benos and Karagiannis 2016). As Callard-Szulgit (2012: 19) mentions, the promise of our future is especially the human capital of the gifted students. According to Rinn and Bishop (2015), the gifted children become gifted adults – and they can promote the economic growth of their country. Kell, Lubinski and Benbow (2013: 1) add that 'being able to identify, attract, and develop human capital is increasingly critical for business, scientific, and technical organizations as they strive for a competitive edge'. If the gifted children cannot do their best, if their valuable human capital is 'unemployed', the massive wasting of this rare source leads to the underachievement of the whole economy (compare Yeung 2012).

However, if we study the background of the most talented and gifted personalities, we often find that there is high level of accumulated human capital across the generations (e.g. Yang and Qiu 2016). Parents with higher education levels have children with higher education levels (Black, Devereux and Salvanes 2003). Parental educational level also affects the lifelong learning of adults (Fischer and Lipovská 2013a). The crucial question is, if the highly gifted students came from families with the high accumulated level of education as well as from the families with the lower (or even the lowest) education level or, on the contrary, if the gifted children from the poorer and less educated families hit the glass ceiling and do not have enough chances to further cultivate their human capital. If the intergenerational transmission mechanism of the human capital worked strongly among the gifted children and their families, it should be the school and teachers, who distinguish the student's potential and help to cultivate his or her talent. Recent Czech schooling policy supports especially disadvantaged children and children with learning disabilities. Characteristically, in the *Act no. 103/2014 Coll. amending Act no. 73/2005 Coll., on the education of children, pupils and students with special educational needs and exceptionally gifted,* just two sections are devoted to the exceptionally gifted, while ten sections deal with the disadvantaged students.

According to the Czech School Inspection Report (Entler, Sosnovec and Šecl 2008) only one third of all Czech schools clearly identify their gifted and talented students. Moreover, the work with such students is not systematic. It mostly consists just of the participation at competitions, as the schools are not motivated to take care of gifted children. Matějů (2006) claims that even the grammar schools 'does not act as an instrument of upward educational mobility', but – on the contrary – their just promote the 'intergenerational reproduction of educational inequality'.

As Ermisch, Pronzato (2010), Sewell, Shah (1968) or Fischer, Lipovská (2013b) mention, there is the sex-dependency in the intergenerational transmission mechanism. Similarly there is a consensus that children from complete families do better than their counterparts from divorced families (e.g. Pavlát 2011). Widely discussed among in the intergenerational transmission research is the Galtonian regression to the mean (e.g. Senn 2011). The question is, if the above-average achievements of the one generation are sustainable (or even better: promoted) in the following generations or if they just regress to the mean. In other words: are the gifted students products of the long academic dynasties rich in the human capital or are they just the random successes in the game of genes?

The aim of this paper is to identify who the talented students are and from which background they did come. To do this we conducted unique survey among the most successful and talented students in the Czech Republic (and especially in the South Moravian Region, which has consistent program for cooperation with talented students since 2003). This paper stems from previous conference paper Lipovská and Fischer (2016) which it extends substantially. While the conference paper used merely the instruments of the descriptive statistics, in this paper the more advanced statistical methods are used. Furthermore, the findings of the new research on the premature reading and writing as well as the eight-year grammar school attendance were added. The most important innovation consists of the research on the human capital accumulation which is supported by the original statistical method.

The rest of the paper is organized as follows. We introduce the survey, data and methods we used and we explain usage of the crucial terms *gift* and *talent*. Then the results of our analysis are presented. Firstly we analyse the intergenerational transmission mechanism from the grandparents to the parents of talented students, as well as their working status. Secondly we explore, who has the greatest effect on the talented students, who brought them to their field of interest and who supports them. Then the self-evaluation of the talented students is examined. In the following chapters the premature reading and writing as well as the 8-year grammar school attendance is studied. Further, the Galtonian regression to the mean is discussed. Finally, we deal with the human capital accumulation over three generations in the talented student's families.

Materials and Methods

Our research is based on unique dataset Talent 2016. This survey was conducted from 24th January to 31st January 2016 among highly talented students in the Czech Republic. On-line questionnaire was sent to two groups of respondents:

- i. All current and former participants of the Support for Talented High School Students (PPNS) managed by the South Moravian Centre for International Mobility (JCMM). These students or former participants enrolled to the program either because of the outstanding results at national or international level of student's competition, or according to the assessment in educational and psychological consulting.
- ii. All participant of national round of Students Professional Activities in 2015 (almost 300 respondents). These students are winners of regional levels, which means that they were able to write during their secondary education professional thesis on the scientific topics. On-line questionnaires were distributed via the National Institute for Further Education.

Both groups overlapped in certain range as some of the successful Student Profession Activities Competition are participants at JCMM PPNS program. Totally 213 questionnaires were fully filled and therefore filed to the final dataset. Even if the pessimistic scenario of no data-overlapping was taken into the account, the minimum response rate exceeded 41%, which is far better than in case of the standard surveys. There was 60% of men and 40% of women in the dataset.

For comparison with the Czech standard education and occupation structure the results of Population and Housing Census 2011 were used. These data are available from the Czech Statistical Office official database. Similarly as in Fischer, Lipovská (2013b) we distinguished students with blue-collars parents and white-collars parents according to the ISCO-08 classification (see Table 1).

	white-collars workers	blue-collars workers		
0	armed forces occupations	6	Skilled agricultural, forestry and fishery workers	
1	Managers	7	Craft and related trades workers	
2	Professionals	8	Plant and machine operators, and assemblers	
3	technicians and associated professionals	9	Elementary occupations	
4	clerical support workers			
5	service and sales workers			

 Table 1: International Standard Classification of Occupations.

 White and blue collars workers distinction

Students were further asked to describe their subjectively greatest success. These verbal descriptions were subsequently classified according to the Table 2.

categories		success level	
minor success	1.	personal	
	2.	local	
	3.	regional	
	4.	national	
major success	5.	international	

Table 2: Classification of respondents' successes

Gifted or talented?

Psychological as well as pedagogical literature distinguishes between terms *gifted* and *talented*. However, the explicit definition of both concepts and their distinction is unclear. Table 3 summarizes examples of completely different meanings of both terms.

(Giftedness	Talent		
Makel	comes from people	Makel et al. (2015)	can be developed	
(2015)	natural ability	Hartl	set of innate abili- ties	
Yeung (2014)	is effortless, not earned	(2000)	revealed gift	
Mudrak (2015)	unusual promise in the learning	Gallardo (2013)	natural ability mastery commitment	
Hříbková (2009)		Synonyms		

 Table 3: Giftedness and Talent – comparison of various definitions (source: own elaboration)

When using *Google trends* statistics, adjective *gifted* is used twice more often than adjective *talented* in English. On the other hand the Czech equivalent for *talented ('talentovaný')* is more frequent than equivalent for *gifted* (*'nadaný')*. As Gallardo (2013) notices, these terms can mean whatever writer wants it to mean.

We are well aware of the fact that the difference between *talent* and *giftedness* might be of vital importance in psychology or for the pedagogical science. Nevertheless, our study deals with the relationship of talent, gift and human capital, not with precious definition of these terms. In line with Hříbková (2009) we can use both words as synonyms. This approach is even underlined by the OECD definition of human capital as the 'combination of the innate talent and individual abilities, skills and education' (Brian 2007).

Human capital accumulation

Qualitative variables used in the survey can be easily quantified if we assign to each level of education the standard length of the study program. Disadvantage of this approach is that it is not always the perfectly precious variable. The main weaknesses are:

- Some of the respondents and their family members might have skipped-of one or even more of the school years (e.g. they could study at the grammar school just 3 instead of 4 years) because of their extra-ordinary good performance.
- Furthermore, the standard length of the each educational level in the Czech Republic had been changing during the last decays. For example the primary education should take 8 years before 1948, 9 years to 1953, 8 years to 1960, 9 years to 1978, 8 years to 1990 and again 9 years since 1990 (e. g. Morkes 2010).
- Bachelor degree in some of the fields (especially the Civil Engineering) is often quadrennial while usual bachelor studies take only three years.
- Medical master's program takes six years instead of usual five years.
- Some of the doctoral programs are triennial, other quadrennial and finally the distance doctoral study program can take e. g. eight years.

However, we selected the length of each level in such way, as it responded to the recent equivalent of the standard program. Thus length is summed up in the Table 4.

	Level of education	Years	Total length of edu- cation (years)
а	Primary education	9	9
b	Lower secondary education	3	(a+b) 12
с	Upper secondary education	4	(a+c) 13
d	Short-cycle tertiary education	3	(a+c+d) 16
е	Bachelor's or equivalent level	3	(a+c+e) 16
f	Master's or equivalent level	2	(a+c+e+f) 18
g	Doctoral or equivalent level	4	(a+c+e+f+g) 22

Table 4: Total length of education

The total length of the education was then calculated as the accumulation of all the standards educational level which the individual had to went through to reach the appropriate level.

Using the lengths listed in the Table 4 the *short run* and *long run* human capital accumulation was calculated. This concept

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(constructed for the very aim of our research) is based on the consideration, that the human capital level can be approximated with the number of years spent in the school system (e. g. Mazouch and Fischer 2011). First of all the total length of education was assigned to each of the talented student's ancestors (mother and father respectively). Then, the short run human capital accumulation HC_0 was calculated for student himself as

$$HC_0 = X_1 + X_2, (1)$$

When X_1 is number of years spent at school by students mother and X_2 is number of years spent at school by students father.

Similarly we calculated short run human capital accumulation HC_1 and HC_2 for student's mother and father:

$$HC_i = X_{i1} + X_{i2}, i \in \{1, 2\}$$
(2)

When X_{1j} is number of years spent at school by maternal grandmother (j = 1) or parental grandmother (j = 2) and X_{2j} represents number of years spent at school by maternal grandfather (j = 1) or parental grandfather (j = 2).

Finally the *long-run* human capital accumulation *LHC* was calculated for each talented student as

$$LHC = \sum_{i=0}^{2} HC_i .$$
(3)

The *short-run* human capital accumulation $HC_j, j \in \{0,1,2\}$ can take

- maximum *MAX* = 44 if both parents reached the doctoral degree;
- minimum MIN = 18 if both parents finished just the elementary school.

For more comfortable handling of these data we rescale the variable HC_i to the scale $HC_i^* \in \langle 0, 100 \rangle$. In this case

- $HC_j^* = 0 = MIN^*$ responses to the situation when both parents finished only the elementary school;
- $HC_j^* = 100 = MAX^*$ responses to the situation, when both parents reached the doctoral degree.

For the aim of rescaling we use the following formula (4):

$$HC_{j}^{*} = 100 - \left(\frac{MAX^{*} - MIN^{*}}{MAX - MIN}\right) \times (MAX - HC_{j}).$$
(4)

In case of the short-run human capital accumulation the HC_j^* can be computed as

$$HC_{j}^{*} = 100 - \left(\frac{100 - 0}{44 - 18}\right) \times (44 - HC_{j}).$$
(5)

Similarly the *long-run* human capital accumulation *LHS* can take

- maximum MAX = 132 if both parents and all four grandparents reached the doctoral degree;
- minimum MIN = 54 if both parents and all four grandparents finished only the elementary school.

The re-scaled variable LHC^* is then computed as

$$LHC^* = 100 - \left(\frac{100 - 0}{132 - 54}\right) \times (132 - LHC).$$
(6)

Figure 1 and 2 respectively depicts the absolute frequencies histogram of the *short-run* and *long-run* human capital of the talented students classified into the 10 class intervals of the with 10.



Figure 1: Histogram shows the distribution of the *short-run* accumulation of the talented student's human capital HC_0^* (source: own calculation)



Figure 2: Histogram shows the distribution of *long-run* accumulation of the talented student's human capital LHC^* (source: own calculation)

Statistical methods

For the aim of our research standard methods of the descriptive as well as mathematical statistic were used. In the first subchapter of chapter Results we use predominantly the arithmetic mean, frequency tables and Pearson's coefficient of correlation ρ . Determination of the correlation strength is subject of many discussions. In our paper we use the classification as presented in Table 5.

Size of correlation coefficient	Interpretation of the relationship	
$\langle \pm 0.70; \pm 1.00 angle$	high	
$\langle \pm 0.30; \pm 0.69 \rangle$	moderate	
$\langle \pm 0.10; \pm 0.29 \rangle$	low	
$\langle \pm 0.00; \pm 0.09 \rangle$	none	

Table5: Pearson'scoefficient of correlation: strength of the relationship (source: Jackson 2008: 42, own elaboration)

Hypothesis on the independence between nominal variables is tested using Pearson's χ^2 test and the Pearson's K statistics.

The strength of this relation is measured by the Cramér's V coefficient which is interpreted in line with the Table 6.

Size of the Cramér's V	Interpretation of the relationship
$\langle \pm 0.30; \pm 1.00 \rangle$	high
$\langle \pm 0.20; \pm 0.29 \rangle$	moderate
$\langle \pm 0.10; \pm 0.19 \rangle$	low
$\langle \pm 0.00; \pm 0.09 \rangle$	very low

 Table 6: Cramer's V coefficient: strength of the relationship (source: Botsch 2011, own elaboration)

Furthermore, the univariate Analysis of variance (ANOVA) based on the Scheffe's post-hoc test was used (see e.g. Budíková, Králová and Maroš 2010).

Results

In this section we firstly examined the human-capital background of the talented students in terms of the educational level of parents and grandparents as well as the field of their studies. Secondly we discuss the self-estimation of talented students and their own explanation of their success. In our dataset 60% of respondents were talented male students, 40% talented female students. Most of respondents (60%) studied at eightyear grammar school (85% of them having tertiary educated parents), 22% studied at four-year grammar school (70% of them having tertiary educated parents) and only 18% at other type of secondary schools (only 26% of them having tertiary educated parents). More than one third of respondents gained the major (national or international) success (35% of students). Those basic statistics are in line with the assumption postulated by Matějů (2006), as there is really just the accumulation, not the transmission of the human capital at the Czech grammar schools. In accordance with Pavlát (2011) most of the talented students (88%) grew up in the complete families with both parents.

Human capital and the family background

As figure 3 clearly shows, the gifted students came from highly educated families. Nearly one half (49%) of all respondents comes from families where both parents have the university degree, 71% come from families where at least one of the parents have the university degree. Moreover, 39% of talented students come from the teacher's families.

If mother has the university degree, her father had the degree in 57% cases and her mother in 33% cases, at least one of her parents had the degree in 75% cases. On the other hand, if the mother did not get university degree, her mother studied the university just in 8% of cases and her father just in 18% of cases. Nevertheless, 77% of these mothers reached an upper secondary education.

This transmission mechanism is slightly weaker in the father's families, where the education of mothers from the father side is the same as in case of mothers, but fathers are significantly less educated (only 48% had a degree). At least one of his parents had the degree in 70% cases. On the other hand, if the father did not get university degree, his mother studied the university just in 4% of cases and his father just in 9% of cases. Those results

are in line with the sex-dependency as described in Fischer and Lipovská (2013) or Ermisch and Pronzato (2010).



Figure 3: Ratio of the gifted students' family members, who got university degree (source: own calculation)

According to the Population and Housing Census 2011, only 17% of all economically active Czech citizens have the tertiary education. In case of the gifted student's families even the generation grandparents reached above-average level of education (compare figures 4 and 5). Apparently the intergenerational transmission mechanism works among talented-students families in the same way as described by Becker (1993).

Figure 4: Development of the educational structure in the Czech Republic in 1950–2011 (source: CZSO 2014, own elaboration)

According to the results of Population and Housing Census 2011, 64% of economically active citizens work at the whitecollars occupations. This ratio is significantly higher for the families of talented students: 94% of mothers and 82% of fathers are white-collars workers.

Figure 5: Educational structure in the gifted student's families (source: own calculation)

If we restrict our dataset just to those respondents, who study or studied at university, we find, that

- a fifth of talented students major in the same field as their mothers;
- one third major in the same field as their fathers;
- one half has the same professional orientation as at least one of the family members (including the grandparents).

As Table 7 clearly shows, there is strong relation between the field of fathers and grandfather as well as between mothers and grandmothers. Significantly high number of talented male students inherited their field from their fathers. On the other hand the relationship between the field of talented female students and field of their parents is somewhat weaker.

		mother	father
Telepted student	female-student	20%	18%
Talenteu student	male-student	22%	43%
Talented	talented student's mother	33%	10%
student's parents	talented student's father	8%	25%

Table 7: After who did the talented students and their parents inherited the field of interest?

When asked who brought them to the field in which they excel, most of the talented students (68%) claims, that their find their way themselves.¹ Most often this was the response of students whose parents lacked the tertiary education (78% chosen the option 'I've found this field on my own') against students from tertiary educated families (57%). Great deal of students also mentioned that they were brought to their field by family members. This impact is stronger especially if the parents have tertiary education.

As Table 8 shows, parents with tertiary education brought talented students to their field twice more often. Again, there is a strong sex-dependency: talented female-students were influenced more often by their mothers (28%) than male-students (15%). On the contrary, talented male-students were influenced more often by their fathers (38%) than the female-students (25%). Only 8% of students stated, that their field selection was influenced by their elementary school teacher and 18% by their high school teacher. What is more, there is no evidence, that the teachers would influence talented students from the lower-educated families more than talented students from higher-educated families. Those results are in line with the findings of Czech School Inspection (Entler, Sosnovec and Šecl 2008).

	Mother	Father
Tertiary education	25%	40%
Lower than tertiary education	13%	19%

Table 8: Parental influence on the field selection according to their level of education

Self-estimation and cause of success

More than half of talented students consider themselves as above-average during their secondary education (57%) as well as during their primary education (52%). However, while 76% of talented male-students consider themselves as above average, the same is valid just for 45% of talented female students. This finding confirms existence of female confidence gap among the top professionals as described e.g. in Sarsons and Xu (2015). Similarly students from higher educated families estimated themselves better than students from lower-educated families (61% as compared with 48% student from lower-educated families).

Most of the talented students explain their success by their interest in the field (69%) and diligence (54%).² On the other hand just 29% of them explained their success by the support

¹ Respondents could select multiple options. 2

Respondents could select multiple options.

of their teachers (in contrary to 42% of talented students who mentioned the importance of their parental support).

As figure 6 clearly depicts, the interest in field is the most often explanation of the male-students success (75%), while the female-students highlights especially their endurance (67%). Talented students who reached the major success on the national or international level mention especially their diligence (77% of them) and endurance (59% of them).

Figure 6: What do you consider to be the main reason for your success? (Respondents by gender)

Figure 7: What do you consider to be the main reason for your success? (Respondents by educational level of their families)

There are large differences between the success-factors consideration among the talented students from the lower and higher educated families. While 58% of talented students from higher-educated families stressed their talent, only 27% of talented students from the lower-educated families considered talent as an important factor. Similarly, talented students from the higher-educated families mentioned importance of their parental support more often than students from lower-educated families (48% in comparison to 29%). On the other hand, students from the lower-educated families find their diligence as more important than students from the higher-educated families (56% in comparison to 46%) and their stressed also the importance of the field interest (74% in comparison to 67% of talented students from the higher-educated families).

The greatest differences in the success explanation might be observed between the talented students from the families with both tertiary-educated parents and families with none of the tertiary educated parents. Talented students from the lowest-educated families extraordinary stress the role of their family support (91% of them in comparison to only 49% of students from the families with the highest human capital level). Compared to that, talented students from the highest educated families extremely highlighted the effect of their talent (62% in comparison to only 27% of students from the families with the lowest human capital level, see figure 7). This is in line with Winner (1997:185) who says that "There are poor and undereducated families who value education and achievement, just as there are many upper-income families, who do not provide

enriching environments, and allow their children to spend the bulk of their time in front of the television or at the mall."

Premature reading and writing: evidence of talent

When entering the first class of the elementary school, 54% of gifted students could read. More often was that valid for male students (56%) than for female students (49%). Read *and* write could 35% of gifted children. Nevertheless, if at least one of the parents has tertiary education, this share increases to 41%. On the other hand, if none of the parents has tertiary education, only 19% of the gifted students could read and write before starting the school.

Respondents, who evaluate themselves as *gifted already from the elementary school*, could read before starting the school more often than those, who consider themselves not being gifted already from the elementary school (44% versus 20%).

The impact of family human capital background is impressive. Figure 8 depicts, that if all ancestors³ of the gifted students gained the university degree, 82% of gifted students could read before entering the elementary school. If at least one of the parents gained the university degree, 60% of gifted could read before entering the elementary school. However if none of the parents gained the university degree 60% of gifted could *not* read before entering the elementary school.

Among the students who graduated from the 8-years grammar school 61% could read before entering the elementary school. The same is truth just for the 36% of graduates from the Specialized secondary schools and 48% of the graduates from the standard 4-years grammar schools.

Figure 8: Could you read before entering the elementary school? (Respondents by educational level of their families)

Gifted students at the eight-year grammar schools Using the χ^2 test the following null hypothesis was tested:

 H_0 : Tertiary education of the parents and gifted children attendance of the 8-years grammar school are independent.

The null hypothesis was rejected at the 5% significance level in favour to alternative that there is strong relationship between the university degree of parents and attendance of the 8-years grammar school of their gifted children. Cramér's V coefficient is 0.36.

Moreover, the analysis of variance proved that this relationship is not only very strong, but also strictly positive. Nearly $\frac{3}{4}$

3 Both parents and all the maternal and paternal grandparents.

of gifted children from the families with at least one tertiary educated parent entered the 8-years grammar school, while the same is truth for only 30% of children from families without any university degree (see figure 9).

Figure 9: Relationship between tertiary education of parents and gifted student's attendance of the 8-years grammar school. Confidence interval plot (95%)

Galtonian regression

As for the *inequality in the opportunities* the vertical mobility is of the vital importance. In this subchapter we ask if the parents of the gifted students reached higher level of the human capital than their own parents.

On average, the mothers and fathers gained higher level of human capital than their parents. However, in both generations fathers gained higher human capital level than mothers. While mothers studied 2.2 years longer than their own mothers and 1 year longer than their own fathers, fathers studied 2.3 years longer than their own fathers and 3.1 years longer than their own mothers (see figure 10).

Figure 10: Accumulation of the human capital among maternal and parental families

As it is summed up in the Table 9, 90% of mothers gained at least the same or higher level of human capital as their own mothers and 82% gained the same or even higher level as their own fathers. Vertical mobility was proved for 60% mothers of the gifted students.

The same pattern is even more pronounced for fathers: 95% of gifted student's fathers gained at least the same or higher level of human capital as their own mothers and 94% gained the same or even higher level of human capital as their own fathers. Vertical mobility was proved for 65% fathers of the gifted students.

Table 9: Share of the gifted student's mothers/fathers who gained the lower (<), same (=) and higher (>) educational level than their parents

In other words, in the families of gifted students we observe not only the higher level of human capital in every generation, but – which is even more important – the sound increase of it. Based on our dataset, we do not observe the Galtonian regression toward the mean.

Human capital accumulation

In this subchapter the human capital accumulation HC_0^* and LHC^* is measured using the expressions (5) and (6) on the scale from

- 0 (all family members finished just the elementary school)
- to 100 (all family members gained their PhD or its equivalent).

The average short-run human capital accumulation reaches $HC_0^* = 55$ points for gifted students, $HC_1^* = 41$ points for their mothers and $HC_2^* = 37$ points for their fathers. The long-run human capital accumulation is therefore for the gifted students lower than short-run accumulation as it reaches $LHC^* = 44$ points. These averages set out the landmarks with which we can compare all the results in this subchapter. The short run human capital accumulation of the gifted students and their mothers is moderately correlated ($\rho = 0.41$). The same is valid for the correlation of the human capital accumulation between gifted students and their fathers ($\rho = 0.40$) and between parents each other ($\rho = 0.38$). It means, that

- The higher level of human capital in the grandparental generation translates substantially to the higher level of the human capital of the gifted parents.
- Mothers from the families with higher level of the human capital tend to marriage men from the families with the higher level of the human capital as well.

If gifted children could read and write before entering their first class of elementary school, their short-run human capital is 61 points (significantly above-average); if they could not, it is only 52 points.

Gifted students who evaluated themselves as above-average from the elementary school have their short-run human capital of 57 points. Those, who underestimate themselves, have shortrun human capital about 45 points. This is in line with the findings, that children from the highly educated families exhibit greater degree of self-confidence.

The accumulation of the human capital is connected also to the factors of gifted student's success. Students, who do named talent as the main factor of their success, have short-run accumulated capital of 61 points. Those, who do no stress importance of the talent, have short-run accumulated capital of only 49 points. It means, that students from the families which are 'richer' in

the human capital observe talent (which they cannot influence on their own) as very important. Similarly, gifted students who observe their family support as the crucial factor of their success has $HC_0^* = 60$ and LHC = 48. On the other hand, students, who do not see their family as crucial for their success exhibit lower level of human capital accumulation: $HC_0^* = 49$ and $LHC^* = 41$.

Students, who see the roots of their success in the support of their teachers, exhibits lower short-run human capital accumulation $(HC_0^* = 52 \text{ in comparison to } HC_0^* = 56).$

Significant difference in the human capital accumulation level can be observed between students who attended 8-years grammar school and those who attended standard grammar school: $HC_0^* = 64$ points in comparison to $HC_0^* = 33$ points. Even this finding support the hypothesis, that children from the highly educated families are being send to elite secondary schools.

In ideal situation gifted children from the families which are poorer in the human capital, should be supported and influenced by their teachers. However, results of our research show, that gifted students, who were brought to their field by teachers, came from the families with higher human capital endowment $(HC_0^* = 59$ versus $HC_0^* = 54$ points). Only those, who choose their filed on their own, came from families with substantially lower human capital endowment than their counterparts $(HC_0^* = 59$ versus $HC_0^* = 52$ points).

Last but not least, we observe the extremely high level of human capital accumulation in the families where gifted students continue in the 'family field'. The human capital accumulation reached 58 points in the 'dynasties' but only 39 points in families in which the gifted student goes his or her own way.

Discussion

The crucial finding of our study suggests that the recognized gifted pupils and students come from the families with high stock of the accumulated human capital. This is in line with traditional model of intergenerational transmission mechanism as presented in Becker (1993) or Fischer and Lipovská (2013a and 2013b). Furthermore, Lundborg, Nordin and Rooth (2011) mentions, that there is a strong correlation between parent's human capital and the human capital of their children. Part of this transmission is according to the authors caused by the nurturing effect of the parental education on their children's education (ibidem).

Similarly as Lindahl et al. (2013) we find the studies on the twogeneration's transmission mechanism as insufficient. As well as in the case of Sweden, described in the Lindahl's study, even in the Czech Republic the education distribution has changed significantly. This transition was demonstrated by figures 2 and 3.

Other reasons for the success of the gifted children from the families with high level of the human capital can be possibly found in the so called *familism* as explained by Durante, Labartion and Perotti (2011). In their research they discovered very high ratio of the academically successful students from the families active in the highest circles of academia. Durante, Labartion and Perotti focused just on the biggest Italian universities and they found there dozens of examples, when

children, sons- and daughters-in-law, nephews and spouses were promoted during the mandates of their relatives serving as rectors or deans. This *familism* can have both the good as well as the bad effect. On the one hand, Durante, Labartion and Perotti suggest that it promotes efficiency of the allocation of the resources. On the other hand, Durante mentions that there might also *Carnegi effect* occurred: when children have confidence of their high academic position they do not work so hard and they possibly waste their human capital.

Sękowski and Siekańska (2008) studied the family background as well as the further career of

- 90 adults who once earned the national academic award prize and proved so their giftedness (focus group);
- 90 adults who reached no outstanding academic achievement (control group).

Their results are very similar to those of us. The most successful adults came from families of higher social and professional status. According to Sękowski and Siekańska nearly 16% of the gifted adult's father held doctoral degrees (in our dataset it is about 8%), while just 1.1% of the fathers in the control group reached the same degree (among all the Czech man there is just 0.9% holders of the doctoral degree)⁴.

Yet more similar are the results regarding the mothers of the gifted children. In the study of Sękowski and Siekańska 57% of the mother had a tertiary education, in our dataset the proportion was only slightly higher (59%). On the other hand, the proportion of gifted only-children in our dataset (11%) is much lower than in the Polish survey (43%). Most of the Czech gifted children (57%) had one brother or sister.⁵

We have shown that most of the gifted children attended the 8-years grammar schools (60% on average). However, the same is truth for nearly 80% of children from families, where both parents have tertiary education, but only for 40% of children from the other families. This finding is in line with remarks of Matějů and Straková (2003) who suggest that parents with higher socioeconomic status are more interested in their child attending a selective school, and are willing to invest more energy to get such a child enrolled in such school.

Havigerová and Křováčková (2011) define exceptionally intellectually gifted children as children who could read, write and count when entering the first class of the elementary school. This is in line with our findings that most of the gifted children could read. However, only one third of the gifted children fulfilled such definition of exceptionally intellectually gifted who could read *and* wright.

We did not find sufficient evidence to support the Galtonian regression toward the mean. It can be caused by the fact, that while in the generation of grandparents the women had same or even higher level of human capital than men in 68% of cases, in the generation of parents this share increases to 75% cases. Furthermore, as we mentioned in the first subchapter, people with the higher education tend to marriage spouses with higher education as well.

⁴ The difference between Polish and Czech results can be caused also by the different perception of the *doctoral degree*.

⁵ It is interesting, that this structure is similar for both the Czech families where both parent has the tertiary education.

An obvious weakness of our research is rooted in the dataset. Firstly, the number of respondents (213) is not very high. However, it is sufficient for the basic statistics. In the field of gifted pupil's research we must be often content with much less observations. For example conclusions of the study conducted by Mudrak and Zabrodska (2015) are based on just nine casestudies. Secondly, we did not and could not compare our results with two crucial control groups:

- normal (not gifted) children;
- children who are gifted but were not recognized as gifted.

Furthermore, as Rinn and Bishop (2015) recall, there is also the group of adults, who are not eminent, but where identified as gifted when they were children. We can summarize this problem in Table 10.

		Adult		
		eminent not eminent		
Children	recognized as gifted	fully used po- tential	waste of the fi- nancial capital	
Children	not recognized as gifted	waste of the hu- man capital	no gain, no loss	

 Table 10: Type I and type II errors in the gifted-support (source: own elaboration)

Ideally the giftedness of the children is recognized and further supported, so his or her potential is fully used. If the ambitious highly educated family supports gifted child who does not growth in the eminent adult, we witness so called Type I error (see e.g. Ary et al. 2010: 165). In such case the (financial) investments in the development of individual's human capital were purely wasted. Such case studies are described on the margin of the research conducted by Mudrak and Zabrodska (2015). In these cases the gifted children were forced by their parents and coaches to work hard on their human capital which leads them to changing their personal goals and career as soon as they were able to make decisions on their own.

However, the lack of care can lead to the Type II error, when the giftedness was not early recognized and hence supported. Children from the families with lower stock of the human capital who were not supported at least by their teachers, can end up as eminent adults, whose human capital was not developed sufficiently. Such a wasting of the human capital is comparable with the unemployment (e. g. Rinn and Bishop 2015).

Conclusion

Talented students are the most promising and most important part of our future human capital stock. However, there is still a profound ignorance of their family background, influences as well as the effect of schooling on their development and professional orientation.

In our study we offered original findings based on our own survey Talent 2016. We intend to conduct this survey every five years to monitor the changes in the structure of the Czech talent pool. This paper provides clear evidence of human capital intergenerational transmission as well as vertical immobility in the same generation. Most of the talented students came from the complete highly educated families with tradition in their field of interest and long positive attitudes toward accumulating the knowledge. On the other hand, the role of teachers in the support and guidance is negligible. Premature reading and writing is often being considered as the sign of giftedness. We have shown that there is close relation between the gifted children premature reading ability and the accumulation of the human capital in their families. For example, if all six ancestors of the child gained the university degree, 82% of gifted students could read before entering the elementary school. The same is valid for the attendance of the 8-years grammar schools.

Based on our dataset, we do not observe the Galtonian regression toward the mean. The vertical mobility in education was proved for 60% of student's mothers and 65% of fathers. Kind of 'dynasties' can be observed among the gifted children families. There is extremely high level of human capital accumulation in the families where gifted students continue in the 'family field'.

The family effect as well as the sex-dependency is incontestable. For the future economic growth and Czech well-being there must be offered a helping hand even for the so far unused talent pool of children with the less educated background as no country all over the world can afford to waste its valuable talent.

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SIMILARITIES AND DIFFERENCES IN TEACHING CORPORATE SOCIAL RESPONSIBILITY: EVIDENCE FROM MEXICO AND CANADA

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Highlights

• A comparative case study that utilizes curriculum and in-depth interview analysis to illustrate not only the similarities and differences in the CSR programs, but how social responsibility is taught. Our findings indicate that the CS

Abstract

The need to incorporate and develop Corporate Social Responsibility (CSR) within university programs is necessary for future leaders, managers and entrepreneurs. Within the framework of CSR and stakeholder theory the paper contributes a comparative case study that utilizes curriculum and in-depth interview analysis to illustrate not only the similarities and differences in the CSR programs, but how social responsibility is taught in a Mexican and Canadian University context. The main findings are: the CSR program in Mexico is perceived as a strategic management tool that adds value to the organization and does not pay any special attention to the globalization phenomena. Whereas in Canada, social responsibility is founded on ethics, attention to the different stakeholders in a globalized environment is emphasized and the strategic importance of CSR is widely accepted. The paper provides academics and researcher insight into exploring how universities can further facilitate students as stakeholders in considering social responsibility as important and necessary to ensure CSR sustainability in practice.

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Introduction

Bowen (1953) provided the first definition of Corporate Social Responsibility (CSR) as "obligations of businessmen to pursue those policies, to make those decisions, or to follow those lines of action that are desirable in terms of the objectives, and values of our society". In today's globalized world as corporation's gain power and economic relations grow the need for increased commitments and responsibilities arises. This gives way to the need to not only carry out more research on CSR from a stakeholder perspective and develop programs that create understanding and awareness for all parties, but also incorporate CSR curriculum into higher education institution programs. It is becoming increasingly necessary to give greater importance to ethical values and CSR policies in higher education institutions (Gaa and Thorne, 2004; Bampton and Maclagan, 2005; Block and Cwik, 2007) as business schools and faculties of economics and business administration have a stake and responsibility to produce graduates who act in an ethical and responsible way and instigate socially and ethically acceptable operations when they join a company (Pfeffer and Fong, 2004; Cornelius, Wallace and Tassabehji, (2007); Waples et al., 2008). The main rationale behind this argument is that education is a key driver of students' moral and ethical development and that the students of today will become the top managers and policy makers of the future (Armstrong, Ketz, and Owsen (2003). In addition, universities have to consider students as important stakeholders who may have expectations about CSR activities. For instance, Kvasničková Stanislavská, et al. (2014) have noted that current and potential university students have different expectations, as stakeholders, in their involvement in active and passive forms of CSR activities as part of their higher education.

Exposure to CSR in the curriculum has been found to have a significant impact on student perceptions of what should be the ideal linkages between organizational ethical practices and business outcomes (Luthar and Karri, 2005, p.353). Despite this growing interest in CSR in university education, there appears to be a lack of consistency among curricular programs in regards to what is taught. Moreover, this inconsistency may not help students, as future business people, to clearly understand how to implement CSR activities appropriately (Tudev and Lkhagvasuren, 2011). In light of comparatively exploring the current state of CSR education various models and of social responsibility are considered.

Bowen (1953) provided the first definition of CSR which since then has evolved significantly, from good corporate citizenship (Johnson, 1971; Waddock and Boyle, 1995) and ad-hoc philanthropies (Carroll, 1991; Porter and Kramer, 2002; Cochran, 2007), to the stakeholder theory (Freeman, Donaldson and Preston, 1995; Freeman, 1984) and, finally, to a corporate strategy which can be more closely associated with financial performance goals (Lee, 2008). Therefore, it is important that management students take courses on CSR at their undergraduate studies because they will be the future entrepreneurs and managers with a responsibility to achieve orgnaizational success and a better society for everyone. Higher education institutions have been using CSR as part of their competitive strategy (Dahan and Senol, 2012). Moreover, Augier and March (2011), note that the corporate scandals in the USA, along with the normative pressures from the AACSB accreditation body are promoting business schools to teach their

students a managerial approach that involves CSR. In addition, globalization has inevitably embraced higher education institutions and within this new competitive environment, many higher education institutions have adopted a more business-like approach in order to compete and survive in the changing education industry (Weymans, 2010; Dahan and Senol, 2012). Both management and faculty need to balance the need to adjust to a changing world while maintaining the organizational identities and the inherent characteristics of higher education (Stensaker, 2007).

In an international survey of 211 scholars with expertise in business ethics, Holland and Albrecht (2013) asked each respondent to identify the three most important issues that business ethics academia will face in the coming decade. The results suggest that the most important issues facing business ethics academia in the future will be the following: curriculum, faculty training, research relevance, and the credibility of the academic field. Consequently, higher education institutions that are adapting a more business-like approach in order to compete and survive in the changing face of industry are discovering the importance of CSR as a reputation and an advantage building strategy (Atakan and Eker, 2007; Stensaker, 2007) which is evident in its aim to embrace responsibility for the company's actions and encourage a positive impact through its activities on the environment, consumers, employees, communities, stakeholders and all other members of the public sphere who may also be considered as stakeholders (Freeman, Harrison and Wicks, 2010).

Corporate Social Responsibility and Stakeholder Theory

Carroll (1979) suggested that businesses have to fulfill economic, legal, ethical and philanthropic responsibilities in order to address its entire obligations to society. This definition has helped define the four components of social responsibility and broadened the scope of its understanding (Maignan, 2001; Popa, 2010).

The comparative analysis of CSR evolution represented by conceptual models within the literature (Carroll, 1991; Schwartz and Carroll, 2003; Geva, 2008), demonstrates that the same terminology represents different meanings and different approaches to CSR. Its nature, assumptions and limits, methodological tools and the measurement of results are at the same time the cause and effect of how the relations of its elements are understood. It is generally accepted that there are certain responsibilities that give shape to CSR as seen in the three aforementioned CSR models. Firstly, economic responsibilities designate the obligations for businesses to be productive and profitable (Maignan, 2001). Secondly, legal responsibilities refer to the framework of legal requirements which businesses need to meet while practicing economic duties (Carroll, 1979). Thirdly, ethical responsibilities are the defined appropriate behavior by established norms that businesses should follow, and lastly, philanthropic responsibilities reflect the common desire to see businesses get actively involved in the betterment of society (Maignan, 2001).

The CSR concept has transitioned significantly to alternative themes such as business ethics theory, corporate social performance, corporate citizenship and stakeholder theory (Forray and Leigh, 2012, 299). Overall, CSR pays less attention to the interests of the stockholders or owners and comparatively more attention to the public, community and employees (Freeman, Harrison and Wicks, 2010, 60). Whereas stakeholder theory is a grounded attempt to take CSR into practice, by providing balanced attention to all stakeholders' demands. Stakeholder theory was developed as an aid to managers, to face complex realities in a more effective way than other prevalent theories (Freeman, Donaldson and Preston, 1995). Considered as an inclusive theory (Freeman; Harrison and Wicks, 2010), all stakeholders who are a part of the value chain receive a status condition just like the corporate fiduciaries, (Freeman, Harrison and Wicks, 2010). Followers believe that companies have obligations and responsibilities toward all those who are affected by their behaviour (Tricker, 2012; Derry, 2012).

The different CSR models (Carroll, 1991; Schwartz and Carroll, 2003; Geva, 2008) and the stakeholder theory have strong links to one another. Companies are expected not only to fulfill their financial obligations with the stockholders and their legal duties, but also to perform ethically, and to act as good corporate citizens, playing an active philanthropic role.

For the purpose of this paper, the predominance of each stage of the CSR evolution model (Geva, 2008) is identified in CSR programs in two university contexts, a Mexican university, *Universidad de Guadalajara (hereafter, UMEX)*, and a Canadian university, *The University of Lethbridge (hereafter, UCAN)*. Thus, we utilize stakeholder theory to understand what is currently happening in management teaching and CSR in Canada and Mexico. In other words, analyzing CSR curriculum from the perspective of understanding corporations relationships with stakeholders, as corporations are a nexus of a complex web of stakeholder relationships where relationships with specific stakeholder groups are managed rather than with society at large (Jamali, 2008). The following research questions are asked:

- 1. What are the differences in the CSR contents of management programs in Canada and Mexico?
- 2. What and how is CSR taught in the participating Canadian and Mexican universities?

Within the framework of CSR and stakeholder theory this research explores through a comparative case study how academics at the UMEX and UCAN interpret and utilize the CSR concept. The paper examines the CSR curriculum taught to undergraduate management students and identifies the similarities and differences of the CSR programs to one another. Considering, that the teaching of CSR might have a positive impact on a company's profitability, (Vogel, 2008), it provides incentives to teach it and investigates how to develop it. Exploring how these universities facilitate students as stakeholders in considering social responsibility as important and necessary is significant in regards to CSR sustainability in practice. The objective of this paper is to set comparisons about the contents and practices of CSR teaching to understand to what degree two universities in two different contexts have similarities and differences.

Materials and Methods

When carrying out research in different geographic regions there is a lack of higher levels of relevant analysis on CSR research that includes countries, economic blocs and geographic regions (Aguinis and Glavas, 2012). For this reason, qualitative research is recommended. This study utilizes an interpretive approach (Alvesson and Sköldberg, 2000), where we moved back and forth between theory and empirical material. We use the case study approach to compare the CSR programs at two universities in two different national contexts (Yin, 2003). Therefore, this case study employs collecting in-depth information through semi-structured interviews with academics that teach CSR at UMEX and UCAN. The literature review and curriculum analysis provided the means to identify the differences in the CSR programs contents at both universities.

Contexts and organizational settings

As part of a broader research project on international comparative education between Canada and Mexico in the context of the NAFTA agreement, this paper presents two case studies on the CSR programs, one from a Mexican university and one form a Canadian university. The selection criteria for these two universities was to be public universities, having a CSR course in business, and their business schools to not be a part of the UN Compact, which allows avoiding the normative pressures (DiMaggio and Powell, 1983) for belonging to a specific accreditation body. In the case of UMEX, it was the only public university with a business school that had implemented a CSR course for undergraduate management students in 2013 in Mexico. The Canadian university, UCAN, was selected due to the first author's access to interviewing faculty members thanks to being a visiting professor several times. This university implemented the program "Managing Responsibly in a Global Environment" (MERGE) in 2002.

Mexico and UMEX

Mexico is an emerging economy with an income per capita of US\$ 10,361.00 (World Bank, 2015). According to the classification of Transparency International (2013), Mexico ranks 106 in honesty out of 177 countries. It also ranks 26 out of 28 countries analyzed in terms of their companies' predisposition to offer bribes when doing business internationally (OECD, 2015). The UN Global Compact Network of Mexico was launched in 2005 and it has 700 participants from businesses and non-business organizations, of which 46 are universities (UN Compact, 2014). It is important to note that in the Mexican context there are both private and public universities.

UMEX is a Mexican public university. It was founded 90 years ago in the state of Jalisco, Mexico. UMEX is the second largest Mexican university. In 2014-2015, UMEX provided higher education to 45% of Jalisco's population. There are 2,926 full time academics of which 44% have a doctorate degree. It has 108,425 undergraduate students enrolled and 6,432 at graduate studies.

Canada and UCAN

Canada is a developed nation with an income per capita of US\$ 50,271.00 (World Bank, 2015). It ranks 9 in honesty out of 177 countries analyzed (Transparency International, 2013). The UN Global Compact Network of Canada was launched in 2013 and it has 159 participants from businesses and non-business organizations, of which 13 are universities (UN Compact, 2014). The majority of universities in Canada are public universities.

UCAN is a Canadian public university. It was founded 50 years ago in the city of Lethbridge in the province of Alberta. UCAN is a comprehensive university that has shown a fast growth in the last years. It has three *campuses* in the cities of Lethbridge, Calgary and Edmonton. There are more than 500

faculty members of which 94% have a PhD degree. It has 7,893 undergraduate students and 560 graduate students.

Data collection

We collected data in two different stages. In the first stage, we collected documents with the academic programs of CSR from both universities containing the general and specific objectives of the course, the themes and topics covered, along with their description and their duration. The academic authorities and the academics from both universities supplied the information on the students, programmes, materials and methods used to teach the CSR courses analyzed. In the second stage, we conducted semistructured interviews with academics from both universities who teach the CSR course, or who have taught it before, or who participated in the course design. A total of 6 from UMEX and 8 from UCAN were interviewed. We developed an interview guide based on our theoretical framework on the notions of CSR endorsed by the faculty to identify the way they teach it, and understand the links of CSR with specific topics such as globalization, ethics, SMEs, and NGOs, and the expectations on students' research on CSR. While we use the same interview guide for both universities, we made variations if we noted that a CSR topic was or was not covered according to the curriculum review.

The interviews were conducted by the first author who visited both universities. Each interview lasted 1.5 hours on average and they were taped and transcribed. The interviews at UMEX were conducted and analyzed in Spanish. Only the quotes used for comparisons with UCAN were translated into English by the first author and reviewed by the third author. The interviews at UCAN were conducted and analyzed in English.

Data analysis

The analysis was also conducted in two stages. First, we analyze, and compare, the curriculum of the CSR programs at both universities by: (a) identifying the degree of alignment of topics in the curriculum with the core theories of CSR (i.e. three stages of the CSR and the stakeholder theory). The omissions detected during the program analysis and the differences between CSR programs across universities were also incorporated in our interview guide. Second, once the interviews were transcribed, we coded them in NVIVO going back and forth between our data and: (a) our theoretical framework on core theories of CSR (i.e. three stages of the CSR and the stakeholder theory). The interviews were used to understand the differences between the contents of both CSR programs.

Results

The CSR course in UMEX is a mandatory in-person course that includes forty theory hours and twenty of practice, making a total of sixty hours per semester. CSR represents six credits for the bachelor in management. Students must have studied principles of management, economy and environment, before having access to the course. From the objectives of the CSR course at UMEX, the purpose of teaching students the 'theoretical and practical components' of CSR is more than a philosophy something that 'can be managed' for the instrumental view of translating it into 'a competitive advantage for organizations and companies that adopt it for practical implementation'. As a strategic tool, they emphasize the use of tools for 'identification of problems, planning, implementation and evaluation' attending to the 'interconnections between organizations and all the interest groups' in the environment. The CSR course at UCAN is called Managing Responsible in a Global Environment (MERGE), a core course and a mandatory requirement for the Bachelor Degree of Management. The purpose of teaching students this course is to provide them a philosophical understanding or worldview for 'decision making at the light of the forces of globalization'. This worldview of decision-making is framed as 'ethical decision making' by attending to multiple stakeholders within a 'political, legal, regulatory and social environment'.

Similarities and differences in CSR contents between UMEX and UCAN

By reviewing the content of the CSR courses at both universities, we identified similarities and differences (see Table 1 in Appendix). In both universities the content of the program provides assistance as a teaching guide for the faculty to teach the course. However, faculty members may use their academic freedom to provide a particular focus to any topic or assign more weight to some than others. We also conduct interviews with faculty members from both academic institutions to provide more depth and nuance to the comparison of content.

Similarities in course content

In both programs the notion on CSR is introduced as a general framework emphasizing the importance of "corporate social responsibility" (UMEX: unit 1; UCAN: units 1.1 & 1.2) not only for businesses (or organization) but also for society, including its economic development (UMEX: units 2.1, 2.2 & 2.3; UCAN: 2.1). In addition to this general emphasis, CSR represents opportunities for the creation of value for different "stakeholders".

In both programs "strategic" and "social" aspects of CSR are covered (UCAN: unit 11; UMEX: units 1.9, 2.2 & 2.5). These two aspects reflect the foundational themes in strategic management of the stakeholder approach (Freeman, 1984). We identify that both programs underlie the importance of stakeholders for the organization. The UMEX (units 3.2, 3.3 & 3.4) calls them "interest groups" while the UCAN (units 7.3, 8.1, 8.2, 9.1 & 9.2) uses the common label of "stakeholders". The content in both cases makes reference to the strategic "management" of them. This focus on managing strategically the stakeholders is aligned with Freeman's (1984) view on CSR companies that deal with a variety of stakeholders or interest groups. It also resembles the view of "good management theorist" who point to the link between adequate attention to stakeholder groups and "corporate social performance" (Waddock and Graves, 1997, p.306). Moreover, it has been noted that the adoption of CSR may help managers to deal a complex reality to achieve organizational effectiveness (Freeman, Harrison and Wicks, 2010), such as dealing with different stakeholders. However, the UCAN (unit 7.3) points out particular distinctions of the different types of stakeholders by noting the importance of consumers, as stakeholders, while the UMEX (unit 2.4) refers to stakeholders in general, pointing to the stakeholders "related" to the organization.

Another topic covered in both universities is "business ethics" (UMEX: unit 1.7; UCAN: unit 4.2) underlying its importance in business and in organizations. In both cases ethics is mentioned as part of pursuing good "corporate governance" (UMEX: unit 1.7; UCAN: unit 5.2).

The topic of "environment" and "sustainability" are both within

the course contents (UMEX: unit 2.3; UCAN: units 8.1 & 8.2). There is a subtle difference in relation to UCAN's program that makes an explicit link to stakeholders. On the other hand, UMEX does not mention the stakeholders when talking about the environment and sustainability (units 2.4 & 3.3). From this, we can argue that UCAN has more specific themes when referring to the types of stakeholders and their link to specific topics of CSR, while UMEX treats the "interest groups" in a more general way in the program content. The "owners" as stakeholders (UCAN: unit 9.1) have social responsibility, or as mentioned before, they have to be in charge of developing good "corporate governance" (UMEX: unit 1.9) as mentioned in both programs.

Finally, the topic of "socially responsible investments" (UCAN: unit 12.1) partially relates to the topic of "maximization of the partner/stockholder values vs. maximization of society's value" at UMEX (unit 2.5). Notwithstanding, the latter is presented as a dichotomy between benefiting the investor vs. benefiting the society. Therefore, there might be a difference in focus on this theme.

Differences in course content

While both programs have equal weight in hours and credits, the CSR course at UMEX has four thematic units and the program at UCAN includes twelve. It was also detected that at UMEX, the four units of the CSR course are displayed in twenty-one subjects, while at the UCAN the program has twelve units displayed in twenty subjects.

The introductory chapter of UMEX has a subtopic that make an explicit focus on and the "objective view of CSR" and the "subjective-corporate reputation" (UMEX: unit 1.4). This topic does not appear on UCAN's program. This topic is in line with what Orlitzky, Schmidt and Rynes (2003) contend in regards to the link between CSR and corporate reputation and their impact on financial performance.

UCAN has a complete unit on "Globalization" (UCAN: unit 10), while UMEX does not include a general topic on globalization but two specific subtopics on "internationally approved initiatives in Europe and Latin America" (unit 1.3) and "international initiatives on CSR" (unit 3.1). The omission of "globalization" by UMEX is explored in the analysis of interviews.

Unit 4 in UMEX considers the specific topics of NGOs (unit 4.1) and SMEs (unit 4.2), which are absent in the UCAN program. These are important topics in CSR. In particular, NGOs may voice the needs of secondary and tertiary stakeholders (Wexler 2000). Moreover, many organizations engage in a minimalist CSR attending to the primary stakeholders (e.g. stockholders, employees, clients, suppliers) who are located at the core of the companies' market and ignoring the secondary (e.g. local communities and social activists) and tertiary (e.g. environment, wildlife, future generations) stakeholders (Ibid).

UCAN offers a variety of subtopics on "Ethics" in Units 4, 5 & 6. In particular, the subtopic of "Ethics in business schools" (UCAN: unit 4.1) is not present at UMEX. We also find that other subtopics on "ethics", in Unit 5 at UCAN are also not present at UMEX, such as "Personal ethics" (unit 5.1) and "Ethics and technology" (unit 5.3). However, both programs do match in reference to the topic of "Business ethics" (UCAN: units 4.2 & 5.2; UMEX: unit 1.7), resonating with Freeman, Harrison and Wicks (2007), on their view that the majority of business decisions have an ethical component. UCAN also offers "Ethics in global business" (unit 6.1) which is absent at UMEX. The UCAN program has more emphasis on ethics than UMEX in different areas through five subtopics across three different units. This difference is explored in the interview analysis with UMEX's faculty.

The program at UCAN includes the topics of "business and government" (unit 7.1) and "business ideology in Canada" (unit 7.3). These topics are not offered by UMEX. It is interesting to note that UMEX is not explicitly offering these subtopics to create student's awareness in regards to the corruption levels in Mexico that may be linked to "government and business", and/or "business ideology". Drawing on Logsdon and Wood's (2002) notion of CSR as social control on business, and Porter's and Kramer's (2006) suggestion that businesses should adopt a social perspective into their business strategies, we argue that a social business ideology may be an important omission at UMEX.

As mentioned previously, both universities include the topic of stakeholders within their program. This is an important component of CSR noted by Freeman's (1984) stakeholder theory. Nevertheless, UMEX mentions the stakeholders in the program content in a more general way by referring to them as "interest groups" (units 3.3 & 3.4), while UCAN presents specific stakeholders from the 'community" or from the "environment" (units 8.1 & 8.2). In relation to CSR theory, Freeman (2010) contends that organizations have to be inclusive of all stakeholders rather than separating the ones that count and the ones that do not. However, he also clarifies that while all of them have the right to be heard, not all of them are equally important at least all of the time for the organization. Therefore, the role of faculty in both universities is important to point out the inclusiveness of all the stakeholders and the relevance of some of them in particular times for the organization.

Continuing with the importance of stakeholders in both programs, we find that both universities have a topic on managing stakeholders (UCAN: unit 9.2; UMEX: unit 3). The only apparent difference is that UCAN has a "simulation of stakeholder's management" which positions students to role-play possible scenarios.

UCAN has a specific topic on "socially responsible investments" (UCAN: unit 12.1) that partially relates to the topic of "maximization of the partner/stockholder values vs. maximization of society's value" at UMEX (unit 2.5). There is clearly a difference in both programs because UCAN is intending to create students' awareness investing in socially responsible organizations though the stock exchange. In fact, they also offer the subtopic "Corporate Knights' a guide for socially responsible investments" (UCAN: unit 12.2). This guide may help students realize that external parties have the responsibility of monitoring organizations' (lack of) ethical behaviour. On the other hand, UMEX approaches this subtopic from the point of view of the equity partner in the organization who may sacrifice the maximization of her investment return for the purpose of maximizing the society's value. The stand point of UCAN is more aligned with Long and Rao's (1995) argument, based on some empirical evidence, that unethical

behaviour in organizations have a negative impact on return on investments.

Finally, we note that UCAN explicitly expects and facilitates students to engage in "research work" related to CSR in organizations. Students compare two companies' websites, from a specific industry, in order to identify the CSR activities reported on the companies' websites. In addition, they identify to what extent these activities are industry related as a norm. The UMEX program on the other hand does not explicitly require research work.

In summary we have presented the similarities and differences between the CSR content in both programs. Now we present our analysis of the interviews with faculty members from both academic institutions to untangle some of these variances.

Interviews at UMEX

Notion of CSR

We found a common theme among the interviewed faculty who consider CSR as a responsibility and a commitment that organizations have. Therefore, they have to teach students this notion of CSR: "This is a very important course in our curricula because organizations have an important impact on the external environment" (FMEX#2). In this view, the responsibility that organizations have is linked to a variety of stakeholders, as suggested by faculty 4: "Companies have to consider their responsibility towards both the internal clients, employees, and the external clients, including the external social environment" (FMEX#4).

The notion of CSR is also considered as a specific way of managing organizations, comments faculty 3: "it is a form of managing companies, departing from a responsibility towards society" (FMEX#3). Then, students learn that organizations can adopt CSR as acquiring a strategic tool that offers specific advantages for the organization as explained by faculty members 5 and 6:

I teach my students that if you have two companies in the same industry, what makes them different or provides with a competitive advantage? Being socially responsible can provide some level of competitive advantage (FMEX#5)

In our course we teach students that companies that focus on social responsibility have an advantage over those that ignore that aspect. Then, they can use it as a strategic tool not only for decision making but also with their clients (FMEX#6)

Business ethics and globalization

The CSR program at UMEX does not make a strong emphasis on business ethics. It is covered in just one topic on the curricula because it is already covered in a previous course. Faculty 1 explains:

We have a previous course called "professional ethics and social values". In that course, we spend a semester discussing ethics in a deeper way (FMEX#1).

The program content does not mention explicitly the topic of globalization. It is left at the discretion of the faculty member in charge of teaching the course. Faculty 2 claims that:

It is not a topic per se; however, we discuss some of the themes with a global perspective (FMEX#2).

Faculty 4 also mentions the inward rather than the outward aspect of globalization in business. She says:

Yes, globalization is not a topic in our program but we certainly touch upon it. Probably, we discuss it on how global business are coming to Mexico and the impact they have on our country, rather than Mexican companies going abroad (FMEX#4).

Not all faculty members discuss the pros and cons of globalization, but faculty 5 makes this emphasis in his class: "We talk in class about the pros and cons of globalization. Specifically, we discuss how globalization may create inequalities" (FMEX#5).

Specific topics (SMEs, NGOs, CSR Investment)

In this section of the interviews, we focus on three special topics of CSR: SMEs, NGOs, CSR Investment. The topic of SMEs is relevant within the Mexican context because they represent the majority of the businesses: "In Mexico we do not only have SMEs but also micro-SMEs who provide employment or selfemployment to the majority of the population. Accordingly, this is an important topic for CSR" (FMEX#3). In a similar vein, faculty 6 notes the importance of SMEs in Mexico and CSR: "SMEs are very important in Mexico, and we have to bring the applicability of the topics of CSR to these type of companies. SMEs can also benefit strategically by adopting CSR" (FMEX#6). The second special topic is the NGOs that is very important not only in the curricula but also in the comments made by the interviewed faculty. Here we show two extracts from interviews highlighting its importance: "NGOs are very important for the analysis of stakeholders because they can have an important impact on organizations" (FMEX#2). Faculty 1 also comments: "The relationship between companies and NGOS is like a symbiosis. They affect each other; therefore, companies have to take this into consideration when making decisions or reacting to NGOs' demands" (FMEX#1).

The topic of *CSR investment* is neither mentioned in the program nor discussed by the faculty due to the claim of not having knowledgeable faculty members who at that time were in charge of both developing the course and teaching it. Faculty 3 refers to the creation of the CSR program: "When the program was designed, we did not bring that topic because some faculty did not consider it important or because the lack of knowledge on it" (FMEX#3). Even during subsequent revisions to the program, the CSR investment was not considered, as explained by faculty 5: "In our discussion to make adjustment and improvement to the program, the topic of investing with a social responsible attitude did not emerge as needed. Probably, we do not know much about it or it just does not apply to the Mexican context" (FMEX#5).

Student research

The interviewed faculty recognized that in the curricula it is not a primary objective for students to do research on the CSR topic. Some faculty who do research may ask students to investigate some topics and may only ask students to get involved in some form of practical research on what companies are doing in terms of CSR: "Research is not a priority for our faculty, then, just the ones who have a PhD degree may be more inclined to engage students in research" (FMEX#2). Faculty 6 explains what he has done in terms of research but he asserts that he might be one of the few doing this:

My students have to identify a few companies and what they do with their stakeholders. They have to visit a company and report whether the company is adopting CSR practices or not. If they are, then students have to study what they did and how they did it. If not, they have to suggest possibilities in the context of the company and see the reactions from the management (FMEX#6)

Interviews at UCAN

Notion of CSR

The faculty at UCAN considers CSR from the perspective of the "stakeholder management approach" as a "balanced but complex equation", where they try to teach students that: "they have to consider economic benefits for stockholders, while considering societal needs as a whole, represented by a variety of stakeholders" (FCAN#1).

Another faculty member (FCAN#2) recalls when they reviewed the curricula of the business program, and the idea of preparing students to "respond to a variety of stakeholders" to stop this trend of negative reputation of solely being concerned with "monetary benefits for the organization". Back then, he recalls, they proposed to have a core course on CSR, within the business program, with the purpose of making students aware of the different stakeholders that companies have a responsibility with. At the same time, faculty 4 comments that "managing stakeholders" is a complex task because "organizations have limited resources", therefore, managers need to "establish priorities" in terms of "stakeholders' needs and claims" (FCAN#4). Similarly, faculty 6 mentions that "regardless of the economic impact" for the company, managers need to "assess the pros and cons" of attending to stakeholder needs and claims in terms of the potential impact on the business (FCAN#6).

Business ethics and globalization

The topic of business ethics is spread out in four subtopics as it is considered relevant for all interviewed faculty. Interviewee 3 asserts how "personal ethics is the foundation of ethics in business and CSR" (FCAN#3). Faculty 5 also supports the importance of ethics in the CSR program by adding: "ethics in organizations is the sum of all the individual's ethical behavior within the organization" and for that reason, he says "four topics on ethics is not much" (FCAN#5). Finally, a faculty member links ethics with stakeholders when teaching students that "there are conflicting points of view, and tensions, when making business decisions that affect more than one stakeholder" (FCAN#7).

Globalization is a core theme in the UCAN's CSR program as stated by one faculty: "students need to be capable of linking ethical issues in the context of globalization, even if the company is domestically located" (FCAN#5). Similar to this view is commented by another interviewee who asserts that "we live in a globalized world in which organizations are competing. Then, many of our students will face this interconnectedness in global operations, and we need to show them the potential ethical problems they will encounter" (FCAN#2). Faculty at UCAN considers that students need to reflect with a global mindset when considering ethical implications.

Specific topics (SMEs, NGOs, CSR Investment)

SMEs are not covered at UCAN. Faculty seem to center their focus, analysis and examples on big corporation. Faculty 8 attributes this omission to "the lack of research on SMEs and CSR" (FCAN #8). Similarly, faculty 4 states that "the media and the case studies we have access to present the big corporations because there is more information on them and usually they are an easy target for many stakeholders" (FCAN#4). However, they also comment that size should not be an issue for considering CSR activities, as mentioned by faculty 1: "we should cover SMEs and big corporations when showing examples to our students, because at the end of the day, all companies have to behave ethically" (FCAN #1).

The topic of *NGOs* at UCAN is not considered a special topic because it is woven into the discussion of managing stakeholders. Some of the faculty cover NGOs as part of the stakeholder management approach but it is up to the instructor: "each instructor makes more or less emphasis on NGOs, but certainly, we discuss it when we talk about the variety of stakeholders" (FCAN#7). Similarly, faculty member 2 comments: "I won't say that NGOs are a core topic in our curricula but it is an important topic to touch in our course" (FCAN#2).

In regards to *CSR Investment*, faculty at UCAN emphasize the importance of paying attention to the CSR monitoring conducted by third parties such as the "Corporate Knights":

The CSR investment guides create awareness in society, and also for our students, of which companies are following some level of standards for ethical behavior. These students in a point in time will be making decisions on investing and/or making decisions in organizations to appear in those rankings (FCAN#6)

Another interviewee, faculty 5, comments that:

These types of CSR rankings create pressures for companies to respond to societal interest. At the same time, these pressures can drive more performance on companies that are more socially responsible because more investors decide to put their money in them" (FCAN#5).

Finally, UCAN is also under certain pressure to show students the rankings of the Corporate Knights every year as stated by faculty 3: "students participate in CSR and ethics case competitions, and we have to present reports of what we are doing in terms of CSR, including the adoption of these rankings" (FCAN#3).

Student research

At UCAN students have to engage in a research project regardless of who the instructor is. The reasons for this, as pointed out by one faculty member is that "students need to go beyond the textbook and collect empirical evidence by themselves to be aware of what is happening out there" (FCAN#7). Similar to this reason is the one expressed by faculty 4 who states that "students will find through their research project that companies incorporate CSR activities in different degrees. None of the companies are perfect, but the important part is that they do at least some form of CSR" (FCAN#4).

Discussion

The aim of this paper was to compare the content of the curricula and the way Corporate Social Responsibility is taught at two different public universities located in two different contexts in North America: Canada and Mexico.

Previous studies have noted the need to understand what type of business ethics and CSR curriculum have to be taught in business schools and how it has to be conducted to provide students with a solid background to respond to societal concerns (e.g. Gaa and Thorne, 2004; Bampton and Maclagan, 2005; Block and Cwik, 2007). This study served to provide an in-depth case study analysis of two universities located in two different contexts and cultures. The purpose of the comparison allows us to establish the similarities in program content that may reveal the normative standards in North America, while the differences provide potential learning lessons from each setting.

In relation to the first research question, what are the differences in the CSR contents of management programs in Canada and Mexico, we found subtle differences in their views. Firstly, the CSR course at UCAN is closer to the stakeholder theory. Secondly, while UCAN seems to place greater emphasis on different subtopics on ethics compared to UMEX, the latter has a previous course on ethics. Yet, both universities emphasize ethics for business students. Thirdly, the alliance between the non-governmental organizations and businesses, appears to be a more relevant topic for UMEX. Finally, research work conducted by students is more structured and considered an integral part of the program at UCAN compared to UMEX.

In respect to our second research question, what and how is CSR taught in the participating Canadian and Mexican universities, we summarize that in both universities, the CSR course is mandatory with the purpose to create awareness and to provide students with the foundations on theories of CSR and tools to engage in creating a sustainable economy, where both business and society benefit. In terms of program content, both universities include the core topics of CSR matching in more or less degree the three stages of CSR (Geva, 2008). They also consider the importance of stakeholders as strategic partners for the organization, and an ethical responsibility for organizations as described in the stakeholder management theory (Freeman et al., 2010). In UMEX, the teaching of CSR is perceived as a strategic management tool that adds value to the organization and does not pay any special attention to the globalization phenomena. Whereas in UCAN, social responsibility is founded on ethics, attention to the different stakeholders in a globalized environment is emphasized in how CSR is taught, and the strategic importance of CSR is facilitated within the curriculum. Both programs take into consideration the role of entrepreneurs and the responsibility they have towards the different stakeholders in their teachings, and the importance of CSR as a management strategy; however, this notion is more heavily emphasized in the UMEX program.

The main challenges in CSR has been identified as curriculum, faculty training, research relevance, and credibility of academic field plus the reputation and building strategy in Business oriented studies (Maignan, 2001; Popa, 2010). Both universities are taking positive steps towards complying with these challenges. However, each university can learn from the other, comparatively, we highlight that UCAN may consider

adding small and medium size companies, alliance and relations between business and NGO's with more attention to NGO's in its curriculum. On the other hand, UMEX in comparison to UCAN, may consider adding globalization and CSR, giving more emphasis to Ethics than UMEX and the issues of socially responsible investors and research. These additions will provide further alignment to PRME and the credibility and reputation to each institution. Both Institutions may take further steps in training their faculty and lastly, UMEX lack of research and research training may be overcome through stronger alignments to PRME and a progression towards AACSB membership.

This study as any other has its limitations and as a comparative case study it only provides us the current state of what is taking place in CSR teaching in two universities, one in Canada and one in Mexico. None of these business schools are AACSB accredited, therefore, we may find more similarities in those that have to "appear" more standardized in relation to normative prescriptions (Meyer and Rowan, 1991) of best practices in CSR. More research is needed to draw out prescriptive models to help practice and facilitate the development of theory. On the other hand, future research can also give voice to student's expectations and perceptions on the CSR activities offered by the universities in addition to the traditional curricula (Kvasničková Stanislavská, et al., 2014).

Conclusions

Our paper contributes to the literature of teaching business ethics and corporate social responsibility in business schools. In particular, we set the study in two contexts in North America highly influenced by the teaching practices in the USA: Canada and Mexico. We center our attention on some of the most important issues that business schools and academics in business ethics and corporate social responsibility will face in the next decade: curriculum and the way CSR has to be taught (Holland and Albrecht, 2013). By studying these two universities we were able to uncover similarities and differences in curricula. In addition, we conducted post-hoc interviews with faculty members in order to understand some of the differences between these two CSR programs. Finally, we draw some learning lessons from each of universities that provide us a window to study in more depth the how and why to teach specific aspects of CSR.

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Appendix

Table 1. CSR Content at UMEX

UMEX	
Unit 1: Introduction to Corporate Social Responsibi	lity.
1.1. Origin and main concepts	
1.2. Positive and negative delimitation of CSR. What it	is and
what it is not.	
1.3. Internationally approved initiatives in Europe and America.	Latin
1.4. Objective view of CSR and subjective- corpreputation- of the phenomenon. Two sides of the same of	oorate coin.
1.5. The need for CSR at current times.	
1.6. The role of CSR in strategic management.	
1.7. Corporate excellence, ethics in organizations and corporate citizenship.	good
1.8. Benefits at organizations that adopt responsible prac	tices.
1.9. Corporate managerial responsibility, social responsi or organizational social responsibility.	bility
1.10. Some evidences on CSR order: ethical code or go practices, sectorial framework, international framework	od s.
Unit 2: Dimensions and interest groups in CSR	
2.1 Economic Dimension	
2.2 Social dimension	
2.3 Environmental dimension	
2.4 Stakeholders related with organizations	
2.5 Maximization of the partner/ stockholder value vs. Maximization of society's value.	
Unit 3: Tools for CSR management.	
3.1. International initiatives on CSR.	
3.2. Management models for internal stakeholders.	
3.3. Management models for external stakeholders.	
3.4. Complex perspective for managing stakeholders.	
Unit 4: Current tendencies on CSR	-
4.1. Alliances between business and NGO's	

Table 2. CSR Content at UCAN

UCAN	
Unit 1.	
1.1. Introduction	
1.2. General overview	
Unit 2.	
2.1. Business and Society.	
Unit 3.	
3.1. CSR.	
Unit 4.	
4.1. CSR at Business schools	
4.2. Ethics in business	
Unit 5.	
5.1. Personal Ethics.	
5.2. Organizational Ethics.	
5.3. Ethics and technology.	
Unit 6.	
6.1. Ethics in global business.	
Unit 7.	
7.1. Business and government.	
7.2. Business ideology in Canada.	
7.3. Consumers as stakeholders.	
Unit 8.	
8.1. Stakeholders and environment	
8.2. Community as a stakeholder.	
Unit 9.	
9.1Owners as stakeholders.	
9.2. Simulation of stakeholder's manage	ment.
Unit 10.	
10.1. Globalization.	
Unit 11.	
11.1. Strategy and society.	
Unit 12.	
12.1. Socially responsible investment	
12.2. Corporate Knights' Guide for Socia	ally Responsible
Investments.	
Research work.	
Investigate at the web sites of two organ	izations from
a selected industry and set comparisons.	In order to have

Investigate at the web sites of two organizations from a selected industry and set comparisons. In order to have a more complete vision on the industry, students will be able to analyze the websites of other organizations at the same industry.

Table 3. Similarities and Differences in CSR Content between UMEX and UCAN

SIMILARITIES	DIFFERENCES
Subjects 1.1 & 1.2 at the UCAN, coincides with subjects 1.1, 1.2, 1.4 1.5 & 1.9, at UMEX, since these topics are taught at UCAN's course introduction and general overview.	The UCAN does not consider a subject related to the - Objective view of CSR and subjective- corporate reputation- of the phenomenon, that is subject 1.4 at UMEX. Neither it considers the difference between Corporate managerial responsibility, social responsibility, and organizational social responsibility, which is subject 1.9 at UMEX.
Subject 2.1 at the UCAN, coincides with subjects 2.1, 2.2 & 2.5 at UMEX's program.	
Subjects 3.2, 3.3, & 3.4, at UMEX, coincide with subjects 7.3, 8.1, 8.2, 9.1, & 9.2 at the UCAN.	UCAN's plan does not consider <i>International initiatives on CSR</i> , which is subject 3.1 at UMEX.
	The UCAN does not consider the subject <i>Alliances between business and NGO's</i> , that is subject 4.1 at UMEX.
Subject 4.2, at UCAN, coincides with subject 1.7, at UMEX	Neither considers specifically a subject referring to <i>Responsibility at small and medium size business</i> , which is subject 4.2 at UMEX.
Subject 5.2, at UCAN coincides with subject 1.7, at UMEX.	UMEX's plan does not consider the subjects <i>Personal Ethics</i> and <i>Ethics and technology</i> , which are the subjects 5.1 and 5.3 at the UCAN.
No Similarities	UMEX's plan does not consider <i>Ethics in global business</i> , subject 6.1 at UCAN.
Subject 7.3 at the UCAN, coincides with 2.4, at UMEX's program.	UMEX's plan does not include a topic on business ideology in Mexico, equivalent to subject 7.2 <i>Business ideology in</i> <i>Canada</i> , at the UCAN's plan.
The two subjects at this unit, 8.1 & 8.2, at the UCAN, coincide with subjects: 2.3, 2.4 & 3.3 at UMEX.	
Subject 9.1 at LICAN coincides with 1.7 & 1.9 at LIMEX	UMEX's plan does not include <i>Simulation of stakeholders'</i> <i>management</i> , subject 9.2 at the UCAN's plan. UMEX's plan does not include <i>Socially responsible investment</i> , subject 12.1 at the UCAN
Subject 7.1 at OCAIN, conicides with 1.7 & 1.9, at OWIEA.	Neither includes a topic such as <i>Corporate Knight's Guide for</i> <i>Socially Responsible Investments</i> , subject 12.2, at UCAN.
No Similarities	UMEX's plan does not consider specifically a topic referring to <i>Globalization</i> , as 10.1 of the UCAN's plan.
Subject 11.1, at the UCAN, coincides with 1.6, 2.2, & 2.5, at UMEX.	
Subject 12.1, at the UCAN, coincides with 2.5, at UMEX.	UMEX's plan does not include a topic that proposes a <i>Socially responsible investment</i> guide as subject 12.2 at the UCAN.
No Similarities	
Although it is not specified at the UMEX's syllabus that students must carry on a research, some academics interviews declare that they actually ask students to conduct some practical research.	UMEX's plan does not include a topic referring to a <i>research</i> work as it is proposed the UCAN.

EFFECT OF TEACHERS' ABILITIES ON STUDENTS' MOTIVATION WITH VARYING LEVELS OF INTELLECTUAL ABILITIES IN THE ECONOMICS

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Highlights

- The above-average intelligent students are motivated by expertise and exposition of curriculum
- The average intelligent students are motivated by expertise, abilities to develop thinking
- The average intelligent students are motivated above that by exposition of curriculum

Abstract

Intelligence and motivation are two crucial components of the education process that can significantly influence its efficiency. The level of intelligence determines our ability to learn from experience and to solve a problem successfully, whereas motivational processes energize and organize our behavior to reach our goals. This paper is connected to our previous article focused on the influence of teachers' abilities on secondary business schools' students' motivation in the Economics.

In our current study, we monitored the motivational potential of teachers' abilities in a connection with students' level of intelligence, measured by Vienna Matrices Test. As we would expect according to the Received in revised form: September 16, 2016 results of our previous study, the expertise of teachers has the most important influence in the groups of both the above-average intelligent and the average intelligent students. Nevertheless, we found some differences in other preferences of both groups: except the teachers' expertise, the average intelligent students refer to be motivated mostly by exposition of curriculum and ability to develop thinking, whereas above-average students refer only about the exposition of curriculum (except the teachers' expertise). The next factor that we observed in our study is an amount of time that students spend on preparation to school.

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Economic education, educational methods, motivation, intellectual abilities, secondary business school, teacher's abilities

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Introduction

Motivation can be defined as a sum of strengths that energize and organize behavior and experiencing of an individual with a goal to change current unsatisfied situation or to reach something positive (Plháková, 2003: 319). In the field of education, motivation can be described as one of the crucial influences that determines effectivity and fruitfulness of educational process. No learning at school occurs without motivation (Fontana, 2014: 153). Despite many educational systems use various forms of external motivational incentives a student can gradually improve his/her ability to motivate himself /herself without dependence on external sources of motivation (Čáp and Mareš, 2001: 506). According to the self-determination theory, external motivation can be modified into intrinsic motivation under certain circumstances, particularly if the task corresponds with values and beliefs of an individual and helps to fulfil his/ her psychological needs (Tohidi and Jabbari, 2012: 820).

Some issues of motivation in education process can be related to the issues of work motivation, because children observe and learn the interests, values and attitudes towards responsibilities of their parents. Kolman, Chýlová and Selby (2012) try to systematize current theories of work motivation. According to their research in the Czech Republic, the older, less educated respondents from the country margins understand job performance differently in comparison with younger, more educated inhabitants who live in the central part of the country. 'These two kinds of respondents differ mainly in their experience on the job. The younger ones believe that to produce

on a job will bring rewards to them. The others do not believe it is so' (Kolman, Chýlová and Selby, 2012: 96). These attitudes can influence motivation of children and students in the Czech Republic.

Motivation in education process is also age-specific and can significantly change during the school attendance. Vostrá Vydrová, Jindrová and Dömeová (2012) analyze motivation of distance students. They observe higher motivation of adult students. Often they need to reach university degree to keep or improve their work position. Successful termination of their studies can also be more important for their private social status. These factors lead to more intensive self-study and higher responsibility in comparison with regular students (Vostrá Vydrová, Jindrová and Dömeová, 2012: 40).

Ferreira, Cardosob and Abrantesc (2011) investigate interaction between a negative sense of school belonging and intrinsic motivation and their impact on perceived learning. With the sample of 1986 high school student, they proved that a negative sense of school belonging negatively affects intrinsic motivation and also perceived learning. The authors conclude that higher intrinsic motivation leads to more positive self-view in learning and to more positive attitude towards their field of study (Ferreira, Cardosob, and Abrantesc, 2011: 1712-1713). Similar findings can be found in study of Popa (2015) that analyzes impact of motivational factors (self-efficacy, locus of control and interest in subject) and regulated learning's influence on

the level of school performance at middle school students. According to their results, 'academic performance increases if the person aware of his purpose, controls, regulates and directs his impulses, follows the rules, prefers careful planning and demonstrates perseverance in achieving success' (Popa, 2015: 2552).

In this article, we related our results of previous study (Krejčová and Berková, 2016) to the factor of intelligence, because it reflects a general level of abilities that could significantly influence the efficiency of a learning process. Despite we measured only the level of nonverbal intelligence in our research, we come out from the definition of intelligence by Sternberg (2005: 189), who formulated the successful intelligence on the basis of four crucial characteristics: '1) the ability to achieve one's goals in life, given one's sociocultural context; 2) by capitalizing on strengths and correcting or compensating for weaknesses; 3) in order to adapt to, shape, and select environments; and, 4) through a combination of analytical, creative, and practical abilities'.

In a relationship between intelligence and motivation it is important to realize that it is above all the self-perceived level of individual's intelligence, also known as the self-concept of intelligence. In the study of Gerstenberg et al. (2014), the selfconcept of intelligence was significant predictor for the level of achievement motivation. The authors further confirmed that by modest individuals, the relation between self-concept of intelligence and real performance on the test of intelligence is mediated by the level of achievement motivation.

Apart from the self-concept of the intelligence, also teacher's individual option about the nature of intelligence could be crucial in the education process (if a teacher beliefs that the cognitive processes are modifiable or if he/she is persuaded about innate level of intelligence etc.). Jonsson and Beach (2012: 387) define the implicit theory of intelligence as 'the more or less systematic ways people think about the ability to learn'. This persuasion can significantly affect the choice of teaching methods that teacher uses in the education and the general approach to improving of his/her students' abilities.

Motivation of a student is significantly determined by personality of a teacher. Teacher's quality affects his/her personality characteristics – qualification level, scope, form and quality of teacher's training, specialization, age, professional experience, ethnicity, verbal skills and attitudes (Windham, 1988). The ideal teacher disposes resilience, adaptability, the ability to absorb new knowledge, social empathy and communication skills (Dytrtová and Krhutová, 2009: 15). The main determinant of the educational process is the teacher's personality and using of teaching methods. Appropriate use of teaching methods causes a positive effect on teaching.

Students with lack of motivation or demotivated ones are not interested in the process of solving problems, but they are only interested in the result (Boekaerts, 2004). The most important stimulus for motivation is experiencing successes and failures (Elliot, 1999). Study success is related to the used teaching methods. As evident from the several empirical researches, in teaching economic subjects traditional teaching methods are still dominating being supplemented by problem-solving teaching methods. This finding was confirmed by Králová (2009) who conducted a research in 2003 and focusing on 200 students of business schools in the Czech Republic. It was proved that in teaching of Economics verbal reproduction prevails. The least represented activating methods were discussions, economic games, staging methods and independent students' work. The new research proves that there is a causal link between the length of teaching experience and applied teaching methods. The longer experience a teacher has the less sophisticated activating methods supporting economic thinking are used. A change occurs by teachers with teaching experience of less than 10 years (Berková and Králová, 2015: 42).

Active learning is closely connected with the development of thinking. In the economic education, the development of economic thinking is very important. This trend results from the need to support financial literacy. For the development of economic thinking is needful to use higher levels of Bloom's taxonomy (i.e. application, analysis, synthesis, evaluation and creating). Authors Tetteh and Sarpong (2015) examined levels of Bloom's taxonomy. They found based on empirical research that active learning impacts on study results and motivation of students. Activity can be achieved by students' creativity, which is the highest level of Bloom's taxonomy. In this context, we can already talk about the development of economic thinking. Based on the research of Zoller (2015: 4476), the guiding conceptual model of Higher-Order Cognitive Skills has been developed. Implementation of this model requires to use the teaching methodology of case studies and to emphasize the activity in the educational process.

Figure 1: The guiding conceptual model of Higher-Order Cognitive Skills (source: Zoller, 2015: 4476)

The model shows the gnoseological processes with effect on the thinking that may have significant positive impact on students' motivation to study of the subject. It is necessary to demonstrate the curriculum on specific examples from practice with using of problem solving. This is also consistent with the trends of economic education – entrepreneurship (see Aff and Fortmüller, 2013).

The objective of our article is to analyze motivational influence of a teacher on students with varying levels of intellectual abilities from the second and third years at secondary business schools in the Economics. The subject of the research is to quantify the impact of teachers' skills – communication and presentation skills, exposition of curriculum, ability of developing thinking and expertise of teachers – on the students' motivation with varying levels of intellectual abilities. The results will help to implement innovative methodology in the training of teacher trainees of economic subjects at secondary schools to achieve more effectively the educational goals of students at different intellectual levels. Our study expands first research oriented the assessment of effect of teachers' abilities on students' motivation without reference to levels of intellectual abilities (Krejčová and Berková, 2016).

Following hypotheses are subjected to empirical verification: The null hypothesis (H_{0-1}) : Monitored skills of teachers do not influence motivation of the above average intelligent students in the Economics.

An alternative hypothesis (H_{1-1}) : Motivation of the above average intelligent students in the Economics is influenced by at least one of the teachers' examined skills.

The null hypothesis $(H_{0.2})$: Monitored skills of teachers do not influence motivation of the average intelligent students in the Economics.

An alternative hypothesis $(H_{1.2})$: Motivation of the average intelligent students in the Economics is influenced by at least one of the teachers' examined skills.

Materials and Methods

The research was conducted in 2015 at 3 business schools in the Czech Republic that are participated in the research project. There are two Business Academies from Prague and one Business Academy from Vysočina region (Jihlava). These schools were chosen by reason of the realization of the same field of study - Business Academy and their different methods that support students' economic thinking in the economic subjects. Development of economic thinking is main sphere of the authors' survey. The difference between these schools helped to get the relevant sample based on the deliberate choice. The survey involved 368 students from the second and third years of studies at secondary business schools out of which 277 students were used for the data analysis (Table 1). The research involved 221 girls (79.8%) and 56 boys (20.2%) between 16 and 18 years of age. Although the questionnaires and tests were distributed to 368 respondents, the authors obtained data only from 277 respondents

Donomotora	2nd	2nd year		3rd year		Total	
Parameters	Absol.	Relat.	Absol.	Relat.	Absol.	Relat.	
Premise	170	х	198	х	368	х	
Return	124	72.9%	153	77.3%	277	75.3%	

Table 1: Research Sample, 2015 (source: own calculation)

Students from the first and fourth years were not included because the economic education in these years is less didactically appropriate for the development of economic thinking. In the first year of the business academy, the subject Accounting is missing. In the fourth year, the education in Economics is too advanced for development of basis of economic thinking. Students are monitored in intellectual level. In summary, for both study years is assessed the level of abstract-visual thinking of the students:

- 138 individuals (49.8%) above average intelligence and highly exceptional intelligent (intellectual level above 110),
- 109 individuals (39.4%) of average intelligence (intellectual level ranging from 91 to 109),
- 30 individuals (10.8%) below average and significantly below the average intelligence (intellectual level below 75).

Because of the very low number of average and significantly below the average intelligent individuals (n = 30) this group is not further analyzed. The sample is too small to be able to identify motivation ways towards this group of students. In addition, we assume reduced validity of the results by this group of students due to the lack of motivation of some individuals. Therefore, the analysis focuses on the first two groups of students (138 and 109 individuals).

For data collection, the method of questioning technique and diagnosing intelligence were used. The validity of the questionnaire assessing the competence of teachers had been detected by testing in a pilot study on a small sample. Students filled questionnaires to find their attitudes to evaluate the personality of the teacher of Economics in the context motivation in the Economics.

To assess the general level of intelligence of our respondents, we used Vienna Matrices Test, the one-dimensional test of abstract-visual thinking. The validity of the test to measure the intellectual level of students was consulted with the Testcentre in the Czech Republic, which deals with the psychological diagnosis and guarantees the selection of appropriate test. The choice of this type of diagnostic instrument also corresponds with our theoretical assumptions that are described in the introduction of this article. The test allows the quantification of the overall level of the intellective performance in the area of intellectual-abstract visual thinking. The processing of the test is a maximum of 25 minutes. "The test consists of 24 items that are ordered with increasing difficulty. Each task includes a matrix of 3 x 3 images with a missing figure in the third row. The task is to complete the matrix by selecting one of the eight offered solutions. The principle of solution is the discovery of rules that defines the relationship between the images in each row or column. Creating a rule is based on detection of mutual relations between the elements and finding relevant solution. The overall strategy applies perception, thinking, attention, shortterm memory" (Forman, 2002: 8). Despite the test also exists in a computer adaptive testing form that is largely comparable to the paper-pencil form (Žitný and Halama, 2012), the paper version was chosen as it was more suitable to our experiment.

Students filled questionnaires to find their attitudes to evaluate the motivational potential (i.e. analytic approach to evaluate personality of the teacher). Students assigned points 1-5 to each teacher's ability (the higher the point value, the better the teacher's ability to motivate students to the subject). It was also possible to assign zero (i.e. student cannot assess the monitored ability). Teacher's personality evaluation was monitored in five categories, each containing files describing the ability of teachers (Table 2).

In addition, we monitored students' weekly preparation time, which was identified by codes on a scale 1-5, which are represented by these time intervals - I am not preparing for the subject at all; less than 60 minutes, 1-2 hours, 2-4 hours, more than 4 hours.

Category	Number of Abilities in Category	Abilities in Category
Communication Skills	6	pronunciation, interest, pace and melody, keeping attention, paying attention, listening
Presentation Skills	4	examples of real life situations, good actor, eye contact, dealing with stage fright
Exposition of Curriculum	3	practical meaning of the curriculum, adopting unconventional ideas, explanations of mistakes
Ability of Developing Thinking	2	interest in developing a task, leading to thinking
Expertise	1	answer factually correct and consistently to all questions

Table 2: Description of Categories and Files of Examined Abilities,2015 (source: authors)

Data were processed and analyzed with the support of NCSS statistical program (version 2007). Verification of null hypothesis was performed based on non-parametric Kruskal-Wallis test at 5% significance. Data were analyzed based on the method One-Way Analysis of Variance that compares mean value of files. The Kruskal-Wallis test is the alternative of method One-Way Analysis of Variance and this may be used if the data have not normal distribution. The importance of differences between the monitored skills is evaluated via paired comparison test (modification Tukey's multiple comparison method). This test may be used if the data is not normal distribution. Normality of our analyzed data has not been proven. Using Tukey-Kramer Multiple-Comparison test is one of the methods of One-Way Analysis of Variance and identifies the conclusive differences between the surveyed factors. These differences are analyzed for the first two groups of students - the above average and the average intelligent students. Tukey-Kramer Multiple-Comparison test proved effect of the combination of more abilities on students' motivation in the Economics. For analysis of date is used mean of assigned points to each teacher's abilities in relative form.

Results

Verification of H_{0.1} – motivation of the above average intelligent students

Null hypothesis $H_{0.1}$ is rejected at the 5% level of significance (P < 0.01). The influence of at least one of the teachers' surveyed ability to motivate 138 of the above average intelligent student is conclusive (Table 3).

	DF	Chi-Squaer	Prob Level (P)	Decision (0.05)	
	4	44.154	0.000	Reject H ₀	
2					

Table 3: Proven dependence – Kruskal-Wallis test, 2015 (source:authors)

The importance of differences between the monitored skills is proved by Tukey-Kramer Multiple-Comparison test (Table 4).

Monitored Skill	Mean	Differences between skills
Communication Skill	0.722	Expertise
Presentation Skill	0.743	Expertise
Ability of Developing Thinking	0.768	Expertise
Exposition of Curriculum	0.781	-
Expertise	0.838	Communication Skill, Presentation Skill, Ability of Developing Thinking

Differences between skills are graphically depicted in a box diagram via exploratory analyzes (Figure 2).

Figure 2: Exploratory Analysis of Differences – the above average intelligent students, 2015 (source: authors)

In our research focused on 138 of the above average intelligent students from the second and third years of studies at secondary business schools, paired comparison proved that in the Economics students are most motivated by teachers' expertise.

This ability is significantly different from other monitored teachers' skills – communication and presentation skills, ability of developing thinking. The ability of exposition of curriculum is not significantly different from other monitored skills. The above average intelligent students perceive higher motivational potential in the ability of exposition of curriculum, compared with communication and presentation skills and ability of developing thinking. Empirically, it has been proven that expertise of teachers and their ability of exposition of curriculum represent almost the same motivational potential for above average intelligent students.

Based on Tukey-Kramer Multiple-Comparison test, effect of combination of the monitored abilities on motivation of 138 above average intelligent students was analyzed. It was proven that teachers do not support motivation of this student group of subject Economics via further action and improvement of their communication and presentation abilities and ability of developing thinking. The most important fact is that there is expertise and ability of exposition of curriculum.

In terms of the relationship of intellectual abilities and weekly preparation time, it has been proven that above average intelligent students are preparing on the subject Economics in shorter time (less than 60 minutes, the maximum is 2 hours) or they are not preparing for the subject at all (Table 5). This result is consistent with level of intellectual abilities of these students. Preparation time of the above average intelligent students (11.5%) over a longer period of time (more then 2 hours), for example, can be explained by their greater interest in the Economics.

I am not preparing for the subject at all	Less than 60 minutes	1-2 hours	2-4 hours	More than 4 hours
22.5%	37%	29%	7.2%	4.3%

 Table 5: Weekly preparation time of the above average intelligent students, 2015 (source: authors)

Attitudes of the above average intelligent students to personality of teacher of subject Economics were compared in terms of aspect of quality and motivational potential of monitored abilities (Figure 3). Evaluation quality of monitored abilities is not the objective of our article, but it is the subject of our research project. Method for evaluation quality of teacher's personality is the same as evaluation of motivational potential of abilities (see Pasiar, Berková et al., 2015). It results from comparison that the teachers do not develop enough their abilities needed for students' motivation in the Economics. All monitored abilities would more motivate students in the Economics. The students must actually experience the abilities of teachers or the teachers must more develop their abilities (Figure 3).

Figure 3: Comparison of quality and motivational potential of teachers' abilities, 2015 (source: own calculation)

Verification of H_{0-2} – motivation of average intelligent students

Null hypothesis $H_{0.2}$ is rejected at the 5% level of significance (P < 0.01). The influence of at least one of the teachers' surveyed ability to motivate 109 of average intelligent student is conclusive (Table 6).

DF	Chi-Squaer	Prob Level (P)	Decision (0.05)	
4	32.669	0.001	Reject H ₀	
Tab 6. Pro	ven denendend	e – Kruskal-Wallie	s test 2015 (source	

authors)

The importance of differences between the monitored skills is proved by Tukey-Kramer Multiple-Comparison test (Table 7).

Monitored Skill	Mean	Differences between skills
Communication Skill	0.716	Expertise
Presentation Skill	0.722	Expertise
Exposition of Curriculum	0.775	-
Ability of Developing Thinking	0.783	-
Expertise	0.828	Communication Skill, Presentation Skill

Table 7: Tukey-Kramer Multiple-Comparison test - analysis of

differences, 2015 (source: authors)

Figure 4: Exploratory Analysis of Differences – average intelligent students, 2015 (source: authors)

In our research focused on 109 of average intelligent students from the second and third years of studies at secondary business schools, paired comparison proved that in the Economics students are most motivated by teachers' expertise.

This ability is significantly different from other monitored teachers' skills – communication and presentation skills. The ability of exposition of curriculum and the ability of developing thinking are not significantly different from other monitored skills. The average intelligent students perceive higher motivational potential in the ability of exposition of curriculum and developing thinking, compared with communication and presentation skills. Empirically, it was proven, that expertise of teachers, their ability of exposition of curriculum and developing thinking represent almost the same motivational potential for average intelligent students.

Based on Tukey-Kramer Multiple-Comparison test, effect of combination of the monitored abilities on motivation of 109 average intelligent students was analyzed. It was proven that teachers do not support motivation of this student group of subject Economics via further action and improving their communication and presentation abilities. Last but not least, there is expertise, ability of exposition of curriculum and developing thinking.

In terms of the relationship of intellectual abilities and weekly preparation time, it has been proven that average intelligent students prepare on the subject Economics mostly 1-2 hours (41.3%). It would be expected that these students will pay more attention to this subject, but the trend is opposite. Only, 16.5% of average intelligent students prepare 2-4 hours a week, which is adequate for their intellectual level (Table 8). It can be stated that the average intelligent students are not more interested in the preparation for the subject Economics than the above average intelligent students.

I am not preparing	Less than	1-2	2-4	More than
for the subject at all	60 minutes	hours	hours	4 hours
12.8%	29.4%	41.3%	16.5%	0%

 Table 8: Weekly preparation time of average intelligent students,

 2015 (source: authors)

Attitudes of average intelligent students to personality of teacher of subject Economics were compared in terms of aspect of quality and motivational potential of monitored abilities (Figure 5). It results from comparison that the teachers do not develop enough their abilities needed for students' motivation in the Economics (as the above average intelligent students). All monitored abilities would more motivate students in the Economics. The students must actually experience the abilities of teachers or the teachers must more develop their abilities. The results are very consistent with the results in the group of the above average intelligent students. Yet, the average intelligent students only evaluate worse the quality of ability of exposition of curriculum than the above average intelligent students.

Figure 5: Comparison of quality and motivational potential of teachers' abilities, 2015 (source: own calculation)

Discussion

Results of our research proved that students' motivation in the Economics is most influenced by the teachers' expertise. According to the self-determination theory (Tohidi and Jabbari, 2012), this finding could support motivation of teachers to develop and enrich their expertise in their pre-gradual education and in life-long education as well, because they need their expertise not only to gain their master degree or certificate from a course, but above all to transmit knowledges and to support the intrinsic motivation of their students by means of their expertise.

From the critical point of view, the superiority of the teacher's expertise as the most important teachers' ability that influence the motivation of students in Economics could be seen as a consequence of overusing of traditional teaching methods at secondary business schools in the Czech Republic. When the students do not experience e. g. the development of thinking during his/her education, he/she cannot assess this teaching method as important for his/her motivation in the questionnaire despite the need to develop the thinking strategies in the education is evident (Krejčová, 2013).

Kolman, Chýlová and Selby (2012) suppose that structure of motivation is culture-specific. The preference of teachers' expertise in our study can be related to the ideology of motivation that Kolman, Chýlová and Selby (2012: 95) called the protestant ethic, in that the value is attached to hard work that is necessarily connected with acquisition of knowledges and expertise. In the context of research of Vostrá Vydrová, Jindrová and Dömeová (2012) that emphasize age-specific factors of motivation, we should consider relativity of our findings. By younger students, communication and presentation skills could be more important than expertise of a teacher; by older students, motivation could be more affected by ability to develop thinking. This hypothesis comes out of the mechanisms of cognitive development (Sternberg and Williams, 2010) and should by verified by subsequent research. One of the most worthwhile findings of our study lies in the analysis of motivational needs of students with above-average level of intelligence in subject Economics. Lipovská and Fischer (2016) emphasize the need to develop above average high abilities in the education. They ascertained in their study of talented students in the Czech Republic that their respondents explain their success (with a possibility to assign more options) by their interest in the field (69%), diligence (54%) and paternal support (42%). The result, which does not sound very supportive for the Czech educational system, shows that only 29% of respondents explain their success by support of their teachers. We suppose that our research helps to understand educational needs of above-average students at least in subject Economics. In light of teaching management and motivation of students, the work with the average intelligent students is more exacting for teachers. Our research proved that for this group of students, not only expertise and exposition of curriculum are important but also developing thinking. The interest of the average intelligent students in the Economics is lower. They underestimated homework. Therefore, it is necessary that the teachers work individually with these students and give them more attention. In terms of study skills of students, it is necessary to differentiate the complexity of tasks to fixation of curriculum. We recommend using practical examples for this group of students, with an emphasis on entrepreneurship (Aff and Fortmüller, 2013). The teachers can also use Bloom's taxonomy of cognitive objectives (Tetteh and Sarpong, 2015). Concept of these tasks should be adequate for this group of students, i.e. you can use still levels of application and analysis.

The subject Economics supports effective application of curriculum to practical situation. The solving of practical situations requires a high expertise of teachers. In this context, it is necessary to change teaching methods and to apply more problematic and activating methods in the teaching. These methods allow students to see progress, not only the finished result. Such methods are motivating (Boekaerts, 2004). The traditional teaching methods are still dominant (Králová, 2009; Berková and Králová, 2015). Those methods are not so motivating for students. In a group of the above-average intelligent students you can increase motivation for the subject Economics to use progressive teaching methods and gnoseological processes which illustrated the conceptual model of Higher-Order Cognitive Skills (Zoller, 2015: 4476). The teachers can also use higher levels of Bloom's taxonomy, i.e. application, analysis, synthesis, evaluation or creativity. These students are most motivated by expertise of teachers and its exposition of curriculum in the form of analysis and interpretation of errors in practical situations. It is more desirable to use activate methods that can support their interest in the Economics.

Conclusion

Motivation is one of the most important issues in education that can significantly support effectivity of educational process. Motivation of students has specific structure and is determined by age, culture, personality and other specific factors. Personality of a teacher significantly affects motivation of students.

Our study expands first research oriented at the assessment of effect of teachers' abilities on 277 students' motivation between 16 and 18 years of age with varying levels of intellectual abilities. The students were differentiated into two groups – the above-average intelligent and the average intelligent. Both groups were motivated by expertise of teacher and his explanation of

the curriculum with an emphasis on practical meaning of the curriculum, adopting unconventional ideas, explanations of error. Yet, the average intelligent students are motivated by the developing thinking. These significant abilities are different from the communication and presentation skills which were also subject of verification.

We recommend with above-average intelligent students to work in the Economics with the help of progressive teaching methods, problem solving through higher levels of Bloom's taxonomy (i.e. application, analysis, synthesis, evaluation or creativity). These procedures can be achieved by using of activate teaching methods. It is desirable to work with average students with the help of the combination of traditional and activate methods. To increase their interest in the Economics is required to exposition of curriculum with practical examples and use Bloom's taxonomy rather to the level of application.

Our research will also tend to elaborate the methodology and examples for working with these groups of students. This proposal will then be experimentally verified.

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