

ADULT LEARNING AS A CHANCE FOR IMPROVING STATISTICAL LITERACY OF DECISION MAKERS: FOCUSING THE CASE OF CROATIA

Ksenija Dumčić¹ and Toni Milun²

¹Faculty of Economics and Business University of Zagreb, Croatia

²College for Applied Computer Engineering “Algebra”, Zagreb, Croatia
kdumicic@efzg.hr

The adult participation in lifelong learning indicator, referring to learning activities after the end of initial education for people 25 and 64, shows an increase in majority of European countries. The Cedefop (2015) survey on skill shortages and gaps in European enterprises focuses that workers' skills of different scope required by the workforce are characterized by larger skill gaps. High-performing organizations tend to invest more in worker skill development, non-formal and informal, reducing the cost of skill incompatibility and increasing the firm's productivity. Statistical knowledge, as other skills, has a great chance to be improved through the adult learning in European countries. Regarding the adult learning as a chance for enhancing statistical literacy for decision makers, for citizenship and the workplace, Croatia is focused.

INTRODUCTION

Lifelong learning encompasses all focused learning activity, whether formal, non-formal or informal, undertaken on an ongoing basis with the aim of improving knowledge, skills and competence. The intention or aim to learn is the critical point that distinguishes these activities from non-learning activities, such as cultural or sporting activities.

Dumčić (2013) investigated life-long learning in EU-27 and six more countries for 2006 and 2011 using variety of multivariate analysis methods. Lifelong learning were positively correlated with economic development indicator Gross Domestic Product per capita in Purchasing Power Standards and with the employment rate, given by three compressed levels of education defined as highest level of education attained within age group 20-64 years. The life-long learning depends on net earnings positively, and on primary and tertiary levels of education, which influences the employment rate. Ward linkage and Euclidean distance clustered similar countries together.

Some recent papers focused on statistical culture, analysing unused potential in enterprises, e.g. Dumčić & Žmuk (2017b). In Dumčić (2017) the enhancing of statistical literacy as a unique language for a better world was promoted. Statistical literacy is considered as a very important skill for official statistical data producers, data users, students, educators, managers, journalists, government, and especially for citizens, etc. Dumčić & Žmuk (2017a, 2018) studied the lifelong learning development level in selected European countries. The higher the development level of the lifelong learning and the higher the participation rate of adult persons in education and training, the higher the employment rate. The descriptive statistics analysis shown significant differences in the participation rates in education and training between the observed European countries. A growing lifelong learning of adults' participation performs a great chance for improving statistical knowledge in all the countries considered. In Dumčić & Žmuk (2016, 2017b) the enhancing of statistical culture was considered as the unused potential of Croatian enterprises. Managers may reach useful information by using statistical methods with the purpose of improving decision-making in their enterprises to achieve better business results. However, the less often appropriate statistical methods are applied, the more potential of achieving better business results remained unused. The web survey on the sample of Croatian enterprises shown that the vast majority of enterprises does not use statistical methods in their businesses so that a lot of such potential remained unused. The statistics experts and scientists should assure managers in enterprises that statistical methods could be useful in their businesses.

Survey on skill shortages and gaps in European enterprises, Cedefop (2015) was realized in Croatia, as given in European enterprises and Agency for Vocational Education and Training and Adult Education (2016).

DATA AND METHODS

According to Eurostat Glossary available at Eurostat (2018), Adult participation in learning refers to persons aged 25 to 64 who stated that they received education or training in the four weeks preceding the survey (numerator). The information collected relates to all education or training regardless of whether it is relevant to the respondent’s current or possible future job. Lifelong learning statistics collected by Eurostat do not cover informal learning. Table 1 includes rate of change in Adult participation in learning in 2017 compared to 2006. In 2017 Croatia is with 2.5% at fourth position from the bottom.

Table 1. Adult participation in learning (APinL) in 2006 and 2017 in EU-28 and Croatia

Country	Country Code	APinL_2006	APinL_2017	Rate of change to 2006 (%)
European Union 28	EU28	9.6	10.9	13.54
Croatia	HR	3.1	2.5	-19.35

Figure 1 shows the trends for Adult participation in learning selected countries. The position of Croatia (HR) with 2.5% of Adults participating in lifelong learning among the leading and among the worst positioned countries is at the bottom part of the chart. The Ordinary Least Squares (OLS) estimated second order polinomial trend for Croatia appeared to be the best fitted among other models with the equation: $APinL_{Trend(HR)} = 2.169 + 0.2516x - 0.014x^2$, with the coefficient of determination of $R^2 = 0.4989$. The line going down shows very bad perspective for Croatian. For comparison, for the EU-28 the best fitted estimated is simple OLS linear trend model showing an increasing tendency, with the equation: $APinL_{Trend(EU-28)} = 0.179x + 8.083$, with $R^2 = 0.7054$.

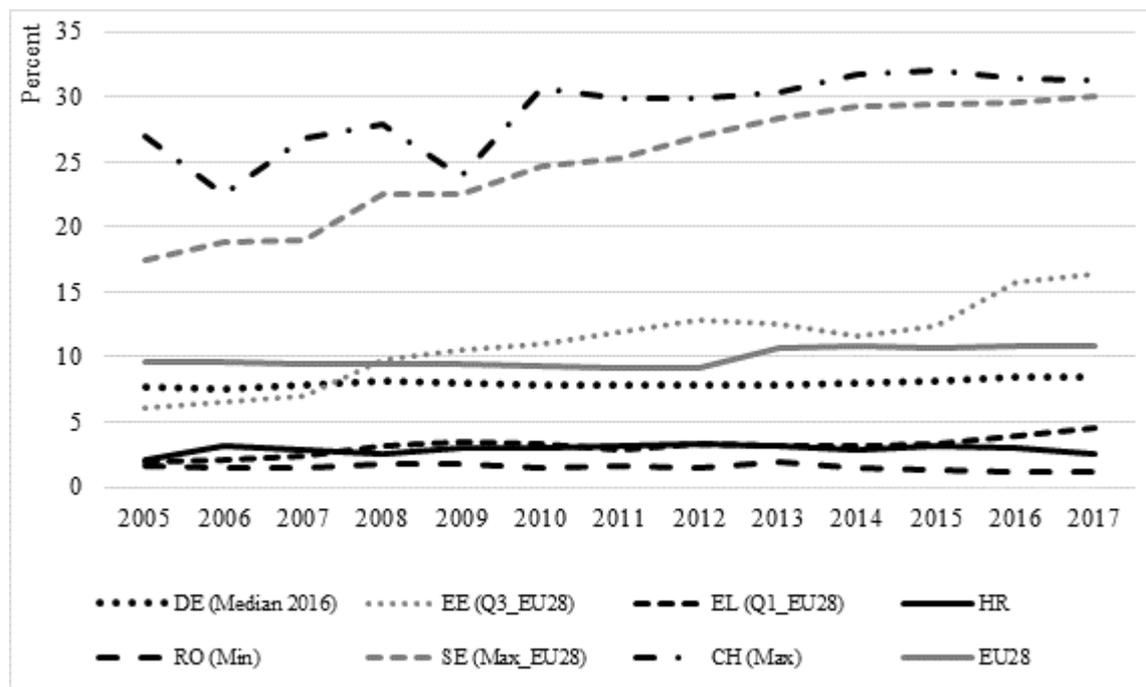


Figure 1. Adult participation in learning (% , based on 2017 ranking of countries), Eurostat codes of countries

SURVEY RESEARCH ON STATISTICAL EDUCATION IN CROATIA

In November 2017, a random sample survey research was conducted in Croatia. This was a part of the face-to-face omnibus survey on general population in Croatia, but the eligible respondents for the questions about statistical education were adults employed for at least 5 years, so n=101 answers were collected. The core questions asked were as follows:

- Is it necessary to know / apply statistical methods when performing work at your workplace

- a. Yes, in my workplace there is a need for knowledge / application of statistical methods. (50% out of total 101 respondents)
- b. No, in my workplace there is a no need for knowledge / application of statistical methods.
- If yes: Do you feel that you personally have enough knowledge and skills to independently apply the statistical methods required in your workplace
 - a. Yes, I have enough knowledge to solve the statistical problems at the workplace independently. (80% out of total 50 respondents who answered YES)
 - b. I do not personally have enough knowledge to independently solve statistical problems and use the help of other members of the working team within the organization or use the outsourcing.
- Are you so far, for the purposes of employment attended some sort of statistical formal or informal education
 - a. Yes, formal education, which includes statistical contents, i.e. statistical training, with the achievement of official qualifications (in school, faculty, etc.)
 - b. Yes, informal education, which involves a significant amount of statistical contents / subjects, i.e. statistical training (workshops, seminars, courses, friends, associates, from the internet, etc.)
 - c. None of the above. (53% of total 101)
- Have you planned to go to some sort of statistical formal or informal training for employment purposes
 - a. Yes, formal education, which includes statistical contents, i.e. statistical training, with the achievement of official qualifications (in school, faculty, etc.)
 - b. Yes, informal education, which involves a significant amount of statistical contents / subjects, i.e. statistical training (workshops, seminars, courses, friends, associates, from the internet, etc.)
 - c. None of the above (69% of total 101 respondents)
- Please indicate on a scale from 1 to 5 how much you agree with the following statements (1 - I strongly disagree; 2 - I disagree; 3 - I neither agree, nor disagree; 4 - I agree; 5 - Strongly agree):
 - a. Knowledge of statistical methods increases the ability to find a more demanding and interesting job.
 - b. Knowledge of statistical methods increases the ability to find a better paid job.
 - c. Knowing the statistical methods does not make a difference in finding a job.

Figure 2 shows that neither males nor females strongly agreed that statistical knowledge matters.

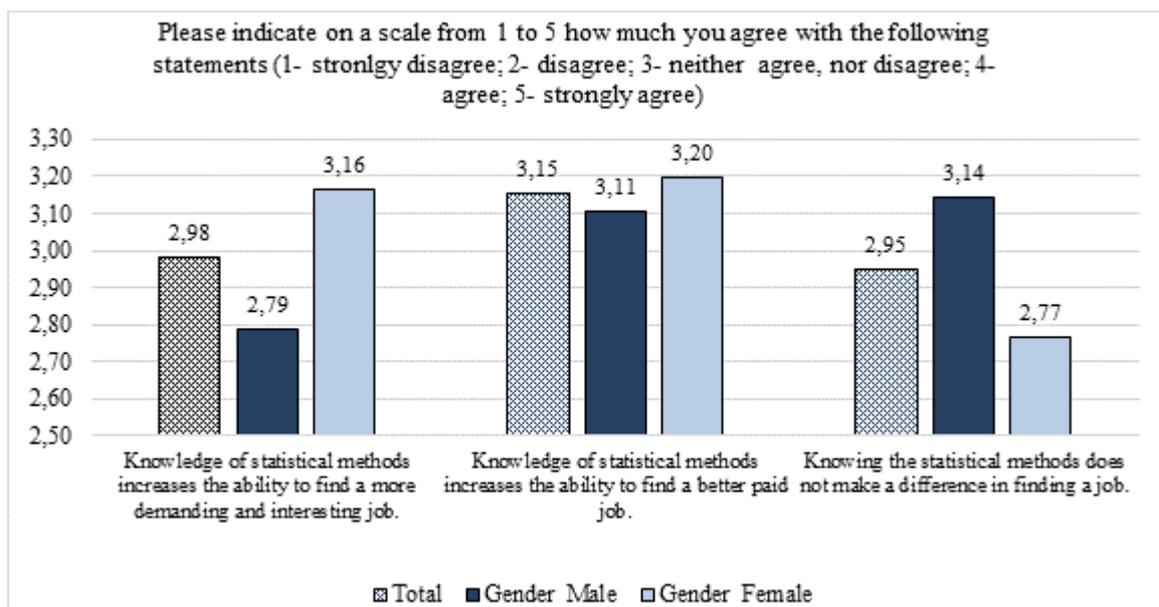


Figure 2. Opinion of people employed at least five years included in the sample (n=101), November 2017, Croatia

CONCLUSION

Croatia is with 2.5% of Adults participating in lifelong learning in 2017 at the fourth from the bottom among 33 European countries considered. Since 2006 it shows 20% decrease. Survey conducted in 2017 estimated that 50% of employed people for at least five years think that it is necessary to know / apply statistical methods when performing work at the workplace and, among them, 80% feel that they personally have enough knowledge and skills to independently apply the statistical methods required in your workplace. Majority (53%) of respondents did not attend any sort of statistical formal or informal education for the purposes of employment, only 40% plan to attend, and only females believe that “Knowledge of statistical methods increases the ability to find a better paid job”. Still, the conclusion remains that there is a perspective for improvement in Croatian Adults participation in lifelong learning percentage and that it may increase the share of those who would be trained in statistics.

REFERENCES

- Agency for Vocational Education and Training and Adult Education (2016). *Vocational education and training in Europe – Croatia*. Cedefop ReferNet VET in Europe reports. http://libserver.cedefop.europa.eu/vetelib/2016/2016_CR_HR.pdf
- Cedefop (2015). *Skill shortages and gaps in European enterprises: striking a balance between vocational education and training and the labour market*. Luxembourg: Publications Office. Cedefop reference series; No 102. LINK [file:///C:/Users/Ksenija/Downloads/3071_en.pdf](http://C:/Users/Ksenija/Downloads/3071_en.pdf)
- Dumičić, K. (2013). Multivariate Analysis of Life-long Learning in European Countries. *Proceedings of the ISI_59th World Statistics Congress (WSC)*, Hong Kong, 25-30, August, 2013, <http://www.statistics.gov.hk/wsc/CPS205-P3-S.pdf>.
- Dumičić, K. (2017). Enhancing Statistical Literacy as a Unique Language for a Better World. Plenary Speech. Kremić, E., Kozarić, K. (Eds.), *Book of Abstracts ICOS2017- The International Conference on Official Statistics*, Sarajevo, B&H, 30.-31.03.2017, School of Economics and Business in Sarajevo, University of Sarajevo, B&H, pp. 19-21.
- Dumičić, K. & Žmuk, B. (2017a). Lifelong learning development level in selected European countries: A perspective for improving statistical literacy. *Challenges and Innovations in Statistics Education, Multiplier Conference of PROCIVICSTAT*, Szeged, Hungary, September 7-9, 2017. Abstract. <http://www.eco.u-szeged.hu/english/research/conferences-workshops/challenges-and-innovations-in-statistics-education/program/program>.
- Dumičić, K., Žmuk, B., (2017b). Enhancing statistical culture – the unused potential of Croatian enterprises. In Baldacci, E., Benoist, G., Boldsen, C., Galambosne Tiszberger, M., Gerendás, J., Karlberg, M., Manninen, A., Nymand-Andersen, P., Poggi, J. M., Sándor, G., Vereczkei, Z. (eds.) *Selected papers from the 2016 Conference of European Statistics Stakeholders - Special issue*, Luxembourg: Publications Office of the European Union, pp. 61-71. <http://ec.europa.eu/eurostat/documents/3888793/8435601/KS-TC-17-006-EN-N.pdf/68310461-0930-4c1d-b935-dfdcd9f36f53>.
- Dumičić, K., & Žmuk, B. (2018). Lifelong learning development level in selected European countries: a perspective for improving statistical literacy. *e-Proceedings of Challenges and Innovations in Statistics Education Multiplier Conference of ProCivicStat* (Kovács, P. Ed), Szeged, Hungary, September 07-09, 2017, Szeged: University of Szeged, Faculty of Economics and Business Administration, pp. 1-6, <http://www.eco.u-szeged.hu/english/research/scientific-publications/challenges-and-innovations-in-statistics-education?folderID=42798&objectParentFolderID=42798>.
- Eurostat (2018a) *Adult learning statistics*. http://ec.europa.eu/eurostat/statistics-explained/index.php/Adult_learning_statistics.
- Eurostat (2018b) *Adult participation in learning by sex*. <http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsdsc440>.