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Full Length Research Paper

Establishing reliability of graduates' self-assessment of acquired generic competences: An innovative approach

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Since self-assessment is often questioned for its subjectivity, our main concern in this article is to study the reliability of self-assessment of higher education graduates' competences with a different approach. This is to answer in particular, "to what extent self-assessment of graduates' competences is reliable", if reliability does exist therein. We used the data set of Reflex project which was carried out under the 6th framework programme of European Union. We employed ordered probit, OLS regression, parametric and nonparametric analyses of variance with the help of SPSS and Stata. Making use of some objective information along with the subjective one, we found nothing contradictory to our reliability hypothesis. We employed the parameters of coherence and consistency to our findings in order to draw conclusions. We feel confident to say that graduates' self-assessment of competences is found to be, in Popperian terms, reliable to a modest extent. The fact that the respondents knew, at the time of survey, that they will not be harmed, could be regarded as a limitation to this study. We have explored only the acquired level of competences in this study. However, we suggest analysing assessment of required competence level of young knowledge workers in the labour market employing the same methodology (to the permissible extent) in order to delineate a comparative description; and this is what provides substance for our subsequent study.

Keywords: Reliability, self-assessment, generic competence, higher education, graduates, ordered probit, nonparametric ANOVA.

INTRODUCTION

In this study, we are concerned with the reliability of self-assessment of acquired competences by the higher education graduates – referred to as graduates from here onward. Various objections have been raised on self-assessment method. For example, individuals may have assessed themselves either optimistically or otherwise. Various intrinsic as well as extrinsic factors could be involved, like, personal bias, self-expectation effect, observer effect, peer effect, sense of institutional prestige, realisation of social and/or cultural pride, socioeconomic situation. Efforts have been made continuously to respond to the objections raised upon self-assessment, for example, Reflex Working Paper 2 (Allen and van der Velden, 2005).

Although self-assessment has its drawbacks, the method is popular and widely used. Eraut (1998) described how people have self- assessed their acquired competences they need in their work. This method offers a convenient way of quickly obtaining a large amount of usable data. Graduates know about themselves what an outside observer may not be aware of. Self-assessment provides only an indirect measure of competence. It is clear that even in the most favourable case self-assessments paint a less than perfect picture. In fact, no method of measuring competences is without its flaws; merits of self-assessment have almost certainly outweighed its demerits.

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Data set

We are using the data set of Reflex project. This research project was funded by the European Union under the 6th framework programme and several national funds. That project was coordinated by the *Research Centre for Education and the Labour Market* at Maastricht University, the Netherlands. The flexible professional in the knowledge society: new demands on higher education in Europe (see http://www.reflexproject.org). From autumn 1998 to 2000, about 40,000 graduates in total from fifteen countries (Austria, Belgium, Czech Republic, Estonia, Finland, France, Germany, Italy, Japan, the Netherlands, Norway, Portugal, Spain, Switzerland and the United Kingdom) provided through a written questionnaire on the relationship between higher education and employment three to four years after graduation. Graduates had been asked to self-assess their competences in it. At the time of survey, however, in 2005 they were already playing their role actively in the labour market.

METHODOLOGY

Methodology is like a blueprint of a construction structure. Whole structure is constructed virtually in the mind of researcher before it comes to enactment. Beauty of the final outcome depends upon how sophisticatedly the methodology has been built. Of course, this is not an easy go. Let us see how successful we have proved ourselves in doing so.

We try to address in present study the issue of self-assessment of acquired competence by the graduates rather quantitatively. The research question is formulated as under.

To what extant is graduates' self-assessment of acquired competence reliable?

The null hypothesis states that there is no statistically significant difference of acquired competence level among the graduates of different subcategories and that all the graduates within their respective subcategories are similar to one another in their acquired levels of competences. Null hypothesis is given here.

H_0*: Graduates of different subcategories do not differ in their self-assessment of acquired competence level*

Whereas the alternative hypothesis states that

H_A*: Graduates of different subcategories do differ in their self-assessment of acquired competence level*

We assume that the graduates are homogeneously distributed within their respective subcategories. All the graduates of a subcategory (e.g. Health Sciences) have similar academic experience. We expect that the graduates of the same subcategory will also reflect homogeneity in their acquired competence level. In other words, similarity in academic experience corresponds to similarity in acquired competence level. If this coherence in their academic experience and their acquired competence level is consistently reflected in their self-assessment of the acquired competence levels, then on the bases of this mutual coherence as well as internal consistency it could be stated that their self-assessment is reliable.

Difference in academic *experience* may lead to the development of a distinct subset of competences with relatively homogenous level of acquisition. We identified three variables characteristic to the academic experience of graduates. The details of these variables will be presented later in the following paragraphs. As an example, Economics graduates should have acquired a distinct subset of competences with relatively homogenous level of acquisition and this group of graduates must differ with Health graduates in this regard. We put our analyses to Popperian criterion of falsifiability. Mutual *coherence* and internal *consistency* are two parameters we will be relying on throughout our analyses in the study.

We are going to analyse statistically the independent responses of graduates' self-assessment of acquired competences. By virtue of logic it is (pre)supposed that the graduates are homogeneous within their respective subcategories on the basis of certain criteria, i.e. *academic experience*. Each subcategory comprises graduates with similar *academic experience*. Thus the subcategory is, logically, supposed to be homogeneous regarding this similarity in *academic experience*. Similar *academic experience* may ensure similar acquired competences. Coherence is expected between *academic experience* and acquired competence. These homogeneous graduates (on the basis of similarity in *academic experience*) are, conceptually, expected to have acquired similar level of competences. In other words, these predefined subcategories, which are homogeneous in *experience*, should have acquired the same set of competences and the same level of acquisition for each individual competence; they should also be homogenous in the acquisition of competences. In a nutshell, graduates, homogeneous in *academic experience*, should be homogeneous in their acquired competences. If this homogeneity in competence acquisition is observed in their self-assessment, we can say that the graduates have judiciously assessed their acquired (level of) competences. On the basis of their coherence in theory and consistence in practice, responses one may say that the self-assessment is reliable.

We have developed a two stage methodology. We would like to describe the variables and their selection just after methodology before giving their basic statics. At first instance, we run ordered probit and OLS regression at the same time in order to have another look at the coefficient estimates of competences for both. We understand that ordered probit is the suitable method in present case as our dependent variable i.e. acquired competences levels, is in ordinal and discrete in nature. But this does not speak about the explained variances in the independent variables. For this purpose we use OLS regression, however, this technique is not suitable to the type of variable we are going to deal with. We made a comparison of coefficient estimates of the ordered probit and OLS regression. It reflects surprising similarity in its degrees of significance. To statisticians the approximation of ordered probit (and ordered logit) to OLS regression may happen to occur often in very large datasets. This similarity encourages us to proceed to ANOVA, in second phase, in order to see the explained variances of dependent variable by the independent variables. As we know that ANOVA is not a suitable technique in present case, we prefer to calculate Kruskal-Wallis test which is a non-parametric counterpart of ANOVA. It is recommended to use this test in lieu of ANOVA when normality condition is not met and when the dependent variable is ordinal. Stata and SPSS have been used for the statistical analyses of the data. For the sake of increased lucidity in interpreting the results we have defined four levels of significance. These are excellent, good, fair, and marginal.

DISCUSSION

Self-assessment is often questioned for its subjectivity. We are studying to respond to the following research question:

Is graduates' self-assessment of their acquired level of competences reliable? If yes, to what extant?

On the basis of the mean values we selected 12 competences out of the set of 19, included in the data set which we are exploiting in this study. Their selection has been detailed in the data section. We identified three variables which are believed to be effective in the acquisition process of these competences. Graduates' acquired level of competences is the response variables. The three variables which served as predictors are: "Field of Education", "Sublevel of Study Programme", and "Demanding Level of Study Programme". We include country and gender as control variables as well.

We have selected a data set in which the graduates provided information about themselves. Hence the data set is questionable. We can't overlook the chances of biased self-assessment. One straight forward response to this objection is that the respondents are qualified enough with a reasonable exposure to the world of work; moreover, there is no harm to them, apparently– neither academic nor professional–whatever their responses may be. Therefore, there is little room for the alleged biasness.

Although, there are some other ways to gather such kind of information, however, the graduates themselves are the most direct source of information. Such objections are further reduced when researchers rationalise their methods and techniques; and try to reduce the bias, objectively. For example, besides asking respondents their acquired level of competence, their corresponding required level in the labour market is asked; and bias is further reduced if they are questioned about their study programmes characterising a set of competences. The responsibility to manage for these issues, while statistically analysing the data, still rests on the shoulders of the researcher so that the final outcome could be of improved quality.

We are persuaded to put Popper's characteristic criterion of falsifiability to the outcomes of our analyses in this study. Rationally, it is useful to accept a (well-tested) theory as true until it is falsified because well-tested theories could also be questioned. "No matter how many times the results of experiments agree with some theory, you can never be sure that the next time the result will not contradict the theory", (Hawking, 1988). According to Popper, a theory is scientific only in so far as it is falsifiable, and should be given up as soon as it is falsified. "The theories are passed on, not as dogmas, but rather with the challenge to discuss them and improve upon them", says Popper (1963). In our situation, judiciously, it is pragmatic to accept the reliability of self-assessment if something contradictory does not come to the scene. Outcome of the study should be acceptable, in Popperian terms, until it is falsified. Moreover, Popper's falsifiability criterion lends scientific elevation to the outcome of the analyses.

We have developed a two stage methodology in order to respond the research question. At first stage ordered probit analyses of selected 12 competences (dependent variable) against three independent variables (namely, "Field of Education", "Sublevel of Study Programme" and "Demanding Level of Study Programme) along with ""Country" and "Gender" as the control variables. Parallel to this OLS regression is also employed for the same set of variables. Stata as a software for statistical analyses is found suitable for this. The purpose of this double regression technique was to compare their outputs. We leave for curious statisticians and econometricians to investigate into the statistical comparison of corresponding coefficient estimates resulted from ordered probit and OLS regression.

We have noticed that corresponding coefficient estimates of ordered probit and OLS regression resemble each other to a high extent in their levels of significance. They do differ sometimes, but this difference is restricted to their immediate significance levels. We have defined four levels of significance, just to elucidate the situation. This resemblance of highest degree is remarkable. Logically, it permits us to rely upon the outputs given by OLS regression as well, which is not advised to rely upon under usual circumstances with the type and set of variables we are dealing with. As a digression we mention that prime difference between ordered probit and OLS regression is that of cardinal and ordinal values of the numbers. Former considers the ordinal values of the numbers whereas the later takes their cardinal values into consideration in their operations. We have previously discussed this in detail in the analyses section in appendix.

Startling similarity in the levels of significance of the coefficient estimates produced by ordered probit and OLS regression became the pretext to go for the analyses of variances. Inter-groups-variances are expected to be larger than intra-groups-variances. This is the research hypothesis of this study. We intend to check our hypothesis through the analyses of variances; but we find it useful to elaborate ordered probit output with an argument of different conceptual orientation. Let us discuss the three predictors in the following.

"Field of education" and "Sublevel Study Programme" are objective parameters whereas "Demanding Level of Study Programme" is subjective in its disposition. We observe a hierarchy in different categories of graduates on the basis of their field of education. For example, ceteris paribus, health professionals fall next to social scientists which in turn are next to mathematicians and computer scientists in this hierarchical order regarding the acquired level of *Ability to use computers and the internet* (Competence 1) and *Analytical Thinking* (Competence 10). It is necessary to remember that this ranking is relative only. In simple words, mathematicians and computer scientists have acquired higher ability to use computers and the internet (and analytical thinking) compared to social scientists and social scientists have got higher ability to use computers and the internet (and analytical thinking) compared to the health professionals. This is what one may expect and it is quite acceptable on logical grounds. "Field of education" provides us an objective measure. Graduates' self-assessment appears to be reliable if graduates' subjective opinion is in accordance with the objective measure of "Field of education". Narrating otherwise, at least, it is not defective logically.

Graduates who followed (the sublevel of) study programme providing direct access to doctorate, ceteris paribus, have higher probability of having acquired and a lower probability of not having acquired greater level of *Ability to write reports, memos or documents* (Competence 6) and *Analytical Thinking* (Competence 10). It appears logical as we have observed in the "Field of Education", previously. Graduates expected to continue to doctorate should have possessed of relatively higher level in these competences for better accomplishment of their future chores. They should know better the science and art of writing the dissertation.

Demanding level of study programme is an ordinal variable. It is subjective in the sense that the graduates (themselves) are to rate their study programme that to what extent it was regarded as demanding. If we take this subjective opinion reliable, it is interesting, however, that the graduates who followed more demanding study programmes have acquired higher level of certain competences. Nevertheless, truthfulness of this finding is favoured by both virtue and convention. Nevertheless charged with subjectivity, we observe that this predictor gives fairly regular patterns in competence acquisition level. These are the graduates who rated their study programmes; and again, these are the graduates who self-assessed their competences. In the face of this multiplied subjectivity, graduates' assessment may become more dubious. There is another side of the picture. It is likely that the graduates were not cautious to provide the information regarding these two variables which are apparently unrelated to one another; and, furthermore, the questions concerning these two variables are isolated in position in the questionnaire. Despite these differences in character and location, these variables have been found coherent to what it is believed and observed in real practical situations. Coherence could be marked easily in graduates' opinion (assessment) at two different points of enquiry. Both of the two are contributing to make the same picture from different angles independently. We have not found any contradiction in the information provided by these two different sources. This marked coherence lends greater reliability to graduates' responses all through the process of enquiry.

Although a good discussion can be provoked on the interpretation of country and gender estimates mentioned in the tables above, but we leave this for the moment; for they are included in the model as control variables only. Reader may look into for their interest. For all three predictors it is observed that the findings are in coherence with theory as well as practice. No grave absurdity has been traced in ordered probit analyses which could affirm, in Popperian terms, the reliability of self-assessment of the graduates.

The surprising similarity between the levels of significance of two analyses encourages us to rely upon the results of OLS regression with relatively greater confidence. We can proceed to calculate ANOVA; and we think, apparently, there is no harm at all in doing so. Our hypothesis is that the inter-groups variances are greater than the intra-groups variances. We have employed General Linear Model (GLM) for multivariate analyses in SPSS. We have calculated this for all fifteen countries. "Sublevel of Study Programme" and "Demanding Level of Study Programme" are not found as good as we envisaged in the beginning for explaining the variances in the dependent variables i.e. competences. Although we found them not very much supportive, however, we consider them positive, to accept our research hypothesis and to reject the null hypothesis. "Field of Education" is found as good as we were expecting to explain the variances in the dependent variables i.e. competences. We consider it very encouraging while rejecting the null hypothesis in favour of our research hypothesis.

It is palpable (from F statistic as well as partial eta squared statistic) that the distinct graduates' intra-group homogeneity is retained; and it is reflected in their self-assessment of transversal competences. This twofold homogeneity lends reliability, however to a modest level, to their self-assessment. Two competences, namely, 'analytical thinking' and 'ability to use computers and the internet' are found to be significant among the graduates of all fifteen countries. Kruskal-Wallis (nonparametric ANOVA) statistic reflects more favourable results than conventional ANOVA statistic. We have calculated this for all fifteen countries using the 'Field of Education' and 'Demanding Level of study Programme' as the grouping variables. For 'Sublevel of study Programme' we calculate Mann-Whitney (U) statistic because this variable has only two subcategories. In brief, through all these analyses we come to find the results which are not contradictory to our hypothesis. Accordingly, in Popperian terms, the self-assessment of acquired competences by the graduates is said to be reliable.

Summing up the analyses of variance for 12 competences with respect to three variables (gender, as control, was the fourth one), one may say that all the independent variables are found useful in explaining the variances in the dependent variables i.e. competences. In rather simple words, these variables reveal that the graduates are homogeneously distributed within their respective subcategories and each subcategory (may) have retained a distinct subset of the graduates. Making use of statistical techniques, and including some objective information we feel confident, in Popperian terms, to rely upon graduates' self-assessment of competences.

CONCLUSION

We draw the conclusion from abovementioned our results of ordered probit (along with OLS regression) and ANOVA. If self-assessment of, say, physics graduates reflects homogeneity with respect to their acquired level of competences, it could be said that their self-assessment is reliable enough. They do not have neither over- nor under-estimated their competences. We should not forget to make some allowance to individual differences among graduates. Our basic model contains "Acquired Level of Competences" as the response variable along with three predictors: "Field of Education", "Sublevel of Study Programme", and "Demanding Level of Study Programme"; and two control variables: "Country" and "Gender". We run ordered probit in Stata environment. "Field of education" and "Sublevel Study Programme" are objective parameters whereas "Demanding Level of Study Programme" is subjective one in its disposition.

We observe an order in the acquired level of competences among different categories of graduates on the basis of field of education. For example, ceteris paribus, health professionals fall next to social scientists which in turn are next to mathematicians and computer scientists in this hierarchical order regarding the acquired level of *Ability to use computers and the internet* (Competence 1) and *Analytical Thinking* (Competence 10). In simple words, mathematicians and computer scientists have acquired higher ability to use computers and the internet (and analytical thinking) compared to social scientists; and the social scientists have got higher ability to use computers and the internet (and analytical thinking) compared to the health professionals. "Field of education" provides us an objective measure. Graduates' self-assessment appears to be reliable if graduates' subjective opinion is in accordance with the objective measure of "Field of education".

Graduates expected to continue to doctorate should have possessed of relatively higher level in these competences for better accomplishment of their future chores. It demands apt observation, logical perception, rationalistic approach, critical thinking etc. etc.

Demanding level of study programme is an ordinal variable. If we take this subjective opinion reliable, it is interesting, however, that the graduates who followed more demanding study programmes have acquired higher level of certain competences. It is likely that the graduates were not cautious to provide the information regarding these two variables which are apparently not related to one another but covertly these are closely related; furthermore, the questions concerning these two variables are isolated in location in the questionnaire. Coherence could be marked easily in graduates' opinion (assessment) at two different points of enquiry.

For all three predictors it is observed that the findings are in coherence with theory as well as practice. No grave absurdity has been traced in ordered probit analyses which could affirm, in Popperian terms, the reliability of self-assessment of the graduates.

Summing up the analyses of variance for acquired level of competences with respect to three variables (gender, as control, was the fourth one), we may say that all these variables are found helpful in explaining the variances in the dependent variables i.e. acquired level of competences. In rather simple words, these variables reveal that the graduates are homogeneously distributed within their respective subcategories and each subcategory may have retained distinct subset of the graduates. Making use of statistical techniques and including some objective information we feel confident, in Popperian terms, to rely upon graduates' self-assessment of competences. Through the ordered probit analysis of data we observed that graduates' independent self-assessment of competence acquisition level is more identical with that of the graduates of the same subcategory but very different from that of the graduates of the other subcategories. They have sustained their homogeneity predetermined upon certain criterion, for example, field of education and training; and have exhibited their intrinsic homogeneity in their self-assessment of competence.

Startling similarity in the levels of significance of the coefficient estimates produced by ordered probit and

OLS regression developed the pretext to go for the analyses of variances. Inter-groups-variances are expected to be larger than intra-groups-variances. This is the research hypothesis of this study. We have employed General Linear Model (GLM) for multivariate analyses in SPSS. “Sublevel of Study Programme”, and “Demanding Level of Study Programme” are not found as good as we imagined in the very outset of the analyses for explaining the variances in the dependent variables i.e. acquired level of competences. We consider it very encouraging while rejecting the null hypothesis in favour of our research hypothesis. It is palpable (from F statistic as well as partial eta squared statistic) that the distinct graduates’ intra-group homogeneity is retained; and it is reflected in their self-assessment of transversal competences. Question could be raised upon the use of ANOVA on the pretext of its unsuitability in the present case. To answer this we have also calculated non-parametric ANOVA i.e. Kruskal-Wallis (H) statistic and Mann-Whitney (U) statistic. Not only nothing was contradictory; but more favourable results were noticed through these analyses.

This twofold homogeneity lends reliability, however to a modest extent, to their self-assessment. The conclusion drawn on the basis of analysis of variance is in agreement with that of the ordered probit analysis. Two competences, namely, ‘analytical thinking’ and ‘ability to use computers and the internet’ are found to be significant among the graduates of all of the fifteen countries.

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Appendix A

STATISTICAL ANALYSES AND RESULTS

Descriptive statistics

The variable “Field of Education” contains nine subcategories. We have excluded the subcategory ‘general programme’ for its very low frequency. ‘Demanding Level of Study Programme’ was initially on five point rating scale; we excluded the observations with the response ‘not at all’ thus leaving only four sublevels with us. The variable “Sublevel of Study Programme” contains two main streams. International Standard Classification on Education (ISCED) has been followed for this variable. One is 5A long programme providing direct access to doctorate. Second is 5A long programme not providing direct access to doctorate? Both “Sublevel Study Programme” and “Field of Education” reveal the facts about the academic training of a graduate. Whereas the third variable “Demanding Level of Study Programme” is relevant to their actual need while they are confronting in the labour market. Total number of valid observations for each variable mentioned here are around twenty seven thousand and half. Table 1 includes number of observations and corresponding percentages of above explained variables. About twenty seven thousand and half graduates participated from 15 countries. Behold, these numbers are showing only the valid cases. We have excluded not responded and irrelevant observations. Table 2 holds mean values and standard deviations along with the number of observations. We see mean value more than three for “Demanding Level of Study Programme” which indicates that the study programmes (of higher education) are generally demanded. Other statistics are in the table below. On the bases of graduates’ responses we calculated the mean values of competences for whole data. Table 3 keeps mean values of all nineteen competences in descending order.

We observe a cut point of five in the means’ order in this table which is dividing the whole set of 19 competences into two subsets. One subset has its means more than the cut point and the other less than the cut point of five. We select first 12 competences with their mean values above the cut point and name this as Subset-I. The other one is named as the Subset-II. We will be using the subset-I for further analyses. The graduates have shown higher acquired levels of competences. This might be an indication that they have optimistically self-assessed their competences. If true, this is what usually be expected. However we cannot infer any valid conclusion at this stage. This is what we are going to study in this study as well as in the ensuing studies.

Ordered probit and OLS regression

Ordered probit is run 12 times for each competence separately with same independent variables. Parallel to this OLS regression is employed for the same set of variables. Before we proceed to present the results of the analyses we like to mention here some basic information in more detail.

Competence 1– Ability to use computers and the internet
Competence 2– Ability to rapidly acquire new knowledge
Competence 3– Ability to work productively with others
Competence 4– Ability to coordinate activities
Competence 5– Willingness to question your own and others’ ideas
Competence 6– Ability to write reports, memos or documents
Competence 7– Ability to perform well under pressure
Competence 8– Ability to use time efficiently
Competence 9– Ability to make your meaning clear to others
Competence 10– Analytical thinking
Competence 11– Ability to come up with new ideas and solutions
Competence 12– Mastery of your own field or discipline

Reference categories

‘The Netherlands’ for “countries”
‘Social sciences’ for “*fields of education*”
‘not providing direct access to PhD’ for “*sublevel study programme*”
‘highly demanding’ for “*to what extent study programme was demanding*”, and
‘female’ for “*gender*”.
The outputs of the two analyses (ordered probit and OLS regression) are presented in the following tables.

Table 1. Percentage participation for variables of interest

S. No.	Variable Country	*n*	Percentage
	Austria	1127	4.07
	Belgium	1040	3.76
	Czech Republic	4555	16.46
	Estonia	686	2.48
	Finland	1774	6.41
	France	1027	3.71
	Germany	1191	4.30
	Italy	1345	4.86
	Japan	1731	6.26
	Netherlands	2355	8.51
	Norway	1648	5.96
	Portugal	487	1.76
	Spain	2707	9.78
	Switzerland	4882	17.64
	United Kingdom	1115	4.03
	Total	**27670**	**100**
	Field of Education		
	Education	2694	9.74
	Humanities	2981	10.77
	Social	8625	31.17
	Science	2808	10.15
	Engineering	5209	18.83
	Agriculture	844	3.05
	Health	3902	14.10
	Services	607	2.19
	Total	**27670**	**100**
	Demanding Level of Study Programme		
	Very Lowly Demanding	3086	11.17
	Lowly Demanding	9512	34.44
	Highly demanding	10751	38.93
	Very Highly demanding	4268	15.45
	Total	**27617**	**100**
	Sublevel of Study Programme		
	Direct access to PhD	16007	57.85
	No direct access to PhD	11663	42.15
	Total	**27670**	**100**
	Gender		
	Male	12365	44.90
	Female	15175	55.10
	Total	**27540**	**100**

Table 2. Descriptive statistics for variables of interest

S. No.	Variable	n	$\bar{x}$	σ
	Country	27670	8.663	4.780
	Field of Education	27670	3.941	1.883
	Demanding Level of Study Programme	27617	3.587	0.880
	Sublevel of Study Programme	27670	2.422	0.494
	Gender	27540	1.551	0.497

Table 3. Acquired level of competences (descriptive statistics)

S. No.	COMPETENCES (rearranged in descending $\bar{x}$ values)	n	$\bar{x}$	σ
	Ability to use computers and the internet	26221	5.861	1.175
	Ability to rapidly acquire new knowledge	26226	5.652	1.064
	Ability to work productively with others	26220	5.601	1.095
	Ability to coordinate activities	26221	5.458	1.176
	Ability to perform well under pressure	26226	5.424	1.240
	Ability to write reports, memos or documents	26216	5.401	1.264
	Willingness to question your own and others' ideas	26218	5.390	1.161
	Ability to use time efficiently	26221	5.374	1.192
	Analytical thinking	26223	5.346	1.198
	Ability to make your meaning clear to others	26214	5.331	1.149
	Ability to come up with new ideas and solutions	26212	5.319	1.149
	Mastery of your own field or discipline	26236	5.302	1.063
	Alertness to new opportunities	26196	4.894	1.309
	Ability to mobilize the capacities of others	26213	4.833	1.274
	Ability to present products, ideas or reports to an audience	26210	4.831	1.468
	Ability to negotiate effectively	26223	4.647	1.429
	Ability to assert your authority	26220	4.626	1.358
	Knowledge of other fields or disciplines	26220	4.470	1.172
	Ability to write and speak in a foreign language	26226	4.416	1.848

The signs of the coefficient estimates allow the direction of change in the probabilities of the extreme outcomes only. Probabilities are relative to corresponding reference category.

We are taking two categories just for example. Firstly, the graduates of Science, ceteris paribus, have higher probability of having acquired and a lower probability of not having acquired greater level of *Ability to use computers and the internet* (competence 1) and *Analytical Thinking* (Competence 10) than that of their counterparts from the Social Sciences (the reference category). Secondly, Health graduates show lesser probability of having acquired and higher probability of not having acquired greater level of *Ability to use computers and the internet* (competence 1), *Ability to rapidly acquire new knowledge* (Competence 2), *Ability to perform well under pressure* (Competence 7), and *Analytical Thinking* (Competence 10) as compared to their counterparts from Social Sciences.

We observe a hierarchy in different categories of graduates on the basis of field of education. In rather simple words, we may say that health professionals fall next to social scientists which in turn are next to mathematicians and computer scientists in a hierarchical order regarding the acquired level of *Ability to use computers and the internet* (competence 1) and *Analytical Thinking* (Competence 10). It is necessary to remember that this ranking is relative only.

Graduates who followed study programme providing direct access to doctorate, ceteris paribus, have higher probability of having acquired and a lower probability of not having acquired greater level of *Ability to write reports, memos or documents* (Competence 6) and *Analytical Thinking* (Competence 10). It appears logical. Graduates continuing to doctorate should have possessed of relatively higher level in these competences for better accomplishment of their future chores. Writing a dissertation is both a science as well an art. It is a science in the sense that it urges to rationalise what is observed or could be perceived. It demands apt observation, logical perception, rationalistic approach, critical thinking etc. etc. It is an art to present what you have accomplished. It is an

Table 4. Coefficient estimates of *ordered probit* and OLS regression

	Competence 1		Competence 2		Competence 3		Competence 4		Competence 5		Competence 6	
	$\beta_{oprobit}$	β_{OLS}	$\beta_{oprobit}$	β_{OLS}	$\beta_{oprobit}$	β_{OLS}	$\beta_{oprobit}$	β_{OLS}	$\beta_{oprobit}$	β_{OLS}	$\beta_{oprobit}$	β_{OLS}
Austria	0.699††	0.431††	0.263††	0.173††	0.597††	0.421††	0.451††	0.318†	0.275**	0.204**	0.363††	0.234††
Belgium	0.119	0.085	- 0.124*	- 0.088	0.087	0.072	0.052	0.035	0.202	0.168	- 0.148*	- 0.136*
Czech Republic	0.588††	0.373††	0.098*	0.066	0.318††	0.218††	0.016	- 0.018	0.416††	0.328††	0.192††	0.128**
Estonia	0.190*	0.123	- 0.122	- 0.107	0.241**	0.181**	- 0.104	- 0.092	0.056	0.044	- 0.238**	- 0.265†
Finland	0.088	0.060	- 0.302††	- 0.251††	- 0.154**	- 0.128**	- 0.047	- 0.060	- 0.102	- 0.090	- 0.253††	- 0.269††
France	0.186*	0.126	- 0.217†	- 0.173†	- 0.125	- 0.118	- 0.447††	- 0.420††	- 0.100	- 0.105	- 0.208†	- 0.208†
Germany	0.528††	0.340††	0.115*	0.077	0.200†	0.155**	0.144	0.125	0.086	0.066	0.060	0.031
Italy	0.136	0.059	- 0.070	- 0.075	- 0.021	- 0.083	0.012	- 0.028	0.059	- 0.009	0.019	- 0.047
Japan	- 0.926††	- 0.960††	- 1.258††	- 1.254††	- 0.957††	- 0.969††	- 1.066††	- 1.136††	- 0.976††	- 1.068††	- 0.928††	- 1.022††
Norway	0.077	0.053	- 0.262††	- 0.214††	- 0.202††	- 0.183††	- 0.389††	- 0.374††	- 0.079	- 0.084	- 0.026	- 0.055
Portugal	0.389†	0.279†	- 0.094	- 0.078	0.050	0.008	- 0.068	- 0.060	0.090	0.064	- 0.156	- 0.194*
Spain	- 0.116	- 0.117*	- 0.176†	- 0.150††	0.241††	0.144††	- 0.244†	- 0.237††	- 0.008	- 0.024	- 0.057	- 0.086
Switzerland	0.374††	0.251††	- 0.065	- 0.061	0.082	0.055	- 0.034	- 0.045	- 0.043	- 0.056	- 0.073	- 0.087
United Kingdom	0.484††	0.306††	- 0.049	- 0.037	0.519††	0.366††	0.403††	0.304††	0.392††	0.300††	0.316††	0.253††
Education	- 0.024	- 0.008	- 0.080*	- 0.067*	0.043	0.018	0.091	0.084	0.189†	0.175†	- 0.104**	- 0.084*
Humanities	0.009	0.000	0.122†	0.091†	0.067	0.031	0.051	0.039	0.079	0.060	0.078**	0.059*
Science	0.291††	0.172††	0.077**	0.057*	- 0.072	- 0.056	0.013	0.012	0.115	0.083	- 0.167††	- 0.150††
Engineering	0.038	0.041	- 0.031	- 0.022	- 0.013	- 0.010	0.055	0.056	0.058	0.044	- 0.165††	- 0.149††
Agriculture	- 0.147*	- 0.099	- 0.258††	- 0.203††	- 0.055	- 0.047	- 0.093	- 0.080	0.170	0.174	- 0.022	- 0.015
Health	- 0.295††	- 0.230††	- 0.301††	- 0.234††	0.031	0.026	- 0.033	0.002	- 0.077	- 0.063	- 0.103**	- 0.080*
Services	0.029	0.022	- 0.014	- 0.005	- 0.037	- 0.051	0.178	0.182**	- 0.027	- 0.005	- 0.004	0.005
Direct access to PhD	- 0.077**	- 0.051*	0.044	0.044*	- 0.005	0.003	0.042	0.038	0.034	0.030	0.167††	0.162††
Very Lowly Demanding	- 0.209††	- 0.170††	- 0.078*	- 0.071**	- 0.130†	- 0.118†	- 0.015	- 0.035	- 0.023	- 0.027	- 0.151††	- 0.172††
Lowly Demanding	- 0.124††	- 0.080†	- 0.107††	- 0.085††	- 0.077**	- 0.058**	- 0.055	- 0.051	- 0.070	- 0.065	- 0.077†	- 0.076†
Very Highly Demanding	0.176††	0.080**	0.247††	0.170††	0.215††	0.141††	0.121*	0.087	0.193†	0.164†	0.259††	0.200††
Male	0.206††	0.132††	- 0.084††	- 0.060†	- 0.109††	- 0.087††	- 0.116†	- 0.091**	0.083*	0.079**	- 0.050*	- 0.039
n	5754	5754	9766	9766	6362	6362	3134	3134	3014	3014	7493	7493
(Pseudo) R^2	0.0828	0.1947	0.0329	0.0874	0.0368	0.0924	0.0292	0.0808	0.0365	0.1027	0.0443	0.1236
$LR\,\chi^2(26)/F$	1087.68††	53.25††	805.38††	35.89††	591.59††	24.80††	235.11††	10.50††	301.84††	13.15††	916.49††	40.50††

Values in bold – $(p>0.100)$ – No; * – $(p\leq0.100)$ – Marginal; ** – $(p\leq0.050)$ – Fair; † – $(p\leq0.010)$ – Good; †† – $(p\leq0.001)$ – Excellent

Table 5. Coefficient estimates of *ordered probit* and OLS regression

	Competence 7		**Competence 8**		**Competence 9**		**Competence 10**		**Competence 11**		**Competence 12**	
	$\beta_{oprobit}$	β_{OLS}	$\beta_{oprobit}$	β_{OLS}	$\beta_{oprobit}$	β_{OLS}	$\beta_{oprobit}$	β_{OLS}	$\beta_{oprobit}$	β_{OLS}	$\beta_{oprobit}$	β_{OLS}
Austria	0.375††	0.255††	0.420††	0.338††	- 0.030	- 0.077	0.238††	0.141†	0.398††	0.252†	0.567††	0.431††
Belgium	- 0.084	- 0.076	0.099	0.073	- 0.288**	- 0.294**	- 0.293††	- 0.241††	- 0.234**	- 0.220†	- 0.122**	- 0.106*
Czech Republic	- 0.175†	- 0.182†	0.175**	0.147**	0.316††	0.225†	- 0.105**	- 0.103†	0.016	- 0.008	0.252††	0.188††
Estonia	0.049	0.007	- 0.012	- 0.016	- 0.001	- 0.010	- 0.266††	- 0.219††	- 0.012	- 0.009	- 0.310††	- 0.265††
Finland	- 0.185**	- 0.169**	0.000	- 0.010	- 0.315†	- 0.287†	- 0.497††	- 0.431††	- 0.296††	- 0.275††	- 0.316††	- 0.282††
France	- 0.037	- 0.072	- 0.053	- 0.054	0.018	- 0.017	- 0.427††	- 0.359††	- 0.068	- 0.060	- 0.211††	- 0.182††
Germany	0.221†	0.161**	0.108	0.075	0.002	- 0.056	- 0.020	- 0.034	0.107	0.062	0.394††	0.305††
Italy	- 0.259††	- 0.303††	- 0.135	- 0.179**	- 0.179	- 0.193*	- 0.300††	- 0.282††	- 0.179*	- 0.209†	- 0.070	- 0.098**
Japan	- 1.040††	- 1.133††	- 0.701††	- 0.772††	- 0.978††	- 1.034††	- 1.194††	-1.146††	- 1.061††	- 1.045††	- 1.367††	- 1.405††
Norway	- 0.007	- 0.015	- 0.127	- 0.126	0.109	0.076	- 0.456††	- 0.389††	- 0.281†	- 0.247†	- 0.109**	- 0.092**
Portugal	- 0.011	- 0.062	0.127	0.085	0.348†	0.224*	- 0.297††	- 0.262††	0.260*	0.176	0.236†	0.175†
Spain	- 0.060	- 0.087	- 0.033	- 0.042	- 0.062	- 0.083	- 0.635††	- 0.556††	- 0.289††	- 0.261††	- 0.228††	- 0.211††
Switzerland	0.022	- 0.003	0.037	0.023	- 0.071	- 0.087	- 0.084	- 0.081**	- 0.151**	- 0.138**	0.047	0.035
United Kingdom	0.292††	0.219†	0.353††	0.261††	0.623††	0.437††	- 0.220††	- 0.191††	0.159	0.081	- 0.096	- 0.091
Education	0.006	- 0.021	0.121*	0.103*	0.181†	0.136**	- 0.160††	- 0.150††	0.164**	0.132**	0.294††	0.253††
Humanities	0.021	0.000	0.110*	0.099*	0.067	0.053	0.000	- 0.009	0.143**	0.128**	0.280††	0.230††
Science	- 0.144**	- 0.132†	0.061	0.054	- 0.049	- 0.053	0.127††	0.097††	0.039	0.044	0.063*	0.048
Engineering	- 0.056	- 0.040	- 0.043	- 0.025	0.010	0.001	- 0.005	0.003	0.069	0.073	- 0.080†	- 0.064**
Agriculture	- 0.137	- 0.131*	0.005	0.028	- 0.058	- 0.081	- 0.097	- 0.073	- 0.077	- 0.022	- 0.050	- 0.029
Health	- 0.163††	- 0.144††	- 0.102*	- 0.080	0.062	0.058	- 0.227††	- 0.184††	- 0.081	- 0.062	- 0.003	0.010
Services	0.055	0.053	- 0.056	- 0.004	- 0.100	- 0.065	0.083	0.067	- 0.070	- 0.041	0.084	0.076
Direct access to PhD	0.017	0.020	0.032	0.023	0.072	0.063	0.136††	0.122††	- 0.016	- 0.006	- 0.054**	- 0.036*
Very Lowly Demanding	- 0.079	- 0.071	- 0.109*	- 0.129**	- 0.093	- 0.100*	- 0.097†	- 0.095†	- 0.123**	- 0.104*	- 0.217††	- 0.210††
Lowly Demanding	- 0.079**	- 0.058*	- 0.056	- 0.047	- 0.059	- 0.051	- 0.121††	- 0.104††	- 0.110**	- 0.092**	- 0.172††	- 0.151††
Very Highly Demanding	0.133††	0.100†	0.255††	0.199††	0.205†	0.140**	0.317††	0.236††	0.308††	0.237††	0.189††	0.139††
Male	0.039	0.046*	- 0.262††	- 0.235††	0.022	0.024	0.102††	0.088††	0.184††	0.155††	0.117††	0.107††
n	5850	5850	4186	4186	2962	2962	12035	12035	3656	3656	13741	13741
(Pseudo) R^2	0.0197	0.0539	0.0297	0.0789	0.0451	0.1201	0.0507	0.1321	0.0382	0.0988	0.0665	0.1924
$LR\ \chi^2(26)/F$	297.31††	12.76††	334.18††	13.70††	361.69††	15.41††	1620.76††	70.31††	365.35††	15.30††	2542.35††	125.63††

Values in bold – $(p>0.100)$ – No; * – $(p\le 0.100)$ – Marginal; ** – $(p\le 0.050)$ – Fair; † – $(p\le 0.010)$ – Good; †† – $(p\le 0.001)$ – Excellent

art how to question, how to answer, how to write and how to juxtapose various entities of different colours in order to produce something different in tinge and texture.
These observations are articulating what it is in theory as well as practice. We can say that veracity of these observations could be reliable as these are found consistent to what is expected theoretically and what is observed practically. These results ceteris paribus are coherent to what we know already and what we observe in real situations.

Demanding level of study programme is an ordinal variable. It is subjective in the sense that the graduates (themselves) are to rate their study programme to what extent it was regarded as demanding. We select *highly demanding category* as a reference. The graduates who rated their study programme (very) lowly demanding, ceteris paribus, have lower probability of having acquired and a higher probability of not having acquired greater level of almost all 12 competences; whereas, the graduates who rated their study programme very highly demanding, ceteris paribus, have higher probability of having acquired and a lower probability of not having acquired greater level of almost all 12 competences.

In case of demanding level of study programme we observe rather regular patterns in competence acquisition level; however, this is pregnant with subjectivity. They are the graduates who rated their study programmes; and again, they are the graduates who self-assessed their competences. In the face of this multiplied subjectivity graduates' assessment may become more suspicious. There is another side of the picture. Coherence could be marked easily in graduates' assessment at two different points of enquiry. This marked coherence lends reliability to graduates' responses all through the process of enquiry. If we take this subjective opinion reliable, it is interesting, however, that the graduates who followed more demanding study programmes have acquired higher level of certain competences. Truthfulness of this finding is favoured by virtue and convention.

Although a good discussion can be provoked regarding the interpretation of country and gender estimates mentioned in the tables, but we leave this for they are included in the model as control variables. Reader may look into them for their interest. The pseudo R^2 (often referred to as McFadden (1973) pseudo R^2) varies between 0 and 1. According to many authors (for example Greene, 2008) there is not natural interpretation of this statistic. However it is observed to be increasing as the fit of the model improves (Borooah, 2001). The χ^2 value, with excellent significant difference, helps us to reject the null hypothesis that our model does not have greater explanatory power than an "intercept only" model. We have not mentioned the cutoff points simply because here we do not intend to discuss them for our own reason. We just overlooked this and come to compare ordered probit and OLS regression.

Most of the cases in the tables above are evident that corresponding coefficient estimates of ordered probit and OLS regression resemble each other to a high extent. They do differ sometimes, but this difference is restricted to their immediate significance levels. We have defined four levels of significance, if it is there, just to elucidate the situation. Prime difference between ordered probit and OLS regression is that of ordinal and cardinal values of numbers. Former considers the ordinal values of the numbers whereas the later takes their cardinal values into consideration in their operations. Although, we have discussed this in some earlier paragraphs of this section prior to discuss the results; however, some deeper insight could be more fruitful.

We, as rational beings, are convinced to believe (or at least, consider) more in exactitude; and are attracted towards numbers' cardinal value. In addition to this, as we know that their cardinal value includes the ordinal (too), we are, intrinsically, dragged more to believe in this property of numbers. Since the set of graduates we are investigating in this study does belong to same population of rational beings, therefore, has no exception. As a researcher we believe (we have observed in our analyses) that despite self-imposed restriction to consider only the ordinal value of numbers we appear helpless to elope ourselves from considering their cardinal value. Thus graduates' ordinal consideration of numbers may have a tinge of cardinality. This could be the possible reason of startling resemblance in the significance levels of estimates of two different analyses mentioned above in tables. This subconscious shift of graduates towards exactitude (ordinal cardinality of numbers) may have some positive conviction to what we intend to investigate (i.e. to what extent graduates' self-assessment is reliable?).

In fact we run two different models, namely, OLS and ordered probit regression, retaining same variables to see the explained variance by the independent variables. Unfortunately, the suitable estimation model, i.e. ordered probit model, according to the nature of the data, is mute to tell us the required information. Juxtaposition of the two outputs better help us to decide which direction we should move in. We find surprising similarity between the outputs of oprobit regression and OLS regression. We are least concerned with the interpretation of the coefficient estimates of the later model; however, a resemblance of highest degree regarding the levels of significance (of coefficient estimates in the two models) is remarkable. Logically, it permits us to rely upon the outputs given by OLS regression as well, which is not advised to rely upon under usual circumstances with the type and set of variables we are dealing with. Hence, the uniqueness of our case is statistically proved and established. This surprising similarity between the levels of significance of two analyses encourages us to rely upon the results of OLS regression with relatively greater confidence. We can proceed to calculate ANOVA; and we think, apparently, there is no harm at all in doing so. Two different coefficient estimates have been found to resemble in their levels of significance. Some deeper insight is required to compare the coefficient estimates of ordered probit and OLS regression. We are not concerned with this as this beyond the scope of this study. Nevertheless, this could be of interest for statisticians and econometricians. Any contribution in this regard might be interesting, we think; and could be valuable as well. We leave this venture to the courage of adventurous researchers for the moment.

ANOVA, Mann-Whitney Test and Kruskal-Wallis Test

We are going to investigate into the variances i.e. between-groups mean square variance (a measure of effect) and within-groups mean square variance (a measure of noise). Inter-groups variance is synonymous to between-groups mean square variance (a measure of effect) and intra-groups variance is synonymous to within-groups mean square variance (a measure of noise). Between-groups variance is the variance of the set of group means from the overall mean of all observations. Within-groups variance is a function of the variances of the observations in each group weighted for group size. Our hypothesis is that inter-groups variance is greater than the intra-groups variance.

F is the ratio of the two variances i.e. between-groups variance (a measure of effect) divided by within-groups variance (a measure of noise). Larger F statistic If the computed F score is greater than 1, then there is more variation between groups than within groups, from which we infer that the grouping variable does make a difference. If the F score is enough above 1, it will be found to be significant in a table of F values, using df = k – 1 (degrees of freedom for between-groups) and df = N – k – 1 (degrees of freedom for within-groups), where N is sample size and k is the number of groups formed by the factor(s). If the computed F score is greater than 1, then there is more variation between groups than within groups, from which we infer that the grouping variable does make a difference. If the F score is enough above 1, it will be found to be significant in a table of F values, using df = k – 1 (degrees of freedom for between-groups) and df = N – k – 1 (degrees of freedom for within-groups), where N is sample size and k is the number of groups formed by the factor(s). signifies that the null hypothesis is less likely to be true. If it is around 1, differences in group means are only random variations. If it is (significantly) greater than 1, then there is more variation between groups than within groups; hence the grouping variable does make a difference. Small significant difference is not surprising as our sample is large enough. Statistically Significant difference observed in F statistic is due to larger measure of effect i.e. *between-groups mean square variance,* than that of the noise i.e. *within-groups mean square variance*. Such F statistics encourage us to reject the null hypothesis in favour of the alternative one i.e. inter-groups variance is greater than the intra-groups variance.

Partial eta-squared describes the percentage of variance explained in the dependent variable by a predictor controlling for the other predictors. It measures the effect size coefficient based on percent of variance explained. Eta-squared is the ratio of the *between-groups sum of squares* (effect the extent to which the means are different between groups. of the grouping variable) to the *total sum of squares*. The coefficient is “partial” in the sense that it reflects the effect after controlling for other variables in the model. It is a biased estimate of the variance explained in the population. Partial eta-squared is interpreted as the percent of variance in the dependent variable uniquely attributable to the given effect variable i.e. the independent variable. The following rules of thumb have emerged: small = 0.01; medium = 0.06; large = 0.14. (*Cf*. Kittler, J. E., Menard, W., and Phillips, K., A. (2007). *Weight concerns in individuals with body dysmorphic disorder*. Eating Behaviors, 8, 115-120.)

Our dependent variable is the acquired level of competence. We selected 12 competences out of the list of nineteen. Selection process has been described in the previous section of this discourse. Independent variables are “Field of Education”, “Sublevel of Study Programme”, “Demanding Level of Study Programme” and “Gender”. We have employed GLM (General Linear Model) multivariate analyses in SPSS. We have calculated this for all fifteen countries. We are presenting only F and $\partial\eta^2$ in the following tables. We discuss separately the effect of each independent variable.

Field of Education

We want to see that to what extent this variable explains the variance (after controlling the effect of the other dependent variables) in the dependent variable i.e. competence. This variable has been marked very satisfactory in terms of the values of $\partial\eta^2$ but not for F values. The predictor ‘Field of Education’ for all fifteen countries is explaining the variance in Competence 1 (Ability to use computers and the internet) with high values of *F* at excellent significant difference level. Greater than 1 value of *F* indicates that there is more variation between groups than within groups.

Null hypothesis is less likely to be true as *F* is found to be large enough; furthermore, the differences in group means are not only random variations since *F* is significantly greater than 1. Values of partial eta squared range from 0.021 to 0.089. This statistic interprets the percent of variance in Competence 1 (Ability to use computers and the internet) uniquely attributable to the effect of the predictor i.e. Field of Education. We take Competence 8 (Ability to use time efficiently) as a second example. The predictor ‘Field of Education’ is explaining the variance in Competence 8 (Ability to use time efficiently) with relatively smaller values of *F* (however large enough to reject the null hypothesis) observed significantly different for only eight countries. Greater than 1 value of *F* indicates that there is more variation between groups than within groups and that the differences in group

Table 6. Analyses of variance (Field of Education)

	Competence 1		**Competence 2**		**Competence 3**		**Competence 4**		**Competence 5**		**Competence 6**	
	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$
Austria	16.741††	0.073	3.502††	0.016	1.128	0.005	1.062	0.005	5.149††	0.024	9.387††	0.042
Belgium	9.537††	0.053	0.902	0.005	0.867	0.005	0.669	0.004	3.203†	0.019	12.416††	0.068
Czech Republic	53.855††	0.061	8.698††	0.010	3.945††	0.005	10.564††	0.013	6.784††	0.008	40.319††	0.046
Estonia	3.848††	0.032	0.878	0.007	3.255†	0.027	2.090**	0.017	3.050†	0.025	4.693††	0.038
Finland	13.594††	0.039	3.167†	0.009	0.610	0.002	3.285†	0.010	0.988	0.003	5.469**	0.016
France	18.967††	0.089	2.865†	0.015	2.135**	0.011	2.628**	0.013	2.875†	0.015	4.700††	0.024
Germany	11.139††	0.049	2.685†	0.012	1.416	0.006	1.825*	0.008	2.217**	0.010	2.048**	0.009
Italy	10.595††	0.033	0.527	0.002	0.322	0.001	1.373	0.004	1.272	0.004	3.041†	0.010
Japan	7.892††	0.021	0.274	0.001	1.899*	0.005	0.700	0.002	1.343	0.004	0.851	0.002
Netherlands	20.702††	0.047	4.422††	0.010	1.450	0.003	3.925††	0.009	2.004*	0.005	3.950††	0.009
Norway	17.039††	0.058	5.752††	0.020	2.682†	0.010	3.953††	0.014	2.999†	0.011	2.541**	0.009
Portugal	5.682††	0.066	1.620	0.020	2.579**	0.031	1.350	0.016	1.288	0.016	1,745*	0,021
Spain	14.886††	0.030	1.405	0.003	4.597††	0.009	4.498††	0.009	1.550	0.003	3.454††	0.007
Switzerland	38.173††	0.058	9.516††	0.015	1.944*	0.003	2.773†	0.004	2.331**	0.004	4.556††	0.007
United Kingdom	8.744††	0.047	0.697	0.004	2.929†	0.016	3.021†	0.017	0.665	0.004	2.444**	0.014

	Competence 7		Competence 8		Competence 9		Competence 10		Competence 11		Competence 12	
	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$
Austria	3.109†	0.014	2.796†	0.013	6.175††	0.028	6.162††	0.028	6.846††	0.031	6.944††	0.031
Belgium	3.167†	0.018	1.555	0.009	1.986*	0.012	9.208††	0.052	3.629††	0.021	2.955†	0.017
Czech Republic	14.511††	0.017	5.035††	0.006	10.274††	0.012	28.546††	0.033	15.795††	0.019	12.032††	0.014
Estonia	4.396††	0.036	1.515	0.013	2.914†	0.024	3.101†	0.026	0.997	0.008	1.468	0.012
Finland	1.402	0.004	2.108**	0.006	2.001*	0.006	2.655†	0.008	5.738††	0.017	9.533††	0.028
France	3.457††	0.018	2.475**	0.013	0.758	0.004	2.634†	0.013	1.285	0.007	1.379	0.007
Germany	3.312†	0.015	2.306**	0.010	3.359††	0.015	10.043††	0.044	4.093††	0.018	4.147††	0.019
Italy	3.368††	0.011	1.220	0.004	0.086	0.000	1.222	0.004	2.206**	0.007	3.396††	0.011
Japan	1.124	0.003	0.946	0.003	1.266	0.003	0.568	0.002	1.343	0.004	8.528††	0.023
Netherlands	4.080††	0.010	1.336	0.003	3.511††	0.008	8.940††	0.021	4.567††	0.011	7.817††	0.018
Norway	0.611	0.002	2.354**	0.008	6.586††	0.023	8.651††	0.030	7.115††	0.025	5.104††	0.018
Portugal	1.190	0.015	1.445	0.018	2.999†	0.036	0.729	0.009	0.344	0.004	3.434††	0.041
Spain	2.220**	0.005	5.558††	0.011	7.212††	0.015	5.878††	0.012	3.531††	0.007	6.545††	0.013
Switzerland	6.306††	0.010	2.679†	0.004	4.493††	0.007	9.418††	0.015	4.916††	0.008	9.881††	0.016
United Kingdom	3.726††	0.021	1.592	0.009	5.737††	0.032	2.509†	0.014	3.637††	0.020	2.549†	0.014

Values in bold – $(p>0.100)$ – No; * – $(p\leq0.100)$ – Marginal; ** – $(p\leq0.050)$ – Fair; † – $(p\leq0.010)$ – Good; †† – $(p\leq0.001)$ – Excellent

Table 7. Kruskal Wallis statisitc (Field of Education)

	COMPETENCE											
COUNTRY	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Austria	151.155††	15.630**	3.678	25.312††	26.779††	49.403††	20.837†	31.161††	13.999*	51.917††	40.383††	18.437†
Belgium	91.627††	4.893	5.846	2.877	16.868**	56.015††	20.799†	22.618†	13.312*	82.098††	33.142††	21.634†
Czech Republic	528.178††	33.803††	20.037†	70.628††	31.140††	209.941††	82.769††	66.446††	37.994††	225.977††	80.871††	59.747††
Estonia	43.115††	6.373	24.531††	15.647**	20.963†	30.685††	25.573††	13.106*	20.214†	26.747††	5.864	2.473
Finland	174.825††	22.134†	12.957*	28.606††	45.555††	32.930††	11.614	43.414††	13.551*	114.167††	63.113††	49.519††
France	151.950††	24.132††	18.813†	11.723	14.425**	39.040††	22.751†	15.308**	5.289	31.578††	16.619**	15.455**
Germany	128.417††	23.068†	7.969	17.401**	22.035†	24.774††	20.004†	23.866††	14.201**	121.543††	36.464††	17.884**
Italy	83.570††	7.200	4.515	9.446	8.246	22.533†	24.599††	8.007	2.518	17.979**	21.570†	17.273**
Japan	49.600††	4.471	14.641**	10.306	8.819	10.374	10.051	18.161†	5.587	11.932*	20.690†	71.822††
Netherlands	223.134††	58.680††	16.605**	51.646††	21.549†	43.747††	31.316††	27.677††	26.433††	175.402††	57.974††	44.091††
Norway	268.527††	87.933††	30.587††	52.685††	28.086††	31.088††	6.913	57.955††	40.761††	234.418††	58.247††	32.235††
Portugal	48.386††	12.698*	19.424†	7.021	5.609	10.251	10.057	14.328**	16.882**	9.879	1.139	22.120†
Spain	156.690††	21.183†	63.000††	26.580††	27.905††	39.194††	32.867††	41.699††	45.373††	131.447††	45.127††	38.614††
Switzerland	389.376††	108.350††	32.456††	41.466††	21.611†	73.618††	33.259††	54.522††	24.524††	129.391††	75.373††	40.639††
United Kingdom	60.401††	4.352	38.551††	32.378††	4.521	22.701†	26.265††	27.250††	56.595††	31.476††	25.960††	13.697*

Values in bold – $(p > 0.100)$ – No; * – $(p \leq 0.100)$ – Marginal; ** – $(p \leq 0.050)$ – Fair; † – $(p \leq 0.010)$ – Good; †† – $(p \leq 0.001)$ – Excellent means are not only random variations. Null hypothesis is less likely to be true as *F* is found to be large enough. Values of partial eta squared range from 0.004 to 0.013. This statistic interprets the percent of variance in Competence 1 (Ability to use computers and the internet) uniquely attributable to the effect of the predictor i.e. Field of Education. We have interpreted effect of the predictor for two dependent variables i.e. competence 1 and 8. Similar interpretation could be made for the rest of 10 competences. We leave this job for the readers' exercise.

We note partial eat squared values as low as 0.004 and as large as 0.089 for the cases with significant *F* values. One may suspect about the acceptability of lower limit value; yet the predefined pretext of large data set may suffice for the justification. One may say that the percentage of effect is too small. This could be questionable in the absence of any valid justification. In fact there is no criterion for this limit, at least, readily available to us. Researchers like Kittler et al (2007) have defined the small limit as 0.01 without giving any valid justification. It appears as this was the researchers own choice for defining the limit. If this is the case, we may set our own limit as 0.004 (or even lower than this e.g. 0.001). We may provide three grounds for doing so. Firstly, the large data set; secondly, the researcher's own choice; and thirdly, the competences are transversal to the fields of education. The last factor we believe in most in this justification. This variable is found as good as we were expecting earlier to explain the variances in the dependent variables i.e. competences. We consider it positive while rejecting the null hypothesis in favour of our research hypothesis.

High levels of significance show that the graduates from different subcategories of 'Field of Education' are not same; they do differ in their self-assessment of acquired competences as they are expected to be. Mutual differences in their self-assessment are coherent to the fact that they belong to different subcategories. In simple words we may say that the graduates with different *academic experiences* possess distinct subset of competences and Kruskal-Wallis test shows that this presumption is coherently observable in their self-assessment. Consequently, their self-assessment of acquired competences could be said to be reliable, in Popperian terms as there is nothing contradictory to factual situations.

Sublevel of Study Programme

We are interested to look how good this predictor is in explaining the variances in the dependent variables of competences. This variable is found to reflect poorer output than the previous one in terms of F as well as $\partial\eta^2$. We take competence 3 and 6 for example. Competence 3 (Ability to work productively with others) is marked among the competences for which the variances have been very poorly explained. It is found to show marginal significant difference for Czech Republic and Spain; fair significant difference for Austria; excellent significant difference for Finland; and insignificant difference for the rest of 11 countries. The partial eta squared statistic is too small ranging from 0.001 to 0.002 for significantly different *F* statistic cases. For such cases *F* statistic is large enough to reject the null hypothesis in favour of the alternative one. However, partial eta squared statistic range is very small. Competence 6 (Ability to write reports, memos or documents) exhibited insignificant difference for four countries, namely, Austria, Czech Republic, Estonia and United Kingdom; marginal significant difference for Germany only; faire significant difference for France and Portugal; and excellent significant difference for the rest of seven countries. Partial eta squared statistic (for significant *F* statistic cases) ranges from 0.002 to 0.014. We selected two competences (3 and 6) for example only. Similar interpretation could be made for the rest of 10 competences. We leave this job for the readers' exercise. This variable has not proved itself as good as we imagined to begin with in explaining the variances in the dependent variables i.e. competences. We found it not supportive to accept our research hypothesis and to reject the null hypothesis.

Table of Mann-Whitney (U) statistics in the following shows that the graduates who followed study programmes providing direct access to doctorate are different from their counterparts (who followed study programmes not providing direct access to doctorate) in their self-assessment of acquired competences. This is what we expected earlier. As this is coherent and not contradictory so, following the falsifiability criterion of Karl Popper, we may say that the self-assessment of the graduates is reliable.
[Insert table 8 and table 9 here]

Demanding Level of Study Programme

The variable 'Demanding Level of Study Programme' is observed to better explain the variances in the dependent variables i.e. competences, than the variable 'Sublevel of Study Programme' in terms of both F and $\partial\eta^2$. But this is poorer than the 'Field of Education'. We are going to interpret, for example, the results of Competence 3 (Ability to work productively with others) and Competence 12 (Mastery of your own filed or discipline).

Table 8. Analyses of variance (Sublevel of Study Programme)

Country	Competence 1		Competence 2		Competence 3		Competence 4		Competence 5		Competence 6	
	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$
Austria	13.856††	0.009	0.067	0.000	6.315**	0.004	3.293*	0.002	0.633	0.000	0.334	0.000
Belgium	1.112	0.001	10.913††	0.009	0.162	0.000	2.836*	0.002	14.935††	0.012	12.676††	0.011
Czech Republic	0.007	0.000	8.331†	0.001	3.410*	0.001	8.052†	0.001	16.490††	0.003	2.537	0.000
Estonia	7.879†	0.009	3.433*	0.004	0.046	0.000	0.256	0.000	1.091	0.001	1.663	0.002
Finland	31.618††	0.013	2.590	0.001	10.620††	0.005	0.075	0.000	4.291**	0.002	13.171††	0.006
France	3.196*	0.002	3.750*	0.003	1.040	0.001	0.034	0.000	0.313	0.000	8.982†	0.007
Germany	8.639†	0.006	0.027	0.000	2.367	0.002	8.787†	0.006	0.189	0.000	2.923*	0.002
Italy	2.434	0.001	0.279	0.000	0.035	0.000	0.011	0.000	1.998	0.001	8.826†	0.004
Japan	0.296	0.000	5.323**	0.002	0.499	0.000	4.510**	0.002	2.985*	0.001	10.304††	0.005
Netherlands	7.215†	0.002	20.596††	0.007	0.366	0.000	0.001	0.000	11.264††	0.004	40.731††	0.014
Norway	0.832	0.000	0.315	0.000	0.535	0.000	1.084	0.001	0.040	0.000	12.878††	0.007
Portugal	0.564	0.001	3.388*	0.006	0.368	0.001	0.732	0.001	3.534*	0.006	6.981†	0.012
Spain	3.472*	0.001	0.270	0.000	3.101*	0.001	0.881	0.000	5.622**	0.002	25.835††	0.008
Switzerland	6.265**	0.001	25.310††	0.006	1.263	0.000	3.729*	0.001	0.138	0.000	21.307††	0.005
United Kingdom	0.351	0.000	2.377	0.002	1.308	0.001	0.058	0.000	1.040	0.001	1.158	0.001
	Competence 7		Competence 8		Competence 9		Competence 10		Competence 11		Competence 12	
	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$
Austria	1.416	0.001	1.837	0.001	0.120	0.000	0.001	0.000	0.259	0.000	0.289	0.000
Belgium	0.915	0.001	0.009	0.000	1.564	0.001	11.321††	0.009	3.874	0.003	0.020	0.000
Czech Republic	2.088	0.000	4.501**	0.001	3.903**	0.001	0.447	0.000	4.309**	0.001	9.653†	0.002
Estonia	0.099	0.000	0.429	0.001	2.456	0.003	6.259**	0.008	0.119	0.000	5.013**	0.006
Finland	7.304†	0.003	9.629†	0.004	0.047	0.000	89.862††	0.037	0.123	0.000	2.328	0.001
France	3.142*	0.002	0.009	0.000	2.789*	0.002	11.824††	0.009	0.008	0.000	3.219*	0.002
Germany	3.840**	0.003	6.693†	0.004	0.001	0.000	0.232	0.000	1.040	0.001	0.969	0.001
Italy	0.016	0.000	1.723	0.001	2.538	0.001	0.008	0.000	0.113	0.000	0.192	0.000
Japan	6.295**	0.003	4.313**	0.002	4.650**	0.002	3.251*	0.001	7.617†	0.003	12.879††	0.006
Netherlands	0.719	0.000	0.136	0.000	0.197	0.000	107.871††	0.035	0.007	0.000	1.933	0.001
Norway	2.590	0.001	1.286	0.001	5.191**	0.003	34.115††	0.017	1.490	0.001	1.080	0.001
Portugal	0.005	0.000	0.257	0.000	2.618	0.005	7.476†	0.013	0.395	0.001	2.050	0.004
Spain	7.642†	0.002	0.001	0.000	2.456	0.001	46.355††	0.013	0.046	0.000	0.775	0.000
Switzerland	1.753	0.000	1.805	0.000	0.431	0.000	29.257††	0.007	10.810††	0.002	31.720††	0.007
United Kingdom	0.073	0.000	0.148	0.000	0.366	0.000	2.532	0.002	1.462	0.001	2.624	0.002

Values in bold – $(p>0.100)$ – No; * – $(p\leq0.100)$ – Marginal; ** – $(p\leq0.050)$ – Fair; † – $(p\leq0.010)$ – Good; †† – $(p\leq0.001)$ – Excellent

Table 9: Mann-Whitney statistic (Sublevel of Study Programme)

	COMPETENCES											
COUNTRY	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Austria	54456††	79599	70746**	73877	74341	79909	72775	79501	78998	78120	76042	78590
Belgium	153034††	157106†	167204	164898	162767	151402††	172390	161322*	168575	162212	168426	163205
Czech Republic	2737628**	2712813**	2755149	2700787**	2742938**	2740728**	2798602	2736197*	2827652	2724851**	2782036	2789592
Estonia	40178††	45110**	50198	46885	49508	48769	49102	50284	44502**	44148**	50117	44097**
Finland	698682††	734934*	714537†	712133†	684479††	660007††	748270	734546*	711563†	530556††	684004††	732483†
France	249542††	254784†	269196	266776	265905	246551††	251685†	278359	257392†	237571††	258378**	255139†
Germany	261098††	270997**	289869	282928	280695	259050††	283095	284264	278050	284812	282211	279331*
Italy	285782†	318428	313702	312548	300508	279719†	303239	316527	303824	302794	290740	318651
Japan	204110†	200682††	228774	200539†	197865††	179101††	192642††	216380	202902†	195237††	190897††	180250††
Netherlands	1094417	957418††	1108348	1083944	1006599††	917664††	1096171	1110807	1087546	803428††	1073324	1104648
Norway	401420††	418877††	474167**	474175**	463589†	440091††	495915	474388**	485630	317348††	456158††	502159
Portugal	35857	32962**	36192	35628	33873	33279*	36576	36506	35360	29660††	34907	30573††
Spain	1567254*	1547296†	1509014††	1613179	1526406†	1416989††	1512866††	1614390	1594586	1329025††	1613732	1642853
Switzerland	2186675†	1891555††	2280355	2265362	2246784	1964028††	2255809	2269600	2175103†	2012760††	2131544††	2180888††
United Kingdom	70844	70146*	68895*	76243	69516*	71545	74870	74777	76218	66142†	67461**	67572**

Values in bold – $(p > 0.100)$ – No; * – $(p \leq 0.100)$ – Marginal; ** – $(p \leq 0.050)$ – Fair; † – $(p \leq 0.010)$ – Good; †† – $(p \leq 0.001)$ – Excellent

Competence 3 (Ability to work productively with others) can be ranked among the competences with poorly explained variances. It is found to show good significant difference for Germany and United Kingdom; excellent significant difference for Austria, Czech Republic, Finland, France, Japan, Spain and Switzerland; and insignificant difference for the rest of 6 countries. The partial eta squared statistic is very small ranging from 0.008 to 0.016 for significantly different *F* statistic cases. Although *F* statistic is also very small but it is large enough with (either good or excellent) significant difference to reject the null hypothesis and to accept the alternative hypothesis. Nonetheless, partial eta squared statistic range is very small, yet it could reasonably explain the percent of the variance of dependent variables i.e. competences.

We take Competence 12 (Mastery of your own filed or discipline) as a second example. The predictor 'Demanding Level of Study Programme' is explaining successfully the variance in Competence 12 (Mastery of your own filed or discipline) for 14 countries. Estonia is the sole country to express the insignificant difference. Among the rest, we note marginal significant difference for Belgium; good significant difference for the Netherlands and United Kingdom; excellent significant difference for Austria, Czech Republic, Finland, France, Germany, Italy, Japan, Norway, Portugal, Spain and Switzerland. The range of partial eta squared statistic is 0.005 to 0.029 for the cases for which significant differences have been marked.

This predictor is proved as good as we foresaw earlier in explaining the variances in the dependent variables i.e. competences. We consider it encouraging while rejecting the null hypothesis in favour of our research hypothesis. Both parameters *F* (because of insignificance in most of the countries) as well as partial eta squared (with maximum value of 0.015) reveal that the variances on the basis of gender in Competences 2, 6, 7 and 9 are very poorly explained. Elevated levels of significance in the table below show that the graduates from different subcategories on the basis of 'Demanding Level of Study Programme' are not same; as we expected in the beginning, they do differ in their self-assessment of acquired competences. Mutual differences in their self-assessment of acquired competences are coherent to the fact that they belong to different subcategories and that they do possess different subset of competences distinct from the graduates of other subcategories. This is evidently observable, through Kruskal-Wallis test, in their self-assessment of acquired competences. In simple words we may say that the graduates with different *academic experiences* possess distinct subset of competences and Kruskal-Wallis test shows that this presumption is coherently observable in their self-assessment. Consequently, their self-assessment of acquired competences might be considered reliable, in Popperian terms, as contradiction has been found through this analysis.

Table 10. Analyses of variance (Demanding Level of Study Programme)

Country	Competence 1		Competence 2		Competence 3		Competence 4		Competence 5		Competence 6	
	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$
Austria	4.654††	0.012	7.415††	0.019	5.279††	0.014	0.491	0.001	1.736	0.005	1.127	0.003
Belgium	3.385†	0.011	1.554	0.005	1.301	0.004	0.078	0.000	0.602	0.002	2.169*	0.007
Czech Republic	3.366†	0.002	19.141††	0.013	11.244††	0.008	13.626††	0.009	11.087††	0.008	9.497††	0.006
Estonia	0.331	0.002	1.867	0.009	0.958	0.005	3.059**	0.015	1.090	0.005	2.404**	0.012
Finland	3.702†	0.006	17.397††	0.029	7.908††	0.013	3.610†	0.006	7.186††	0.012	5.121††	0.009
France	2.766**	0.008	5.594††	0.016	5.589††	0.016	2.816**	0.008	2.005*	0.006	3.945†	0.011
Germany	8.429††	0.022	4.764††	0.012	3.345†	0.009	1.872	0.005	0.265	0.001	1.666	0.004
Italy	3.598†	0.007	5.967††	0.011	1.652	0.003	3.580†	0.007	6.582††	0.012	4.378†	0.008
Japan	11.185††	0.020	8.236††	0.015	6.558††	0.012	4.172†	0.008	7.342††	0.013	12.557††	0.023
Netherlands	0.739	0.001	2.041*	0.003	1.581	0.002	0.241	0.000	2.167*	0.003	0.673	0.001
Norway	1.396	0.003	5.311††	0.011	1.862	0.004	2.076*	0.004	2.911**	0.006	4.444††	0.009
Portugal	0.924	0.006	4.133†	0.028	0.450	0.003	2.903**	0.020	2.819**	0.020	3.741†	0.026
Spain	7.041††	0.008	11.188††	0.013	8.211††	0.010	8.095††	0.009	4.725††	0.005	4.546††	0.005
Switzerland	9.038††	0.008	13.066††	0.012	8.297††	0.008	1.668	0.002	4.076†	0.004	4.166†	0.004
United Kingdom	1.980*	0.006	5.599††	0.016	4.405†	0.012	4.001†	0.011	4.848††	0.014	4.471††	0.013
	Competence 7		Competence 8		Competence 9		Competence 10		Competence 11		Competence 12	
	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$	F	$\partial\eta^2$
Austria	6.247††	0.016	4.922††	0.013	7.880††	0.021	6.047††	0.016	5.798††	0.015	12.045††	0.031
Belgium	1.744	0.006	3.110**	0.010	1.884	0.006	1.722	0.006	0.497	0.002	1.964*	0.007
Czech Republic	15.220††	0.010	14.932††	0.010	17.017††	0.012	22.304††	0.015	12.546††	0.009	29.362††	0.020
Estonia	3.285**	0.016	1.875	0.009	2.931**	0.014	4.623††	0.022	2.170*	0.010	1.711	0.008
Finland	10.000††	0.017	4.838††	0.008	11.845††	0.020	12.424††	0.021	7.980††	0.013	17.693††	0.029
France	6.929††	0.020	3.592†	0.010	6.323††	0.018	4.186†	0.012	3.639†	0.011	6.194††	0.018
Germany	7.767††	0.020	5.570††	0.014	1.790	0.005	7.925††	0.020	1.618	0.004	13.738††	0.035
Italy	2.534**	0.005	2.089*	0.004	5.643††	0.010	11.404††	0.021	5.297††	0.010	9.303††	0.017
Japan	8.584††	0.016	6.316††	0.011	11.730††	0.021	12.184††	0.022	8.538††	0.015	16.608††	0.030
Netherlands	1.294	0.002	3.517†	0.005	1.408	0.002	3.436†	0.005	3.740†	0.005	3.499†	0.005
Norway	4.514††	0.009	6.533††	0.013	3.869†	0.008	1.095	0.002	1.994*	0.004	6.725††	0.014
Portugal	1.986*	0.014	0.651	0.005	2.393**	0.017	5.511††	0.037	3.321**	0.023	8.312††	0.055
Spain	6.021††	0.007	14.793††	0.017	5.332††	0.006	6.854††	0.008	8.830††	0.010	9.336††	0.011
Switzerland	11.682††	0.011	4.698††	0.004	2.973**	0.003	17.665††	0.016	5.557††	0.005	7.894††	0.007
United Kingdom	2.551**	0.007	2.969**	0.008	5.031††	0.014	7.623††	0.021	5.024††	0.014	3.517†	0.010

Table 11. Kruskal-Wallis Test (Demanding Level of Study Programme)

	COMPETENCE											
COUNTRY	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Austria	29.615††	23.675††	25.781††	1.164	4.585	1.714	16.222†	4.448	22.343††	33.896††	26.562††	31.413††
Belgium	20.905††	10.026**	6.843	0.852	1.852	2.562	3.530	4.695	4.528	19.051††	5.677	13.774†
Czech Republic	15.335†	54.500††	44.181††	10.458**	31.344††	2.951	37.177††	40.583††	36.539††	57.606††	23.076††	77.791††
Estonia	2.585	7.885**	2.799	7.416	5.057	7.851*	9.765**	4.872	10.619**	18.346††	7.909*	7.605
Finland	21.682††	70.742††	21.230††	15.717†	50.159††	40.198††	44.324††	13.813†	45.971††	118.413††	40.824††	56.082††
France	11.584**	31.207††	35.708††	16.682†	8.787*	20.692††	32.367††	25.129††	35.840††	26.795††	17.905††	31.283††
Germany	60.862††	32.537††	6.525	3.109	6.356	5.513	28.308††	12.139**	9.961**	83.525††	19.764††	38.270††
Italy	17.120†	22.767††	11.574**	14.427†	31.879††	14.557†	24.445††	12.152**	27.777††	48.438††	28.785††	44.953††
Japan	31.566††	42.237††	31.904††	24.571††	30.620††	40.520††	39.182††	27.213††	50.558††	44.221††	34.214††	77.778††
Netherlands	13.090**	16.910†	12.305**	3.372	24.759††	3.509	4.913	5.828	6.396	48.367††	32.737††	17.009†
Norway	39.642††	51.614††	2.801	3.744	22.822††	38.929††	18.740††	19.598††	16.913†	88.605††	12.485**	26.536††
Portugal	2.440	14.847†	3.266	12.942**	12.914**	13.500†	10.522**	7.904**	8.259*	31.210††	12.975**	33.100††
Spain	65.667††	59.180††	23.110††	27.428††	39.570††	26.805††	48.053††	33.42††7	10.130**	89.108††	49.886††	26.682††
Switzerland	74.728††	63.382††	39.536††	6.484	21.104††	22.423††	47.975††	12.318**	10.956**	93.993††	37.438††	24.380††
United Kingdom	9.738**	25.169††	16.141†	11.876**	26.077††	8.740*	12.469**	10.900**	23.805††	38.266††	21.078††	20.227††

Values in bold – $(p>0.100)$ – No; * – $(p\leq 0.100)$ – Marginal; ** – $(p\leq 0.050)$ – Fair; † – $(p\leq 0.010)$ – Good; †† – $(p\leq 0.001)$ – Excellent