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Getting closer to the needs of the labour market: a system measuring soft skills at a Hungarian rural university

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Abstract

A key measure of higher education's success is the extent to which it can provide the labour market with graduates that excel not only in terms of their professional training but also in terms of their soft skills. To that end, the competences of students entering university must first be diagnosed. This paper presents a pilot study of such a measurement system, together with first-year results obtained by a rural university faculty. Equipped with better information about its freshman students, such a university can begin to address the revealed competence deficiencies actively, and, over the course of an entire training cycle, further improve the labour market value of the young people when they come to graduate. Provisional recommendations are made at the end of this paper; however, further data analysis, once undertaken, may lend further support to the practical approach outlined here.

Keywords: competences, competence development, employability, soft skills, student success, training needs diagnosis

1. Introduction

In order to deliver a competitive higher education system in today's knowledge-based world economy, a higher education **action plan for 2016-2020** was introduced by the Hungarian government (1359/2017: Mid-term Policy Strategy of Gear Shift in Higher Education, Action Plan 2016-2020). One of the key pillars of this plan has been to **support the success of students**. The top targets have been to improve the competence level of enrolled students, and to **urge the adoption of programmes aimed at reducing dropout**, e.g. extracurricular courses aiming at language and professional skills improvement (Action plan, 2016-2020). Thus, in line with the trends of a rapidly changing world, higher education institutions face an ever-increasing challenge concerning soft competency development that goes beyond boosting students' employability and labour market value by the development of professional (hard) competencies.

In response to the Mid-term Policy Strategy of Gear Shift in Higher Education, the shift to 'a Higher Gear' in higher education was elaborated in the Hungarian Human Resources Development Operative Program Application (EFOP in Hungarian) titled EFOP 3.4.3-16 'Innovative Solutions for Improving the Quality of and Access to the Higher Educational Training Courses of Budapest Business School'. Within its framework - as a pilot study - the following actions were taken at the Zalaegerszeg campus of Budapest Business School that is a faculty located in Western Hungary:

1. diagnosing the existing competences of first year full-time students and preparing personal competence maps for them;
2. recommending **improvement programmes** to the students based on the diagnosis; and
3. measuring the competences of full-time students directly before graduation.

The programme provides opportunities for the students to improve their competence levels and in addition, it increases their chances of graduation, their labour market prospects and potentially, also their labour market value. It is not without reason that the smallest faculty of the university has been selected to develop and test the measurement system, as the whole range of the first-year students are more easily accessible and could be involved in the study at such a small faculty. As part of the pilot programme, the last query was conducted in 2020-2021.

This study presents both the system approach and the results of competence measurements of students entering university taken in Academic Year 2017/2018. This paper will now present a "best practice" competence measurement framework, one informed by both the researchers' practical experience and known labour market expectations.

Within the framework of a pilot programme, we have developed measurement instruments that focus on the soft skills of students in one higher education institution, with a view to assisting companies' recruitment, selection, competence, and career management activities. Key competences such as creativity, problem solving, stress management etc. have been analysed using these instruments. Following completion of the pilot research, data will be collected for all five years, after which a final measurement system and methodology will be extended to all faculties of the university. A further widening of the research will involve studying the way soft skills are measured by both domestic and international universities.

2. Methods & Materials

2.1. Models and systems forming the basis of a questionnaire focusing on the soft competences

Before establishing the framework system of competence measuring, we studied international and domestic trends and reviewed various models and assessment systems which are not primarily related to the Detailed Project Reports (DPR-based career tracking practices of universities) which focus less on soft skills. In developing the pilot system, we relied on solutions that are in line with the expectations of the labour market and within that, are increasingly focusing on soft skill competencies.

- a) In this section, we present the most important of the sources that we used to develop our own measurement system that can be used by our university faculty.
- b) The key factors of emotional intelligence that were presented in the book of Stephen R. Covey titled ‘The 8th Habit: from Effectiveness to Greatness’ (Covey, 1999). These key factors are summarised in Table 1.

TABLE 1. FIVE KEY COMPONENTS OF EMOTIONAL INTELLIGENCE THROUGH THE SEVEN HABITS

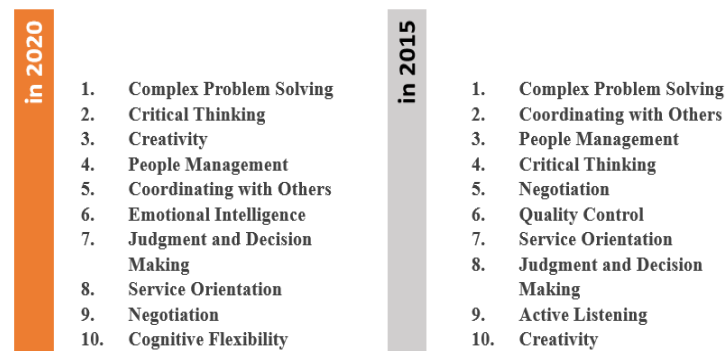
Key components of emotional intelligence	Habits
Self-awareness	1. Be proactive
Personal motivation	2. Begin with the end in mind
Self-regulation	3. Put first things first 7. Sharpen the saw
Empathy	5. Seek first to understand, then to be understood
Social and communication skills	4. Think win/win 5. Seek first to understand, then to be understood 6. Synergize

Source: own compilation, based on Covey, 2004, p. 346

- c) The soft skills cube of André Moritz (Moritz, n.d.), **containing 6 competence fields**, within which there are 26 key competences. We chose to highlight the following factors from the cube model: empathy, resourcefulness, moderating and visualisation skills, presentation skills, self-promotion skills, knowledge of human nature, persuasion skills, conflict management skills, critical thinking, motivation skills, creativity, decision-making skills, and time management.
- d) Thomas-Kilmann conflict mode questionnaire containing 30 statement pairs (Thomas and Kilmann, 1970).
- e) The mindset model of Carol S. Dweck published in 2015, in which she suggested that **if we look at ourselves and the world with a growth mindset**, it will motivate us to hunger knowledge and be steadfast, due to which we will be accomplish more in every area of our life. The growth mindset therefore means that despite the difficulties (actually more in a difficult situation) we are determined to grow and develop. (Dweck, 2015, p. 19) This new approach also highlights the role of **creativity, perseverance and flexibility**.
- f) The 2014 competence system of digital citizenship, which “incorporates the **model of digital communication and use of equipment in harmony with the 21st century**, value creating activity performed on online forums and its impacts, as well as the ethical, legal, mental and physical health status related aspects of the activity performed with digital equipment.” (Racsko, 2016, p. 46).

- g) The most important skills published by the World Economic Forum in 2017 can be seen in Figure 1.

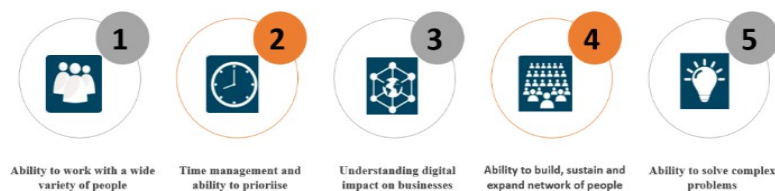
FIGURE 1. TOP 10 SKILLS



Source: World Economic Forum (2017/3)

- h) In August 2017, the **Financial Times** published the results of the research in which the labour market participants attempted to identify the key skills expected from those with MBA qualification. Figure 2. presents **the five most important skills**.

FIGURE 2. TOP 5 MOST IMPORTANT SKILLS



Source: Financial Times, 2017

- i) The self-assessment tool regarding key competences used by the University of Victoria, which, with the help of a 1-5 scale also examines student competences in more dimensions¹. The key competence categories here are: personal efficiency, commitment to quality, change management, communication, building fair relationships and teamwork.
- j) The survey of Erasmus+ regarding competences, which provides a starting-point to the identification of digital skills².
- k) The questionnaire of OECD regarding global competence also based on self-assessment provided a good point of reference in issues concerning social sensitivity and global thinking (OECD, 2016).
- l) The most required labour market competences that the university offers in the course of the entire training cycle were collected from job search sites such as <https://jobline.hu/>, <https://www.jobinfo.hu/> and <https://www.profession.hu/> to see what is relevant and needed on the employer's side.

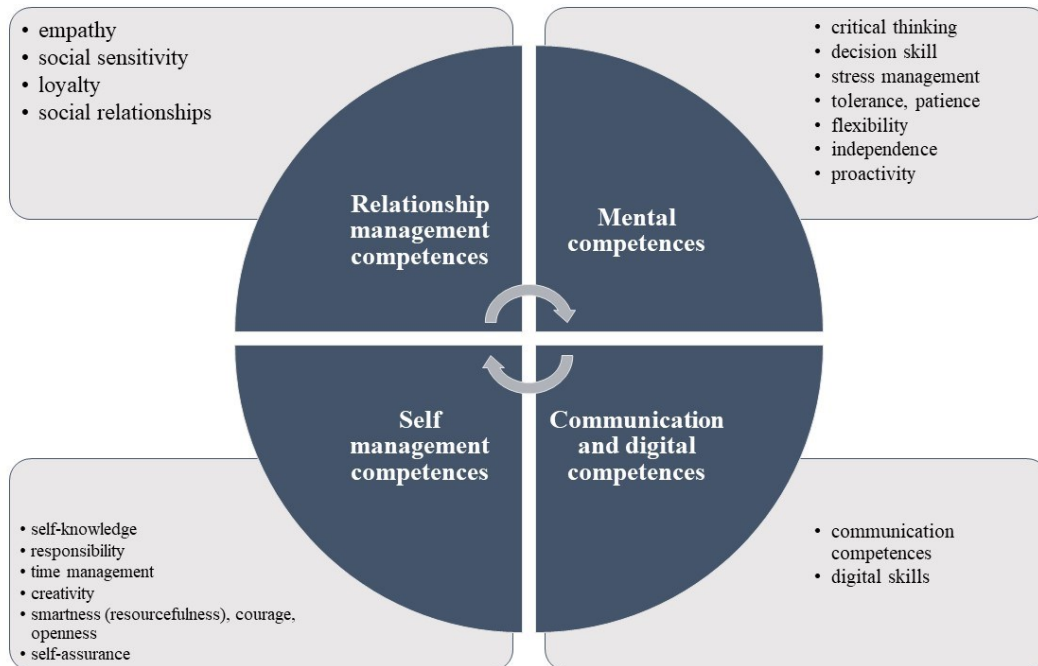
¹ Please refer to https://www.uvic.ca/hr/assets/docs/od/core_self%20assessment.pdf for the questionnaire, and for further categorisation to <https://www.uvic.ca/coopandcareer/career/build-skills/core/index.php> on the website of the university.

² Please refer to <https://tinyurl.com/y8cx9d9n> for the Erasmus+ questionnaire.

2.2. Focal areas of the competence measurement system

We established the competence measurement system after having revised the above detailed studies in which we focused on the **soft skill factors**. These include all skills, which, in addition to the professional knowledge (hard skills) fundamentally specify the adapting, motivation, manageability and creativity characteristics of the employee. We indicated **four focal areas** for the **pilot competence measurement**, such as relationship management, mental, self-management as well as communication and digital competences.

FIGURE 3. FOCAL AREAS OF MEASURING SOFT SKILLS COMPETENCES



Source: own compilation

2.3. Statistical methods

The questionnaire is completed by first-year students at the beginning of each academic year at an online interface (kérdőívem.hu). The first survey was conducted in September 2017, when all the first-year students at our Faculty (102 people) completed the questionnaire. Due to the very small number of students and the strict deadlines dictated by the project, we did not have the opportunity to test the questionnaire: we are practically still at the beginning of the testing phase. The constraints of the project and the need to compare the results with later results do not allow us to modify the original questions of the questionnaire, so we can correct the questionnaire only after the project is closed. The questions (statements to be assessed on a scale of 1-6) were compiled with the help of the books and studies listed above in this section.

It is important to note that during the pilot period the sample size could not exceed 100, because the target value of the project application was set at 100. Furthermore, the maximum number of first-year students entering university at our rural faculty is just around 100. Due to the small size of the sample, the number of statistical methods that can be used is correspondingly limited, however, the sample was excellent for testing.

We did not find any studies looking at the soft skills of higher education students, so we do not have the opportunity to reflect on existing international or even specifically Hungarian experiences in our research. In this article, we can only present the results and connections we discovered in the case of the first-year students of our faculty. During the compilation of the questions and the development of the analysis methodology, it was a limitation that we did not find any description or existing questionnaire specifically related to the assessment of soft skills, and the project is primarily about analysing students' individual competencies (this specifically means soft skills). This means that a short description was prepared for each student individually, based on their answers to the questions of the questionnaire. The general analysis and assessment of the questionnaire is an additional benefit of the project implementation. Based on the 21st century expectations and labour market trends described above, we finally created a questionnaire of 147 variables, 30 of which examine the student's demographic background and progress to date, and 117 statements relate to soft skills. We hope that as the number of items increases getting closer to the end of the project, we will get more accurate and generalizable results. This study describes our experiments and the results of the analysis for one single group of students started their studies in 2017.

In addition to this, our main aim was to identify the impacts of the different factors that have an influence on first year students' competence levels. We found that these influencing factors are: the impacts of previous studies, family background and certain character traits;

The questionnaire has two parts. There are questions regarding the background variables in the first part and questions examining the competences in the second part.

The background variables can be categorised in five groups:

- basic demographic data;
- questions regarding previous studies, existing professional competences;
- questions regarding family background, parents;
- questions regarding activity, attitude in community.

We provided a total of 100 items for the examination of competences, which the students had to assess in a scale of 1-6. The scale used in the questionnaire has the following characteristics:

- we used a balanced scale;
- we established an even scale to avoid there being a middle value;
- compelling scale: we did not provide 'I do not know' or 'I do not remember' options.

In the interest of achieving the research targets we used one-, two- and multiple-variable statistical methods.

2.3.1. One-variable statistics

Among our tools used for the presentation of the changes in the background variables there is only the calculation of the distributions and mode, as the majority of these variables are not of metric measurement level (e.g. residence, qualification, post). A smaller number of variables are metric: here, in addition to the distribution and mode it is also possible to calculate averages and dispersion indicators.

In the course of competence examination, we calculated competence indexes in order to clean the analysis and make it clear: the four examined competence sets each include different numbers of partial competences and items.

In the interest of balancing the examination we worked with average scores within the different categories, which actually means the following averages:

- 19 partial indexes for the top competence areas (empathy, social sensitivity, loyalty);
- 4 complex indexes for the competence factors: average of the competence areas belonging to the different competence sets (relationship management, mental competence, self-management, communication and digital competences);
- 1 summary index: the average of the four competence sets.

The value of the partial indexes thus calculated can be between 1 and 6 points. Based on the 19 partial indexes and the 4 complex indexes the following factors can be examined:

- What points were scored by the majority of the students within the different categories?
- What average score is typical of the first-year students?
- Do the majority of the students have over or under average skills?

The answer to these questions requires mode, average and asymmetry calculations in the different areas. In the analyses, the given year is also worth examining with quantiles, with the partial indexes taken into account. Based on the terciles, the typical point values scored by the lowest third of the students showing a very weak performance, the points scored by the 'average' third and the top third of the students can be established providing a more overall picture of the attitude and skills of the examined year.

2.3.2. Two- and multiple-variable statistics

To test the statements of the questionnaire and to reduce the present variable set of relatively large number, we performed exploratory factor analysis. In addition to this, the purpose of the analysis is also to establish the competences with the biggest influence on the final, composite competence index. To establish it, we also used multi-variable regression analysis.

Factor analysis is a method, the essence of which is to produce factors from the original variable structure, which do not correlate with each other. The data are standardised as the first step to allow factor extraction based on the principle of the unweighted least squares. The advantage of this method is that the distribution of the variables is unimportant in this case. (Sajtos-Mitev, 2007).

To meet the KMO conditions and achieve 60% explanatory force, the low communality variables were eliminated in the first step, after which the low factor weight variables were discarded. We used the Varimax method in the course of factor rotation, thereby maximising the variance explained by the factors. The advantage of this method is the better separation of the factors during the rotation, by which the interpretation of the factors becomes easier (Sajtos-Mitev, 2007).

While categorising the students it must also be considered that if in the case of any partial index a student has 'average' skills in total, however, his/her answers given to the different items are more scattered. This problem can be managed with cluster analysis, where grouping is performed on the basis of several variables, by which a more realistic picture can be received

about the different student groups. The procedure is performed with the C-centroid method. With the help of this relations, connection or even contradictions may be revealed between the different questions.

Further purpose of the analysis is to reveal the social factors, which may influence the students' competences, i.e. it must be examined whether there is any relation between the background variables and the different competences. We performed χ^2 tests with the help of cross tables in this interest, where the independent variables were given by the background factors and the dependent variables by the competence partial indexes. If we find significant connections, we calculate the strength of association appropriate for the scale of the variables. In addition, the analyses also include variance analysis to compare the average competence scores of student groups of different background and characteristics. We calculate with 95% reliability level in the course of analysing the connections between variables.

3. Results and discussion

The results gained from the answers given by the full-time students entering university and enrolled in autumn of the 2017/18 academic year are summarised in this section.

3.1. Key characteristics of the students involved in the survey.

The questionnaire was completed by 102 full-time first year student, 60 females and 42 males. The majority of those filling in the questionnaire live in towns, among them nearly **50% in the county seat town**, 12% in other towns in the region or county that are not a county seat, one person resides in the capital, and **40%** of those filling in the questionnaire **live in settlements or villages**. Only 25.5% of the students involved in the questionnaire live in boarding. 31% of the first-year students filling in the questionnaire study in higher educational vocational training and 69% are in training leading to university degree. 11 persons of the latter group attend the business informatics faculty. **19 persons (18.6%)** of the 102 interviewed students **participate in the dual-training system** (the so-called dual training is a special form of training in higher education. Our University is part of this system where the student has a job at a company that has a contract with the university. In this way, the student receives academic and corporate training in parallel).

The averages were between the value of 4 - 4.5 in every examined competence group, which is a clear indication of the need for competency development or improvement. The interviewed students mostly found their following competences the **weakest**, requiring most development:

- Relationship management: work in team, social relationships, contact building, corporate and management skills.
- Mental competences: stress and conflict management, stubbornness, self-control, problem solving, analysing skill, patience, calmness, resoluteness, punctuality, memory, solid power of conception.
- Self-management competences: resourcefulness, forgetfulness, self-assurance, scheduling, sense of time, time management, self-assessment, creativity, diligence
- Communication and digital competences: communication, command of language, public performance, written communication, composition, English language, information technology and digital skills.

3.2. Impact of the student background on the competences

In the case of students who started their university studies in 2017, we found differences originating from some socialisation and demographic phenomena, factors in four particular competency areas. These differences appear in the area of proactivity, social sensitivity, empathy and flexibility.

3.2.1. Proactivity

Difference in the area of proactivity (statements of question No. 34) were shown in two background variables: on the one hand, the women typically described themselves with higher scores in answer to the questions regarding mental competence proactivity. There was even more significant difference among the students in connection with a question regarding the future (In what job can you envisage yourself?): the relatively realistic self-assessment of the students is indicated by the fact that those preferring to work in the background have lower level of initiative and reaction skills, than those more willing to work in the front line.

3.2.2. Social sensitivity

Between the average of the points scored to statements regarding social sensitivity within the relationship management competence (statements of question No. 29), there are significant differences based on two demographic factors: type of residence and the highest education of the mother. On the basis of the averages, it can be established that the social sensitivity of our only one student from the capital is significantly higher than that of the rest of the students, followed by the students coming from other towns, settlements, villages, and finally from the county seat (mostly from Zalaegerszeg) with the lowest sensitivity level.

This conclusion definitively deserves attention as nearly 50 per cent of our students are from Zalaegerszeg. In the course of the training and development it would be worth paying attention to this area to be improved, too. It would not be rejectable to make sure that these students participate in some sensitising training. It is interesting to note that the highest educational achievement of the mother is also influential, insofar as that the children of less educated mothers have been shown to be more sensitive than those whose mother has higher level of education.

Social sensitivity - based on the calculations - is also influenced by the pass mark of the students. As opposed to our previous assumptions higher mark does not automatically mean a higher level of social sensitivity. Although the students enrolled with the highest marks were proven most tolerant, they were followed by students with average and lower performance.

There have been further differences in the social sensitivity based on the training the student presently participates in: it is interesting that the highest points were scored by students in the higher educational vocational training in the business administration and management faculty, and the finance and accounting faculty students in training leading to university degree. It is less surprising, though, that the least sensitive students study business informatics.

3.2.3. Empathy

We found significant differences in three areas of empathy (statements of question No. 28). According to this the pass mark and the sports activity affects empathy and the degree of empathy also differs according to the envisaged work area of the person in the future. Data did

not cause surprise in terms of the work area to be chosen: the more empathic students and those more sensitive to others would like to work with people in the front line.

It is an interesting result that based on the regularity of the sports activity and the deepness of the commitment to sports there are significant differences among the students. Professional sportspersons and those who regularly go in for sports are more empathic, pay more attention to their fellow beings than those who do not perform such activity. This confirms the ideas concerning sports related personality development. As before, the results based on pass mark are not wholly unequivocal, and we cannot specify a ‘rule of thumb’ for this connection: a higher level of empathy is not the result of either an outstanding or a low pass mark. However, it can be observed that the students with very low and outstanding pass marks are the most empathic ones.

3.2.4. Flexibility, independence

Within mental competence, in the statements regarding flexibility and independence (question No. 33), we can observe that the extent to which a student is active in the community and/or undertakes study tasks in addition to the mandatory ones has a large impact on these characteristics. The students often participating in academic competitions and willing to perform community tasks assessed themselves as more flexible, independent than the more passive students. In connection with the work area to be chosen, the “more resourceful” students would – by nature – be more willing to work in the front line, where independent decision-making and adaptability are important.

3.3. Latent structure and student groups

The questions on digital skills were treated separately from the soft skills, and the result of the reliability calculation calculated for the remaining 97 variables is as follows (Table 2.):

TABLE 2. RESULTS OF RELIABILITY STATISTICS

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
.930	.941	97

Source: own calculations

Based on Cronbach’s alpha value, the questions in the questionnaire have an internal consistency, but based on their high value, the questionnaire contains unnecessary statements, so their number needs to be reduced later.

In the case of the questions including 97 items, we managed to reduce the number of variables to achieve explanatory force higher than 60%, while the value of the KMO indicator was 0.756, and the result of the Bartlett test also shows a significant relationship between the variables.

TABLE 3. RESULTS OF KMO AND BARTLETT'S TEST

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.756
Bartlett's Test of Sphericity	Approx. Chi-Square	1805.308
	Df	528
	Sig.	.000

Source: own calculations

The questions “remaining” in the course of the procedure and the factors defined by us on this basis were the following: Flexibility and adaptability, Firmness, consistency, Self-confidence, resoluteness, Purposiveness, consistency, Stress management, tolerance, and Time management, punctuality.

With the help of the established factors, we examined the student groups, which could be differentiated based on the seven new competence categories, for which we used cluster analysis. We used C-centroid method in the course of the procedure and requested the establishment of three groups. Table 4. and 5. present the results:

TABLE 4: CLUSTER CENTRES IN THE DIFFERENT COMPETENCE CATEGORIES

Final Cluster Centres			
	Cluster		
	1 (19 persons)	2 (44 persons)	3 (39 persons)
Resoluteness	4.40	5.30	4.50
Flexibility	3.39	5.15	4.69
Self-confidence	3.65	5.07	4.01
Purposiveness	4.20	4.70	4.20
Stress management	4.21	4.49	3.49
Punctuality	4.50	4.80	4.40
+ Digital	4.24	4.59	4.09

Source: own calculation, based on the 2017 competence survey

We can see from the data that the method created three groups relatively proportionally. Let us have a look at the characteristics of the different clusters (see Table 4.).

Based on the cross-tables prepared on the basis of clusters and demographic data the different groups can be described by the following background characteristics:

The ‘**Indecisive**’: mostly male from settlements or villages, from grammar school in general, attending training leading to university degree, finance and accounting faculty.

The ‘**Courageous**’: mostly female from technical college attending business administration and management faculty (half of them within the framework of higher educational vocational training, and half of them attend training leading to university degree).

The ‘**Sensitive**’: mostly female with low pass mark, mostly from vocational high school, students attending training leading to university degree (half of them are at the finance and accounting faculty and half of them at the business administration and management faculty).

TABLE 5. PERSONALITY TYPES OF THE DIFFERENT STUDENT GROUPS

1. cluster	2. cluster	3. cluster
<ul style="list-style-type: none"> • less resolute • less flexible • moderately target oriented • less stress resistant • relatively punctual and precise • with moderate digital knowledge 	<ul style="list-style-type: none"> • very resolute • largely flexible • with high self confidence • purposeful • stress resistant • most punctual • with relatively deep digital knowledge 	<ul style="list-style-type: none"> • relatively low resoluteness • moderate flexibility • moderate self confidence • lower level of purposefulness • not stress resistant • least precise • lower digital knowledge
The Indecisive (Introverted, ‘phlegmatic’ type)	The Courageous (More extroverted, stronger self-assessment, sanguine/irascible type)	The Sensitive (gloomy type)

Source: own calculation, based on the 2017 competence survey

4. Conclusion

The changing environment presents new challenges to both the educational institutions and the labour market participants in a modernised economy; as a result, it was not by chance that the **requirement of competence measuring in higher education** became the focal point of the implementation of the Hungarian government’s “1359/2017 Mid-term Policy Strategy of Gear Shift in Higher Education, Action Plan 2016-2020” strategy, which could provide a good basis for the following:

- knowledge of the competence set of incoming students,
- definition of the competences to be developed and specification of the directions of individual development, recommendation of developing courses,
- elaboration of innovative training methods and solutions aimed at quality improvement,
- follow-up of the students, as the survey of the output competences of those leaving education can be compared to the results of the input measuring,
- establishment of career cooperation between universities and labour market participants, within the framework of which the student can be recommended with more detailed background information,
- strengthening the labour market value of the students.

We tried to adapt the pilot competence measurement system primarily to the expectations of the labour market, but we also studied several theoretical models and survey methods to design a soft skill-centered system of competence measurement. We indicated four focal areas for the pilot competence measurement: relationship management, mental, self-management, communication and digital competences. We presented the results of the first measuring year in this present study.

We plan to present the experiences of all the four years in further publications, as well as ultimately, a fine-tuned final version of the survey and its attendant methodology. This measurement system can be a key link between the university and the labour market actors, and it can support the value-creating activities of both parties.

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