Application of Soft-Skills Competence
in Practice (Practice vs. Students)

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INTRODUCTION

In general, the current labour market dynamics are causing a major change in the original orientation of higher education. To have competence means that a person possesses a set of interrelated knowledge, skills, abilities, and attitudes, which enables them to successfully handle various life (personal, work, social) situations. The acquisition of key competences is not only a matter of the individual's personal efforts and efforts but also requires favourable conditions in the social and economic environment (Markechova et al., 2011). It is clear from the above that there is a link between quality work and competences with the possibility of great impact not only on the educational process.

In the academic year 2018-2019, we conducted research at the Technical University in Zvolen, which focused on the evaluation of practice requirements for knowledge competencies of graduates of technical universities. Relevant areas of soft-skills assessment were specified for the analysis of knowledge competencies of university graduates of technical studies. The questionnaire survey method was conducted within the research. Two groups of respondents were addressed – enterprise respondents who evaluated the expected (or required) and actual state of competencies of university graduates and current university students who assessed their own level of knowledge in the specified areas.

The starting point to design technical or professional areas of graduate´s evaluation was the assumption that the basic requirement of employers in the employment of university graduates is an excellent knowledge of computer applications and work with information technologies. As with the assessment of soft skills, the future employers assessed the competences which are expected of graduates from the technical university, and the knowledge actually achieved by newly recruited employees – graduates of the technical university.

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LITERATURE REVIEW

Competence is understood as the penetration of acquired knowledge, acquired skills, skills forming attitudes, value orientation, motives for action. Competence is a behavior (activity, complex of activities) that characterizes excellent performance in a certain area of activity. Competence has the ability to develop continuously, so it can be the basis of lifelong learning and personal flexibility of the individual (Armstrong 2012, Tavodova 2009).

Soft skills are interpersonal competences for effective communication, persuasion, empathy, teamwork, organizing, negotiating and others (Baron 2000). Some authors characterize soft skills as non-technical skills, characteristics and abilities that are necessary for working in the working environment (Cierna et al., 2015, Katz 2020). Kevin Capuder (2012) confirms the importance of soft skills. While soft skills are a prerequisite for recruitment, special training is provided elsewhere. This type of training covers from non-verbal communication, conflict resolution to teambuilding, i.e. everything necessary to acquire soft skills. The great role of teambuilding in learning or improving the soft skills gas been confirmed. Robles (Robles 2020), who indicates the soft skills research from the point of view of various HR agents, presents similar soft skills and describes in his list ten most important soft skill necessary for the contemporary world of work. Originally, the list contained more than 600 skill, but gradually it was categorized and limited to 25.

Based on the previous literary research (Arnold et al., 2007, Banhard et al., 2001, Bradbery et al., 2007, Drucker 2002, Fobel et al., 2019, Habek et al., 2019, Hitka and Lorincova 2016, Khelerova 2010, Simanova and Gejdos 2019, Sujova et al., 2019, Stefkova 2016, Suler 2008), the soft – skills competences were chosen which are important, in our opinion, in positions occupied by graduates of technical university studies. The following eight areas of soft skills were specified for the analysis: creative thinking, teamwork, time management, communication, assertiveness, stress resistance, organizational skills and competences, conflict resolution. Subsequently, from the perspective of future employers, the knowledge competences that employers expect from graduates of the technical university as well as the knowledge that newly recruited employees – graduates of a technological university actually achieve, were evaluated.

MATERIALS AND METHODS

The aim of the research was to assess the requirements of practice for knowledge competencies of graduates of technical universities. The method of questionnaire survey which is standardly used for so oriented research objectives, was chosen for the execution of the research. There were two target groups of the questionnaire: respondents from companies who described the expected (or required) and actual state of competences of university graduates, and current university students who evaluated their own level of knowledge in the specified areas.

Questionnaire research method

The purpose of the questionnaire research was to gain an overview of what knowledge of a student or a graduate of a technical university, is necessary for its successful employment in practice, or what competencies of the graduates need to be improved (Sujova et al., 2019). The addressed sample of respondents consisted from students of technically oriented study programs from the Faculty of Technology and the Faculty of Wood Sciences and Technology, Technical University in Zvolen. The results of the questionnaire were used for research purposes of the APVV and KEGA projects. The aim of our research was to analyze and compare the level of education provided in the relevant areas – soft skills. The following sequence of steps was chosen to carry out the research:

1. Defining the soft skill areas.
2. Questionnaire design.
3. Random choice of respondents and their demographic characteristics specification.
4. Evaluation of the results of the questionnaire research.

Specification of soft-skills areas

Based on the literature review (Baron 2000, Khelerova 2010, Suler 2008), selected soft skills competencies, which we consider to be the most sought-after and relevant in the positions occupied by graduates of technical university degree. The following eight areas of soft skills were specified for the analysis:

1. Creative thinking,
2. Team cooperation or team work,
3. Time management,
4. Communication,
5. Assertiveness,
6. Stress resistance,
7. Organizational skills,
8. Dealing with conflicts.

Considering the soft skills assessment from the point of view of the practice or future employers, the competences which were assessed were those: 1. the employers expect the graduates of technical universities to have 2. the newly recruited employees – the technical university graduates actually have.

Enterprise questionnaire design

The questionnaire for evaluating the practice requirements for the knowledge competencies of graduates of technical universities was divided into four parts. The introductory part included addressing the respondent, explaining the research purpose of the questionnaire, emphasizing the feedback for faculties as educational institutions with an emphasis on improving services and ensuring the anonymity of the respondent. Part A of the questionnaire was to find out the basic information about a respondent and the enterprise, the respondent´s work

position, the name of the enterprise, the number of employees in the enterprise. Part B of the questionnaire was aimed at assessing the need for soft skills in graduates of technical universities. It was divided into two parts: 1. assessing the level of soft skills that enterprises expect from graduates of technical universities; 2. evaluation of the level of soft skills actually achieved by newly recruited university graduates. The concept of the questionnaire was based on the definition of relevant areas of soft skills assessment (Sujova et al., 2019). Respondents evaluated the individual areas through the Likert scale of evaluation, which is shown in Table 1. The respondent chose just one statement in each evaluation area, which was represented by the relevant point value in the evaluation of the questionnaire.

Table 1 Likert scale of evaluation

Statement	Excellently developed	Developed very well	Developed well	Developed sufficiently	Not developed
Point value	1	2	3	4	5

STUDENTS 'QUESTIONNAIRE DESIGN

In order to compare the results and find out students' opinion on the quality and applicability of the knowledge gained by studying in the analyzed areas of soft skills, a targeted questionnaire was created in which students assessed their own level of knowledge in the specified areas. In the questionnaire, students were asked about their opinion of soft skills as a part of the educational process in their field of study and their own self-assessment of the achieved level of knowledge. The areas of soft skills as well as the rating scale were the same as in the enterprise questionnaires.

Selection of respondents and specification of their demographic characteristics

The questionnaires were sent to the business respondents (mostly external students) in printed form or electronically by e-mail. In total, the questionnaire was sent to 200 potential respondents – employees of enterprises operating in the Slovak Republic. 155 respondents responded to the questionnaire. The return on the questionnaire represents 77.5%, which we consider to be a successful result. After completion of the questionnaire survey, the demographic characteristics of respondents were specified. The respondents were categorized according to the size of the company according to the number of employees and the job position of the respondent. The evaluation of the replies of the enterprises revealed that 35% of the participating enterprises were large enterprises, 27% were medium-sized enterprises and 38% of the replies represented the evaluation of small enterprises with less than 50 employees. The analysis of respondents shows that the largest share of 65% of respondents was in the position of technical – economic workers (THP), followed by managers with a share of 29%. We believe that the above-mentioned

composition of respondents is very suitable with the respect to the objectives of the research, because mainly THP workers and managers cooperate with newly recruited university graduates and we assume that they are able to best define expectations and reality in soft skills.

Respondents – students of full-time bachelor's and master's studies received questionnaires for completion by teachers directly at the lessons. A total of 132 questionnaires were distributed, of which 100% returned. Of the total number of students, the proportion of students studying at the Bachelor's degree (Bc.) was 55%, the proportion of students studying at Master´s studies (Ing.) was 45%. Students participating in the research studied at the two faculties (Faculty of Technology (FT) and Faculty of Wood Sciences and Technology (DF), at the following study programmers. It was an initial research into the evaluation of soft-skills in enterprises and among students. The research was limited in time to one academic year, resulting in smaller sample of respondents assessed. Of course, in the next phase of the research we plan to collect data for several years, the results will have a stronger explanatory power.

STATISTICAL METHODS OF THE RESEARCH

In order to select a suitable method of mathematical induction, the data obtained from the questionnaires were first tested for normal distribution. We chose the Shapiro-Wilk test of the many tests that statistical software currently provides (Ostertargova 2012). Based on the results of the Shapiro-Wilk normality test, it can be stated that our assumption that the samples (soft-skills rated by enterprises and soft-skills rated by students) do not follow the normal probability distribution was confirmed. For this reason, the tested variables are considered to be nonparametric. Subsequently nonparametric testing using statistical induction methods, namely Mann-Whitney U-test was used to investigate the significance of the difference between expected and actual state of competences. The decision was also supported by the fact that our variables are at the ordinal level of measurement.

Nonparametric Mann-Witney U-test

The Mann-Whitney test of significance is an especially appropriate test when two independent and randomly selected sets of sample observations are at least ordinal-level; that is, the data must be such that they can be ranked from low to high (or high to low). The purpose of the test is to determine whether or not the two independent samples come from the same population. U-statistics is a simple function of totals of the ranks. It can be shown that the Wilcoxon sum test for two independent samples and the Mann-Whitney U-test are equivalent. The only difference between the two tests is that the Mann-Whitney U-test has two test statistics in the form:

$$U_1 = n_1 n_2 \frac{n_1(n_1+1)}{2} - T_1 \tag{1}$$

$$U_2 = n_1 n_2 \frac{n_2(n_2+1)}{2} - T_2 \tag{2}$$

The conclusion of the test is based on an assessment of whether the first or second test statistics, or both test statistics, are too small to confirm H_0. For small samples, the smaller computed U value is used in making the decision to either reject or accept the null hypothesis; namely, that there is no difference in the distribution between the two samples. The values of U_1 and U_2 statistics are interrelated, and according to (2), only one of them can be calculated, while the other stands for:

$$U_2 = n_1 \, n_2 - U_1 \tag{3}$$

The sum of $U_1 + U_2$ is equal to $n_1.n_2$ since $U_1 + U_2$ is constant for the tested samples, a small value of U_1 means a large value of U_2 and vice versa. At approximation by normal distribution with test statistics in the form,

$$Z = \frac{U_1 - \frac{n_1 \cdot n_2}{2}}{\sqrt{\frac{n_1 \, n_2 (n_1 + n_2 + 1)}{12}}} \tag{4}$$

then the mean value deducted in the numerator of the test statistics $\frac{n_1 \cdot n_2}{2}$ equals according to the relation (5) to average of both values of U_1 and U_2. The value of test statistics in the absolute value is the same in case any of the values U_1 and U_2 is used. Then, it does not matter which one is used in the test for the difference between two population medians (Pacakova et al., 2015).

RESULTS AND RESEARCH EVALUATION

The aim of the research was to assess the requirements of practice for knowledge competencies of graduates of technical universities. There were two target groups of the questionnaire: respondents from companies who described the expected (or required) and actual state of competences of university graduates, and current university students who evaluated their own level of knowledge in the specified areas (Sujova et al., 2019).

In the first step, the evaluation results in questionnaires were processed into two databases. The first database contained evaluations of 155 respondents from enterprises for individual evaluation areas in terms of expectations and achieved reality. The second database contained evaluations of 132 respondents – students with statements, which of the so-called soft skills they develop within the educational process in the relevant field of study. Results from data databases were first processed through descriptive statistics. In Excel 2010, frequency tables for each data group were created and based on them, radar charts were processed. Radar charts are a common tool used to evaluate opinions presented by the Likert scale for one or more subjects. The radar chart shows the relative position of the data points relative to the centre. The number of data points (categories) determines the number of value axes (in our research it is 5 degrees of the Likert scale) and the point value then indicates its distance from the center of the graph. Each category has its own center of values. Separate radar charts were created for each area of soft-skills, comparing expectations with reality. The research results were evaluated in STATISTICA (VERSION 10). Since the Shapiro-Wilk test confirmed that the distribution of our

variables was not normal and the data from the questionnaires were ordinal variables, in the second step of mathematical statistical analysis, non-parametric testing by means of the Mann-Whitney U-test was used to test the significance of the mean difference. Used table data are presented in a modified form, box plots are presented in the original format. A significance level of α = 5% was used in all tests.

Research results on soft skills for the stress resistance area in enterprises
Table 2 shows summarized results from questionnaires using descriptive characteristics – absolute and relative frequency for stress resistance area. Individual assessments are characterised by Likert scale for expected (OS) and actual (SS) states.

Table 2 Descriptive statistics parameters for the area of stress resistance

Stress resistance	Expected state – OS		Actual state – SS	
Likert scale	Frequency	Relative frequency %	Frequency	Relative frequency %
1	45	29,1	8	5,5
2	51	32,7	56	36,3
3	22	14,5	54	34,5
4	8	5,5	25	16,4
5	29	18,2	12	7,3
Total	155	100	155	100

Source: (Sujova et al., 2019)

The radar chart in Fig. 1 shows relative frequencies (RP) of individual ranks of the Likert scale for stress resistance area.
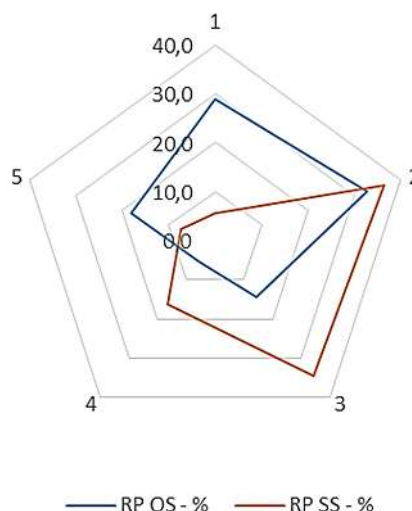

Fig. 1 Radar chart of relative frequencies for Likert scale ranks for the area of stress resistance area by expected (OS) and actual (SS) states
Source (Sujova et al., 2019)

By comparing the graphs for the expected (OS) and the actual states (SS) of the relative frequency of individual ratings for stress resistance, it can be

concluded that there are considerable differences between ratings. To confirm the hypothesis about the significance of the difference between the expectations of practice and actual knowledge of graduates, the Mann-Whitney U-test shall be used to test our results.

MATHEMATICAL STATISTICS FOR THE AREA OF STRESS RESISTANCE

In order to test the significance of the difference between the expected and the actual states of soft skills competencies for graduates of technical faculties, nonparametric testing of the Mann-Whitney U-test was chosen. The test results for the stress resistance area are shown in Table 3.

Table 3 The Mann-Whitney U-test results for the area of stress resistance

Variable	Mann-Whitney U-Test Significance level $p < 0.05$						
	Sum of ranks OvS_OS	Sum of ranks OvS_SS	U – value of tested criterion	Z – modified value of tested criterion	p-value	N valid OvS_OS	N valid OvS_SS
Stress resistance	2727.50	3377.50	1187.50	**-2.006**	**0.045**	155	155

Source: (Sujova et al., 2019)

Based on the test results and the p-value (p = 0.045), the null hypothesis is rejected and incline to the alternative hypothesis that there is a statistically significant difference between the expected and actual states of soft skills assessment. The box plot shows the results of respondents' evaluation (Fig. 2).
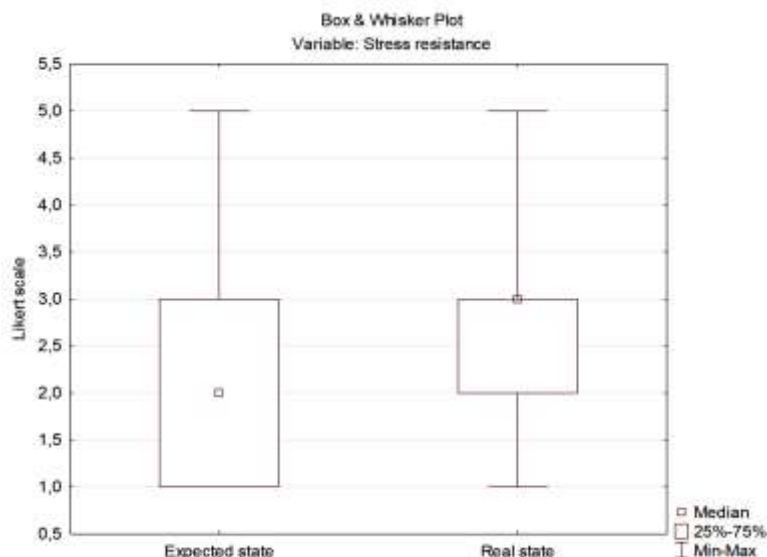

Fig. 2 Box plot for the variable of stress resistance

Source: [21]

The box plot in Fig. 2 shows:

- 25 to 75% of all respondents' assessments in the area of stress resistance for the expected state are within 1-3 of Likert scale corresponding to the 2nd and 3rd quartiles,
- the median for the expected state of stress resistance is 2.0 which corresponds to a very well developed area of soft skills,
- 25 to 75% of all respondents' assessments in the area of stress resistance for the actual state are within 2-3 of Likert scale corresponding to the 2nd and 3rd quartiles,
- the middle value, for the actual state of stress resistance is 3.0 which is a well-developed soft skills competence.

DISCUSSION AND CONCLUSION

From the results presented in the previous chapter we can state that the biggest differences in the area of soft skills were recorded just in the resistance to stress (expected vs. actual state) by the companies. The results of testing the significance of the difference between the expected and actual states of competencies assessed by enterprises bring us to the conclusion that there is a provable significant difference in the area of stress resistance.

Increasing demands on the efficiency and effectiveness of business entities are inevitably generating efforts to introduce improved management systems that take into account a number of rules and documents, thus changing labour market requirements. Employers ' demands on candidates' expertise change, with the individual personality of each candidate coming to the forefront. These are features that are not usually included in qualification training.

At present, several dozen qualified graduates with the same or similar educational background often apply for a job. What gives one candidate an advantage over others is the added value showed by various professional certificates presenting hard-skills or one´s interpersonal skills represented by soft-skills. Its added value can be candidate´s ability to respond flexibly and efficiently to these parameters before the first contact with a future employer, the ability to conduct successful negotiations with supervisors, subordinates and colleagues, business partners or customers, or the ability to lead a team or to take a back seat and participate in team´s work and others.

Having the required level of competence for the current demanding labor market at a professional level means for technical universities also to focus on areas that experience is insufficient by graduates. One of them is the development of competencies in the field of soft skills.

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Abstract: The paper deals with application of soft-skills competence in practice comparing of education and employers requirements. In addition to what a graduate is to know in terms of the knowledge theoretically acquired, the labour market today defines quite clearly the specific requirements in terms of what a graduate should be able to do, provide for, organize, including the demands related to their competences. The purpose of the paper is to assess the ethical credibility of selected subjects in the field of soft skills based on the analysis and conclusions of research conducted in 2018-2019 at the Technical University in Zvolen. The method of questionnaire survey was chosen for the execution of the research. The paper presents the results of the selected area research of soft-skills, which showed the most significant differences – stress resistance. To evaluate the results was used the Mann-Whitney test of significance which is an especially appropriate test for two independent and randomly selected sets of sample observations. At the end of paper are proposed recommendations for improving teaching in accordance with the requirements of practice.

Keywords: soft-skills, competence, time management, teamwork, communication, stress resistance