

Soft Skills' Evaluation in Textile Engineering and Design

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Abstract

There is a growing awareness of the importance of higher education to produce highly skilled graduates that will be able to respond to complex needs of their workplace. The aim of this study is to gain insight into the perception of students to the soft skills that are important for their future profession and successful entrance into the labour market. Furthermore, the intention is to compare the perception of soft skills' importance among three different student groups that study at the same faculty, according to quite different curricula and their own current soft skills.

Introduction

There is a growing awareness of the importance of higher education to produce highly skilled graduates that will be able to respond to complex needs of their workplace [1-3]. The concerns have been expressed regarding the gap between the hard skills and soft skills that students obtain during their education [4]. Therefore, the significant effort in a number of studies is given to the popularisation and recognition of soft skills. Soft skills are extremely important due to the fact that they help people to adapt and behave positively so that they can deal effectively with the challenges of their professional and everyday life.

There is a number of existing projects dealing with soft skills, either among students, participants of VET or employed/unemployed individuals. The project ModEs [5] indicates relevant weaknesses in the reform of the curricula in order to tailor them with the requests coming from the labour market. On their opinion, one of ways to increase the soft skills among students is to develop a prototype of serious games on soft skills. The project MASS [6] outlines importance to use different approaches. According to the named project, it was very important for each partner to use the assessment method that best suites the group. A variety of approaches were collected, which can be used as a base for an adaptable system for many types of institutes and audiences. The results of survey in project E-QUA [7], that maps the various models of mobility in Europe, give exact situation regarding the soft skills on European universities. It was shown that only eight out of twenty-eight universities offer a soft skills development programme. All of them provide the development programme for both local students and incoming mobility students. The developed skills are mostly operative skills, intellectual/practical/relational/managerial skills, personal skills and thought skills. Furthermore, only 50% of incoming mobility students receive a formal acknowledgment of the soft skills programs that could be recognized once back in their home country. In the project „Soft skills - improving professional competence and management“ [8] is also defined a significant lack of training in soft skills. At the same time, if they exist, they are too expensive or physically out of reach of most SMEs. Therefore, the authors realized the importance of delivering a full range of training materials for free to as many European organizations as possible that can be used to improve the skills of European professionals.

From their experience, it is useful to unit grouped materials by module/group of skills they belong to. The project DAISS [9] also supported many unemployed adults in 6 EU countries to gain greater self-awareness in terms of their soft skills. They also supported recognition of the need to develop these skills and competences to meet the needs of an increasingly competitive labour market. As a result of project activity, is evidenced a number of new collaborations where VET providers and employers have worked together. Project NESSIE [10] brings up a list of poor skills that are linked to a range of labour market problems: high staff turnover/difficulty recruiting (particularly in the young), lack of ability to compete, inability to cope with change, reasons for staff dismissal and problems in school. In the CREDNET project [11], that deals with accreditation of managerial skills, is defined one major common problem among partner countries: the absence of a comprehensive national policy for the certification of skills acquired through non-formal and informal learning. As far as these certifications are not recognised by other states, similar initiatives would remain pilot. The analysed countries (Greece, Italy, Rumania, Latvia, Cyprus, Poland, Slovenia) don't have very well-established systems for validation of non-formal and informal learning, but they have recently introduced appropriate measures, or are in the process of doing so.

The aim of this study is to gain insight into the perception and attitude of students to the soft skills that are important for their future profession and successful entrance into the labour market. Furthermore, the intention is to compare the perception of soft skills' importance among three different student groups that study at the same faculty, according to quite different curricula.

Method

In the survey participated the following three groups of students of master's degree levels at the University of Zagreb, Faculty of Textile Technology:

- textile technologists (dominantly technical courses in their programme),
- textile designers (dominantly artistic courses in their programme) and
- industrial designers (both technical and artistic courses in the programme).

The research instrument - questionnaire was developed. It consisted of 14 questions. The aim of the survey was to gain insight into the perceptions of the most important soft skills for the future employment in the domain of textile technology and design.

For the preparation of questionnaire were used the outcomes of previous projects, regarding the list of most important soft skills [5, 6]. In the questionnaire is included set of 30 personal, social and methodological soft skills and students were asked to rate their perception of importance of each listed skill for the success in employment and work. For the questionnaire was used bipolar 5 - level Likert scale with following responses: 1- strongly disagree, 2- disagree, 3 - neither agree nor disagree, 4 - agree, 5 - strongly agree. In the first section of questionnaire, respondents were also asked to provide personal information regarding their socio-economic characteristics (age, gender, school they completed before enrolment at University, etc.), their work experience, current employment status, hobby, foreign language knowledge, driving license and awards.

Statistical analysis was made in software STATISTICA conducting methods of descriptive statistics for socio-demographic answers and for questionnaire questions/answers. Two questions encompassed same 30 sub questions/variables. The set of 60 manifest variables was analyzed using 5-point Likert-type scale, so that this paper brings insights into the basic antecedents of soft skills by selected population. Further, multivariate data analysis, i.e. first factor analysis (FA) is proceed separately over two criteria questions, and then with 60

variables (soft skills) to examine the variables. It should be mentioned here that, because of relatively small sample size, the final results are going to be just indicative.

Findings and Discussion

Socio-demographic characteristics of the convenient sample consisted of MA design students, studying in academic year 2013/2014., at University of Zagreb, Faculty of Textile Technology, are shown at Table 1.

Table 1. Frequencies and percentages of socio-demographic characteristics of the sample

Survey question	Variable	Frequency	Percentage
Study module-group	textile technologists	5	15,63
	industrial designers	5	15,63
	textile designers	22	68,74
Age of respondents	21	2	6,25
	22	5	15,63
	23	12	37,50
	24	6	18,75
	25	5	15,63
	26	2	6,25
Gender	female	32	100,00
	male	0	0,00
School finished	professional school	16	50,00
	gymnasium	13	40,63
	art high school	3	9,38
Professional school	service occupation	10	31,25
	manufacturing occupation	4	12,50
	missing specification	2	6,25
Work experience	yes	29	90,63
	no	3	9,38
Current work status	student - unemployed	28	87,50
	student - employed	1	3,13
	student – part time jobs	3	9,38
Hobby	yes	11	34,38
	no	21	65,63
Type of hobby practicing	aerobic	1	3,13
	drawing	3	9,38
	making art jewellery	1	3,13
	sport	5	15,63
	sewing and drawing	1	3,13
Number of foreign languages	one foreign language	29	90,63
	two foreign languages	3	9,38
Foreign languages	English	32	91,43
	German	1	2,86
	French	2	5,71
Driver's license	yes	28	87,50
	no	4	12,50
Awards or rewarded result	yes	1	3,13
	no	31	96,88

The average grades given by three groups of students (technologists, industrial designers and designers) are shown on the figure 1.

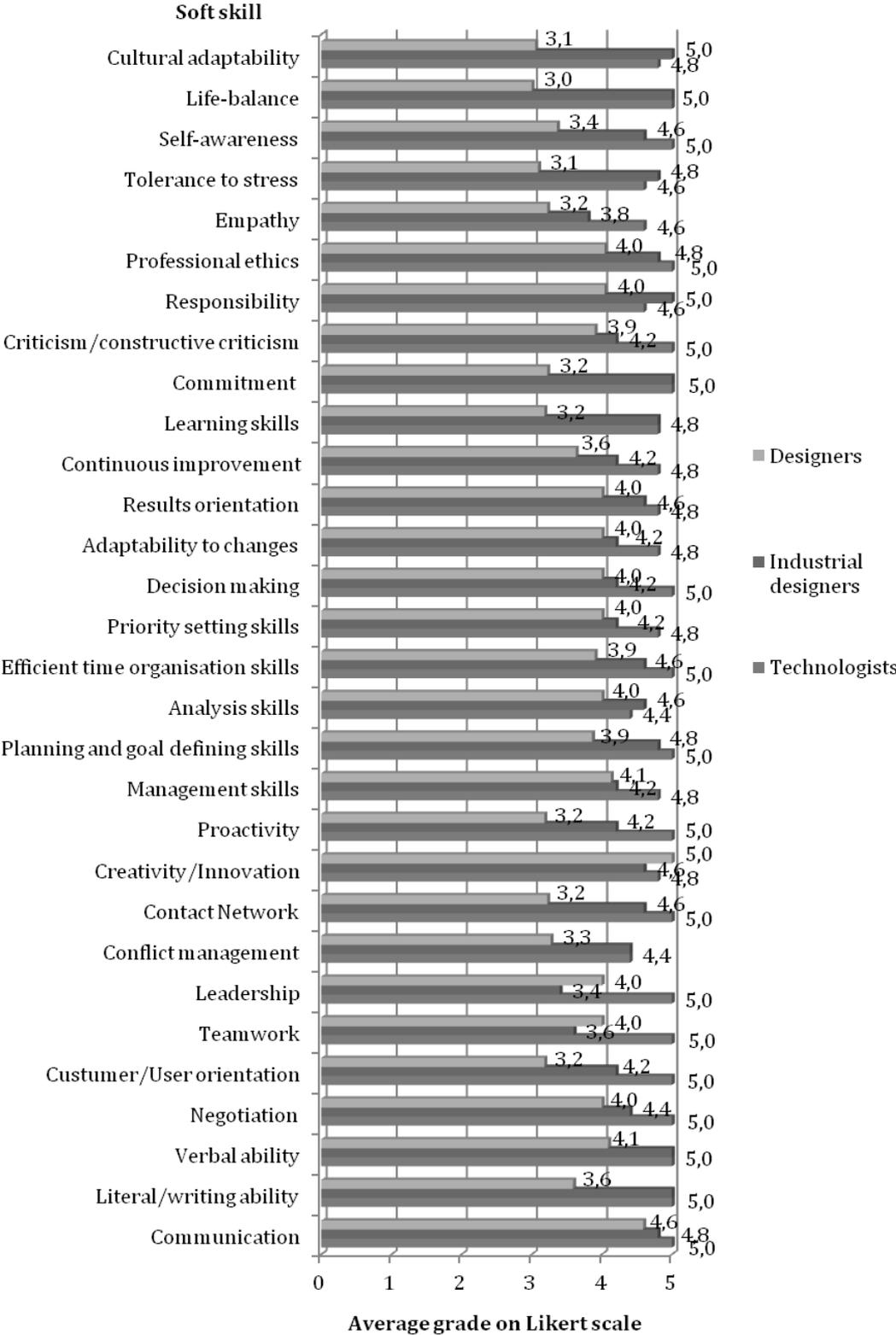


Fig. 1. Average grades on Likert scale given by three groups of students (technologists, industrial designers and designers)

The results of the survey indicated differences in the perception of most and least important soft skills among different groups of students.

Regarding the definition of skills which all students consider most important for employment and work (graded with highest rate by all students in the group), students of textile technology indicated a majority of skills – life-balance, self-awareness, professional ethics, criticism, commitment, decision making, efficient time organisation skills, planning, proactivity, creativity, contact network, leadership, teamwork, customer/user orientation, negotiation, verbal ability, writing ability and communication. In contrast to this, textile designers indicated only one important soft skill – creativity. Students of industrial design indicated three methodological soft skills – commitment, life balance and culture adaptability.

Regarding the skills that are considered least important, the students of textile technology did not point out at any. The interesting fact is that textile designers indicated a number of skills, mainly those that were indicated as most important by textile technologists. Industrial designers pointed out leadership, management skills, decision making, results orientation and continuous improvement.

The results obtained from each group of students indicated high consistency of perception within each group. Taking into account the average grades given by each of three observed groups, a list of most and least important skills is defined. On the top of the list of most important skills is creativity. It is followed by communication, verbal ability, professional ethics and planning and goal defining skills. The least important skill is leadership and furthermore conflict management, proactivity, customer/user orientation and leadership.

Using factor analysis - method of principal components, at 30 variables (i.e. soft skills that are observed) were extracted 3 factors explained by eigenvalues unrotated: F1 - 12,527, F2 – 8,395 and F3 – 1,448. Factors loading with varimax rotation - raw follow in table 2.

Loadings higher than 0,7 describe each factor (in this case - importance of soft skill), i.e.:

- F1 – is represented by Life-balance/self-control skills, Cultural adaptability/ tolerance, Commitment to work/organization skills, Professional ethics, Planning and goal defining skills, Tolerance to stress/ stress solving ability, Responsibility, Learning skills, Self-awareness, Literal/writing ability, Costumer/User orientation, Social/Contact Networking ability, Efficient time organisation skills and Analysis skills. The lowest representation is by management skills, lack of leadership skills and team work skills.
Therefore, F1 represents good, rich and productive professional and personal living skills deliberated of intention to be leader or manager
- F2 – represents Leadership, Effective decision making skills, Team work, Constructive criticism, Management skills, Discussion/Negotiation ability, Priority setting skills and Adaptability to changes
Therefore, F2 represents focused leadership and managerial skills.
- F3 – Communication (0,79), followed by Creativity/Innovation (0,45) and ending with negative overall management skills.
Therefore, F3 represents open communication and creative skills, quite opposite from F2.

Table 2 Factor analysis for importance of soft skill – loadings of variables and their rank in each of 3 factors

Type of soft skill	Factor 1	Rank F1	Factor 2	Rank F1	Factor 3	Rank F3
1. Communication	0,260	27	0,201	26	0,793	1
2. Literal/writing ability	0,795	10	0,235	24	-0,169	27
3. Verbal ability	0,549	19	0,241	22	0,157	8
4. Negotiation ability	0,624	16	0,751	6	0,062	15
5. Customer/User orientation	0,737	11	0,488	13	0,166	7
6. Teamwork	0,252	28	0,860	3	0,287	3
7. Leadership	-0,164	29	0,947	1	0,148	9
8. Conflict management	0,619	17	0,398	15	0,018	19
9. Contact Networking	0,735	12	0,475	14	0,141	10
10. Creativity/Innovation	-0,523	20	-0,138	30	0,453	2
11. Proactivity	0,663	15	0,570	12	0,039	18
12. Management skills	0,101	30	0,800	5	-0,177	28
13. Planning and goal defining	0,825	5	0,277	20	-0,106	25
14. Analysis	0,720	14	0,148	27	0,141	11
15. Efficient time organisation	0,722	13	0,311	17	-0,190	29
16. Priority setting	0,323	26	0,706	7	-0,348	30
17. Decision making	0,367	24	0,919	2	-0,031	24
18. Adaptability to changes	0,587	18	0,701	8	0,055	16
19. Results orientation	0,471	22	0,674	9	-0,133	26
20. Continuous improvement	0,331	25	0,616	11	0,196	5
21. Learning skills	0,809	8	0,246	21	0,235	4
22. Commitment	0,864	3	0,230	25	0,014	20
23. Constructive criticism	0,395	23	0,812	4	-0,026	23
24. Responsibility	0,820	7	0,070	29	0,107	13
25. Professional ethics	0,853	4	0,304	18	-0,014	22
26. Empathy	0,505	21	0,668	10	0,174	6
27. Tolerance to stress	0,823	6	0,124	28	0,070	14
28. Self-awareness	0,808	9	0,319	16	0,133	12
29. Life-balance	0,932	1	0,286	19	0,043	17
30. Cultural adaptability	0,900	2	0,241	23	0,011	21
Eigenvalue/Expl.Var.	12,527		8,395		1,448	
Prp.Totl	0,418		0,280		0,048	

Using the same principle, factor analysis was performed for at the same 30 variables, regarding the personal current level of soft skills. Three- factor analysis with varimax-raw rotation follows in table 3.

Table 3 Factor analysis for the personal current level of soft skills – loadings of variables and their rank in each of 3 factors

Type of soft skill	Factor 1	Rank F1	Factor 2	Rank F1	Factor 3	Rank F3
1. Communication	0,455	13	0,063	27	0,108	25
2. Literal/writing ability	0,522	11	0,176	20	0,408	7
3. Verbal ability	0,639	8	0,439	11	-0,168	20
4. Negotiation ability	0,705	4	-0,195	18	0,026	29
5. Customer/User orientation	0,684	5	-0,103	24	0,504	6
6. Teamwork	-0,083	24	0,389	13	0,537	4
7. Leadership	-0,535	10	0,219	16	-0,271	11
8. Conflict management	0,581	9	0,510	9	0,302	9
9. Contact Networking	0,221	19	-0,099	26	0,254	14
10. Creativity/Innovation	-0,870	2	-0,052	29	0,071	28
11. Proactivity	-0,272	17	0,494	10	-0,255	13
12. Management skills	-0,155	21	0,101	25	-0,163	22
13. Planning and goal defining	0,643	7	-0,138	21	0,206	17
14. Analysis	-0,294	16	-0,034	30	0,190	18
15. Efficient time organisation	0,781	3	0,219	15	0,099	26
16. Priority setting	0,233	18	0,693	3	-0,078	27
17. Decision making	0,005	30	0,542	7	-0,179	19
18. Adaptability to changes	0,011	29	0,617	6	-0,127	23
19. Results orientation	0,878	1	0,120	23	0,114	24
20. Continuous improvement	-0,040	26	0,807	2	0,259	12
21. Learning skills	-0,181	20	0,204	17	0,371	8
22. Commitment	0,371	15	0,651	4	-0,003	30
23. Constructive criticism	-0,109	23	0,871	1	0,164	21
24. Responsibility	0,458	12	0,636	5	-0,230	16
25. Professional ethics	0,122	22	-0,320	14	0,239	15
26. Empathy	0,073	25	0,530	8	0,278	10
27. Tolerance to stress	-0,683	6	0,121	22	0,579	3
28. Self-awareness	0,034	27	0,193	19	0,830	1
29. Life-balance	0,397	14	-0,059	28	0,745	2
30. Cultural adaptability	-0,011	28	-0,392	12	0,536	5
Eigenvalue/Expl.Var.	6,360		5,111		3,515	
Prp.Totl	0,212		0,170		0,117	

Again, loadings higher than 0,7 describes each factor loaded from personal current level of soft skill, i.e. representing:

- F1 – by Results orientation ability, non-Creativity/Innovation, Efficient time organization skills and Discussion/Negotiation ability
So, F1 describes utilized market oriented skills.
- F2 – by Constructive criticism and Continuous improvement, followed by Priority setting skills (0,69).
So, F2 represents some kind of adapting, growing process skills inexperienced.
- F3 – by Self-awareness and Life-balance/self-control, and lack of professional management ambition.

Conclusion

The results presented in this paper indicated high differences in the perception of skills' importance among groups and rather high consistency between the perceptions of the students within single group. Considering all opinions, creativity is perceived as the most important skill. At the same time, the empathy is perceived as least important soft skill for the future employment.

The factor analysis indicated three factors that are explained by eigenvalues. The factors represent the following: rich and productive professional and personal living skills, focused leadership and managerial skills and open communication and creative skills.

The results will further be used for the comparison with the employers' perception and furthermore for the development of soft-skills-related pedagogical tools and digital credentials that will map learner's achievements.

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