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ANALYSIS OF SOFT SKILLS IN DUAL HIGHER EDUCATION STUDENTS: PILOT VALIDATION

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Abstract

The main aim of this study was to develop and conduct a preliminary evaluation of an online questionnaire (N = 344) designed to assess ten soft skills. The instrument consisted of demographic questions, items measuring the perceived importance of soft skills in the workplace, and self-assessment items. The psychometric results indicated partly acceptable reliability (Cronbach's α = .79) and item consistency. Although several indicators met conventional thresholds, the overall model fit suggests that further refinement is required to strengthen construct validity. The findings show that students particularly value communication, time management, autonomy, adaptability, and stress tolerance. Self-assessment results indicate relatively high perceived competence in teamwork, communication, critical thinking, creativity, autonomy, adaptability, and stress tolerance, whereas slightly lower proficiency was reported for foreign language skills, presentation skills, and time management. These results are preliminary and exploratory, and additional validation is planned in future research.

1 Introduction

Dual Higher Education integrates academic learning with practical workplace training, emphasizing the development of both technical and soft skills to prepare students for real-world challenges. While technical knowledge is crucial, soft skills play an equally significant role in shaping well-rounded professionals. Special emphasis should be placed on soft skills at universities as there seems to be a gap between the employers' expectations and the university graduates' skills (Varga & Sági, 2024). Companies need employees who can solve problems quickly and creatively (Dragan & Hochrinner, 2024; Dupouy & Bakni, 2024; Halista-Telus, 2023; Laukkanen et al., 2024; Merlo et al., 2023; Montalto & Agius, 2023; Sági & Fülöp, 2024; Turk, 2023; Viklund & Elgundi, 2024).

Soft skills offer a lot of benefits. They contribute to career advancement since strong communication, leadership, and teamwork skills increase job opportunities, promotions and support better working relationships. Effective communication and empathy enhance customer satisfaction and brand reputation. Employees with strong collaboration skills contribute to a more productive and harmonious workplace. Therefore, employers benefit from the workers' advanced soft skills. Good interpersonal skills create a positive work environment, reducing stress and burnout. In addition, good interpersonal skills encourage cooperation, and promote social harmony (Chamorro-Premuzic et al., 2010).

Problem-solving and creativity help individuals navigate career changes and challenges, and they lead to higher efficiency (Doherty & Stephens, 2023). Interpersonal skills and empathy help build meaningful personal and professional relationships since they increase adaptability. Leaders

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with advanced social and conflict resolution skills drive teams toward success. A society with skilled professionals fosters economic growth and innovation. Empathy and integrity in leadership contribute to fair policies and sustainable development. Soft skills play a crucial role in shaping a more efficient, connected, and prosperous world (Goleman, 2008).

1.1 Definition of soft skills

The term soft skills entail a range of non-technical skills that relate to how individuals work and interact with others. Soft skills have different names in literature e. g., 21st century skills, transversal skills, future workplace skills (Cimatti, 2016). Emotional intelligence and soft skills are also commonly employed concepts (Ricchiardi & Emanuel, 2018). Bandura's social learning theory emphasizes the importance of observational learning where individuals acquire knowledge, skills, attitudes, and beliefs by watching the actions of others and the outcomes of those actions, ultimately leading to the modelling and internalization of those observed patterns (Bandura, 1986).

There are different definitions of soft skills in literature. Soft skills are non-technical interpersonal and behavioural skills that enable individuals to communicate, collaborate, and adapt effectively in different environments. The workplace-oriented definition emphasizes the personal attributes and social abilities that help employees interact productively with colleagues, customers, and management, such as teamwork, communication, and problem-solving (Cimatti, 2016). The psychological definition postulates that soft skills are cognitive and emotional intelligence-based abilities that influence how individuals perceive, respond to, and engage with others in various social and professional settings (Stankevičiūtė et al., 2024). From an educational perspective soft skills are transferable skills that go beyond academic knowledge, including leadership, adaptability, and critical thinking, essential for lifelong learning and career success (Marin-Zapata et al., 2022). In the field of business and management soft skills are crucial human-centred competencies that drive workplace efficiency, leadership, and organizational success by fostering collaboration, innovation, and positive company culture. In sociology, soft skills are social behaviours and communication techniques that facilitate cooperation, conflict resolution, and relationship-building within communities and organizations. Soft skills are related to personal development. They encompass self-management, emotional intelligence, and interpersonal skills that contribute to an individual's personal growth, confidence, and ability to navigate life challenges (Sokhanvar et al., 2021).

Models of soft skills identify several soft skills. The Big Five Personality Traits Model (OCEAN Model) categorizes personality traits that influence soft skills development: openness (creativity, adaptability, and curiosity), conscientiousness (organization, reliability, self-discipline), extraversion (social interaction, teamwork, and leadership), agreeableness (empathy, cooperation, and conflict resolution), and emotional stability including stress management and resilience (De Raad, 2000). The Big Five is a personality model, it describes tendencies not teachable competencies. Also, it lacks specificity, for example, agreeableness might imply communication, but necessarily conflict resolution or presentation skills.

The Emotional Intelligence (EQ) Model affects personal and professional success. It consists of self-awareness that is understanding one's emotions, self-regulation that is controlling impulses and emotions, motivation, inner drive to achieve goals, empathy which means understanding others' emotions and social skills which promote effective communication and conflict resolution (Goleman, 2008). Emotional intelligence model is often criticised for conceptual ambiguity. There is no single, universally accepted definition. Also, there are measurement issues since self-report tools are prone to social desirability. EI often overlaps with personality, empathy, or even general intelligence.

Soft Skills Competency Models focus on workplace requirements. This model concentrates on interpersonal skills, decision-making, analytical skills, adaptability, resilience, work ethic and professionalism. The competency model plays a key role in closing skill gaps between employers' expectations and employees' skills by aligning workforce capabilities with organizational objectives; therefore, it contributes to shaping a sustainable society (Sá & Serpa, 2022). One of the weaknesses of the model is the lack of conceptual clarity. Additionally, the concepts included in the model are difficult to measure objectively.

Interestingly, the soft skills included in the top skills forecast for 2025 of The World Economic Forum highlight different skills from the above-mentioned ones: analytical thinking and innovation,

active learning and learning strategies, complex problem-solving, critical thinking and analysis, creativity, originality and initiative as well as leadership and social influence, technology use, monitoring and control, technology design and programming, resilience, and tress tolerance (Vera Millalén, 2023). A substantial number of soft skills are included in the model, but there is a conceptual ambiguity that makes the assessment difficult since the dimensions defined loosely.

1.2 Methods for assessing soft skills

Measuring soft skills can be challenging due to their subjective and intangible nature. To address this, both quantitative and qualitative methods have been developed to evaluate these skills systematically. Quantitative methods focus on numerical data and statistical analysis to assess soft skills. These methods provide standardized and objective measurements (surveys and questionnaires), making them suitable for large-scale assessments and comparisons (Ricchiardi & Emanuel, 2018). Quantitative methods also involve structured tests, such as problem-solving exercises or role-playing scenarios which can be used to test a conflict resolution. In addition, digital tools, online tests, questionnaires, and artificial intelligence might be applied to analyse communication patterns, body language, and voice tone (Emanuel et al., 2021). These tools provide quantitative metrics on factors like emotional intelligence or adaptability during interviews or interactions. Quantitative methods are suitable for extensive applications. However, they may oversimplify complex behaviours, they often rely on self-reported data, which can introduce bias, moreover, they lack context and depth in understanding individual behaviours.

On the other hand, qualitative methods emphasize understanding the context, experiences, and behaviours that underpin soft skills. These methods incorporate structured or semi-structured interviews, observations, case studies, portfolios and focus groups, which enable evaluators to explore an individual's experiences and behaviours (Chiu, 2024).

1.3 Challenges in the assessment of soft skills

Assessing soft skills in higher education presents significant challenges due to their subjective and context-dependent nature. Unlike technical skills, which can be measured through exams and practical tasks, soft skills require different assessment approaches. One of the primary challenges in assessing soft skills is their subjective nature. Unlike technical competencies, soft skills such as communication, leadership, and adaptability lack clear-cut measurement criteria. Standardized assessments that effectively capture that these skills are still evolving (Ponmalar et al., 2018).

Soft skills involve qualitative attributes that are challenging to quantify. Soft skills are often situation-dependent, meaning their effectiveness varies based on the context. A student might demonstrate excellent teamwork in one setting but struggle in another. This variability complicates assessment, as performance in one scenario does not always translate to overall proficiency.

Assessing soft skills requires more time and effort compared to traditional exams. Role-playing exercises, case studies, and feedback-driven assessments demand extensive observation and analysis, which can strain faculty resources (Cimatti, 2016). Many institutions struggle to implement comprehensive soft skill assessments due to these constraints. Students often perceive soft skill assessments as subjective and less important than technical evaluations. Additionally, educators may lack training in assessing these skills effectively, leading to inconsistencies in implementation. Overcoming this resistance is essential for integrating soft skill assessments into higher education effectively.

1.4 Roles of soft skills in different learning and working environments

Effective communication is essential for students in dual higher education as they navigate both academic and workplace environments. Strong verbal and written communication ensure clarity in expressing ideas, collaborating with peers, and interacting with supervisors. Presentation skills and foreign language skills also promote fulfilling the employees' career goals. Additionally, active

listening helps students understand instructions and feedback, improving overall performance (Iksan et al., 2012).

Teamwork is a fundamental soft skill in dual education, as students often work in groups during academic projects and within professional teams at the workplace (Prada et al., 2022). Learning to collaborate effectively, respect diverse opinions, and contribute meaningfully to group tasks foster a cooperative work ethic that is essential for career success (Kónyi et al., 2023).

Balancing academic coursework with workplace responsibilities requires adaptability. Students must adjust to different environments, work under various management styles, and respond to new challenges quickly. Flexibility in handling unexpected changes or shifting priorities ensures they remain efficient and productive (Emanuel et al., 2021). Autonomy is a crucial skill at workplaces. Having autonomy means being able to work independently, make decisions, and take responsibility for tasks without constant supervision. It boosts productivity, employees who manage their own time and tasks efficiently get more done. Autonomy increases job satisfaction. People feel more engaged and motivated when they have control over their work (Caeiro-Rodríguez et al., 2021).

Managing time effectively is crucial in dual higher education since students juggle multiple responsibilities. Prioritizing tasks, meeting deadlines, and maintaining an organized schedule help prevent burnout and improve efficiency. Developing these skills early on prepares students for future professional challenges where time management is a key factor in productivity.

Students in dual education programs encounter real-world problems that require critical thinking and problem-solving skills. Analysing situations, evaluating practical solutions, and making informed decisions contribute to their ability to handle workplace challenges effectively. These skills also enhance their ability to innovate and improve processes in their professional roles (Guzm et al., 2023).

Creativity in the workplace is not just about artistic skills; it is about thinking outside the box, solving problems, and producing innovative ideas. Creative employees contribute to innovative ideas, products, and processes that improve efficiency and competitiveness. Creativity helps with problem-solving. Thinking creatively allows employees to tackle challenges in a unique way (Sá & Serpa, 2022).

Understanding and managing emotions, as well as recognizing the emotions of others, are essential for maintaining healthy professional relationships. Emotional intelligence helps students navigate workplace dynamics, resolve conflicts, and build strong interpersonal connections, contributing to a positive and productive work environment (Marin-Zapata et al., 2022).

The existing literature suggests that most available tools are tailored to specific learning environments and typically do not assess both perceived importance and self-assessment at the same time. For this reason, we decided to develop a new instrument tailored to dual higher education.

2 Methodology

2.1 Objectives

The primary aim of this study is to create and conduct a preliminary evaluation of an online instrument to assess various aspects of soft skills in dual higher education. Our research questions are related to the instrument, the structure, and dimensions of soft skills.

1. What do the psychometric properties of the questionnaire reveal about the internal consistency reliability and construct validity of the instrument?
2. What relationships and patterns appear related to the importance and self-evaluation of soft skills in the examined sample?

H1: We hypothesize that dual students, as well as those engaged in permanent employment, will attribute greater importance to soft skills and report higher levels of self-perceived competence compared to their non-dual peers.

H2: We hypothesize that students in higher semesters will assign greater importance to soft skills and report higher levels of self-assessed soft skill competence.

2.2 Participants

344 full time students answered the questions: male (N=223), female (N=121). The number of students from different faculties were the following: GAMF Faculty of Engineering and Information Technology (N=206), Faculty of Economics and Business (N=118), Faculty of Horticulture and Rural Development (N=20). Number of dual students (N=58), non-dual students (N=286), students who have a permanent workplace (N=112), students who do not have a permanent workplace (N=232). The respondents were 18–19 (N=58), 20–21(N=193), 22–23 (N=56), 24–25 (N=23), 26 and over (N=14) years of age. Division of students according to semesters: 1st (N=3), 2nd (N=152), 4th, (N=101), 5th (N=1), 6th (N=64) 7th (N=1), 8th (N=12) 9th (N=1) 10th (N=9). We only analysed the data of the 2nd, 4th, and 6th because in other semesters we only had a small number of responses.

2.3 The instrument and the procedures

Microsoft Forms online platform was used to design the questionnaire. The survey was anonymous, and voluntary. Part 1—general questions: We asked the students about their gender, age, the faculty they study at, which semester they spend at the university, whether they are dual students or not, whether they have a permanent workplace or not. Part 2—The respondents indicated how important soft skills are at the workplace. A 6–point Likert scale was employed: 1: not important—6: very important. Ten dimensions of soft skills were selected: teamwork, communication, time management, foreign language skills, presentation skills, creativity, critical thinking, stress tolerance, autonomy, and adaptability (Alt et al., 2023; Escolà-Gascón & Gallifa, 2022).

Part 3—The students were asked to indicate their perception of their level of the skills in each area using the 6–point Likert scale. The students had to evaluate themselves on the following scale: How true are the following statements for you: it is never true (1)—it is always true (6).

The instrument was constructed based on the literature (Table 1). We applied the following models: The Big Five (De Raad, 2000), Emotional Intelligence (EI) (Goleman, 2008), Soft Skills competency Model (Sá & Serpa, 2022), World Economic Forum (Vera Millalén, 2023), WEF, The Future of Jobs Report, 2020, 2025.

Table 1. Models related to the items of the questionnaire

	Big Five	EI	Soft skills competency model	Future of Jobs 2020	Future of Jobs Report 2025
teamwork	agreeableness	social skills	teamwork		cooperation
communication	extraversion	social skills	communication		sociability
time management		self-regulation	time management	self-management	dependability and attention to detail
foreign language skills		social skills	intercultural competence	multilingualism	multilingualism
presentation skills	agreeableness	self-regulation, social skills	public speaking		communication
creativity	openness	self-awareness, motivation	problem solving	creativity, initiative	creativity
critical thinking			analytical thinking	critical thinking	critical thinking
stress tolerance	emotional stability	self-regulation		stress tolerance	
autonomy		self-management	self-direction	self-direction	
adaptability	openness	emotional self-regulation	flexibility	resilience	resilience

The questionnaire consisted of thirty questions. In Part 2, we enquired about the importance of the given soft skill, the questions had the same item stem, for example, “How important is teamwork at the workplace?” In order to avoid social desirability bias we used general questions. In Part

3 we asked students to evaluate themselves in different soft skills. We did not use the same item stem. every question was different. See the examples in Table 2.

Table 2. Examples for self-evaluation questions

dimension	examples
presentation skills	1. I can draw up presentations on complex technical topics and present them without having to read the text. 2. Giving presentations on complex technical topics is challenging for me.
critical thinking	1. I never doubt the correctness of the information I got from my teachers and employers. 2. I recognise the biases in my thinking, and I try to mitigate their effects.
creativity	1. I often find novel solutions to problems which others could not see/find. 2. The tasks requiring creativity are challenging for me.
time management	1. I can effectively manage my time which helps me complete my tasks in my studies. 2. It often happens that I postpone my assignments to the last minute.

Participants responded to the questionnaire voluntarily and under conditions of anonymity. By ensuring the anonymity, we attempted to counterbalance students' anxiety while answering the questions, it was also aimed to avoid social desirability bias. The sampling method used was convenience sampling. The decision to employ this sampling method was driven by practical limitations, particularly time constraints.

3 Results & Discussion

3.1 General analysis

The psychometric properties of the questionnaire show an acceptable reliability: Cronbach's Alpha: 0.79. The internal consistency of the subscales was assessed using McDonald's Omega (ω) (Table 3). The reliability coefficients showed substantial variation across the dimensions (ω = .30–.75). The communication subscale demonstrated acceptable reliability (ω = .75), while autonomy showed a borderline acceptable value (ω = .64).

Table 3. Reliability of the subscales

Dimensions	1	2	3	4	5	6	7	8	9	10
McDonald's ω	0.31	0.75	0.43	0.46	0.35	0.43	0.42	0.40	0.64	0.30

note: 1: teamwork, 2: communication, 3: time management, 4: foreign language skills, 5: presentation skills, 6: creativity, 7: critical thinking, 8: stress tolerance, 9: autonomy, 10: adaptability

In contrast, the remaining subscales yielded low omega coefficients (ω < .60), suggesting limited internal consistency for those dimensions. These results indicate that, although one dimension can be considered reliable and one shows potential, the majority of the subscales require further refinement to improve measurement precision.

The validity analysis was conducted on AMOS 26 software. The results are the following: $\chi 2$=1298,23. this number is influenced by the sample size. CMIN=3.65 which is good because it should be less than 5, GFI= .758, RMSEA= 0.088. The reliability and validity assessments produced mixed outcomes: while internal consistency coefficients and selected validity indicators were satisfactory, several factors did not achieve ideal statistical performance. Accordingly, the study calibrated validity claims to the actual CFA fit, emphasizing that although the measurement model shows preliminary empirical support, its construct representation requires further refinement.

Correlation analyses were conducted using the ten subscales. Due to the low internal consistency of several dimensions, the results should be interpreted with caution. Despite this limitation, the analyses reveal meaningful patterns that provide preliminary insights into the relationships between the investigated constructs.

Pearson's correlation results indicate that the questionnaire has a strong internal consistency, and significant positive weak and moderate positive correlations at the 0.01 level were found among the items of the questionnaire except the correlation between time management and foreign language skills (r=.12 p<.05) level.

Correlations among interpersonal skills (teamwork, communication, foreign language skills and presentation skills) show significant positive relationships at .01 and .05 level (Table 4). Teamwork shows weak but positive correlations with all the other constructs. These findings may indicate that the instrument captures teamwork as a separate intrapersonal or behavioural domain, not just a byproduct of communication skills. The other three skills (communication, presentation, foreign language) form a moderate to strong cluster, whereas teamwork sits slightly outside that cluster. This implies good discriminant validity—the instrument does not artificially inflate relationships between different soft skills.

Table 4. Correlations among interpersonal skills

	teamwork	communication	foreign language	presentation
teamwork	1			
communication	,154**	1		
foreign language	,123*	,288**	1	
presentation	,133*	,341**	,301**	1

** Correlation is significant at the 0.01 level (2-tailed), * Correlation is significant at the 0.05 level (2-tailed).

We investigated correlations among intrapersonal skills. The examination showed significant positive relationships among the variables (critical thinking, creativity, time management, autonomy, adaptability, and stress tolerance (Table 5). The moderate to strong positive correlations between related intrapersonal skills (e.g. adaptability, stress tolerance, autonomy, creativity) suggest that the tool successfully measures related constructs that are expected to be associated. The weaker, though still significant, correlations of critical thinking with other intrapersonal skills (e.g. time management, autonomy) show that the tool can differentiate between constructs that are related but not identical (construct validity). The correlations are not too high, which avoids redundancy or multicollinearity—another sign that the instrument is not measuring just one general soft skill, but a range of related but distinct abilities.

Table 5. Correlations among Intrapersonal skills

variables	critical	creativity	time management	autonomy	adaptability	stress
critical thinking	1					
creativity	,263**	1				
time management	,146**	,188**	1			
autonomy	,175**	,339**	,261**	1		
adaptability	,221**	,399**	,217**	,384**	1	
stress tolerance	,174**	,304**	,286**	,330**	,437**	1

** Correlation is significant at the 0.01 level (2-tailed)

Although the reliability of some subscales was limited, the group comparison results were retained to explore potential trends. Table 6 provides the following patterns: students value soft skills more than they feel competent in them. These findings support the need for targeted soft skills development, especially in communication, time management, and stress tolerance. The instrument seems effective in capturing both subjective importance and self-perceived competence.

Table 6. Importance of soft skills and self-evaluation

M/SD	1	2	3	4	5	6	7	8	9	10
importance	4.79	5.31	4.36	4.67	4.58	4.19	5.06	5.12	5.00	5.07
	.99	.87	1.18	1.11	1.36	1.16	.91	.95	.98	1.08
self-evaluation	4.28	4.14	3.87	4.25	4.49	4.05	3.91	4.31	4.27	4.24
	0.96	0.91	1.01	0.94	0.93	1.14	1.18	0.93	0.85	1.02

note:1. teamwork, 2. communication, 3. foreign language skills, 4. critical thinking, 5. creativity, 6. presentation skills, 7. time management, 8. autonomy, 9 adaptability 10. stress tolerance

The analysis of the whole sample indicates that students place primary importance on five subskills: communication (5.31), time management (5.06), autonomy (5.12), adaptability (5.00) and stress tolerance (5.07). Our research might suggest that the students rated themselves highest in creativity (4.49) and autonomy (4.31), the lowest in foreign language skills (3.87), and time management (3.91).

3.2 Soft skills through a gender lens

In general, female students consider all soft skills to be more important than male students. Both male and female students give a high priority to communication skills, time management and autonomy. Female students find stress tolerance (5.31) particularly important, for male students it was less important (4.94). We see the same tendency in adaptability: female (5.12), male (4.94) (Table 7).

Table 7. Gender differences in the importance of soft skills

Variables	*Men*		*Women*		*t (342)*	*p*
	M	*SD*	*M*	*SD*		
teamwork	4.82	.94	4.73	1.06	.838	.403
communication	5.26	.86	5.40	.87	-1.53	.127
time management	5.02	.97	5.14	.79	-1.19	.235
foreign language skills	4.38	1.18	4.33	1.186	.38	.704
presentation skills	4.16	1.18	4.24	1.126	-.59	.552
creativity	4.75	1.21	4.26	1.573	3.26	.001*
critical thinking	4.83	1.03	4.37	1.184	3.75	.000*
stress tolerance	4.94	1.12	5.31	.956	-3.03	.003 *
autonomy	4.97	.98	5.38	.829	-3.88	.000*
adaptability	4,94	1,00	5,12	,936	-1,68	,092

note: * p<0.05 level

The self-evaluation showed female students rate themselves lower than male students in foreign language skills (3.59), presentation skills (3.79) and stress tolerance (4.08). A significant difference has been found between female and male students' self-evaluation in foreign language skills and presentation skills. Female students evaluate themselves higher than male students in teamwork (4.34) (Prada et al., 2022), creativity (4.67), time management (4.23) and autonomy (4.41). A significant difference has been found between male and female students in time management at 0.05 level. All genders evaluated themselves on the same level in communication, critical thinking, and adaptability.

3.3 Students in different faculties

Students studying at different faculties prioritized the same skills as the whole sample shows except creativity which students of Economics Faculty and Business (3.93) regarded to be less important than the students of the other two faculties (4.91,4.95); significant differences were found at 0.05 level among the students of the Faculty of Economics and the other two faculties regarding the importance of creativity.

The self-evaluation shows that students studying at different faculties gave similar self-evaluation in all soft skills. However, there are a few differences. The students of the Faculty of Economics and Business and the Faculty of Horticulture and Rural Development think that their strength is creativity (4.60, 4.95); however, they assume that it is not really important at future workplaces (3.93). The students of the Faculty of Engineering rated themselves between 4.14 and 4.40 in all skills except foreign languages (3.96), and time management skill (3.79) in which similarly to the students of the other two faculties, they confessed that foreign language skills, presentation skills and time management skills are their weaknesses, therefore, these skills should be improved. The students studying the Faculty of Economics and Business evaluated themselves similarly in all skills (4.14-4.60) except in foreign languages (3.73), presentation skills (3.78). Students of Faculty of Horticulture and Rural Development evaluated themselves above 4.00 (4.03- 4.95) in seven soft skills. The lowest values appear in three skills: communication (3.82), foreign language skills (3.78), and presentation skills (3.88).

3.4 Students' self-evaluation studying in different semesters and different age groups

Students studying in their sixth semester value teamwork, communication skills, foreign language skills, time management, and critical thinking higher than students studying in the 2nd and 4th semester. Regarding self-evaluation, students show a slight improvement in the following skills: critical thinking, presentation skills, autonomy, adaptability. However, there is no increase in the following fields: teamwork, communication, creativity, foreign language skills, time management, stress tolerance.

All soft skills tend to be more important for older adults. The self-evaluation shows that the students improved their skills in teamwork, communication, critical thinking, creativity, time management, autonomy, adaptability, and stress management. Unfortunately, foreign language skills and presentation skills do not show differences in the examined age groups.

3.5 Dual and cooperative learning

Dual students put greater importance on certain soft skills than non-dual students especially on teamwork, communication, time management, presentation skills, and autonomy. There is no difference between the two groups related to foreign language skills and critical thinking. The non-dual students regard creativity, stress tolerance and adaptability higher than dual students. Dual students evaluate their competences higher than non-dual students in six soft skills: communication, critical thinking, time management, presentation skills, adaptability, and stress tolerance (Figure 1).

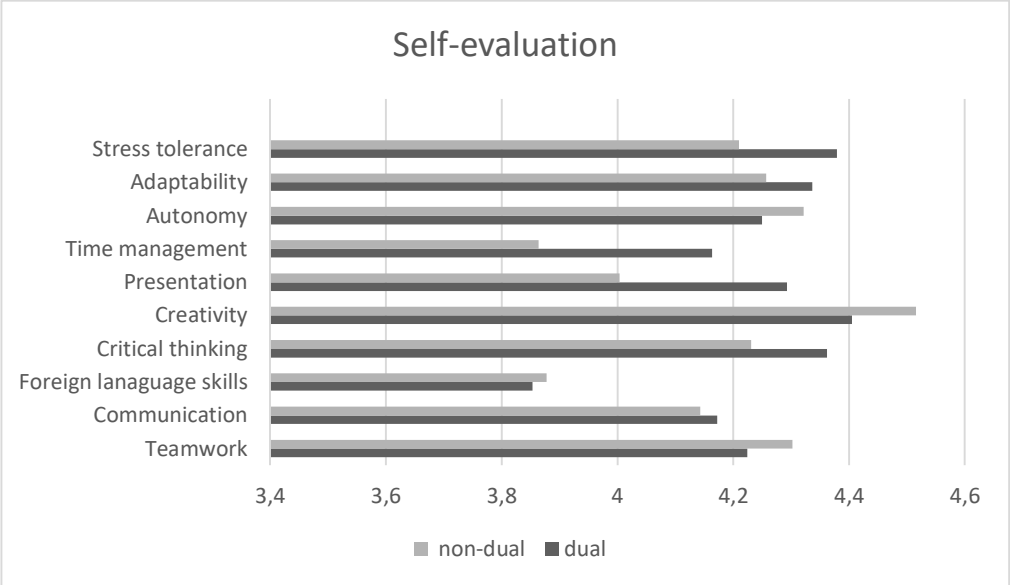

Figure 1. Self-evaluation of dual and non - dual students on soft skills.

The students who have a permanent workplace attached slightly higher importance to communication, foreign language skills autonomy, and adaptability. Also, they evaluated themselves slightly higher than the students who do not have work experience in all soft skills except foreign language skills.

The T test shows that students who had work experience rated themselves higher in several skills. We found significant differences between students with work experience (M=4.68, SD=.74) and without work experience (M=4.41, SD=1.00) in creativity: t (342) =2.52, p=.01. In presentation skills, we also found a difference between students with work experience (M=4.26, SD=1.94), and without work experience (M=3.95, SD=1.10) t (342) =2.34, p=.02. Concerning autonomy, students with work experience (M=4.47, SD=.84), and students without work experience (M=4.23, SD=.97) showed significant differences: t (342) =2.21, p=.02. Similar tendency is observed in adaptability between students with work experience (M=4.47, SD=.79), without work experience (M=4.17, SD=.87), t (342) =3.10, p=.002.

4 Conclusions

The primary objective of this study was to create and an online questionnaire for assessing ten soft skills. This instrument is aimed to fill a research gap since previous instruments do not assess the perceived importance and self-assessment of soft skills at the same time. We carried out a preliminary evaluation of our online instrument to assess various aspects of soft skills in dual higher education. Our research questions referred to the instrument, its structure, and dimensions of soft skills. Based on the research literature, ten dimensions of soft skills were selected: interpersonal skills such as teamwork, communication, foreign language skills, presentation skills, and intrapersonal skills such as time management, creativity, critical thinking, stress tolerance, autonomy, and adaptability. We asked the students about how important these soft skills are at the workplace, and to assess themselves in each area using the 6–point Likert scale.

Based on our analyses the answers to the research question 1 are as follows: the psychometric properties indicate a partly acceptable reliability (Cronbach-α: 0.79). The validity tests partly show partly acceptable results, but $\chi 2$ value, needs to be improved, by increasing the sample size. CMIN is acceptable 3.65 it should be <5 and RMSEA also needs to be improved (0.08) The current measurement model exhibited partial construct validity, with several fit indices meeting, but not consistently exceeding, established standards. A limitation of the present study is the low internal consistency of several subscales. As a result, the findings should be interpreted with caution, particularly for subscales with $\omega < .60$. Nevertheless, because the study is exploratory and represents an early phase of instrument validation, the analyses were retained to identify preliminary trends. These findings indicate that although the model offers a promising foundation for measuring the targeted constructs, re-specification or item revision may be required to improve its psychometric robustness.

The correlations analyses were conducted to investigate potential trends. Significant associations were found between skills that are theoretically expected to be related and weaker correlations among skills that are conceptually distinct. Overall, the tool effectively captures a diverse range of soft skills and mirrors the way these abilities are connected in real-life contexts.

Our study showed that the students attach immense importance to communication, time management, autonomy, adaptability, and stress tolerance, the students rate themselves higher in teamwork, communication critical thinking, creativity, autonomy, adaptability, and stress tolerance. However, they find themselves slightly weaker in foreign language skills, presentation skills, and time management.

Female students regard all soft skills more important than male students. Both male and female students give a high priority to communication skills, time management and autonomy. Foreign language skills, presentation skills, and stress tolerance are more challenging for female students than for male students. Male students are less skilful than female students in teamwork, creativity, time management and autonomy.

Regarding the research question 2 we have come to the following conclusions: It is anticipated that students participating in dual programmes and those with permanent employment will place increased importance on soft skills (teamwork, communication, time management, presentation

skills, and autonomy) than non-dual students. Also, students studying in dual and cooperative education evaluate their own proficiency levels more favourably than non-dual students in soft skills e.g., adaptability, communication, critical thinking, presentation skills, stress tolerance and time management (H1). These findings support the efficiency and success of the dual higher education model since dual students and students with work experience are more aware of the importance of soft skills and become more competent in most soft skills than the ones without work experience.

Some soft skills become slightly more important for students during university years (teamwork, communication skills, foreign language skills, time management, and critical thinking) and students improve in most soft skills (H2). Therefore, our second hypothesis is partly justified by our data. The fact that foreign language skills and presentation skills do not improve during university years implies that there is a need for intervention. These findings should be regarded as tentative and exploratory.

Further limitations of the research are the following: We could rely only on self-assessment which arises the issue of the potential social desirability bias. Therefore, the research should be complemented by peer, instructor, or employment assessments. The sample size, the sampling method and the contextual specificity also restrict the generalisability of our results.

Future research should expand or refine the item pools to improve internal consistency and measurement precision as well as longitudinal research, employer validation and cross-cultural comparisons.

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