



POSSIBILITIES FOR EVALUATION TO FOSTER THE SOFT SKILLS OF CRITICAL THINKING, CREATIVITY, AND COMMUNICATION IN HIGHER EDUCATION

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Abstract. Soft skills are the foundation of a solid and consistent lifelong education in a changing world. Students' self-reported achievement motivation is a good indicator of their level of self-awareness. A rigorous assessment of the process' results is necessary for an effective soft skill education program. There are significant flaws in the way the university's curriculum handles soft skill assessments. Therefore, the question is: given the resources at hand, how can one properly ascertain which soft skills requirements change the most over a university education? To identify changes at the start and finish of studies and prepare instruction for soft skill suggestions during university studies, this study intends to measure the differences in self-assessment indicators of students' creativity, critical thinking, and communicative abilities in university settings. The purpose of this study is to verify a variety of tools for assessing students' soft skills and figure out how effectively they can recognize variations throughout multiple university study stages. This could aid in the preparation of recommendations for soft skill instruction in courses, which could be beneficial for university graduates' future employment. Among first- and last-year university students, a self-assessment study on soft skills was conducted. The results show that students' soft skills are not equally impacted by their university education. The critical thinking abilities of first- and fourth-year students only tend to improve but do not differ reliably.

Keywords: abilities, changes, self-assessment, skills, students.

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1. Introduction

The needs of the job market are changing due to the development of information technologies. Narrow specialisation specialists are becoming less and less necessary, and it is possible that they will not exist in the future (George, 2023). The content of professional work is influenced by the growth in information flows and technological advancements. The concept of professionalism, as we know it, is changing. With the help of information technology, "narrow" knowledge can be acquired instantly. Recruitment procedures are also changing; "narrow professional specialization" ceases to be an advantage, sometimes hindering successful labour market activity (Kovačević, 2022). The terms *hard skills* and *soft skills* are used to describe the characteristics necessary for professional activity (Lamri & Lubart, 2023; Lubart & Thornhill-Miller, 2019). In the context of technology, hard skills refer to specialized or profound knowledge, skills, and abilities that are in high demand within a particular industry, sometimes even inside an organization. Soft skills refer to the abilities, knowledge, and skills required in a variety of

professional disciplines that are centred on task performance and environment adaptation in a fast-changing context. The term *soft skills* refers to the knowledge and skills needed to accomplish duties in a quickly changing environment (Joie-La Marle et al., 2023). The development of narrow professional hard skills has become faster and cheaper than the development of soft skills. Soft skills largely determine the efficiency of a modern specialist. Therefore, employers pay more and more attention to the soft skills of employees (Marin-Zapata et al., 2022). Soft skills are especially important for freelancers, as they have to market their services on their own. It can be said that soft skills help to function effectively and independently in various work situations. Unlike hard skills, soft skills do not depend much on their innate characteristics and are easily developed (Almeida & Buzady, 2022). Hard skills are rapidly becoming less important because the modern job market does not ensure that an individual will be able to continue his current employment for a long enough time. Changes are occurring in work formats, employment, demand, technologies, products, and the emergence and disappearance of professions. Different experts have different opinions about which soft skills are most important in the current environment. The following skills stand out as a summary of the trends in labour market needs: the ability to adapt, change, act in uncertain situations, communicate effectively, plan and carry out tasks independently, evaluate data, and work in a team. It is hard to overstate the significance of learning, self-regulation, decision-making, and forming relationships in terms of personal effectiveness. Research reveals that soft skills comprise the 4C's (creativity, critical thinking, communication, and collaboration) block (Thornhill-Miller et al., 2023). It is argued that the 4C block could be considered the highest level of transversal skills or meta-competences that enable individuals to remain competent and develop their potential in a rapidly changing professional world. When evaluating the components of the 4C block, three basic components can be distinguished: creativity, critical thinking, and communication (Barevičiūtė et al., 2023). Creativity can be defined as the capacity to produce novel, original decisions that fit with task constraints and have value in their context. The importance of creative education is based on the need to generate innovative ideas in all fields and activities. The personality's ability to generate new creative solutions, understand, and interpret new values becomes very important in professional activities and everyday life (Foster & Schleicher, 2022). Creativity becomes one of the most important goals in the educational process at all levels. Critical thinking is understood as the ability to structure the information under consideration, consistently analyze it, and generalize the basis on which the planning and implementation of actions are carried out (Bellaera et al., 2021). The development of critical thinking skills is considered one of the most important aspects of education in a democratic society (Pasquinelli et al., 2021). Critical thinking abilities directly influence the academic progress of students and the ability to adapt to difficult situations and solve problems (Thornhill-Miller et al., 2023; Halpern & Dunn, 2021; Ren et al., 2020). Information exchange for cognitive processes is linked to communication skills. The ability to work together to convey information in a way that makes it possible to accomplish the desired outcome is referred to as communication skills (Schultz, 2010). Furthermore, according to Jones and LeBaron (2002), communicative talents encompass the ability to process and perceive information that is received, both verbally and nonverbally, and to formulate reply messages in response to that information. In conclusion, it can be said that social skills, the capacity to discern others' intentions, and the capacity to effectively

convey one's objectives are all strongly associated with communicative abilities (Tomasello, 2005). They boost self-esteem, improve emotional intelligence, and assist you in overcoming obstacles in life. Soft skill development fosters flexibility and adaptability in students, which supports changes in the workplace and helps them reach their full educational and personal potential. The goal of contemporary education is for soft skills to be cultivated throughout life and it requires evaluating them. Their incorporation into the learning process turns into a recurring element of contemporary pedagogy. Evaluating their shift in the study process is vital to addressing the difficulties in acquiring soft skills and achieving meaningful growth. Without introspection and the chance to assess oneself honestly, educational objectives cannot be met. Students' intentional self-development and intentional study process management are based on their self-discipline, self-control, self-assessment of their capabilities, analysis of gaps in their available talents, and their improvement at different stages of academic pursuits.

Students' self-reported achievement motivation is a good indicator of their level of self-awareness (Mendoza et al., 2023). A rigorous assessment of the process' results is necessary for an effective soft skill education program (Almeida & Morais, 2023; Alt et al., 2023). There are significant flaws in the way the university's curriculum handles soft skill assessments (Chen et al., 2024; Al-Sa'di et al., 2023). Thus, the question is: which soft skills criteria change the most during a university education, and how can we achieve this effectively with the tools available? It is essential to provide students with the opportunity to evaluate their soft skills since this will lay the groundwork for managing and optimizing the teaching of soft skills. The purpose of this study is to verify a variety of tools for assessing students' soft skills and figure out how effectively they can recognize variations throughout multiple university study stages. This could aid in the preparation of recommendations for soft skill instruction in courses, which could be beneficial for university graduates' future employment.

2. Materials and methods

2.1. Participants

One hundred and four ($n = 104$) students from the first course and one hundred and thirty-seven ($n = 137$) last course (fourth) were randomly selected from the bachelor students enrolled in the Faculty of Creative Industries (FCI) at Vilnius Gediminas Technical University (VGTU), Lithuania in 2022 (approximately 80% of all first course students and approximately 90% of last course students). The selected participants were 19.50 ± 2.30 years old and 22.18 ± 0.58 years old.

2.2. Design framework

A communication inventory was used to measure the communication skills of the student participants. It is a self-report measure that contains 20 items adapted from *HTC Consulting* (Prajna & Prasad, 2017). The scale covered broad communication domains: intrapersonal, verbal, nonverbal, and interpersonal communication aspects. The research was conducted based on self-esteem. The test chosen to evaluate the change in communication abilities of students consists of 20 questions assessing four criteria: intrapersonal (communication

with oneself); interpersonal (ability to exchange information between two or more people); verbal (conveying information with spoken and written language); and nonverbal (conveying information without spoken and written language). Also assessed was the change in communication skills averages. Evaluated according to a five-point Likert scale.

The Kaufman domains of creativity scale (K-DOCS) was used to measure the creative skills of the student participants. It is a self-report measure that contains 50 items. The scale captured broad domains of creativity: self/everyday, scholarly, performance (encompassing writing and music), mechanical/scientific, and artistic (Kaufman, 2012). The test was used to assess how students' creative abilities had changed. It has 50 questions that evaluate five different criteria: individual/daily (interpersonal and intrapersonal creativity); learner (creative analysis, discussion, and academic endeavours); performance (creative literature and music); scientific/mechanical (creative mathematics and mechanics); and creative (creating and illustrating visual art). Evaluated according to a five-point Likert scale.

The students' critical thinking abilities were assessed using the critical thinking questionnaire (CThQ). It is a 25-item self-report questionnaire. According to some authors (Kobylarek et al., 2022), the measure covered a wide range of critical thinking domains, including analyzing, evaluating, producing, remembering, understanding, and applying. Six criteria were selected to gauge the students' development of critical thinking: assessing (capacity to ascertain the worth of the state of system components); analyzing (capacity to ascertain the characteristics and connections of system components); generating (capacity to generate via behaviour or activity); Recalling is the process of remembering an occurrence. Understanding (capacity to grasp the meaning of the elements or process – intellect); it is understood that something can be used to accomplish an objective. Evaluated according to a five-point Likert scale.

2.3. Procedure

The research instruments' responses are presented on a five-point Likert scale (Joshi et al., 2015). The respondents for the performance of the self-assessment task used 30 minutes to respond to the anonymous questionnaires. The procedure ensured the anonymity of the participants' identities. Where are calculated indicators of test scores averaged.

The Cronbach's alpha of each scale was calculated in order to evaluate the internal consistency of the integrated parameters. Cronbach's alpha value was calculated for each applying group using fifteen criteria: creativity skills (self/everyday, scholarly, performance, mechanical/scientific, and artistic); communication skills (intrapersonal, interpersonal, verbal, and nonverbal); and critical thinking (analyzing, evaluating, creating, remembering, understanding, and applying). Students' criteria data from the first course had a Cronbach's alpha value of 0.821, whereas students' data from the last course had a value of 0.793. Because the reliability indicated a value close to 0.8, Nunnally's (1978) suggestion for the tests' reliability coefficient and internal consistency assessment measure for each group was deemed to have been reached (Cho, 2020).

Analyzing the Cronbach's (1951) coefficients for the measures examined separately produced the following results: on the creativity skills scale (self/everyday, scholarly, performance, mechanical/scientific, and artistic), first-year students scored 0.679 and last-year students scored 0.662; on the communication skills scale (intrapersonal, interpersonal, verbal, and

nonverbal): 0.648 and 0.729; and on the critical thinking scale (analyzing, evaluating, creating, remembering, understanding, and applying): 0.840 and 0.845. These indications aid in assessing the tool's quality during the design process. On the other side, the standardized processes used in this research provide information based on the reliability of the data. The benchmark value of 0.7 for Cronbach's alpha is appropriate. This level of consistency among the items suggests the dependability of the measure (Henson, 2001; Lance et al., 2006).

2.4. Methodological limitations

Approximately 80% of first course students and 90% of last course students in the study programme of communication at VGTU, FCI anonymously solved tasks assigned by the researchers.

Therefore, the summaries of analyzed indicators of communication, creativity and critical thinking skills are exclusive to students of the FCI, and additional studies should be conducted for the evaluations of students of other study programmes.

When assessing the influence of studies on students' creativity, communication and critical thinking skills, it is necessary to conduct research with dependent samples (the same research subjects at the beginning of the first year and the end of the fourth year). Only assumptions can be made when evaluating the self-esteem data independent samples. Research with dependent samples is planned to be done in the future.

To evaluate the correlations of the studied creativity, communicative abilities, and critical thinking abilities with the evaluations of formal studies, further research is necessary with the refusal of anonymity, but this may affect the evaluations of the tests performed. This aspect should also be investigated in the future. The authors of the tests provide rating scales and do not specify target audiences; therefore, specialised research is necessary based on which target rating scales are created. To ensure the internal validity of the research, approved tests were used. The research participants were introduced to the test tasks just before performing them. To exclude erroneous data, tests with values outside the three standard deviations (SDs) mean were excluded from the study.

2.5. Statistical tools

The sample was stratified to ensure that abilities were appropriately represented. *Microsoft Excel* was used to examine the data. Applicable indicators included: test reliability (t), mathematical difference (d), average (X), SD, standard error (SE), coefficient of variation (CV), maximum value (Max), and minimum value (Min). To determine if data are statistically significant or not, statistical significance testing compares the p -value to a predetermined significance student's t -test level ($p < 0.05$ – low, $p < 0.01$ – average, and $p < 0.001$ – high) (Mikyo Oh & Pyrczak, 2023). The formulas were typed into *Microsoft Excel* for the calculations, and Cronbach's alpha indications were computed using statistical tools from *SPSS*. To compare variability or assess how stable the mean values are, we compute the mean CV. One way to measure variability is via the CV. The CV is a standardized measure of the dispersion of a probability distribution or frequency distribution and can be used for maximum likelihood estimation (Sokal & Rohlf, 1994; Hanemann & Kanninen, 2001). The CV can be used as a tool that helps evaluate the normal distribution of data (Limpert et al., 2001; Dowdy et al., 2004; Achcar & Barili, 2024).

2.6. Ethical consideration

This research received no external funding. All research participation was voluntary and confidential. This research was approved by the FCI and realized under its supervision. All participants were informed in writing about the course of the study and gave consent to participate by the Declaration of Helsinki. The author declares no conflicts of interest.

3. Results

The averages of the indicators of the communicative abilities of the studied students of both courses are higher than the average value and are 3.50 ± 0.49 points in the first year, 3.69 ± 0.48 points in the last year. The fluctuation of these indicators around the arithmetic mean is moderate ($CV = 14.13\%$ and 13.09%) (Table 1), which testifies to the normal distribution of these indicators. This testifies to the homogeneity of the student's communicative abilities enrolled in the FCI of VGTU. Persons with sufficiently well developed communication skills enrol in communication studies. The spread of communicative abilities of fourth-year students is lower than that of first-year students, both for all criteria and for the average indicator. It can be claimed that studies homogenize students' communicative abilities. When evaluating the differences in the communicative abilities of the first and last courses, a reliable difference in the average indicator of communicative abilities was determined (-3.07 ; $p < 0.01$). When evaluating the differences in individual criteria between the first and last courses, reliable differences were found between intrapersonal (-2.64 ; $p < 0.01$), interpersonal (-2.90 ; $p < 0.01$) and nonverbal (-2.43 ; $p < 0.05$) communicative abilities. Meanwhile, no reliable difference was found in verbal communication skills. It can be assumed that the VGTU FCI studies develops communication skills differently. This may be because studies do not focus enough on activities that develop writing and speaking skills.

The average indicator on the creativity self-esteem test of the first-year research students was 3.09 ± 0.50 points, which is higher than the average value, and its variation about the arithmetic mean is the average ($SE = 0.05$; $CV = 16.14\%$), which testifies to the average homogeneity of creativity abilities and its normal distribution among enrolled students (Table 2). The average creativity of fourth-year students is rated slightly better ($X = 3.28 \pm 0.49$), but this is enough for a reliable difference ($d = -0.19$; $p < 0.01$). It is necessary to note that, on average, the spread of creativity decreased in the fourth year ($SE = 0.04$; $CV = 14.99\%$). Thus, the distribution of creativity in the final year becomes more even, and this has the greatest impact on its improvement. As for creativity, it can be assumed that studies in the FCI have a positive influence on students' creativity. Unequivocal assessments cannot be made when evaluating the indicators of creativity elements and the differences between the studied groups. The indicators of creativity of the studied students can be conditionally divided into three categories according to their distribution in the groups and into two categories according to the differences between the studied courses.

The parameters of self/everyday and scholarly creativity were characterized by an average dispersion, in both courses it varied from 13.60% to 16.99% . These indicators were characterized by high evaluations among first-year students (self/everyday: $X = 3.68 \pm 0.56$;

Table 1. Indicators of the communication skills of the first course and last course students of the Faculty of Creativity Industries at Vilnius Gediminas Technical University, Lithuania (source: created by author, based on Prajna & Prasad 2017)

Indicators		Intrapersonal (points)	Interpersonal (points)	Verbal (points)	Nonverbal (points)	Average (points)
First course (n = 104)	X	3.36	3.43	3.56	3.63	3.50
	SD (1*)	0.62	0.53	0.72	0.86	0.49
	SE (2*)	0.06	0.05	0.07	0.08	0.05
	CV (3*)	18.36	15.58	20.23	23.62	14.13
	Min (4*)	1.86	2.43	2.00	1.67	2.33
	Max (5*)	4.57	4.57	5.00	5.00	4.71
Last course (n = 37)	X	3.57	3.63	3.69	3.88	3.69
	SD	0.60	0.50	0.74	0.68	0.48
	SE	0.05	0.04	0.06	0.06	0.04
	CV	16.76	13.92	19.91	17.59	13.09
	Min	1.86	2.14	1.67	1.33	1.96
	Max	4.86	4.71	5.00	5.00	4.70
Reliability in group differences	d (6*)	-0.21	-0.20	-0.13	-0.25	-0.20
	t (7*)	-2.64	-2.90	-1.34	-2.43	-3.07
	p (8*)	< 0.01	< 0.01	-	< 0.05	< 0.01

Notes: 1*: SD – standard deviation; 2*: SE – standard error; 3*: CV – coefficient of variation; 4*: Min – minimum value; 5*: Max – maximum value; 6* d – mathematical difference; 7* t – test reliability; 8* p – p-value.

Table 2. Indicators of the Kaufman domains of creativity scale and assessment of the first course and last course students of the Faculty of Creativity Industries at Vilnius Gediminas Technical University, Lithuania (source: created by author, based on Kaufman, 2012)

Indicators		Self/everyday (points)	Scholarly (points)	Performance (points)	Mechanical/scientific (points)	Artistic (points)	Average (points)
First course (n = 104)	X	3.68	3.49	2.71	2.18	3.40	3.09
	SD (1*)	0.56	0.59	0.89	0.84	0.86	0.50
	SE (2*)	0.05	0.06	0.09	0.08	0.08	0.05
	CV (3*)	15.19	16.99	32.95	38.38	25.33	16.14
	Min (4*)	2.27	2.18	1.20	1.00	1.33	1.81
	Max (5*)	4.73	4.73	4.90	4.56	5.00	4.35
Last course (n = 137)	X	3.96	3.74	3.01	2.28	3.40	3.28
	SD	0.54	0.58	0.91	0.80	0.90	0.49
	SE	0.05	0.05	0.08	0.07	0.08	0.04
	CV	13.60	15.40	30.23	35.04	26.45	14.99
	Min	2.36	1.91	1.20	1.00	1.11	2.21
	Max	5.00	5.00	5.00	4.56	5.00	4.83
Reliability in group differences	d (6*)	-0.28	-0.25	-0.29	-0.10	0.00	-0.19
	t (7*)	-3.89	-3.27	-2.50	-0.95	-0.03	-2.87
	p (8*)	< 0.001	< 0.01	< 0.01	-	-	< 0.01

Notes: 1*: SD – standard deviation; 2*: SE – standard error; 3*: CV – coefficient of variation; 4*: Min – minimum value; 5*: Max – maximum value; 6* d – mathematical difference; 7* t – test reliability; 8* p – p-value.

scholarly: $X = 3.49 \pm 0.59$). This testifies to the great potential of the enrolled students' interpersonal and intrapersonal creativity, the ability of creative analysis, debate, and scholarly pursuits, which increases in the graduating students (self/everyday: $p < 0.001$; scholarly: $p < 0.01$). It can be assumed that the studies of the FCI and the direction of communication develop the creativity abilities of self/everyday and scholarly.

When evaluating the performance of the criteria of creativity, it was found that the applicants and graduates have a large dispersion (first year – 32.95%; fourth year – 30.23%). This testifies to the great diversity of the students of this criterion. The student's self-esteem of this criterion was characterized by average indicators ($X = 2.71 \pm 0.89$) among first-year students, but it is rated better by fourth-year students ($X = 3.01 \pm 0.91$) and is reliably better ($p < 0.01$). It can be assumed that communication studies in the FCI positively promote students' writing and music creativity abilities. The third group of study students' creative abilities, mechanical and mathematical creativity and making and drawing visual creativity, does not differ between the first and second courses. It is necessary to note that students with mechanical and mathematical creativity below the average assessment indicators ($X = 2.18 \pm 0.84$) enter the communication studies of the FCI. A high CV indicator ($CV = 38.38\%$) testifies to the differences in this characteristic among students, which does not change significantly during studies. It can be assumed that little attention is paid to its development when studying communication. Although students with a sufficiently high ability to make and draw visual creativity also enrol in the communication studies of the FCI ($X = 3.40 \pm 0.86$) and its distribution among students is high ($CV = 25.33\%$), no significant differences in this indicator were found when evaluating the fourth year. We can say that these features do not give attention to the development of creativity in the communication studies of the FCI.

The average indicator of the critical thinking self-esteem test of the first-year research students was 3.39 ± 0.47 points, this indicator is higher than the average value, and its variation about the arithmetic mean is average ($SE = 0.05$; $CV = 13.97\%$). This testifies to the homogeneity and normal distribution of the average critical thinking ability indicator of students enrolled in the FCI, communication studies (Table 3). The average indicator of critical thinking abilities of graduating students is statistically better ($p < 0.05$). The distribution of critical thinking skills among fourth-year students is lower ($SE = 0.04$; $CV = 12.75\%$). Thus, it can be assumed that communication studies develop critical thinking skills on average. However, the ability of critical thinking is integrated, and when comparing the values added by first and fourth-year students, the trends are not unambiguous. The statistical difference in students' self-esteem between the first and fourth years was determined only by the ability to evaluate ($p < 0.01$). It is necessary to note that self-assessment of the ability to evaluate improved not only the average value but also its homogeneity. In addition, the distribution of all critical thinking skill components about the arithmetic mean of fourth-year students is on average 2% lower than that of first-year students. It can be assumed that the communication studies of the FCI have a positive effect on the student's critical thinking skills, but do not have a significant effect on most of its components.

Table 3. Indicators of the critical thinking questionnaire and assessment of the first course and last course students of the Faculty of Creativity Industries at Vilnius Gediminas Technical University, Lithuania (source: created by author, based on Kobylarek et al., 2022)

Indicators		Analyzing (points)	Evaluating (points)	Creating (points)	Remembering (points)	Understanding (points)	Applying (points)	Average (points)
First course (n = 104)	X	2.36	3.68	3.57	3.44	3.60	3.71	3.39
	SD (1*)	0.58	0.66	0.60	0.74	0.62	0.61	0.47
	SE (2*)	0.06	0.07	0.06	0.07	0.06	0.06	0.05
	CV (3*)	24.70	18.05	16.76	21.59	17.17	16.55	13.97
	Min (4*)	0.80	2.25	1.83	1.67	2.00	2.25	2.19
	Max (5*)	3.40	5.00	5.00	5.00	5.00	5.00	4.59
Last course (n = 137)	X	2.50	3.97	3.72	3.50	3.72	3.81	3.53
	SD	0.52	0.65	0.58	0.69	0.58	0.58	0.45
	SE	0.04	0.06	0.05	0.06	0.05	0.05	0.04
	CV	20.82	16.49	15.63	19.68	15.54	15.32	12.75
	Min	0.40	2.00	2.17	1.00	2.25	2.50	2.49
	Max	3.60	5.00	5.00	5.00	5.00	5.00	4.58
Reliability in group differences	d (6*)	-0.14	-0.28	-0.15	-0.06	-0.12	-0.10	-0.14
	t (7*)	-1.87	-3.31	-1.91	-0.67	-1.52	-1.24	-2.33
	p (8*)	–	< 0.01	–	–	–	–	< 0.05

Notes: 1*: SD – standard deviation; 2*: SE – standard error; 3*: CV – coefficient of variation; 4*: Min – minimum value; 5*: Max – maximum value; 6* d – mathematical difference; 7* t – test reliability; 8* p – p-value.

4. Discussion

In assessing characteristics' distinct elements of students' communication skills, it is impossible to draw clear conclusions. Overall, the researched students' verbal communication abilities did not change from the previous year to the first. It was determined that communication skills are the most crucial and necessary (Miranda & Yudi Wahyudin, 2023). Various verbal and nonverbal cues are used in communication to transmit and receive information. Building strong interpersonal and professional relationships first requires effective verbal communication. Verbal communication skills correlate with teamwork skills, organizing skills, information and communication technology skills, lifelong learning skills, initiative, and enterprise skills. Persons can better convey views, ideas, feelings, and requirements through verbal expressions (McKay et al., 2009). Language affects personality reliability and can be used as a tool for control and self-expression (Walker, 2023). There was no change in the first- and last-year students' verbal communication indicators, though they are both high and almost at a four-point grade. It is reasonable to assume that education in the FCI does not adequately develop verbal communication skills, even though these are a crucial component of the jobs of communication professionals. Self-communication is known as intrapersonal communication (Danesi, 2009). Self-communication abilities support the personality's ability to self-organize (information processing, self-control, internalization, and problem-solving) (Spielhofer & Haselberger, 2023). In both intrapersonal and interpersonal interactions, messages are

conveyed. In interpersonal communication, the sender and the recipient are two distinct individuals, just like when people speak to each other (Rochmat, 2023). The two phenomena also have different effects on each other. One's self-concept, or how one sees oneself, is shaped, for instance, by the comments one hears from others, both favorable and negative. This affects the kind of self-talk people engage in, whether it is constructive or destructive (Wrench et al., 2020). However, the opposite is also true: a person's self-talk influences their interactions with others (Latinjak et al., 2023). The transfer of messages or signals via non-verbal channels, such as eye contact (oculesics), body language (kinesics), social distance (proxemics), touch (haptics), speech (paralanguage), physical environments or appearance, and the use of items, is nonverbal communication. When people communicate, they use non-verbal cues to send various signs or messages that other people may or may not understand (Hall et al., 2019). The primary focus of nonverbal communication is the interaction between individuals. It falls into three primary categories: the environment in which communication takes place, the communicators' physical characteristics, and the behaviors of communicators during interaction (Smith, 2024). According to certain authors, two-thirds of all communications take place nonverbally, which enhances an impression (Burgoon et al., 2021). The interdependence and significance of both verbal and nonverbal forms of communication are highlighted by the necessity of proficiency in nonverbal communication for navigating social settings, understanding complex human behavior, and forging meaningful connections in a variety of scenarios (Law, 2011). Studying at the university helps in the development of these communication fields of personality. Studying at the university helps in the development of these intrapersonal, interpersonal, and nonverbal communication fields of personality.

The ability to generate novel and inventive concepts, connections, and problem-solving strategies is all part of creativity. Being creative is the quality of a person (or activity) that results in the creation of something new and worthwhile. Creativity allows people to build resilience, arouse joy, and present chances for self-actualization. Therefore, creativity is defined as internal attention constrained by a generative goal (Green et al., 2024). A person's capacity for creativity is

"a process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; identifying the difficulty; searching for solutions, making guesses, or formulating hypotheses about the deficiencies; testing and retesting these hypotheses and possibly modifying and retesting them; and finally communicating the results" (Torrance, 1966, p. 6).

Three attributes led to creativity: problem recognition, "the ability to rapidly produce a variety of ideas fulfilling stated requirements", and "the ability to produce responses that are novel and high in quality" (Guilford, 1967). However, mechanical/scientific, and artistic creativity abilities do not differ between first and last-year students. Mechanical and scientific creativity are areas of engineering specialties such as innovation that deal with physical equipment and can entail force and movement in their work with physical machines. This branch of engineering combines' mathematics, engineering physics, and materials science to design, analyze, create, and maintain electronic and mechanical systems (Grote & Hefazi, 2021). While there is little reason to expect improvement from students in the creativity of mechanical and scientific areas, communication and social sciences are studied in the FCI.

However, these competencies are becoming increasingly relevant in both professional and everyday activities. The term *art* refers to a broad category that includes both high (classical) and low (popular) forms of architecture, performing arts, photography, cinema, opera, and plays. Artistic creativity is a skill in this area (Lindauer, 2011). Graduate students' creative ingenuity is not different from that of first-year students. Likely, studies do not foster students' capacity for artistic and creative expression. What is meant to be understood as artistic creativity is the ability to see empirical reality from a different perspective, to express oneself uniquely, to make connections and correlations on your own that others are unable to make, and to continuously recreate reality. Thus, realized artistic and creative talent contribute to the manifestation of an individual's uniqueness, which means being different lets one show off their creative abilities (Purnomo, 2023). Studying in the FCI does not improve the artistic creativity talents of the first- and last-year students under investigation, despite their highly valued creative abilities. Throughout the study in university, the daily expression of students' creativity saw the largest shift. The term *everyday creativity* refers to creative endeavors that occur during one's free time – when they are not working and are not consumed by food, personal grooming, or domestic chores – and are more deeply personal than achievements acknowledged by the public (Benedek et al., 2020). In this way, everyday creativity is important in its content: originality (or the relative rarity of creation within a certain reference group) and meaningfulness (*i.e.*, being understandable to others, not random or idiosyncratic and thus socially meaningful) (Richards, 2010). The other two varieties of students' creativity differed significantly (scholarly and performance) between the first and last study years. Studies in the FCI likely had a decisive influence on this. A student's approach to thinking about, absorbing, and producing knowledge during the educational process is referred to as scholarly creativity. It is thought to entail both divergent thinking, which is often considered the major component of creativity, and creative analysis (Wang et al., 2017). A creative performance is an exhibition of one's capacity to create original, relevant work. Creative products could be material or intangible manifestations of creative performance. Thus, a latent, undiscovered capacity for creative labor that might arise in the future is known as creative potential (Treffinger et al., 2006).

When evaluating critical thinking, it was found that only the ability to evaluate the last year was better compared to the first-year students. The remaining critical thinking abilities (analyzing, creating, remembering, understanding, and applying) between first- and fourth-year students only tend to improve but do not differ reliably. Students' scientific literacy skills are built on critical thinking, which is based on the material covered in lectures, the fundamental ideas of science, and the characters (Sukmawati & Zulherman, 2023). To be able to analyze something is to investigate or scrutinize it thoroughly and methodically to produce more credible results than those that rely on only one or two sources and methods of investigation (Malcolm-Davies, 2023). Making a workable model is the goal of creation; it goes beyond just choosing the ideal set of statistics for the process. The creation is directed at the interaction of the model's viable elements (Beer, 1984). When disassembling the primary topic analysis in a design, the initial step should be to create memorable experiences. The conceptualization of process studies of objects and fundamental remembering in the context of daily and work-related tasks is influenced by the relationships between remembering and

other related activities. Thus, recalling enables one to draw lessons from the past and see the bright side of an otherwise unpleasant situation. Persons develop alongside these memories and utilize them to preserve their identities, fortify bonds with others, and shape the future by reinterpreting past events in fresh ways (Getzmann et al., 2023). Understanding is the cognitive process of modeling an abstract or real object like a person, a circumstance, a message, etc. by using concepts. The relationship that exists between the knower and the understood item is known as understanding. Understanding is the possession of skills and attitudes about a subject sufficient to enable reasoned action (Bereiter, 2002). Knowing how to deduce a basic set of principles that describe something is the first step toward understanding it. Someone unable to comprehend broadcast information may overlook crucial cues, pass up chances, and fail to notice developments in time to respond. The secret to understanding oneself is to understand others (Chaitin, 2006). There is a correlation between understanding and the ability to make inferences (Guest & Martin, 2023). Applying entails putting concepts into practice or changing things. By enhancing available resources, merging, mixing, using in the pursuit of certain aims, and making an effort to act, this term refers to how to act (Quinn Patton, 2011). People with critical thinking abilities are better able to evaluate circumstances and facts in an accurate, efficient, and innovative manner. Workers with strong critical thinking abilities frequently innovate and help solve challenging issues. In this approach, the processes of analysis, creation, memorization, comprehension, and application should receive greater emphasis during the educational process. On the other hand, significant variations in the evaluating skills between first-year and last-year students are found. Problem solving requires the ability to evaluate information, from the strength of the evidence to the argument's viability. A correct analysis of information and the ability to draw well-founded conclusions are the components of evaluating skills. These abilities include logical reasoning, data interpretation, and problem-solving techniques (Anderson et al., 2023). Because they make it possible to assess the viability of scientific theories and hypotheses, they are crucial for the study of science and critical thinking.

When assessing the importance of soft skills for personality formation, it is necessary to mention that their possession and the ability to manage them lead to professional career success and a higher salary (Franco-Ángel et al., 2023; Hwang et al., 2023). In addition, the application of soft skills is not limited to the professional career and is directly related to the quality of personal life (Enrique et al., 2024). Soft skills are particularly important to mastering hard skills or changing the specialization and area of the activity (Čuić Tanković et al., 2023). The dynamics of changing professions and specializations in the labor market are accelerating, so the importance of soft skills will grow. Soft skill development is a complicated process that calls for methodical application exercises involving the simulation of real-world scenarios through immersion (Willard et al., 2023). The best way to immerse pupils in realistic scenarios, according to some authors (Laska-Leśniewicz et al., 2023), is through project activities. In summary, it can be claimed that instructional strategies that foster student participation in the learning process also stimulate their high levels of engagement in lectures and extracurricular activities. This enables you to acquire hard and soft abilities in equal measure. Soft skills are therefore developed via the structure of the study process and the use of applied methods rather than so much through the substance of the studies themselves. The tools employed

to arrange the studies foster interaction and communication. All academic fields require the development of soft skills. The relationship between the teacher and the student during the study, which should be reduced to collaboration in completing activities, is also vital in developing soft skills (González-Cacho & Abbas, 2022). In conclusion, it may be argued that instructional technologies – applied methods – are more crucial for the development of soft skills than the program’s content (Tadger et al., 2022).

5. Conclusions

This study identified the primary soft skill requirements that organizers and executors of university education programs need to focus on more. The findings of this study ought to encourage a debate about the 21st century goal of higher education. It might be difficult to tackle emerging societal concerns (such as sustainability, ecology, climate change management, etc.) if one lacks the necessary soft skills. University graduates who can communicate, produce, critically analyze, collaborate, and otherwise positively influence their communities are needed in today’s culture, in addition to being holistic individuals. This document lists validated instruments that facilitate the evaluation of soft skill alterations during research. It provides context for the need to create curricula that link students’ soft skills, discipline-specific abilities, and general skills to the demands of the labor market. That might also help to clearly outline the learning objectives that should be met to support democratic vitality and economic competitiveness. The self-esteem of first-year and senior soft skills students at VGTU is compared in this research. We can make assumptions about how university study influences students’ development of critical thinking, creativity, and communication abilities based on the study evidence that has been gathered. Because of this, all university programs that train experts with a range of profiles must emphasize the development of soft skills to prepare their graduates for successful careers in the workforce as well as for the progress of the nation. Based on the research findings, we can say that the studies conducted in the FCI at VGTU have a beneficial effect on the development of soft skills (critical thinking, creativity, and communication). When evaluating critical thinking, it was found that only the ability to assess the last year was better compared to the first-year students. The remaining critical thinking abilities (analyzing, creating, remembering, understanding, and applying) between first- and fourth-year students only tend to improve but do not differ reliably. Communication, creativity, and critical thinking are the three soft skill characteristics that the research looked at. These qualities may all be assessed as a person’s capacity to adjust to changes in their social environment and demonstrate how relevant university study is to the demands of contemporary society. As a result, contemporary educational institutions ought to shift their emphasis from the knowledge-transfer process of traditional university education to the development of an active student who can take an active role in their education. Digital and soft skills should make up a sizable portion of the curriculum. Studies should put more emphasis on students’ capacity for self-realization and self-development than on the subject matter. The ability of learners to develop and realize themselves in social and professional contexts is aided by this type of educational process. Therefore, the educational process should center on the student rather than the authority of the teacher or the subject of study

to build soft skills. This criterion is realized by innovative teaching strategies such as problem-based learning, flipped learning, individual educational trajectories, and project learning. Based on the research done, it can be inferred that the studies carried out in VGTU's FCI have varying effects on students' soft skills. Systematic assessments of students' abilities during the study period (from the first to the last year) are required to ascertain the impact of studies on soft skills. Research assessing the effects of various pedagogical approaches on various soft skill attributes is also essential.

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