

# *Transversal Skills that Matter to Computer Engineering and Information Technology Undergraduates and Strategies for their Development in English Classroom*

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**Abstract.** *The importance of transversal skills for employees who work in the field of computer science is undeniable as transversal skills complement technical computer science skills and play a key role in their professional development and success. It means that while studying at higher educational institutions Computer Engineering and Information Technology undergraduates should have all the opportunities to develop these skills. And the English language classroom is not an exception since English teachers can use a wide range of strategies for developing transversal skills among Computer Engineering and Information Technology undergraduates. The research is aimed at finding out Computer Engineering and Information Technology undergraduates' points of view on the importance of transversal skills for their future work and identifying effective strategies for their development in the English language classroom. 217 Computer Engineering and Information Technology undergraduates were participants in the research conducted by the team of researchers. To find out Computer Engineering and Information Technology undergraduates' points of view of the importance of transversal skills for their future work and to identify effective strategies for their developing in the English language classroom, the researchers developed a questionnaire which consisted of close-ended and open-ended questions and items on a 5-Likert scale. The study may contribute to the improvement of Computer Engineering and Information Technology undergraduates' training by identifying effective strategies for the development of transversal skills in the English language classroom.*

**Keywords:** *Computer Engineering and Information Technology undergraduates; English classroom; strategies for developing transversal skills; transversal skills.*

## I. INTRODUCTION

The importance of transversal skills for employees who work in the field of computer science is undeniable as transversal skills complement technical computer science skills and play a key role in their professional development and success. It means that while studying at higher educational institutions Computer Engineering and Information Technology undergraduates should have all the opportunities to develop these skills. And the English language classroom is not an exception since English teachers can use a wide range of strategies for developing various 21<sup>st</sup> century skills including transversal ones among Computer Engineering and Information Technology undergraduates. The research is aimed at finding out Computer Engineering and Information Technology undergraduates' points of view on the importance of transversal skills for their future work and identifying effective strategies for their development in the English language classroom.

## II. LITERATURE REVIEW

Many present-day researchers and practitioners who are engaged in Computer Engineering and Information Technology training emphasise the importance of so-called soft skills or skills of the 21<sup>st</sup> century to which one can refer transversal skills [1], [2], [3], [4]. And this we see on the official site of European Centre for the Development of Vocational Training, where along with the concept of "transversal skills" the following concepts as "basic skills", "soft skills", "non-cognitive skills", "socio-emotional skills" and "core skills" are used alternatively [5].

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It should be also noted that CEDEFOP defines transversal skills as “learned and proven abilities which are commonly seen as necessary or valuable for effective action in virtually any kind of work, learning or life activity” [6]. There are six categories of transversal skills and competences which include core skills and competences; thinking skills and competences; self-management skills and competences; social and communication skills and competences; physical and manual skills and competences; life skills and competences.

In “Project Spotlight: Validation of Transversal Skills Across Europe (TRANSVAL-EU)” transversal skills which are equated with soft or transferrable skills are defined as “skills, knowledge and attitudes that can be used in a wide variety of situations, both in life and at work. The term “transversal” refers to the way these skills “cut across” different spheres and tasks, as they are not specifically related to a particular job role or knowledge area” [7]. Their implicit and intangible nature makes it difficult to create a unified list of transversal skills. For today the most commonly used transversal skills include problem-solving, communication, teamwork and leadership and these skills are better acquired through non-formal and informal learning.

Ritvanen points out that everyone has transversal skills but people often “find it difficult to make them visible...” [8]. In the context of work, employees with transversal skills are able “to handle conflicts, solve problems and interact with colleagues...” [9]. Moreover, people need these skills to achieve their full potential and become active and responsible members of the present-day society.

Maunsell claims that transversal skills are “also given many different names such as soft skills, employability skills, key skills, generic skills, 21st century skills and skills for life (to name just some)” [10, p. 2]. The researcher explains that transversal skills are “commonly understood as the ability to work in a team, to communicate effectively, to be proficient in foreign languages, to be entrepreneurial, to be able to think creatively and to be able to solve problems” [11, p. 2-3].

Caeiro-Rodríguez et al. introduce a similar idea and state that university students in the field of engineering “need to be prepared to address sustainable solutions to the complex problems faced in this century. They should become proficient problem solvers, able to work in multidisciplinary teams, ready to adapt to new technologies, and able to acquire new knowledge and skills when needed” [10, p. 29222].

“The Glossary of Education Reform” which equates the notion of “transversal skills” with the notion of “21<sup>st</sup> century skills” contains an exhaustive list of skills which are associated with transversal skills [11].

Let’s turn to one more source according to which, transversal or professional skills are “career competences that are not specific to a particular job, task, discipline or area of knowledge. They are skills that can be used in variety of work settings, and as such are necessary for engineering graduates’ successful transition into future jobs” [12].

Considering all this, we focus on such transversal skills as “perseverance, self-direction, planning, self-discipline,

adaptability, initiative” [13] since we do believe that English as a medium of instruction effectively contributes to their development.

### III. RESEARCH METHODOLOGY

The research sample in this study included 217 first- and second-year Computer Engineering and Information Technology students who study English at two Ukrainian universities, namely, Kyiv National Economic University named after Vadym Hetman and Kyiv National University of Technologies and Design.

To find out Computer Engineering and Information Technology undergraduates’ points of view of the importance of transversal skills for their future work and to identify effective strategies for their developing in the English language classroom, the researchers developed a questionnaire which consisted of close-ended and open-ended questions and items on a 5-Likert scale.

The research was based on the following questions:

1. *Do you believe that English as a discipline promotes the development of the following transversal skills, namely, perseverance, self-direction, planning, self-discipline, adaptability, initiative?*

2. *Do you believe that such transversal skills as perseverance, self-direction, planning, self-discipline, adaptability and initiative are important for your future work?*

3. Please, rate the importance of the following transversal skills on a 5-Likert scale (1 – very unimportant, 2 – unimportant, 3 – neutral, 4 – important, 5 – very important): *perseverance, self-direction, planning, self-discipline, adaptability, initiative.*

4. *What activities used in the English language classroom contribute to the development of such transversal skills as perseverance, self-direction, planning, self-discipline, adaptability, initiative?*

The survey was conducted during the autumn semester of 2023/2024 academic years (between September-December 2023).

### IV. FINDINGS

Fig. 1 shows the results concerning the first question of our research.

Thus, 168 respondents (77.42%) believe that English as a discipline promotes the development of the listed transversal skills. 37 respondents (17.05%) gave a negative answer to this question and 12 respondents (5.53%) found it difficult to answer this question.

Answering the second question “Do you believe that such transversal skills as perseverance, self-direction, planning, self-discipline, adaptability and initiative are important for your future work?”, 171 respondents (78.80%) answered positively, 15 respondents (6.91%) gave a negative answer to this question and 31 respondents (14.29%) found it difficult to answer this question. Fig. 2 visualises the results concerning the second question.

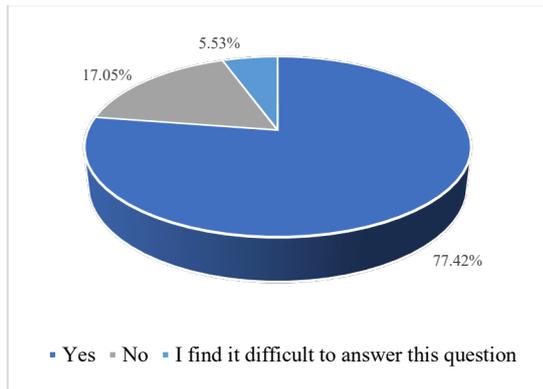


Fig. 1. Results concerning the importance of English as a discipline for promoting perseverance, self-direction, planning, self-discipline, adaptability, initiative.

Source: own study

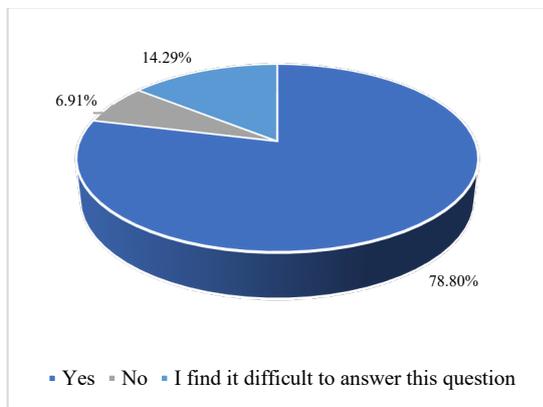


Fig. 2. Results concerning the importance of transversal skills on respondents' future work.

Source: own study

It should be noted that the respondents' opinions on the importance of selected transversal skills were measured from 'very unimportant' to 'very important' based on the 5-Likert scale intervals given in Table 1.

TABLE 1 INTERVAL LEVEL OF 5-LIKERT SCALE

Mean Interval	Opinion
1.00–1.80	Very unimportant
1.81–2.60	Unimportant
2.61–3.40	Neutral
3.41–4.20	Important
4.21–5.00	Very important

Source: own study

The results concerning the respondents' opinions on the importance of the selected transversal skills are presented in Table 2.

Thus, as shown by the results of our research, all the selected transversal skills are ranked as "very important" by the respondents, namely: perseverance ( $\bar{x}$ =4.63), self-direction ( $\bar{x}$ =4.47), planning ( $\bar{x}$ =4.52), self-discipline ( $\bar{x}$ =4.38), adaptability ( $\bar{x}$ =4.68), initiative ( $\bar{x}$ =4.48). Therefore, based on the results obtained we can assume that

present-day Computer Engineering and Information Technology undergraduates involved in our survey recognise the importance of the selected soft skills for achieving success at work.

TABLE 2 RESPONDENTS' OPINIONS ON THE IMPORTANCE OF SELECTED TRANSVERSAL SKILLS

Transversal skills	Variables					$(\bar{x})$	Overall Ranking
	1 (n)	2 (n)	3 (n)	4 (n)	5 (n)		
Perseverance	0	0	6	78	133	4.63	2
Self-direction	0	0	17	81	119	4.47	5
Planning	0	0	9	86	122	4.52	3
Self-discipline	0	0	21	92	104	4.38	6
Adaptability	0	0	3	64	150	4.68	1
Initiative	0	0	11	90	116	4.48	4

Source: own study  
 n=217

Fig. 3 demonstrates the obtained results regarding the importance of the selected transversal skills.

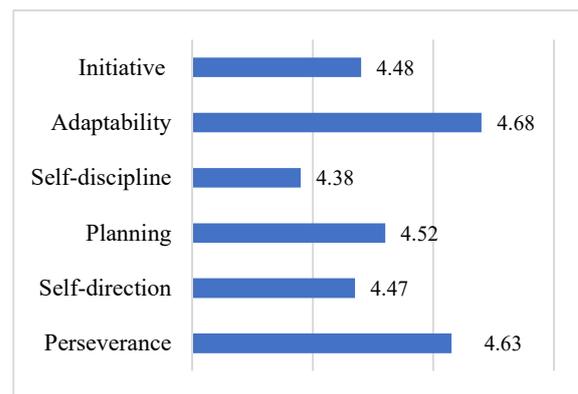


Fig. 3. Overall ranking of the selected transversal skills ( $\bar{x}$ )

Source: own study

In the overall ranking of the selected transversal skills adaptability takes the first place ( $\bar{x}$ =4.68). The second place is given to perseverance ( $\bar{x}$ =4.63). Planning ( $\bar{x}$ =4.52) ranks 3<sup>rd</sup> in the overall ranking whereas initiative ( $\bar{x}$ =4.48) holds the fourth position. The fifth rank is given to self-direction ( $\bar{x}$ =4.47) and the sixth rank is given to self-discipline ( $\bar{x}$ =4.38).

The fourth question was targeted at identifying activities which in respondents' views contribute to the development of such transversal skills as perseverance, self-direction, planning, self-discipline, adaptability, initiative in the English language classroom.

In respondents' point of view, to develop such transversal skills as perseverance, self-direction, planning, self-discipline, adaptability and initiative English teachers have to use activities aimed at tracking their progress (for instance, reflective diary writing, peer evaluation, individual and group projects etc).

## V. CONCLUSIONS

The research was targeted at finding out Computer Engineering and Information Technology undergraduates' points of view on the importance of transversal skills for their future work and identifying effective strategies for their development in the English language classroom. The results obtained enable us to conclude that the majority of respondents (77.42%) believe that English as a discipline is important for promoting the following soft skills as perseverance, self-direction, planning, self-discipline, adaptability, initiative. It should be also noted that the majority of respondents (78.80%) believe that such transversal skills as perseverance, self-direction, planning, self-discipline, adaptability and initiative are important for their future work.

The study may contribute to the improvement of Computer Engineering and Information Technology undergraduates' training by identifying effective strategies for the development of transversal skills in the English language classroom, namely:

Strategy 1 – *Teach students to set clear goals and to plan actions before undertaking the task.*

Strategy 2 – *Use a variety of time management techniques in the English language classroom.*

Strategy 3 – *Set clear deadlines for doing different tasks.*

Strategy 4 – *Regularly assess students' progress and involve students in various self-assessment activities.*

Strategy 1 – *Teach students to set clear goals and to plan actions before undertaking the task.* The majority of activities used in the English language classroom should be aimed at teaching students to set clear goals (short-termed and long-termed) and to plan their actions. The strict observance of the goals can help students be more motivated and adhere to the planned actions.

Strategy 2 – *Use a variety of time management techniques in the English language classroom.* The usage of time management techniques teaches students to prioritise tasks given in and outside the classroom, accomplish them quickly and meet deadlines without additional reminders.

Strategy 3 – *Set clear deadlines for doing different tasks.* Setting clear deadlines helps students schedule tasks effectively, optimise educational process and turn them into responsible learners. Moreover, students learn to identify priority tasks and achieve goals.

Strategy 4 – *Regularly assess students' progress and involve students in various self-assessment activities.* The

practical experience shows that the regular usage of different methods and techniques of assessment and self-assessment helps students identify reasons for the failures (in case they occur) and find ways to overcome them.

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