Formation of personal competencies of students in the field of training Information and Communication Technologies and Systems

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The demand for personal competencies in the Russian labor market has been analyzed for vacancies corresponding to the field of study "Information and Communication Technologies and Communication Systems," as well as the potential for their development in the educational process.
Keywords: Information and Communication Technologies and Communication Systems, personal competencies, universal competencies, self-organization, personal development.

1. INTRODUCTION

The issues of developing competencies in students, as well as the specifics of self-development, must be consistently addressed in the process of professional training. The results of research on students' ability to set goals, plan their day, prioritize tasks, and optimally utilize time resources enable the proposal of an adjusted plan for practical sessions to foster personal (universal) competencies.
Various aspects of competency development in the process of professional training for specialists in the field of information and communication technologies and communication systems have been the focus of research by the authors [1–6].

2. THEORETICAL PART

The analysis of job vacancies for positions such as "electronic engineer" and "communication engineer" in the labor market reveals that in up to 50% of cases, employers consider personal competencies, in addition to hard skills, as key qualifications. Among these, responsibility (60%), teamwork (29%), and a willingness to learn and develop (27%) are most frequently emphasized. Personal competencies are associated with:
- Time and activity organization skills (prioritization, planning, stress tolerance, and self-control).
- Willpower qualities (goal orientation, initiative, independence).
- Communicative skills (establishing contact with people, articulating decisions).
- Cognitive characteristics (attention to detail, accuracy, punctuality, multitasking ability).

These competencies align with the universal competencies outlined in the educational standards, particularly the Federal State Educational Standard for "Information and Communication Technologies and Communication Systems." This standard includes universal competencies such as systemic and critical thinking, teamwork and leadership, communication, self-organization, and self-development. However, there is a conflict between the employer's requirements ("must-have") and the qualities possessed by students – future employees ("are present").
Research on students, especially those in the early years of technical education, reveals the following characteristics:

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• Low indicators of motivation for creative self-realization, a preference for individual work, reluctance to engage in collaborative projects, a tendency to minimize psycho-emotional and intellectual efforts on academic tasks, insufficient desire for communication, diminished motives of duty and responsibility, substituting the goals of learning by meeting minimal requirements without developing self-improvement and time management skills, communication, and teamwork;
• Dependence on information technologies, a penchant for gaming forms of presenting media reality, an inability to critically analyze and perceive a large volume of information, displacement of real communication by virtual means, low stress resilience, high personal anxiety, self-orientation, lack of interest in others, pronounced individualism;
• Issues with self-organization, study and life planning, self-control, lack of inclination towards reading, delayed maturation process, lack of formed life orientations, virality – emphasizing the importance and connection of education with status in the virtual world.

Therefore, the outcome of education should be the development of personality [4]. It is essential to foster a positive attitude towards work, self-development, a desire for communication, and active overcoming of difficulties [2].

Considering the characteristics of modern students, typical recommendations for developing personal competencies in theory and practice suggest the following teaching strategies: practical application of acquired knowledge, utilizing all channels of perception in information delivery, maintaining constant dialogue and feedback, using information technologies, result-oriented approaches; formulating tasks succinctly (no more than 25 words) and step-by-step, setting tasks in the Moodle system tracker, employing collaborative work methods, tying tasks to manageable deadlines (in the case of long-term tasks, breaking them into subtasks), establishing clear task completion deadlines, and providing various forms of encouragement.

The development of personal competencies can be achieved through various forms of educational activities, including collective and individual creative projects, discussions, social performances, and sociodramas, as well as art technologies. This may involve using the Moodle educational environment, interactive assignments (surveys, forums, tests), socio-psychological and motivational training, self-development and self-realization training, cohesion and team-building training, tolerance and stress resilience training, overcoming exam stress, and the social project method (as a means of acquiring information through active engagement in transforming reality).

The potential of educational disciplines is not limited to the listed forms of work. Specifically, the discipline "Personal Development," included in the curriculum of the "Information and Communication Technologies and Communication Systems" program, shapes the universal competence of "self-organization and self-development." This includes the ability to manage one's time, establish and implement a trajectory of self-development based on the principles of lifelong learning.

3. PRACTICAL PART

To achieve the development of universal competencies within the course "Personal Development" and to adjust the thematic and practical plan of the discipline in 2023, the authors conducted a study in which first-year students participated. During practical sessions, students were assigned a task. The main requirements for the task included planning the day, setting goals and tasks for the day, determining the priority of tasks based on importance-urgency, allocating time resources for task implementation, and conducting day monitoring. The results of the day monitoring allowed an analysis

of the ability to set goals and plan, prioritize tasks, and optimally use time resources. It also identified "time absorbers and traps" negatively affecting the goal-setting and planning process.
Additionally, students completed the "psychological well-being" methodology, providing a subjective assessment of their perception of key life areas on scales such as "positive relationships," "autonomy," "personal growth," "life goals," and "meaningfulness of life." It is worth noting that this study was conducted among students from other fields as well. The trend of identified problems was not specific to a particular field of study.
During the analysis of students' planning results, the following data were obtained ($\rho \leq 0.05$):
- 63% of students experience difficulties with planning and creating a list of tasks;
- Determining the priority of tasks on the "urgency-importance" scale poses the greatest difficulty;
- 45% of students fill their day with "routine tasks," defining the priority of these tasks as important (tasks such as watching TV series and playing computer games are considered urgent and important in their version of task prioritization);
- 73% of students do not have problems with task setting in non-academic time (from sports activities to meeting friends, visiting shopping centers) and clearly define the value of the tasks they perform;
- 56% of students face difficulties in task setting and planning during academic hours, referring to it as the "institution," without a clear delineation of subtasks, as well as the importance and value of the tasks being performed.
Let's consider the distribution of "time absorbers" and "time traps" indicators based on the results of the students' day monitoring (Figure 1).

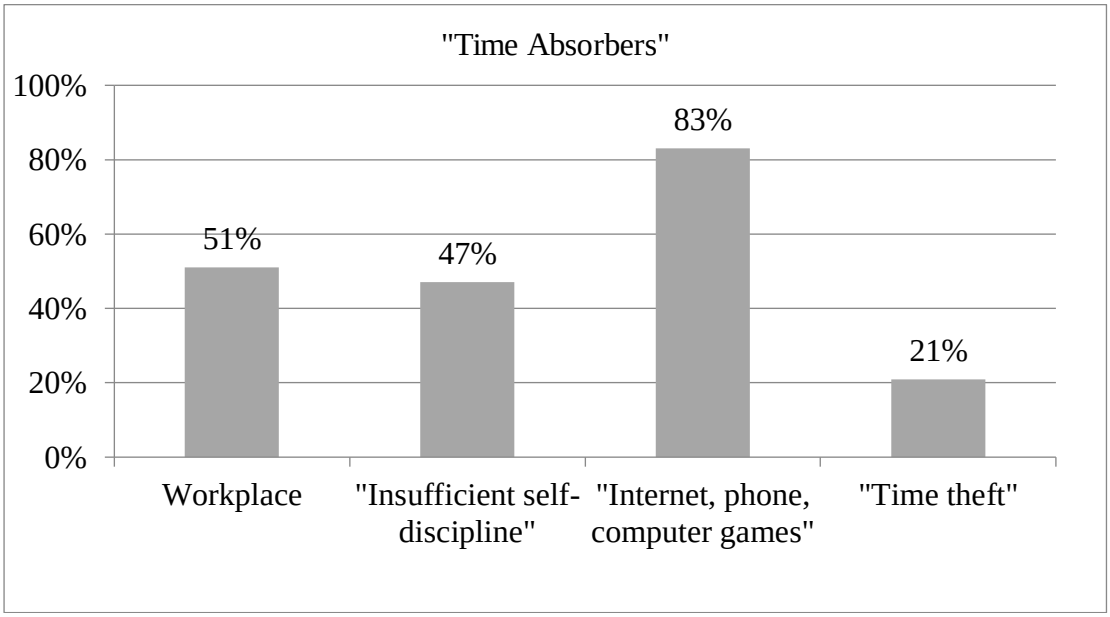

Figure 1. Distribution of "Time Absorbers"

"Time absorbers" are processes in which the learner actively or passively participates in the inefficient use of time.
- Analyzing their results, students identified processes they believe hinder the effective utilization of time.
- 51% of students note that their workspace, desk, and the state of their email and documents/files require organization.

- 47% of students admit to frequently getting distracted during classes, lacking control over personal time, and indulging in breaks during study and work.
- 83% of students confess that they are always ready to spend a significant percentage of time on phones, the internet, and computer games.

"Time traps" are incorrectly formulated tasks or the execution of "unnecessary, unimportant" work:

- The main "time traps" encountered by students during the planning and monitoring of the day include "setting unattainable goals," "unclear goal setting," "setting a false goal," and "incorrectly setting the right goal."

Indicators of "time traps" based on day monitoring data by students are presented in Figure 2.

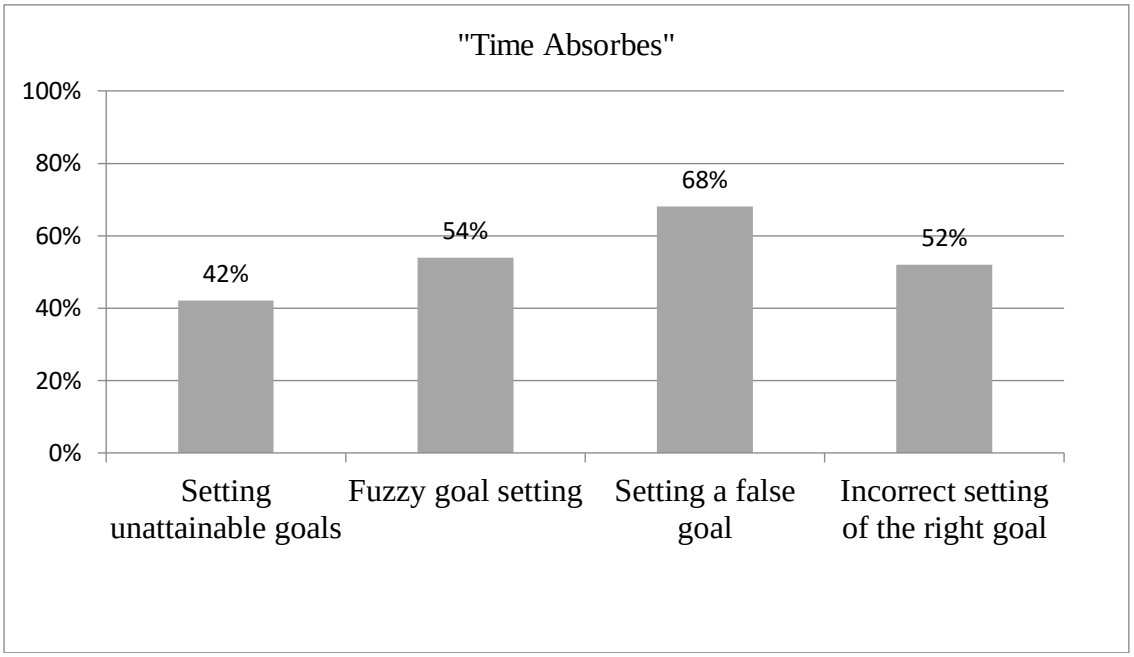

Figure 2. Distribution of "time traps" indicators

- 68% of students encounter the "false goal setting" trap when planning tasks, believing that the minimal time resource they allocate will be sufficient to achieve the goal.
- 52% of students assume that they need the maximum time resource to complete a task, leading to falling into the "incorrect setting of the right goal" trap throughout the day.
- 42% of students, during time expenditure calculations and analysis of the planned day, acknowledge tasks that they never managed to accomplish.
- 17% of students fall into all types of "time traps," explaining their unwillingness to plan their day and adhere strictly to the schedule, both in terms of time and the importance of planned tasks.

Additionally, the supplementary technique of "psychological well-being" allowed for obtaining a subjective assessment of the learners' perception of life areas on scales such as "positive relationships," "autonomy," "personal growth," "life goals," and "meaningfulness of life." Figures 3 and 4 present the distribution of indicators for low and high levels on the "psychological well-being" scales (PWB).

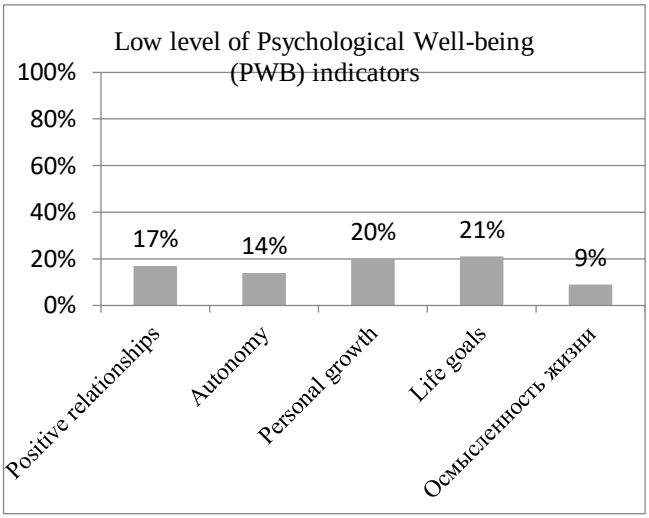

Figure 3. Low Psychological Well-being (PWB) Indicators

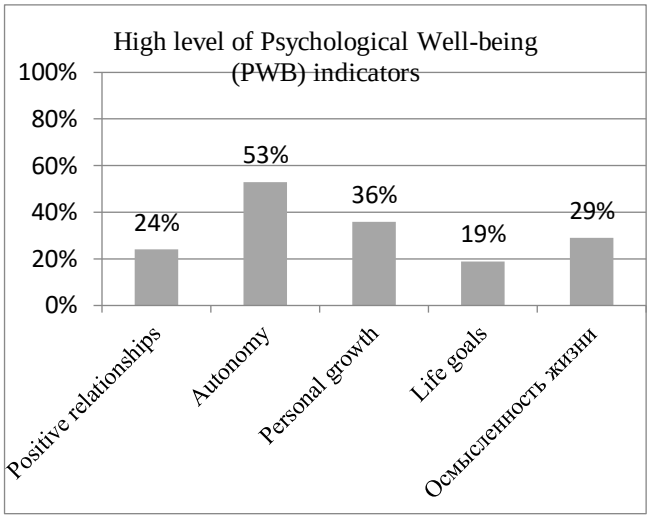

Figure 4. High Psychological Well-being (PWB) Indicators

Most indicators on the scales of "psychological well-being" among students are situated in the range of average values. However, the normative values of indicators for the age group up to 25 years, according to this methodology, should be in the range of high values when achieving psychological well-being.

Comparing high and low indicators on the scales of psychological well-being ($\rho \leq 0.01$), the following conclusions can be drawn:

- 53% of students characterize themselves as independent individuals, capable of resisting attempts by others to influence their thoughts and actions in a specific way; only 14% of students believe that they depend on the opinions and judgments of others in making important life decisions.
- 20% of students admit to having a low interest in what is happening in life and are not always able to change their behavior; 36% of those who responded to the methodology questions consider themselves open to new experiences, eager to realize their potential and self-actualize in life.
- 24% of students have trusting relationships with others, are capable of empathy, understand that relationships between people are built on mutual concessions, in contrast to 17% of students who are unwilling to compromise to maintain relationships with others.
- 19% of students believe they have a life goal, adhere to beliefs, and have intentions for life, while 21% admit to having difficulties in defining life goals, perspectives, and beliefs that determine the meaning of life.

The conducted research allows the authors to propose a plan for practical sessions to adjust the structure of the "Personal Development" course. Within the discipline, it is planned to use time management techniques to develop a sense of time and the ability to plan, prioritize, identify unproductive time spending, and improve time efficiency. The analysis of case studies on time planning and priority setting will be conducted in subgroups using examples of students. The possibility of creating individual and collective videos on various topics of personal effectiveness is also considered, such as self-motivation in studies, defining life goals, and stress regulation. A tentative list of topics for practical sessions in the "Personal Development" course is proposed in Table 1.

Table 1
Plan of Practical Sessions for the "Personal Development" Course

№	Themes of practical classes	Number of hours: Practical classes / student's independent work	Ожидаемые результаты
1	Time of life. Time competence. Introduction to the Zimbardo Time Perspective Inventory (ZTPI) questionnaire, and the test of life meaning orientations.	1/0	Reflection on the Perception of Time. Understanding the Necessity of Planning Your Time, Future Time. Awareness of the Meaningfulness of One's Life. 'Viewing Oneself from the Outside
2	Chronometry method (conducted over a period of 2 weeks)	1/during 2 weeks	Reflection on Time Expenditure, Identifying Time Absorbers, Developing a Sense of Time, and Effective Thinking
3	Mission and life goals. Values. How to set goals in life and in education	2/2	Setting Long-term and Short-term Goals in Education, Formulating a Plan to Achieve Educational Goals
4	How to study effectively. Methods of summarizing, memorization, critical analysis. Creative and critical thinking.	2/2	Awareness of Personal Responsibility for One's Learning. Mastery of Effective Learning Methods. Understanding the Importance of Independent Work, Self-education, and Self-development
5	Engineer's Professional Development Trajectory. Analysis of Job Vacancies in the Labor Market. Professional Career Strategies. Motives for Educational and Professional Activities, and Success	2/2	Understanding One's Motives in Education and Profession. Forming a more comprehensive understanding of the chosen profession. Understanding the importance of the relationship between 'need' – 'can' – 'want' – 'have' in professional self-determination
6	Self-motivation. Creation and presentation of video clips/comics on independently chosen topics related to self-motivation	2/3	Understanding personal resources and motivators
7	Success and happiness. Development and presentation of projects 'Success Strategy of a Well-Known Personality	4/3	Training in public speaking skills, presentation development, understanding various success strategies, awareness of life meaning orientations
8	Resilience to Stress. State Management Skills. How to Take Exams Without Stress? (Training Format)	2/2	Mastery of self-management skills using cognitive, somatic, imagery techniques, and mindfulness

Note: PC – practical classes, SIW – student's independent work

4. CONCLUSION

The formation of personal (universal) competencies should be carried out systematically throughout the entire period of education (personal and professional competencies continue to develop in the process of professional activities). In the formation of universal competencies, instructors of professional disciplines, mentors (supervisors) of study groups, and psychologists of educational institutions can be involved. Students should be engaged in various types of educational, scientific, social, volunteer, and creative activities. The formation of personal competencies, in addition to hard skills, will enable the preparation of more sought-after professionals who meet the requirements of the labor market.

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