



## Condiciones pedagógicas para la formación de la competencia autoeducativa durante el estudio de materias profesionales

### Pedagogical conditions for the formation of self-educational competence during the study of professional subjects

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### Resumen

El objetivo de esta investigación fue desarrollar y probar experimentalmente la efectividad de un conjunto de condiciones pedagógicas para construir la competencia autodidacta de los futuros especialistas de la carrera de pedagogía. Los métodos empleados consistieron en: análisis, síntesis, cuestionario encuesta, simulación y métodos de estadística matemática. Los indicadores que describen la competencia autodidacta de los alumnos del grupo experimental fueron significativamente superiores a los de los alumnos del grupo control. Los estudiantes del grupo experimental discutieron más activamente temas de autoaprendizaje, elaboraron mejor un plan para resolver una situación profesional problemática planteada por el docente, tuvieron mayores indicadores de motivación y autoeficacia. Estos resultados fueron promovidos por la diferenciación de la motivación que los profesores utilizaron en el experimento. Los resultados obtenidos pueden ser utilizados para mejorar las calificaciones pedagógicas de los docentes, así como para mejorar la calidad de la formación de estudiantes de diferentes carreras en el estudio de materias profesionales. Por ende, las perspectivas de futuras investigaciones incluyen probar el impacto de las herramientas desarrolladas en el desarrollo de la competencia autodidacta de los estudiantes de carreras médicas, técnicas y económicas.

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**Palabras clave:** autoeducación, motivación, eficiencia, diferenciación, cualificación, pedagogía.

### **Abstract**

The aim of this research was to develop and experimentally test how effective is a set of pedagogical conditions is for building self-educational competence of future specialists majoring in Pedagogy. The methods that were used are the following: analysis, synthesis, questionnaire survey, simulation, and methods of mathematical statistics. The indicators that describe the self-educational competence of the experimental group students were significantly higher than those students of the control group were. The experimental group students more actively discussed self-studied topics, better made a plan to solve a problematic professional situation set by the teacher, and had higher indicators of motivation and self-efficacy. These results were promoted by the differentiation of motivation that the teachers used in the experiment. The obtained results can be used to improve the teachers' pedagogical qualifications, as well as to improve the quality of training of students of different majors in the study of professional subjects. Therefore, prospects for further research include testing the impact of the developed tools on building self-educational competence of students of medical, technical and economic majors.

**Keywords:** self-education, motivation, efficiency, differentiation, qualification, pedagogy.

### **Introduction**

Current working conditions require constant self-education to keep knowledge and skills of each individual up-to-date. Even carrying out a certain type of activity in one area stably, a person needs to constantly develop skills and expand knowledge. This requires future specialists to have self-learning skills, the ability to produce creative ideas for solving problems. Self-learning skills also significantly improve the learning curve of students and, as a result, the qualifications of future specialists. According to HolonIQ (2020), the main skills in 2030 learning scenarios are the ability to make decisions and independent judgments, the ability to produce ideas, active learning, and the ability to learn throughout life.

In this case, Yu and Levesque-Bristol (2020) argue that the degree of self-determination of student motivation is critical to success. Self-educational activity is a process of learning and a way of life, which is characterized by a way of knowing oneself and the world, self-improvement in all spheres of education. Independence of students involves planning the learning process, a conscious attitude to choosing their profession. Motivation and research activities are the preconditions for self-education. In this case, Safin et al. (2015) found that the content of professional education, pedagogical relations, motivational and value attitude of the student to professional training necessitate independent educational cognitive activity. In addition to

professional qualities, the student must have well-developed empathy and reflection. According to works of Byhar et al. (2020) and of Striguna (2015), self-educational competence is expressed in a set of motivational, cognitive, activity and communicative components, takes into account the attitude to the process of independent acquisition of knowledge, skills and abilities.

By his part, Guseynova (2020) states that a high motivation is more important for successful learning of a student as a future professional than a high intelligence. Motivation plays a crucial role in a person's behavior, and is necessary for students to achieve certain academic performance (Pekrun, 2021). Eccles and Wigfield (2020) define motivation as a variety of activities that determine the line, stability and intensity of certain behaviors. Motivation is also strongly linked to self-efficacy (Li et al. (2020)). There are different types of motivation: external and internal (autonomous). Autonomously motivated students show higher academic performance and are more satisfied with the learning process (Nikula & Brazhaniuk, 2021).

It should be note how experts point to certain means to increase students' motivation for self-study. Calavia et al. (2020) indicate the effectiveness of creative assignments and design for self-education and development of the students' 21st-century skills. Gruzdeva et al. (2020) note that games (business, role), case studies, integrative and information technology, design are effective technologies for self-education. Astapenko and Bedareva (2020), Leshchenko et al. (2021) prove the effectiveness of including media resources in the educational process and Arens et al. (2021) showed the need to introduce innovative methods and technologies, irregular activities.

The above-mentioned studies show the effectiveness of certain pedagogical conditions for increasing the self-learning ability of students. Cho et al. (2021) found that the motivation of students who studied online is largely related to self-regulation and has a significant impact on learning outcomes. Instead, Hartwig and Malain (2022) obtained interesting results that students who studied independently online protracted their study time almost to deadlines and exams, rarely used optional learning tools, indicating a low level of motivation and/or self-regulation.

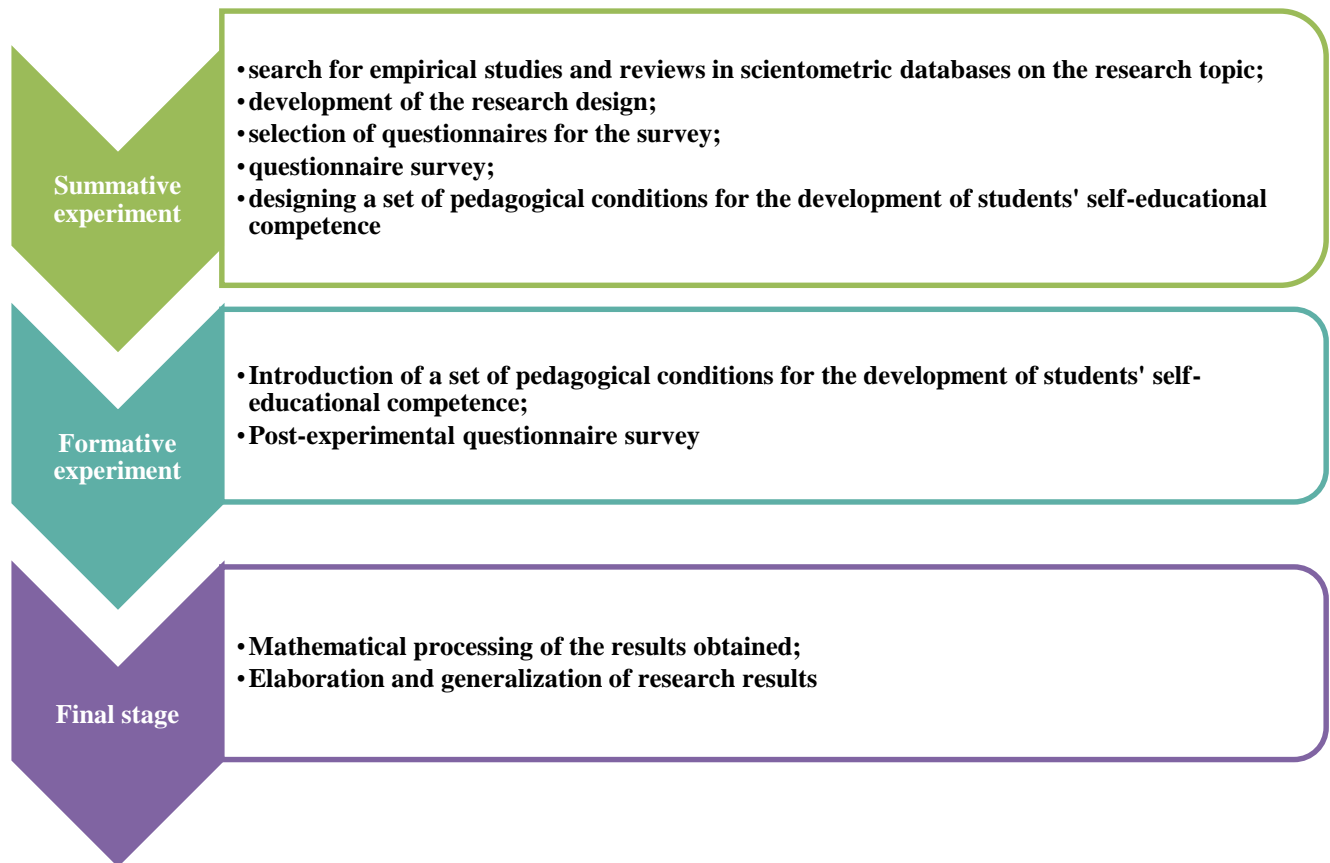
Given the considerable number of research, there are many unresolved issues regarding the qualitative building of future specialists' self-educational competence in the study of professional subjects. In particular, it is not identified how the application of certain pedagogical conditions (differentiated motivation, assignments for self-study based on individual needs and wishes of students, creative assignments in small groups, flipped classroom, and brainstorming)

will affect the development of students' self-educational competence. In light of all this background, the aim of this work is to develop and experimentally test the impact of certain pedagogical conditions applied in the study of professional subjects on the development of students' pedagogical competence.

## Methods

The research was conducted using a mixed method in 3 stages:

**Figure 1.** Research stages



The survey involved students of pedagogical majors of the 3rd-4th years of study of Drohobych Ivan Franko State Pedagogical University, the Educational and Research Institute of Physical Culture and Sports of Bogomolets National Medical University, Vinnytsia Mykhailo Kotsyubynskiy State Pedagogical University (n=132, men = 56, women – 76). Students were selected for the experiment upon their consent, without reference to academic performance. Table

1 presents quantitative composition.

**Table 1**

*Quantitative composition of the respondents*

Drohobych Ivan Franko State Pedagogical University	3 <sup>rd</sup> year of study - 20 students (8 men, 12 women) 4 <sup>th</sup> year of study - 22 students (8 men, 14 women)	total for 3 <sup>rd</sup> year of study - 69 students 26 men 33 women
Educational and Research Institute of Physical Culture and Sports of Bogomolets National Medical University	3 <sup>rd</sup> year of study - 28 students (19 men, 9 women) 4 <sup>th</sup> year of study - 25 students (12 men, 13 women)	total 4 <sup>th</sup> year of study - 70 students 27 men 43 women
Vinnitsia Mykhailo Kotsyubynskyi State Pedagogical University	3 <sup>rd</sup> year of study - 21 students (9 men, 12 women) 4 <sup>th</sup> year of study - 23 students (7 men, 16 women)	total 132 students 56 men 76 women

The control and experimental groups were formed after the summative experiment the number of respondents is presented in Table 2.

**Table 2**

*Composition of control and experimental groups*

Gender	EG	CG
Women	39	37
Men	28	28
Total	67	65

### ***Instruments***

As the motivation of students is a predictor of the development of self-educational competence, the study involved a survey to measure its level with the help of The Motivated Strategies for Learning Questionnaire (MSLQ, third edition) and Self-Efficacy Scales developed by Schwarzer and Jerusalem (1995), which Li et al. (2020) successfully used in their studies.

The MSLQ survey allows making a comprehensive assessment of students' motivation and their use of different learning strategies for a higher education course. MSLQ is based on a general cognitive understanding of motivation and learning strategies. Duncan et al. (2015) state that one

of the sections of the questionnaire is self-efficacy for learning and productivity, the results of this section will be discussed in more detail. The Cronbach's alphas of the sections of these scale are robust, ranging from 0.52 to 0.93 (Duncan et al., 2015).

The Self-Efficacy Scale developed by Schwarzer and Jerusalem (1995) consists of 10 questions that are available in different languages at <http://userpage.fu-berlin.de/~health/russian.html>. In samples from 23 nations, Cronbach's alphas of this scale ranged from 0.75 to 0.90 with the majority to 0.80 (Schwarzer & Jerusalem, 1995). After the experiment, teachers also evaluated academic performance in studying topics for self-study (5 topics that students study independently); drawing up a plan for solving problem professional situations set by the teacher, which students have not previously studied; finally, students' activities in the study of topics for self-study during the experiment. The Likert five-point scale was used from very good (5 points) to bad (1 point).

### *Analysis of data*

The received answers of students were entered and processed, and some results are graphically represented in MS Excel spreadsheets. The obtained data are calculated in MS Excel, and the arithmetic mean of indicators in groups, the percentage of indicators in groups, Student's t-test are determined. The study was conducted with anonymity, all students who participated in the study confirmed in writing their consent to publish the results.

## **Results**

A summative experiment allowed determining the initial data of students' motivation and self-efficacy, as well as determining the correlations with the results of overall performance in professional subjects. Table 3 presents the results of the survey using the Motivated Strategies for Learning Questionnaire.

**Table 3**

*Survey results for motivation and strategies for teaching students before the experiment (women)*

	<b>Top 25</b>	<b>Medium 50</b>	<b>Low 25</b>
1 Value component: internal goal orientation	13.16%	50.00%	36.84%
2 External goal orientation	15.79%	51.32%	32.89%
3 Component value: assignment value	18.42%	61.84%	19.74%
4 Expectation component: control of learning beliefs	11.84%	51.32%	36.84%
5 Expectation component: self-efficacy for learning and productivity	11.84%	48.68%	39.47%
6 Affective components: test anxiety	13.16%	50.00%	36.84%
7 Cognitive and metacognitive strategies: rehearsal	14.47%	65.79%	19.74%
8 Cognitive and metacognitive strategies: development	7.89%	50.00%	42.11%
9 Cognitive and metacognitive strategies: organization	11.84%	36.84%	51.32%
10 Cognitive and metacognitive strategies: critical thinking	15.79%	50.00%	34.21%
11 Cognitive and metacognitive strategies: metacognitive self-regulation	14.47%	35.53%	50.00%
12 Resource management strategies: time and learning environment	13.16%	44.74%	42.11%
13 Resource management strategies: effort management	14.47%	48.68%	36.84%
14 Resource management: mutual learning	14.47%	39.47%	46.05%
15 Resource management: seeking help	14.47%	43.42%	42.11%
Overall result	13.68%	48.51%	37.81%

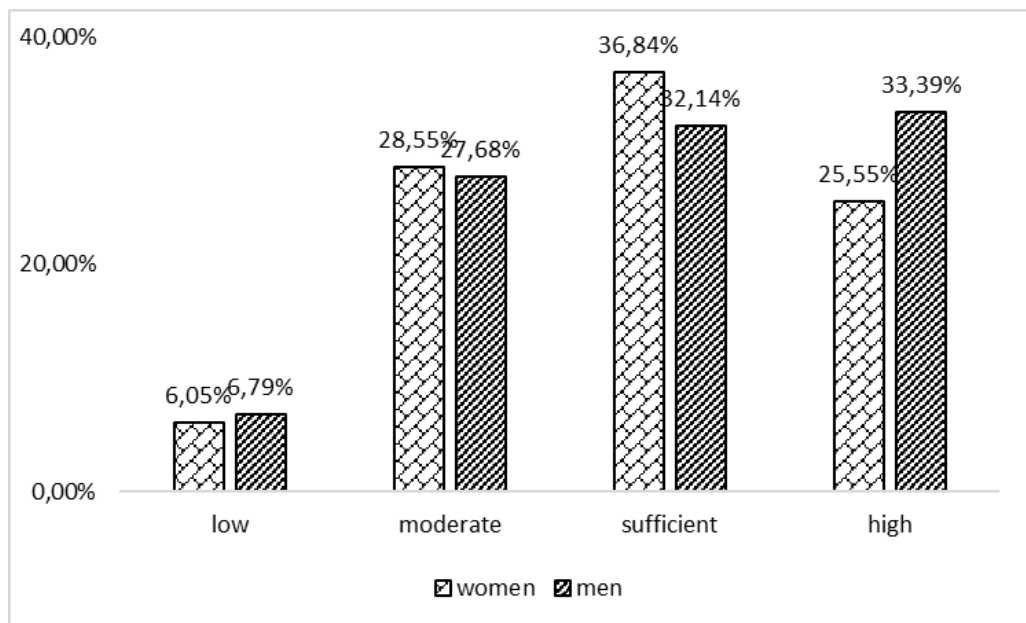
**Table 4**

*Survey results for motivation and strategies for teaching students before the experiment (men)*

	<b>Top 25</b>	<b>Medium 50</b>	<b>Low 25</b>
1 Value component: internal goal orientation	12.50%	50.00%	37.50%
2 External goal orientation	10.71%	58.93%	30.36%
3 Component value: assignment value	14.29%	42.86%	42.86%
4 Expectation component: control of learning beliefs	10.71%	50.00%	39.29%
5 Expectation component: self-efficacy for learning and productivity	8.93%	57.14%	33.93%
6 Affective components: test anxiety	14.29%	57.14%	28.57%
7 Cognitive and metacognitive strategies: rehearsal	14.29%	57.14%	28.57%
8 Cognitive and metacognitive strategies: development	7.14%	57.14%	35.71%
9 Cognitive and metacognitive strategies: organization	8.93%	51.79%	39.29%
10 Cognitive and metacognitive strategies: critical thinking	21.43%	39.29%	39.29%
11 Cognitive and metacognitive strategies: metacognitive self-regulation	16.07%	44.64%	39.29%
12 Resource management strategies: time and learning environment	8.93%	44.64%	46.43%
13 Resource management strategies: effort management	19.64%	51.79%	28.57%
14 Resource management: mutual learning	16.07%	51.79%	32.14%
15 Resource management: seeking help	8.93%	41.07%	50.00%
Overall result	12.86%	50.36%	36.79%

According to the survey results, there are no significant differences between the motivation of men and women ( $p < 0.05$ ). The results of the survey on General Self-Efficacy are illustrated in Figure 2.

**Figure 2.** Students' General Self-Efficacy (according to a survey using Self-Efficacy Scale developed by Schwarzer and Jerusalem (1995))



High General Self-Efficacy in men who participated in the study was significantly better developed than in women ( $p > 0.05$ ). There are significantly more women with moderate self-efficacy than men ( $p > 0.05$ ). The following pedagogical conditions have been developed and implemented for building self-educational competence in the study of professional subjects:

1. Formation of motivational and value attitude of students to self-study in professional subjects. This condition is realized with the help of differentiated influence on student motivation. Taking into account the obtained research data, a system of methods for influencing students' motivation for self-educational competence has been developed depending on the results and performance (which teachers evaluate by methods of current control during classes using methods to determine readiness to answer questions, the level of knowledge on each topic, self-learning skills acquired as a result of independently completed assignments).

2. Interrelation of all directions of professional training of future specialists (theoretical, methodical, practical), which provides for the development of self-educational competence:

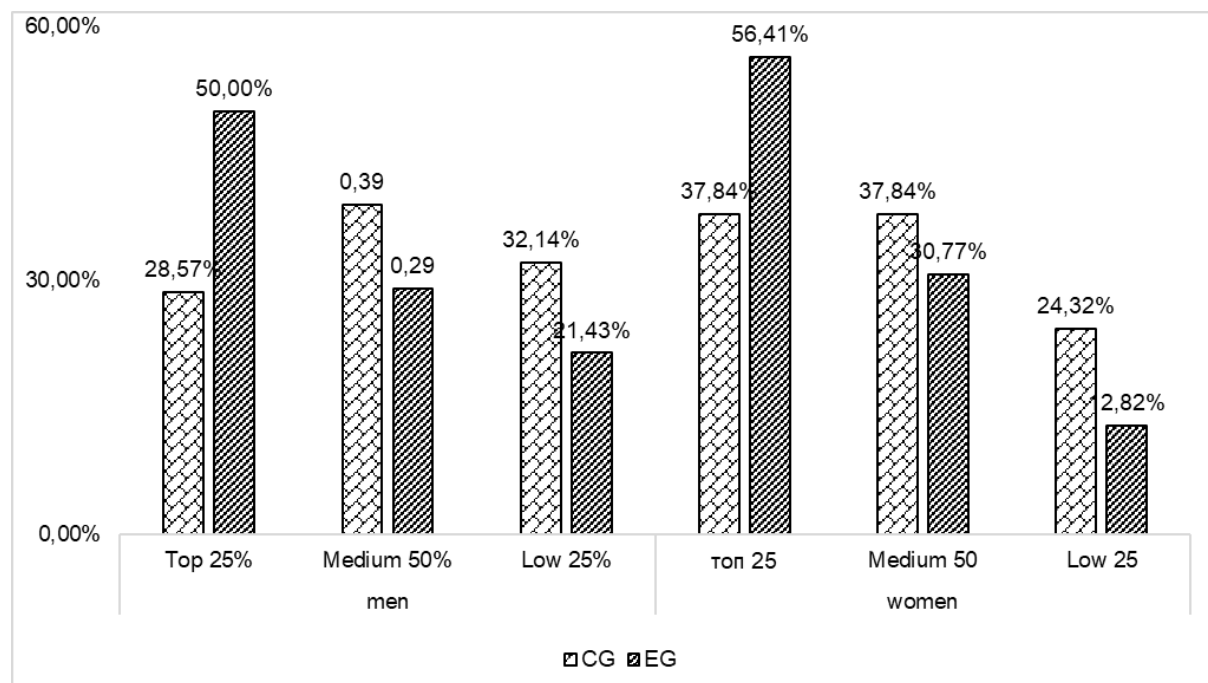


theoretical preparation for independent activity, practical training, preparing graduate qualification works. Teachers direct students to the most independent search for information, but under the teacher’s supervision. Mutual evaluation was conducted between students (projects, answers, discussions, additions) during practical and seminar classes.

3. Educational and methodological support for the development of self-educational competence includes multimedia presentations, online materials for self-study and knowledge improvement, online forums, chatting. Also, interactive technologies for simulation, design, self-study, communication: drawing a mindmap, breaking big goals into small progressive (when implementing projects for self-study), assignments in social networks (surveys, website links, communication), simulation of professional activities during classes through information technology, watching videos about the profession.

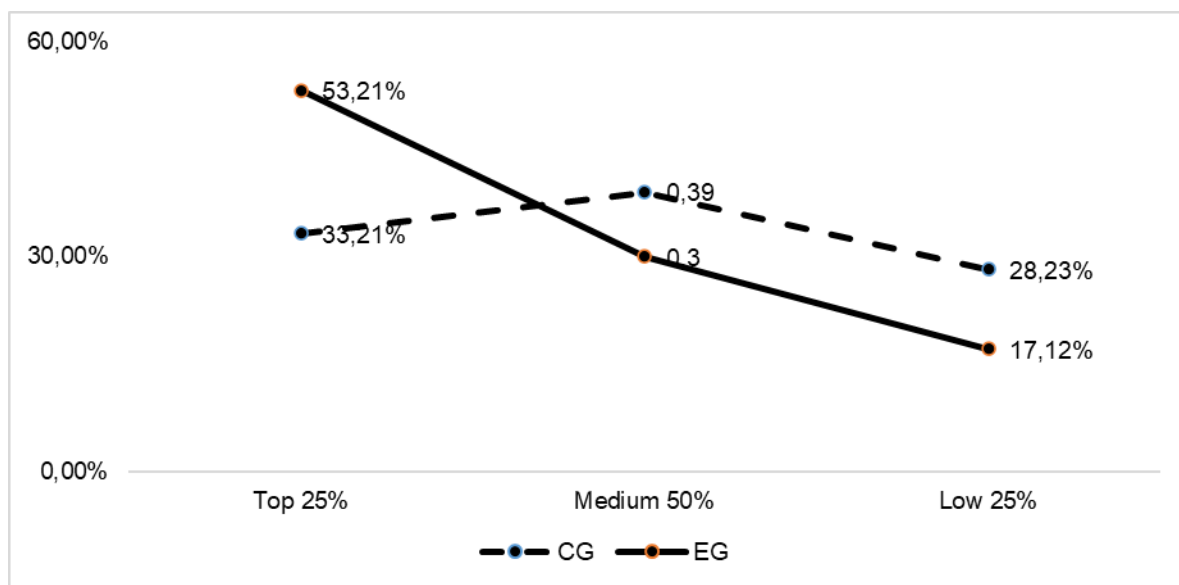
These pedagogical conditions were implemented during the two semesters of the 2020-2021 academic year. The second survey was conducted at the end of the academic year in order to determine the motivation of students, which shows significantly better results of motivation in both women and men (Figure 3), and self-efficacy (Table 5).

**Figure 3.** Indicators of motivation and learning strategies after the experiment (men, women)



As Figure 3 demonstrates, those who were motivated to study at the top level (25% of those who scored the most points according to the survey) dominated significantly among both men and women in the experimental group. It is interesting to note that there were significantly more women in the top 25% than men ( $p>0.05$ ). The total group indicators of the control and experimental groups also show the advantage of the experimental group in motivation to learn (Figure 4).

**Figure 4.** Indicators of motivation and learning strategies after the experiment (total group data)



The survey on student self-efficacy after the experiment also confirms the positive impact of pedagogical conditions developed and implemented into the student learning process, which contribute to the development of self-educational competence (Table 5).

**Table 5**  
*Indicators of overall self-efficacy of students after the experiment*

Gender	Group/level	Low	Moderate	Sufficient	High	p
Men	EG	10.71%	14.29%	39.29%	35.71%	>0.05
	CG	25.00%	35.71%	28.57%	10.71%	
Women	EG	17.95%	17.95%	23.08%	41.03%	>0.05
	CG	18.92%	32.43%	32.43%	16.22%	
Total group data	EG	14.33%	16.12%	31.19%	38.37%	>0.05
	CG	21.96%	34.07%	30.50%	13.47%	

Table 6 presents the results of the evaluation of additional factors that indicate the effectiveness of pedagogical conditions introduced in the educational process of experimental group students.

**Table 6**

*Evaluation of students' academic performance in studying topics for self-learning (5 topics that students studied independently)*

	<b>E</b>	<b>D</b>	<b>C</b>	<b>B</b>	<b>A</b>
<b>EG women</b>	<b>0.00%</b>	<b>12.82%</b>	<b>25.64%</b>	<b>28.21%</b>	<b>33.33%</b>
<b>EG men</b>	<b>0.00%</b>	<b>7.14%</b>	<b>25.00%</b>	<b>28.57%</b>	<b>39.29%</b>
CG women	0.00%	21.62%	29.73%	29.73%	18.92%
CG men	3.57%	14.29%	32.14%	28.57%	21.43%
<b>EG</b>	<b>0.00%</b>	<b>10.45%</b>	<b>25.37%</b>	<b>28.36%</b>	<b>35.82%</b>
CG	1.54%	18.46%	30.77%	29.23%	20.00%

So, as expected, students of experimental groups have higher academic performance for self-studied topics. It should be noted that these topics were assessed separately from the overall assessment for the subject course. Evaluation of additional criteria, such as “Drawing up a plan for solving problem professional situations set by the teacher, which students have not previously studied”, and “Students’ activity in discussing topics for self-study during the experiment” found that experimental group students received higher scores than students in control groups.

**Table 7**

*Evaluation of self-study of the topics and student activity while discussing these topics during the experiment*

Skills and abilities to be evaluated	Group/scores	1	2	3	4	5	p
Drawing up a plan for solving problem	EG women	0.00%	0.00%	10.26%	41.03%	48.72%	0.88
	EG men	0.00%	0.00%	21.43%	39.29%	39.29%	
professional situations set by the teacher, which students have not previously studied	CG women	0.00%	13.51%	29.73%	37.84%	18.92%	0.59
	CG men	0.00%	7.14%	21.43%	39.29%	32.14%	
	EG	0.00%	0.00%	14.93%	40.30%	44.78%	0.96
	CG	0.00%	10.77%	26.15%	38.46%	24.62%	
Students’ activity in discussing topics for self-study during the experiment	EG women	0.00%	0.00%	15.38%	41.03%	43.59%	0.67
	EG men	0.00%	0.00%	3.57%	42.86%	53.57%	
self-study during the experiment	CG women	0.00%	5.41%	37.84%	40.54%	16.22%	0.66
	CG men	3.57%	7.14%	42.86%	39.29%	7.14%	
	EG	0.00%	0.00%	10.45%	41.79%	47.76%	0.96
	CG	1.54%	6.15%	40.00%	40.00%	12.31%	

So, the evaluation found significant differences between women and men in both the control and experimental groups in terms of how teachers assessed drawing up plans for solving professional situations, and students' activity in discussing topics for self-study. In particular, the women of the experimental group were estimated at 5 points (48.72%), men (39.29%) for drawing up the plan. At the same time, 53.57% of men and 43.59% of women in the experimental group received 5 points for their activity in discussing self-studied topics. Such results may indicate that women are better at making plans to solve professional situations, while men are more active in discussing self-studied material, which can be explained by gender differences or the peculiarity of the sample. In the control group, the assessments between men and women also differed significantly, but there were significantly less women who drew up a plan to solve problem situations than men ( $p>0.05$ ), while there were more women who most actively discussed self-studied topics in the control group than men.

These are quite interesting results that show the impact of differentiation of motivation on the overall state of motivation and activity of the group, and the diverse behaviour of men and women, which determines future professionalism. We can also assume that male students, who are not applied different pedagogical conditions for the development of self-educational competence, have more opportunities to draw up a plan for solving problem situations than women who studied in similar conditions, while women may be more able to study independently and discuss topics (without special conditions).

It is necessary to differentiate types of motivation that teachers should use for the development of self-educational competence, because students with a lower level of knowledge and weak self-regulation ability cannot complete some assignments. The reverse is true in the following case: the means of controlled motivation are not appropriate for students with a high level of motivation and self-discipline. The effectiveness of a set of developed tools for the building self-educational competence in the study of professional subjects was experimentally proven.

## Discussion

The results of the research show that students' motivation for self-study, as well as their self-efficacy, was not high. This to some extent confirms the results of Hartwig and Malain, (2022). The complex of pedagogical conditions for the formation of self-educational competence made it

possible to increase the number of motivated students for self-education. The results of the implementation of a set of pedagogical conditions intended for the development of self-educational competence in the study of professional subjects indicate their indisputable effectiveness. Many experts, namely Glazunova et al. (2018), Ishmuradova et al. (2015) and Trolian et al. (2021) emphasize the need to build self-educational competence in order to develop the professional skills required for future professionals, which is also proved in this study.

The current context provides for the use of digital technologies, but their effective use requires developed organizational skills of self-education and the ability to apply the skills acquired in the course of learning using digital technologies in practice, students need to be able to discuss, critically perceive information, analyze, plan. The use of pedagogical conditions selected for this study is favorable for this purpose, Astapenko and Bedareva (2020); Arens et al. (2021); Calavia et al. (2020) confirm their effectiveness of which, in addition to the authors of this study.

By its part, Striguna (2015); Safin et al. (2015); Calavia et al. (2020) believe that the development of self-educational competence requires such conditions that will contribute to the psychological well-being of students, and in addition to learning, will address such needs as autonomy, motivation, self-expression, creativity. In turn, Bureau et al. (2021); Guseynova (2020); Ryan and Deci (2020) maintain that the use of motivation should be differentiated for students with different levels of opportunities for self-education, and this differentiation will have a positive effect on the quality of self-educational competence. According to Nikula and Brazhaniuk (2021), Santana-Monagas et al. (2022), Adachi et al. (2018), the influence and competence of teachers are extremely important factors in the quality of education, the development of self-education competence and the future specialist in general. Teachers' pedagogical competence, regardless of the variety of digital technologies or opportunities for self-learning (which equally involves the participation of teachers or mentors, coaches) is one of the most important predictors of success in learning.

Also, the obtained results emphasize the importance of pedagogical influence for successful student learning. This is especially important at a time when computer-based learning is somewhat displacing teaching with the teacher and shows that with all the variety of educational aids in today's world, teaching competence and influence are one of the essential factors in successful learning. Based on this, teachers need to apply their pedagogical competence using new

teaching aids in different conditions (online, distance, blended learning). Teachers must skillfully motivate students to learn theory and use new technologies to create their own projects by students. The consequences of the conducted research are the introduction of pedagogical conditions during the study of professional disciplines to increase students' motivation and ability to self-study. The result of this is an increase in the ability to self-study not only for obtaining a diploma and completing studies at a higher educational institution, but also for constantly improving one's knowledge in future professional activities.

Future research focuses on other factors that contribute to students' intrinsic motivation. These may be specific strategies that teachers will use in their practice, tasks for students to perform certain tasks, and interactive teaching methods. It is necessary to consider current learning conditions (most of the time, learning takes place in distance mode), the need to update curricula, the composition of study groups, and the individual characteristics of each student. It is vital to consider the professional requirements of future professionals, emphasize the need for continuous self-study and expand their skills in connection with various factors of society and events in the country, and adapt to different learning and working conditions in other countries (overcoming difficulties and new career opportunities in the chosen profession).

This study has certain limitations: population and number of students (132 students), their specialty, Pedagogy, as well as the use of specific interactive tools (described in the results), and non-use of other tools that can be more effective in teaching others specialty.

### **Conclusions**

Developed and implemented pedagogical conditions for building self-educational competence had a positive impact on the evaluated criteria. The main principle was the differentiation of students' motivation depending on their capabilities for self-study, the level of knowledge and specifics of the subject, students' preparedness for classes and their motivation for self-study.

The developed set of pedagogical conditions for building self-educational competence can be used by teachers for students of various majors, in training and retraining teachers, drafting guidelines for classes (for teachers), and planning individual assignments for independent work of students. Therefore, it is planned to further test the developed pedagogical conditions with students

of other majors (which include exact sciences, medical, legal sciences) to verify the impact of differentiated motivation and other conditions on the development of their self-educational competence.

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