



**MEDICAL UNIVERSITY
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**THE IMPACT OF INTERACTIVE TECHNOLOGIES ON THE
FORMATION OF PROFESSIONAL COMPETENCIES IN STUDENTS
OF THE REHABILITATION THERAPIST SPECIALTY**

A B S T R A C T

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Scientific jury:

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The public defence of the dissertation work will take place on February 28, 2024 at 12:00 online via Webex.

The materials of the defense are available at the Scientific Department of the Medical University - Varna and have been published on the website of the Medical University - Varna.

Note: In the abstract, the numbers of the figures and tables do not correspond to their numbers in the dissertation.

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I. INTRODUCTION

**"Education is not preparation for life,
education is life itself"**

John Dewey

Tracking the trends in current medical education in Bulgaria, we can observe that they pose a real challenge to modern young people. Contemporary education creates opportunities for dynamic development in the preparation of future students, where knowledge, skills, and adaptability are of paramount importance. Thus, the need to transition from acquiring knowledge and skills to competency-based learning logically arises. It is aimed at developing the complex individual – the student becomes an active participant in their own learning, develops social and emotional skills, learns to cope with the rapidly changing world, and prepares for continuous self-education throughout life.

Undoubtedly, the current generation of students grows up in the spirit of rapidly applicable innovative technologies. They naturally impose themselves not only in our daily lives but also significantly contribute as a factor in the future education of young healthcare professionals. This, in turn, leads to a modification in the traditional sense of the educational process. The implementation of new approaches to education in the medical college, institutionally, is necessary in order to lead primarily to the modernization of the model of the educational process for healthcare professionals.

The profession of a rehabilitation therapist has undergone significant progress in recent decades, dictated by the extreme development in various fields of science and technology in medicine.

The possibilities of modern rehabilitation science provide high-tech and integrated solutions that take into account not only the strictly personalized needs of patients but also help the recovery-needing population to rapidly and completely restore or improve their functional abilities, to achieve and enhance

their quality of life, and most importantly, to transition to their active role in society.

Today, healthcare utilizes the rehabilitation process in all aspects - promotion, prevention, therapy, recovery, and resocialization of patients. Essentially, it is a relatively inexpensive, easily applicable medical treatment approach with clearly established traditions of application. Therefore, the training of future rehabilitation therapists should aim to adapt to new technologies in the teaching and learning processes. This provides us with the right answer regarding the needs for quality rehabilitation of both society and the individual.

The main principle in modern rehabilitation education is the pursuit of personalized learning in the educational experience. This means that students receive individualized educational paths that shape the diverse set of their individual needs, interests, and skills. This personalization is technologically dependent and presupposes an environment for adaptive learning, online resources, and tools for effective assessment and monitoring of their progress. Technological educational models today can be used to improve self-regulation skills, emotional intelligence, and interpersonal interactions. Subsequently, this helps learners to develop broad creativity, positivism in human relations, and a proper approach to their forthcoming emotional and social challenges.

Continuous updating of pedagogical approaches for the acquisition of the knowledge and skills of the modern rehabilitation therapist is a necessity in future pedagogical practice.

II. PURPOSE, TASKS, METHODOLOGY AND ORGANIZATION OF THE STUDY

2.1. Purpose and tasks of the study

Purpose: To create a scientifically-based model for conducting practical training classes on kinesiotherapy and therapeutic massage using interactive methods and tools to optimize education and develop sustainable professional competencies in students of the "Rehabilitation therapist" specialty.

Tasks: Achievement of the goal is associated with the accomplishment of the following tasks:

1. To study in a theoretical aspect the basic documents and the available literature on the researched problem.
2. To analyze the interactive methods and tools correspond to the specificity of education for students of the "Rehabilitation therapist" specialty.
3. To study and analyze the opinions of lecturers and mentors regarding interactive learning and its impact on building the professional competencies of the future rehabilitation therapist.
4. To study and analyze the opinions of the students of "Rehabilitation therapist" specialty, regarding interactive learning as a factor for the shaping practical skills and professional competencies.
5. To conduct a study on students' academic motivation of the students and their attitude towards the learning process.
6. To develop a model based on interactive methods and tools for practical training classes on kinesiotherapy and therapeutic massage.
7. To conduct a didactic experiment on the developed model, including interactive technologies in the practical training classes on kinesiotherapy and therapeutic massage.
8. To analyze the results of the conducted didactic experiment.

2.2. Working hypotheses:

The following hypotheses have been formulated during the work process:

Hypothesis 1 It is assumed that the training of student rehabilitation therapist with traditional methods and means in the core subjects of kinesiotherapy and therapeutic massage needs to be updated given the rapidly evolving innovative technologies in education.

Hypothesis 2 It is suggested that a focus on interactive educational technologies in the learning process is needed to increase motivation for learning and to achieve a more thorough understanding of the study material.

Hypothesis 3 It is assumed that if students' training is conducted through a model based on interactive methods and tools in practical training classes on kinesiotherapy and therapeutic massage, it will contribute to higher success rates in building professional competencies and confidence in handling various professional situations.

2.3. Organization, time and place of the study

2.3.1. Subject of the study

The subject of the research is the developed model, composed of specially selected interactive educational approaches applicable in practical training classes on kinesiotherapy and therapeutic massage.

2.3.2. The object of the study includes:

- **Students** - enrolled in the Medical Colleges of the Trakia University - Stara Zagora, Medical College - Varna, and Medical College - Plovdiv, with specialty "Rehabilitation therapist".
- **Lecturers** - teaching at the Medical College - Stara Zagora, Medical College - Varna, and Medical College - Plovdiv in "Rehabilitation therapist" specialty.
- **Mentors** - practicing rehabilitation professionals from clinical skills training centers in the city of Stara Zagora and the city of Varna.

2.3.3. Organization of the study

The questionnaire survey was conducted from January to June 2023, following approval from the Ethics Committee of Scientific Research at Varna Medical University with Decision No. 123/15.12.2022.

The study was conducted after obtaining a Declaration of Consent from the directors of MC - Stara Zagora, MC - Varna, and MC - Plovdiv, as well as the managers of the healthcare facilities where the survey was conducted.

2.3.4. Scope of the study

The study included a total of 308 respondents, divided into three groups:

- *First group* - students specializing in "Rehabilitation therapist" at MC Stara Zagora (n = 85), MC Varna (n = 80), and MC Plovdiv (n = 55);
- *Second group* - lecturers in the "Rehabilitation therapist" specialty from MC Stara Zagora (n = 10), MC Varna (n = 10), and MC Plovdiv (n = 10);
- *Third group* - Mentors from the clinical skills training centers in the city of Stara Zagora and the region and in Varna (n = 58).

2.4. Stages of the study:

The study was conducted in three stages. Table 2.1. presents the activities, tools, location, and period of the study. For greater accuracy in the results, the study was conducted personally by the doctoral student.

Table 1. Stages of the Study

<i>Stages</i>	<i>Activity</i>	<i>Toolkit</i>	<i>Location</i>	<i>Period</i>
Preparatory stage- organization of the study	Analysis of the literature on the researched problem. Formulation of a thesis, definition of a goal, tasks, object and subject, hypotheses.	Literary sources on the subject /Bulgarian and foreign/, scientific database related to the researched problem.	Stara Zagora	July - September 2022г.

<i>Stages</i>	<i>Activity</i>	<i>Toolkit</i>	<i>Location</i>	<i>Period</i>
	Creation of survey tools - survey questionnaires; Obtaining a Declaration of consent from the directors of the institutions.	Participant Information; An informed consent Questionnaire card: for students for lecturers for mentors	Stara Zagora and the region, Varna Plovdiv	September - October 2022
	Model development Obtaining approval from the Research Ethics Committee.	Practical training interactive model for practical training classes in kinesiotherapy and therapeutic massage	Stara Zagora	October November 2022 15.12.2022
Application of the didactic experiment	Actual research: Conducting a survey among students, lecturers and mentors from the clinical skills training centers.	Questionnaire card for special "Rehabilitation therapist" students Questionnaire card for lecturers Questionnaire card for mentors	Stara Zagora Varna Plovdiv	January - March 2023
	Conducting a didactic experiment with the students.	Practical training interactive model	Stara Zagora	January- May 2023
	Survey after the experiment is over.	Questionnaire card for students - after the experiment	Stara Zagora	January - May 2023
Analysis and discussion of results	Statistical processing of the results. Analysis and summarization of the obtained data. Summarizing conclusions and contributions derived from the dissertation work.	IBM SPSS Statistics 26.0 statistical data processing package	Stara Zagora	June - August 2023

2.5. Research methods

2.5.1. Documentary Method: Bulgarian and foreign literature sources related to the process of education in medical education, innovative and traditional methods and tools applied in the educational process, the essential characteristics of the

competency-based approach, and its significance in the education of rehabilitation therapists were studied.

2.5.2. Sociological Method: A questionnaire survey was conducted to investigate the opinions of:

- Students from the first, second, and third year of the "Rehabilitation therapist" specialty at the Medical Colleges of Stara Zagora, Varna, and Plovdiv.
- Lecturers in the "Rehabilitation therapist" specialty at the Medical Colleges of Stara Zagora, Varna, and Plovdiv.
- Mentors from the clinical bases in Stara Zagora, the region, and Varna.

2.5.3. Statistical Methods:

Methods for analyzing and interpreting data were applied to reveal the essence of the observed phenomena and their relationships. The obtained results were considered statistically significant when the p-value <0.05 , at which point the null hypothesis was rejected. The following statistical methods were used to present the results:

A. Descriptive methods and assessment methods:

- Descriptive statistics for quantitative variables – mean, standard deviation, minimum value, and maximum value.
- Frequency analysis of qualitative variables (nominal and rank), including absolute frequencies, relative frequencies (in percentages), and cumulative relative frequencies (in percentages).
- Graphical representations - data are visually presented through tables, bar charts, and pie charts created in MS Excel.

B. Hypothesis Testing Methods

- Chi-squared tests for consistency, independence, and hypothesis testing for the presence of a relationship between categorical variables.

- Correlation analysis to establish the relationship between the studied quantitative and qualitative variables.

The statistical analysis was conducted using the IBM SPSS Statistics 26.0 statistical package.

2.6. Research Instruments:

Four author-designed survey questionnaires were used to achieve the scientific research goals and address the predefined tasks:

- *Survey Questionnaire No.1* to study the opinions of students whose from the "Rehabilitation therapist" specialty regarding the application of interactive technologies. The survey questionnaire includes 14 questions;

- *Survey Questionnaire No.2* for "Rehabilitation therapist" specialty lecturers regarding the place of interactive methods in education and their connection to building professional competencies for future rehabilitation therapists. The survey questionnaire includes 13 questions;

- *Survey Questionnaire No.3:* for mentors from the clinical skills training centers regarding their opinion on the application of interactive technologies in the process of shaping the professional competencies of future rehabilitation therapists. The survey questionnaire includes 13 questions;

- *Survey Questionnaire No.4:* Survey to study the opinions of students "Rehabilitation therapist" after the didactic experiment. The survey questionnaire includes 14 questions.

For the purposes of the experiment, a practical training interactive model was developed and implemented, incorporating a combination of interactive methods and tools tailored to the specificities of training rehabilitation therapists. It was applied during the conduct of practical training classes on kinesiotherapy and therapeutic massage with 85 students from the first, second, and third year of the "Rehabilitation therapist" specialty at the Medical College in Stara Zagora.

III. RESULTS OF OWN RESEARCH

3.1. General characteristics of the studied groups of respondents:

In the present study, a total of 308 respondents participated, distributed into three groups: students of the "Rehabilitation therapist" specialty (71.43%, n=220), lecturers (9.74%, n=30) in the "Rehabilitation therapist" specialty, and mentors from the clinical bases for training (18.83%, n=58).

3.1.1. Characteristics of the participating students in the scientific study.

The scope of the research study included a total of 220 students first, second and third year. The distribution of the year of study and the educational institution in which they are enrolled is presented in Table 3.1.

Table 3.1. Distribution of students by year of study and college:

Course of study	Number of students from Medical College – Stara Zagora		Number of students from Medical College - Varna		Number of students from Medical College - Plovdiv		Total	
	n	%	n	%	n	%	n	%
First year students	37	43,5	26	32,5	25	45,5	88	40,0
Second year students	20	23,5	33	41,3	20	36,3	73	33,2
Third year students	28	33,0	21	26,2	10	18,2	59	26,8
Total:	85	100	80	100	55	100	220	100

The largest relative share of students is from the first year (n=88, 40%), followed by respondents from the second year (n=73, 33.2%), and the smallest percentage is of those in the third year (n=59, 26.8%).

The mean age of the student respondents is as follows: for students from Stara Zagora, it is 22.90 (SD±5.05), for students from Varna, it is 23.14 (SD±6.25), and for those from Plovdiv, it is 22.36 (SD±4.85). The minimum age of students surveyed, is 18 years, and the maximum is 49 years (Table 3.2).

Table 3.2. Age characteristics of respondents from the three Medical Colleges

<i>Medical College</i>	N	Min	Max	Mean±SD
<i>Stara Zagora</i>	85	18	41	22,90±5,05
<i>Varna</i>	80	18	49	23,14±6,25
<i>Plovdiv</i>	55	18	46	22,36±4,85

Regarding **gender**, the data analysis shows a higher relative proportion (55.5%, n=122) of female students compared to the relative proportion (44.5%, n=98) of male students (Table 3.3).

Table 3.3. Distribution of respondents from the student group by gender according to the Medical College in which they are studying:

<i>Medical College</i>	<i>men</i>		<i>women</i>		Total:
	n	%	n	%	n
<i>Stara Zagora</i>	32	37,6	53	62,4	85
<i>Varna</i>	33	41,3	47	58,7	80
<i>Plovdiv</i>	33	60,0	22	40,0	55
Total:	98	44,5	122	55,5	220

3.1.2. Characteristic of participating lecturers in the scientific study.

From the **group of lecturers**, 30 respondents participated in the study, teaching in the "Rehabilitation therapist" specialty from three different medical colleges in the country – Stara Zagora (31.33%, n=10), Varna (33.33%, n=10), and Plovdiv (33.33%, n=10).

Data analysis shows that, in terms of **gender**, a higher relative proportion (86.66%, n=26) of female lecturers participated compared to the relative proportion (13.33%, n=4) of male lecturers.

Regarding **age**, the predominant age group is the one between 41-60 years (n=18, 60.0%), compared to lecturers between 20-40 years (n=12, 40.0%). In terms of work experience, more than half of the teaching staff have between 1-10

years of experience (n=17, 56.66%), followed by those with 11-20 years of experience (n=5, 16.66%), and the ones with over 20 years of experience (n=8, 26.66%). The average work experience is 11.6 years.

The predominant **academic qualification** among the teaching staff is a Master's degree (66.66%, n=20), followed by a Doctorate degree (16.66%, n=5), Associate Professor (13.33%, n=4), and Professor (3.33%, n=1).

3.1.3. Characteristics of participating mentors in the scientific study.

In the study, 58 respondents from the group of **mentors** from the clinical skills training centers (working as rehabilitation therapists) expressed their willingness to participate, including those from Stara Zagora and the region (65.50%, n=38) and from Varna (34.50%, n=20). In terms of gender, a higher relative proportion (70.70%, n=26) of women participated compared to the relative proportion (29.30%, n=4) of men.

The predominant **age group** is between 20-40 years old (n=32, 55.20%), followed by fewer mentors aged 40-60 years (n=24, 41.40%), and two individuals over 60 years old (3.40%).

In terms of **education**, the majority of respondents have a Bachelor's degree (n=53, 40%), followed by a Master's degree (n=20, 70%), and (n=15, 25.90%) indicating another degree.

3.2. Data analysis and discussion of results from the conducted study:

3.2.1. Results and analysis of the survey questionnaire among students and lecturers regarding interactive methods and tools applied in teaching practices:

The educational process for rehabilitation therapists is predominantly practical-oriented. In this context, interactive teaching methods and tools are diversified based on their essence and content. Their variety suggests differences primarily in their application approach.

The survey questionnaire outlined several of the most commonly used interactive methods in practical classes: *discussion, role-playing games, project-based learning, problem-based learning, and multimedia presentations*. Respondents were asked to determine their contribution to their practical training.

Upon analyzing the results, it becomes clear that respondents from the three educational institutions prefer **human-centered design methods** (based on interaction between lecturer and student) –role-playing games and discussions. More than half of the respondents from the three medical colleges in Stara Zagora (n=73, 85.9%), Varna (n=50, 62.5%), and Plovdiv (n=42, 76.4%) indicate that role-playing games contribute the most to their preparation (Figure 3.1).

Regarding the *discussion*, the majority of students from Medical College Varna (n=51, 63.7%) and Plovdiv (n=44, 80.0%) believe that it contributes to their practical training. This is also supported by those trained in Stara Zagora (n=49, 57.6%).

Multimedia presentation are highly valued by students from Medical College Stara Zagora (n=63, 74.1%). In support of students from Stara Zagora, those from Varna (n=47, 58.8%) and Plovdiv (n=25, 45.5%) also recognize the importance of multimedia presentations in their practical training (Figure 3.1.).

Students from all three colleges consider *problem-based learning* and *project-based learning* to be the least applicable in teaching practices.

It is assumed that students perceive educational tasks and cases as terminologically more recognizable methods, hence half of those from Stara Zagora (n=45, 52.9%) and significantly fewer than half from Varna (n=22, 37.5%) and Plovdiv (n=21, 38.2%) believe that this method contributes less to their practical activities. It is believed that problem-solving in education provides a more thorough and deeper meaning to the task and it has its place in achieving the goals of practical training for students in the "Rehabilitation therapist" specialty. (Figure 3.1.)

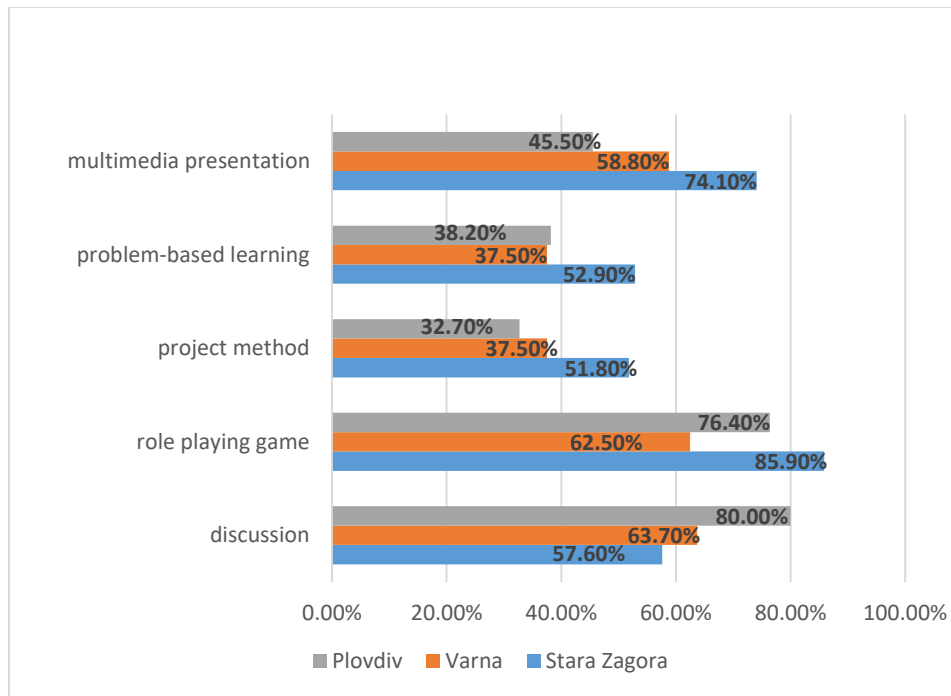


Figure 3.1. *Opinion of students from Stara Zagora, Varna and Plovdiv Medical College on preferred interactive methods in practical training*

The **project method** is less prevalent in the practical training sessions, Stara Zagora (n=44, 51.8%), Varna (n=22, 27.5%), and Plovdiv (n=18, 32.7%) (Figure 3.1.).

From the comparative analysis of the contribution of interactive methods to the practical training of respondents from the three medical colleges, statistically significant differences are found in the problem-based learning method ($\chi^2 = 16.021$, $p < 0.05$) and the project method ($\chi^2 = 21.696$, $p < 0.05$) (Table 3.4.).

No statistically significant difference is found in the discussion methods ($\chi^2 = 10.269$, $p > 0.05$), role-playing games ($\chi^2 = 12.402$, $p > 0.05$), and multimedia presentations ($\chi^2 = 11.615$, $p > 0.05$). The lack of significant differences confirms that students from all three colleges show unity in their opinions regarding discussion methods, role-playing games, and multimedia presentations (Table 3.4.).

Table 3.4. Interactive methods and their significance according to students from the three colleges

Interactive methods	Medical College	Disagree		Rather Disagree		Neither Agree nor Disagree		Rather Agree		Agree		χ^2	p-value
		n	%	n	%	n	%	n	%	n	%		
Discussion	Stara Zagora	0	0	1	1,2	14	16,5	21	24,7	49	57,6	10,269	p>0,05
	Varna	0	0	1	1,3	11	13,8	17	21,3	51	63,7		
	Plovdiv	0	0	1	1,8	1	1,8	9	16,4	44	80,0		
	total	0	0	3	1,4	26	11,8	47	21,4	144	65,5	$\chi^2_{theoretical}=12,59$	
Role-playing games	Stara Zagora	0	0	5	5,9	7	8,2	0	0,0	73	85,9	12,402	p>0,05
	Varna	0	0	6	7,5	5	6,3	19	23,8	50	62,5		
	Plovdiv	0	0	3	5,5	1	1,8	9	16,4	42	76,4		
	total	0	0	14	6,4	13	5,9	28	12,7	165	75,0	$\chi^2_{theoretical}=12,59$	
Project method	Stara Zagora	0	0	1	1,2	25	29,4	15	17,6	44	51,8	21,696	p<0,05
	Varna	0	0	10	12,5	21	26,3	19	23,8	30	37,5		
	Plovdiv	1	1,8	12	21,8	14	25,5	10	18,2	18	32,7		
	total	1	0,5	23	10,5	60	27,3	44	20,0	92	41,8	$\chi^2_{theoretical}=15,51$	
Problem-based learning	Stara Zagora	0	0	1	1,2	26	30,6	13	15,3	45	52,9	16,021	p<0,05
	Varna	1	1,3	10	12,5	18	22,5	21	26,3	30	37,5		
	Plovdiv	0	0	5	9,1	18	32,7	11	20,0	21	38,2		
	total	1	0,5	16	7,3	62	28,2	45	20,5	96	43,6	$\chi^2_{theoretical}=15,51$	
Multimedia presentation	Stara Zagora	0	0	0	0	2	2,4	20	23,5	63	74,1	11,615	p>0,05
	Varna	0	0	9	11,3	2	2,5	22	27,5	47	58,8		
	Plovdiv	0	0	5	9,1	9	16,4	16	29,1	25	45,5		
	total	0	0	14	6,4	13	5,9	58	26,3	135	61,4	$\chi^2_{theoretical}=12,59$	

The opinion of lecturers, indicating which interactive methods and tools they prefer to apply in practical classes on kinesiotherapy and therapeutic massage, has been examined.

The sum of responses to this question exceeds 100% because respondents have indicated more than one answer.

The analysis of responses from lecturers from the three medical colleges shows that they mainly use human-centered design methods (based on interactions between learners and lecturers) in practical training sessions. They unanimously agree that problem-based learning (n=30, 100%) and role-playing

games (n=30, 100%) fully correspond to the basic actions in an interactive educational process - activity and communication (Figure 3.2.).

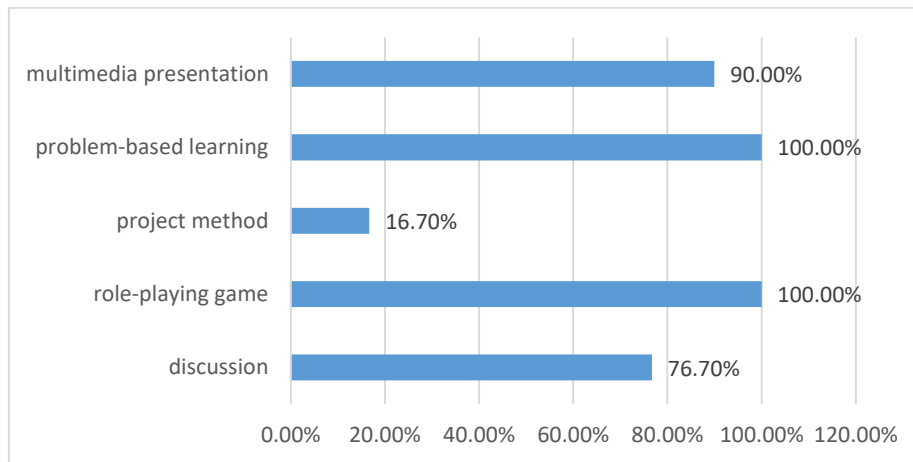


Figure 3.2. *Interactive methods applied by lecturers in practical training classes in kinesiotherapy and therapeutic massage.*

According to a large portion of the respondents, multimedia presentations (n=27, 90.0%) and discussions (n=26, 76.7%) also contribute to the good practical preparation of rehabilitation therapists. Only a small portion of lecturers mention the project method (n=5, 16.7%) (Figure 3.2.).

Based on the conducted study of the opinions of students and lecturers regarding methods and tools applied in practical classes, the following conclusions can be drawn:

- Students prefer interactive methods in their practical training and indicate role-playing games, discussions, and multimedia presentations as preferred choices since they contribute to their better preparation.
- Lecturers apply interactive methods and tools in the practical training of rehabilitators. They consider problem-based learning, role-playing games, and multimedia presentations as the most suitable, corresponding to the specifics of practical classes for rehabilitators.

3.2.2. Results and analysis of the data from survey of the lecturers and mentors

➤ **Analysis of the data from the questionnaire survey regarding the opinions of lecturers and mentors regarding the combination of traditional and interactive methods**

In response to the question about the need to include not only traditional but also preferably interactive methods in the educational process, all lecturers from Stara Zagora Medical College (n=10, 100%) responded positively with "agree". A significantly large relative share of respondents from Plovdiv Medical College agrees (n=9, 90.0%) on the necessity of combining traditional and interactive methods. Two-thirds of the respondents from Varna Medical College (n=70, 70.0%) responded positively, while one-third responded with "rather agree" (n=3, 30.0%) (Figure 3.3.).

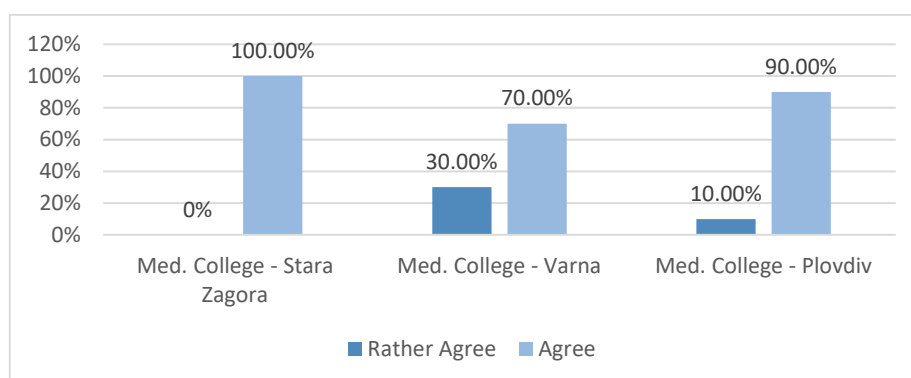


Figure 3.3. *Opinion of lecturers on the necessity of applying interactive methods alongside traditional methods in the learning process*

The comparative analysis of the data from the three medical colleges did not show a statistical difference ($\chi^2=4.038$, $p>0.05$) in the responses regarding the necessity of applying both methods in student education. The high relative share of positive responses from lecturers in the three medical colleges indicates that they prioritize education with interactive methods, in conjunction with traditional methods (Table 3.5.).

Table 3.5. Opinion of lecturers from Stara Zagora, Varna and Plovdiv Medical Colleges on the combination of interactive and traditional methods

Medical College	Rather Agree	Agree	Total	χ^2	p-value
Stara Zagora	0	10	10	4,038	p>0,05
	0,0%	100%	100%		
Varna	3	7	10		
	30,0%	70,0%	100%		
Plovdiv	1	9	10		
	10,0%	90,0%	100%		
Total	4	26	220	χ^2 theoretical =5,99	
	13,3,0%	86,7%	100%		

According to the opinion of the mentors from the clinical skills training centers regarding the necessity of incorporating new technologies into the educational process alongside established traditional ones, nearly half (n=25, 43.1%) believe it is necessary. One-third of them indicated "rather agree" (n=19, 32.8%), and "neither agree nor disagree" (n=13, 22.4%). Only one respondent indicated "rather disagree" (1.7%) (Figure 3.4.).

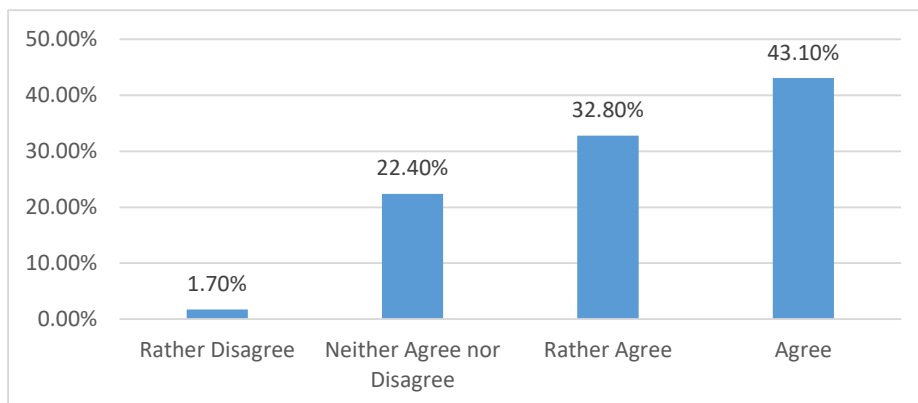


Figure 3.4. Opinion of mentors from the clinical bases regarding the combination of interactive and traditional methods

The comparative analysis between lecturers and mentors regarding the application of both interactive and traditional technologies shows a statistically significant difference ($\chi^2=16.571$, $p<0.05$) (Table 3.6.). The high proportion of positive responses in both groups of respondents indicates that they consider

interactive learning as a positive factor in the education of rehabilitation therapists.

Table 3.6. *Opinion of lecturers and mentors about the combination of interactive with traditional methods*

<i>Respondents</i>	<i>Rather Disagree</i>	<i>Neither Agree nor Disagree</i>	<i>Rather Agree</i>	<i>Agree</i>	<i>Total</i>	χ^2	<i>p-value</i>
<i>Lecturers</i>	0	0	4	26	30	16,571	<i>p</i> <0,05
	0,0%	0,0%	13,3%	86,7%	100%		
<i>Mentors</i>	1	13	19	25	58		
	1,7%	22,4%	32,8%	43,1%	100%		
<i>Total</i>	1	13	23	51	88	χ^2 theoretical=7,81	
	1,1%	14,8%	26,1%	58,0%	100%		

➤ **Data analysis of the survey regarding the opinion of lecturers and mentors on the formation of professional competencies** reveals that interactive methods contribute to the development of professional competencies, as evidenced by the responses of the respondents from all three colleges. More than two-thirds of the respondents from Stara Zagora Medical College (n=8, 80.00%) responded positively, with an additional "rather agree" (n=2, 20.00%). A significant relative proportion of lecturers from Varna Medical College (n=7, 70.00%) and Plovdiv Medical College (n=6, 60.00%) also responded "agree" (Figure 3.5.).

When analyzing the data concerning the contribution of interactive methods to mastering professional competencies, no statistically significant differences were found in the responses of the lecturers ($\chi^2=0.952$, $p>0.05$). This confirms the thesis that, according to mentors from the three medical colleges, interactive methods applied in practical training classes contribute to the development of professional competencies.

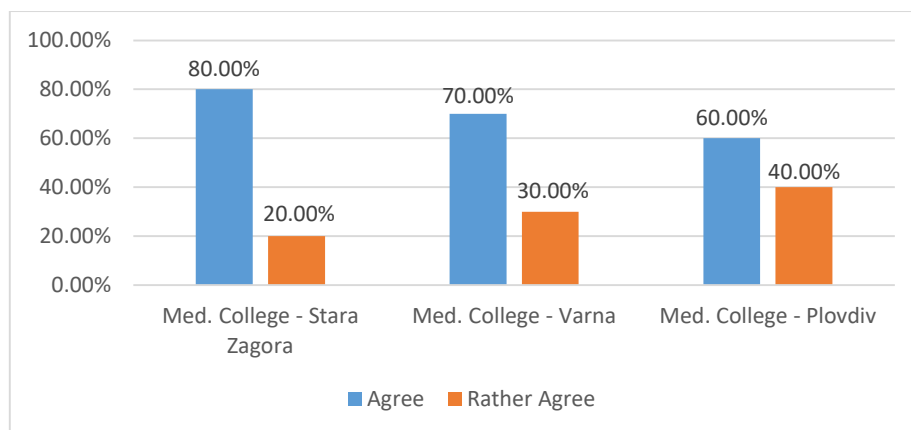


Figure 3.5. *Opinion of lecturers on the relationship between interactive methods and the development of professional competencies*

A significant portion of mentors from clinical skills training centers, similarly to lecturers, believe that interactive learning contributes to the development of professional competencies, as evidenced by their positive responses "agree" (n=23, 39.7%) and "rather agree" (n=23, 39.7%). A small portion of them responded "neither agree nor disagree" (n=10, 17.2%), and only two (3.4%) responded "rather disagree". There is lack of a categorical "disagree" response (Figure 3.6.).

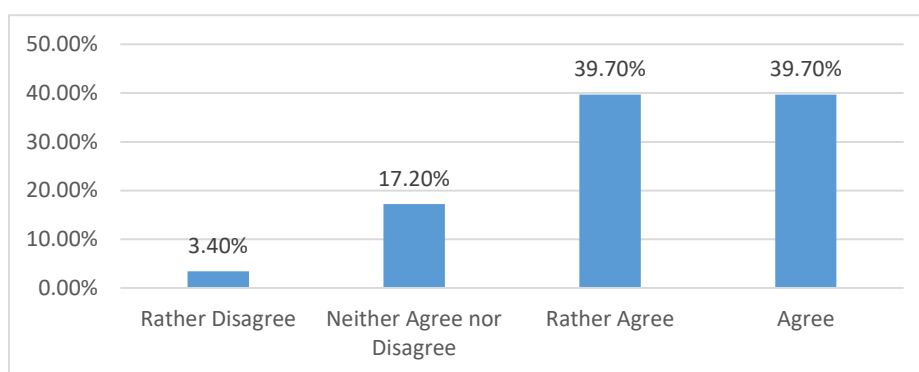


Figure 3.6. *Opinion of mentors on the relationship between interactive methods and the development of professional competencies*

In the comparative analysis of responses from lecturers and mentors regarding the importance of interactive methods in developing professionally significant competencies, a statistically significant difference is found ($\chi^2=11.539$, $p<0.05$) (Table 3.7.).

Table 3.7. *Opinion of lecturers and mentors about the influence of interactive technologies on the formation of professional competences*

<i>Respondents</i>	<i>Rather Disagree</i>	<i>Neither Agree nor Disagree</i>	<i>Rather Agree</i>	<i>Agree</i>	<i>Total</i>	χ^2	<i>p-value</i>
<i>Lecturers</i>	0	0	8	22	30	11,539	<i>p=0,009</i>
	0,0%	0,0%	26,7%	73,3%	100%		
<i>Mentors</i>	2	10	23	23	58		
	3,4%	17,2%	39,7%	49,7%	100%		
<i>Total</i>	2	10	31	45	88	χ^2 theoretical=7,81	
	2,3%	11,4%	35,2%	51,1%	100%		

Lecturers in the medical colleges believe that the incorporation of new, more innovative technologies is imperative in contemporary rehabilitation education. This would lead not only to the enhancement of knowledge and skills but also to the development of professional competencies necessary for shaping students as future healthcare professionals. The difference in opinion among mentor likely stems from the fact that they themselves have rich practical experience in clinical settings but not as much in academic educational processes.

➤ **Analysis of the survey data regarding the opinion of lecturers and mentors on the professional competencies required for the work of a rehabilitation therapist**

For the purposes of this dissertation, it was crucial to *investigate which professional competencies are important for the work of a rehabilitation therapist.*

According to the majority of *lecturers from the Medical College in Stara Zagora*, the most important competencies that interactive methods can develop are “*communication skill*”s (90.0%, n=9) and “*clinical reasoning*” (90.0%, n=9). Another equally significant competence, according to them, is “*teamwork*” (80.0%, n=8). More than half of the lecturers (60.0%, n=6) believe that interactive

learning builds skills for “*independent decision-making*”, while 50.0% (n=5) think it fosters “*creativity and innovation*” in applying knowledge (Figure 3.7).

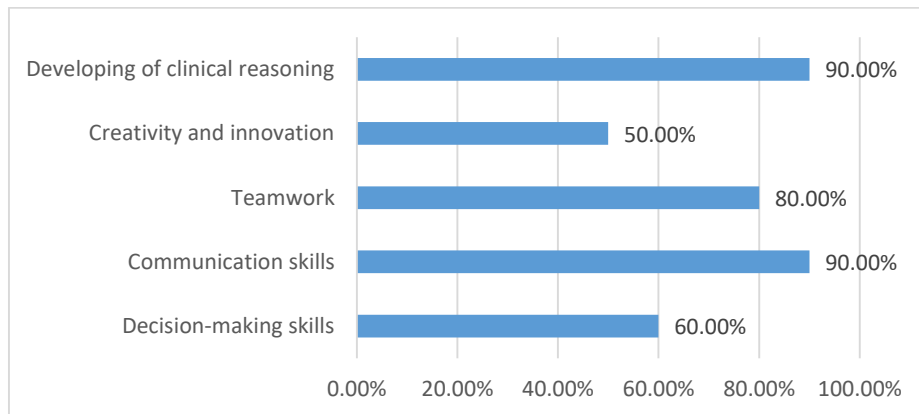


Figure 3.7. *Opinion of lecturers from the Medical College in Stara Zagora, determining the most important professional competencies formed through interactive methods*

The results of the survey among **lecturers from the Medical College in Varna** show that the majority of respondents (80.0%, n=8) believe that the most important competency formed through the application of interactive methods in the training of rehabilitation therapists is “*teamwork*”. The opinion of nearly two-thirds (70.0%, n=7) is “*creativity and innovation*”, while for more than half of the lecturers, these are “*communication skills*” (60.0%, n=6) and “*decision-making*” (60.0%, n=6). They least consider this to be “*clinical reasoning*” (50.0%, n=5) (Figure 3.8).

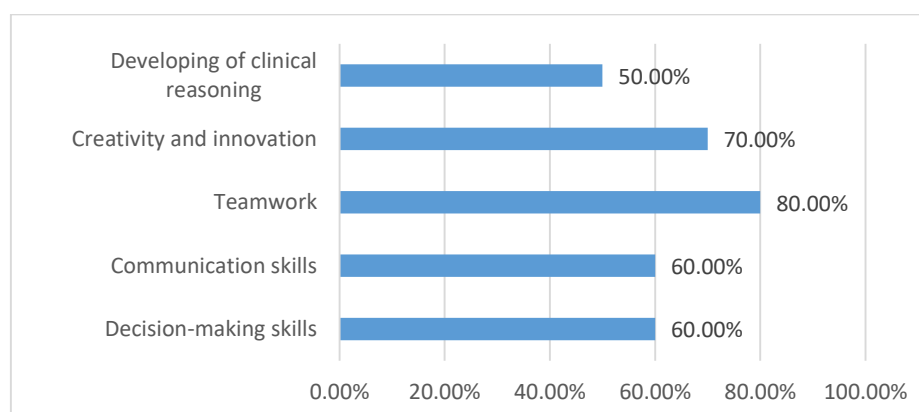


Figure 3.8. *Opinion of the lecturers from the Medical College in Varna, determining the most important professional competencies formed through interactive methods*

The majority of **lecturers from the Medical College in Plovdiv** identify “*communication skills*” as the most important competency (90.0%, n=9). In second place, they have indicated “*clinical reasoning*” (70.0%, n=7), while more than half of them mention “*teamwork*” (60.0%, n=6). The smallest percentage consider “*decision-making*” and “*creativity and innovation*” to be important (50.0%, n=5) (Figure 3.9.).

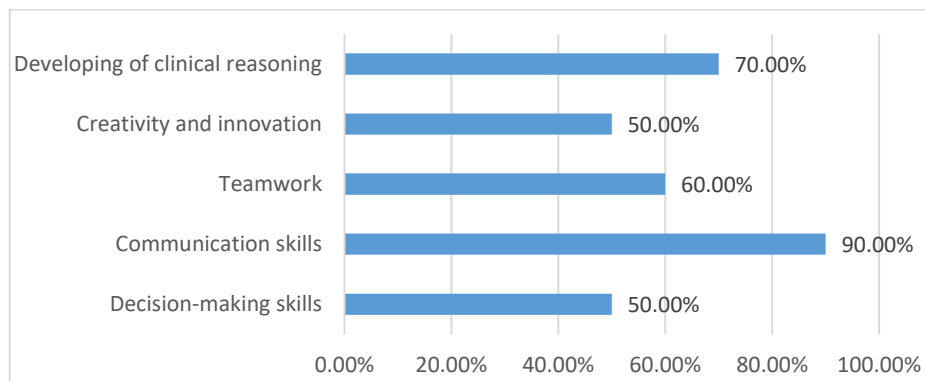


Figure 3.9. *Opinion of the lecturers from Plovdiv, determining the most important professional competencies formed through interactive methods*

For the mentors from the clinical skills training centers, the most significant competencies for the practical work of a rehabilitation therapist are *communication skills* (60.3%, n=35) and *teamwork* (56.9%, n=33). A smaller proportion of them respond positively to *decision-making skills* (39.7%, n=23), while competencies such as *developing clinical reasoning* (37.9%, n=22), and *creativity and innovation* (37.9%, n=22) are equally rated (Figure 3.10.).

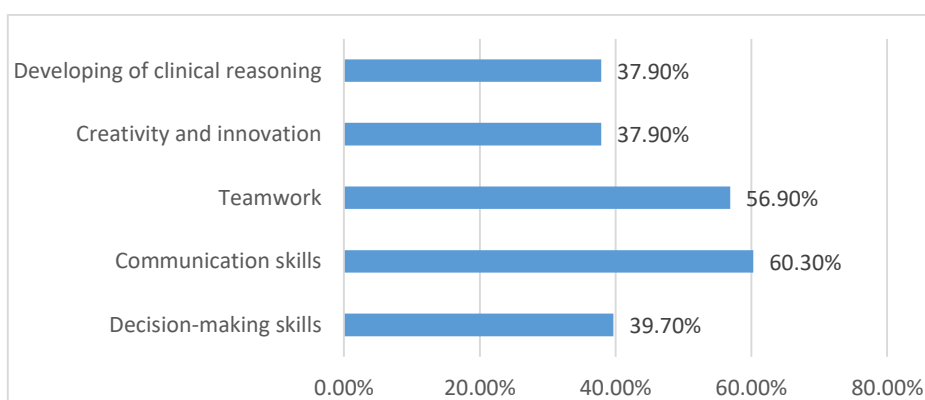


Figure 3.10. *Opinion of mentors determining the most important professional competencies needed in clinical practice*

In the *comparative analysis of responses from lecturers and clinical skills training center mentors* regarding the acquisition of competencies in the practical training of rehabilitation therapists, a statistically significant difference was found in the competency of "*decision-making*" ($\chi^2=7.820$, $p<0.05$).

In the comparative analysis of the remaining competencies, no statistically significant difference was found regarding the competencies of "*teamwork*" ($\chi^2=7.211$, $p>0.05$), "*communication skills*" ($\chi^2=6.834$, $p>0.05$), "*creativity and innovation*" ($\chi^2=5.520$, $p>0.05$), and "*development of clinical reasoning*" ($\chi^2=4.957$, $p>0.05$) (Table 3.8.).

Table 3.8. *Opinion of lecturers and mentors regarding the influence of interactive learning on the formation of professionally significant competencies*

Professional competencies	Respondents	Rather Disagree		Neither Agree nor Disagree		Rather Agree		Agree		χ^2	p-value
		n	%	n	%	n	%	n	%		
Independent decision-making	Lecturers	3	10,0	0	0,0	10	33,3	17	56,7	7,820	$p<0,05$
	Mentors	6	10,3	11	19,0	18	31,0	23	39,7		
	Total	9	10,2	11	12,5	28	31,8	40	45,5	χ^2 theor.=7,81	
Communication skills	Lecturers	0	0,0	0	0,0	6	20,0	24	80,0	6,834	$p>0,05$
	Mentors	3	5,2	8	13,8	12	20,7	35	60,3		
	Total	3	3,4	8	9,1	18	20,5	59	67,0	χ^2 theor.=7,81	
Teamwork	Lecturers	0	0,0	0	0,0	8	26,7	22	73,3	7,211	$p>0,05$
	Mentors	2	3,4	10	17,2	13	22,4	33	56,9		
	Total	2	2,3	10	11,4	21	23,9	55	62,5	χ^2 theor.=7,81	
Creativity	Lecturers	2	6,7	1	3,3	9	30,0	18	60,0	5,520	$p>0,05$
	Mentors	9	15,5	8	13,8	19	32,8	22	37,9		
	Total	11	12,5	9	10,2	28	31,8	40	45,5	χ^2 theor.=7,81	
Development of clinical reasoning	Lecturers	1	3,3	3	10,0	7	23,3	19	63,3	4,957	$p>0,05$
	Mentors	6	10,3	12	20,8	18	31,0	22	37,9		
	Total	7	8,0	15	15,9	25	28,4	41	47,7	χ^2 theor.=7,81	

The absence of a significant difference and the high proportion of positive responses "agree" and "rather agree" indicate a unified opinion of the two groups

of respondents that the following competencies - "*teamwork*", "*development of clinical reasoning*", and "*communication skills*" are of great importance in the profession of rehabilitation therapist. They can be formed during practical training sessions through the application of suitable interactive methods and tools for learning and can be further improved during students' clinical practice.

➤ **Analysis of the survey data on mentors' opinions regarding students' independent activities in clinical skills training centers**

In the survey, mentors were asked a question directly related to the **amount of time available to students during their clinical practice and independent work with patients**. The primary criterion was whether the necessary time was a factor in achieving the desired learning outcome, and its sufficiency was indicative of the various opinions in the survey. Only with the necessary time can students improve the skills acquired during their practical training sessions. In this question, all respondents were divided in their opinions. Nearly half of the rehabilitation therapists from Stara Zagora answered "agree" (18.4%, n=7) and "rather agree" (31.6%, n=12). The other half provided answers of "disagree" (15.8%, n=6) and "rather disagree" (26.3%, n=10). Only three responded "neither agree nor disagree" (7.9%). Similar responses were given by the mentors from Varna, who were also divided in their opinion, with half responding "agree" (30.0%, n=6) and "rather agree" (20.0%, n=4), and almost as many responding "rather disagree" (45.0%, n=9). Only one rehabilitation therapist was unable to judge (5.0%), and accordingly, there were no categorical "disagree" responses (Figure 3.11.).

The analysis did not reveal a statistically significant difference ($\chi^2 = 6.134$, $p > 0.05$) in the responses of mentors regarding the time for students' independent activities in the conditions of their clinical practice. This indicates unity in the opinion of mentors on this matter.

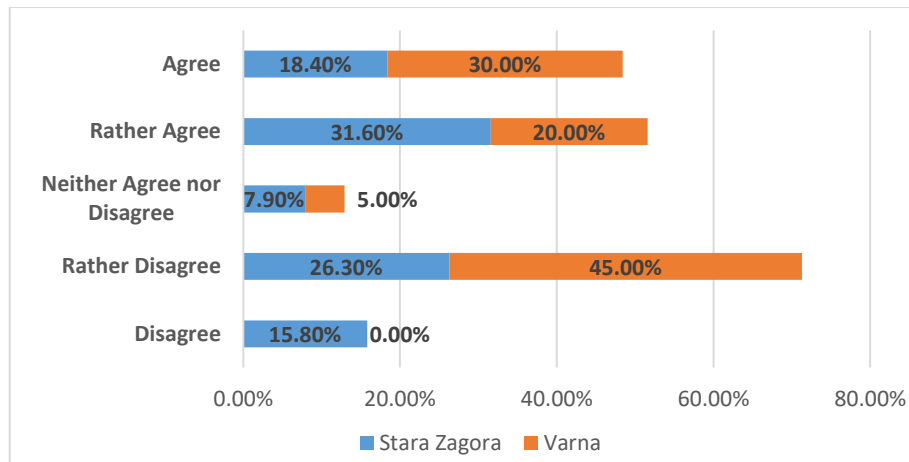


Figure 3.11. *Mentors' opinion about the time factor as sufficiently necessary in the students' independent activity in clinical practice*

It is presumed that half of the mentors who disagree with the claim about the time allocated for students' independent work may be influenced by several factors. It is likely implied that the allocated hours for clinical practice are insufficient. Rehabilitation procedures with patients are time-consuming, and students feel constrained by time limits within clinical practice, especially when other forms of learning such as lectures and exercises are also included during the day.

Based on the conducted survey among mentors from the "Rehabilitation therapist" specialty at the medical colleges in Stara Zagora, Varna, and Plovdiv, as well as mentors from clinical skills training centers, the following conclusions can be drawn:

- Lecturers believe that it is necessary to modernize the educational process by incorporating innovative teaching technologies such as interactive methods. This opinion is also shared by mentors in clinical skills training centers, who also see the need for change, prioritizing more modern teaching technologies in the practical training of rehabilitation therapists.
- Lecturers in the mentioned medical colleges are convinced that interactive learning, applied in practical training sessions, influences the formation of

professional competencies. According to lecturers and clinical skills training center mentors, mastering *communicative skills*, *teamwork*, *creativity*, and *development of clinical reasoning* are necessary for shaping a rehabilitation therapist as a professional.

- Lecturers believe that incorporating interactive methods and tools into the practical training of rehabilitation therapists will improve the educational process and enhance students' academic motivation.
- According to mentors, the time allocated for students' independent work in clinical practice is not sufficient for them to improve their skills and competencies acquired during their practical training classes.

3.2.3. Results and analyses from the survey conducted among students of the "Rehabilitation Therapist" specialty

- **Data analysis of the survey on students' opinions regarding interaction.**

Interaction is defined as the mutual communication and influence between participants in the communication process. Effective learning can only be achieved through interaction between learners and lecturers based on active communication, collaboration, and support. Therefore, it is appropriate to examine the opinions of surveyed students from medical colleges regarding the need for interaction in the learning process and its significance in acquiring knowledge, skills, and competencies.

The data from the survey indicate that the relative majority among the students (n=128, 58.2%) provide a positive response. Close to a quarter of the respondents (n=52, 23.6%) responded with "rather agree" The number of respondents who cannot assess the necessity of communication is not significant (n=32, 14.5%), and only eight students (n=8, 3.6%) responded with "rather disagree" No one gave a categorical "disagree" response (Figure 3.12.).

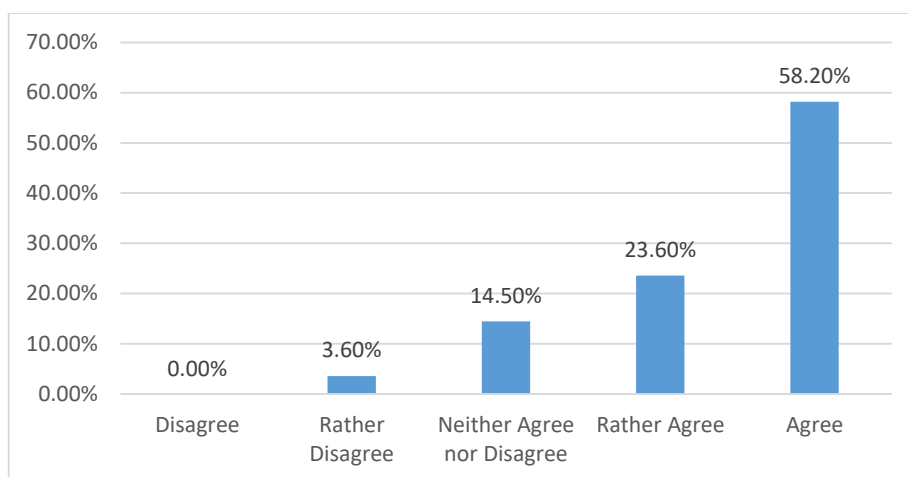


Figure 3.12. Students' opinion on the necessity of interaction in the learning process

In the comparative analysis of the data, the conducted analysis does not show a statistical difference ($\chi^2=7.956$, $p>0.05$) in the responses of the students regarding interaction in education (Table 3.9.). This means that the respondents from the three medical colleges in Stara Zagora, Varna, and Plovdiv show unity in their opinion about the necessity of interaction in acquiring knowledge and skills.

Table 3.9. Opinion of students from the three medical colleges regarding the need for interaction in the learning process

Medical College	Rather Disagree	Neither Agree nor Disagree	Rather Agree	Agree	Total	χ^2	p-value
Stara Zagora	6	16	17	46	85	7,956	$p>0,05$
	7,1%	18,8%	20,0%	54,1%	100%		
Varna	1	10	19	50	80		
	1,3%	12,5%	23,8%	62,5%	100%		
Plovdiv	1	6	16	32	55		
	1,8%	10,9%	29,1%	58,2%	100%		
Total	8	32	52	128	220	χ^2 theoretical=12,59	
	3,6%	14,5%	23,6%	58,2%	100%		

➤ **Study and analysis of students' opinions regarding the combination of**

The optimal approach in the learning process involves combining traditional methods with modern technologies, enriching the educational process and fully utilizing the potential of each. So, the study focused on their views regarding the incorporation of traditional methods combined with contemporary interactive technologies in education.

When asked whether there is a need to incorporate both traditional and predominantly interactive methods in education, nearly two-thirds of the respondents (65.0%, n=143) believe that a combination of the two technologies is necessary. About one-fifth of the respondents (23.5%, n=52) answered "rather agree". A small percentage of respondents (7.7%, n=17) responded with "neither agree nor disagree", while eight students (3.7%) answered "rather disagree". None of the respondents answered "disagree" (Figure 3.13.).

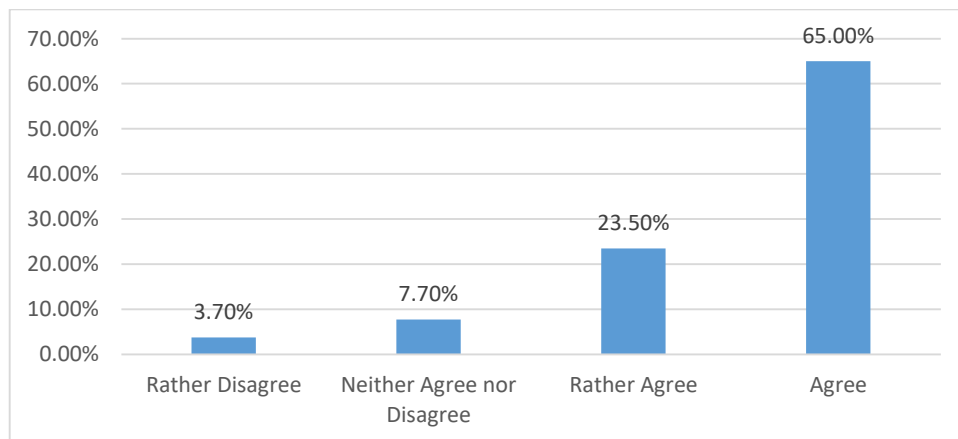


Figure 3.13. *Students' opinion on combining interactive and traditional teaching methods*

The analysis revealed that the difference in relative proportions regarding the inclusion of interactive methods in education alongside traditional ones is statistically significant ($\chi^2 = 15.439$, $p < 0.05$), (Table 3.11.).

Table 3.11. Students' opinion on combining interactive and traditional methods in the three medical colleges

Medical College	Rather Disagree	Neither Agree nor Disagree	Rather Agree	Agree	Total	χ^2	p-value
Stara Zagora	1	6	13	65	85	15,439	p<0,05
	1,2%	7,1%	15,3%	76,5	100%		
Varna	3	5	20	52	80		
	3,8%	6,3%	25,0%	65,0%	100%		
Plovdiv	4	6	19	26	55		
	7,3%	10,9%	34,5%	47,3%	100%		
Total	8	17	52	143	220	χ^2 theoretical=12,59	
	3.7%	7.7%	23.6%	65.0%	100%		

Support for the argument of applying both technologies - traditional and interactive, is found in the high relative percentage of positive responses from respondents from the Medical Colleges in Stara Zagora (76.5%) and Varna (65.0%). Less than half of the respondents from the Medical College in Plovdiv (47.3%) answered "agree". There are no negative responses "disagree" from any of the three educational institutions. This indicates that according to students, interactive methods play a significant role in education, and their implementation will increasingly become necessary in the modern educational process.

➤ **Data analysis of the questionnaire survey on students' opinions regarding the advantages of interactive learning:**

For the successful conduct of the dissertation research, it is crucial to analyze students' opinions on the advantages of interactive learning, which help improve their professional training. In the questionnaire, five main advantages of interactive learning are listed, and students are given the opportunity to assess them.

- In the questionnaire survey among respondents from the three colleges, it is found that over half of the respondents (58.2%, n=128) believe that interactive

methods "*facilitate the application of theoretical knowledge in practice*". A small portion of them have given equal shares of responses "rather agree" (17.3%, n=38) and "neither agree nor disagree" (17.3%, n=38). With "rather disagree", students responded (6.4%, n=14), and only two (0.9%, n=2) gave the answer "disagree" (Figure 3.14.).

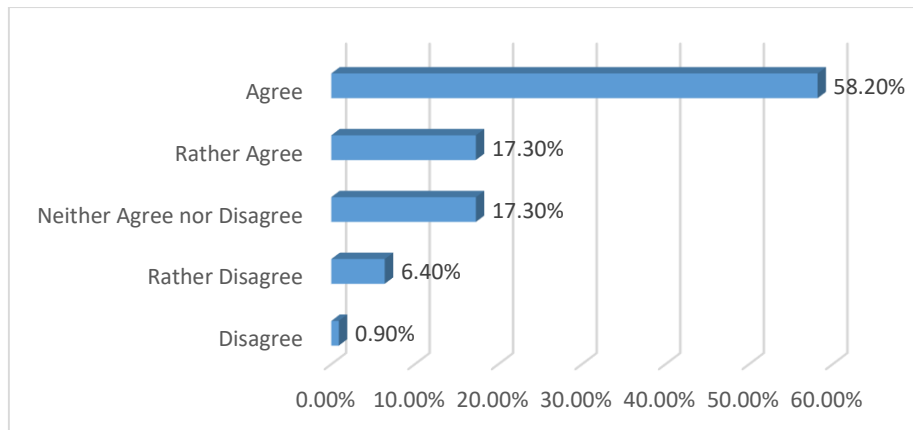


Figure 3.14. Students' opinion on the contribution of interactive methods to "*facilitate the application of theoretical knowledge in practice*"

During the statistical analysis, regarding the contribution of the interactive methods as "*facilitating the application of theoretical knowledge in practice*", " it has been found that there is no statistically significant difference in the responses of students from the three medical colleges ($\chi^2 = 14.078$ $p > 0.05$). This indicates that students do not show unity in their opinion regarding interactive methods as facilitators for the faster transition from theoretical knowledge to practical skills (Table 3.12.).

- One of the primary objectives of the interactive learning process is to create conditions in practical training classes where students come as close as possible to the professional clinical environment. Therefore, the question about the advantage of interactive methods in "*creating an environment close to the real work one*" is of crucial importance. The analysis from the survey shows that a larger relative percentage of students responded positively (59.1%, n=130). A significantly smaller portion responded "neither agree nor disagree" (19.5%, n=43), with only seven providing a "rather disagree" response (3.2%, n=7), while

there are no responses with a categorical negative answer "disagree" (Figure 3.15.).

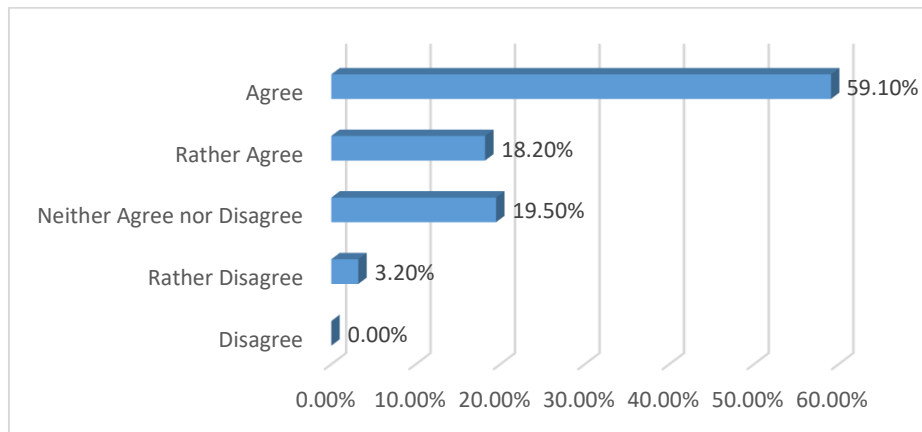


Figure 3.15. Students' opinion on the contribution of interactive methods in "creating an environment close to realy"

The comparative analysis among the three medical colleges shows that there is no statistically significant difference ($\chi^2 = 37.974$, $p < 0.05$) This means that students do not have a unanimous opinion on the matter. The high percentage of positive responses, according to students, highlights the necessity of establishing a learning environment close to real-world conditions (Table 3.12.).

- In the In the education of rehabilitation therapists, an essential question arises regarding the extent to which the knowledge and skills conveyed remain ingrained in students' minds and contribute effectively to their preparation for seminars, semester exams, state exams, and clinical practice. Responses to whether interactive methods and tools "**build more lasting practical knowledge and skills**" show clear positive answers. In the detailed analysis across educational institutions, respondents provide answers ranging from "agree" "rather agree" to "neither agree nor disagree" with no disagreeing answers. More than half (62.7%, $n=138$) firmly answer "agree" The relative proportion of students responding "neither agree nor disagree" is 15.0% ($n=33$), and those responding "rather disagree" is 3.6% ($n=8$), with no responses indicating "disagree" (Figure 3.16.).

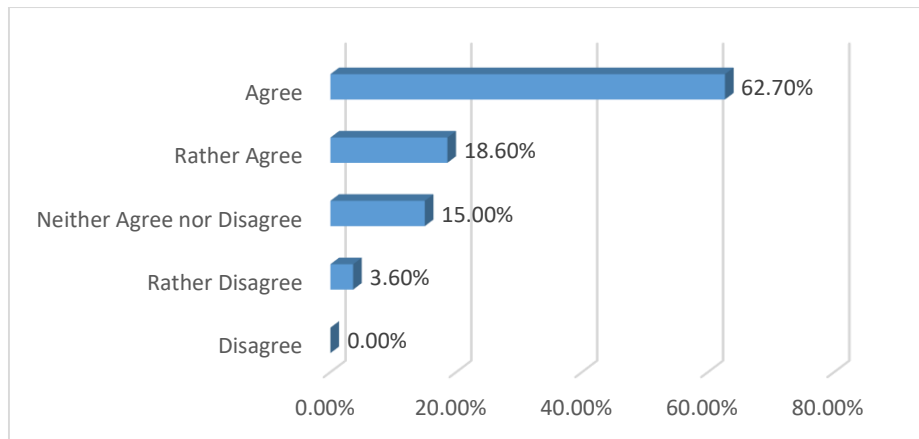


Figure 3.16. *Opinion about the contribution of interactive methods to "building more lasting practical knowledge and skills"*

In During the comparative analysis among the three colleges, no statistically significant difference was found again ($\chi^2 = 20.645$, $p < 0.05$). The high relative proportion of positive responses indicates that students from all three colleges believe that interactive methods can contribute to the development of more lasting knowledge and practical skills (Table 3.12.).

- To the question of whether interactive learning *"improves communication with lecturers and among students,"* the majority of respondents (61.4%, n=135) agree with this claim, while (14.1%, n=31) responded "neither agree nor disagree" (5.4%, n=12) responded "rather disagree" and there were no students with a categorical "disagree" response (Figure 3.17.).

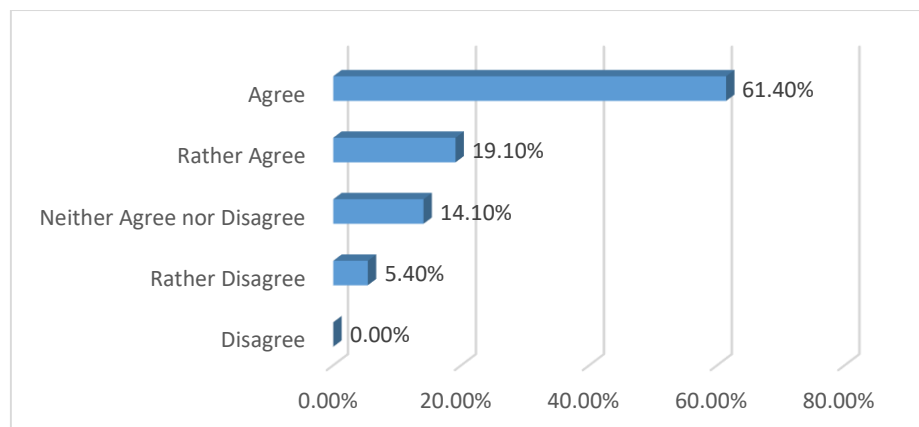


Figure 3.17. *Students' opinion on the contribution of interactive methods to "improving communication between lecturer and students"*

A statistically significant difference was observed in the comparative analysis among the three colleges ($\chi^2 = 28.874$, $p < 0.05$), as shown in Table 3.12.

- To the question of whether interactive methods "*create confidence in working with patients*," slightly over half of the respondents from the colleges answered positively (55.5%, $n=122$), 20.9% ($n=31$) responded "neither agree nor disagree" and only 5.0% ($n=11$) responded "rather disagree" (Figure 3.18.).

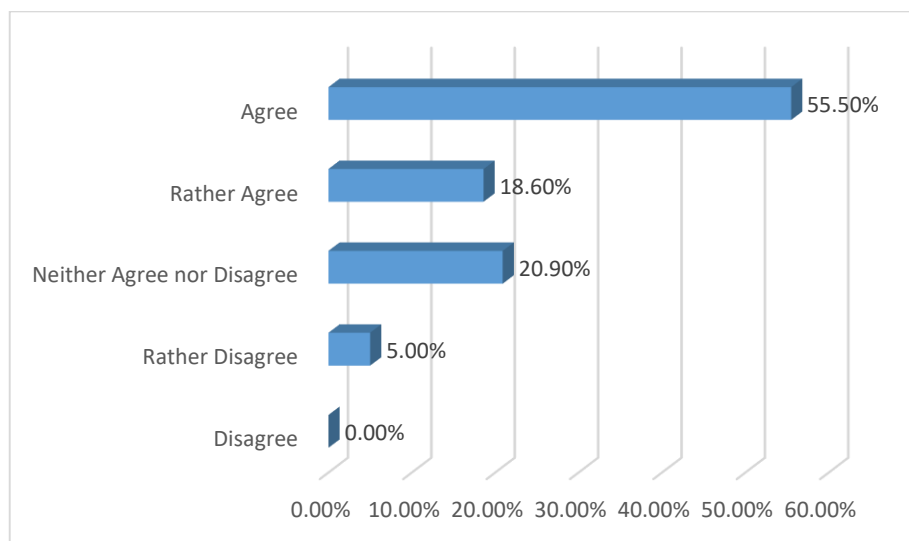


Figure 3.18. Students' opinion on the contribution of interactive methods to to "creating confidence in working with patients"

Comparative analysis shows a statistically significant difference in the responses of respondents from the three medical colleges ($\chi^2 = 18.739$, $p < 0.05$). From this, it can be concluded that through the application of interactive methods, some students feel more confident, but there are also those who are not sure about their skills when working in real clinical settings (Table 3.12.).

Table 3.12. Students' opinions from medical colleges in Stara Zagora, Varna, and Plovdiv regarding the advantages of interactive learning

Advantages of interactive learning	Medical College	Disagree		Rather Disagree		Neither Agree nor Disagree		Rather Agree		Agree		χ^2	p-value
		n	%	n	%	n	%	n	%	n	%		
Facilitating the application of theoretical knowledge in practice	Stara Zagora	1	1,2	3	3,5	22	25,9	10	11,8	49	57,6	14.078	p>0,05
	Varna	0	0	8	10,0	8	10,0	19	23,8	45	56,3		
	Plovdiv	1	1,8	3	5,5	8	14,5	9	16,4	34	61,8		
	Total	2	0,9	14	6,4	38	17,3	38	17,3	128	58,2	χ^2 theor.=15,51	
Creating an environment close to the real work one	Stara Zagora	0	0	0	0	31	36,5	11	12,9	43	50,6	37.974	p<0,05
	Varna	0	0	7	8,8	7	8,8	19	23,8	47	58,8		
	Plovdiv	0	0	0	0	5	9,1	10	18,2	40	72,7		
	Total	0	0	7	3,2	43	19,5	40	18,2	130	59,1	χ^2 theor.=12,59	
Builds more lasting practical knowledge and skills	Stara Zagora	0	0	0	0	21	24,7	9	10,6	55	64,7	20,645	p<0,05
	Varna	0	0	6	7,5	7	8,8	17	21,3	50	62,5		
	Plovdiv	0	0	2	3,6	5	9,1	15	27,3	33	60,0		
	Total	0	0	8	3,6	33	15,0	41	18,6	138	62,7	χ^2 theor.=12,59	
Improves communication with lecturers and among students	Stara Zagora	0	0	0	0	19	22,4	6	7,1	60	70,6	28.874	p<0,05
	Varna	0	0	8	10,0	7	8,8	24	30,0	41	51,3		
	Plovdiv	0	0	4	7,3	5	9,1	12	21,8	34	61,8		
	Total	0	0	12	5,5	31	14,1	42	19,1	135	61,4	χ^2 theor.=12,59	
Create confidence in working with patients	Stara Zagora	0	0	1	1,2	27	31,8	11	12,9	46	54,1	18.739	p<0,05
	Varna	0	0	6	7,5	7	8,8	21	26,3	46	57,5		
	Plovdiv	0	0	4	7,3	12	21,8	9	16,4	30	54,5		
	Total	0	0	11	5,0	46	20,9	41	18,6	122	55,5	χ^2 theor.=12,59	

➤ **Data analysis of the questionnaire survey regarding the opinion of rehabilitation therapy students on the role of interactive methods in shaping professional competencies.**

The questionnaires explored students' opinions *on the relationship between interactive technologies and the subsequent acquisition of relevant professional competencies*.

The data analysis shows that respondents from the three medical colleges highly value interactive learning in developing professionally significant competencies. More than half (63.2%, n=139) responded positively, while 10.0% (n=22) answered "neither agree nor disagree" and 5.9% (n=13) responded "rather disagree" (Figure 3.19.).

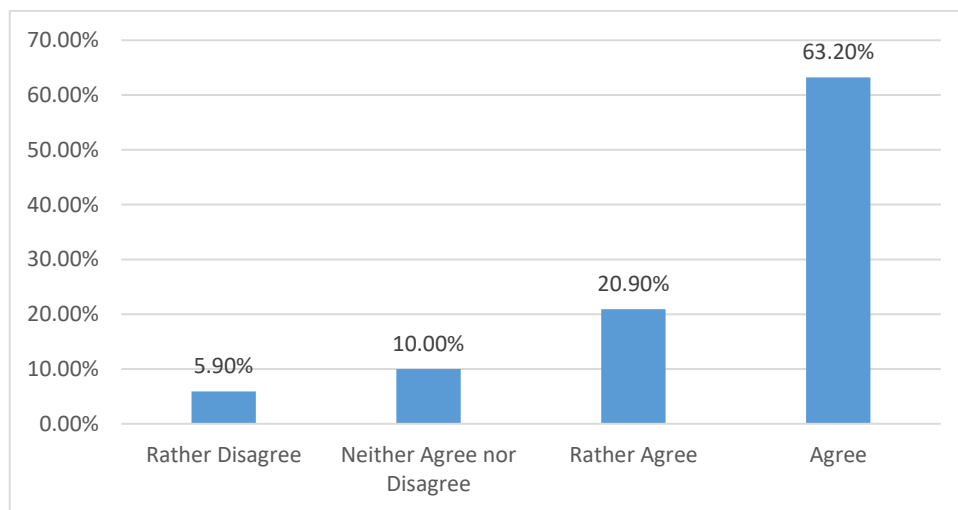


Figure 3.19. *Students' opinion on the importance of interactive methods in the shaping of professional competences*

In the comparative analysis, the relationship between interactive methods and their influence on the development of professional competencies is statistically significant ($\chi^2 = 22.691$, $p < 0.05$). The high relative proportion of positive responses from students indicates that the respondents highly value interactive technologies in the process of forming professionally significant competencies (Table 3.13.).

Table 3.13. Students' opinion on the application of interactive technologies in the shaping of professional competences

Medical College	Rather Disagree	Neither Agree nor Disagree	Rather Agree	Agree	Total	χ^2	p-value
Stara Zagora	3	14	13	55	85	22.691	p<0.05
	3,5%	16,5%	15,3%	64,7	100%		
Varna	9	2	24	45	80		
	11,3%	2,5%	30,0%	56,2%	100%		
Plovdiv	1	6	9	39	55		
	1,8%	10,9%	16,4%	70,9%	100%		
Total	13	22	46	139	220	χ^2 theoretical=12,59	
	5,9%	10,0%	20,9%	63,2%	100%		

The next question from the survey is specifically related to the level of **mastering certain competencies during the practical training classes.**

For the purposes of the study, five competencies have been identified: **decision-making, communication skills, teamwork, creativity and innovation, clinical reasoning.**

The analysis of the survey shows that respondents from Medical college - Plovdiv, with the highest relative proportion (70.9%, n=39), value **"communication skills" and "clinical reasoning"** most (65.5%, n=36). More than half of the respondents from Medical college -Stara Zagora believe that the application of interactive technologies in practical training classes leads to the development of **"communication skills"** (60.0%, n=51) and **"creativity and innovation"** (58.8%, n=50). Regarding students from Medical college -Varna, more than half value **"teamwork"** (53.8%, n=43) (table 3.14.).

A statistically significant difference has been observed ($\chi^2 =23.764$, p<0.05) in the responses of students regarding the competency "development of clinical reasoning". However, no statistically significant difference is found in the competencies of "communication skills" ($\chi^2 =10.744$, p>0.05), "teamwork" ($\chi^2=10.449$, p>0.05), "decision-making" ($\chi^2 =11.700$, p>0.05), and "creativity

and innovation" ($\chi^2 = 13.843$, $p > 0.05$), indicating a consensus among the respondents (table 3.14.).

Table 3.14. Students' opinion on the impact of interactive learning on the development of more important professional competencies

Professional competencies	Medical College	Disagree		Rather Disagree		Neither Agree nor Disagree		Rather Agree		Agree		χ^2	p-value
		n	%	n	%	n	%	n	%	n	%		
Independent decision-making	Stara Zagora	0	0	6	7,1	19	22,4	16	18,8	44	51,8	11,700	$p > 0.05$
	Varna	0	0	9	11,3	9	11,3	29	36,3	33	41,3		
	Plovdiv	0	0	4	7,3	6	10,9	14	25,5	31	56,4		
	Total	0	0	19	8,6	34	15,5	59	26,8	108	49,1	$\chi^2_{theoretical} = 12,59$	
Communication skills	Stara Zagora	0	0	2	2,4	11	12,9	21	24,7	51	60,0	10,744	$p > 0.05$
	Varna	0	0	7	8,8	10	12,5	25	31,3	38	47,5		
	Plovdiv	0	0	1	1,8	5	9,1	10	18,2	39	70,9		
	Total	0	0	10	4,5	26	11,8	56	25,5	128	58,2	$\chi^2_{theoretical} = 12,59$	
Teamwork	Stara Zagora	0	0	0	0	15	17,6	21	24,7	49	57,6	10,449	$p > 0.05$
	Varna	0	0	6	7,5	7	8,8	24	30,0	43	53,8		
	Plovdiv	0	0	4	7,3	5	9,1	13	23,6	33	60,0		
	Total	0	0	10	4,5	27	12,3	58	26,4	125	56,8	$\chi^2_{theoretical} = 12,59$	
Creativity and innovation	Stara Zagora	2	2,4	1	1,2	17	20,0	15	17,6	50	58,8	13,843	$p > 0.05$
	Varna	0	0	2	2,5	13	16,3	30	37,5	35	43,8		
	Plovdiv	0	0	2	3,6	6	10,9	15	27,3	32	58,2		
	Total	2	0,9	5	2,3	36	16,4	60	27,3	117	53,2	$\chi^2_{theoretical} = 15,51$	
Development of clinical reasoning	Stara Zagora	0	0	6	7,1	23	27,1	13	15,3	43	50,6	23,764	$p < 0.05$
	Varna	0	0	7	8,8	8	10,0	30	37,5	35	43,8		
	Plovdiv	0	0	0	0	9	16,4	10	18,2	36	65,5		
	Total	0	0	13	5,9	40	18,2	53	24,1	114	51,8	$\chi^2_{theoretical} = 12,59$	

➤ **Data analysis of the questionnaire survey regarding students' opinion on their academic motivation in the context of interactive learning.**

Learning motivation is a crucial factor in the educational process, influencing both the effectiveness and quality of education, as well as the personal and professional development and improvement of students.

For the purposes of the scientific study, students were asked whether the application of interactive technologies in education enhances their academic motivation. A similar result has been reported in the positive responses from all

three colleges: Medical college Stara Zagora (51.8%), Medical college Varna (55.0%), and Medical college Plovdiv (54.5%). Overall, the relative proportion of most respondents (53.6%, n=118) indicates that interactive methods are a motivating factor in their education. The relationship between interactive learning and students' academic motivation is statistically significant ($\chi^2 = 15.165$, $p < 0.05$). This means that interactive technologies, applied in the practical training of rehabilitation therapists who participated in the survey, contribute to increasing academic motivation (Table 3.15.).

Table 3.15. Students' opinion on the role of interactive learning on their academic motivation

Medical College	Rather Disagree	Neither Agree nor Disagree	Rather Agree	Agree	Total	χ^2	p-value
Stara Zagora	2	17	18	48	85	15,165	p<0,05
	2,4	20,0%	21,2%	56,4	100%		
Varna	5	7	24	44	80		
	6,3%	8,8%	30,0%	55,0%	100%		
Plovdiv	2	3	20	30	55		
	3,6%	5,5%	36,4%	54,5%	100%		
Total	9	27	62	122	220	χ^2 theoretical=12,59	
	4,1%	12,3%	28,2%	55,4%	100%		

➤ **Data analysis of the questionnaire survey regarding students' opinions on the factors influencing the interactive educational process**

A survey was conducted among students regarding the factors contributing most to the successful implementation of an interactive process. The sum of responses to this question exceeds 100%, as respondents indicated more than one answer. The majority of respondents from the three medical colleges attribute importance to the "material-technical base," with the highest proportion being students from *Medical College Plovdiv* (83.6%, n=46) and *Medical College Varna* (82.5%, n=66) (Figure 3.20).

More than two-thirds of students at *Medical College Varna* (81.3%, n=65) identify the "*lecturers` qualification*" as an important factor.

Two-thirds of all respondents believe that the curriculum should include "more hours for practical training," with a very close proportion in *Medical College Plovdiv* at 76.4% and *Medical College Stara Zagora* at 75.3%. For the majority of students trained at *Medical College Varna*, the factor of "motivation" is important (68.8%). A significant portion of respondents identify "selection of methods and resources" as important, with the highest proportion among students from *Medical College Stara Zagora* (68.2%). "Time for self-preparation" is of least importance, with respondents from all three colleges giving similar responses (47.3%, 46.3%, 43.5%) (Figure 3.20).

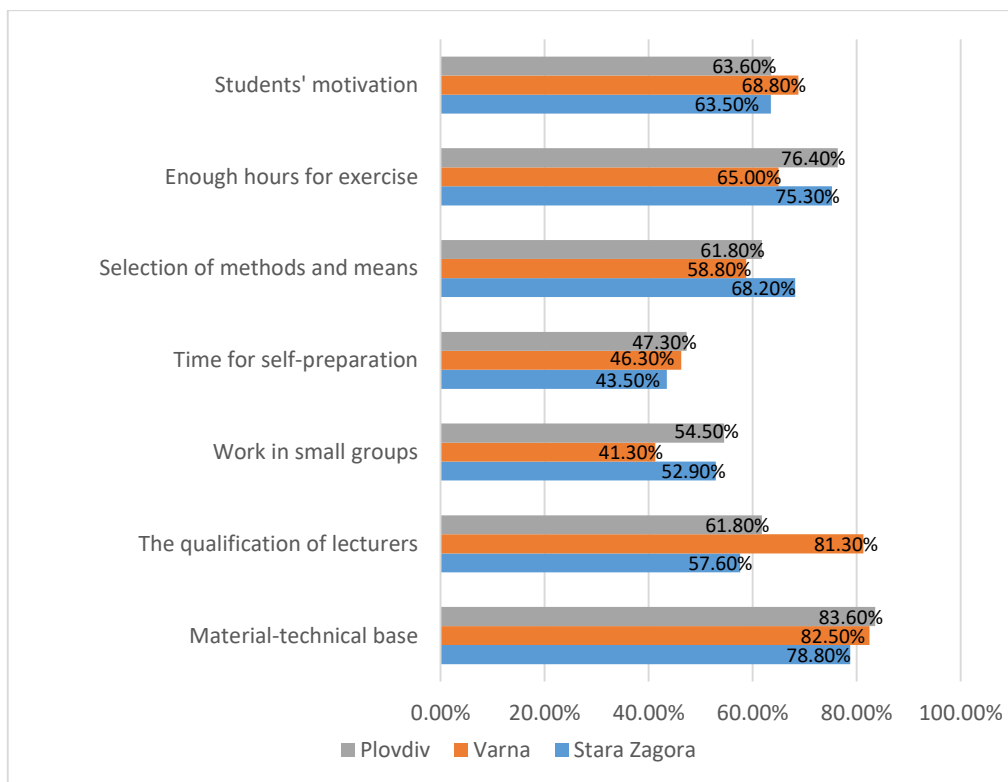


Figure 3.20. Factors influencing a productive interactive learning process

Based on the conducted survey among students specializing in "Rehabilitation therapist" from the medical colleges in Stara Zagora, Varna, and Plovdiv, the following conclusions can be drawn:

- Students value the necessity of interaction in the learning process for acquiring knowledge and skills, believing that achieving a successful learning process requires a high level of communication.
- According to students from the three medical colleges, there is a need for the priority inclusion of modern teaching and learning technologies in the educational process. Students believe that the application of interactive methods and tools contributes to increasing their academic motivation.
- Regarding the advantages of interactive learning, students rate the development of more long-lasting knowledge and practical skills as the highest, along with improving communication. In comparative analysis, they reach a consensus on the advantage of interactive learning in facilitating the application of theoretical knowledge in practice.
- Learners believe that through the use of interactive methods, professionally significant competencies can be formed, identifying communication skills, teamwork, creativity, independent decision-making as the most important to them.
- Leading factors in implementing an interactive learning process for students are the material-technical base, lecturer` qualifications, and more hours for exercises.

3.2.4. Comparative analyses of the results of the didactic experiment

The didactic experiment was conducted in practical training classes in kinesiotherapy and therapeutic massage, involving 85 students specializing in "Rehabilitation therapist" at Medical College - Stara Zagora from the first (n=37, 43.50%), second (n=20, 23.50%), and third year (n=28, 32.90%) of study.

The aim of the questionnaire survey after the experiment was to assess the effectiveness of the applied interactive model in practical training sessions in the core disciplines of kinesiotherapy and therapeutic massage.

The model combines interactive methods and learning tools: clinical case studies, small group discussions, and role-playing games with role reversal. It is presented in detail in the fourth chapter of the dissertation.

➤ **Comparative analysis of the of the data from the questionnaire survey on students' opinions regarding the advantages of interactive methods before and after the applied model**

Before the experiment, students were asked about the contribution of interactive learning, identifying five of its most important advantages. After conducting the experiment, students again provided their assessment of the advantages that determine the contribution of interactive learning.

- An essential A significant advantage of interactive methods was pointed out to be that they "*build more lasting knowledge and practical skills.*" In the questionnaire survey before the applied model, the relative proportion of students with a "agree" response was 64.7% (n=55), increasing to 75.3% (n=64) after the experiment (Table 3.16).

A significant change occurs among students who, before the experiment, hesitate and respond with "neither agree nor disagree" (24.7%, n=21). After implementing the interactive model, there are no students who responded with "neither agree nor disagree" regarding the given question (Table 3.16).

Table 3.16. *Interactive methods contributing to "building more lasting knowledge and practical skills" before and after the conducted didactic experiment*

<i>Answers</i>	<i>Neither Agree nor Disagree</i>	<i>Rather Agree</i>	<i>Agree</i>	<i>Total</i>	<i>χ²</i>	<i>p-value</i>
<i>Before applying the model</i>	21	9	55	85	10,249	p<0,05
	24,7%	10,6%	64,7%	100%		
<i>After applying the model</i>	0	21	64	85		
	0,0%	24,7%	75,3%	100%		
<i>Total</i>	21	30	119	170	χ ² theoretical=5,99	
	12,4%	17,6%	70,0%	100%		

In the comparative analysis of the results, a statistically significant difference in responses of the respondents was found ($\chi^2 = 10.249$, $p < 0.05$). This indicates that students support the claim that the applied interactive methods in the model are beneficial for building more lasting knowledge and skills (Table 3.16).

- The indicators from the study show that the applied interactive model *"improves communication with the lecturer and among students."* The high relative proportion of positive responses before (70.6%, $n=60$) and after conducting the experiment (74.1%, $n=63$) reaffirms the significance of communication between lecturers and students in interactive learning (Table 3.17).

The analysis of the results before and after the applied experiment revealed a statistically significant difference in the responses of the participants ($\chi^2 = 13.729$, $p < 0.05$). The difference in responses leads to the conclusion that students are confident after the experiment that the application of interactive methods leads to improvement in interaction with the lecturer and among themselves (Table 3.17).

Table 3.17. *Students' opinion on whether interactive methods "improve communication with the lecturer and among students"*

<i>Answers</i>	<i>Neither Agree nor Disagree</i>	<i>Rather Agree</i>	<i>Agree</i>	<i>Total</i>	χ^2	<i>p-value</i>
<i>Before applying the model</i>	19	6	60	85	13,729	$p < 0,05$
	22,4%	7,1%	70,6%	100%		
<i>After applying the model</i>	0	22	63	85		
	0,0%	25,9%	74,1%	100%		
<i>Total</i>	19	28	123	170	χ^2 theoretical=5,99	
	11,2%	16,5%	72,4%	100%		

- To the question regarding interactive methods as *"facilitating the application of theoretical knowledge in practice,"* before the experiment, more

than half of the students (56.6%, n=49) gave a positive response, "neither agree nor disagree" were 25.9% (n=22), and only four responded "rather disagree" - 4.7%. After conducting the experiment, there was an impressive increase in the proportion of those answering "agree" (69.4%, n=59) and only five responses of "neither agree nor disagree" (5.9%, n=5), with no negative responses (Table 3.18).

In the comparative analysis of the students' responses before and after the experiment, a statistically significant difference was found ($\chi^2 = 16.526$, $p < 0.05$). This directs towards the claim that as a result of the conducted methodology, the respondents believe that the interactive methods in the model facilitate the application of theoretical knowledge in practical skills (Table 3.18).

Table 3.18. *Students' opinion on the contribution of interactive methods to "facilitating the application of theoretical knowledge in practice"*

<i>Answers</i>	<i>Rather Disagree</i>	<i>Neither Agree nor Disagree</i>	<i>Rather Agree</i>	<i>Agree</i>	<i>Total</i>	χ^2	<i>p-value</i>
<i>Before applying the model</i>	4	22	10	49	85	16.526	$p < 0,05$
	4,7%	25,9%	11,8%	57,6%	100%		
<i>After applying the model</i>	0	5	21	59	85		
	0,0%	5,9%	24,7%	69,4%	100%		
<i>Total</i>	4	27	31	108	170	χ^2 theoretical=7,81	
	2,4%	15,9%	18,2%	63,5%	100%		

- The statement that interactive methods "*creates conditions close to real practice*" shows the largest difference in positive responses from students before the experiment (50.6%, n=43) and after it (70.6%, n=60). There is a significant change also in the response "neither agree nor disagree" Before the methodology

was applied, 36.5% (n=31) of the respondents indicated this response, while after its implementation, no respondents indicated this response (Table 3.19).

The comparative analysis of the results showed a statistically significant difference ($\chi^2 = 23.741$, $p < 0.05$) in the responses, confirming that the application of the interactive model creates conditions close to real practice (Table 3.19).

Table 3.19. Students' opinion on the contribution of interactive methods to "creating conditions close to real practice"

<i>Answers</i>	<i>Neither Agree nor Disagree</i>	<i>Rather Agree</i>	<i>Agree</i>	<i>Total</i>	χ^2	<i>p-value</i>
<i>Before applying the model</i>	31	11	43	85	23,741	$p < 0,05$
	36,5%	12,9%	50,6%	100%		
<i>After applying the model</i>	0	25	60	85		
	0,0%	29,4%	70,6%	100%		
<i>Total</i>	31	36	103	170	$\chi^2_{theoretical} = 5,99$	
	18,2%	21,2%	60,6%	100%		

- Regarding whether the applied interactive model develops "**confidence in future patient work,**" positive responses were given by 54.1% (n=46) of the students before the experiment, and 69.4% (n=59) after its implementation. There is a significant change among students who responded "neither agree nor disagree" before the experiment (31.8%, n=27). After the model was applied, only 5.9% (n=5) of respondents answered "neither agree nor disagree" (Table 3.20).

The analysis of the results before and after the applied model shows a statistically significant difference in the respondents' answers ($\chi^2 = 20.346$, $p < 0.05$). Therefore, it can be concluded that students became confident after the experiment that the interactive model develops their confidence in applying practical knowledge in real practice (Table 3.20).

Table 3.20. Students' opinion on the contribution of interactive methods to developing "confidence in future patient work"

<i>Answers</i>	<i>Rather Disagree</i>	<i>Neither Agree nor Disagree</i>	<i>Rather Agree</i>	<i>Agree</i>	<i>Total</i>	χ^2	<i>p-value</i>
<i>Before applying the model</i>	1	27	11	46	85	20,346	<i>p</i> <0,05
	1,2%	31,8%	12,9%	54,1%	100%		
<i>After applying the model</i>	0	5	21	59	85		
	0,0%	5,9%	24,7%	69,4%	100%		
<i>Total</i>	1	32	32	105	170	χ^2 theoretical=7,81	
	0,6%	18,8%	18,8%	61,8%	100%		

➤ **Comparative analysis of the data from the questionnaire survey on students' opinions regarding the formation of professional competencies before and after the applied model**

In the conducted didactic experiment, an important task is for the applied model to guarantee the acquisition of specific knowledge, skills, attitudes, and behaviors that gradually lead to the creation of expected professionally significant competencies.

- In the questionnaire survey following the experiment, the way students' opinions changed regarding the possibility of forming competencies through the interactive methods implemented in the model was tracked.

The analysis shows that over half of the students before the experiment gave a high rating (n=55, 64.7%) to the need for the application of interactive methods in competency formation. After the applied model, the relative proportion of positive responses shows higher values (n=74, 87.1%). There is a difference in the result concerning the response "neither agree nor disagree" before the methodology (n=24, 14.1%), as after the methodology, no students gave this response (Table 3.21).

The change in students' responses before and after the application of the model can be observed in the comparative analysis, where there is a statistically significant difference ($\chi^2 = 13.851$, $p < 0.05$). This provides grounds to accept the thesis that as a result of the applied interactive model, students believe that interactive methods contribute to the formation of professionally significant competencies (Table 3.21).

Table 3.21. *The interactive model contributes to the formation of professional competences, students' opinion before and after the applied experiment*

<i>Answers</i>	<i>Rather Disagree</i>	<i>Neither Agree nor Disagree</i>	<i>Rather Agree</i>	<i>Agree</i>	<i>Total</i>	χ^2	<i>p-value</i>
<i>Before applying the model</i>	3	14	13	55	85	13,851	$p < 0,05$
	3,5%	16,5%	15,3%	64,7%	100%		
<i>After applying the model</i>	0	0	11	74	85		
	0,0%	0,0%	12,9%	87,1%	100%		
<i>Total</i>	3	14	24	129	170	$\chi^2_{theoretical} = 7,81$	
	1,7%	8,3%	14,1%	75,9%	100%		

The questionnaire survey tracked students' opinions before and after the experiment *specifically on which professional competencies could be formed as a result of the applied model.*

- Regarding the competence "making independent decisions", the results of the survey indicated that there was a significant difference in positive responses before (51.8%, $n=44$) and after (69.4%, $n=59$) the experiment. There is also a significant difference in the response "Neither Agree nor Disagree" before (22.4%, $n=19$) and after (2.3%, $n=2$) the methodology was applied.

Upon analyzing the students' responses before and after the experiment, a statistically significant difference was found ($\chi^2 = 22.180$, $p < 0.05$). This means that students highly value the possibility of mastering the competency of "making

independent decisions" through the interactive methods implemented in the model (Table 3.22).

- In the results of the questionnaire survey regarding the formation of the competency "*communication skills*," it was found that more than half of the respondents gave positive answers both before (60.0%, n=51) and after (78.8%, n=67) the experiment. Before the model was applied, 12.9% of the students responded "neither agree nor disagree" while after its application, this decreased to 3.5%. A comparative analysis revealed a statistically significant difference ($\chi^2 = 31.942$, $p < 0.05$) in the responses before and after the experiment. The significant increase in positive responses indicates that students highly value the opportunity for communication and interaction as a result of the interactive methods in the model.

- From the questionnaire survey results regarding the formation of the competency "*teamwork*," it was found that over half of the respondents gave positive responses (57.6%, n=49) before the application of the interactive model. After applying the model, the relative proportion of positive responses increased significantly (74.1%, n=62). Additionally, there was a substantial difference in the response "neither agree nor disagree" which was 17.6% (n=15) before applying the model, but absent after its application.

The analysis of the results revealed a statistically significant difference ($\chi^2 = 9.278$, $p < 0.05$) in the degree of responses. This indicates that students highly rate the formation of the competency "*teamwork*" in the practical training sessions through the applied interactive model (Table 3.22).

- In the results of the questionnaire survey regarding the formation of "*creativity and innovation*," the analysis again indicated a difference in the relative proportions of positive responses before (58.8%, n=50) and after (78.8%, n=67) the experiment. There was also a change in the "neither agree nor disagree"

response, decreasing from 20.0% (n=17) before the experiment to 4.7% (n=4) after it.

This was also evident in the comparative analysis of students' responses before and after the experiment, where a statistically significant difference ($\chi^2 = 12.526$, $p < 0.05$) was found, confirming that students highly value the opportunity to master the competency of "*creativity and innovation*" through the applied interactive model (Table 3.22).

Table 3.22. Students' opinion on the formation of professional competencies before and after the experiment

Professional competences	Answer	Disagree		Rather Disagree		Neither Agree nor Disagree		Rather Agree		Agree		χ^2	p-value
		n	%	n	%	n	%	n	%	n	%		
Independent decision-making	Before the experiment	0	0,0	6	7,1	19	22,4	16	18,8	44	51,8	22,180	p<0,05
	After the experiment	0	0,0	2	2,3	2	2,3	22	25,9	59	69,4		
	Total	0	0,0	8	4,7	21	12,3	38	22,4	103	60,6	χ^2 theoretical=7,81	
Communication skills	Before the experiment	0	0,0	2	2,4	11	12,9	21	24,7	51	60,0	31,942	p<0,05
	After the experiment	0	0,0	0	0,0	3	3,5	15	17,6	67	78,8		
	Total	0	0,0	2	1,17	14	8,2	36	21,2	118	69,4	χ^2 theoretical=7,81	
Teamwork	Before the experiment	0	0,0	0	0,0	15	17,6	21	24,7	49	57,6	9,278	p<0,05
	After the experiment	0	0,0	0	0,0	0	0	22	25,9	63	74,1		
	Total	0	0,0	0	0,0	15	8,8	43	25,3	112	65,9	χ^2 theoretical=7,81	
Creativity and innovation	Before the experiment	2	2,4	1	1,2	17	20,0	15	17,6	50	58,8	12,526	p<0,05
	After the experiment	0	0,0	0	0	4	4,7	14	16,5	67	78,8		
	Total	2	1,2	1	0,6	21	12,3	29	17,1	117	68,8	χ^2 theoretical=9,49	
Development of clinical reasoning	Before the experiment	0	0,0	6	7,1	23	27,1	13	15,3	43	50,6	16,520	p<0,05
	After the experiment	0	0,0	0	0	4	4,7	15	17,6	66	77,6		
	Total	0	0,0	6	3,5	27	15,8	28	16,4	109	64,1	χ^2 theoretical=7,81	

- In the survey regarding the development of the skill of "*clinical reasoning*," it was found that half of the respondents (50.6%, n=43) give positive responses before the experiment and over two-thirds (77.6%, n=66) after its

conduction. "Neither agree nor disagree" in the initial case is (27.1%, n=23), and then significantly decreases to (4.7%, n=4). Comparative analysis of the results again shows a statistically significant difference ($\chi^2 = 16.520$, $p < 0.05$). This indicates that surveyed students give a high rating for the development of the "clinical reasoning" competency after the application of the interactive methodology (Table 3.22.)

➤ **Comparative analysis of the data from the survey regarding students' opinions on the change in their academic motivation before and after the applied model:**

Results from the analysis obtained from the survey on *the motivation* of rehabilitation therapists show that half of the respondents (56.4%, n=43) give positive responses before the experiment and over two-thirds (78.8%, n=67) after its conduction. There is also a significant change in the response "neither agree nor disagree" as before the implementation of the model, it was 20.0% (n=23), and then significantly decreased to (3.5%, n=3).

Table 3.23. *Students' opinion on academic motivation before and after the experiment*

<i>Responses</i>	<i>Rather Disagree</i>	<i>Neither Agree nor Disagree</i>	<i>Rather Agree</i>	<i>Agree</i>	<i>Total</i>	χ^2	<i>p-value</i>
<i>Before applying the model</i>	2	17	18	48	85	15,056	p<0,05
	2,4%	20,0%	21,2%	56,4%	100,0%		
<i>After applying the model</i>	0	3	15	67	85		
	0,0%	3,5%	17,7%	78,8%	100,0%		
<i>Total</i>	2	20	33	115	170	χ^2 theoretical=7,81	
	1,2%	11,7%	19,5%	67,6%	100,0%		

This fact is supported by the results of the conducted χ^2 -square analysis, which shows a statistically significant difference ($\chi^2 = 15.056$, $p < 0.05$) in the responses of the students before and after the experiment. These cumulative data

clearly emphasize that the academic motivation of the students significantly increased after the application of the didactic experiment with interactive methods (Table 3.23).

Based on the scientific study conducted among students in the "Rehabilitation Therapist" specialty at the Medical College in Stara Zagora, the following conclusions can be drawn:

- After the didactic experiment, students reaffirm their views on the advantages of interactive learning. According to them, *the application of interactive methods contributes to acquiring sustainable practical knowledge and skills and improves communication with lecturers and among students.* There is a significant change in their evaluations of the methodology after the implementation of the interactive model. They believe that interactive methods create conditions close to the real environment, which boosts their confidence when working in clinical practice with real patients.
- Regarding the formation of professional competencies, after the didactic experiment, students confirm their belief that the methods embedded in the model develop professional competencies: *communicative skills, innovation and creativity in the implementation of knowledge, and teamwork abilities.* Additionally, they add a new competency, which they believe the applied interactive model has contributed to, and that is the *development of clinical reasoning.*
- Regarding *academic motivation*, there is a significant positive increase in students' responses after the methodology is implemented which is a clear indication that the interactive methods embedded in the model stimulate students' interest in the learning process and encourage their motivation to acquire knowledge and practical skills.

IV. INTERACTIVE MODEL. METHODOLOGY FOR CONDUCTING A DIDACTIC EXPERIMENT

4.1. Practical training interactive model

The practical training interactive model aims to enrich, consolidate, and complement the knowledge, skills, and competencies of “Rehabilitation therapist” students, as outlined in the curricula of the specialized disciplines of kinesiotherapy and therapeutic massage. Its main goal is to create an educational approach that incorporates modern interactive learning technologies. By using this model, the teaching and learning process moves away from the traditional structure and offers more flexible interactive methods that meet the specific requirements of the discipline and modern educational process. These include maximum activity, interaction, proximity to the real clinical environment, and emphasis on the formation of professional competencies in the context of practical training classes.

➤ Structure of the model

The developed interactive model is a complex of interconnected components in a logical sequence. The model demonstrates the relationship between organization and planning with the selection of suitable methods and resources for the practical training classes's objectives. It emphasizes the correlation between the formation of professional skills and competencies in students and the selection of appropriate educational technology. (Figure 4.1).

➤ Formulation the objectives of the practical training classes

The main goal of education in kinesiotherapy and therapeutic massage is for students to develop both practical knowledge and skills, as well as the necessary competencies to solve problems related to their professional activities. The applied author's model achieves the main goal by using a suitable selection of innovative methods that lead to the development of professional competencies.

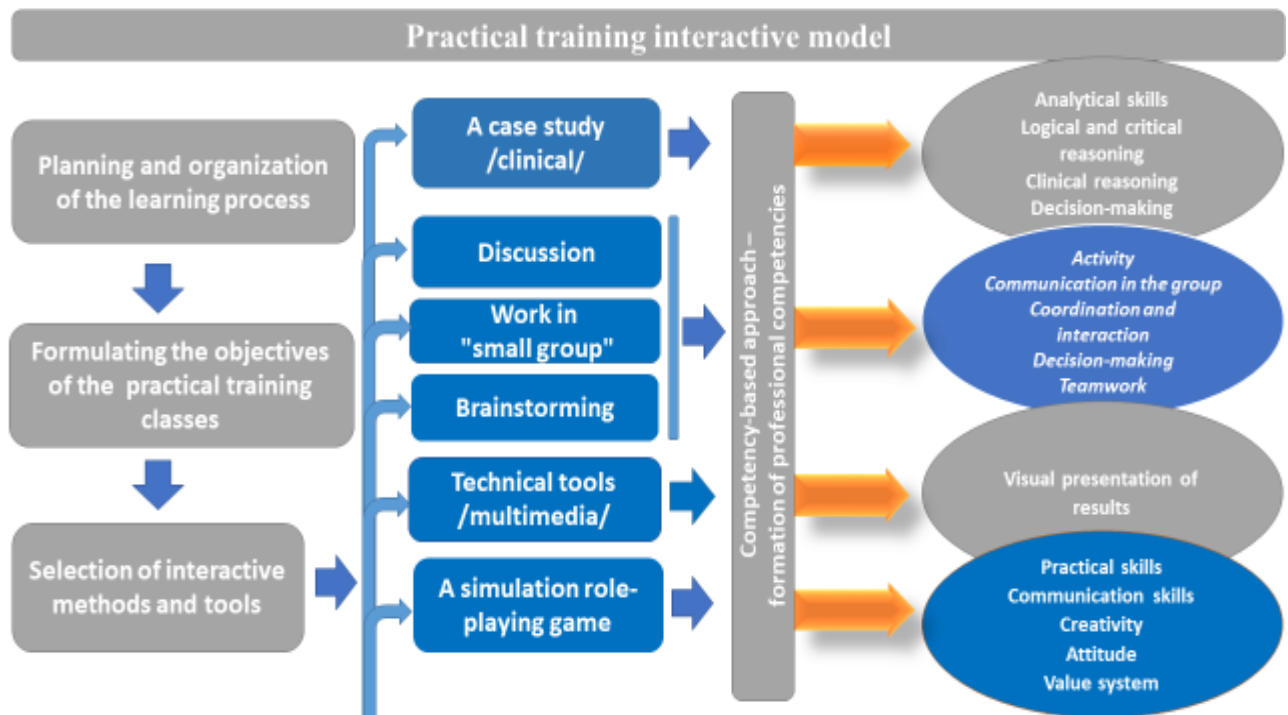


Figure 4.1. Schematic of an practical training interactive model for training rehabilitation therapists in the practical classes kinesiotherapy and therapeutic massage

➤ **Organization and planning of practical training classes**

The success of the interactive learning process directly depends on planning and organization. This includes:

Formulating specific educational objectives;

- Choosing interactive teaching methods that support the achievement of the objectives of the practical session;

- Developing of educational materials such as cases studies, problem tasks, multimedia presentations, etc.;

- Organizing the learning environment – specialized rooms and cabinets, as well as the necessary technical equipment (multimedia, etc.) that meet the conditions for conducting interactive learning;

- Time planning – to be optimally distributed to ensure the full conduct of all stages of the class.

The aim of organizing and planning the practical training class is to create a structured and goal-oriented interactive environment that enhances student interest, stimulates active participation, and supports the achievement of desired educational outcomes.

➤ **Interactive teaching methods included in the model**

The interactive teaching process takes place in conditions of active communication and interaction between learners and educators and among the students themselves. Interaction in such a process helps to stimulate student activity, engage their attention, maintain their interest, and increase motivation for learning. This is a direct prerequisite for a deeper understanding and assimilation of the studied educational content.

The applied model proposes interactive methods tailored to the specificity of training rehabilitation therapists specialists in the disciplines of kinesiotherapy and therapeutic massage – case study, discussion, small group work, brainstorming, role-playing games, and multimedia presentation

A case study presents a real problem, situation, or case. Solving cases necessitates the emergence of cognitive needs and activates students to analyze, consider, and propose alternatives to solve the presented problem. In the model, the applied clinical case provides sufficient information about a hypothetical or real patient, provoking cognitive processes in students directed towards independent or group search for different approaches to reach the final action solution.

A discussion is an interactive method for exchanging opinions and seeking optimal solutions to the respective problem. In the interactive model, the aim of the discussion is to encourage students to apply communication skills in a debate and analysis, providing constructive solutions to complex problem tasks. This method aims to develop a deeper understanding of the essence of the problem.

For greater effectiveness of interactive processes, the discussion is conducted in smaller groups.

Work in "*small groups*" is an approach where a limited number of students unite around achieving a common goal. In such groups, relationships are built entirely on active joint activity, collaboration in direction, character, and goals. Such a process is characterized by higher participant activity, collaboration, better coordination, and mutual assistance. The method presupposes a high level of communication and builds teamwork skills.

Brainstorming is a method where "ideas are generated" for a short time, and alternatives for solving the required task are sought. Applying the method provokes students to be more active and to think faster. Through this method, in practical training classes on kinesiotherapy and therapeutic massage, not only the effect of its application is observed, but also control over the action time is exercised.

Multimedia allows the visual presentation of educational materials. In its specific application in the model, the data from the given case study and the result of the students' decision on the problem are visualized. This provides an additional opportunity for trainees to acquire skills in effective professional expression and presentation of their opinion to others.

In a **role-playing game**, a real situation is reproduced, and students assume simulated roles as "patients" and "rehabilitation therapists". Each participant is required to display behavior appropriate to their role. Through this method, students get closer to an environment close to the professional one. In the model, the focus is on the independent practical work of the "rehabilitation therapist" and the formation of communication skills, attitude towards the "patient," and behavioral character.

➤ **Competency-based approach and formation of professional competencies**

The competency-based approach focuses on the practical significance of acquired knowledge and its application in a real professional environment. The shift in the education paradigm from knowledge transmission to competency mastery and the development of problem-solving abilities outline the main characteristics of the competency-based approach: integrated interdisciplinary interaction, results orientation, application of innovative approaches and practices in the teaching and learning process.

The competency-based approach finds its application through interactive methods and innovative technologies in education, which focus on stimulating student activity and acquiring profession-specific competencies. Each interactive method contributes to the development of specific professional competencies, meaning that the level of their formation for the rehabilitation therapist depends on the appropriate choice and application of the selected method. The model demonstrates the connection of each interactive method with the development of the respective competencies.

➤ **Benefits of implementing the practical training interactive model**

- ***Increased student activity***: Through the interactive methods embedded in the model, the passive nature of traditional knowledge transmission teaching is overcome, and the emphasis is placed on stimulating active student participation in the learning process.
- ***Enhanced communication***: The interactive methods and tools in the model are selected to provoke constant communication and interaction among students and between students and lecturers. Through communication, students interact by entering into interpersonal relationships, influencing and supporting each other, hence developing teamwork skills.
- ***Bringing students closer to the professional environment***: The applied methods (small group discussions and role-playing games) create realistic

conditions that bring students as close as possible to the clinical environment in which they will practice their profession.

- ***Formation of professional competencies:*** Each interactive method in the model is aimed at building and developing professionally relevant competencies necessary for the future work of a rehabilitation therapist. In this way, students acquire not only knowledge and practical skills but also internalize social norms, values, and relationships, learning to cope with the various challenges of the profession as rehabilitation therapists.
- **Increased student motivation**-enhancing and maintaining student interest and motivation stimulates the development of their cognitive skills and social competencies, encouraging active participation in the educational process, as they absorb specific information, develop their professional abilities. In this way they prepare to deal successfully with educational and future professional and personal challenges, which encourages them to be independent and innovative in their profession and in various areas of life.

4.2. Methodology for conducting a didactic experiment during a kinesiotherapy practical training class

The implementation of the didactic experiment was carried out according to the general plan for conducting practical training classes described in pedagogical literature (E. Zheleva, M. Mitova). In the substantive part, an author's model consisting of specially selected and combined interactive methods was used, tailored to the specifics of teaching the discipline of kinesiotherapy and aimed at forming the necessary professional competencies for practice as a rehabilitation therapist (Figure 4.2).

1) Preliminary preparation of the practical training class includes:

- Lecturer`s preparation:

- Theoretical preparation - literature review on the topic of the session;

- Material-technical preparation - specialized kinesiotherapy room, multimedia equipment provision;
- Pedagogical preparation – formulation specific educational objectives, preparing case studies.
- *Students' preparation:*
- Students prepare in advance by studying the lecture material and recommended literature provided by the lecturer

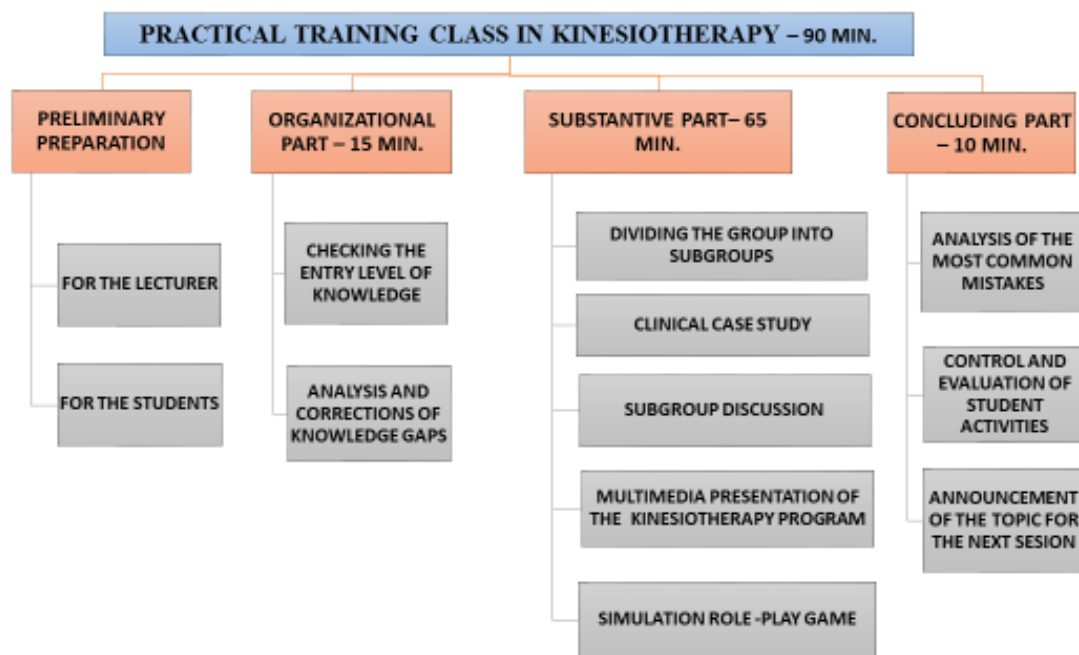


Figure 4.2. Plan for conducting an practical training class in kinesiotherapy using the practical training interactive model

2) The organizational part of the practical training class lasts 15 minutes and includes:

- **Assessment of students' prior knowledge level** through group discussion.

- *Analysis and correction of knowledge gaps*

3) Substantive part – 65 minutes

The kinesiotherapy practical exercise is conducted in two stages.

Stage 1 - Discussion - the lecturer divides the group into smaller subgroups of 2-6 students. A clinical case is presented to all students, providing detailed information about the discussed disease the duration of the illness, and the rehabilitation potential (motor abilities) of a real patient.

The main activity of the subgroups is based on the previously provided information, evaluating the nature of motor impairments, and developing a kinesiotherapy program (determining the methods and means of kinesiotherapy).

Students analyze the information provided in advance, discuss different alternatives, and make decisions regarding the development of a kinesiotherapy program. To fit within the time frame set by the lecturer, brainstorming techniques are used during the discussion, with one student from each subgroup tasked with taking notes on the generated ideas.

After the discussion, a representative from each subgroup reports the decision regarding the kinesiotherapy program to all students. For better visualization, the decision is projected using a multimedia projector so that all students can follow the presentation.

In the first stage, teamwork in the subgroups is evaluated, observing the activity of each student, communication among students, analytical abilities, clinical reasoning, coordination, interaction, and the achieved level of teamwork.

Stage 2 - In the second stage, students are paired up and engage in a **role-playing game**, assuming the roles of "patient" and "rehabilitation therapist"

The task of the role-playing game is for students in the role of "rehabilitation therapist" to independently apply a set of exercises with the simulated "patient." After completion, the roles are reversed.

Individual work of each student is assessed - practical skills, creativity, consistent application of kinesiotherapy program tools, communication abilities, and attitude towards the "patient."

4) Concluding part – (10 minutes):

- Analysis of the most common mistakes;

The lecturer analyzes the most common mistakes made by the subgroups during the discussion and by individual students in the role-playing activities with the simulated "patient."

- Control and evaluation of student activities:

Student actions in the discussion subgroups and the individual activities of each student during the role-playing games are monitored and evaluated.

- Announcement of the topic and objectives for the next session.

4.3. Methodology for conducting the didactic experiment during the practical training class on therapeutic massage

In the substantive part of the session, the practical training interactive model is applied once again. The general plan for conducting the practical training class is presented in Figure 4.3.

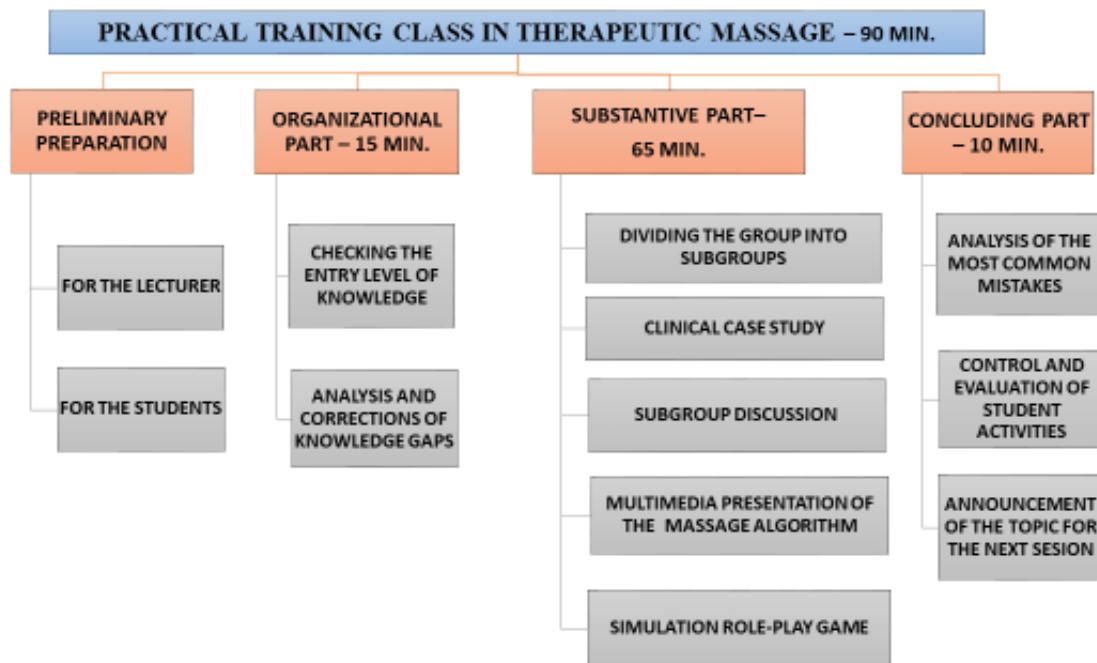


Figure 4.3. Plan for conducting a practical training class on therapeutic massage using the interactive model

1) Preliminary preparation for the practical training class includes:

- Lecturer` preparation

- Theoretical preparation - literature review on the topic of the lesson;
- Material-technical preparation - specialized room for therapeutic massage, provision of multimedia equipment;
- Pedagogical preparation - formulation of specific educational objectives, preparation of case studies.

- Students' preparation

- studying of lecture material and recommended literature provided by the lecturer in advance

2) The organizational part of the practical training class lasts 15 minutes and includes:

- Checking and evaluating the students' initial level of knowledge through group discussion.

- Analysis and correction of knowledge gaps

3) Substantive part – 65 minutes

The practical training exercise on therapeutic massage is conducted in two stages:

Stage 1 –The group is divided into subgroups of 2-6 students. Each subgroup is presented with a clinical case, providing information about the discussed disease, the period of illness, and the rehabilitation potential (motor capabilities) of a real patient.

Based on the provided preliminary data, each subgroup engages in a discussion, explores various alternatives, and decides on the construction of a massage algorithm (sequence of massage techniques, additional and special techniques).

After the discussion, each subgroup reports their decision on conducting the therapeutic massage to all students. In the first stage, the teamwork and behavior

of each member of the subgroups are assessed. Student activity, communication, analytical skills, clinical reasoning, coordination, interaction, and level of teamwork are monitored.

Stage 2 - In the second stage, students pair up and engage in a role-playing, assuming the roles of "patient" and "rehabilitation therapist"

The task of the role-playing game is for the student playing the role of "rehabilitation therapist" to apply the therapeutic massage and additional techniques correctly and sequentially with the "simulated patient." After completion, roles are reversed.

The independent work of each student - practical skills in applying therapeutic massage, communication abilities, and attitude towards the "patient" - is assessed.

3. Conclusion part – 10 minutes

- *Analysis of the most common mistakes*

- *Control and assessment of students' work* - The work of students in the subgroups during the discussion and individual activities in role-playing games is to be assessed.

- *Announcing of the topic and objectives for the next practical class.*

CONCLUSION

Education in the "Rehabilitation therapist" specialty requires changes in line with rapidly evolving technologies in education and science as a whole. These changes involve overcoming the passive nature of traditional knowledge transmission-based learning, moving towards interactive education that emphasizes stimulating active participation and interaction among students in the educational process. Its aim is to contribute to the development and consolidation of the abilities of future rehabilitation therapists to effectively apply the knowledge and skills learned in the real professional environment. Through these methods, a deeper understanding of the educational material is provided, and professionally relevant competencies are formed. They also provide an opportunity to improve students' educational experience by engaging them, increasing their academic motivation, and facilitating their development.

By applying the interactive model in practical training classes on kinesiotherapy and therapeutic massage, students are more active, closer to the real clinical environment, satisfied with the efforts they make, and they develop skills and competencies.

The practical knowledge, skills, and competencies gained during practical classes in kinesiotherapy and therapeutic massage have a significant impact on the final results in carrying out high-quality rehabilitation activities with patients. They are a key factor in the students' successful performance in their future professional practice.

OUTCOMES

Based on the conducted study, the following conclusions can be observed:

- As a result of the reviewed literature and the analysis of the questionnaire survey on interactive methods and tools, specifically designed for the education of rehabilitation therapists, according to the opinion of lecturers and students problem-based education, role-playing games, discussion, and multimedia presentation are the most suitable, as they contribute to better practical preparation the most.
- According to the conducted survey regarding interactive learning, lecturers believe it necessary to modernize the educational process by incorporating innovative teaching methods such as interactive ones, a view shared by mentors from clinical skills training centers, as well. Both groups of respondents believe that interactive learning influences the formation of certain professionally significant competencies, highlighting communication skills, teamwork, and the development of clinical reasoning as the most important.
- Students highly value the need for interaction, emphasizing the importance of prioritizing the inclusion of modern teaching and learning technologies in the educational process. According to them, interactive learning facilitates the application of theoretical knowledge in practice, enhances their professional preparation, and contributes to the formation of professional competencies such as communication and teamwork skills, creativity, and decision-making.
- Learners believe that interactive learning significantly contributes to increasing their academic motivation. This statement confirms Hypothesis 2 of the dissertation.
- After the conducted didactic experiment, students are of the opinion that interactive learning is necessary for their practical training as it creates conditions close to real practice and makes them more confident in their future professional activities. They believe that through the interactive methods

embedded in the model, professional competencies are developed, with communication skills, creativity, and clinical reasoning being highlighted as the most important. These claims confirm Hypotheses 1 and 3 of the dissertation.

SUGGESTIONS

1. Periodical improvement of the material and technical base to keep up with constantly changing technologies.
2. Provision of opportunities for lecturers to enhance their qualifications in light of the new developments entering education.
3. Encourage lecturers to improve their teaching methodology by introducing innovative approaches that have proven effective in order to optimize the learning process.
4. Treat students as full participants in the educational process by stimulating their participation in scientific forums, university and national projects, which will further enhance their activity and professional competencies.

CONTRIBUTIONS

Based on the conclusions and results of my own research, theoretical and practical contributions can be formulated.

Theoretical-applied Contributions:

1. A thorough study and analysis of interactive methods and tools suitable for the practical training of students in the "Rehabilitation therapist" specialty have been conducted.
2. The opinions of lecturers, mentors, and students regarding the prerequisites and conditions under which interactive learning optimally influences the formation of professional competencies in future rehabilitation therapists and contributes to increasing the academic motivation of learners, have been investigated.

Practical-applied Contribution:

1. A scientifically based model based on interactive methods and tools applicable in the practical training of rehabilitation therapists has been developed by the author.
2. A methodology for teaching in practical training classes on kinesiotherapy and therapeutic massage has been developed based on the interactive model.
3. A didactic experiment to establish the effectiveness of the applied interactive model has been conducted.

List of publications related to the dissertation work

1. **Mollova, K.** (2023). Factors for the implementation of an effective interactive educational process according to the rehabilitation therapist students of Stara Zagora Medical college, *Knowledge - International Journal*, 57(4), pp. 511–516, ISSN 1857-923X (e), 2545-4439 (p)
Retrieved from <https://ikm.mk/ojs/index.php/kij/article/view/6022>
2. **Mollova K.**, (2022) The competence approach in the training of the future rehabilitation therapist, *Knowledge - International Journal*, 54(4), 713-717, ISSN 1857-923X (e), 2545-4439 (p)
DOI: <https://doi.org/10.35120/kij5404713m>
Retrieved from <https://ikm.mk/ojs/index.php/kij/article/view/5634/5553>
3. **Mollova, K.**, Filkova, S. (2022). Constructivism and training at the Medical College, *Varna Medical Forum Vol. 11 (2022): Suppl. 2.*, pp. 366-370.
DOI: <http://dx.doi.org/10.14748/vmf.v11i0.8986>

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