

MEDICAL UNIVERSITY - PLOVDIV
FACULTY OF PUBLIC HEALTH
Department of Health Care Management



Katya Stefanova Kichukova

**CONTINUING TRAINING AS A MEANS OF
ENHANCING THE PROFESSIONAL COMPETENCE
OF MEDICAL LABORATORY TECHNICIANS**

**Dissertation work for awarding
the educational and scientific degree
DOCTOR
in the field of higher education
7. Health and Sports, professional field:
7.4. Public Health,
scientific specialty "Health Care Management"**

**Academic advisors:
Prof. B. Tornyoova, PhD
Assoc. prof. T. Taneva, PhD**

PLOVDIV, 2021

The dissertation contains 196 standard pages, 38 figures and 55 tables. The bibliography includes 221 sources, of which 122 in Cyrillic and 109 in Latin.

This dissertation has been approved and submitted for defense by the Extended Departmental Council of the Department of Health Care Management, Faculty of Public Health of the Medical University-Plovdiv, held on 20.12.2021.

Scientific jury:

Chairperson:

Members:

Assoc. prof. Vanina Mihaylova, MD

Assoc. prof. Milena Sandeva, MD

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Assoc. prof. Tanya Paskaleva, MD

Prof. Elena Zheleva, PhD

Alternate members:

Prof. Dr. Maria Semerdzhieva, MD

Assoc. prof. Galina Terzieva, PhD

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The materials for the defense are available at the Academic Affairs Office of Medical University - Plovdiv and have been uploaded on the website of Medical University - Plovdiv.

I. INTRODUCTION

Learning and education have been considered essential for the development of human societies since ancient times. Early on, people have realized that their full development depends on satisfying their educational needs.

In recent decades, we have witnessed a trend that links the functionality of education to individual life and social needs. In today's dynamic life, which requires a new set of competences, learning and development are seen as a precondition for personal and professional success. In this sense, the process of continuing training also depends on the individual needs of people. One of the main goals of lifelong learning programmes is to contribute to people's personal development.

The rapidly changing professional life in the context of continuous introduction of new diagnostic and medical technologies in healthcare facilities requires the continuing training of medical personnel to become a constant process of improving professional competences and qualifications. Developments in laboratory diagnostics in recent years have been impressive. New diagnostic methods and equipment have rapidly been adopted and put into practice, and new laboratory indicators have also been introduced. This evidence is even more convincing in the attempt to establish the continuing training of medical laboratory technicians as a continuous process of acquiring new knowledge and skills to fill the information deficit and prevent professional illiteracy among workers in various medical laboratories.

Continuing training is directly related to the professional realization and development of individuals, as it is aimed at updating the knowledge and skills of individuals, as well as their personal growth, but mainly for career purposes.

The global pandemic of Coronavirus (COVID-19) has put to the test people's ability to cope in demanding and complex situations that threatened their life and health. The greatest challenge that healthcare professionals faced was to quickly acquire new diagnostic, testing and treatment competences at the highest standards of utmost importance

to public health. Medical laboratory technicians also rose to the same challenges in the months following the outbreak of the pandemic.

The present study was conducted before the pandemic of SARS-CoV-2 and was inspired by the belief that the profession of the medical laboratory technician generally implies a continuous improvement of competence, in line with the dynamics in the development of medical science and technological innovativeness of the profession. During the pandemic situation, additional arguments were raised and two main problems addressed by medical laboratory technicians were reinforced: the need for continuous vocational training, and staff's readiness and individual motivation for continuing qualification and improvement.

The study of the factors that determine the readiness for continuing training of medical laboratory technicians and the institutions in which they work has theoretical and practical significance for several reasons. Firstly, a significant amount of scientific research proves the relationship of subjective learning readiness and learning outcomes, as well as of career development and success opportunities, which is probably also evident with regard to continuing training.

Secondly, there are empirical results that justify the importance of the conditions in the professional or learning environment for stimulating the pursuit of professional development among learners and practitioners. Therefore, state education policy and the organisation of work in medical laboratories could provide more opportunities to stimulate the willingness for continuing training in medical laboratory technicians.

This dissertation has established the necessity for continuing training of medical laboratory technicians and their significant orientation towards continuing training and profiled specializations as a concrete form of training.

II. METHODS

1. Aim, tasks and hypothesis of the study

1.1 Aim of the study

To examine the subjective determinants of the need for continuing training as a means of increasing the professional

competence of in-service medical laboratory technicians, students from the specialty “Medical laboratory technician” and employers (laboratory doctors).

1.2. Main tasks of the empirical survey

From the perspective of the aim of the study, the following main tasks have emerged:

1. To examine the main subjective assessments of the need for continuing training as a means of enhancing the professional competence of medical practitioners, students and laboratory doctors.

2. To differentiate the descriptors defining the interest in continuing training of medical laboratory technicians and students of the specialty “Medical laboratory technician”, and to examine their influence on the attitude towards continuing training.

3. To examine the motivation of students and practitioners for choosing a profession and to establish its influence on the subjective assessments of the need for continuing training.

4. To explore the motivation for achievement in students and medical laboratory technicians and the impact on the main variables and descriptors of subjective assessments with respect to the need for continuing training.

5. To investigate the connectedness to/alienation from the specialty in lab technicians and students and the influence on the variables (main variables and descriptors) of the subjective necessity for continuing training.

6. To examine the needs for further professional training of students and medical laboratory technicians, as well as the opinion of laboratory doctors on the need for it.

7. To examine the subjective opinions of respondents for profiled specialization for medical laboratory technicians as a form of continuing training.

1.3. Hypothesis:

Medical laboratory technicians declare the need for continuing training as a means to increase their professional competence, while their subjective judgements are influenced by the motivation for choosing the profession, their motivation for achievement and the tendency for connectedness to/alienation from the profession.

2. Materials and methods

2.1. The object of the study is continuing training as a means of increasing the professional competence for health care professionals in Bulgaria.

2.2. The subject of the study are the subjective determinants of the necessity for continuing training of students, medical laboratory technicians and laboratory doctors, and for creating profiled specializations for medical laboratory technicians.

2.3. Study contingent

The study contingent comprises respondents from three target groups:

First target group:

First and second year students from the specialty “Medical laboratory technician”, enrolled at the Medical College of Trakia University - Stara Zagora – a total of 42 students.

Second target group:

Includes 111 medical laboratory technicians from laboratories in the cities of Stara Zagora, Kazanlak, Sliven, Yambol, and Radnevo. The choice of laboratories is random, in order to cover health care structures (private and public) and independent medical diagnostic laboratories.

Third target group:

Consists of 37 laboratory doctors with varying clinical specialties, some of whom are owners of laboratories. Of these, 16.22% are male and 78.38% female.

2.4. Units and observation indicators in the empirical study

Technical units of observation are:

- *Medical College*, Trakia University – Stara Zagora and
- *Medical laboratories* in the cities of Stara Zagora, Kazanlak, Sliven, Yambol, and Radnevo.

Logical units of observation are:

- All students from the specialty “Medical laboratory technician”, enrolled at the Medical College of Trakia University - Stara Zagora, and
- medical laboratory technicians and laboratory doctors working in laboratories in the cities of Stara Zagora, Kazanlak, Sliven, Yambol, and Radnevo, who consented to participate in the study.

Observation indicators

Factorial indicators

- **Socio-psychological factorial indicators** related to:

- Motivation for work and training in the specialty - intensity of internal motivation, intensity of external motivation.

- Connectedness to/alienation from the specialty - respect for the tasks and instructions, efforts made for their implementation, attitude towards the results of the work, emotional connection to the work. The method has been adapted from the work of Velichkov (2005). In the context of the present study, the low degree of alienation from the specialty or profession is considered to be connectedness.

- **Individual-psychological factorial** - motivation for achievement (sub-indicators - targeting, perspective and complexity of tasks, motivation after failure, etc.);

- **Demographic factorial** - age; sex; type of laboratory, according to the profile of the medical activities; size of the location; place of work - according to the registration under the Law on Healthcare Centres and the method of funding; course of study for students.

Resulting indicators

- **Cognitive components of the attitude to CT:**

- Interest in the opportunities for continuing training;
- Needs for further training in areas related to professional functioning.

- **Behavioural components of the attitude to CT:**

- Readiness to attend forms of continuing training to increase professional competence - preferred professional areas for CT, attitude to distance learning, credits as an incentive for CT.

- Applicability and satisfaction with CT - actual attendance of the forms of continuing training by medical laboratory practitioners, assessment of the applicability of knowledge, satisfaction with the CT, subjective incentives for CT, expected employers' support for CT.

2.5. Methods of the empirical study

To obtain data for empirical analysis, the *sociological method* of Direct Group Survey has been adopted. Specific questionnaire cards have been used for each of the surveyed groups of respondents. The questionnaire cards represent a system of **questionnaires and standardized psychological tests**, adapted for the population in Bulgaria, as well as questionnaires developed for the specific study. The modules allow comparability of information for the different

target groups, where relevant questions are formulated. The questionnaires have been developed specifically for the study and are aimed at investigating its main variables and descriptors.

The methodological toolkit has been organized provisionally in 3 modules:

First module: "Socio-psychological"

- **Diagnostic methodology for examining the motives for selecting a specialty** by students, or respectively for exercising a profession by medical laboratory technicians.

It has been developed for the purposes of this study and contains statements reflecting the motivation of respondents from both groups. Deci and Ryan's theoretical concept of internal and external motivation for work (according to which learning is seen as work) has served as a basis for the analysis of the empirical data.

After exploratory factor analysis, three subscales have been extracted:

- a. **Internal motivation.** It includes motives such as interest in the profession, need to care for people, pleasure from work, capabilities to perform it, etc. They represent 12.12% of the dispersion with a coefficient α Cronbach = 0.74.

- b. **Motives oriented towards career development and professional prestige.** They represent 18.18% of the dispersion with a coefficient α Cronbach = 0.68.

- c. **External motivation – motives not derived from the content of the specific activity.** They represent 66.66% of the dispersion with a coefficient α Cronbach = 0.65.

- **Alienation Assessment Test** created by Angel Velichkov from the Institute of Psychology at the Bulgarian Academy of Sciences (Velichkov, 2005).

The test contains 10 statements describing reactions of indifference and alienation from work under normal conditions. The structure of the method is revealed using exploratory factor analysis.

Its consistent reliability according to α Cronbach is 0.66.

Second module "Personal-psychological"

- **Achievement Motivation Test (AM 4)** – according to D. McLelland (Bulgarian adaptation and standardization – Iv. Paspalanov and D. Shtetinski IP-BAS (1985))

Third Module "Professional and educational"

• **Questionnaire for examining the main components of the subjective necessity for continuing training** for students, laboratory technicians and laboratory doctors.

Questions covering the study of the basic parameters of continuing training in the three groups of subjects studied have been compared, where possible. They have been divided provisionally into questions examining the main variables of the need for CT, and those examining the descriptors of CT.

• **Questionnaire to investigate the need for profiled specialization** for medical lab technicians in students and lab technicians and laboratory physicians (laboratory managers).

2.6. Mathematical and statistical data processing

The statistical processing of empirical data was carried out using the statistical analysis package intended for studies in social sciences STATISTICA.

The following main statistical analyses were used:

- **T-test of Student-Fisher** - to measure the significance of the differences between the groups of respondents, formed according to the sub-scales of the variables studied, characteristics of the personality and individual demographic characteristics;

- **Correlation analysis** – to establish statistically significant relationships between the variables in the study;

- **Dispersion Analysis (ANOVA)** - to establish the influence of motivation and the alienation from the profession on the subjective necessity of continuing training;

- **Factor analysis** – to establish the factor structure of the questionnaires used and the part of the total variance exploited by each factor;

- **Cronbach reliability coefficient α** for measuring the reliability of the scales, as well as of the sub-scales analysed in the text;

- **Percentage analysis** of the distribution of responses for all variables included in the study.

III. ANALYSIS OF THE STUDY RESULTS

3.1. Main variables of the attitude of laboratory technicians, students and laboratory doctors to continuing training

The main variables related to the topic of the study describe the attitude of the respondents from the three target groups – medical laboratory students, medical laboratory technicians and laboratory doctors towards continuing training.

As main variables, the study adopted:

1. The interest of medical laboratory students, medical laboratory practitioners and laboratory doctors in the opportunities for continuing training for medical laboratory technicians;

2. The expressed needs for further training in areas related to professional functioning.

3. The subjective assessment of respondents about the need for continuous updating of professional knowledge;

4. The readiness of laboratory technicians and students to attend further training to increase professional competence;

5. Actual attendance of the forms of continuing training by medical laboratory practitioners.

These variables are consecutively presented in the exposition in item 3.1.

3.1.1. Interest of students, lab technicians and laboratory doctors in continuing training opportunities

It is evident from Fig. 1 that the highest interest in all opportunities for upgrading qualifications is expressed by students – 52.38%, relatively lower by medical lab technicians – 33.63% and lowest by laboratory physicians - 27.03%, the latter showing a stronger interest only in some of these forms.

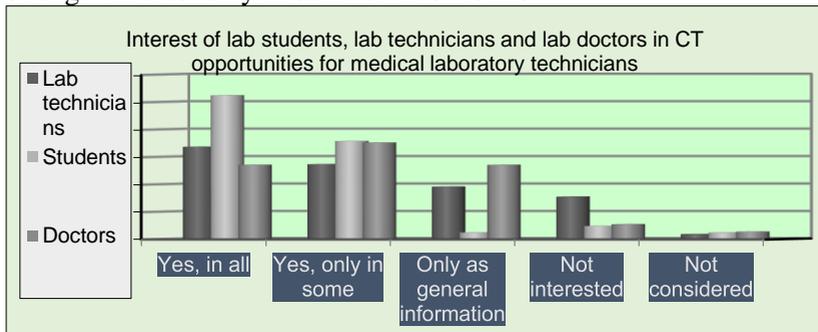


Fig. 1.

3.1.2. Needs for further training of students and medical laboratory technicians

The results show that lab technicians have a strong need for further training and preparation to work with specific new technologies and equipment. For laboratory doctors, the priority is to increase practical and theoretical competences in the field in which they are professionally involved, as well as in using new technologies (Fig. 2).

Fig. 2. Subjective assessment of medical lab technicians and employers on the needs for further training (average values)

Although students tend to be hypothetical during the survey, they believe that they would need further training to increase professional competence in a certain area, possibly related to their career, learn how to use new technologies, and search for opportunities to acquire a higher educational and qualification degree (Fig. 3).

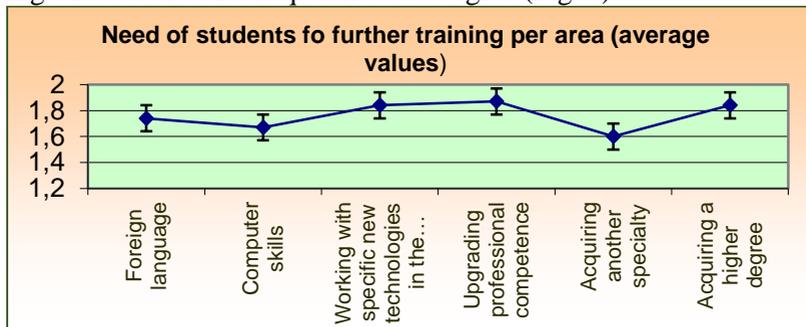


Fig. 3.

3.1.3. Need for continuous updating of knowledge in the profession according to laboratory technicians and students

The analysis of the frequencies shows that the need for continuous updating of the knowledge of the profession is strongest according to the laboratory doctors (100% of the doctors in total), less for the students (90.48%) and relatively least - according to the opinions of lab technicians (87.26%) (Fig. 4)

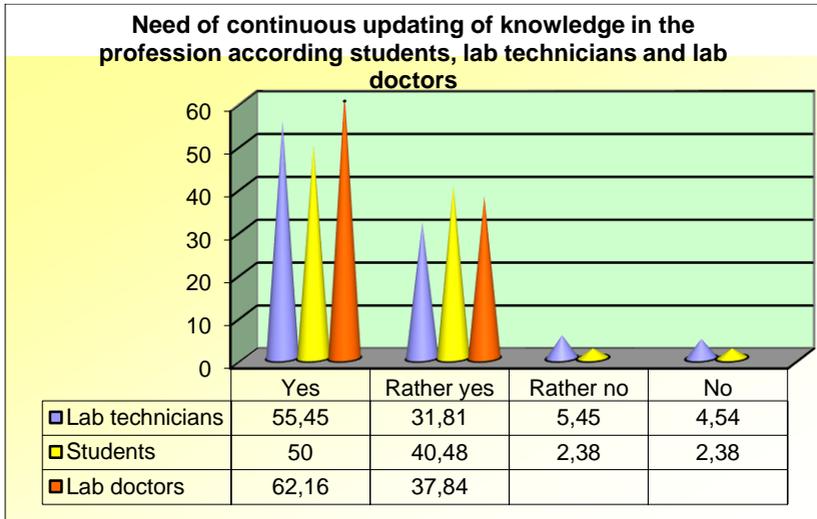


Fig. 4.

3.1.4. Readiness of laboratory technicians and students to undertake continuing training opportunities to increase professional competence

The next main variable is the readiness of laboratory technicians and students to attend CT events. A large number of students – 35.71%, would certainly take advantage of this opportunity, and 38.09% rather tend to use continuing training as a resource to increase their professional competence after graduation; 33.64% of the lab technicians respond affirmatively and just over a quarter - 26.36% of them express strong intention to participate in continuing training (Fig. 5).

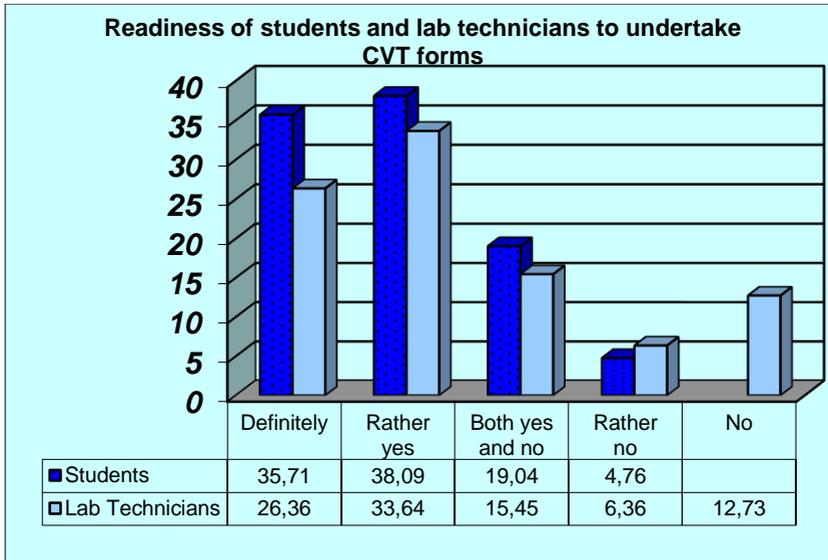


Fig. 5.

A very large proportion - 62.16% - of doctors are more convinced that their laboratory technicians are ready to attend CT events, compared to the lab technicians themselves who have expressed readiness to pursue CT forms (Fig. 6).

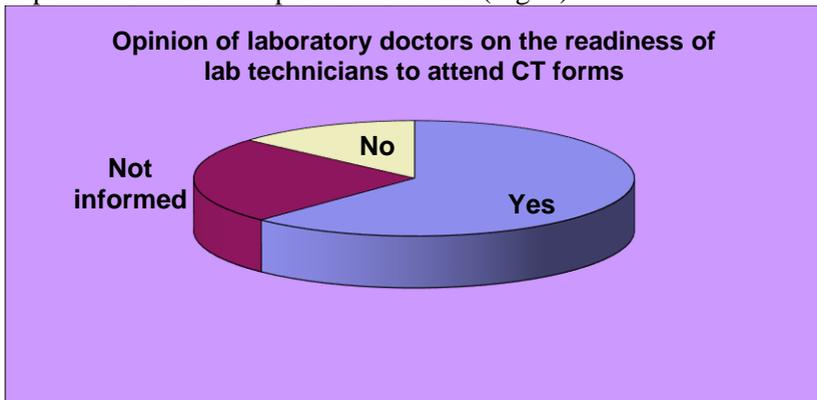


Fig. 6.

Almost half of the surveyed specialists, who are practicing lab technicians, respond that they have not engaged in any forms of continuing training at all – 47.27% (Fig. 7).

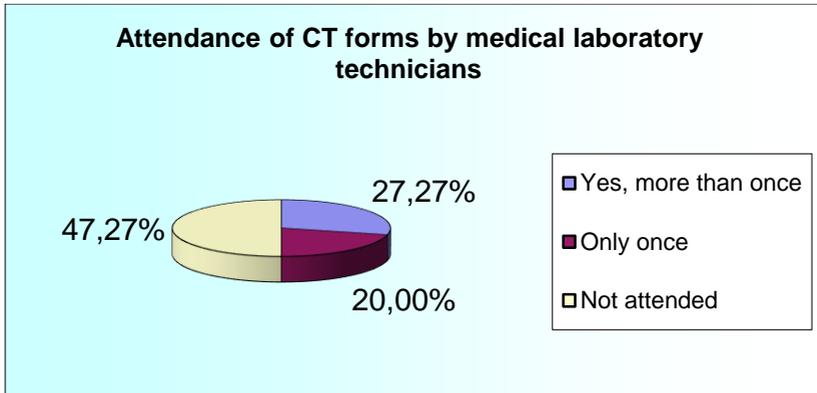


Fig.7.

This result corresponds to the opinion of the laboratory doctors on the low interest and lack of information about postgraduate training of laboratory teams. Only 13.5% of all lab technicians have attended CT forms (Fig. 8).

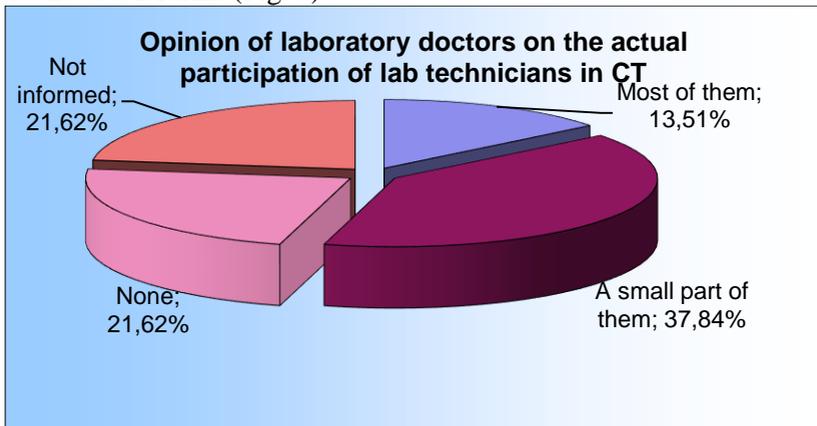


Fig. 8.

3.2. Motives for studying and practicing the profession of the medical laboratory technician and their influence on the attitude towards continuing training

Of the 33 surveyed motives for choosing a profession, 7 have a very strong influence on the professional orientation of both in-service lab technicians and students. The three internal motives ('I like to help people and take care of their health', 'The profession is

interesting', 'The profession is pleasant') imply a purposeful, active and creative implementation of the activity, even in the absence of external incentives.

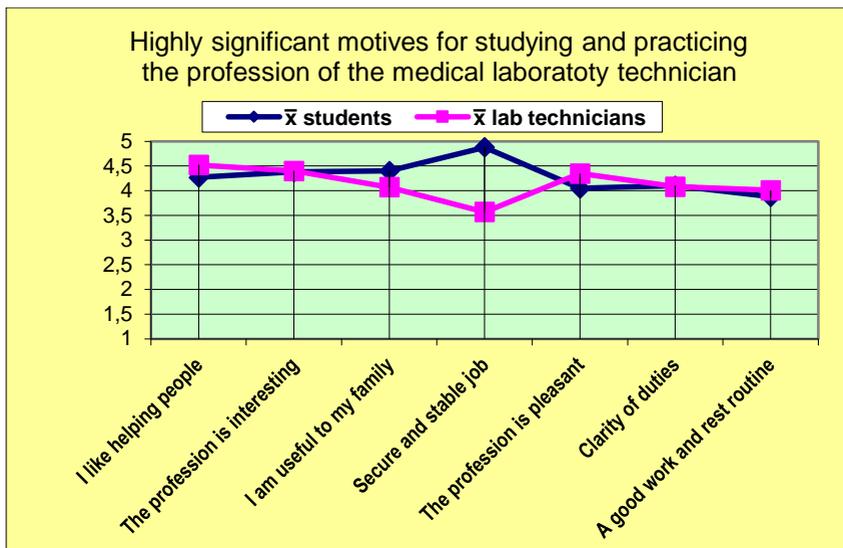


Fig. 9.

The strong external motives are: benefit for the family, satisfying work and rest routine, secure and stable work, clarity of duties in the profession. There are no statistically significant differences in highly significant motives for students and lab technicians, with the exception of the 'secure and stable work' motive, which is much more significant for students (Fig. 9).

Among the averagely significant motives for learning and work are two internal motives – possessing the necessary abilities and having preliminary knowledge of the profession. Working abroad, a relaxed profession with light workload with opportunities for career development are more important for students, than for lab technicians (Fig. 10).

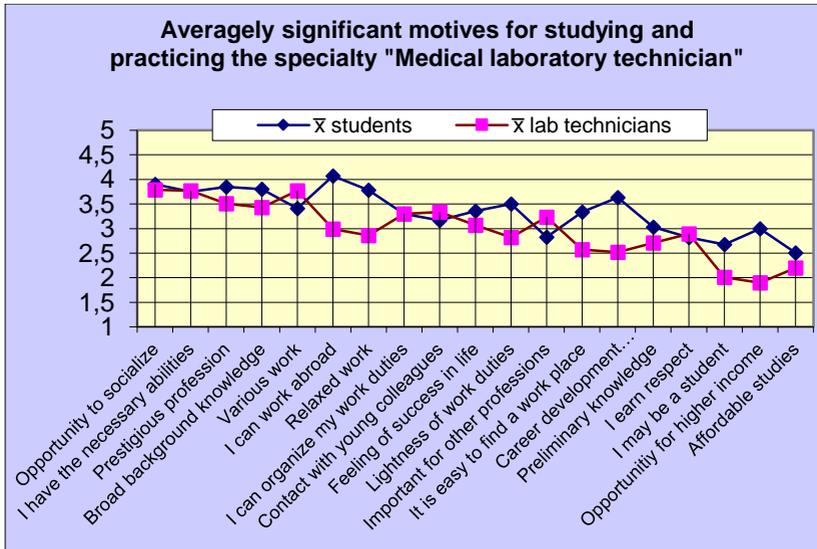


Fig. 10.

3.2.1. Influence of the motives for work and study of the specialty “Medical laboratory technician” in students and in-service medical laboratory technicians on the subjective necessity of continuing training.

This item analyses the impact of student choice of specialty motives on the main variables of continuing training defined in item 3.1.

The following relationships were observed:

The internal strong motive "The profession offers an opportunity for stable and secure work" statistically significantly ($F=2.76$; $p < 0.05$;) influences the need for further training **for working with specific new technologies** in the profession. It turns out that **when the motive of "Stable and secure work" is significant, students believe that they will have a greater need for further training to work with specific new technologies in the profession** ($\bar{x} = 1,86$), which may be acquired at continuing training courses, compared to students for whom acquiring a profession that provides security and stability is not a motive for studying the specialty ($\bar{x} = 1,00$). It is likely that learners are aware that in modern laboratories the impact of new technologies

is extremely high and every laboratory technician who strives to be a good professional and have a secure job must not only be well prepared, but also continually increase his professional competence in the field of new technologies (Table 1).

❖ A statistically significant influence of **the average in importance** external motive "**Acquisition of broad background knowledge**" is observed on one of the main variables describing the attitude towards continuing training. Students whose professional learning motive is the acquisition of broad background knowledge ($\bar{x} = 1,93$) have a statistically significantly higher need to acquire a higher educational and qualification degree ($F=2,69$; $p<0,05$), compared to students for whom the acquisition of broad background knowledge is not a motive for choosing the specialty in which they are trained ($\bar{x} = 1,40$) (Table 1).

Table 1. *Influence of the motives for "Stable and secure work" and "Acquisition of broad background knowledge" on the need for continuing training according to students (ANOVA)*

Independent variable	Dependent variable	Degrees of the dependent variable	\bar{X}	F $p<0,05$	t
Gives me the opportunity for stable and secure work	Need for further preparation to work with specific new technologies in the profession	Untrue for me.	1,00	2,76	$t_{1,4}=3,24$ $p=0,006$ $t_{1,5}=3,09$ $p=0,008$
		Rather true for me.	1,86		
		True for me.	1,85		
I acquire broad background knowledge	Need to acquire a higher educational degree	Untrue for me.	1,40	2,69	$t_{1,5}=2,78$ $p=0,01$

3.2.2. Influence of students' reasons for choosing a specialty on the continuing training descriptors

This item considers the influence of student selection motives on **descriptors** of the attitude to continuing training defined in item 3.5.

❖ Students who are trained in the specialty "Medical laboratory technician", where the motive "To help people and take care of their health" ($\bar{x}=1,66$) is statistically significantly more intense ($F=4,71$; $p = 0,008$), would much more often seek information about continuing training for medical laboratory technicians, than students

who are not attracted to the specialty for these reasons ($\bar{x} = 1.10$). (Table 2)

College students who chose the noble medical profession with the purely internal motive "To help people and care for their health" are very likely to seek opportunities to increase their professional knowledge and skills, as well as their personal efficiency, in all possible ways.

❖ Students who study this specialty because their future profession offers **clarity of duties**, mark a statistically significant tendency to (Table 6):

- consider to a greater degree ($F=5.67$; $p=0.008$) that continuing training is a **condition** to stimulate the **pursuit of obtaining new knowledge** ($\bar{x}= 3.85$), compared to students who have chosen to study this specialty, yet for whom the motive "Clarity of duties in their future profession" is weaker ($\bar{x}=3.13$).

- more confidently consider ($F=4.51$; $p < 0.05$) that continuing training, with more certificates, courses and specializations, is a **condition for reaching a higher position** in the hierarchy of the workplace ($\bar{x}=3.79$), compared to students who study this specialty, but for whom the clarity of duties in their future profession is a weaker motive for choosing the specialty ($\bar{x}=3.13$).

Clarity in the workplace is perhaps preferred as a condition for creating a relaxed working atmosphere that indirectly stimulates the pursuit of new knowledge of the profession. On the other hand, the clarity of responsibilities in the workplace is an important aspect of work, which is also achieved through further training after basic medical education (more courses or specializations), creating opportunities for growth in the professional hierarchy. Table 2

Table 2. *Influence of the motives with a high degree of significance "I like to help people and take care of their health" and "Clarity of duties" on continuing training descriptors (ANOVA)*

Independent variable	Dependent variable	Degrees of the dependent variable	\bar{x}	F $p < 0.05$	t
I like to help people and take care of their health	They would look for information about CT from	Rather untrue for me.	1,10	4,71	$t_{2,5}=2.67$ $p < 0.05$
		True for me.	1,66		

	all possible sources				
In my future profession, there will be clarity of duties	CT is a condition for stimulating the pursuit of obtaining new knowledge	Rather true for me.	3,13	5,67	$t_{4,5}=3,09$ $p=0.002$
		True for me.	3,85		
	Higher position in the job hierarchy	Rather true for me.	3,13	4,51	$t_{4,5}=3,36$ $p=0.002$
		True for me.	3,79		

Among the motives with a medium degree of significance is the internal motive “Preliminary knowledge of the profession”, which influences one of the main descriptors of the attitude towards continuing training – the incentives for CT.

❖ Statistically significantly **stronger incentive for further training, if paid by the employer** would have students who are motivated in the choice of a specialty by their prior knowledge of the profession ($(F=3.63; p<0.05, \bar{x}=1.93)$), compared to those students who are less motivated by prior knowledge of the profession of the medical laboratory technician ($\bar{x}=1.33$) (Table 3).

Table 3. *Influence of the internal motive of medium degree of significance “I had prior knowledge of the profession” on the descriptors of continuing training (ANOVA)*

Independent variable	Dependent variable	Degrees of the dependent variable	\bar{X}	F $p<0.05$	t
I had prior knowledge of the profession.	An incentive for continuing training, if paid by the employer	Rather untrue for me.	1,33	3,63	$t_{2,4}= 3,60$ $p=0.001$
		Rather true for me.	1,93		

3.2.3. Influence of the motives for practicing the specialty by medical laboratory technicians on the main variables of their attitude towards continuing training

The analyses did not reveal a statistically significant influence of **strong motives** on the main variables of continuing training.

A statistically significant influence of a group of medium degree of significance motives on the defined main variables determining the subjective need for continuing training is observed.

❖ The **need** for further training in computer skills ($\bar{x}=2,00$) is statistically significantly stronger for in-service laboratory technicians who are strongly **motivated by the opportunity for higher income** ($F=4,03$; $p<0.05$), compared to those lab technicians for whom the possibility for higher income is a weak motive for practicing the profession ($\bar{x}=1,27$) (Table 4);

❖ Statistically significantly stronger **need** to improve their educational and qualification degree ($F=3,33$; $p<0.05$) **have** those medical laboratory technicians for whom a strong motive for working in the same field is the **opportunity to find a job abroad** ($\bar{x}=3,13$), compared to lab technicians who have considered working abroad as a weaker motive to choose practicing their specialty. ($\bar{x}=2,28$) (Table 4).

❖ A higher statistically significant value ($F=3.40$; $p<0.05$) for wishing **to increase their educational qualification degree** belongs to those medical laboratory graduates for whom the **opportunity that the profession gives for career development** is a strong motive for choosing the specialty ($\bar{x}=3.23$), compared to laboratory technicians, for whom career opportunities are a weak motive for exercising the profession ($\bar{x}=2.34$) (Table 4).

Table 4 *Influence of the motives "Opportunity for higher income", "Work abroad" and "Career opportunity" on main variables of attitudes towards students' continuing training (ANOVA)*

Independent variable	Dependent variable	Degrees of the dependent variable	\bar{x}	F $p<0.05$	t
I have a better opportunity for higher income	Need to acquire computer skills	Rather untrue for me.	1,27	4,03	$t_{2,5}=3,76$ $p=0.002$
		True for me.	2,00		
I can practice the profession abroad	Willing to acquire a higher degree	Untrue for me.	2,28	3,33	$t_{1,5}=3.09$ $p=0.003$
		True for me.	3,13		
Offers me an opportunity for		Untrue for me.	2,34	3,40	$t_{1,5}=2.35$ $p<0.05$

career development	Willing to acquire a higher degree	True for me.	3,23		
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3.2.4. Influence of the motives for practicing the specialty by medical laboratory technicians on the descriptors for continuing training

There is a statistically significant influence of two of the motives with a **strong degree** of significance - the internal motive «To help and care for the health of people» and «To be useful to the family».

❖ Medical laboratory technicians who practice the specialty with a strong motive **to help people and take care of their health**, statistically significantly:

- are more convinced ($F=4.53$; $p=0.000$) that continuing training is rather a condition for authority within the team ($\bar{x}=3.13$) (Table 5);

- think that continuing training is rather a condition for more contacts with colleagues ($F=2.67$; $p<0.05$) ($\bar{x}=3.35$), compared to those lab technicians for whom the same motive is weak for exercising the profession ($\bar{x}=2.25$) (Table 5).

Table 5. *Influence of the motive "To help and care for the health of people" on descriptors of the attitude towards continuing training. (ANOVA)*

Independent variable	Dependent variable	Degrees of the dependent variable	\bar{x}	F $p<0.05$	t
I like to help people and take care of their health	CT presupposes authority within the team	Untrue for me	1,25	4,53	$t_{1,5}=3,75$ $p=0.000$
		I don't know	1,67		
		True for me	3,13		
	CT presupposes more contacts with colleagues	Untrue for me	2,25	2,67	$t_{3,5}=2,36$ $p<0.05$
		True for me	3,15		

❖ Medical laboratory technicians, for whom it is true that they practice their specialty, because **as health care workers they will be useful for their families** statistically significantly:

- are more convinced that continuing training is a **condition** for a higher degree of trust on the part of colleagues ($F=2.66$; $p<0.05$; $\bar{x}=3.13$) (Table 6);

- regard continuing training as a **condition** for establishing authority within the team ($F=4.18$; $q=0.004$; $\bar{x}=3.29$) (Table 6);

- consider continuing training **as a source** of respect in the family ($F=3.90$; $p=0.006$); $\bar{x}=3.29$) (Table 6);

- are convinced that continuing training is also a **condition** for delegating more rights at work ($F=2.58$; $p<0.05$; $\bar{x}=3.04$), compared to those lab technicians who express the motive “work is useful for my family” ($\bar{x}=2.25$) (Table 6).

Table 6 *Influence of the motive “As a healthcare worker I will be useful to my family” on the descriptors of the attitude towards continuing training (ANOVA)*

Independent variable	Dependent variable	Degrees of the dependent variable	\bar{x}	F $p<0.05$	t
As a healthcare worker, I will be useful to my family.	CT is a condition for a higher degree of trust on the part of colleagues	Untrue for me	2,33	2.66	$t_{1.5}=2.31$ $p<0.05$
		True for me	3,13		
	CT presupposes authority within the team	Untrue for me	2,25	4.18	$t_{1.5}=3.20$ $p=0.004$
		True for me	3,29		
	CT presupposes respect in the family.	Untrue for me	2,17	3.90	$t_{1.5}=2.69$ $p=0.004$
		True for me	3,06		
	CT presupposes delegation of duties, but more rights at the work	Untrue for me	2,25	2.58	$t_{1.5}=2.69$ $p<0.05$
		True for me	3,04		

3.3. Motivation for achievement in laboratory students and in-service medical laboratory technicians

It can be assumed that the pursuit of adding competence through continuing training in medical laboratories depends on the motivation to achieve as a personality trend.

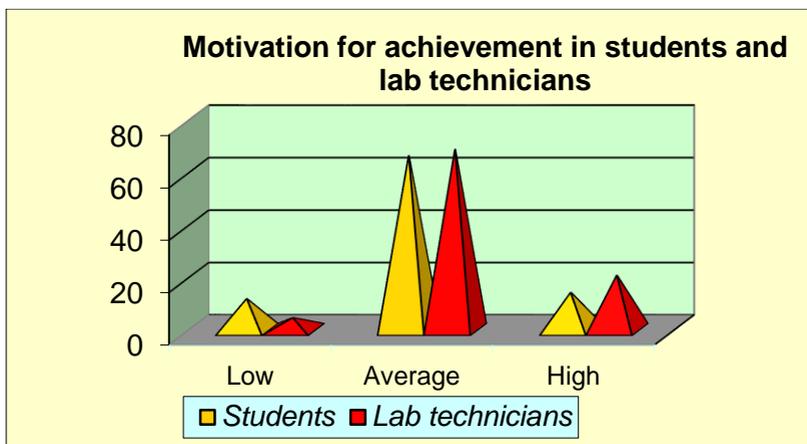


Fig. 10.

With a low degree of motivation for achievement are 11.9% of students and 4.54% of practitioners. The highest proportion of people with an average degree of motivation for achievement in both groups of respondents is 69.09% of the medical lab technicians and 66.67% of lab students. Highly motivated for success are 14.29% of students and a much higher percentage of practitioners - 20.91% (Fig. 10), for whom it can be assumed with a higher degree of probability that they will form stronger needs for continuing vocational training.

The working hypothesis that the motivation for achievement will be a predictor of the attitude towards continuing vocational training has been substantially confirmed.

❖ Laboratory technicians who possess a **high degree of achievement motivation**, compared to those who have a lower performance motivation statistically significantly:

- have a stronger need for professional competence **in another field** than their current area ($F= 3.22$; $p < 0.05$) ($\bar{x} = 1.82$) (Table7);

- would be more willing to acquire **higher educational qualification degree** ($F=6.08$; $p = 0.003$) ($\bar{x} = 3.38$), i.e. to acquire a degree with which to formalize their professional development (Table29);

- consider more often that continuing training presupposes the **stimulation of the pursuit of new knowledge** ($F=5.50$; $p=0.005$) ($\bar{x}=3.65$) (Table7);

- would prefer a higher **professional specialization** as a form of continuing training ($F=6.51$; $p=0.002$) ($\bar{x}=1.95$), compared to those lab technicians who have a low degree of motivation for achievement ($\bar{x}=1.40$) (Table 7).

Table 7. *Influence of motivation for achievement in medical lab technicians on continuing training*

Independent variable	Dependent variable	Degrees of the dependent variable	\bar{X}	F $p<0.05$	t
Motivation for achievement	Need for professional competence in a different field	Average	1,54	3,22	$t_{2,3}=2.38$ $p<0.05$
		High	1,82		
	Willing to acquire a higher degree	Low	1,80	6,08	$t_{1,3}=3.38$ $p=0.003$
		High	3,38		
	CT is a condition for stimulating the pursuit of obtaining new knowledge	Low	2,20	5,50	$t_{1,3}=5.30$ $p=0.000$
		High	3,65		
	Preference for specialization	Low	1,40	6,51	$t_{1,3}=3.80$ $p=0.000$
		High	1,95		

As students are not in an actual situation directing them to continuing training, the influence of the motivation for achievement on their attitude towards its forms is not observed.

3.4. Professional connectedness/ alienation in medical laboratory technicians and laboratory students

Alienation from the profession is seen as the final stage before the disruption of the relationship between the worker and their performance in the professional environment. The manifestations of alienation are associated with lower motivation to perform work tasks (Velichkov, 1989). In the present work, the lack of alienation will be interpreted as connectedness to the profession.

In the conducted study the lab technicians showed a high percentage of connectedness to the profession – 62.72%, while in 28.18% there was accumulating boredom with the profession, and only 5.45% registered an existing presence of alienation (Fig. 11). In the group of students, 35.71% expressed connectedness to the specialty “Medical laboratory technician”, while in 45.24% there was

an emerging boredom with it, and in 16.67% of learners there was an alienation from the specialty.

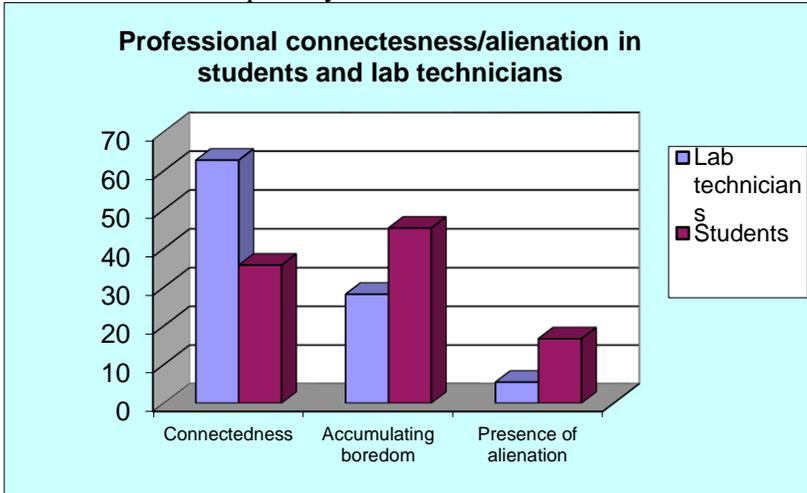


Fig. 11.

3.4.1. Influence of professional alienation /connectedness in practitioners on their attitudes towards continuing training

❖ Laboratory technicians who show connectedness to the profession consider statistically significantly more strongly that continuing training is a condition for:

- better professional self-esteem ($F=3.85$; $p<0.05$; $\bar{x}=3.45$);

- greater personal job satisfaction ($F=4.86$; $p=0.009$; $\bar{x}=3.29$);

- confidence in working with patients ($F=5.72$; $p=0.004$; $\bar{x}=3.27$);

- stimulating the pursuit of obtaining new knowledge ($F=4.12$; $p<0.05$; $\bar{x}=3.45$);

- greater job satisfaction ($F=6.81$; $p=0.002$; $\bar{x}=3.27$) compared to those with alienation or accumulating job boredom (Table 8).

Furthermore,

❖ Medical laboratory technicians, connected to the profession would statistically significantly show higher:

- stimulation for continuing training with an autonomous pursuit of new knowledge ($\bar{x}=2.73$; $F=12.34$; $p=0.000$);
- preference for acquiring a higher level of education and qualification ($\bar{x}=1.71$), compared to those with alienation from the specialty.

❖ Laboratory technicians who have developed **professional alienation**, statistically significantly more often ($F=3.79$; $p < 0.05$) would be stimulated to pursue continuing training, if paid by employers (Table 8).

Table 8. *Influence of professional connectedness/alienation in medical lab technicians on continuing training (ANOVA)*

Independent variable	Dependent variable	Degrees of the dependent variable	\bar{x}	F $p < 0.05$	t
Professional connectedness/ alienation	Willingness for further professional specialization	Connectedness	3,10	3.27	$t_{1,2} = 3.10$ $p < 0.05$
		Accumulating boredom	2,53		
	CT is a condition for better professional self-esteem	Connectedness	3,45	3.27	$t_{1,3} = 2.21$ $p < 0.05$
		Presence of alienation	2,60		
	CT is a condition for greater personal satisfaction.	Connectedness	3,29	4.86	$t_{1,3} = 3.06$ $p = 0.003$
		Presence of alienation	2,00		
	CT is a condition of confidence when working with patients	Connectedness	3,27	5.72	$t_{1,3} = 2.66$ $p = 0.009$
		Presence of alienation	2,17		
	CT is a condition for stimulating the pursuit of obtaining new knowledge	Connectedness	3,45	4,12	$t_{1,3} = 2.52$ $p < 0.05$
		Presence of alienation	2,50		
	CT is a condition for greater job satisfaction.	Connectedness	3,27	6.81	$t_{1,3} = 1.83$ $p = 0.002$
		Presence of alienation	1,83		
	Preference to acquire a higher degree	Connectedness	1,71	3,57	$t_{1,3} = 2.39$ $p < 0.05$
		Presence of alienation	1,30		

	An incentive for CT is the autonomous pursuit of new knowledge	Connectedness	2,73	12,34	$t_{1.3} = 4.89$ $p = 0.000$
		Presence of alienation	1,67		
	The incentive for CT is the employer's financial support for the training	Connectedness	2,52	3,79	$t_{1.3} = 2.23$ $p < 0.05$
		Presence of alienation	2,83		

3.4.2. Influence of professional alienation/ connectedness in laboratory students on their attitudes towards continuing training

The results of the dispersion analysis show that students who express connectedness to the specialty, statistically significantly:

- ❖ are more convinced that continuing training is a condition for a higher degree of trust on the part of colleagues ($F = 4.18$; $p < 0.05$; $\bar{x} = 3.73$);

- ❖ more often are of the opinion that it is a condition to stimulate the pursuit of new knowledge ($F = 5.21$; $p < 0.05$; $\bar{x} = 3.80$) (Table 9).

Table 9. *Influence of professional connectedness/ alienation in laboratory students on their attitudes towards continuing training (ANOVA)*

Independent variable	Dependent variable	Degrees of the dependent variable	\bar{x}	F $p < 0.05$	t
Professional connectedness/ alienation	CT is a condition for a higher degree of trust on the part of colleagues	Connectedness	3,73	4,18	$t_{1.2} = 2.76$ $p < 0.05$
		Accumulating boredom	3,00		
	CT is a condition for stimulating the pursuit of obtaining new knowledge	Connectedness	3,80	5,21	$t_{1.2} = 3.17$ $p = 0.004$
		Accumulating boredom	3,13		

3.5. Descriptors determining the attitude towards continuing training in laboratory technicians and laboratory students

The descriptors of the interest in continuing training refer to: awareness, main sources of information about continuing training,

subjective judgement of students on the availability of forms of continuing training in the specialty in which they are trained, while for of laboratory technicians and laboratory doctors - on the availability of forms of continuing training in their career profile. The descriptors defining the needs for continuing training relate to the attitude towards new technologies in the profession, the application of knowledge from the various forms of CT attended in practice, satisfaction with CT, incentives for lab technicians and students, as well as the assessment of laboratory doctors on the practices for stimulating medical lab practitioners.

3.5.1. Awareness of medical laboratories, students and laboratory doctors about the forms of continuing training for medical professionals

First of all, from the list of descriptors of the attitude to the CT the adopted ones are: awareness of the possibilities for CT and the forms in which it is realized.

In general, all three groups most often claim to be partly familiar with the opportunities for continuing training for medical laboratory technicians – 41.82%, laboratory doctors – 40.82% and students – 38.1%. Lack of familiarity was most rarely declared by students (11.9%), probably because the main sources of information for students come from the training bases, such as universities, and from their websites (see Fig. 15 and Fig. 12).

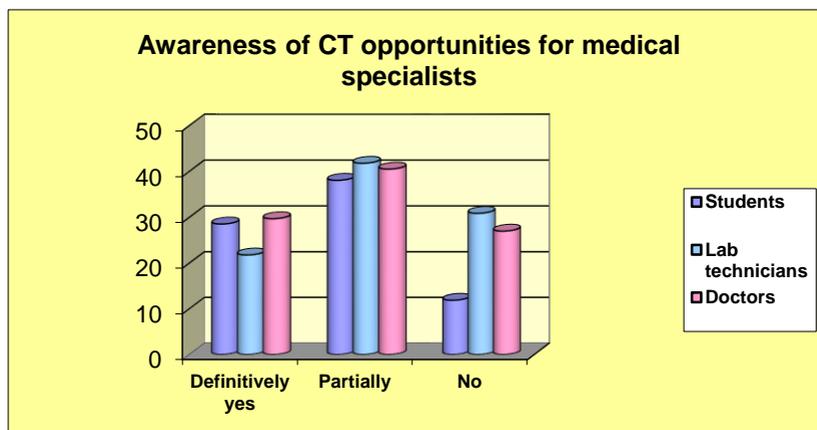


Fig. 12.

Data on the relatively low awareness of healthcare professionals about the forms of continuing training (Fig. 25) are also confirmed for the awareness of continuing training in the specialty and, in particular for the profile in which they are currently implemented. Only 22.94% of the lab technicians estimate that there are profiled forms of continuing training according to their career profile. They have no idea of the existence of such forms (36.7%) and according to 32.11% there is no continuing training matching their job profile (Fig. 13).

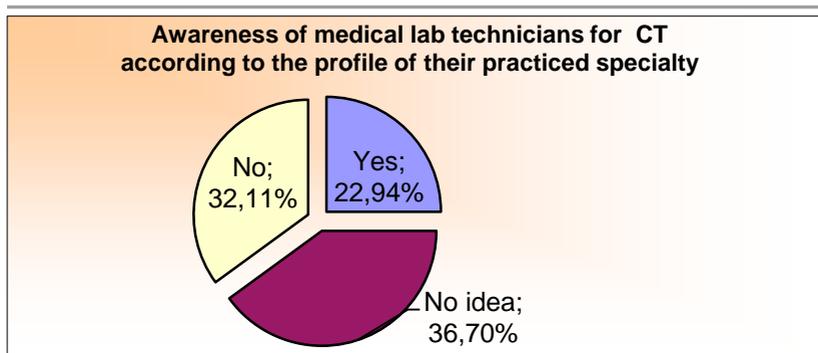


Fig. 13.

Regarding the opportunities for continuing training, which the specialty they are studying offers, students are much more optimistic. Of all respondents, 84.62% are certain that such opportunities exist after graduation (Fig. 14). In active laboratories with different profiles, laboratory doctors are relatively poorly informed about the existence of appropriate forms of continuing training for their laboratory profile.

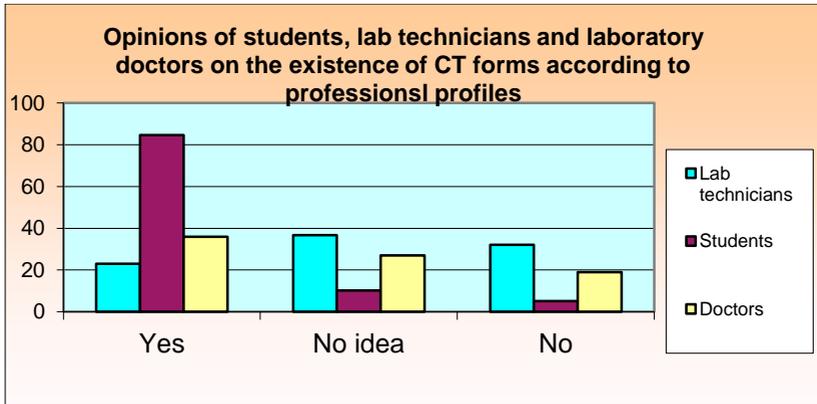


Fig. 14.

Of the respondents in this group, 35.92% consider that such forms exist, 27.03% have not shown much interest, and 18.92% felt that there was no suitable continuing training for the profile of their lab workers (Fig. 14).

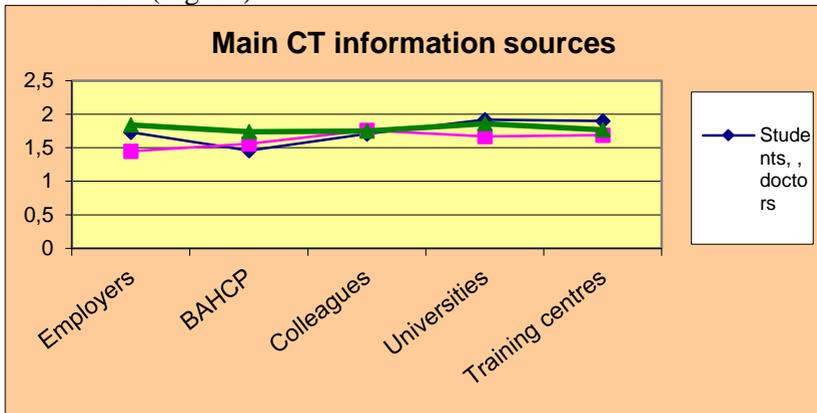


Fig. 15.

University and training centre websites, which are also main units of university clinics or centres, have the highest priority for students in the search for information ($\bar{x}=1,90$), laboratory doctors/employers ($\bar{x}=1,86$) and laboratory technicians ($\bar{x}=1,69$). Stronger confidence in providing information about CT from

employers is expressed by students ($\bar{x}=1.73$), and among doctors ($\bar{x}=1.84$), compared to lab technicians ($\bar{x}=1.45$). Trust in the Bulgarian Association of Health Care Professionals (BAHCP) as the main institution responsible for postgraduate training of health care professionals in Bulgaria is relatively low (Fig. 15).

All three groups of respondents suggest that the main forms of CT are professional courses and specializations (Fig. 16).

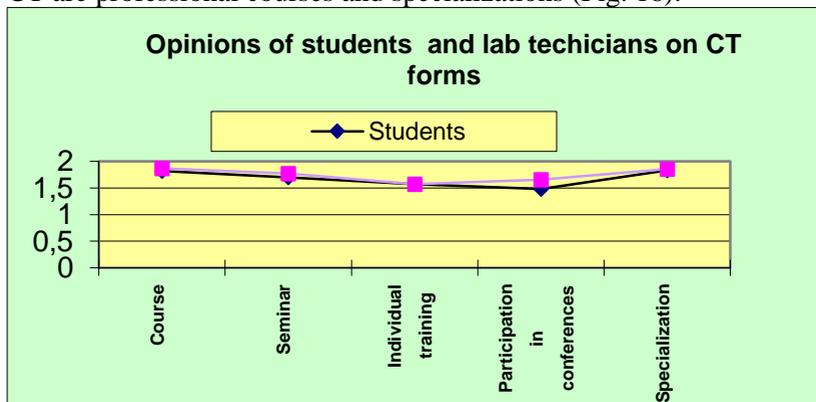


Fig. 16.

3.5.2. Subjective assessments of the importance of new technologies in the profession of the medical laboratory technician

The three groups surveyed claimed high applicability of new technologies in laboratory work (71.82% of the lab technicians, 69.05% of the students and 59.46% of the lab doctors, respectively) (Fig. 17).

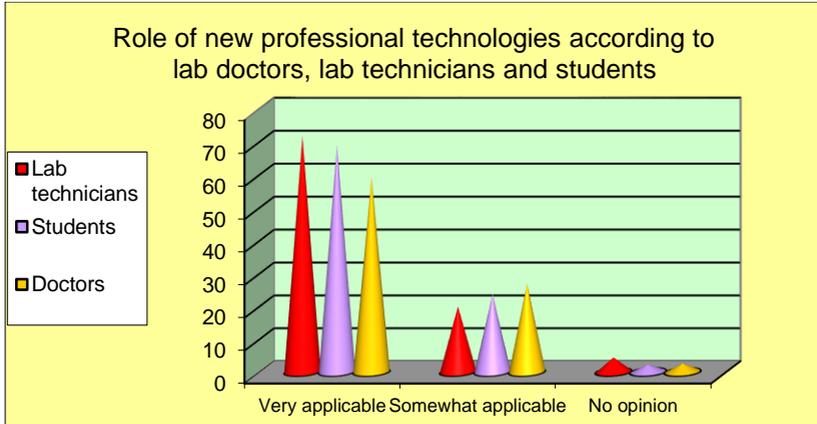


Fig. 17.

Almost 65% of the medical laboratory technicians surveyed, regardless of their profile, prefer professions where innovations are implemented (34.55% noted "true for me" and 30.00% - "rather true for me"). In the student group, 57.14% approve of professions in which innovations are implemented (26.19% - "true for me" and 30.95% - "rather true for me"). Students who do not know whether they like such professions are 28.57% (Fig. 18).

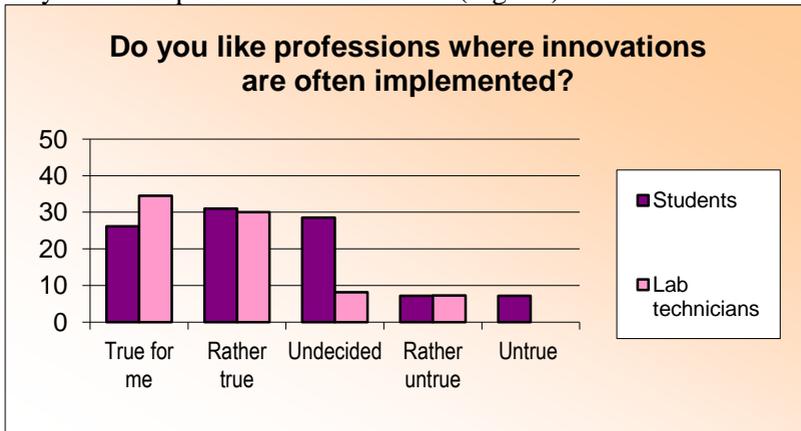


Fig. 18.

3.5.3. Satisfaction of medical lab technicians with continuing training

Laboratory technicians who have taken part in continuing training express comparatively high satisfaction with the competence of the lecturers ($\bar{x}=3.15$), the topic and content of the training ($\bar{x}=2.85$), and the way the content is presented ($\bar{x}=2.83$) (Fig. 19). The lab technicians also take into account the fact that the theory taught is sufficiently in-depth, and express their satisfaction with the proximity of the event site, as well as with tuition costs. They are sensitive to the respect for the needs and opinions of practitioners when choosing topics, probably because the practical applicability of the knowledge from continuing training is relatively least satisfactory for the in-service medical staff (Fig. 19).

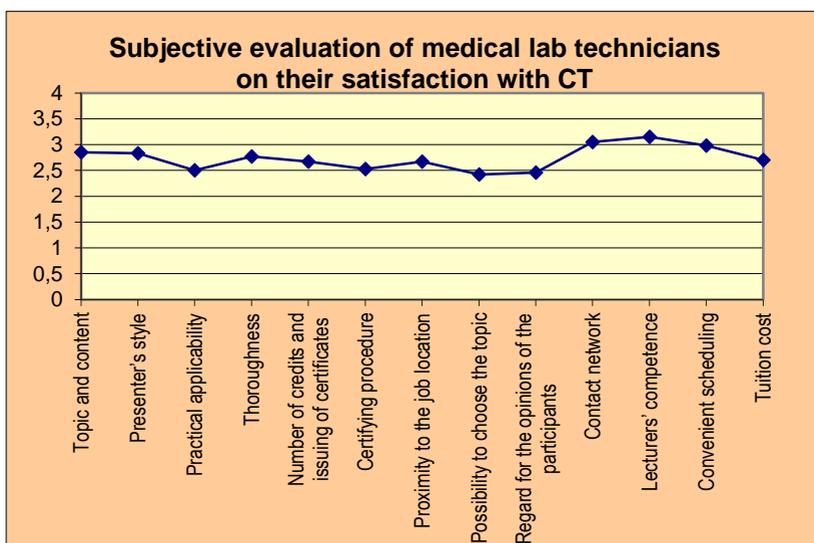


Fig. 19.

For 14.68% of the professionals the knowledge obtained from the CT has been used only for general purposes, while for 8.25% the knowledge obtained was not at all useful in practice (Fig. 20).

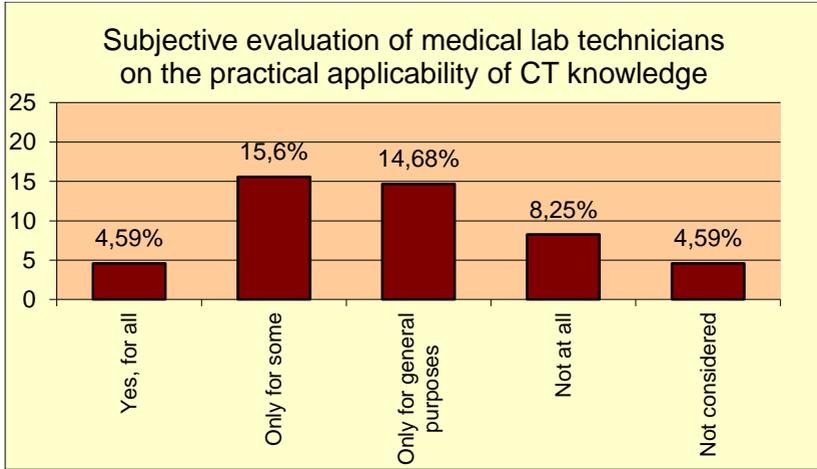


Fig. 20.

According to almost 30% (29.73%) of doctors, the knowledge and skills acquired during the continuous education courses have found application in the work of practitioners. Yet more than a third of them (37.84%) are not convinced of this. (Fig. 21).

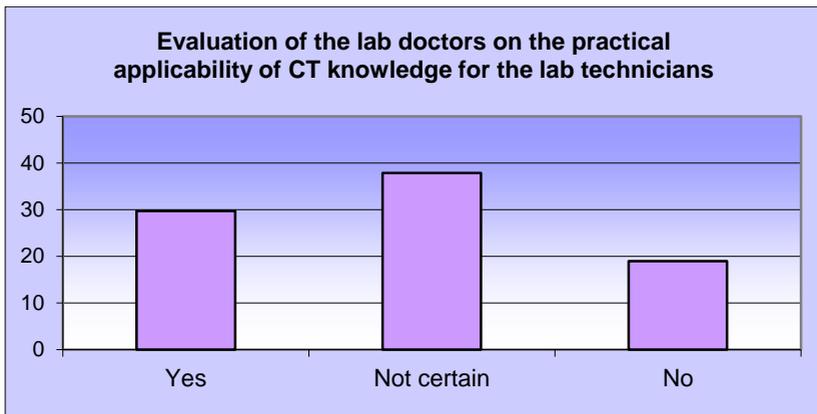


Fig. 21.

3.5.4. Subjective judgement of students, lab technicians and laboratory physicians on continuing training as a condition for development and authority

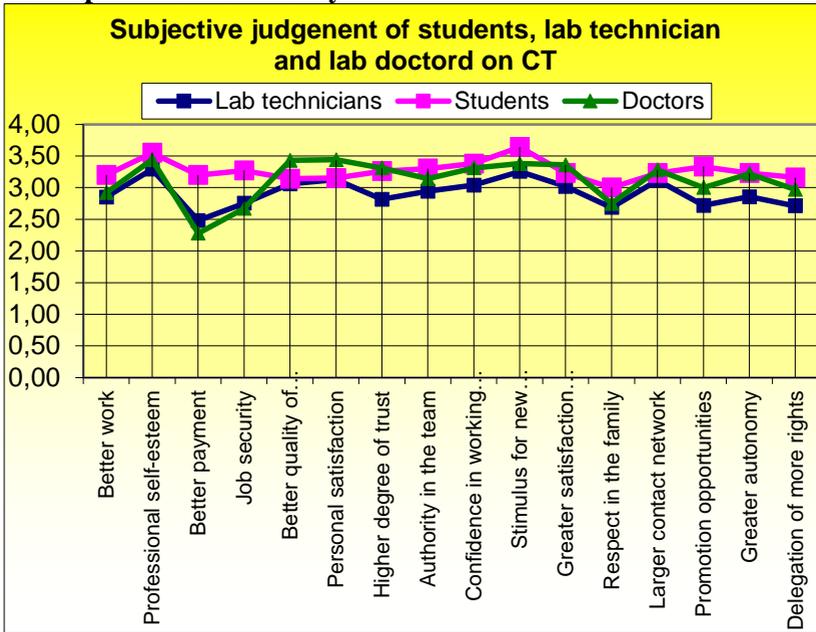


Fig. 22

According to students, lab technicians and doctors, continuing training would mainly contribute to the better professional self-esteem and stimulate the pursuit of new knowledge. For lab technicians and laboratory doctors, CT is a condition for better performance of work tasks, confidence in working with patients and satisfaction with their job as a whole. Doctors are of the opinion that CT can become a prerequisite for delegating more rights, more autonomy at work, and getting a promotion. Students believe that holding more certificates from postgraduate training would have a positive impact on quickly finding a well-paid job (Fig. 22).

3.5.5. Incentives for continuing training according to medical laboratory technicians

One third (33.34%) of the lab workers affirm that the incentive for CT should be permanent, 20.91% consider that it is necessary to

accumulate a certain amount of experience beforehand. Almost the same percentage – 18.18%, are of the opinion that the incentive for continuing training should occur after professionals have chosen their area of development (Fig. 23)

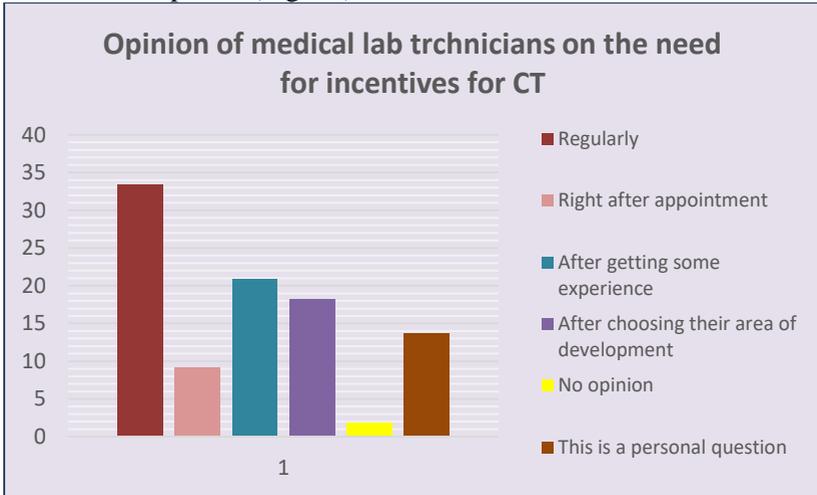


Fig. 23.

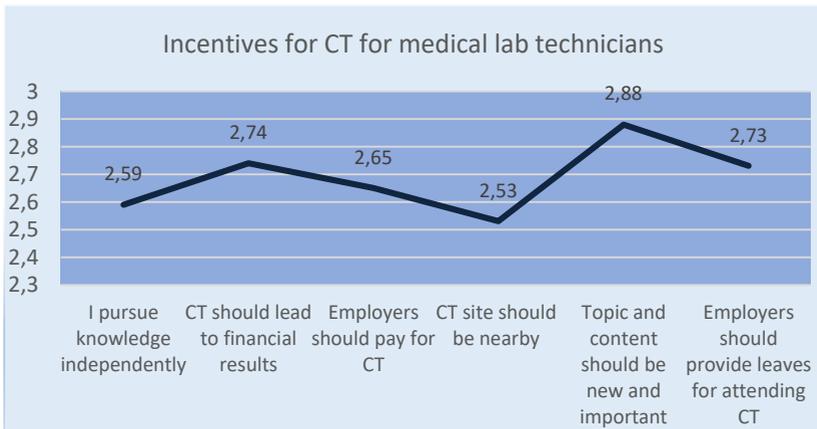


Fig. 24.

For respondents, the importance and relevance of the topic and content are an important incentive, followed by the financial result of the

training and the possibility of taking training leave from employers (Fig. 24).

3.6. Influence of the descriptors on the main variables describing the attitude of medical laboratory practitioners towards CT

The results show that the preference of medical laboratory technicians for specialties where innovations are often implemented influences the main variables describing their subjective opinion on the need for continuing training.

❖ Medical technicians who like professions in which innovations are often introduced, show statistically significantly that:

- they would like to acquire **another specialty** (F=4.00; $p < 0.05$; $\bar{x}=2.64$)

- they would like to acquire a **higher educational and qualification degree** (F=3.76; $p < 0.05$; $\bar{x}=3.23$), compared to those who do not like professions with frequently introduced innovations (Table 10).

- they consider that continuing training **is a condition for finding a better job** (F=4.46; $p=0.006$; $\bar{x}=3.31$) and **for better professional self-esteem** (F=8.57; $p =0.000$; $\bar{x}=3.78$), compared to those who do not like such professions (Table 10).

Table 10. *Influence of medical lab technicians' preference for specialties with frequently introduced innovations on continuing training (ANOVA)*

Independent variable	Dependent variable	Degrees of the dependent variable	\bar{x}	F $p < 0.05$	t
Do you like professions where innovations are often introduced?	They would like to acquire another specialty	Rather untrue for me.	1,25	4,00	$t_{2,5} = 3.30$ $p = 0.002$
		True for me	2,64		
	Willing to acquire a higher degree	Rather untrue for me.	1,86	3,76	$t_{2,5} = 3.54$ $p = 0.001$
		True for me	3,23		
	CT is a condition for finding a better job	Rather untrue for me	2,13	4,46	$t_{2,5} = 2.78$ $p = 0.006$
		True for me	3,31		

	CT is a condition for better professional self-esteem	Rather untrue for me	2,38	8,57	$t_{2,5} = 5,47$ $p=0.000$
		True for me	3,78		

Although pursuing a higher educational qualification degree, or another specialty is not a form of continuing training, but rather continuing education, the desire of medical professionals to acquire them is perhaps a sign of their need to improve their competence in a certain field and as a whole, an expression of the desire for learning.

❖ Medical technicians who prefer professions in which innovations are often introduced, show statistically significantly more that:

- **they would rather carry out individual training at an institution** as a form of continuing training ($F=2,86$; $p<0.05$; $\bar{x}=1,53$) and would attend forms of continuing training to increase their professional competences in the future ($\bar{x}=4,19$) ($F=5,59$; $p=0,001$) (Table 11).

- **they would seek information about continuing training for the specialty “Medical laboratory technician” from the Bulgarian Association of Health Care Professionals** ($F=4,79$; $p<0.05$) ($\bar{x}=1.81$) (Table 11). BAHCP, with one of its main functions to conduct the continuing training of health professionals, already emerges as one of the main sources of information for continuing training for them (Table 11).

Table 11. *Influence of medical laboratory technicians' preference for specialties with frequently introduced innovations on continuing education (ANOVA)*

Independent variable	Dependent variable	Degrees of the dependent variable	\bar{x}	F $p<0.05$	T
Do you like professions where innovations are often introduced?	They would prefer to carry out individual training at an institution	I don't know	1,13	2,86	$t_{3,5} = 2.13$ $p<0.05$
		True for me	1,53		
	They would attend forms of CT to increase their professional competence	Rather untrue for me	2,75	5,59	$t_{2,5} =3.32$ $p=0.002$
		True for me	4,19		
	They would look for information about CT for medical laboratory	Rather untrue for me	1,33	4,79	$t_{2,5} =3,62$ $p<0.05$
		True for me	1,81		

	technicians from BAHCP				
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The willingness of professionals to continue their training individually at an institution in a form similar to professional specialization is perhaps related to the high quality of the knowledge acquired in this form.

3.7. Influence of the main determinants of subjective necessity for CT on the attitude of in-service lab technicians towards profiled professional specialization

The influence of the awareness and interest of medical lab technicians in continuing training on their needs for profiled specialization is important issue for the present study.

❖ The dispersion analysis notes that lab technicians who at present are informed about the opportunities for continuing training for medical specialists **could be stimulated** statistically significantly ($F=4.42$; $p<0.05$) **to complete profiled specialization** if the theoretical training or parts of it are conducted remotely. ($\bar{x}=2.09$) (Table 12) Perhaps the lab technicians who are informed about the opportunities for continuing training are familiar with the already introduced forms of distance learning and may have even taken advantage of them. Medical technicians who are certain that there are forms of continuing training in the profile of their specialty, statistically significantly more often claim that:

- **would specialize**, even if during the specialization they have to work for another laboratory, which functions as a training base ($F=3.66$; $p <0.05$) ($\bar{x}=2.21$). (Table 12).

- if they wanted to specialize, the **employer would assist them** with additional paid leave ($F=4.55$; $p <0.05$) ($\bar{x} =2.17$) and unpaid leave ($\bar{x} =2.35$) ($F=5.40$; $p =0.006$). (Table 12)

Table 12. *Influence of the interest of medical laboratory technicians in continuing training for medical specialists and in continuing training for medical lab technicians in different professional profiles on profiled specialization (ANOVA)*

Independent variable	Dependent variable	Degrees of the dependent variable	\bar{x}	F $p<0.05$	t

Are you currently informed about the CT opportunities for medical specialists?	Conducting the theoretical training or parts of it remotely would be an incentive for opting for CT	No	1,30	4,42	$t_{2.5} = 3,32$ $p = 0.002$
		Yes	2,09		
Are there any CT forms matching the profile of your specialty?	Would you specialize if you needed to work in another laboratory during the training period?	No	1,73	3,66	$t_{1.3} = 2,22$ $p < 0.05$
		Yes	2,21		
	If they wish to specialise, the employer will assist them with additional paid leave.	No	1,55	4,55	$t_{1.3} = 2,88$ $p = 0.006$
		Yes	2,17		
If they wish to specialise, the employer will assist them with additional unpaid leave.	No	1,69	5,40	$t_{1.3} = 2,88$ $p = 0.006$	
	Yes	2,35			

❖ Medical lab technicians who are interested in the forms of continuing training, statistically significantly:

- think that **profiled specialization** for laboratory technicians is **necessary** ($F=4.05$; $p = 0.005$) ($\bar{x} = 2.58$) compared to those who are not interested in the forms of continuing training for laboratory technicians (Table 13);

- believe that a profiled specialization for medical laboratory technicians may be required by the **introduction of new methods** in laboratories ($F=2.68$; $p < 0.05$) ($\bar{x} = 2.70$) (Table 13);

- consider that profiled specialization may also required due to the **need to train more young specialists** ($F=3.65$; $p = 0.008$) ($\bar{x} = 2.69$) (Table 13);

- consider that profiled specialization may be required by the introduction of new and modern equipment ($F=3.33$; $p < 0.05$; $\bar{x} = 2.75$) (Table 13).

Table 13. *Influence of the interest of medical laboratory technicians in continuing training for medical specialists and in continuing*

training for medical lab technicians (in different professional profiles) on profiled specialization (ANOVA)

Independent variable	Dependent variable	Degrees of the dependent variable	\bar{x}	F p<0.05	t
Are they interested in continuing training opportunities for medical lab technicians, in general?	Is a profiled specialization required for medical lab technicians?	No	1,57	4.05	$t_{2.5} = 2.78$ $p=0.008$
		Yes, all	2,58		
	Profiled specialization would require the introduction of new methods	No	2,00	2,68	$t_{2.5} = 2.55$ $p<0.05$
		Yes, all	2,70		
	Profiled specialization would be required due to the need for training of young specialists	Not considered	2,00	3.65	$t_{1.5} = 2.03$ $p<0.05$
		Yes, all	2,69		
	Profiled specialization would be required by the introduction of new and modern equipment	No	2,27	3,33	$t_{2.5} = 2.72$ $p=0.009$
		Yes, all	2,75		

❖ The need for **additional theoretical professional training** in the field in which the lab technicians work, statistically significantly:

- determines a stronger **need for profiled specialization** ($F=11.87$; $p=0.000$; $\bar{x}=2.57$), as well as the opinion that its introduction may be required by the **implementation of new laboratory indicators** ($F=7.50$; $p=0.007$; $\bar{x}=2.42$), and new methodologies ($F=5.08$; $p<0.05$; $\bar{x}=2.60$) (Table 14)

❖ Medical technicians who require additional **theoretical training** in the field in which they work, statistically significantly more frequently ($F=5.40$; $p < 0.05$) state that the introduction of profiled specialization may be imposed by the **need to train young specialists** ($\bar{x}=2.60$), by the **shortage of qualified personnel in the laboratory** ($F=7.16$; $p=0.009$; $\bar{x}=2.55$), and by the **increased demands on the work of laboratory specialists** ($F=14.63$; $p=0.000$; $\bar{x}=2.57$) (Table 14). The need to introduce a profiled specialization for medical laboratory technicians, as well as the reasons justifying it, are

very complex, especially for those of them who need additional theoretical competence in the field in which they work (Table 14).

❖ Lab technicians in need of additional **practical professional competence** in the field in which they work, statistically significantly:

- consider ($F=11.87$; $p=0.000$) that the introduction of profiled specialization for medical lab technicians is necessary ($\bar{x}=2.57$) and ($F=7.11$; $p=0.009$) that this **may be required by the introduction of new laboratory indicators** ($F=7.11$; $p=0.009$), ($\bar{x}=2.63$) (Table 14).

Table 14. *Influence of the needs for further training of medical laboratory technicians in a specific field on their attitude towards profiled specialization for medical laboratory technicians (ANOVA)*

Independent variable	Dependent variable	Degrees of the dependent variable	x	F	P
Need for theoretical professional competence in their current field	Need for profiled specialization.	No	1,95	11,87	p=0.000
		Yes	2,57		
	The introduction of profiled specialization may be required by the introduction of new indicators	No	1,98	7,50	p=0.007
		Yes	2,42		
	The introduction of profiled specialization may be required by the introduction of new methods.	No	2,24	5,08	p<0.05
		Yes	2,60		
	The introduction of a profiled specialization may be required by the training of young specialists	No	2,27	5,40	p<0.05
		Yes	2,60		
	The introduction of profiled specialization may be required by a shortage of qualified personnel in laboratories.	No	2,14	7,16	p=0.009
		Yes	2,55		
	The introduction of profiled specialization may be required due to increased demands on laboratory specialists	No	2,07	14,63	p=0.000
		Yes	2,64		

Need for practical professional competence in their current field	Need for profiled specialization	No	1,95	11,87	p=0.000
		Yes	2,57		
	The introduction of profiled specialization may be required by the introduction of new methods.	No	2,21	7,11	p=0.009
		Yes	2,63		

3.8. Influence of the main variables and descriptors of the attitude towards CT of students of the specialty “Medical laboratory technician” on the need for profiled specialization.

The study of the influence of the main determinants of students' attitudes towards continuing training and profiled specialization is important for clarifying students' attitudes towards continuing training in general and profiled specialization for medical laboratories in particular.

❖ Students who are partly familiar with the opportunities for continuing training for healthcare professionals, statistically significantly ($F=4.37$; $p < 0.05$) consider that continuing training **involves professional specialization** ($\bar{x}=2.00$) (Table 15).

❖ Students interested in **all forms of continuing training** statistically significantly more often:

- think that continuing training is a condition for greater **autonomy at work** ($F=3.43$; $p < 0.05$; $\bar{x}=3.57$) (Table 15);

- would focus on continuing training if it would lead to a **pay rise** ($F=8.94$; $p=0.000$; $\bar{x}=2.00$);

- think that credits should be awarded for professional specialization that would facilitate them in finding employment abroad ($F=4.47$; $p=0.006$; $\bar{x}=2.73$) (Table 15).

❖ Students who **would use all forms** of continuing training to increase their professional competence, statistically significantly more often:

- think that continuing training is a condition for **greater autonomy at work** ($F=5.85$; $p=0.002$; $\bar{x}=3.80$);

- would focus on continuing training if this would lead to an **increase of their salary** ($=5.88$; $p=0.002$; $\bar{x}=2.00$) (Table 15);

- consider that **credits should be awarded** for professional specialization that would facilitate their work abroad ($F=4.47$; $p=0.006$) ($\bar{x}=2.73$);

- are of the opinion that **profiled specialisation** would make them **more competitive** on the labour market ($F=4.08$; $p < 0.05$) ($\bar{x}=2.64$) (Table 15).

❖ The view that the specialty enables continuous training statistically significantly ($F=8.65$; $p=0.000$) **determines the need for training to work with specific new technologies in the profession** ($\bar{x}=1.90$) (Table 15).

Table 15. *Influence of the attitude of medical laboratory students towards continuing education and profiled specialisation (ANOVA)*

Independent variable	Dependent variable	Degrees of the dependent variable	\bar{X}	F $p < 0.05$	t
Are you currently aware of the possibilities for CT for medical professionals?	CT includes professional specialization	No	1,60	4.37	$t_{1,2} = 3,11$ $p=0.006$
		Partly	2,00		
Interest in the possibilities for CT after graduating the Medical College	CT is a condition for greater autonomy at work	Yes, only some.	2,87	3.43	$t_{3,4} = 2,80$ $p=0.008$
		Yes, all	3,57		
	They would opt for CT if it would lead to a pay rise	Yes, only some.	1,71	8.94	$t_{3,4} = 2,88$ $p=0.008$
		Yes, all	2,00		
	Credits should be awarded for professional specialization.	For general information	1,00	4.47	$t_{2,4} = 3,71$ $p=0.001$
		Yes, all	2,73		
They would attend forms of CT to increase their professional competence	CT is a condition for greater autonomy at work	Both yes and no	2,75	5.85	$t_{3,5} = 3,91$ $p=0.000$ $t_{4,5} = 3,88$ $p=0.000$
		Yes, all	3,80		
	They would opt for CT if it would lead to a pay rise	Rather no	1,00	5.88	$t_{1,5} = 2,09$ $p < 0.05$
		Yes, all	2,00		
	Credits should be awarded for professional specialization.	Yes, only some.	2,57	4.47	$t_{1,4} = 2,21$ $p < 0.05$ $t_{2,4} = 3,71$ $p=0.001$
		Yes, all	2,73		
	Profiled specialisation would make them more	Rather no	1,00	4.08	$t_{2,5} = 3,56$ $p=0.003$

	competitive on the labour market	Yes, all	2,64		
The specialty in which they are trained provides an opportunity for CT	Need to work with specific new technologies in the profession	No	1,00	8.65	t _{1,3} = 4.11 p=0.000
		Yes	1,90		

3.9. Laboratory physicians' attitudes towards continuing training for medical lab technicians

There is an influence of the subjective assessments of employers on the professional competence of medical laboratory technicians and on the priority areas for further training, projected on their opinion on continuing training and their attitudes to stimulate the teams towards the CT.

The share of laboratory doctors who evaluate the skills acquired during their higher education as good is highest – 42.5%, followed by very good –and satisfactory with 17.50% each. The opinions for poor and excellent evaluation are equally distributed – 5.00%.

After applying a dispersion analysis, the following influences were identified (Table 16):

❖ Employers who give a **poor to good grade of the professional competence** acquired during university studies to their lab technicians statistically significantly more often (compared to the doctors who give an excellent grade for the professional training of medical lab technicians) think that:

- the medical lab technicians need further training to improve their computer skills (F=4,50; p=0,005; \bar{x} =2,00), and

- lab technicians need further training to work with specific new technologies in the profession (F=4,88; p=0,005; \bar{x} =2,00) (Table 16)

❖ Laboratory doctors, who evaluate the professional competence of their lab technicians acquired during their university studies as **very good**, think that:

- attending a short course/or seminar can give in-depth knowledge in a specific area of the work of medical lab workers (F=3.38; p<0.05; \bar{x} =3.72).

- consider that the continuing training of medical lab technicians is a condition for authority within the team ($F=3.55$; $p<0.05$; $\bar{x}=3.57$) (Table 16)

- would search information for CT offered by universities ($F=2.82$; $p<0,05$; $\bar{x}=2,00$) (Table 16)

Table 16. *Influence of the employers' evaluation of the professional competence of medical lab technicians, its importance for the effective work of the laboratory as a whole, on their opinion on continuing training (ANOVA)*

Independent variable	Dependent variable	Degrees of the dependent variable	\bar{x}	F $p<0,05$	t
Evaluation of the acquired professional competence of the medical lab technician during their studies at the Medical College.	Would like the lab technicians from their team to receive further training for computer skills	Good	2,00	4.05	$t_{4,6}=3.77$ $p=0.002$
		Excellent	1,50		
	Would like the lab technicians from their team to receive further training to work with specific new technologies in the profession.	Good	2,00	4.88	$t_{4,6}=3.77$ $p=0.002$
		Excellent	1,50		
	Attending a short course (or a seminar) may provide in-depth knowledge in the specific area	Good	3,32	3,38	$t_{3,4}=2.69$ $p=0.002$
		Very good	3,72		
	CT of the lab technicians presupposes authority within the team	Poor	1,50	3,55	$t_{2,4}=3.48$ $p=0.003$
		Very good	3,57		
	As employers they would seek information about CT from universities	Satisfactory	1,33	2,82	$t_{3,5}=3.34$ $p<0,05$
		Very good	2,00		

❖ Laboratory physicians who consider that their lab workers need further theoretical professional competence and additional practical professional competence in the field in which they work, statistically significantly ($F=5.07$; $p<0.05$ and $F=9.83$; $p=0.004$) are

generally interested in continuing training opportunities for medical lab technicians ($\bar{x} = 2.77$ and 2.91 respectively) (Table 17).

It can be summarised that the importance of the professional competence of laboratory technicians, both theoretical and practical, for the efficient operation of laboratories is a factor that arouses the interest of employers and doctors in continuing training.

Where the laboratory doctors consider that the technicians working for them need **further training in another field** than the one in which they work, they statistically significantly:

- would seek information on further training from fellow medics ($F=6.30$; $p<0.05$; $\bar{x}=2.00$) (Table 17).

Table 17. *Influence of the opinion of laboratory doctors on the need for further training of medical laboratory technicians on the opinion of doctors on continuing training (ANOVA)*

Independent variable	Dependent variable	Degrees of the dependent variable	\bar{x}	F $p<0,05$
Need for further computer skills training	Would stimulate medical laboratory technicians to attend CT, paid by the employer	No	2,00	9.65 $p=0.004$
		Yes	2,79	
Need for further training to work with specific new technologies in the profession	Attending a short course (or a seminar) may provide in-depth knowledge	No	1,00	4.95 $p<0,05$
		Yes	3,16	
	Their lab technicians would attend the CT	No	1,00	5.29 $p<0,05$
		Yes	2,56	
	They would stimulate lab technicians by pay rise	No	1,00	18.29 $p=0.000$
		Yes	2,79	
	They would stimulate medical laboratory technicians to attend CT, paid by the employer	No	1,00	15.34 $p=0.000$
		Yes	2,75	
	They would stimulate medical laboratory technicians to participate in CT by	No	1,00	16.88 $p=0.000$
		Yes	2,77	

	getting leave from employers			
Need for theoretical professional competence in their current field	Interest in CT opportunities for medical laboratory technicians	No	1,75	5.07 p<0,05
		Yes	2,77	
Need for practical professional competence in their current field	Interest in CT opportunities for medical laboratory technicians	No	0,000	9.83 p=0.000
		Yes	2,91	
Need for further training in a different field	They would search for information on CT by fellow medics	No	1,61	6.30 p<0,05
		Yes	2,00	
Need for further training in the areas of social competence: team work, self-development, conflict resolution, etc.	Motivation for achievement of their medical lab technicians	No	2,44	6.09 p<0,05
		Yes	1,80	

❖ Laboratory doctors who would prefer a **specialization as a CT form** for their lab technicians, statistically significantly think that:

- creating a profiled specialization for medical technicians may be required by the **increased demands** on the work of lab specialists (F=6,12; p<0.05) (\bar{x} =2.75), and

- they would **provide** continuous **paid leave** for profiled specialization of their lab technicians (F=10,78; p=0,003; \bar{x} =2,57) (Table 18).

❖ Laboratory doctors who **would search for information** on continuing training of medical lab technicians provided by BAHCP, statistically significantly more often (F=6,89; p<0.05) think that **profiled specialization would make the lab technicians more successful at work** (\bar{x} =2,85) (Table 18).

❖ Laboratory physicians who **would inform themselves about continuing training for medical lab technicians** from the training bases, statistically significantly (F= 17.38; p=0.000) would

give **more autonomy** to a lab technician with a profiled specialisation if their laboratory had one ($\bar{x}=2.73$) (Table 18).

❖ Laboratory physicians who would search information about CT for medical lab technicians statistically significantly:

- **would allow the specialization of a laboratory technician** by their supervised laboratory **if he/she had to be absent from work** ($F=11,27$; $p=0.005$) ($\bar{x}=2,94$) compared to those physicians who would not seek information about the CT for medical laboratory technicians ($\bar{x}=2,00$) (Table 18).

❖ Laboratory physicians who **would inform themselves about CT for medical lab technicians by other employers** statistically significantly more often would allow additional leave to their lab technician if he/she wishes to specialize ($F=4.38$; $p<0.05$; $\bar{x}=2.38$) (Table 18).

- **would keep the position of a lab technician**, if he/she had to **be absent from work to attend a specialization** ($F=5.20$; $p<0.05$; $\bar{x}=2.86$), compared to those physicians who would not seek information about CT for medical laboratory technicians ($\bar{x}=2,00$) (Table 18).

Table 18. *Influence of the awareness of laboratory doctors and their preference for continuing training for their laboratory technicians on profiled specialisation*

Independent variable	Dependent variable	Degrees of the dependent variable	\bar{x}	F, $p<0.05$
They prefer specialization of their lab technicians	Opening a profiled specialization for medical technicians may be required by the increased demands on the work of lab specialists.	No	2,20	6.09 $p<0.05$
		Yes	2,75	
	If one of their lab technicians decided to specialize, they would allow a continuous paid leave.	No	1,40	10.78 $p=0.003$
		Yes	2,57	
They would get information on CT for medical lab technicians from other employers	If one of their lab technicians decided to specialize, they would allow additional unpaid leave.	No	1,50	4.38 $p<0.05$
		Yes	2,38	

They would get information on CT for medical lab technicians from BAHCP.	Profiled specialization would make medical lab technicians more successful at work.	No	2,14	6.89 p<0.05
		Yes	2,85	
They would get information about CT for medical lab technicians from the websites of the training bases.	If the laboratory has a lab technician with profiled specialization, he/she would be allowed greater autonomy.	No	2,00	17.38 p=0.00 3
		Yes	2,73	
They would not look for information about CT for medical laboratory technicians.	Permission to one of their lab technicians to specialize if he/she had to be absent from work.	No	2,94	11.27 p=0.00 5
		Yes	2,00	
	Keeping the workplace of a lab technician if he/she had to be absent because of a specialization.	No	2,86	5.20 p<0.05
		Yes	2,00	

CONCISE CONCLUSIONS FROM THE EMPIRICAL STUDY

1. Medical laboratory technicians state the need for continuing training as a means of increasing professional competence, while their subjective judgements are influenced by the motivation for choosing the profession, the motivation for achievements and the tendency for connectedness to/alienation from the profession.

2. The main variables determining the subjective opinions on the need for continuing training are highly influenced by motives related to work variety and professional autonomy, opportunities for higher income, career development, a sense of success in life and acquiring a broader background knowledge.

3. The main variables that are influenced by the motives for choosing a specialty and practicing the profession are related to the needs to increase professional competences in the field of realization and specific new technologies in the profession, the desire to acquire

higher educational degree and the willingness of the laboratories to attend forms of CT in order to increase professional competence.

4. The CT descriptors are influenced by motives related to the interest in the profession, care for people, influence of the family environment on the choice of profession, the benefits for the family, the needs for prestige and career development.

5. The main descriptors, which are statistically significantly influenced by the motives for choosing a specialty and profession, can be grouped into several directions: awareness of CT, preferred forms of LLL, definition of CT as a condition for personal or career development and determination of incentives for CT by respondents.

6. According to the laboratory technicians with a high degree of connectedness to the profession, the possibilities for CT would contribute to a stronger identification with the profession and to a higher efficiency of professional functioning of the work with patients.

7. The opinions of medical professionals support the need for incentives to participate in continuing training, regardless of the stage of the professional career of in-service laboratory technicians. The main incentives for CT are the autonomous pursuit of knowledge by lab workers and the relevance and importance of the topic and the content of the training, yet financial support is also among the main factors for participation in CT. Laboratory technicians think that CT also leads to a higher educational and qualification degree, and would like to acquire one.

8. Students from the specialty “Medical laboratory technician”, who are strongly connected to their specialty, consider CT as a condition for greater security for their position and for occupying a higher position in the job hierarchy.

9. Medical laboratory technicians consider the opening of profiled specialization to be necessary, and as justification they indicate the increased requirements for laboratory specialists and their shortage on the labour market. They are convinced that profiled specialisation would make them more successful and declare their readiness to start one, even if a long absence from work is necessary. Their preference is for theoretical instruction or a part of it to be conducted remotely.

10. Students from the specialty are ready to pursue CT if it will lead to a pay rise. They are convinced that profiled specialisation

would make them more successful on the labour market and believe they should receive credits.

11. Laboratory doctors see the creation of profiled specializations as necessary and are ready to allow greater autonomy at work to a lab technician with profiling specialty. They consider CT as a condition for better performance of work duties and declare an intention for priority hiring of a laboratory technician with profiled specialization.

12. Laboratory doctors declare their readiness to support members of the teams when they want to specialize, by assisting in providing leave and keeping the workplace during the specialization.

RECOMMENDATIONS TO THE MINISTRY OF HEALTH

1. To create more opportunities and more flexible forms of continuing education in the National Qualifications Framework for Lifelong Learning for health care professionals, including medical laboratory technicians. Greater flexibility in the educational system would enable professionals' individual needs to be met, resulting in an increase in the quality of health services provided to the population.

2. It is appropriate to link these processes with career prospects and adequate pay.

3. It is necessary to work actively on the part of the Advisory Council of the Medical Laboratory Technicians with BAHCP to supplement Ordinance No.1 on the specialties in the Republic of Bulgaria and the inclusion of the medical laboratory technicians in it.

RECOMMENDATIONS TO MEDICAL UNIVERSITIES

1. It is imperative to create legal opportunities for the opening of profiled specializations and/or master's programs for medical laboratory technicians within the medical universities.

2. To enhance professional competence through continuing training and education, the opportunities of electronic and distance learning could be used more widely.

3. It is necessary to work towards increasing the motivation for learning and acquiring competences for lifelong learning, as early as students start their college training. Students from the specialty

“Medical laboratory technician” at the Medical College should be informed and stimulated to continue their professional development as early as the period of their university studies.

RECOMMENDATIONS TO MEDICAL INSTITUTIONS

1. To stimulate postgraduate training and professional qualification of medical laboratory technicians.

CONTRIBUTIONS OF THE DISSERTATION

From the realization of the purpose and the tasks of the theoretical and empirical study, the following original elements in the study of the problem could be differentiated:

1. Theoretical contributions:

- The dissertation enriches the scarce scientific information about the historical development of laboratory analyses, the establishment of the specialty “Medical laboratory technician” and its development.

- Contribution of the dissertation is the systematization of the idea of lifelong learning and its application to the continuing professional development of medical laboratory technicians in Bulgaria and abroad.

2. Methodological contributions:

- The author's research methodology has been developed to investigate the subjective necessity of continuing training of students, medical laboratory technicians and laboratory doctors, and in particular the discovery of profiled specializations for medical laboratory technicians.

- The study of the motivation for choosing and exercising the profession and the motivation for achievements as main factors for continuing professional development has an original character.

3. Applied and Practical Contributions:

- The dissertation is a scientific justification of the need to expand the opportunities for increasing professional competences, professional development and career growth through continuing training for medical laboratory technicians.

- The results of the study can be used for changes in the National Legislative Framework for Lifelong Learning for healthcare professionals.

- The educational practice of medical colleges can be enriched in order to motivate young professionals for continuing professional training as a condition for successful professional functioning.

PUBLICATIONS AND PARTICIPATIONS RELEVANT TO THE DISSERTATION

I. Scientific publications

1. Mollova, K., Miteva, K., & Kichukova, K. (2017). OPTIMIZING THE CURRENT PROCESS BY INCLUSION OF NEW GENERATION EDUCATIONAL DECISIONS. *KNOWLEDGE-International Journal*, 20(3), 1215-1219. **10t**
2. Kichukova, K. (2018). E-LEARNING OF CONTINUING EDUCATION OF MEDICAL LABORATORY TECHNICIANS. *KNOWLEDGE - International Journal*, 22(5), 1285-1291. **30t**
3. Kichukova K. S., Taneva T. G. Achievement motivation and attitude of medical laboratory assistants to continuing education. *The Education and Science Journal*. 2021; 23 (6): 185-215. DOI 10.17853/1994-5639-2021-6-185-215

II. Participation in scientific conferences

1. Mollova, K., Miteva, K., & Kichukova, K. (2017). OPTIMIZING THE CURRENT PROCESS BY INCLUSION OF NEW GENERATION EDUCATIONAL DECISIONS. *XVth Jubilee International Scientific Conference Knowledge Without Borders, December 15-17, 2017 Bansko Bulgaria*
2. Kichukova, K. (2018). E-LEARNING OF CONTINUING EDUCATION OF MEDICAL LABORATORY TECHNICIANS. *KNOWLEDGE - XVIth International Conference Knowledge Without Borders, March 16-18, 2018 Vrnjacka Banja, Serbia*
3. Katya_659 Kichukova, Biyanka Tornyova, Tanya Taneva Influence of Globalization in the Contemporary World on the Profession and Training of Medical Laboratory Assistants Jubilee Conference “The Medicine of the Future” 75 th Anniversary of Medical University of Plovdiv 29-30 October, 709

I wish to express my heartfelt gratitude to:

***The academic administration** of Trakia University for the institutional and financial support provided;*

***Prof. Bianka Torneva, PhD** for the trust, guidance and shared experience;*

***Assoc. prof. Tanya Taneva, PhD** for the patience, support and assistance in the experimental work;*

***To my colleagues** from the Department of Health Care Management at the Medical University of Plovdiv for the fruitful cooperation.*

***My family** for their unreserved faith in me, which gave me the strength to realize this endeavor of mine.*

Katya Kichukova