# VARIABILITY AND DIFFERENCES IN EMPATHY, SELF-EFFICACY, AND ACADEMIC SUCCESS AMONG STUDENTS IN MEDICAL FIELDS WITH REGARD TO EDUCATIONAL STAGE AND PRACTICAL TRAINING

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#### **ABSTRACT**

Introduction: Education in the medical field combines theoretical knowledge, practical skills, and personal competencies such as empathy, self-efficacy, and academic success, which are essential for healthcare work. Practical training enables the development of technical, emotional, and social competencies, contributing to academic success.

Aim: To examine the variability and differences in empathy, self-efficacy, and academic success levels among students of the Medical School and the Undergraduate Nursing Program, with a focus on the presence of practical training.

Participants and Methods: This research was conducted as a quantitative descriptive and comparative study, involving students from the Medical School Dubrovnik (n=82) and students from the Undergraduate Nursing Program at the University of Dubrovnik (n=68). The General Self-Efficacy Scale, Emotional Empathy Scale, and a sociodemographic questionnaire were used. Data were analyzed using non-parametric tests (Mann-Whitney U test and Kruskal-Wallis test for analyzing differences, with significance levels p=0.01 and p=0.05) in IBM SPSS (version 20).

Results: Students in the Undergraduate Nursing Program showed higher self-efficacy and academic success compared to Medical School students, while empathy levels were similar, with greater variability among nursing students. Participants with practical classes showed higher levels of all variables, confirming the importance of practical experience. Differences in empathy, self-efficacy, and academic success based on educational level and practical classes were statistically significant.

Conclusion: Educational stages and specific programs result in differences in variables, but practical experience further develops these skills, contributing to better preparation for professional challenges. Curriculum improvements are necessary for greater effectiveness in healthcare education.

**Keywords:** empathy, self-efficacy, academic success, students, practical training

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#### INTRODUCTION

Education in the medical profession represents a complex process that requires the integration of theoretical knowledge, practical skills, and personal competencies for performing healthcare essential activities. In this context, traits such as empathy and self-efficacy play a crucial role in the professional development of future healthcare workers. The connection between these traits and academic success, as well as their development through practical training, is often highlighted as a priority area in research on educational processes in medical education.

Empathy, defined as the ability to understand and appreciate the emotions, experiences, and perspectives of others, is one of the fundamental qualities of healthcare professionals. It enables better communication with patients, increases trust, and contributes to higher quality healthcare delivery (1). Research indicates that empathy can be developed during education, particularly through practical training that provides direct contact with patients and real clinical situations (2). However, the level of empathy may vary depending on the intensity of practical experiences and the stage of education, with a decline in empathy often observed in the later phases of medical training due to exposure to stress and increased responsibility (3).

In addition to empathy, self-efficacy referring to an individual's belief in their own ability to successfully perform a specific task is a significant factor in both academic and professional success. Bandura (1997) emphasizes that a high level of self-efficacy enhances motivation,

perseverance, and resilience to stress, which is of great importance for students in medical education (4). Practical training allows students to apply theoretical knowledge in clinical situations, thereby strengthening their sense of competence and confidence in performing professional tasks (5).

Academic achievement, as a measure of accomplishment in an educational context, encompasses both theoretical knowledge and the ability to apply it in practical settings. In medical schools, practical training plays a key role in linking theoretical knowledge with clinical skills, and research indicates that high-quality practical training has a positive impact on students' motivation and academic achievement (6).

Practical training is only not opportunity for technical development, but also for the emotional and social growth of students. Direct contact with patients, facing the challenges of healthcare, and working in teams foster the development of empathy, strengthen self-efficacy, and communication enhance skills However, differences in the intensity and quality of practical training between secondary and higher medical education, as well as among students with varying levels of experience, open space for exploring its impact on key variables.

The aim of this research is to examine the variability and differences in the levels of empathy, self-efficacy, and academic achievement among students of a Medical School and Undergraduate Nursing Program students, with a focus on the presence of practical training.

# PARTICIPANTS AND METHODS Participants

The sample included in this research of groups consists two target participants from medical education institutions. The first group comprises the Medical students from School Dubrovnik, with a total of 98 participants (59.0%), while the second group includes participants (41.0%)from Undergraduate Nursing Program at the University of Dubrovnik.

The research was conducted in October 2024. Participants were selected based on their educational level within the medical field, with the aim of analyzing differences in the variables of empathy, self-efficacy, and school/academic achievement in relation to the level of education and the presence of practical training.

#### **Methods**

The research utilized the General Self-Efficacy Scale developed by Schwarzer and colleagues (1997), which measures a general and stable sense of personal efficacy in coping with a variety of stressful situations (8). The scale consists of 10 items and is characterized by high internal consistency, with reliability coefficients ranging between 0.75 and 0.90. In Croatian samples, Cronbach's alpha ranges between 0.853 and 0.874, while the test-retest reliability was 0.743 (9,10).

The scale is positively associated with optimism, satisfaction with academic success and studies, and negatively associated with anxiety and pessimism, making it suitable for assessing self-efficacy in students of medical education.

The total score is calculated as a linear combination of item ratings.

The Emotional Empathy Scale developed by Raboteg-Šarić (1991, 1993) measures the tendency for emotional reactions triggered by the emotional state of others. The scale contains 19 statements that describe emotional experiences corresponding to the emotional state of others, as well as feelings of sympathy for those in distress. The highest possible score is 76 points, with a higher score indicating a greater tendency to experience emotional empathy (11).

In addition, the questionnaire included general sociodemographic questions (gender, grade, academic achievement, and practical training).

The questionnaires were completed anonymously, electronically, with prior informed consent obtained, and the average time to complete them was 15 minutes. The collected data was coded and prepared for further statistical analysis.

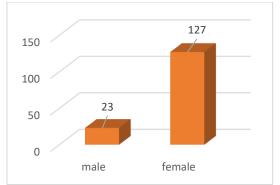
#### Statistical Data Analysis

The analysis of the results was conducted using IBM SPSS Statistics software (version 20), employing both descriptive and inferential statistical methods. Given the assessment of the normality of the data distribution, non-parametric tests were chosen. To examine differences in levels of empathy and general self-efficacy based on the level of education and the presence of practical training, the Mann-Whitney U test was used, while differences in school/academic achievement were analyzed using the Kruskal-Wallis test. Statistical significance was assessed at the levels of p = 0.01 and p = 0.05.

#### **RESULTS**

Sociodemographic Characteristics of Participants The study included 150 participants, the majority of whom were women (84.6%, n = 127), while 15.3% (n = 23) were men. (Figure 1)

**Figure 1.** Gender Distribution of the Sample



Participants were distributed according to their level of education, with a total of 82 participants from the Medical School and 68 students from the Undergraduate Nursing Program. Among the secondary school students, 48.8% (n = 40) were in

third grade, and 51.2% (n = 42) were in their fifth grade. At the university level, 30.1% (n = 50) of the participants were in their first year of the nursing program, and 10.8% (n = 18) were in their third year. (Figure 2)

50 50 42 40 45 40 35 30 18 25 20 15 10 5 Third year Third grade Fifth grade First year **Undergraduate Nursing** Medical School Program

Figure 2. Educational Level Distribution of the Sample

The academic/school achievement of the participants was very good, as no participant had a grade of "sufficient" or "insufficient." (Figure 3) Of the total

number of participants, 14.8% (n = 22) had a good achievement, 42.6% (n = 64) had a very good achievement, and 42.6% (n = 64) had an excellent achievement.

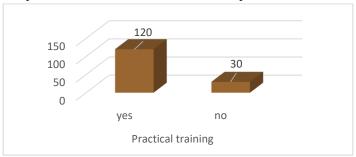
**Figure 3.** Achievement Distribution of the Sample



In terms of practical training, the majority of participants (80%, n = 120) had

experience with practical training, while 20% (n = 30) had not participated in it.

Figure 4. Sample Distribution Based on Participation in Practical Training



Descriptive Statistical Indicators of Empathy, Self-Efficacy, and Academic Achievement of Participants from Different Education Levels

The data from Table 1 indicate that participants from the Undergraduate Nursing Program achieved scores on the empathy scale ranging from 32 to 75, with a mean value of 58.85, suggesting a moderate to high level of empathy, with significant variability in the results (SD = 11.386). On the self-efficacy scale, scores ranged between 31 and 50, with a mean score of 41.90 and lower variability (SD = 5.261), indicating a more stable sense of

self-efficacy among the participants. Academic achievement was rated with an average value of 4.43 on a scale from 3 to 5, indicating a high level of achievement with relatively low variability in the results (SD = 0.642). These findings suggest generally high performance among participants across all examined domains.

**Table 1.** Descriptive Statistical Indicators of Empathy, Self-Efficacy, and Academic Achievement of Participants from the Undergraduate Nursing Program

	N	Minimum	Maximum	Mean Std. Deviation		Ske	Skewness		osis
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Empathy	68	32	75	58.85	11.386	474	.246	776	.488
Self-Efficacy	68	31	50	41.90	5.261	149	.244	777	.483
Academic Achievement	68	3	5	4.43	.642	681	.244	515	.483

According to the data from Table 2, participants from the Medical School achieved results on the empathy scale ranging from 42 to 70, with an average score of 57.29 and a standard deviation of 6.995, indicating a high level of empathy with moderate variability in the results. On the self-efficacy scale, the scores ranged from 28 to 50, with an average of 38.26 and a standard deviation of 4.715,

suggesting a slightly lower, but still satisfactory, level of self-efficacy. The academic achievement was assessed with an average score of 4.03 on a scale from 3 to 5, with relatively low variability (SD = 0.753), indicating solid academic performance among the participants. These results reflect a generally good level of achievement across all examined domains. (Table 2)

**Table 2.** Descriptive Statistical Indicators of Empathy, Self-Efficacy, and Academic Achievement of Participants from the Medical School

	N	Minimum	Maximum Mean		Std. Deviation	Skewness		Kurto	sis
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Empathy	82	42	70	57.29	6.995	675	.291	136	.574
Self-Efficacy	82	28	50	38.26	4.715	370	.291	.748	.574
Achievement	82	3	5	4.03	.753	049	.291	-1.207	.574

# Descriptive statistical indicators of empathy, self-efficacy, and academic achievement of participants with practical training

The descriptive statistical indicators for participants who have practical training (Table 3) show a moderate level of empathy, with an average score of 57.13 (SD = 9.856). The range of scores is from 32 to 75, indicating moderate variation among the responses. Skewness (-0.583) indicates a slight shift towards higher scores, while kurtosis (-0.192) suggests a more even distribution. The self-efficacy

of these participants is also high, with an average score of 40.70 (SD = 5.509). The range of scores from 28 to 50 indicates some variation among participants. The skewness value (-0.174) suggests slight symmetry in the distribution, while kurtosis (-0.131) shows a more even distribution of scores. The academic achievement of these participants is high, with an average grade of 4.28 (SD = 0.720). The range of grades goes from 3 to 5, with minimal variation in the results. Skewness (-0.480) indicates a slight shift towards higher grades, while kurtosis

(-0.950) suggests a broader distribution of grades. Accordingly, participants with practical training demonstrate a high level

of empathy, self-efficacy, and academic achievement, with moderate variability among the results.

**Table 3.** Descriptive Statistical Indicators of Empathy, Self-Efficacy, and Academic Achievement of Participants with Practical Training

	N	Minimum	Maximum Mean Std. Skewness Deviation Skewness		Skewness		Kurto	osis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Empathy	120	32	75	57.13	9.856	583	.216	192	.428
Self-Efficacy	120	28	50	40.70	5.509	174	.214	131	.425
Academic Achievement	120	3	5	4.28	.720	480	.214	950	.425

Descriptive statistical indicators without practical training participants show slightly lower values compared to participants with practical training. On the empathy scale, the average score is 53.74 (SD = 9.664), with results ranging from 37 to 71. The skewness value (-0.503) indicates a slight shift towards higher values, while kurtosis (-0.640) shows a slightly wider data distribution. The average level of self-efficacy is 37.42 (SD = 4.654), with results ranging from 32 to 49. The skewness value (0.033) indicates an almost symmetric distribution of results, while kurtosis (-0.720) suggests a slightly wider distribution than normal. The academic achievement of these participants has an average grade of 4.21 (SD = 0.704), with results ranging from 3 to 5. Skewness (-0.321) shows a slight shift towards higher grades, while kurtosis (-0.878) indicates a broader distribution, meaning that grades are mostly distributed towards higher values. Overall, participants without practical training show solid levels of self-efficacy, empathy, and academic achievement, with slightly lower variability in the results compared to participants with practical training.

**Table 4.** Descriptive Statistical Indicators of Empathy, Self-Efficacy, and Academic Achievement of Participants without Practical Training

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Empathy	30	37	71	53.74	9.664	503	.383	640	.750
Self-Efficacy	30	32	49	37.42	4.654	.033	.383	720	.750
Academic Achievement	30	3	5	4.21	.704	321	.383	878	.750

# Differences in Empathy, Self-Efficacy, and Academic Achievement Among Participants with Different Levels of Education

The Mann-Whitney U test was used to analyze the differences in levels of empathy and self-efficacy between participants with different levels of education, specifically between students of the Undergraduate Nursing Program and Medical School students (Table 5). The results of the Mann-Whitney test for empathy show a significant difference between nursing students and high school

medical students (p = 0.004). Nursing students have a higher mean rank (83.85) compared to high school medical students (70.59), indicating a higher level of empathy among nursing students. For self-efficacy, a significant difference was also found between nursing students and high school medical students (p = 0.000). Nursing students have a higher mean rank (95.79) compared to high school medical students (65.79), meaning that nursing students have a greater perception of their own self-efficacy compared to high school medical students.

**Table 5.** Results of the Mann-Whitney Test for Determining Differences in Empathy and Self-Efficacy Between Participants with Different Levels of Education

	Levels of Education	N	Mean Rank	Sum of Ranks	Mann- Whitney U	Wilcoxon W	Z	Asymp. Sig. (2- tailed)
Empathy	Undergraduate Nursing Program	68	83.85	8050.00	- 3134.000	5480.000	435	.004
	Medical School	82	70.59	5480.00				
Self-Efficacy	Undergraduate Nursing Program	68	95.79	9387.00	2128.000	4474.000	-3.966	.000
	Medical School	82	65.79	4474.00	_			

The Kruskal-Wallis test was used to analyze in academic differences achievement between participants different education levels (Table 6). The results show a significant difference in academic achievement between participants Undergraduate from the

Nursing Program and those from the Medical School (p = 0.001). Participants from the Medical School have a lower mean rank (69.38) compared to nursing students (93.30), suggesting that these students achieve lower academic results than nursing students.

**Table 6.** Results of the Kruskal-Wallis Test for Identifying Differences in Academic Achievement Among Participants of Different Education Levels

	Educations Levels	N	Mean Rank	Chi-Square	df	Asymp. Sig.	
Achieved Success	Undergraduate Nursing Program	68	93.30	- 11.743 1		001	
(Academic/School)	Medical School	82	69.38	- 11./43	1	.001	

# Differences in Empathy, Self-Efficacy, and Academic Success Based on Participation in Practical Training

The results of the Mann-Whitney test for empathy and self-efficacy indicate significant differences between respondents who have practical training and those who do not (Table 7). For empathy, respondents who have practical training (mean rank = 82.56) show a higher mean rank compared to

respondents without practical training (mean rank = 62.29), and the test is statistically significant (p = 0.015). These results suggest that respondents with practical training have a higher level of empathy.

For self-efficacy, respondents with practical training (mean rank = 85.81) also show a higher mean rank compared to those without practical training (mean rank = 75.71), and the test is also significant (p = 0.024).

**Table 7.** Mann-Whitney Test Results for Identifying Differences in Empathy and Self-Efficacy of Respondents Based on the Presence of Practical Training

	Practical Training	N	Mean Rank	Sum of Ranks	Mann- Whitney U	Wilcoxon W	Z	Asymp. Sig. (2- tailed)
F 4	yes	120	82.56	10403.00	- 2386.000	3127.000	031	.015
Empathy	no	30	62.29	3127.00	2380.000	3127.000	051	
C-16 E66	yes	120	85.81	10984.00	2126 000	2077 000	1 141	024
Self-Efficacy	no	30	75.71	2877.00	2136.000	2877.000	-1.141	.024

The results of the Kruskal-Wallis test for academic performance show a significant difference between respondents who have practical training and those who do not. Respondents with practical training (mean

rank = 84.63) show a higher mean rank compared to respondents without practical training (mean rank = 69.71), and the test is statistically significant (p = 0.047). (Table 8)

**Table 8.** Results of the Kruskal-Wallis test for determining differences in academic performance of respondents based on the presence of practical training.

	Practical Training	N	Mean Rank	Chi-Square	df	Asymp. Sig.
Achieved Success	yes	120	84.63	1.362	1	.047
Achieved Success	no	30	69.71	1.302	1	.047

#### **DISCUSSION**

Given the importance of understanding the psychological and educational factors that influence the success of students in health professions, this study focuses on analyzing the levels of empathy, self-efficacy, and academic success among high school medical students and nursing students, with a particular emphasis on the

role of practical training in shaping these competencies. The results indicate that high school medical students exhibit a high level of empathy (M = 57.29), while nursing students show a moderately high level of empathy (M = 58.85), with greater variability among the results. In terms of self-efficacy, Medical School students have a slightly lower average level (M = 1.00)

38.26) compared to nursing students, who demonstrate moderately high self-efficacy (M = 41.90). Academic achievement is slightly lower among high school medical students (M = 4.03) compared to nursing students, who achieve a higher average grade (M = 4.43). These findings suggest that nursing students have somewhat higher self-efficacy and academic success than high school medical students, while their levels of empathy are similar, with greater variability observed among nursing students. These results may reflect specificities in the educational context and level of education: nursing students, due to their higher level of education and possibly more intensive engagement in practical training, develop a stronger sense of self-efficacy and achieve slightly better academic outcomes. However, the lower variability in empathy levels among Medical School students may reflect a more standardized approach to teaching the homogeneity of students' and experiences at this level of education.

Respondents who have practical training demonstrate high self-efficacy, empathy, and academic success, with moderate variability among the results. This supports the theory that practical experience in education, particularly in healthcare professions, has a significant impact on the development of emotional and cognitive skills. Previous studies indicate that students who have access to practical training tend to achieve better academic outcomes and develop a higher degree of professional empathy and efficiency in performing their tasks (12). Practical experience allows students to apply theoretical knowledge in real-life situations, enhancing their perception of personal efficacy the and fostering development of their emotional competencies. For the respondents who do not have practical training, the results show high levels of self-efficacy, empathy, and academic success, with slightly lower compared variability to those with practical training. Although these respondents also exhibit high levels of confidence and success, the lower variability may suggest limited application of theoretical knowledge in real-life situations, which could be attributed to the lack of practical experience. This finding may also reflect different learning styles among students, where those without practical training may rely on other forms of learning, such as simulations theoretical workshops.

Interestingly, students the from Undergraduate Nursing Program have a higher average rank in self-efficacy compared to Medical School students, which could point to specific factors related to the academic program and the support nursing students receive. This finding aligns with research suggesting that high academic demands and learning challenges students' can increase perception of their own efficacy (13).

When academic achievements are compared, students from the Medical School show lower results compared to students from the Undergraduate Nursing Program. This may be related to the different teaching methods and curriculum differences between these educational programs. It is possible that nursing study programs provide a greater amount of structured tasks and assessments, which help students achieve more stable and consistent academic results.

The results for academic/school success showed a significant difference between participants who had practical training and those who did not. Participants who had practical training had a higher average rank, which is consistent with previous suggesting research that practical experience can positively affect academic outcomes. Practical training not only allows students to develop their professional skills but also increases their motivation and engagement in learning, which directly reflects in their academic performance (14).

In general, these results confirm the importance of practical training in education, particularly in healthcare fields, highlight significance and the developing emotional and cognitive competencies are that crucial successful professional development.

Although the study provides valuable insights, there are certain limitations that may restrict the generalizability of the results. The first limitation pertains to the sample size, as the research was conducted relatively small number participants, limited to one Medical School and one Undergraduate Nursing Program, which may reduce its representativeness for a broader population. Additionally, the self-assessment method used to measure empathy and self-efficacy may be subject to subjective biases, which could affect the accuracy and reliability of the results. Participants may have a tendency to rate themselves more favorably than they especially actually are, in socially desirable skills such as empathy. Furthermore, the short-term nature of the study may limit our understanding of the long-term effects of practical training and emotional skills on professional development and work efficiency.

For future research, it is recommended to expand the sample to include students from other healthcare and non-medical disciplines, which would allow for a better understanding of how different educational stages shape emotional skills and academic performance. Longitudinal studies tracking the development of emotional skills, such as empathy and self-efficacy, throughout education and into the professional environment would be valuable to assess their impact on long-term professional success. Additionally, it would be useful to employ mixed methods, combining selfassessments with objective measures, such evaluations mentor or performance assessments, to ensure greater precision and reliability of the data. Furthermore, future studies could explore specific educational strategies, such as simulation methods or virtual learning, and their impact on the development of emotional skills and academic achievements.

#### **CONCLUSION**

This research makes significant a contribution to understanding how different educational frameworks and experiences (such as practical training) influence the development of emotional skills and academic achievements among students in healthcare programs. The first key finding of this research indicates that participants exposed to practical training exhibited higher levels of empathy and self-efficacy, which are important for their later professional application in healthcare institutions. Furthermore, the differences in self-efficacy levels between secondary

Medical School students and Ungraduate Nursing Program students highlight the importance of subjective perceptions of one's effectiveness, which can impact learning, and ultimately motivation, success in both education and professional life. These findings can serve as a foundation for improving educational methods and curricula, with the aim of further developing emotional skills that are crucial for success healthcare in professions.

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# VARIJABILNOST I RAZLIKE U EMPATIJI, SAMOEFIKASNOSTI I POSTIGNUTOM USPJEHU UČENIKA I STUDENATA MEDICINSKOG SMJERA OBZIROM NA OBRAZOVNU FAZU I PRAKTIČNU NASTAVU

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#### SAŽETAK

Uvod: Obrazovanje u medicinskoj struci kombinira teorijska znanja, praktične vještine i osobne kompetencije poput empatije, samoefikasnosti i akademskog uspjeha, koji su ključni za rad u zdravstvu. Praktična nastava omogućuje razvoj tehničkih, emocionalnih i socijalnih kompetencija, čime doprinosi akademskom/školskom uspjehu.

Cilj: Ispitati varijabilnost i razlike u razini empatije, samoefikasnosti i akademskog uspjeha kod učenika Medicinske škole i studenata Preddiplomskog studija sestrinstva, s naglaskom na prisutnost praktične nastave.

Ispitanici i metode: Istraživanje je provedeno kao kvantitativno deskriptivno i komparativno, obuhvaćajući učenike Medicinske škole Dubrovnik (n = 82) i studente Preddiplomskog studija sestrinstva Sveučilišta u Dubrovniku (n = 68). Korišteni su upitnici Skale opće samoefikasnosti, Skale emocionalne empatije i sociodemografski upitnik. Podaci su analizirani neparametrijskim testovima (Mann-Whitney U test i Kruskal-Wallis test za analizu razlika, s razinama značajnosti p = 0,01 i p = 0,05) u IBM SPSS-u (verzija 20).

Rezultati: Studenti Preddiplomskog studija sestrinstva pokazali su višu samoefikasnost i postignuti akademski uspjeh od učenika Medicinske škole, dok su razine empatije bile slične, uz veću varijabilnost među studentima sestrinstva. Ispitanici s praktičnom nastavom pokazali su višu razinu svih varijabli, što potvrđuje važnost praktičnog iskustva. Razlike u empatiji, samoefikasnosti i postignutom uspjehu s obzirom na razinu obrazovanja i praktičnu nastavu pokazale su se statistički značajnim.

Zaključak: Obrazovne faze i specifični programi donose razlike u varijablama, ali praktično iskustvo dodatno razvija ove vještine, čime doprinosi boljoj pripremljenosti studenata za profesionalne izazove. Potrebno je unaprijediti kurikulum za veću učinkovitost obrazovanja u zdravstvenim strukama.

Ključne riječi: empatija, samoefikasnost, akademski uspjeh, učenici, studenti, praktična nastava

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