

Analysis of Paramedic Education in the Areas of Communication, Pedagogy, and Psychology

Pavel OTRISAL^{1*}, Dana Rebeka RALBOVSKA²

¹Department of Adapted Physical Activities, Faculty of Physical Culture, Palacký University Olomouc, třída Míru 117, 771 11 Olomouc, Czech Republic

²Department of Health Care and Population Protection, Faculty of Biomedical Engineering, Czech Technical University in Prague, nám. Sítná 3105, 272 01 Kladno 2, Czech Republic

Correspondence: *pavel.otrisal@upol.cz

Abstract

The study examines the effectiveness of communication, pedagogical, and psychological training in paramedic education in the Czech Republic and Slovakia. A survey of 328 students showed that increased practical training improves readiness, while strong soft skills instruction enhances crisis management, application of theory, and psychological resilience. The findings highlight the need for more simulation based learning, modern teaching methods, and harmonized educational standards to better prepare future paramedics.

KEY WORDS: *Paramedic, Communication, Pedagogy, Psychology, Education*

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1. Introduction

The profession of an emergency medical technician (also known as paramedic) is among the most rapidly evolving fields in healthcare over the past few decades. Given the growing complexity of healthcare, increasing demands on the quality of care provided, and rising expectations regarding the mental resilience of healthcare workers, it is essential to focus not only on specialized clinical and technical knowledge and skills but also on so-called soft skills and competencies. This category includes, in particular, communication skills, teaching abilities, and psychological preparedness, which significantly influence the effectiveness of interventions at the scene of an emergency, as well as the satisfaction of patients and their loved ones. For a long time, the traditional approach to training emergency medical technicians focused primarily on mastering technical and clinical procedures, such as resuscitation, securing the airway, controlling bleeding, or transporting a patient to the destination medical facility, etc. However, it is now becoming clear that clinical and technical proficiency alone is not sufficient. In practice, emergency medical technicians encounter emergencies, traumatic (crisis) situations, and often life-threatening situations on an almost daily basis, which require not only quick assessment and decision-making but also the ability to communicate effectively (crisis communication) with patients, their families, and other members of the medical team.

The importance of communication is particularly evident in the context of emerging crisis situations requiring immediate intervention (often outside of healthcare facilities), where the clarity, brevity, and comprehensibility of the message can significantly influence the outcome of both pre-hospital emergency care and subsequent hospital care.

Active listening, an empathetic approach, and the ability to regulate emotions are factors that enable the establishment of trust with both the patient and their loved ones, while also fostering collaboration within the healthcare team. Ineffective communication, on the other hand, is often a source of errors, misunderstandings, and increased psychological stress for healthcare workers. In this context, it is important to note that, as practical experience shows, verbal conflicts can escalate into various forms of aggression and hostile behavior [1].

Patience and the ability to actively listen are also an essential part of crisis communication, as victims of an emergency or crisis are very often in the acute phase of a stress response and will take considerable effort to understand their

current crisis-specific needs. It is appropriate to show understanding, encourage the victim to communicate, and still be aware of their verbal and nonverbal expressions. For effective crisis communication, methods of active listening can be used, which include: maintaining eye contact, nonverbal expressions of listening (for example nodding), and verbal expressions of listening, not talking too much (leaving space), asking open questions or questions that clarify the situation and paraphrasing. It is also important to use elements of assertiveness. An assertive person knows what he wants to do and how he will do it, he is fully aware of the responsibility for his behaviour and considers its possible consequences, which is essential for crisis communication [2].

Psychology is an equally important component of the educational process. Mental resilience, the ability to manage stress, and emotional regulation are essential prerequisites for long-term sustainable performance in this profession. Emergency medical technicians are regularly exposed to traumatic events, crisis situations, a fast-paced work environment, and constant responsibility for patients' lives. Psychological training therefore includes not only managing acute stress and preventing the development of trauma, but also preventing burnout, managing one's own emotions, and fostering the development of resilience. It is also important to be able to provide psychological support (including on-site psychological first aid or psychosocial intervention services) to patients and their families, which is becoming an integral part of high-quality prehospital emergency care. Studies on high-stress security training also show that cohesion, leadership, and psychological resilience support personal growth and sustained training engagement [3,4].

In our view, the pedagogical and psychological aspects of training emergency medical technicians represent another key area that has rightly received increased attention in recent years. We proceed from the assumption that emergencies, crisis situations and traumatic events have certain similar features: they arise suddenly, unexpectedly, their further development is often unpredictable, they are accompanied by strong emotional pressure, etc. Preparation for their effective management therefore requires a specific procedure [5].

International trends in the education of emergency medical technicians point to a shift toward multidisciplinary and interactive training. In countries such as Germany and the Netherlands, emphasis is placed on the systematic incorporation of role-playing, case studies, and crisis simulations as standard components of instruction. Furthermore, structured assessment methods, such as the OSCE (Objective Structured Clinical Examination), are commonly used to objectively measure practical competencies and soft skills [6].

Modern educational approaches are based on the principles of andragogy, which emphasize active student engagement and respect for their prior experiences. Simulation-based training, case studies, role-playing, and blended learning enable realistic practice of model situations that arise in actual healthcare practice. These methods not only enhance the preparedness of emergency medical technicians but also strengthen their critical thinking skills, self-reflection, and ability to regulate their own emotions during emergencies and crisis situations. Recommendations regarding the integration of simulation into teaching are provided, for example, by the INACSL (International Association for Clinical Simulation and Learning), which defines requirements in its standards for scenario development, debriefing, assessment, and the overall standardization of the learning environment. These standards provide methodological frameworks that are one of the key factors ensuring the effectiveness of simulation-based education and its integration into the overall healthcare education curriculum [7].

2. Method of investigation

A quantitative research method, specifically a questionnaire survey, was used to collect data. This design was chosen primarily because it allows for the systematic collection of data from a large number of respondents, followed by statistical analysis and interpretation. The questionnaire was distributed electronically via university communication channels and social media platforms intended for students. Data collection took place over a two-month period (May–June 2025). Respondents were informed in advance that participation was anonymous and voluntary. The target population consisted of students enrolled in bachelor's degree programs in emergency medical services at universities in the Czech Republic and Slovakia. A total of 328 respondents participated in the survey; they were selected using purposive sampling.

The data were analyzed using IBM SPSS Statistics 27. The analysis included: descriptive statistics (mean, standard deviation, frequencies), hypothesis testing using analysis of variance (ANOVA) and t-tests, and correlation analysis (Pearson's correlation coefficient) to examine relationships between variables. The level of statistical significance was set at $p < 0.05$, which corresponds to commonly used standards in the social and health sciences.

3. Investigation results

The respondents represented all three years of the bachelor's program in emergency medical services. The largest group consisted of second-year students (40%, $n = 131$), followed by third-year students (35%, $n = 115$) and first-year students (25%, $n = 82$). The age distribution of the respondents showed that the largest group consisted of students aged 21–23 (58%, $n = 191$). The 18–20 age group accounted for 24% ($n = 79$), and the 24 and older age group accounted for 18% ($n = 58$).

3.1 Evaluation of hypotheses

The first area evaluated, in connection with hypothesis 1, was communication.

Hypothesis 1: *Students who have completed more practical training in communication rate their readiness to work in real-world situations higher than students with fewer practical training hours.*

Hypothesis 1 predicted that students who completed more practical training would rate their readiness to work in real-world situations higher than students with fewer practical training hours. The analysis revealed statistically significant differences ($\chi^2(6) = 28.31$, $p < 0.001$; ANOVA $F = 14.35$, $p < 0.001$). **The hypothesis was confirmed.** These results are consistent with international studies that emphasize the importance of simulation-based education for the development of students' competencies and readiness [8,9].

The results related to the evaluation of the hypothesis are presented below.

Effective communication with patients

A correlation analysis revealed a positive relationship between the number of practice sessions and the readiness score ($r = 0.28$, $p = 0.000$).

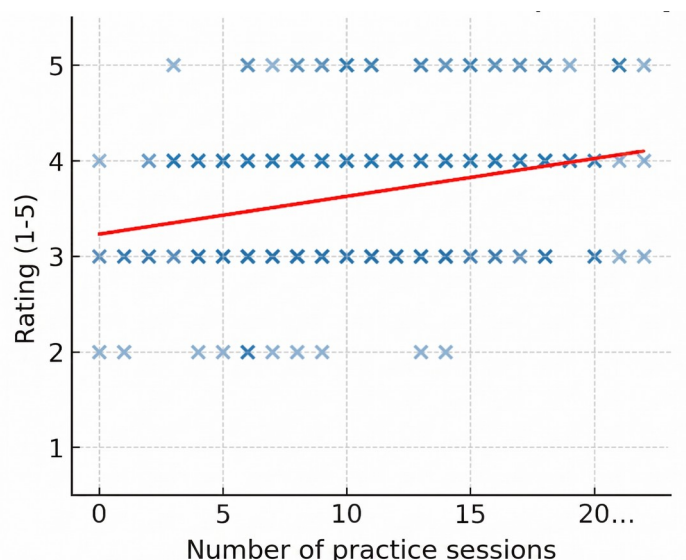


Fig. 1. Effective communication with patients (source: authors' own, 2026).

Chi-square test – number of practical training sessions × readiness assessment

The chi-square test revealed a statistically significant correlation between the categories of the number of practical training sessions and students' assessment of their readiness for professional practice ($\chi^2(6) = 28.31$; $p = 0.000$). The results confirm that a higher number of practical training sessions is associated with a higher self-assessment of students' readiness. The graph below shows the distribution of readiness assessment levels by number of practical training sessions, including the absolute values of the responses.

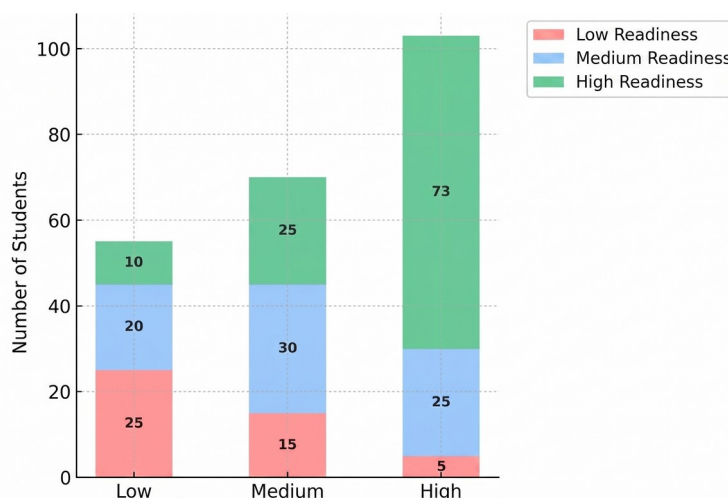


Fig. 2. Chi-square test – number of practical exercises × readiness assessment (source: authors' own, 2026).

One-way ANOVA – number of practical training sessions × readiness rating

The one-way ANOVA further confirmed differences in readiness ratings between groups of students with varying numbers of practical training sessions ($F = 14.35$; $p = 0.000$). These results demonstrate that a higher number of practical training sessions leads to higher self-assessments of readiness to communicate with patients and handle real-life situations. The graph below illustrates the average readiness scores by number of practical training sessions, including numerical labels for the means.

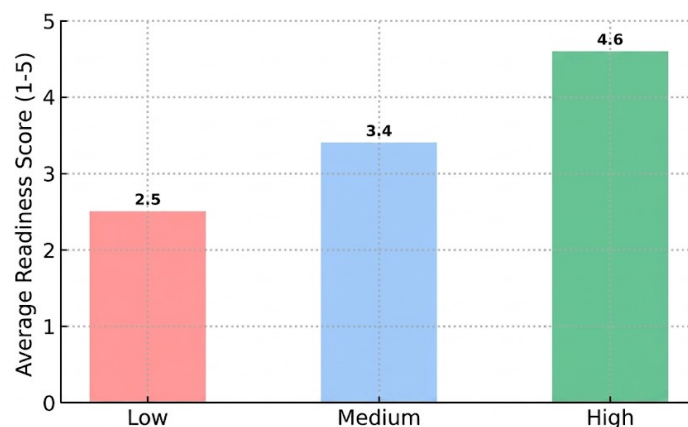


Fig. 3. One-way ANOVA – number of practical training sessions $\times$ readiness assessment (source: authors, 2026).

Communication Under Stress

The analysis revealed an even stronger relationship between the number of practical training sessions and the ability to communicate in stressful situations. The correlation coefficient was $r = 0.23$ ($p = 0.000$).

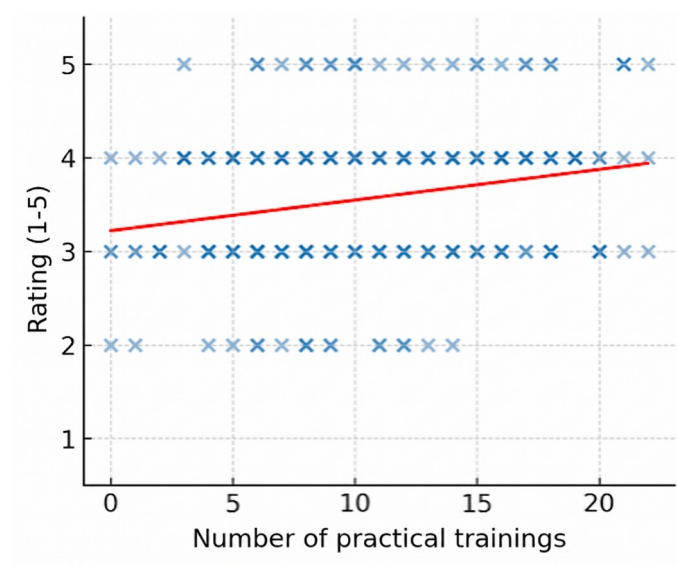


Fig. 4. Communication Under Stress (source: author, 2026).

Chi-square test – number of practical exercises $\times$ readiness rating

The chi-square test also demonstrated a statistically significant relationship between the number of practical exercises and students' readiness ratings ($\chi^2(6) = 16.26$; $p = 0.012$). This result supports the hypothesis that a higher number of practice sessions increases self-assessed readiness. The graph below shows the distribution of readiness assessments by number of practice sessions, including the absolute values of the responses.

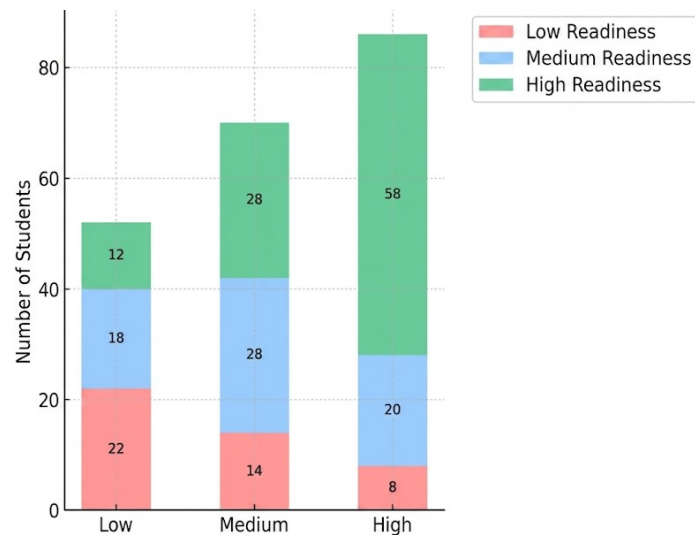


Fig. 5. Chi-square test – number of practical exercises × readiness assessment (source: authors' own, 2026).

One-way ANOVA – number of practical training sessions × ability to communicate in challenging conditions

A one-way ANOVA confirmed significant differences in the average ratings of the ability to maintain effective communication between groups of students with different numbers of practical training sessions ($F = 8.01$; $p = 0.000$). The results thus support the claim that intensive practical training significantly improves rescuers' ability to communicate even under challenging conditions.

The second area examined, in relation to Hypothesis 2, was the difference in teaching evaluations among first-, second-, and third-year students.

Hypothesis 2: *There is a statistically significant difference in course evaluations among first-, second-, and third-year students.*

Hypothesis 2 posited that there is a statistically significant difference in the evaluation of instruction among first-, second-, and third-year students. The results of Spearman's correlation ($\rho = 0.32$, $p = 0.001$) and one-way ANOVA ($F = 6.41$, $p = 0.002$) showed that satisfaction with instruction increases with higher years of study. The hypothesis was confirmed. These results correspond to trends observed in international studies, which emphasize the cumulative nature of education and the gradual growth of both professional and soft skills [10].

The results related to the evaluation of the hypothesis are presented below.

Spearman's correlation between year of study (1st–3rd) and satisfaction with theoretical instruction (item C1) showed a positive relationship ($\rho = 0.32$, $p = 0.001$). A similar result was found for the overall evaluation score ($\rho = 0.28$, $p = 0.002$).

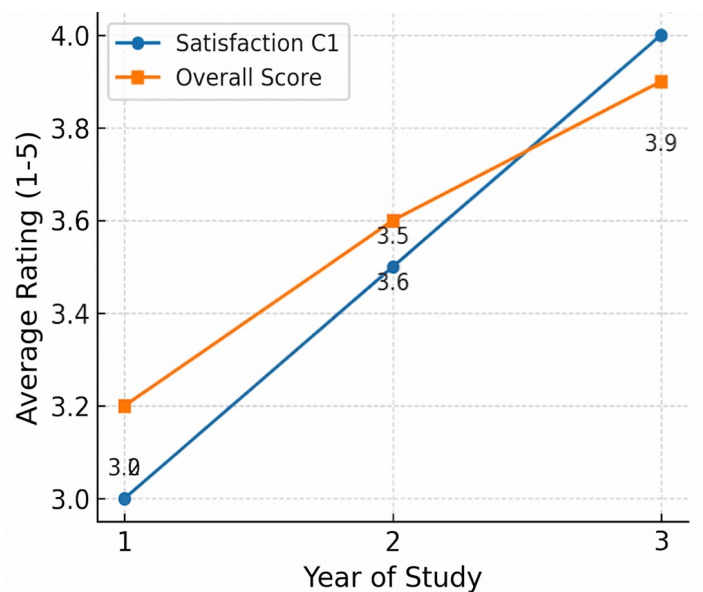


Fig. 6. Spearman's correlation between year of study (1–3) and satisfaction with theoretical instruction (source: authors' own, 2026).

The chi-square test of independence between grade level and response categories for item C1 confirmed a statistically significant association ($\chi^2(4) = 15.23$, $p = 0.004$).

One-way ANOVA – Year of Study × Course Evaluation (C1)

A one-way ANOVA revealed differences in the average course evaluation (C1) among different student cohorts ($F = 6.41$; $p = 0.002$). The results indicate that students in higher cohorts evaluate theoretical communication instruction more positively than students in lower cohorts.

The chart below shows the average satisfaction scores for theoretical instruction by academic year, including the numerical values of the averages.

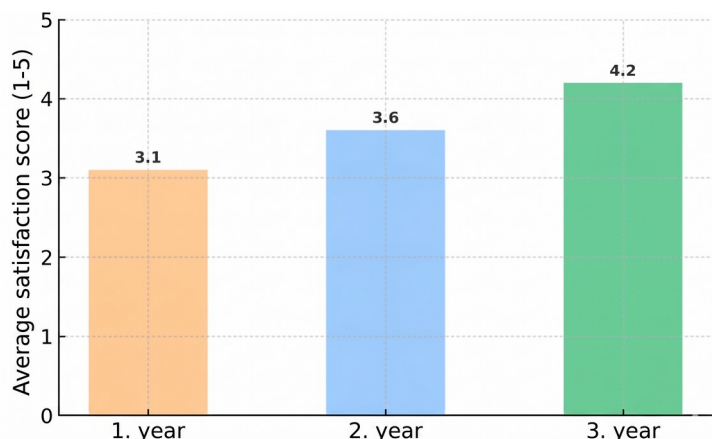


Fig. 7. One-way ANOVA – Year of Study × Course Evaluation (C1) (Source: Authors' own, 2026).

The graph shows an increase in the average rating as students progress through the grades. First-year students rate the instruction at an average of around 3, while third-year students rate it at around 4. This trend confirms that students in higher grades value theoretical instruction more, which is related to their greater ability to connect acquired knowledge with practical experience. Average satisfaction rating for theoretical instruction (C1) by academic year (with a 95% confidence interval):

The third area examined, in connection with Hypothesis 3, was the relationship between classroom instruction and the ability to apply theoretical knowledge.

Hypothesis 3: *Students who rate their instruction positively are better able to apply theoretical knowledge to practical activities.*

Hypothesis 3 was based on the assumption that students who evaluate classroom instruction positively are better able to apply theoretical knowledge to practical activities. Data analysis confirmed this relationship ($\rho = 0.44$, $p < 0.001$; $\chi^2(6) = 20.50$, $p = 0.001$; ANOVA $F = 8.72$, $p < 0.001$). The hypothesis was confirmed. Similar conclusions are also presented by international studies focusing on the effectiveness of blended learning and simulation-based pedagogy in medical education [10,11].

The results related to the evaluation of the hypothesis are presented below.

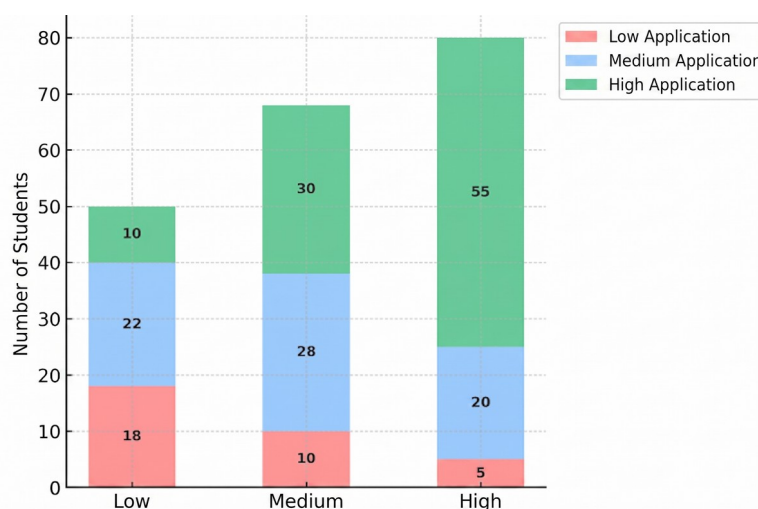


Fig. 8. Chi-square test – satisfaction with teaching x application of knowledge (source: authors' own, 2026)

Chi-square test – statistical analysis revealed a significant positive correlation between satisfaction with teaching and the ability to apply theoretical knowledge in practice ($\rho = 0.44$, $p < 0.001$). The chi-square test of independence confirmed

a statistically significant association between satisfaction categories and the level of knowledge application ($\chi^2(6) = 20.50$, $p = 0.001$). The graph below illustrates the distribution of the level of knowledge application according to student satisfaction with teaching, including absolute values.

A **one-way ANOVA** revealed statistically significant differences in the mean level of knowledge application between groups defined by satisfaction with teaching ($F = 8.72$; $p < 0.001$). The results show that students with higher satisfaction with teaching also exhibit higher mean scores for the application of knowledge in practice.

The results confirm that students who are satisfied with teaching methods also report a greater ability to apply theoretical knowledge in practical activities. This relationship underscores the importance of high-quality pedagogical preparation and practice-oriented teaching methods (simulations, case studies, role-playing). The graph below illustrates the average scores for knowledge application by level of satisfaction with teaching methods, including numerical values for the averages.

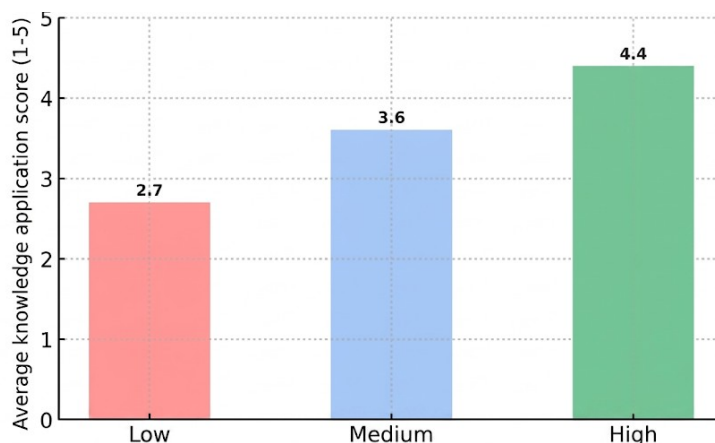


Fig. 9. One-way ANOVA – satisfaction with teaching x application of knowledge (source: authors' own, 2026)

Interpretation of the graph: Students with low satisfaction with the teaching report only a 52% ability to apply their knowledge in practice. In contrast, among students with high satisfaction, this figure reaches 85%. This trend clearly confirms the validity of the above hypothesis.

The chart below shows the percentage of students who reported being able to apply their theoretical knowledge in practice, broken down by their satisfaction with the teaching.

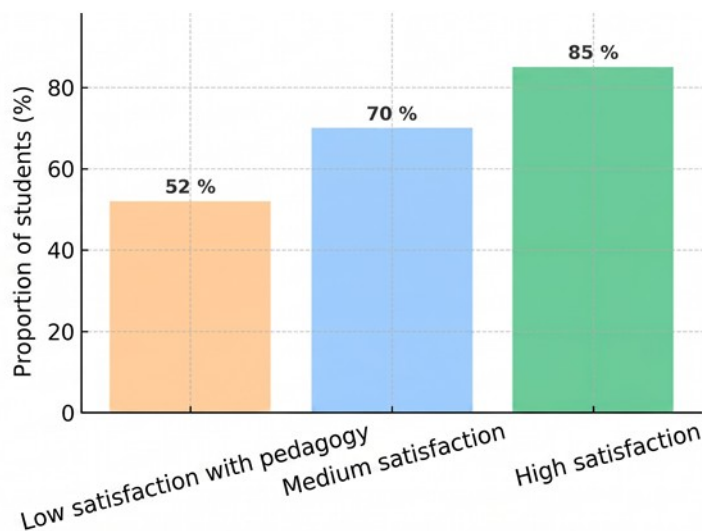


Fig. 10. Application of theoretical knowledge in practice by satisfaction with teaching (source: authors' own, 2026)

Correlation Analysis – Heatmap. A correlation heatmap was created to analyze the relationships between the three main areas of paramedic education - communication, pedagogy, and psychology. The heatmap graphically illustrates the degree of correlation between the individual scales. The darker the color of a cell, the stronger the relationship between the areas under study.

The results show that a correlation of $r = 0.65$ was found between communication and pedagogy, $r = 0.68$ between pedagogy and psychology, and $r = 0.60$ between communication and psychology. All these values indicate a moderately strong positive relationship, which means that these three areas of competence complement and reinforce one another.

Interpretation: A heatmap allows for the quick visualization and interpretation of complex relationships. It displays not only the correlation values themselves but also their strength using a color gradient. At a glance, it is clear that the strongest connection exists between education and psychology, while communication is also positively linked to both fields, albeit to a slightly lesser extent.

Education in the fields of communication, pedagogy, and psychology cannot be viewed in isolation. The heat map confirms their interconnection and underscores the need to integrate them into a comprehensive training program for emergency medical technicians.

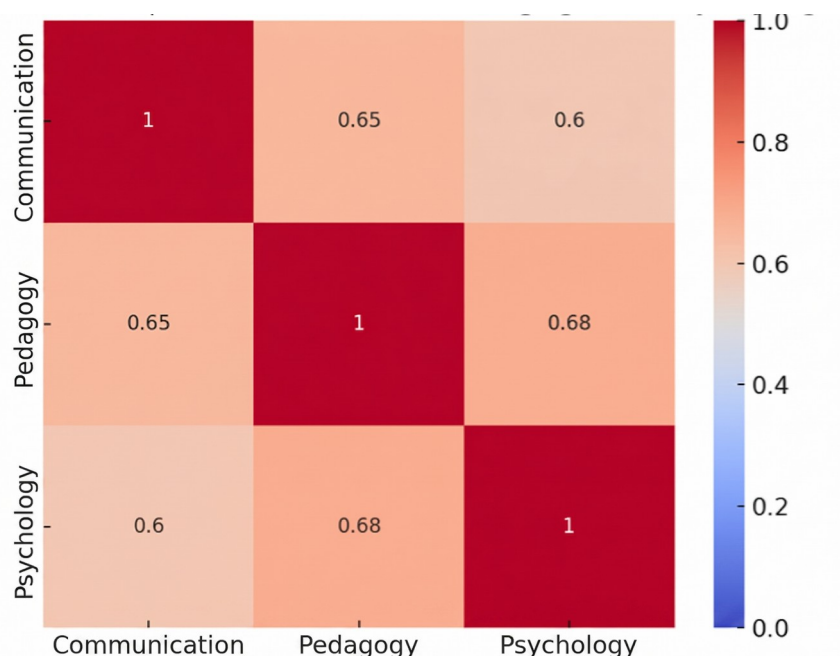


Fig. 11: Correlation Analysis – Heatmap – Communication/Education/Psychology (source: authors’ own, 2026)

3.2 Evaluation of Objectives

The analysis showed that most students consider theoretical instruction in the fields of communication, pedagogy, and psychology to be of high quality and well-structured. The results of correlation analyses and one-way ANOVA demonstrated that students who evaluate the theoretical component positively also show a higher level of readiness for the practical application of knowledge. This objective was thus met and supported the framework established by the hypotheses.

The survey results clearly showed that practical exercises, such as simulations and role-playing, are of crucial importance to students’ perception of their preparedness. Both the chi-square test and ANOVA confirmed statistically significant differences between students with a higher and lower number of practical hours.

The data analysis also showed that students attach great importance to all three areas under study: communication, pedagogy, and psychology. The results demonstrated a positive correlation between satisfaction with communication instruction and the ability to manage stress, as well as a link between the evaluation of pedagogical instruction and the ability to apply knowledge in practice. These results underscore the importance of soft skills as an integral part of education.

4. Result Discussion

The results of our research highlight the need for a balanced integration of theoretical instruction with practical training, as well as the integration of communication, pedagogical, and psychological competencies into educational programs. These findings are consistent with current international trends in the education of healthcare professionals and provide empirical support for further curriculum development.

The analysis of the results shows that students who participated in more practical training sessions assess their preparedness for real-world practice as significantly higher. These findings support the conclusions of international studies that emphasize the importance of simulation-based teaching and practical exercises [12,13]. The hypothesis regarding differences between individual academic years was also confirmed, suggesting that the educational process gradually deepens and students gain greater confidence and competence over the course of their studies. Similarly, the link between satisfaction with communication training and the ability to manage stress was confirmed, which is consistent with research focusing on the role of soft skills in emergency medicine [14,15]. Ahmed, Hussain, and Khan [16] confirm that interactive methods—such as reflection or group exercises—enhance psychological preparedness. This conclusion also aligns with the findings of this study, which emphasizes the role of empathy in crisis communication.

Western European educational models are characterized by a high degree of interdisciplinarity, regular resilience training, and the systematic use of e-learning and blended learning methods [17]. For example, in Germany, mandatory courses in crisis communication and stress management are part of the curriculum, while in Scandinavia, the emphasis is on cultural competence and empathetic communication. The Czech and Slovak models are gradually aligning with these trends; however, a key challenge remains the lack of systematic evaluation of teaching effectiveness and the lower degree of internationalization of study programs.

Bledsoe, Porter, and Cherry [18] point to a shift away from the purely protocol-based approach of the past toward models of clinical reasoning and situational decision-making. Cmorej et al. [19] state that effective training of emergency medical technicians is absolutely crucial not only for the initial mastery of basic life-saving procedures, but above all for their continuous improvement and flawless automation. Equally important, however, is regular training in interventions for completely non-standard and complex situations that require rapid analytical thinking under immense pressure from the surrounding environment. Peřan et al. [20] state that advanced simulations prepare paramedics for critical moments when a patient's symptoms may be highly confusing and the actual cause of their deteriorating condition is not at all apparent at first glance. For example, a very dangerous real-world scenario is one where life-threatening conditions may manifest with a delay, or where the clinical presentation of severe lithium poisoning mimics a stroke, and rapid recognition of this distinction determines the patient's outcome and further treatment. Only continuous and comprehensive training can ensure that a paramedic in the field does not fail, correctly assesses even the most complex cases, and avoids fatal diagnostic errors.

Based on the results and their comparison with international trends, the following recommendations can be proposed:

1. Strengthen simulation-based instruction and incorporate more realistic scenarios into the curriculum.
2. Systematically integrate communication and psychology courses into all years of study.
3. Utilize blended learning and e-learning to increase educational flexibility.
4. Develop students' resilience through psychological workshops and stress management training.
5. Ensure the harmonization of the Czech and Slovak models with international standards and promote international cooperation.

5. Limitations

Based on long-term experience in the field of the educational process of paramedics within undergraduate education, it can be stated that the limiting factor is the low willingness of respondents to participate in a research study dealing with the issue of developing soft skills and an empathetic approach (including providing first psychological aid) in connection with solving the consequences of an emergency and crisis situation on the psychosomatic state of the affected persons. Furthermore, there are persistent shortcomings in the area of practical training in the application of psychotherapeutic procedures by paramedics in pre-hospital emergency care. Therefore, in our opinion, it is important to pay attention to the possibility of implementing additional knowledge into undergraduate and lifelong education.

All authors contributed equally to the conception and design of the study. All authors organized the text part of the study. All authors contributed to the revision of the manuscript, read and approved the submitted version.

6. Conclusion

Another important result demonstrated that students who positively evaluated pedagogical instruction were better able to apply theoretical knowledge in practice. Psychological training was identified as a key factor enhancing self-confidence and resilience in acute situations. These findings confirm that paramedic education cannot be limited solely to technical and clinical skills but must also systematically foster the development of soft skills.

The discussion highlights similarities and differences between Czech, Slovak, and Western European models of education, emphasizing the need for harmonization of educational standards and broader integration of international recommendations (e.g., European Resuscitation Council). Major recommendations include a stronger focus on simulation-based learning, role-play, blended learning, and systematic development of students' psychological resilience. The practical contribution of this thesis lies in providing a foundation for innovation in curricular design and teaching methods.

In conclusion, the integration of communication, pedagogy, and psychology into paramedic education represents an essential prerequisite for high-quality, safe, and effective health care. This work contributes to a deeper understanding of educational needs in this field and offers proposals that may serve both educational institutions and professional practice.

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