

# The professional readiness of student-teachers in physical education in Ukraine's war-torn areas

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## Abstract

**Background and Study Aim** Military conflicts present unique educational challenges and complexities for students specializing in physical education. These conditions can profoundly impact their professional preparedness and alter their educational priorities. Thus, this study aims to assess the level of professional preparedness of physical education student-teachers living in areas of military conflict.

**Material and Methods** Three Ukrainian universities contributed students to the study, two from the eastern conflict zones (including Kharkiv) and one from the western shelling-prone area (Ivano-Frankivsk), with a total of 157 participants (61 male, 96 female). The survey 'Level of Professional Preparedness of Physical Education Student-Teachers', containing 39 questions, was used. For statistical analysis, the PyCharm CE development environment and various Python programming language libraries were utilized.

**Results** Statistical evaluation using the Kruskal-Wallis test revealed notable differences in student responses among the university groups. Further analysis using the Mann-Whitney test for each pair of universities revealed differences between pairs of groups. However, there are no statistically significant differences between universities 1 and 2 from Kharkiv (war zone). The fewest correct answers were received on the question about the influence of a teacher's professional qualities on the overall growth of a student and the question about the atmosphere for learning.

**Conclusions** The professional competencies of physical education teachers play an important role in the educational process. It is noted that there is a need to improve teacher training in various aspects, including the impact of their professional qualities on student success.

**Keywords:** school, profession, teacher, physical education, educational level

## Introduction

Continued global military conflicts not only disrupt societal structures but also pose significant challenges to education, evidenced by various studies [1, 2, 3, 4]. Such conflicts can fundamentally alter the professional training of prospective physical education teachers. For students aspiring to become physical education teachers, these conflicts can radically change the level of their professional preparedness. Overcoming the difficulties of learning in conflict zones requires understanding how these circumstances affect the readiness of university students for their future role as physical education teachers.

With the advent of the COVID-19 pandemic in 2020, universities transitioned to online modes of instruction, prompting a necessary adaptation for students and instructors to new educational environments [5, 6, 7, 8]. This shift to online platforms notably reduced practical training in pedagogy and coaching for future physical education teachers,

thereby affecting their professional preparedness level.

The outbreak of war in Ukraine in early 2022 aggravated pre-existing educational difficulties, severely affecting student training. The conflict posed new challenges, altering the educational framework and necessitating innovative training strategies in universities [9, 10]. This crisis led to a critical reassessment of educational approaches, aiming to adapt to the combined challenges of the COVID-19 pandemic and the ongoing conflict [11, 12], pushing universities to balance educational excellence with the safety of their students.

The results of multiple studies underscore the critical need to track the professional readiness of students who aim to be physical education teachers [13, 14, 15]. A specialized assessment questionnaire is a key instrument for gauging these students' professional training, essential for pinpointing areas for enhancement in their educational programs. This evaluation method gains added significance amidst persistent military conflicts [16, 17, 18, 19].

Utilizing surveys helps identify specific challenges

and deficiencies in the professional development of future physical education teachers [20]. Research across nations highlights the necessity of enhancing physical education training [21, 22], with a focus on broadening skill sets, notably digital literacy [23], and examining the influence of professional demeanor on job performance and satisfaction [24, 25].

Collectively, these studies indicate the need for a more comprehensive and multifaceted approach to training physical education teachers, considering the changing demands of the profession in various contexts. Such improvements are especially important in areas of military conflict, where the physical and psychological strain on teachers is significantly higher [18, 26]. Therefore, assessing the level of professional preparedness using specialized questionnaires not only serves as a tool for improvement but also becomes a crucial component of preparing future teachers for the complexities of working in conflict zones. Thus, this study is aimed at evaluating the level of professional preparedness of physical education student-teachers living in areas of military conflict.

## Materials and Methods

### *Participants*

The study involved students from three Ukrainian universities (physical education departments): two located in the eastern part (Kharkiv - included in the list of active combat zones) and one in the western part (Ivano-Frankivsk – an area under constant threat of shelling). A total of 157 students participated (men – n=61; women – n=96). Students were advised to follow safety rules in case of an air raid alert in the city. They were also recommended to use a special phone application ‘Alarm’, which notifies about the threat of missile attacks.

### *The living conditions of the respondents and the surrounding environment*

The timeframe of the study coincides with a significant period in Ukraine’s history, marked by the start of the military conflict on February 24, 2022, and the global COVID-19 pandemic. The total duration of online learning, initially caused by the pandemic and then extended by the war, amounted to [3 years and 6 months] by the start of the study. This prolonged period of virtual learning significantly impacted the educational landscape in Ukraine. In the Eastern regions (Kharkiv), proximity to combat zones forced a complete transition to online learning due to safety issues related to frequent shelling and air raids. In the Western part of Ukraine (Ivano-Frankivsk), the university implemented a hybrid educational model (face-to-face and online classes), with the possibility of a full transition to remote learning during intensified military actions or emergencies.

### *Research Design*

The study used a specialized questionnaire titled ‘Level of Professional Preparedness of Physical Education Student-Teachers’. The questionnaire was formatted as a Google online form. Its content was oriented towards students living in areas of military conflict. The students found themselves in a situation of more than three years of predominantly online learning (due to the COVID-19 pandemic since 2020 and the military conflict from February 2022). The study was conducted at the beginning of the academic year (September and October 2023). The professional part of the questionnaire contains 39 questions. The questionnaire items were aligned with the educational curricula for physical education faculties and the responsibilities of teachers in Ukrainian state schools. In addition to these questions, the Google online form also collected the following information: student’s pseudonym, age, year of study, specialty, and university affiliation. All responses were used exclusively for educational and research purposes.

### *Statistical Analysis*

For statistical analysis, the PyCharm CE development environment and various Python programming language libraries were used. Cronbach’s alpha coefficient was used to assess the internal consistency of the questionnaire for reliability evaluation. The Kuder-Richardson (KR-20) coefficient was used to assess the reliability of the questionnaire. Bartlett’s test of sphericity was applied to check the suitability of data for factor analysis. The validity of the questionnaire was assessed using factor analysis. The mean and standard deviation were determined. The significance level was set at 0.05.

## Results

For the reliability assessment of our questionnaire, we applied two techniques: the computation of Cronbach’s alpha and the Kuder-Richardson (KR-20) coefficients. The Cronbach’s alpha (0.630) and KR-20 (0.633) coefficients indicate an adequate level of internal agreement in the questionnaire. These results affirm the questionnaire’s dependability. Special conditions of the students’ living environment (war zone) were taken into account, which could have influenced their responses. The results of the Bartlett’s test of sphericity (Chi-Square Value: 1410.500, p-value: 0.000) indicate that the data are suitable for factor analysis.

To validate the questionnaire, an examination of the explained variance was performed using factor analysis findings (Figure 1). The graph indicates that the foremost components significantly explain the variance, particularly the first three components, which account for roughly 24.8%. This reveals that the questionnaire data possess a distinct structure

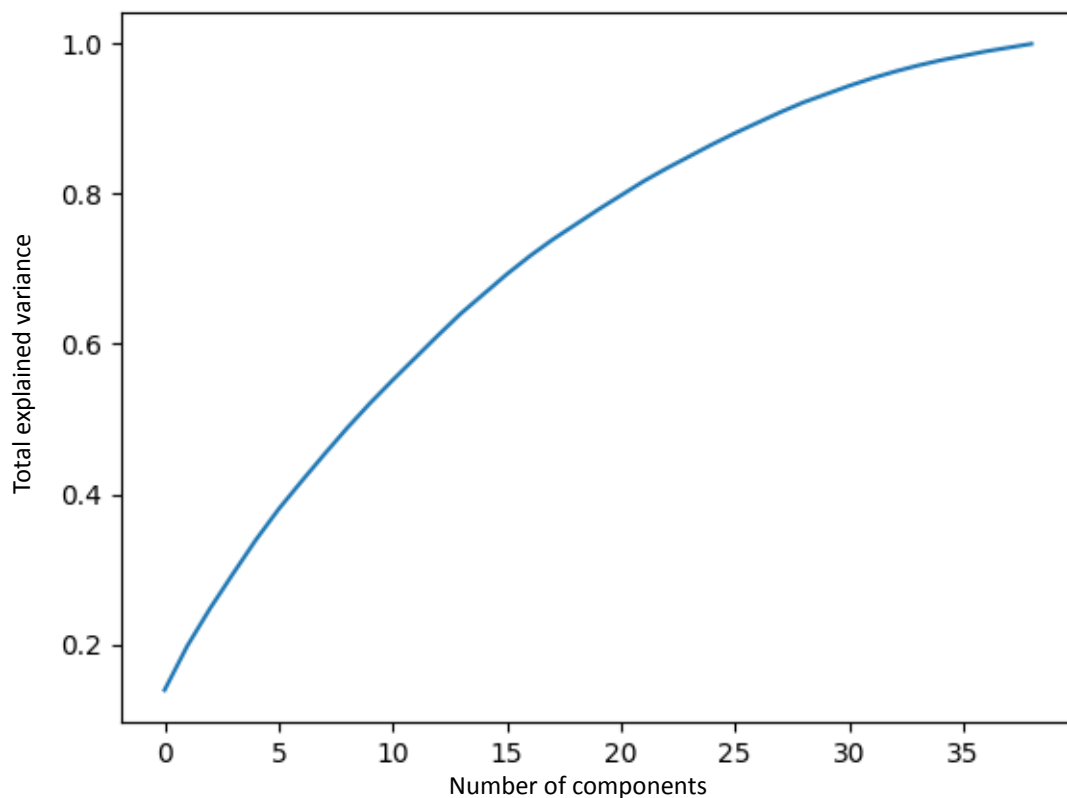
and internal agreement, validating their validity.

The results from the Kruskal-Wallis test and the subsequent Mann-Whitney test provide the following insights (Table 1): The Kruskal-Wallis test (2.064) reveals statistically significant disparities in student response distributions among the groups (universities). Additional detailed analysis using the Mann-Whitney test for each university pair uncovers specific variances between the groups. The initial pair (University 3 versus University 1 and 2) and the subsequent pair (University 3 and University 1) demonstrated statistically significant variances in response distribution with a significance level below 0.05, indicating distinct differences in student responses among these groups. Conversely, no significant differences were found between University 2 and University 1, suggesting similar response patterns among these students.

The analysis of data from Table 1 revealed the following: University 2 demonstrated the highest percentage of successful responses, while University 1 and University 3 showed lower results (column 3). University 2 also had the highest average score (column 4) and median (column 5). The standard deviation (column 6) was 0.092, which may indicate a diversity of scores. Universities 1 and 3 had lower average scores (column 4) and medians (column 5), with the standard deviation (column 6) remaining low.

University 2 also showed the highest average total score (column 7) and median (column 8), although the standard deviation (column 9) was slightly higher. Universities 1 and 3 had lower average total scores and medians, with similar standard deviation values.

The findings suggest that University 2 ranks highest in student achievement, reflected in



**Figure 1.** Variance explained chart

**Table 1.** Statistical data of the survey results on a binary response scale (1 – correct answer, 0 – incorrect answer)

University	n	Correct answers (% , average score)				Correct answers, total points		
		%	Mean	Median	Std_Dev	Mean	Median	Std_Dev
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
University 1	36	46.01	0.46	0.0	0.027	17.944	18.0	4.229
University 2	73	52.3	0.523	1.0	0.092	20.397	21.0	4.415
University 3	48	46.47	0.465	0.0	0.028	18.125	19.5	4.836
University 1 + University 2	109	50.22	0.502	1.0	0.056	19.587	20.0	4.487

Note. Universities 1 and 2 - training exclusively online; University 3 - a combination of online and offline.

the highest rates of successful answers, average marks, and overall grades, with varied outcomes. Universities 1 and 3 show lower performance, with University 1 having marginally better success rates but similar averages and totals. A combined analysis of Universities 1 and 2 reveals moderate results in all aspects.

Several reasons might account for the higher performance of students from military operation areas (Universities 1 and 2): Firstly, these students could be more driven to excel in their studies, aspiring to better their future opportunities. Secondly, the challenging environment might foster resilience and stress management skills, which can positively impact their academic achievements.

The analysis of the results from Table 2 highlighted the following trends:

1. The average scores of men and women at University 1 are roughly equal and close to the average scores at University 3. This may

indicate a similar level of student preparedness at these universities. At University 2, there is a slight increase in the average score for women compared to men. This could reflect differences in educational programs or teaching approaches.

2. University 2 has the highest average score among women, which may indicate a higher quality of education or motivation. University 3 also shows high average scores for women, but they are less than at University 2. This may suggest different teaching approaches at these universities.
3. The standard deviation of average scores for men and women in most universities is relatively small, indicating a narrow distribution of responses. This could mean that students at these universities have a similar understanding of the material and approaches to problem-solving.

According to Table 3, the least correctly

**Table 2.** Results of correct answers on a binary response scale (1 – correct answer, 0 – incorrect answer) among men and women (N=157, Nmale=61, Nfemale=96)

University	Gender	Mean	Std_Dev	N
University 1	Male	0.458	0.123	13
	Female	0.462	0.023	23
University 2	Male	0.498	0.113	24
	Female	0.535	0.093	49
University 3	Male	0.417	0.035	24
	Female	0.513	0.038	24
University 1+ University 2	Male	0.484	0.096	37
	Female	0.512	0.047	72

Note. Universities 1 and 2 - training exclusively online; University 3 - a combination of online and offline.

**Table 3.** Questions with the least number of correct answers

Question	Num, Correct Answers	Num, Respondents	Percent Incorrect
<b>University 1</b>			
Question19	7	36	80.56
Question6	9	36	75.0
Question7	9	36	75.0
Question27	9	36	75.0
Question21	9	36	75.0
<b>University 2</b>			
Question6	2	73	97.26
Question27	5	73	93.15
Question24	7	73	90.41
Question2	7	73	90.41
Question12	13	73	82.19
<b>University 3</b>			
Question6	9	48	81.25
Question39	10	48	79.17
Question31	10	48	79.17
Question24	12	48	75.0
Question7	14	48	70.83

None. Num, Correct Answers: This is the number of correct answers to the specified question. Num, Respondents: This is the total number of respondents who answered the specified question. Percent Incorrect: This is the percentage of incorrect answers to the specified question.

answered questions were as follows: Question 19 had only 7 correct responses out of 36, indicating 80.56% incorrect responses, showing a lack of knowledge or poor comprehension of the exam system. Question 6, with only 9 correct answers out of 36 (75.0% incorrect), relates to the influence of teachers' professional attributes on students' growth, reflecting varied opinions. Question 27 also had 9 correct responses out of 36 (75.0% incorrect), addressing the educational environment, which may be subject to different interpretations.

## Discussion

Amidst the military conflict in Ukraine continuing since February 2022, our November 2023 study aims to explore educational adjustments and difficulties encountered by physical education students. This approach's significance is highlighted in several research works [1, 2, 3, 4], offering practical advice for bettering conditions associated with wartime conflicts.

Given the geopolitical situation since February 24, 2022, marked by warfare and partial Russian occupation of Ukrainian lands, there has been a substantial shift in the educational setting for students. Universities in Kharkiv, situated near the active war zones in Eastern Ukraine, have fully switched to online teaching platforms due to the ongoing military activities posing risks to physical attendance. In contrast, the university in Ivano-Frankivsk in Western Ukraine has adopted a hybrid educational approach, allowing for both face-to-face and online instruction.

The move to online education, initially a response to the COVID-19 pandemic in 2020, fortuitously prepared these educational institutions and their students for the demands of the current military conflict. In such a scenario, adapting the educational approach to complex environments is vital. Monitoring the professional readiness of students can reveal areas needing improvement, a strategy highlighted in several studies [27, 28, 29, 30]. Therefore, our research's use of a survey assessing the professional preparedness of physical education teachers is an appropriate method.

The outcomes of our research show disparities in the responses of students from different areas: those in war zones versus those in safer regions. This corroborates with similar research findings [18, 26]. It's underscored in our study that students living in war-affected areas are likely more motivated towards academic success and capable of developing skills to adapt and manage stress, enhancing their academic achievements.

Other research supports these findings. Bicca Ribeiro et al. [31] discusses the influence of stress and organizational contexts on increasing teachers' burnout risks. Chiva-Bartoll et al. [32] explores the link between physical education students'

professional education and their understanding of prosocial behavior. Girard et al. [33] identifies a connection between students' motivational factors and the motivational environment they perceive. Xu and Luo [34] reveals both overt and covert stereotypes about physical education teachers' professional dedication, indicating shifts in motivational structures and new influencing elements.

Our investigation uncovered gender-related differences in students' professional training levels. The average marks for men and women in all three universities are comparable, implying a consistent level of preparedness. A notable difference is seen in the average scores of women, especially at University 2 in the conflict zone, indicating potentially higher motivation. The critical role of motivation is also underlined in Spittle's et al. study [35], which analyzes the findings of a confidence and motivation survey for elementary physical education teaching and its psychometric analysis.

The significance of having professional competencies in physical education teaching is highlighted in the research by Yesica Ochoa-Martinez [36], Cocca et al. [37], Kovac et al. [38], and Franks et al. [39]. Our study identified specific questions that garnered the lowest percentage of correct answers (20-25%), which included topics on the learning environment and the impact of teachers' professional attributes on student growth, among other aspects.

Our research findings highlight key shifts in the educational landscape due to the military conflict, potentially affecting the drive and achievement of physical education student-teachers. Aligning our findings with prior research in related areas reveals consistent patterns. Factors like motivation, the environment for motivation, and professional skills are still pivotal in the realm of education.

Prospective research areas encompass a thorough investigation of the effects of warfare on educational processes and student advancement, along with an extensive analysis of physical education teachers' professional abilities under these conditions. It's vital to assess strategies and guidelines for refining educational practices and assisting students amid conflicts. Moreover, grasping how the milieu of military conflict affects education can aid in formulating more versatile and potent educational frameworks, aiding students in navigating challenges and attaining success in unstable and strained environments."

## Conclusions

The conflict and Russian occupation in parts of Ukraine have drastically changed the educational sphere. Universities in affected areas have moved to online teaching, introducing new difficulties and chances for students. The abilities of physical

education teachers are essential in this educational scenario, highlighting the need to refine their training, especially regarding their influence on students' success.

Our research stresses the criticality of adapting education to the challenging war conditions and underscores the importance of motivation and professional competencies in effectively teaching physical education students amid such challenges.

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