Original Article

Improvement of professional competence of future specialists in physical education and sports during the process of vocational training

OLEKSANDR SOLTYK¹, YEVGEN PAVLYUK², BOGDAN VYNOGRADSKYI³, OKSANA PAVLYUK⁴,
TETYANA CHOPYK⁵, OLEKSANDR ANTONIUK⁶

^{1,2,4,5,6}Khmelnitskyi National University, Khmelnytsky, UKRAINE

³Lviv State University of Physical Culture, Lviv, UKRAINE

Published online: August 25, 2017

(Accepted for publication July 10, 2017)

DOI:10.7752/jpes.2017.s3148

Abstract: The article reveals the results of research of professional competence formation of future specialists in physical education and sports in the process of vocational training by the motivational and evaluative, gnostic, professional and personal, activity and practical as well as analytical criteria in the experimental and control groups. Significant improvement of all criteria of professional competence of future specialists in physical education and sports in the process of vocational training has been revealed. This proves that the dynamics of professional competence formation of future specialists in physical education and sports in the process of vocational training is successful due to the implemented organizational and pedagogical conditions of professional formation of such specialists in vocational training.

Key words: vocational training, future specialists in physical education and sports, criteria, professional formation, professional competence.

Introduction

The efficiency of vocational training within professional formation of future specialists in physical education and sports is defined by the obtained results: both qualitative and quantitative characteristics of levels of future specialists' professional competence components formation in the process of vocational training. Giving definition to the formation of professional competence of future specialists in physical education and sports in the process of vocational training was possible due to pedagogical experiment.

According to the aim and tasks of the research, the efficiency of pedagogical system of professional formation of future specialists in physical education and sports in the process of vocational training had to be verified by implementing organizational and pedagogical conditions.

Material & methods

The experimental work has been done in four stages of scientific and pedagogic research (research and analytical, conceptual and modeling, organizational and implementation, final) on the basis of seven higher educational establishments of Ukraine. To obtain optimal authenticity of results, 470 participants, of which 394 were students (197 persons – CG, 197 persons - EG) and 76 – teachers have been involved in the experiment.

The idea behind the pedagogical experiment was to define the efficiency of organizational and pedagogical conditions of professional formation of future specialists in physical education and sports in vocational training, such as: formation of motivation of future specialists in physical education and sports to perform professional activity on the basis of professional and motivational trainings; improvement of content of vocational training of future specialists in physical education and sports on the basis of realization of educational and methodological complex; the development of professional competence of future specialists in physical education and sports in the process of having various types of field studies; implementation of efficient diagnostics to define readiness of future specialists in physical education and sports to professional activity; ensuring professional self-development of future specialists in physical education and sports by using personal-oriented technologies. In the process of its implementation, quality and rate of mastering of theoretical knowledge, practical skills in major subjects, the role of the teacher under the conditions of innovational teaching form aimed at the development of professional competence future specialists in physical education and sports have been studied.

For practical solution of the tasks of the research, components and cumulative criteria for the definition of level of professional competence development of future specialists in physical education and sports at the stage of statement diagnostics and dynamics monitoring within the formative stage of the experiment comparative analysis have been defined. In the structure of professional competence the following components has been pointed out: *motivational* (professional guidelines, interests, the ability to be engaged in coaching and pedagogical activity, professional orientation, acknowledgement and observance of coaching and pedagogical activity values, understanding the aim and tasks of teachers' activity, realization of value of professional and pedagogical value, acknowledgment of value of subject relations, satisfaction from pedagogical activity, and

orientation on personal self-development, ability for emotional behavior regulation), *personal* (professionally important personal qualities: moral-ethic, communicative, emotional and willpower, organizational, management, leadership, sports culture), *cognizant* (general culture, methodological, psychological and pedagogical, special (vocational), methodical and informational knowledge), *functional* (having knowledge of methods, technologies and techniques needed for successful coaching and teaching activity), *reflexive* (ability for adequate self-evaluation and skills for behavior self-regulation).

According to each component the following criteria and indices have been defined: *motivational and evaluative* (formation of inner and outer motivations (inner and outer “I-concept”), incentives, professional orientations, striving for perfection of professional activity, professional growth and creativity; availability of cognitive interest, evident needs and motivation for professional competence; value treatment of pedagogical activity, recognition of the importance of continuing and systematic improvement of level professional skills throughout the life; will to reach the goals that correspond to internalized (appropriated, that became inner) values (aim internalization); *gnostic* (the level of students obtaining psychological and pedagogical as well as methodological knowledge as to education of different age groups; knowledge of professional terms and notions, knowledge about individual peculiarities of students, selection of methods, forms, formulating tasks and variants of their application according to the subject, topic, and conditions; obtaining professional (special, vocational) knowledge (scientific concepts, theories, laws, regularities, models, classifications, categories, processes, phenomena, notions, facts etc.); available knowledge about possible forms of pedagogical interaction organization communication style, work methods); *professional personal* (formation of professionally important personal qualities: communicability, creativity, dynamisms and emotional firmness; recognition of importance of continuing and systematic improvement of professional skills throughout the life; independence and responsibility for educational outcomes; interest to learning modern educational technologies; available strategy of self-organization and self-development to reach the desired level of effectiveness in professional activity); *activity-professional* (level of knowledge of system of methodological skills, namely: the ability to use innovational methods and modern pedagogical technologies in the process of education with creativity; the ability to realize and analyze personal creative pedagogical skills; knowledge and skills of building educational process in consideration with student’s individual peculiarities; the ability to involve children to sports clubs and groups of various types; the ability to use innovations based on personal sports experience; aptitude for self-education); *analytical* (ability for self-reflection, adequate self-assessment, critical analysis, readiness to active self-development, self-learning, self-regulation, self-improvement, level of existing self-esteem and professional identity that are psychological regulators of professional development of future specialists in physical education and sports).

Development of professional competence of future specialists in physical education and sports has been assessed by three levels: lower, middle, and higher (fig. 1).

Fig. 1. Algorithm to Define Formation of Professional Competence of Future Specialists in Physical Education and Sports in the Process of Vocational Training

Thus, in the context of our research, pedagogical experiment was based on innovational ensuring of vocational training of future specialists in physical education and sports taking into account aims, content, methods, ways, means, and forms of student-teacher interaction, peculiarities of their behavior in certain aspects of educational process.

To define levels of the formation of motivational component of future coaches-instructors in the process of vocational training by motivational and evaluation criteria, we have chose the method of "Defining motivation of future coaches-instructors for the formation of vocational orientations" (authors L. Barbuto, R. Skoll) [1].

What concerns definition of quality of students' knowledge by gnostic, professionally-personal, activity and practical, analytical criteria, we have used the method of calculation of final grade in the process of studying major subjects as recommended by educational-methodological department of Khmelnytskyi National University, which is calculated by the following formula of knowledge quality assessment:

$$M = \frac{\sum_{i=1}^n w_i m_i}{\sum_{i=1}^n w_i}$$

in which m_i – native grade for each type of activity

w_i – respective value of a separate activity;

n – the number of all activities that student is engaged in for the subject.

The features of using this method of calculation is: weight w_i is interpreted as "value" of each individual activity for i -type of control; m_i grade is interpreted as the "price" of activity (cost per "value" unit). To obtain the value of a certain activity, the price should be multiplied by the activity ($w_i \cdot m_i$); the value of all the activities is the sum of those products; overall grade for the discipline (price) is the cost per weight unit.

Advantages of this method: assessment for each activity is taken into account in the overall assessment in proportion to its value; the number of optional grades is taken into account (student's activity); there is a possibility to take into account the complexity of individual activities, giving them different values; the amount of weighting coefficients may not equal one; their relative correlation is important (more weighty activity bears greater share of the overall assessment); the technique creates good simulation of the intuitive desire both of a teacher and a student to receive a "fair" overall grade, which takes into account the complexity and importance of each individual activity of the discipline.

Based on existing knowledge in pedagogical science, we have developed and implemented in the educational process of Khmelnytskyi National University an electronic educational-methodological complex of vocational training of future specialists in physical education and sports in higher educational establishment, which is based on competence approach and innovative technologies of the respective professional training with use of credits accumulation system (ECTS), formed on the basis of weight coefficients. Specific features of the teaching major subjects of the educational and methodological complex are aimed at ensuring the aforementioned organizational and pedagogical conditions of professional formation of future specialists in physical education and sports in vocational training.

The main objectives of the implementation of educational and methodological complex are: optimization of educational activity of future specialists in physical education and sports; objectivity in the preparation of interim tests; improvement of level of theoretical and practical knowledge, skills and professional competence; elaboration of a transparent rating system for evaluation of the level of knowledge and skills of future specialists in physical education and sports; elaboration of objective criteria for selecting candidates for continuing education, in terms of multi-level system of education; increase of motivation with future specialists in physical education and sports to learn the content of professional education programs.

The contents of educational-methodological complex envisages integrative nature of interactive learning, which incorporates elements of various innovations aimed at enhancing teaching and learning, independent, communicative activities through enhanced interpersonal interaction characterizing it as an innovative process and determining the main direction of educational transformation as "technology shift from "killing the knowledge" to organization of self-education of future specialist specialists".

Implementation of educational and methodological complex envisaged three methods of educational and cognizant activities, namely: explanatory-illustrative, problematic, reproductive, research, individual, deductive, productive as well as methods of analysis, comparison, generalization, and concretization and pointing out the main aspect of education. The methods of organization of vocational training of future specialists in physical education and sports were aimed at giving students knowledge and skills, educating consciousness, emotional and feelings sphere, formation of skills. They included verbal, demonstrative and practical educational methods. The use of interactive methods in the realization of educational and methodological complex envisages organization of the process of vocational training of future specialists in physical education and sports in interactive mode, chat consultation, on-line testing.

Results

Generalization of the results of *statement* stage of the experiment showed that the dominant level of professional competence of future specialists in physical education and sports, students of CG and EG is average: CG - 65.82% of students EG - 68.36%. Lower level has been observed in both groups (CG - 13.03% EG - 11.79%), higher level has been revealed in CG - 21.15%, in EG - 19.85% of individuals. This, in its turn,

negatively affects the formation of professional competence of future specialists in physical education and sports in the process of vocational training.

Formation stage of the pedagogical experiment was aimed at checking the efficiency of the elaborated educational system of professional development of future specialists in physical education and sports in the process of professional training. At this stage, all developed and theoretically grounded conceptual provisions of pedagogical system of professional formation aimed at improvement of the quality of professional development of future specialists in physical education and sports, improvement of level of their occupational competence development have been implemented in the educational process for CG. Students, enrolled in CG, studied according to traditional methods, students, enrolled in EG – according to the experimental methods.

At the summarizing stage of the pedagogical experiment based on statistical data processing methods, the overall level of professional competence formation of future specialists in physical education and sports has been defined, the comparative analysis of statement and formative stages of the experiment has been done (Table 1).

Table 1

The Dynamics of Levels of the Development of Professional Competence of Future Specialists in Physical Education and Sports by the Defined Criteria (before and after the experiment)

Levels	Control group						Experimental group					
	Before the experiment			After the experiment			Before the experiment			After the experiment		
	Absolute unit	%	avg. grade	Absolute unit	%	avg. grade	Absolute unit	%	avg. grade	Absolute unit	%	avg. grade
Motivational and evaluation criterion – inner processes												
Lower	17	8,63	-12,14	16	8,12	-11,09	18	9,14	-6,04	0	-	-
Medium	146	74,11	4,03	148	75,13	5,01	147	74,62	3,89	156	79,19	5,14
Higher	34	17,26	9,18	33	16,75	10,11	32	16,24	10,05	41	20,81	11,17
Motivational and evaluation criterion – instrumental motivation												
Lower	32	16,24	-9,14	31	15,74	-7,96	27	13,71	-8,54	0	0	-
Medium	123	62,44	4,81	125	63,45	4,85	126	63,96	4,78	138	70,05	5,84
Higher	42	21,32	12,46	41	20,81	12,51	44	22,33	12,48	59	29,95	14,97
Motivational and evaluation criterion – outer I-concept												
Lower	16	8,12	-11,19	17	8,63	-10,34	16	8,12	-10,91	0	-	-
Medium	142	72,08	3,18	140	71,07	3,27	138	70,05	3,24	135	68,53	5,65
Higher	39	19,8	8,41	40	20,3	8,43	43	21,83	8,27	62	31,47	12,84
Motivational and evaluation criterion – inner I-concept												
Lower	0	0	-	0	0	-	0	0	-	0	0	-
Medium	87	44,16	4,18	79	40,1	3,98	93	47,21	4,14	42	21,32	5,74
Higher	110	55,84	10,26	118	59,9	10,19	104	52,79	10,28	155	78,68	12,43
Motivational and evaluation criterion – aim internalization												
Lower	0	0	-	0	0	-	0	0	-	0	0	-
Medium	98	49,75	2,19	96	48,73	2,23	129	65,48	2,15	87	44,16	5,27
Higher	99	50,25	10,01	101	51,27	10,07	68	34,52	9,94	110	55,84	12,08
Gnostic criterion												
Lower	58	29,44	2,34	56	28,43	2,52	54	27,41	2,47	6	3,05	2,72
Medium	139	70,56	3,47	141	71,57	3,49	140	71,07	3,51	152	77,16	4,19
Higher	0	0	-	0	0	-	3	1,52	4,63	39	19,79	4,72
Professional and personal criterion												
Lower	34	17,26	2,48	33	16,75	2,57	35	17,77	2,29	3	1,52	2,73
Medium	146	74,11	3,28	151	76,65	3,31	149	75,63	3,25	146	74,11	4,19
Higher	17	8,63	4,68	13	6,6	4,71	13	6,6	4,61	48	24,37	4,74
Activity and practical criterion												
Lower	38	19,29	2,13	36	18,27	2,17	24	12,19	2,11	0	0	-
Medium	132	67,01	3,54	128	64,98	3,52	141	71,57	3,49	154	78,17	4,17
Higher	27	13,7	4,57	33	16,75	4,48	32	16,24	4,54	43	21,83	4,76
Analytical criterion												
Lower	36	18,27	2,37	31	15,74	2,41	35	17,77	2,38	0	-	-
Medium	154	78,17	3,36	158	80,2	3,39	149	75,63	3,44	162	82,23	4,22
Higher	7	3,56	4,61	8	4,06	4,58	13	6,6	4,58	35	17,77	4,76

According estimated overall level of professional competence of future specialists in physical education and sports, at the formative stage of the experiment, average level prevailed in EG (66.10% of students), lower level in EG was formed by of 0.51% of students, higher level - by 33.39% of students. The following results by the levels have been revealed in CG: lower level - 12.41%, average level - 65.76%, higher level - 21.83%.

After completion of the experimental work, differences between the students in CG and EG were of authentic character by key indicators. EG indicators significantly exceed similar indicators for CG. With the help of Student t-criteria ($p \leq 0,05$) it has been revealed that differences in levels of development of professional

competence of specialists in physical education and sports in the process of vocational training in EG and CG is statistically significant. Qualitative analysis of experimental data made it possible to argue that the increase of the level of professional competence of specialists in physical education and sports is caused by the implementation of reasonable theoretical principles of scientific research, organizational and pedagogical conditions and scientific and methodological support in the process of training students in EG, which proves effectiveness of the proposed pedagogical system of professional formation of future specialists in physical education and sports in the process of vocational training and its advantages over traditional teaching methods.

Discussion.

Pedagogical diagnostics of levels of professional competence of future specialists in physical education and sports has been administered in the process of statement stage of the experiment. It has proven the need to elaborate and implement educational system, organizational and pedagogical conditions, scientific and methodological support, innovative methods, and educational technologies with consideration of professional activity specifics.

The authors have proven scientific conclusions of N. Bielikova [2], P. Winterstein [3] concerning professional training of specialists in physical education and motivation component in the process of physical education and sports; L. Sushchenko [4] that reveal theoretical and methodological issues basics of vocational training in physical education and sports; E. Backman, H.Larsson [5] who studied the process of teaching future specialists in physical education and sports in Sweden. Also, the authors have confirmed the results of scientists from European countries, whose works are aimed at the problems of vocational training, professional competence of future professionals in physical education and sports, focusing on the acquisition of knowledge and skills that should be aimed at improving their competence to facilitate intellectual and professional growth [6 7]. Forecasting learning outcomes (competence) by a specialist is an important stage of realization of the content of vocational training, which also has been proven in the works [8, 9]. The study of motivational structure of the subject of sports and educational activities in the process of professional development by E. Zeyer has been proven [10] in the context of motivation formation for future specialists in physical education and sports to professional activity in the process of vocational training.

The second group of obtained indicators includes results that supplement the works by T. Buns Matthew [11], which reflect criterion approach to the standards of educational system in the field of physical education and sports: data on the professional competence of future specialists in physical education and sports *have been supplemented and proved* (professional and generally pedoagogical, professional and managerial, professional self-development and self-education, vocationally-oriented, professional and special, general); scientific researches by O. Azhyppo [12], in which the author has studied the role of physical education in the formation of healthy lifestyles in after-school hours; in works by the authors [13, 14], as a result of the study, the obtained data, which reflect the peculiarities of using by coaches-instructors methods of elite-qualification heavyweight athletes training based on the types of horizontal movement of the barbell in chest weightlifting.

Conclusions

Thus, we may conclude that there have been significant improvements of all criteria of professional competence of future specialists in physical education and sports in EG in the process of vocational training. This suggests that the positive dynamics of formation of professional competence of future specialists in physical education and sports in the process of vocational training is successful due to organizational and pedagogical conditions of professional formation of such specialists within vocational training. The results of research also prove that efficiency of our educational system of professional development of future specialists in physical education and sports in the process of vocational training.

Mathematical and statistical data processing, which confirms high degree of reliability of the results of the pedagogical experiment, reveals general pattern of improvement of quality of knowledge and skills formation in vocational training of future specialists in physical education and sports; formation of the content of educational courses by means of increasing the number of elements of scientific and prognostic methodological and interpretative nature creates the conditions and opportunities for improvement of quality of knowledge content. Changing the content of subject content occurs when the accumulation of quantitative characteristics of scientific and methodological content reaches a certain limit of transition of quantitative changes to qualitative ones.

The improvement of pedagogical outcome as a result of the experimental factor is greater than the action of a control factor. Content restructuring ensures in the process of teaching qualitative indicator of the level of knowledge of future specialists in physical education and sports, which is defined as an increase of the number of excellent grades during complex examinations and graduation paper presentations.

References:

Barbuto J. (1996). A self-concept-based model of work motivation: a class exercise. Proceedings of the Eastern Academy of Management Annual Meeting, Washington, DC, pp. 44 – 53.

- Byelikova N. O. (2014). Scientifically-methodological approaches to vocational training of contemporary specialist in physical education and sports [in Ukrainian]. Kyiv, Naukovo-pedagogichni problem fizychnoyi kultury, 3K(44)14. – pp. 91-96.
- Winterstein, P. J. (2002). The Motivation for Physical Activity and Sport. In: De Rose Jr., D.. Sport and Physical Activity in Children and Adolescents: A Multidisciplinary Approach. Porto Alegre: Artmed.
- Sushchenko L. P. (2003). Vocational training of future specialists in physical education and sports (theoretical and methodological aspect): monograph [in Ukrainian], 442
- Backman, E., & Larsson, H. (2014). What should a physical education teacher know? An analysis of learning outcomes for future physical education teachers in Sweden. Physical Education and Sport Pedagogy, 1-16. doi: 10.1080/17408989.2014.946007
- Grabowski H., Uwagi krytyczne o wychowaniu fizycznym i kształceniu nauczycieli. «Impuls», Krakow 2004, 70 s.
- Wuest D.A. Foundations of Physical Education, Exercise Science and Sport (14th ed.). / D.A. Wuest, Ch. A. Bucher. – St. Louis: Mosby: YearBook Inc., 2003. – 451 p.
- Quennerstedt M., Larsson H. Learning movement cultures in physical education practice / M. Quennerstedt, H. Larsson // Sport, Education and Society. 2015. T. 20. № 5. C. 565–572. doi:10.1080/13573322.2014.994490.
- Rychen D.C. et al. Key Competencies for Successful Life and Well-Functioning Society. – OECD: Hogrefe and Huber, 2003. – 224 p.
- Zeir, E. F. (2003). Psychology of professions [in Russian]. Iekaterinburg, Delovaia kniga, 336
- Buns Matthew T. Systematic analysis of physical education standards, benchmarks and related teacher decisions. Journal of Physical Education and Sport ® (JPES), 15(2), Art 42, pp. 277 - 286, 2015 online ISSN: 2247 - 806X; p-ISSN: 2247 – 8051; ISSN - L = 2247 - 8051 © JPES
- Aghyppo Aexandr, Tkachov Sergij, Orlenko Olena. Role of physical education on the formation of a healthy lifestyle outside of school hours. Journal of Physical Education and Sport ® (JPES), 16(2), Art 54, pp. 335 - 339, 2016 online ISSN: 2247 - 806X; p-ISSN: 2247 – 8051; ISSN - L = 2247 - 8051 © JPES
- Antoniuk O.V., Vynogradskyi B.A., Pavlyuk O.S., Chopyk T.V., Pavlyuk E.A., Soltyk O.O. (2017). Peculiarities of barbell motion trajectory during snatch lift of elite female weightlifters. Journal of Physical Education and Sport ® (JPES), 17(1), Art. 59, pp. 402 - 406, online ISSN: 2247 - 806X; p-ISSN: 2247 – 8051; ISSN - L = 2247 - 8051 © JPES
- Antoniuk O.V., Pavlyuk O.S., Chopyk T.V., Pavlyuk E.A. (2016) Characteristics of barbell trajectory in snatch, fulfilled by elite female weight-lifters. Pedagogics, psychology, medical-biological problems of physical training and sports, 6:4–8. doi:10.15561/18189172.2016.0601