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Network Planning at the Faculties of Physical Education and Sport in the Postmodern Era

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Abstract: *The article aims to study the issues of university teachers and students from the faculties of physical education and sport to improve the educational process based on the principles of network planning. The article presents the results of the sociological questioning of the subjects of the educational process of physical education and sport faculties about the problems in the organization and planning of effective learning, as well as appropriate optimizing recommendations. A subject correlation matrix has been developed in the furtherance of this goal, in which each subject has a specific line and column. The analysis of the subjects' matrix allows one to pre-determine the order of study of individual subjects in courses and cycles, their relationship and interframe sequence. Within the framework of the experiment, the authors of the article have surveyed 52 university teachers and 450 physical education students. The survey included questions relating to personal opinions about the advantages and disadvantages of the new curriculum and relevant programmes in 16 major subjects. Statistical data processing was carried out using the SPSS Statistics 17.0 software package. The recommended concentrated arrangement of the leading subjects of the biomedical cycle will allow one to create an interdisciplinary programme giving a complete vision of the structure, functions and biochemical processes occurring in various human body systems.*

Keywords: *Subject matrix; inter-cycle sequence; sport; students; teachers; interdisciplinary links.*

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Introduction

The existing system of personnel training in physical culture and sports had evolved by the end of the 1990s. During its 30-year existence, significant problems have been accumulated, mainly since physical education and sports spheres in the world have continuously progressed, developed in a scientific, methodical, and purely practical way, along with the development of the whole society. It is precisely this that causes certain discrepancies between the real practical needs of physical culture and sports in personnel and the requirements for them in Ukraine, on the one hand, and the structure and content of training specialists in physical education, physical therapy, and occupational therapy at the faculties of physical education and sports, on the other hand.

The government resolutions on improving the quality of specialists with higher education and the decision of the Ministry of Science and Education and the Ministry of Health of Ukraine on the reform of higher education impose a number of new requirements for graduates of institutes and faculties of physical education and sport. This led to a series of studies: optimization of the competence approach in the educational content of the direction "Physical Education", Adamova (2018); introduction of innovations in the professional self-development of future physical education teachers (Palamarchuk et al., 2020), as well as futurological orientation in the training of students of physical education, (Maksymchuk et al., 2020a). In 2016, Ukrainian university teachers and students from these educational units began to work on new curricula and programmes; some new textbooks and manuals were published; relevant government institutions declared their need for training specialists based on the qualification characteristics of new specialties. Specific suggestions for modifying the educational process for subjects of postmodernist consciousness are: total interdisciplinarity and synergy, Klychnikova (2014), and their congruent expansion of expected competencies (physical education teacher as ecologist, paramedic, rehabilitator, etc.) (Maksymchuk et al., 2020b). Thus, they need coach-teachers, physical education teachers, physical therapists, ergotherapists. The qualification characteristics of a coach-teacher (specialties 014 and 017) and a physical rehabilitologist (specialty 027) impose certain requirements on the role of these specialists, as well as on the level of their training and volume of knowledge and skills.

Relevance of the article. The draft of the "Main directions of higher education restructuring" states the necessity of radical improvement of higher school work for qualitative improvement of specialists' professional training. This provision fully applies to institutes of physical

education and faculties of physical education and sport, especially in the era of postmodernism. But, unfortunately, in the post-Soviet space we do not find theoretical, methodological and experimental works devoted to network planning and self-organization of multimodal work of physical education teachers and sports coaches.

At the same time, many years of experience show that graduates from faculties or institutes of physical culture, depending on what specialty they mastered, are assigned to work in different units or systems of physical education or health care, each of which, in addition to the general, has its own specific features of working with people (children youth sports, secondary schools, technical schools, universities, physical education groups, sports management organizations, instructors (methodologists) on physical therapy in medical institutions).

Some graduates work as assistant physiotherapists. Occasionally, they work with highly qualified sportsmen. All this requires specific knowledge and skills. However, practice shows that it is impossible to optimally prepare a highly qualified coach for a specific, certain sphere in the field of sports in the institutes and faculties according to existing curricula since they do not acquire the necessary theoretical, methodical and practical knowledge and skills (Lopukhina, 2015). The fact is that the profession of the coach can be absent at all. This profession is very specific, which is determined by the contingents of sportsmen with whom a coach has to work. The absence of such specificity in the training of a coach significantly (up to several years, depending on abilities) increases the period of work-in and adaptation of a graduate in the branch of the sport in which he or she works. The same provision applies equally to a physical rehabilitation therapist and a teacher of physical education at school. At the same time, throughout employment, specialists move from one branch to another, which requires reconstructing work, mastering new skills and abilities and a long accumulation of experience (Knyazkova, 2018).

However, there is the knowledge required in any field of work on physical culture and sports, as well as relevant skills that determine success in any work with people, that is, organizational and pedagogical skills necessary to involve the population in active activities, physical culture and sports, organize and conduct various sports and recreational activities with children, adolescents and adults. Still, the faculties of physical education and sport do not train multi-skilled specialist since the curriculum and programmes do not envisage such training.

Thus, it is vital to develop students' practical skills in organizational and pedagogical work with people and provide them with relevant sports

and fitness education, shape their specific outlook and allow them in a relatively short time to master any field not only of physical culture and sports but also health care (Bondarenko, 2012).

The fundamental changes in activities of institutes and faculties of physical training are caused by the need for some quality changes in professional training of specialists in the field of physical education, sport, and physical rehabilitation. However, the existing curricula cannot prepare a high-qualified coach, instructor, or physical therapist for a specific branch of the sport since they do not provide the necessary theoretical, methodical, and practical knowledge and skills.

The international significance of the article lies in the fact that it is the first theoretical discussion of the mentioned topic, which empirically complements popular in the international scientific community statements about personal curricula and personal responsibility of subjects of education in the postmodern era (Slattery, 2012), about the importance of psychological, ethical and value aspects in the interdisciplinary expansion of professional postmodern consciousness, as written about by K. Gordon (2013), citing the popularization of particular sports as an example.

We have also tried to take into account the newly popular holistic-phenomenological interdisciplinary approach, which is now widely implemented in the arts and humanities (Coskun et al., 2021). Our article provides sociological material for a deeper understanding of the stylizations of "postmodern planning," which, according to M. Dear, is based on the evaluative oppositions of "function - context; commodification – non-comodification; and penetration - participation" (Dear, 1986).

The significance of the article also lies in the fact that its results confirm L. Dawley's arguments regarding the construction of knowledge in social virtual networks or real networks, which involve the organization of the educational environment as a self-organized "second life" ("Second Life") (Dawley, 2009).

The results of this article can serve as a social back-runner for participants in horizontal network planning, as the post-2015 development of such network planning planes: "horizontal integration of the education sector with other development sectors, such as health and social protection; vertical integration at national and subnational levels; and lateral integration of state and non-state actors" (Persaud, 2017). Also, the findings from our article will help develop integrated interdisciplinary training programs for physical education teachers, regardless of region or traditional educational background.

The aim of the article is to conduct a sociological study of the thematic and professional-value priorities of students and teachers of the Faculty of Physical Education and Sports after studying the theoretical side of our topic; on the basis of these priorities and the study of the present curriculum to form appropriate recommendations to optimize the network planning of the educational process.

The methods used in the article include both theoretical and social experimental approaches. We used a systematic analysis of relevant literature from domestic sources and international journals, which are included in the scientometric databases Scopus and Web of Science.

The hypothesis of the study is the thesis: the creation of full-fledged programs and curricula is possible only with the use of network planning and management of the learning process. It is necessary to accurately determine the content and timing of each discipline, taking into account interdisciplinary relationships and its compliance with the qualification characteristics. It is necessary to review the structures of textbooks and place the material in them taking into account the sequence of its study in the courses and in relationship with other disciplines.

Article Ethics. All participants in the social survey agreed to participate voluntarily, and the authors coordinated the social survey with the appropriate ethics committees.

Educational planning under the dominance of the postmodern consciousness

One should also consider the socio-cultural background of the issue in question. Simonsen argues that planning on postmodern conditions is closely related to trends in urban environment. The main discourse that arises on this basis is associated with cultural and social factors in management. On the one hand, there is "a postfordist model of accumulation" in the socio-economic system of society (Simonsen, 1990). On the other hand, one can observe a culturological and socio-philosophical model of "otherness" in planning social structures and events (Simonsen, 1990). In any case, such duality only stimulates the discourse of interaction and self-organization.

Also, somewhat destructive ambivalence occurs in opposition of modernist traditions and postmodern innovations in planning. According to Daliot-Bul (2009), planning is currently suspended between the modernist sensibility, whose validity is rather problematic, and the postmodern reality, which poses serious challenges to the foundations of planning in the form of

assumptions. A possible solution to this issue lies in connecting planning and critical social theory.

Postmodernism views a network in a broad sense. As noted by Booher & Innes, it is "a flow of power in which participants all share", regardless of the hierarchy. The latter is losing its traditional meaning. Bucher, & Innes indicate that collaborative planning synergistically enhances the efficiency of the entire network. Indeed, "it comes into being most effectively when three conditions govern the relationship of agents in a collaborative network: diversity, interdependence, and authentic dialogue (DIAD)" (Booher, & Innes, 2002). Such a network resembles a complex adaptive system, flexible and sensitive to rapid changes, segmentation, and fragmentation of controlled elements. However, participants in network planning should constantly learn and acquire multimodal roles.

A historical approach to the postmodern aspect of planning social (including educational) processes proves that fundamental changes in this area took place between the late 1960s – the early 1970s. They are associated with shifts in economic and urban processes. Collective planning has faced the plurality of personal values and intentions, which greatly fragments its history and stages of development. After all, in the 1960s and the early 1970s, social planning proceeded from the protection of human rights, environmental and social factors of one well-being. In the late 1980s and the early 1990s, however, planning dealt with the plurality of opinions. It must be noted that the latter has generated more debate than practical changes.

Recent publications indicate that the main problems of social planning are flexibility, ethics, procedural validity, and openness. However, most of the open issues are determined by the "open-enddedness" of postmodernism, which makes normative and effective planning impossible (Jon, 2020). Jon (2020) states that one can develop the principles of environmentally friendly participation in collective planning based on the concept of equality and the so-called "anti-essentialist norms". According to Jon (2020), these norms are as follows: one should "1) take into account the historicity of social relations, 2) have a modest attitude toward what we claim as the representation of "the public", 3) recognize human interdependence". Solidarity and mutual understanding can solve the main problems of network management. It involves the following aspects: whose opinion is a priority; which social groups, collectives, individuals and other components of the network should be prioritized at a particular moment in the development of the organization.

Regarding educational planning, global changes in the economy, politics, culture and demography create new educational paradigms. Lamb,

& Vodicka call them "critical postmodern pedagogies". Both planning and management of the educational environment in such a context should "respond to the complexities and erratic shifts of the world, whilst also addressing the power structures" (Lamb & Vodicka, 2021). This will enable the transition from "critical postmodern pedagogies" to "a pedagogy of hope". The latter, "rather than reinforcing the status quo, has the potential to be a space of resistance and transformation" (Lamb & Vodicka, 2021).

A. Patton and C. Prince believe that the educational environment in the era of postmodernism, or in its post-epoch, while maintaining a postmodern social consciousness, extends far beyond the institutional educational environment. They believe that interdisciplinarity broadly encompasses the entire lived experience of educational actors: Connecting academic experience with lived experience, partnering with life professionals on campus is an attractive option for planning a postmodern curriculum (Patton, & Prince, 2018, p. 102).

The postmodern orientation of the future professional is impossible without the implementation of the personal and pragmatic aspects. Certain groups of scholars boldly combine career guidance and postmodern personal or group orientation, and consider careers instead of professions (Kara et al., 2020). They suggest the development of general and specific career adaptation programs as an element of planning, managing, and self-regulating the learning process.

Due to this broadening of the scope of the problem and the postmodern revision of the scope of key concepts, we are now seeing a proliferation of quasi-scientific but relevant synonyms to the educational process and its management: educational scenarios, intensions, professional and career models, projects, etc. (Kozielska et al., 2020).

Distributing the Basic Subjects in the Context of Creating Interdisciplinary Programmes

The authors have surveyed 52 university teachers and 450 students from the Faculty of Physical Training and Sport. It must be acknowledged that 18 university teachers work at the Department of Theories and Principles of Physical Education and Sport; 24 university teachers work at the Department of Sports and Pedagogical Skills Development; 10 university teachers work at the Department of Physical Therapy and Ergotherapy. Regarding the interviewed students, 176 of them are trained within a specialization 014 – physical education; 192 of them are trained within a specialization 017 – Physical Education and Sports; 82 of them are trained within a specialization 027 – Physical Therapy and Ergotherapy.

The survey included questions relating to personal opinions about the advantages and disadvantages of the new curriculum and relevant programmes in 16 major subjects (medico biologic and general theoretical cycles, as well as basic courses of relevant specialization). A separate group contained questions about the role of a specialist both in the field of physical education and physical rehabilitation.

A subject correlation matrix has been developed in the furtherance of this goal, in which each subject has a specific line and column.

The subjects are given preliminary numbers, while the final numbering considers social subjects and also subjects not requiring special interrelations (foreign languages, legal studies, political science, history and other similar courses). The specializations present the main topics that require coordination with the subjects of other cycles.

A unit at the intersection of a column and a line indicates that the subject with the column number must be based on the course with the line number. Thus, each column displays all the subjects, the generated information in which should be used in studies of the course, corresponding to the column. In the lines, there are the subjects, namely the intended consumers of information for this course.

The analysis of the subjects' matrix allows one to pre-determine the order of study of individual subjects in courses and cycles, their relationship and interframe sequence.

Statistical data processing was carried out using the SPSS Statistics 17.0 software package. Standard methods of variation statistics, calculation of averages, standard error of the mean were used. The significance of differences between the indicators was determined using the criterion of Student's t-distribution (the method of parametric statistics) and Mann-Whitney U test (the method of non-parametric statistics). Significant differences were considered indicators at $p<0.05$.

According to 84.2% of university teachers and 75.6% of students (regardless of their specialization), the role of a specialist is seen as preparedness for teaching, coaching, organizational, managerial, scientific, research, rehabilitation and wellness work with youth and adult groups of the population.

Among the majority (89.5%) of students, the work that is assumed to be a coach-teacher is that the role of a specialist is viewed as work in sports schools, boarding schools of sports profile, higher and secondary specialized educational institutions, sports teams in sports societies and departments, managerial apparatus for physical culture, sports clubs, groups of physical culture.

The authors have found that according to 70.9% of university teachers and 58.7% of students, in the specialist's sense, early specialization in many sports should be taken into account. Therefore, according to the majority of the respondents (91.7% and 90.3%, respectively), the largest amount of knowledge and skills must be acquired for working with children. Indeed, 78.8% of university teachers and 88.1% of students believe that the requirements for the moral and ethical training of the future specialists, the amount of knowledge on psychological subjects have been successfully developed in the topics of the complex plan of research work of the faculty and can be reflected in new curricula and plans.

Almost half (48.7%) of respondents believe that the main difficulties arise regarding the coordination of the relationship and the sequence of studying the main subject of biomedical, general theoretical and sports-pedagogical cycles.

The analysis of the subjects' matrix that was filled in by all the survey participants has made it possible to determine the order of studying individual subjects in courses and cycles, their interrelation and interframe sequence (see Table 1).

Table 1. Interrelation matrix of the subjects that determines the order of studying individual subjects in cycles

No	Subject	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Anatomy	■	1	1		1	1		1	1	1	1	1		1		
2	Biochemistry		■	1			1		1	1	1	1	1		1		1
3	Physiology		1	■	1	1	1	1	1	1	1	1	1		1	1	1
4	Psychology				■			1	1	1		1	1	1	1	1	1
5	Biomechanics					■			1	1			1		1	1	1
6	Massage						■					1	1				1
7	Pedagogics							■	1	1			1	1	1	1	1
8	Theories and Principles of Physical Education								■	1		1	1		1	1	1
9	Sports Theory									■		1	1		1		1
10	Hygiene										■	1	1	1			1
11	sports medicine											■	1				1
12	Medical Physical Education												■				1
13	Management of physical culture													■			1
14	Sports technique														■	1	1
15	Teaching method															■	1
16	Training method																■

Source: Author's own conception

According to this data, all subjects can be divided into several groups. The first includes those that do not require prior information from others. This group includes anatomy.

The second includes the subjects based on one of the subjects of the first group. In this case, there were 10 such subjects.

The third group includes the subjects based on the other two. These are biochemistry and physiology, based on the anatomy and each other. Pedagogy should also be included in this group, for which the basic subjects are physiology and psychology. Since psychology in the matrix relies only on physiology, in the opinion of half of the respondents, it can be studied immediately after the topic "the physiology of higher nervous activity".

This group also includes biomechanics, based on several topics on anatomy (bone and muscular system) and physiology (functions of the muscular system and other supporting subsystems).

According to 80.3% of university teachers and only 30.2% of students, if the subjects have direct and inverse dependencies, they should be studied with a parallel linking of the necessary courses' topics.

As for the curriculum for the specialty coach-teacher, the study of the main subjects of biomedical and general theoretical cycles, which are basic for the course of specialization of physical therapists, ergotherapists, is unreasonably extended (for four semesters). This is the opinion of the majority (88.4%) of students and only 24.7% of university teachers.

All respondents agree that if time is needed to receive basic training in the subjects of biomedical and general theoretical cycles before the main topics of the course of specialization, it is filled with topics that do not require preliminary information from other subjects.

Following the abovementioned, the authors propose a scheme for the distribution of basic subjects in the curriculum for the creation of interdisciplinary programmes, taking into account the themes of the course of specialization (see Table 2).

Table 2. The scheme for the distribution of basic subjects in the curriculum for the creation of interdisciplinary programmes, taking into account the themes of the course of specialization

No.	Subject	Semesters							
		1	2	3	4	5	6	7	8
1	Anatomy	+	+						
2	Biochemistry	+	+						
3	Physiology	+	+	+					
4	Psychology		+	+					
5	Biomechanics		+	+					

6	Massage			+					
7	Pedagogy				+	+			
8	Theory and methods of physical culture				+	+			
9	Sports theory						+	+	
10	Hygiene				+	+			
11	Sports medicine						+	+	
12	Healing fitness							+	
13	Management of physical culture							+	+
14	Sports technique		+	+	+				
15	Teaching methods				+	+			
16	Training method						+	+	+

Source: Author's own conception

Conclusions and results

The findings prove the presence of particular postmodern forms of thinking of the subjects of the educational process. These subjects are attuned to the removal of the "unnecessarily limited possibilities of intelligence" in university education (Mourad, 1997). By removing interdisciplinary boundaries and reinforcing corporatism and naturalness in the behavior and learning activities of each individual, these forms of thinking and self-organization create a field for immanent intellectual activity, the knowledge of essences independent of disciplinary segmentation. Thus, network planning and management proceeds from the above determinants.

The article confirms the hypothesis: it is possible to create full-fledged programs and curricula only with the use of network planning and management of the educational process. It is necessary to accurately determine the content and timing of each discipline and its compliance with the qualification characteristics, taking into account interdisciplinary links. It is necessary to review the structures of textbooks and place the material in them taking into account the sequence of its study in the courses and in relationship with other disciplines. The recommended concentrated arrangement of the leading disciplines of the medical and biological cycle will create an interdisciplinary program that gives a complete picture of the structure, functions and biochemical processes occurring in various systems of the human body when engaged in sports.

After the study, according to the objectives, we obtained the following results:

1. Regarding not general theoretical, but factual data, the results of the study showed that the matrix we created can trace the dependence of many disciplines on the leading disciplines of the medical and biological cycle (anatomy, physiology, biochemistry, biomechanics and psychology). At the same time, there is a significant dependence of specialization course topics on the disciplines of the medical-biological and general theoretical cycles. In the practice of developing curricula and programs, these dependencies are not taken into account (Sokolnikov, 2013). Our research has clearly shown that most teachers and students consider gaining knowledge about child and youth sports to be very important, but these issues are not adequately represented in the curricula of biomedical, general theoretical cycles and specialization.

2. If we take into account that the volume of specialization is about 800 hours, 200 hours on average per course, then I and II years are experiencing a lack of knowledge in the basic disciplines for the full development of the specialization course. There are still a number of shortcomings in the current curriculum and programs. Most teachers consider them to be such that it is not yet possible to eliminate them for the following reasons:

(a) The selection of teaching material is made without due consideration of the requirements for the profile of training specialists and qualification characteristics.

b) Curricula are drawn up first, and then the programs to them, while it is necessary to first determine the scope of disciplines, their topics, relationships and only then move on to the development of the curriculum, adjusting the disciplines.

c) The current curriculum does not define the basic disciplines of medical-biological and general theoretical courses and the terms of practice are not linked to the specialization course developed on the basis of a unified program.

d) This curriculum does not take into account at all the timing of the leading disciplines (for example, anatomy, physiology and biomechanics only 1 semester), on which it should be based.

3. A brief analysis of the current curriculum, programs, and the matrix of discipline relationship allows us to make a number of recommendations:

a) From the 1st semester the anatomy course should begin, as planned in the curriculum. Sections of the musculoskeletal system are studied first, and then the nervous system. After these topics, physiology and biochemistry courses can begin. Further, all three disciplines run in parallel.

Space in the curriculum for them in the 1st and 2nd semesters should be freed up by pedagogy, sports metrology, and technical means of instruction.

(b) From the 2nd semester, after taking a short course in the physiology of higher nervous activity, a course in psychology may begin, which must precede a course in pedagogy. From the 3rd semester, after the study of the musculoskeletal system, a course in biomechanics should begin, on which the "General Fundamentals of Technology" course of the specialization is based. A similar arrangement of disciplines also implies a uniform sequence of topics (e.g. musculoskeletal system - nervous system - digestion - circulatory system, etc.) in the cycle.

(c) A course in massage should be studied in the 3rd semester, a course in exercise hygiene in the 4th and 5th semester, which must be completed before the teaching practicum. Sports medicine should be studied in the 6th and 7th semesters, during the period of study in the specialization course of the topic "Methodology of Training", and therapeutic physical education should fall in the 7th semester.

We would like to single out: this sequence of disciplines allows you to fully build on them in a specialization course (Naumenko, 2015). The courses of pedagogy and theory and methodology of physical education should be studied in parallel, as many of their topics are interrelated. Both disciplines are studied in the 4th and 5th semesters, contributing in addition to the formation of general theoretical knowledge preparation for pedagogical practice. On these disciplines is based on the section "Teaching Methodology" in the course of specialization. "Theory of Sports" must be taught in the 6th-7th semesters, and the subjects studied should be linked to the methods of training in the course of specialization. In the same terms it is necessary to study questions of the psychology of sport from the course "Medical and Biological Basis of Sports". The topics of the course "Organization of Management of Physical Education Movement" does not require special coordination with other disciplines and can be planned for the 7th and 8th semesters.

And yet insurmountable difficulties arise when trying to establish interdisciplinary links with such discipline as "Sports Metrology and Technical Means of Training". The curriculum allotted 90 hours for it, and it is studied in the I course. However, knowledge of many of its topics is necessary in the study of specialization from I to IV year. In our opinion, this discipline should be divided into several courses and studied in relationship with the disciplines of medical and biological, general theoretical and sports and pedagogical cycles. For the I course it is difficult and, in our

opinion, it is entered unreasonably. It is especially desirable to link it with the research work of students in the courses of specialization.

Thus, the development of the structure of the specialization course for the purpose of network planning and management of the educational process requires a non-traditional approach. We assume that it is necessary to clearly define the sections and topics that are interconnected with the disciplines of biomedical and general theoretical cycles, and topics that have no reference disciplines in other cycles.

The greatest number of connections have the themes "Sport Technique", "Methodology of training in a sport" and "Methodology of training" (taking into account selection, training system, etc.). Such topics as "Gymnastics in the system of physical education", "Terminology" and several others do not require special links. The study of exercise technique should be started with the material of the biomechanics course, i.e. from the 2nd semester, and finished in the 4th semester. The methods of teaching exercises must be taught after mastering the basic chapters of technique, physiology of higher nervous activity, theory and methods of physical education, psychology and related subjects of pedagogics courses. Term 4 and 5 are reserved for the study of "Methods of Training", and the training system and methods are studied in terms of "Theory of Sports" and "Sports Medicine" in Term 6, 7 and 8

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