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Training physical education teachers in the context of the industrial revolution 4.0 - research of the faculty of physical education and sports, Thai Nguyen university of education

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Abstract

Today improving the training quality to physical education teachers in the context of the Industrial Revolution 4.0 is very necessary. With General Study, Document Analysis and Mathematical Statistics, the paper has evaluated the current status of teacher training at the Department of Physical Education and Sports, Thai Nguyen University of Education as the basis for future solutions to improve the quality of training and meet the requirements of the new era.

Keywords: Industrial revolution 4.0; training; teachers; physical education and sports

Introduction

Overview

Teachers are always the core force of education and training, the decisive factor for the quality of education. Teacher qualification is always regarded as one of the educational quality's determinants. In the context of fundamental and comprehensive innovation in education and especially the industrial revolution 4.0, teacher training needs to be changed to meet the requirements of the rapid change in labour market.

The Faculty of Physical Education and Sports, Thai Nguyen University of Education was established in 1995 with the task of training students majoring in sports and physical education and amateur students in the University. Over the past 20 years of establishment and development, the Faculty has trained thousands of graduate students, provided the source of physical education and sports staff and teachers to the northern mountainous provinces and the country.

The survey showed that there are still a lot of limitation and inadequacies in the scale of training, training management, training programs, operation process, teachers, facilities, etc., leading to the fact that students' studying needs, students' capacity development have not been fully met. The assessment of the status and the development of solutions in training physical education teachers in the context of the industrial revolution 4.0 are the objectives of the paper.

Research methods

Research methods used: method of analyzing and synthesizing; Mathematical and statistical methods.

Results and discussion

1. Industrial Revolution 4.0 with the teacher training

The definition of industrial revolution 4.0 or intelligent plant was first introduced at the Hannover Industrial Fair in the Federal Republic of Germany in 2011. Industry 4.0 aims to intelligentize the manufacturing and management in the manufacturing industry. In 2013, a new keyword "Industry 4.0" (Industrie 4.0) began to emerge from a German government report referring to this phrase in terms of high technology, production computerization without human control ^[2].

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At the 46th World Economic Forum (WEF) in Switzerland, with the theme "The 4th Industrial Revolution," Klaus Schwab, President of the World Economic Forum, gave the larger new concept than that of Germany. Specifically, this is a "cluster of terms for the technology and concepts of organization in the value chain" that goes along with physical systems in cyberspace, IoT and the Internet of Service (IoS). The 4th Industrial Revolution or Industry 4.0, is the current trend of automation and data exchange in manufacturing technology. It includes physical networking, IoT and cloud computing. The nature of the Fourth Industrial Revolution is based on digital technology and smart technology integration to optimize processes and production methods; emphasizing the technologies that have had the greatest impact like 3D printing technology, biotechnology, new materials technology, automation technology, robots, etc. Revolution 4.0 gives a signal of a dramatic shift in global workforce, skillfull workers will go to developed countries, amateur workers moveto less developed countries. The world will change, technologies are developed interdisciplinarily and reach to high level of automation. The emergence of cutting-edge technologies will disrupt the mode of production and services, and the world will witness a shift of change

around the globe.

In order to catch up with that shift, the world's tertiary education in general and Vietnam's tertiary education in particular must have a radical and comprehensive change. Transforming the teaching style from knowledge transferring to qualification and competence as well as self-study ability, requires each teacher to spend more time, learners to have more options of methods and knowledge which are appropriate to their abilities and passion.

In that context, institutions of teacher training must rapidly reform their objectives, curriculum, content, form, teaching methodology, methods of evaluating student outcomes, practical and technological orientation. It is necessary to invest more in advanced education technology, promote online training and pedagogical capacity fostering in students, teachers and educational administrators in the system, ensure the integration in the country and in the world [8].

2. Status of teacher training in the Faculty of Physical Education and Sports, Thai Nguyen University of Education

2.1. Training scale

Table 1: Scale of enrollment and training of the Faculty of Physical Education and Sports, Thai Nguyen University of Education

Year	Regular	College	Address	National Defense Education	NDE Address	Total
2001	59	49	0	0	0	108
2002	108	0	0	0	0	108
2003	109	0	34	0	0	143
2004	85	0	45	0	0	130
2005	85	0	24	0	0	109
2006	112	0	22	0	0	134
2007	130	0	0	69	0	199
2008	109	0	22	68	0	199
2009	186	0	78	57	0	321
2010	126	46	137	65	0	374
2011	130	0	21	81	1	233
2012	212	0	9	76	1	298
2013	115	0	0	67	0	182
2014	58	0	0	0	0	58
2015	20	0	0	0	0	20
2016	12	0	0	0	0	12
2017	16	0	0	0	0	16
2018	20	0	0	0	0	20

Table 1 shows that enrollment and training of the Faculty from 2001 up to now are unstable, narrowing down in recent years. The reason can be explained that graduated students are difficult to get jobs so the enrollment is less each year [7].

2.2. The training model

The model used in the Faculty is a parallel model. With this model, the process of training tertiary teachers will be conducted for 4 years, in which the basic science training and professional training will be carried out simultaneously. The advantages are helping learners early determine the learning objective as a physical education teacher and it is continuously enhanced in a pedagogical environment, facilitating the formation of capacity, occupation love and personality. But the disadvantage is changing slowly to adapt to the reality.

2.3. Training program and development program

The curriculum of the faculty has a knowledge of 120-125 credits with an average duration of 4 years and is structured as

follows: General knowledge is about 20%; Professional education accounts for 44.1%, including basic knowledge: 12.5%, specialist knowledge: 31.7%; Professional pedagogical knowledge accounts for about 30%; The graduation thesis and alternative modules accounts for 5.8%.

In reality, the current curriculum has some limit as the following:

- The program is still theoretical, with little practice at schools;
- Teacher-centered education restricts students' creativity and makes them passive.
- Students have few opportunities to work in groups, in pairs, to improve communication skills and presentation. Skills to organize sports tournaments and referee work are not yet developed in the training program.

The development of the curriculum has not been rigorous and logical according to the curriculum development process. The development of a training program lacks or does not fully involve all related parties; context analysis for training program development has not yet been considered; the

standard of outcome is out of scientific basis; the role of outcome is unclear, many subjects in the training program have not been assigned to be appropriate to the training program standards, so the fact of "excessive" credits in the training program is existing.

2.4. Teaching methods and examination, evaluation

The methods used by teachers are traditional teaching methods, ie one-way and teacher-centered method, focusing on theory without capacity development.

Test and examination as well as assessment are not good, just stop in the theoretical tests, not focus on evaluating the learners' capacity according to the objectives of subjects. Particularly, in term of the practice modules, students are just evaluated through what they learned, their major competencies such as: sports practice, teaching, training, competition organizing, referee, etc. have not been focused.

2.5. Current status of physical education and sports lecturers

At present, the Faculty of Physical Education and Sports has a total of 21 lecturers, including 01 Associate Professor, 05 Doctors, 05 lecturers are studying in country and abroad, and the rest is 100% master. Despite the high qualification force, the narrow specialist assignment is not reasonable, some majors have a lot of specialized lecturers, some do not have anyone. This is a difficulty when implementing the training process.

2.6. Status of facilities for physical education and sports training

In addition to swimming pools and tennis courts, the items for the training are very poor, stadiums and gymnasiums are under construction and can not be used. Equipment is proposed to buy for a long time but it is not enough, equipment's quality is only average, and degrades fast. Particularly, there are no classroom and equipment for major

subjects, which also affects the effectiveness of teaching - learning process.

2.7. Status of students' working after graduation

According to the survey in 2018, the proportion of regular students graduating from 2010 to now having jobs is shown as Table 2 below:

Table 2: Status of students' working after graduation from the Faculty of Sports and Physical Education, Thai Nguyen University of Education

School year	The proportion of graduate students having jobs
2009 - 2010	95%
2010 - 2011	90%
2011 - 2012	90%
2012 - 2013	80%
2013 - 2014	70%
2014 - 2015	50%
2015 - 2016	40%
2016 - 2017	30%
2017 - 2018	30%

Table 2 shows that having jobs after graduation from the faculty of physical education and sports is quite difficult. It can be explained that the need of this position is low. Basically the vacancies in main agencies are fully covered [7].

2.8. Adaptation to the jobs of students graduating from the University of Physical Education and Sports, Thai Nguyen University of Education

To find out the status of adaptation to the jobs of students, interviews are implemented with 35 managers of labor units and 80 alumni who graduated from the Faculty of Physical Education and Sports and are working in agencies through the following scale: 1: Very poor, 2: Poor, 3: Average, 4: Good, 5: Very good. The results are presented in Tables 3, 4, 5:

Table 3: Results of interviews with managers and alumni on the status of professional skills and occupation qualification after graduating from the Faculty of physical education and sports, Thai Nguyen University of Education

NO	Occupational skills	Achievement (%)									
		Managers (n=35)					Alumni (n=80)				
		1	2	3	4	5	1	2	3	4	5
1	Skill of understanding curriculum and textbooks	0.0	0.0	18.5	69.9	11.6	1.1	0.0	7.8	77.9	13.2
2	Skill of making lesson plans	0.0	2.3	25.2	65.4	7.1	0.0	0.0	14.3	79.0	6.7
3	Skill of designing lesson plans	0.0	0.0	18.5	72.2	9.4	0.0	0.0	13.2	72.5	14.3
4	Skill of organizing teaching activities	0.0	4.5	20.7	65.4	9.4	0.0	0.0	5.6	83.3	11.0
5	Skill in organizing educational activities	0.0	0.0	27.5	65.4	7.1	0.0	0.0	13.2	80.1	6.7
6	Skill of practicing sports' skills	0.0	0.0	13.9	67.6	18.5	1.1	0.0	5.6	69.2	24.1
7	Skill of sports training	0.0	2.3	20.7	69.9	7.1	1.1	0.0	12.1	74.7	12.1
8	Skill of organizing competition and referee work	0.0	2.3	27.5	67.7	2.5	1.1	0.0	14.3	71.4	13.2
9	Skill of assessing students' learning outcomes	0.0	0.0	16.2	79.0	4.8	0.0	0.0	4.5	73.2	14.3
10	Skill of career development	0.0	2.5	29.8	65.4	2.3	0.0	0.0	18.7	73.6	17.8

Table 3 shows that the evaluation of managers and alumni on occupational skills have similarities in some of the strengths of graduated students from the Faculty of Physical Education and Sports such as skill of understanding curriculum and textbook; skill of designing lesson plans; skill of practicing sports; skill of testing and evaluating students' studying

results.

Managers and alumni have similarity assessment on some limitations like skills of making lesson plans; skill of sports training; Skill of organizing competition and referee work; Skill of career development [7].

Table 4: Results of interviews with managers and alumni on the current state of teaching skills of graduated students from the faculty of physical education and sports, Thai Nguyen University of Education

TT	Teaching skills	Achievement (%)									
		Managers (n=35)					Alumni (n=80)				
		1	2	3	4	5	1	2	3	4	5
1	Creating a learning environment for students in class.	0.0	0.0	25.2	72.2	2.5	0.0	0.0	7.8	76.8	15.4
2	Using teaching aids	0.0	2.3	13.9	67.6	16.2	0.0	0.0	3.4	73.6	23.0
3	Problem introducing and solving in teaching	0.0	0.0	38.9	61.1	0.0	0.0	0.0	13.2	81.2	5.6
4	Organizing individual activities, group activities, collective activities for students	0.0	0.0	23.0	77.0	0.0	0.0	1.1	13.2	79.0	6.7
5	Creating an online learning environment for students	2.3	4.5	59.4	31.2	2.5	2.2	3.3	57.8	33.5	3.3
6	Skills of designing teaching aids	0.0	6.8	38.9	52.0	2.3	0.0	0.0	33.9	63.8	2.3
7	Skills of applying the knowledge and practical skills to the real life	0.0	2.3	27.5	65.4	4.8	1.1	0.0	11.0	82.3	5.6

Table 4 shows the similarities and differences of the assessments between managers and alumni:

- Similarities: Some limitations in teaching skills are: No online learning environment for students; Skill of designing

teaching aids is poor.

- Differences: According to the assessment of managers, the limitations are problem introducing and solving. Alumni assess this skill at a higher level ^[7].

Table 5: Results of interviews with administrators and alumni on competences of implementing the teaching plan of graduated students from the faculty of physical education and sports, Thai Nguyen University of Education

TT	Competences Of implementing Teaching Plan	Achievement (%)									
		Managers (n=35)					Alumni (n=80)				
		1	2	3	4	5	1	2	3	4	5
1	Organizing, managing classes	0.0	0.0	23.0	69.9	7.1	0.0	0.0	5.6	86.6	7.8
2	Maximizing students' learning in class	0.0	0.0	16.2	81.3	2.5	0.0	0.0	5.6	80.1	14.3
3	Organizing outdoor sports activities	0.0	0.0	27.5	59.5	13.9	0.0	0.0	14.2	80.1	5.7
4	Giving suitable instruction to students	0.0	2.3	38.9	51.7	7.1	0.0	0.0	12.1	82.3	5.6
5	Applying the new achievements of sports and physical education in developing lessons.	0.0	2.3	41.2	51.7	4.8	0.0	1.1	37.1	58.3	3.4

Table 5 shows the similarities and differences on the assessments between managers and alumni:

- Similarities:

+ Through the evaluation, there are similarities of competences of implementing teaching plan such as organizing, managing classes; maximizing students' learning in class

+ The limitations are applying the new achievements of sports and physical education in developing lessons.

- Differences: According to the assessment of managers, the graduated students have limitations in limited their ability to organizing outdoor sports activities and giving suitable instruction to students ^[7].

3. Solutions to improve the qualifications of teachers in the faculty of physical education and sports, Thai Nguyen university of education in the context of the industrial revolution 4.0

From the current status of training programs, training activities and capacities of students and from our professional experience and reference to related documents, we propose some solutions as follows:

Firstly, developing a training program. It is necessary to consider the content, requirements and trends of the 4th industrial revolution to identify the knowledge and skills of a physical education and sports teacher. In addition, it should be important to pay attention to the basic skills needed for future human resources, such as the use of information technology, the use of English, creativity, adaptation to change, self-learning.

Secondly, improving the capacities and qualifications of teaching staff and managers: teachers have to have new and creative competences and qualifications by training, self-training, using modern teaching methods, taking learners as the center, focusing on developing learners' capacities according to the learning outcomes and training program.

Therefore, it is necessary to regularly organize training courses like pedagogic training, scientific research methods and soft skill. In addition, the teachers also have to self study, establish their own wide and deep enough knowledge background to meet the professional requirements of the new era.

Administrators also need to be standardized, and be capable of working in a highly creative and self-responsible environment, dare to propose and implement innovative solutions.

Thirdly, innovating management methods, promoting the application of IT in management. It is necessary to improve the mechanism and management apparatus in the training activities at university and the Faculty, to foster the cadres in the direction of identifying functions, tasks and powers clearly, in association with the responsibility; reduce the involvement of parent institutions in school administration; to standardize and professionalize the administrators. Promoting the application of IT in the management and construction of modern IT infrastructures. Online library, multi-media room, etc.

Fourthly, investing modern facilities for training teachers of physical education and sports. Quickly completing the stadiums, gymnasiums - the first important items for training teachers of physical education and sports. Purchasing high quality sports equipment, facilities is necessary. In addition, it is important to build classrooms and specific facilities for training teachers of physical education and sports.

Fifthly, improving and renovating the regulations on recruitment of teachers; there should be mechanisms and policies to attract high-quality graduated students at good level from other educational institutions to come to train; to attract highly qualified staff at local and foreign educational institutions to train. Besides, there should be a suitable benefit policy to retain teachers at the Faculty and university.

Conclusion

From the current situation of physical education and sports teachers in the faculty of physical education and sports, Thai Nguyen University of Education, the improvement of training quality is very necessary in the context of industrial revolution 4.0. Solutions to improve the quality of teacher training therefore should be implemented in a logical and rationalized plan, from current issues to long-term issues. The solutions of program development; improving the capacity and qualification of teaching staff; innovating management methods, promoting the application of information technology in management; investing in modern facilities and renovating the regulations of recruiting teachers should be paid attention and implemented synchronously.

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