IDENTIFYING SOME TYPES OF BASIC SCIENTIFIC RESEARCH TOPICS IN THE FIELD OF SPORTS

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Abstract:
Based on conventional research methods in the field of Sport Education (SE), the topic has identified six types of basic scientific research topics in the field of SE, on that basis, it is proposed to apply the method of Mathematical Statistics (MS) in data analysis to contribute to improving the quality of scientific research in the university.

Keywords: types of topics, basic scientific research, mathematical statistics, data analysis

1. Introduction

At Bac Ninh Sport University of Vietnam, the scientific research work is highly focused, it is set as one of the prerequisites to successfully carry out the tasks of physical education, sports training, etc.

In the research process, many methods are applied; it is impossible not to mention the MS method, a field of mathematics that is applied in most human activities, where: "data, summary and conclusions appear more and more in our daily work than any other form of mathematical analysis"; "in practical terms, probability theory and statistics have risen to be the subject that has the most applications and have become an essential tool for a wide variety of science and engineering careers".

Through a preliminary survey of a number of small-scale enterprise-level scientific research topics, doctoral theses and master theses show that the application of MS in the research process has many limitations: it has not yet followed any scientific procedure; with the same type of topic, there are different ways of applying the method of MS or even making unfortunate mistakes. Therefore, it is necessary to propose the application of MS method in data analysis for some basic types of scientific research topics in the field of sports education.

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2. Methodology

In the process of researching the topic, the following methods are used: analysis and synthesis of documents; discussion interviews; pedagogical observations, MS method.

3. Results and Discussion

3.1. Identify basic types of scientific research topics in the field of sport and physical education

Pursuant to the Decision No.84/QD-BGDĐT dated March 12, 2018, of the Minister of Education & Training about the list of training majors of Bac Ninh Sport University of Viet Nam including 8 specialized trainings with 2 doctoral training majors, 2 master training majors and 4 undergraduate training majors; Through several related documents, doctoral theses, master theses, etc., we have summarized some basic research topics in the field of sports education.

Table 1: Statistics of types of scientific research topics for postgraduate students, master students in the period from 2002 to 2017

No.	Common types of scientific research topics	Doctoral Theses (n=89)		Master Theses (n=1132)	
		Quantity	Percentage	Quantity	Percentage
1	Research on developing standards for assessing training levels for athletes	17	19.10	245	21.64
2	Research on building, improving curriculum	14	15.73	137	12.10
3	Research on reviewing (developments) the index of body morphology - Mental function – Physiology and biomechanics in sports	10	11.24	140	12.37
4	Research on choosing solutions (measures, exercises) to improve physical strength – movement techniques	36	40.45	447	39.49
5	Research on applying technology in teaching and training	2	2.25	37	3.27
6	Survey on some Qualitative Characteristics (satisfaction, necessity, importance)	7	7.87	72	6.36
7	Others....................................	3	3.37	54	4.77

Results of Table 1 show that there are 17 theses about developing standards for assessing training levels for athletes, accounts for 19.1%; 14 researches about building and improving the curriculum, accounts for 15.73% and especially there were 36 researches on choosing solutions (measures, exercises) to improve physical fitness - technical impact,

accounts for 40.45% while researches on applying technology in teaching and training only accounts for 2.25%.

The results of the master's thesis system are quite similar to those of doctoral theses. The highest is still the kind of the researches which focuses on choosing solutions (measures, exercises) to improve physical strength - techniques, impact tactics with the number of 447 theses, accounts for 39.49 while researches on IT application in teaching and training very small with only 37 theses, with only 3.27%.

More specifically, the explanation of some basic contents focuses on the following main contents:

In the third form, researches evaluate (evolution of) the morphometric indexmental - physiological and biomechanical functions in sports referring to:

- The development of body form, and mind function (transporting sensations, intelligence, emotions, will, personal quality of mind);
- Physiological functions (circulation, respiration, sensation, balance)
- Physical qualities (fastness, strength, power, dexterity, flexibility, coordination ability) of athletes;
- Training level, recovery abilities of the athletes;
- The suitability of the evaluative criteria for athletes only;
- The level of adaptation of the body to the training activities;
- The effectiveness of the exercise system for physical training, and technical training tactics;
- The effectiveness of the advanced training exercise to improve performance;

In the fourth form, research on choosing solutions (measures, exercises) to improve physical strength - skills, movement tactics referring to:

- Improve people's physical fitness; in which children and the elderly are highly focused;
- Develop body morphological indexes of athletes and practitioners in general;
- Forecast and select sports talents;
- Improve sports performance;
- Develop physical qualities for athletes (fastness, strength, endurance, flexibility, dexterity);
- Improve adaptability to physical activities;
- Improve recovery after exercise.

Based on the above results, we have conducted an interview with 30 scientists, lecturers and students for the purpose of analyzing the problem and proposing the application of mathematical theory to each type. The results are presented in Table 2.

Table 2: Results of interviews about selecting types of basic scientific research topics

No.	Research Topics	Interview Results					Σ	Average
		5	4	3	2	1		
1	Research on developing standards for assessing training levels for athlete	20	5	3	2		133	4.43
2	Research on building, and improving curriculum	20	6	3	1		135	4.50

3	Research on reviewing (developments) the index of body morphology - Mental function – Physiology and biomechanics in sports	20	4	4	2		132	4.40
4	Research on choosing solutions (measures, exercises) to improve physical strength – movement techniques	25	3	2			143	4.77
5	Research on applying technology in teaching and training	18	7	3	2		131	4.37
6	Survey on some special calculations (satisfaction, necessity, importance)	18	7	4	1		132	4.40

The results of Table 2 show that all 6 types of topics that we have chosen are considered essential by experts and scientists (due to the average score $\in$[4,2 -5], according to the rating interval in the Likert's scale). Therefore, we intend to propose the application of the mathematical theory method in analyzing and processing data for some basic types of scientific research topics mentioned above.

3.2. Proposing the application of the mathematical theory method in data analysis for some basic types of scientific research topics in the field of sport

According to the result of surveying scientific research topics, theses, and master's theses, based on the specific mathematical method, we build an application process for a number of basic scientific research topics. Specifically, with form 1, research on developing standards for assessing training levels for athletes can be conducted in the following process:

Step 1: Select the evaluation test
- Through analysis and synthesis of references, select n - test;
- Interview to select n_1 test ($n_1 \leq n$) (It is recommended to use the Likert scale and Cronbach's Alpha index to confirm the necessary level and remove confounding variables);

If conducting interviews, the second time, it is possible to: check the consistency between the two interviews by one of the following ways:
  o Using Wilcoxon index;
  o Using reliable coefficient;
  o Using test $\chi2$.

In particular, with the Wilcoxon index and the reliable coefficient, it only shows whether the results between the two interviews in all contents are consistent or not, but the second test is more effective in the situation that indicates the differences between each component element.
- Evaluating the reliability and informability of the test.

Step 2. Developing evaluation criterion
- Selecting a sample (large enough to follow the rules of probability) (with random, homogenous, and representative)
- Developing standards to evaluate the training level of athletes by considering the proportional influence of the following factors:
  - Determining the criteria and indicators for the research's subjects.
  - Scoring each criterion and index.
  - Determining each factor's overall point according to the proportional system according to the formula:

$$M = \frac{\beta \sum m_i}{10f}$$

In which:

M: Total score achieved by each component factors into account the influence ratio.

m_i: Score according to the C scale of the ith criteria of the corresponding group of factors.

β: Proportion of influence of each group of factors (%);

f: Number of indicators in the group of factors
  - Calculating the total score of all components according to the proportion (%) using the formula:

$$\mathbf{P} = \sum M_i.$$

In which:

P: Total score of all components

Mi: The point value of each ith component.
  - Comparing the total P score achieved by the research subjects with the standards for assessing the level of training taking into account the proportion of the components to draw conclusions about the training level of that athlete.
- Developing standard criteria-table scores (usually using the 2-sigma rule, taking into account positive or negative relationships).
- Building a summary score table (need to calculate the possible distance for each case).

Form 3, Research on choosing solutions (measures, exercises) to improve physical strength - technique of action.

Step 1: Building and surveying the reliability of the interview form (determination of evaluation criteria, determination of solutions) (as in Form 1);

Step 2: During the research process, several research topics about solutions. Therefore, in the survey process, the SWOT method is often used. This is the method established by economic researchers from the Stanford Research Institute, Menlo Park, California (USA). SWOT is a semi-qualitative and semi-quantitative method, which can be given in pairs

or as a combination of four factors to exploit external opportunities, reduce or avoid threats on the basis of promoting strengths and overcoming weaknesses.

On the basis of the SWOT analysis, determine the factor matrices, called the SWOT matrix. The SWOT relationship is shown by the TOWS matrix, which must go through 8 steps. The TOWS matrix chart has 4 cells containing important factors, 4 strategic cells are SO, WO, ST and WT.

- o **S-O:** factors that help use opportunities in accordance with strengths;
- o **W-O:** factors that help overcome weaknesses to seize opportunities;
- o **S-T:** Identify factors that help use strengths to explore the impact ability of challenges;
- o **W-T:** factors that help build solutions to limit weaknesses before challenges.

Step 3: Evaluating the effectiveness of solutions

- o If the variables are expressed as qualitative characteristics: results are often expressed as percentage, the test $\chi 2$ should be used.
- o If the variables are expressed as quantitative characteristics: To test the difference of two means, t-test and F-test can be used:
- o To calculate the growth rate:

(1) Absolute growth rate: $\Delta A = A - A_0$

(2) Relative growth rate: $\gamma_A = \dfrac{\Delta A}{A_0}(\%)$

(3) Growth rate (S. Brody - 1927): $W = \dfrac{(V_2 - V_1)}{0,5(V_2 + V_1)}(\%)$

(4) Average growth rate: $\left(\dfrac{A}{A_0}\right)^{\frac{1}{n}} - 1$

- o Draw a system of diagrams illustrating the difference between two points in time.

Form 6, Survey about some qualitative characteristics (satisfaction, necessity, importance, ...). After the interview it can be done according to the process as following:
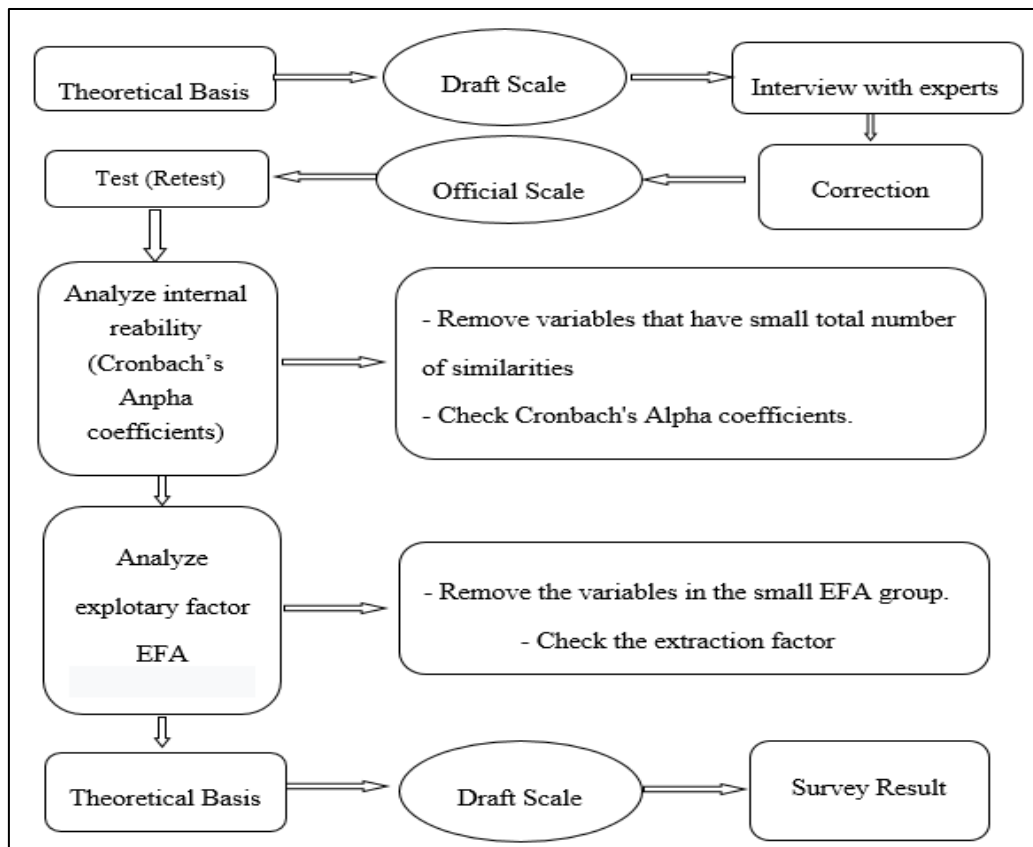
Figure 1: Process of surveying some qualitative characteristics

4. Conclusion

Research results have identified six types of basic scientific research topics in the field of sport. Based on a practical basis and selected principles, it is proposed to apply the mathematical method in data analysis and processing. The initial applications show that the measures have been effective, gradually improving the applicability of computational methods for staff, lecturers, and postgraduates, contributing to improving the quality of scientific research in the university.

Conflict of Interest Statement
The authors declare no conflicts of interest in the article. We have seen and agree with the contents of the manuscript and certify that the submission is our original work and is not under review at any other publication.

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