SPSS Software-based Analysis of Comprehensive Score in "Basketball" Course

Hangwei Liu[*]

Zhengzhou Shengda College of Economics, Business and Management, Zhengzhou, Henan 451191, China
*Corresponding Author.

Abstract:

"Basketball", a compulsory general course for undergraduates of all majors, aims to exercise students via classroom teaching and extracurricular activities under the goal of cultivating students' interest through physical exercises. SPSS statistical software, as an effective tool for data analysis, can practically analyze the collected data and make correct conclusions based on the output results. This paper uses SPSS software to analyze the comprehensive scores of 368 undergraduate students of grade 2020 in the "Basketball" course, proposes suggestions for classroom teaching reform according to the analysis results, and provides reference for course teaching reform and construction.

Keywords: SPSS software, Basketball, Frequency, Normality test.

I. INTRODUCTION

"Basketball" is a special course of public physical education courses in colleges and universities. Learning of this course enables students to understand the basic characteristics and laws of basketball, master the basic theory, basic methods and basic skills of basketball, develop ability to play basketball, thereby achieving the effect of physical fitness.

Score provides one index to measure students' learning attitude and teachers' teaching effect. Based on the relevant theories of statistics, this paper uses spss25.0 software to analyze and interpret the final exam scores of 2020 undergraduates in "Basketball" course, with a view to testing the teaching effect, improving the teaching quality, and providing some references for formulation of talent training plan for this major.

II. DATA COLLECTION

The data in this research is randomly selected scores of 368 basketball class undergraduate students in grade 2020. The scores are provided in EXCEL files which are read through SPSS software and converted into SPSS data files. Where, 212 are boys and 156 are girls, whose scores are comprehensive scores (before make-up exams).

The data analysis software is SPSS25.0.

III. DESCRIPTIVE ANALYSIS

3.1 Frequency

Frequency analysis is to understand the variable values and then understand the data distribution state [1]. First of all, the scores herein are classified and sorted, followed by basic data analysis using SPSS software, with the histogram derived as follows:
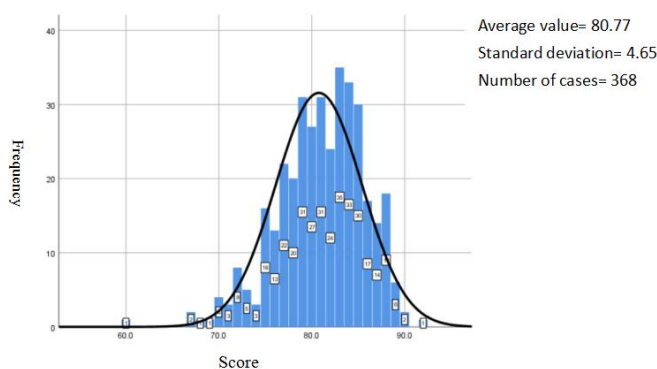
Fig 1: Data histogram

As can be seen from Fig 1, "Basketball" has a mean value of 80.77 points, with score of 0 people below 60 points, that of 9 people between 60-70 points, that of 148 people between 70-80 points, that of 210 people between 80-90 points, and that of 1 people above 90 points, so students' scores are reasonably distributed. The comprehensive scores in "Basketball" course present approximately normal distribution, with a standard deviation of 4.65, reflecting that the teacher's rating is reasonable.

3.2 Standard Deviation and Mean

SPSS software is used for statistical analysis on the data to construct descriptive statistics such as maximum value, minimum value, mean value, standard deviation, etc., followed by statistical analysis using SPSS (see Figure 2). The results show that: the total sample number is 368, the highest score is 92 points, the lowest score is 60 points, the mean value is 80.77, the difficulty value of the final test is about 0.80, and the sample standard deviation is 4.65. As mentioned above, the drawn samples have a mean value of 80.77, indicating that the sampled students have good results in basketball course, and the teachers have a reasonable grasp of the key points and difficulties in the syllabus. The standard deviation is 4.65, indicating small gap between students and good teaching effect. Skewness, as a distribution statistic in data description, describes the symmetry in the overall numerical distribution [2]. As can be seen from Figure 2, the skewness is negative, indicating that scores are negatively skewed in distribution. With several extreme values at the right end of the data, there is great dispersion on the right side of the mean value. The kurtosis value of 0.774 is greater than 0, indicating that students' score is in steeper distribution compared to normal distribution.

TABLE I. Descriptive results

Descriptive statistics

	N	Min	Max	Mean	Standard deviation	Skewness		Kurtosis	
	Statistics	Statistics	Statistics	Statistics	Statistics	Statistics	Standard error	Statistics	Standard error
score	368	60.0	92.0	80.766	4.6495	-.627	.127	.774	.254
Number of valid cases (in columns)	368								

IV. NORMALITY TEST

The data shown in Fig 3 are derived from K-S test based on nonparametric testing.

TABLE II. K-S results

Single-Sample Kolmogorov-Sminov Test

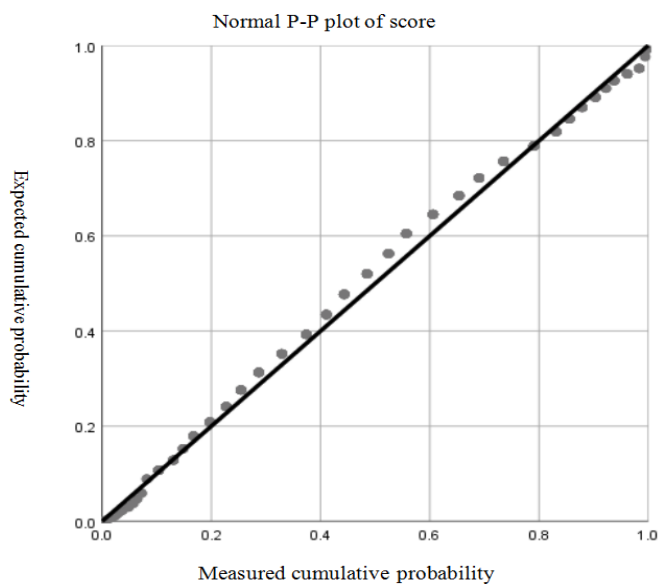|		Score
Number of cases		368
Normal parameter [a,b]	Mean value	80.766
	Standard Deviation	4.6495
Most extreme difference	Absolute	.069
	Positive	.040
	Negative	-.069
Test Statistics		.069
Asymptotic significance (two-tailed)		.000[c]

a. The test distribution is normal.
b. Result is calculated based on data.
c. Lillie's significance correction.

It is hypothesized that the comprehensive scores are normally distributed. The single-sample K-S test results are shown in Figure 3, with a mean of 80.77 and a standard deviation of 4.65. sig value is less than 0.05, so the null hypothesis is rejected, indicating that the hypothesis does not hold and the sample data is not normally distributed.

In addition, we can more intuitively judge whether the variable obeys normal distribution through the P-P plot in SPSS [3]. If the points representing the data basically coincide with the diagonal line, it can be judged that the data are normally distributed [3]. Figure 4 displays a clear difference between the actual and theoretical score distribution.

Fig 2: P-P-1

Figure 2 showcases the residual graph of the actual value and theoretical value calculated based on normal distribution. If the data is normally distributed, then the points representing the score should be evenly distributed on the line Y=0 [4]. Hence, it is judged that the sample data does not conform to normal distribution, that is, the students' scores in basketball course are not normally distributed.
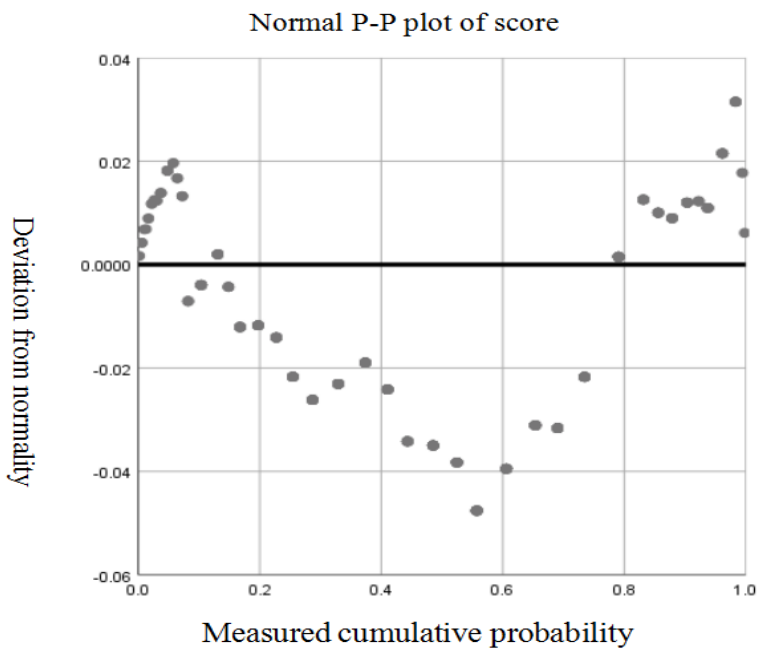
Fig 3: P-P-2

V. RESULTS AND SUGGESTIONS

5.1 Results

Seen from the above statistical results, students' scores in basketball course present negatively skewed distribution. The reasons for this phenomenon are summarized as follows: The comprehensive score of public physical education is given based on usual score, mid-term score and final exam score. First, the usual score is comprehensively calculated based on classroom performance and attendance to improve students' subjective initiative in learning and make them more devoted to classroom learning.Second, the final exam is not difficult enough to distinguish between beginners and continuous learners. As a result, students' comprehensive score is generally high, presenting negatively skewed distribution. Hence, while strengthening teaching management, school should set up different test contents for students at different levels to truly provide individualized test, making every student "learn enough" in the classroom.

5.2 Suggestions

5.2.1 Strengthen students' sense of identity with the course

The level of students' sense of identity with the course directly affects the degree of students' sense of belonging to the course and the degree of devotion [5], which is what we usually call learning attitude. Students with a high sense of identity will develop strong interest in the course and are willing to invest more time in this sports activity. Only through learning in which physical education score is not ranked first can students perceive their insignificance, thus laying certain foundation for "lifelong sports".

5.2.2 Teaching students in accordance with their aptitude, with focus on differences in levels

Teaching grouping does not mean differentiation of teaching levels. Instead, learners should be classified into different teaching groups according to the teaching elements in progressive manner [6]. Individual's physical coordination, development, basic strength, will and quality, etc. can affect the teaching effect, which also serves as the basis for classification of different teaching groups. Meanwhile, educators should also change teaching strategies in time according to different learners and teaching contents.

5.2.3 Create seminar-based learning atmosphere driven by teaching tasks

Seminar-based learning is a learning method in which the learner builds new knowledge based on acquired knowledge through the interaction between the individual and the teaching environment. The merit of this approach is that learner groups of different types exert their own subjective initiative by putting theory into practice. Meanwhile, it strengthens the collaboration, discussion, practice among the learners, so that they exchange learning results with each other, examine their own shortcomings, which will consolidate the teaching effect, keep students in a state of conscious learning, and enhance the overall teaching effect.

VI. CONCLUSION

SPSS statistical software is used to make statistical analysis on the scores of basketball course, and then master basic information of students' scores (including the highest score, lowest score, average score, frequency distribution of different score segments, etc.). Rationality of the score distribution is tested by K-S test and P-P plot. Different from traditional manual calculation or Excel software calculation, SPSS statistical software not only saves time and effort in data statistical analysis, but also provides comprehensive statistical analysis results of scores. Comprehensive score analysis of final exam enables mastery of the students' learning in this semester, facilitates teaching reflection, so that it is possible to better understand the students' learning status, and further improve the teaching quality. It is a must-have teaching ability for every teacher in today's era.

REFERENCES

[1] Ye Kang. Analysis of Linear Algebra Exam Paper. Master's Thesis of Fujian Normal University, 2017.

[2] Information Technology - Data Processing; Reports Outline Data Processing Findings from Xi'an University of Architecture and Technology (Research On the Factors Affecting Consumer Trust In Green Residences-based On Sem Model and Spss Data Processing Software).

[3] Jianping Yang, Yao Zhang. Research on the factors affecting consumer trust in green residences—Based on SEM model and SPSS data processing software. International Journal of Electrical Engineering Education, 2020.

[4] Feng Xin, Wang Jianyong, Ding Mengqi. Statistical analysis of the final exam score of the course. Zhejiang Chinese Medical University, 1998(04): 44-45.

[5] Chen Bingjie, Shao Qingshan, Fan Wenqin. Relationship between college students' usual score and final exam score. Journal of Yuncheng University, 2006, (06): 68-70.

[6] van WingerdeBart,vanGinkelJoost. SPSS Syntax for Combining Results of Principal Component Analysis of Multiply Imputed Data Sets using Generalized Procrustes Analysis. Applied Psychological Measurement, 2021, 45(3).Computer Technology Journal, 2020.

[7] Sun Yi, Liu Renyun, Wang Song, et al. Examination Score Evaluation and Prediction Based on Multiple Linear Regression Model. Journal of Jilin University (Information Science Edition), 2013, 31(04): 404-408.

[8] Li Zhiping, Yan Zhong, Tang Li. The Statistical Analysis and Enlightenment of the Experimental Class's Scores in School of Economics. Journal of Anhui University of Technology (Social Science Edition), 2002(02): 101-102+104.

[9] Huang Ying, Lin Duanyi. A review of the research status of test paper analysis. Northwest Medical Education, 2005, (01): 29-38.

[10] Chemistry; Data from Anhui University of Finance and Economics Provide New Insights into Chemistry (Business English Translation Skills Based On Spss Statistical Analysis Software). Computer Technology Journal, 2019.

[11] Ahmad Abdul Azeem Abdullah Omer,MohammedElnibrasAbdulrahim,Ibrahim Abdullah Albalawi. Flawed multiple-choice questions put on the scale: What is their impact on students′ achievement in a final undergraduate surgical examination? Journal of Health Specialties, 2016, 4(4).