Analysis of Teaching Effect of Web Design Course in Software Engineering Institute of Guangzhou

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Abstract. At present, in the course assessment system, the proportion of final exam scores is very large. Based on this, it is necessary to understand the teaching effectiveness of the course by analyzing the final exam scores. Taking the exam results of the "Web Design" course at Software Engineering Institute of Guangzhou as an example, SPSS software is used to quantitatively analyze the score data, reveal the hidden laws in the score data, and provide reference for teachers to scientifically carry out teaching decision-making, improve teaching quality and talent cultivation quality.

Keywords: Web design; SPSS; Teaching Effectiveness

1 Introduction

Academic evaluation is the process of measuring whether students' individual development has reached the predetermined educational goals, and exams are the most important tool for academic evaluation. Web Design is a compulsory course for majors, and the total score assessment mainly includes: usual grades and final exam scores. The final exam scores can truly reflect students' mastery of the course and evaluation of teaching quality, generally accounting for 50% of the total score. The quality of exam papers is directly related to the evaluation of course teaching effectiveness, and directly affects the positive interaction between teachers and students.

The assessment content of the course "Web Design" includes the application of HTML5 and CSS3, the use of media query technology, the implementation of responsive web page design using Bootstrap framework technology, and the design and production of graphics and animations using CSS3.

The specific scoring items for the final exam are:

(1) Meets the theme, the website structure is correct, and the number of pages meets the requirements; (0-10 points)

(2) Reasonable color matching, distinctive interface layout design, non-repetition, and elegant style; (0-20 points)

(3) Correctly apply the structure and content tags of HTML5; (0-10 points)

(4) No issues such as empty or incorrect links; (0-10 points)

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(5) Correctly use media query technology; (0-10 points)

(6) Correct use of elastic box technology; (0-10 points)

(7) Set the width correctly using percentages; (0-10 points)

(8) Correctly use the bootstrap framework technology. (0-20 points)

2 Research Objectives

By analyzing exam scores; Find effective information from it to verify the reliability of test paper quality and adjust the difficulty level of future exams.

Through data mining and analysis of various scoring items in the exam, it is possible to understand the level of students' mastery of each webpage creation technology while studying this course, thus providing scientific basis and suggestions for future curriculum teaching reform and improvement of curriculum teaching quality.

3 Research Method

3.1 Quantitative analysis

Quantitative analysis of the final exam papers for the course "Web Design" in the field of network technology. The research object is the final exam scores of 88 students in the first semester of the 2021-2022 academic year. According to the requirements of the teaching syllabus and the degree of achievement of the course learning objectives, the focus is on examining students' comprehensive application ability of various web page creation techniques introduced in the course "Web Design". The proposition of the test paper closely revolves around the purpose of the course assessment, striving to cover all chapters and knowledge points. By requiring students to complete the theme website within the specified time, a fair and objective evaluation will be conducted based on the eight scoring criteria for the course exam mentioned earlier.

3.2 SPSS Software

SPSS software was used for data mining and quantitative analysis of performance data. SPSS (Statistical Product and Service Solutions) is a statistical analysis software that uses a graphical menu driven interface, characterized by an extremely user-friendly operating interface and beautiful output results. It has been widely used in academic research and practical operations. SPSS is the earliest statistical software in the world to use a graphical menu driven interface, presenting almost all functions in a unified and standardized interface. It uses Windows as a window to display various functions for managing and analyzing data, and dialog boxes display various function options. As long as users master certain Windows operating skills and are proficient in statistical analysis principles, they can use this software to serve specific scientific research work.[1]

3.3 Score analysis

Skewness can be used to measure the asymmetry of the probability distribution of random variables. The formula for calculating skewness is the third-order normalized moment of the sample, which is the average of the differences between each observation value and the mean to the third power divided by the standard deviation to the third power. [2] The range of skewness values is (- ∞, +∞). It measures the tail (long tail or short tail) of the data distribution and the degree of deviation of the data from the center (mean) of the distribution. A skewness of 0 indicates symmetrical data distribution, a positive skewness (skewness greater than 0) indicates a longer tail on the right side of the data distribution, and a negative skewness (skewness less than 0) indicates a longer tail on the left side of the data distribution. The distribution of positive skewness usually shows a right skewed shape, while the distribution of negative skewness shows a left skewed shape. In grade analysis, skewness can help us understand the degree of skewness in the distribution of grades. For example, the distribution of grades is skewed to the right (positive skewness), which means that most students' grades are concentrated in the lower score range, while the higher score range is relatively small. This may indicate that some students perform well and achieve high scores, while the majority of students have lower grades. The right biased distribution of grades is commonly referred to as the positive biased distribution. On the contrary, if the distribution of grades shows a left bias (negative skewness), it means that most students' grades are concentrated in the higher score range, while the lower score range is relatively small. This may indicate that most students perform well and achieve high scores, while only a few students have lower grades. The left biased distribution of grades is commonly referred to as the negative biased distribution.[3]

Kurtosis can be used to measure the steepness of the probability distribution of random variables. The formula for calculating kurtosis is the fourth order normalized moment of the sample, which is the mean of the difference between each observation value and the mean to the fourth power divided by the fourth power of the standard deviation. [4] The range of kurtosis values is [1, +∞). It measures the height of the peak and the thickness of the tail of the data distribution. A positive kurtosis indicates that the data distribution has a high peak and a relatively heavy tail, while a negative kurtosis indicates that the data distribution is relatively flat, with a low peak and a relatively light tail. A kurtosis of 0 indicates that the data distribution is similar to a normal distribution. For grade analysis, kurtosis can help us understand the concentration of the grade distribution and the thickness of the tail. For example, peak Degree indicates that the distribution of grades is relatively concentrated, and there may be some particularly high-grade or low-grade values; Low kurtosis indicates a relatively flat distribution of grades and a relatively uniform distribution of grades.[5]

Quartiles are the arrangement of a dataset in order of size, dividing the data into four equal parts, and dividing the data into four groups using three segmentation points. Among them, the first quartile (Q1) refers to the value in the 25th percentile after the sample values is arranged from small to large. The second quartile (Q2): The value in the 50% percentile position after the sample values are arranged from small to large, which is the median. Third quartile (Q3): The value in the 75% percentile position after the sample values are arranged from small to large.[6]

4 Interpretation of Result

Import the final exam scores of 88 students in the web design course into SPSS, and use the software's descriptive statistics function to obtain Table 1 and Figure 1.

Table 1. Statistical Table of Total Score Frequency

Statistics

Total Score

N	Valid	88
	Missing	0
Mean		74.00
Median		72.00
Skewness		.230
Std. Error of Skewness		.257
Kurtosis		-1.097
Std. Error of Kurtosis		.508
Percentiles	25	64.00
	50	72.00
	75	84.00

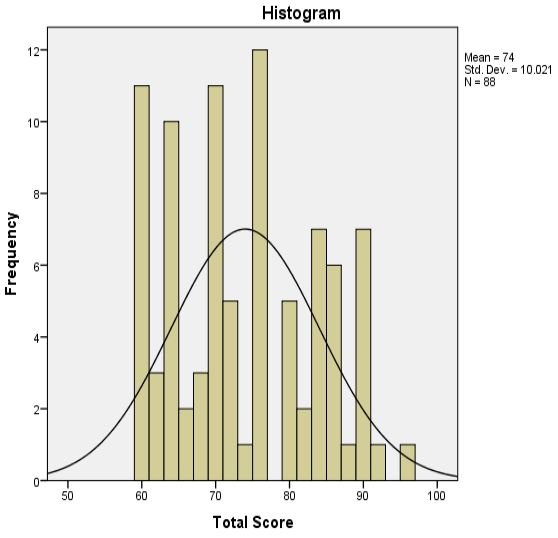

Fig.1. Histogram of Total Score Frequency

From Table 1 and Figure 1, we obtain the following analysis results:

The skewness value is 0.230, indicating a slight right deviation in the distribution of grades, meaning that the overall trend is skewed towards higher scores, but the skewness is relatively mild. This means that some students achieve higher scores, but most students have relatively lower grades. The overall distribution is relatively symmetrical, with no obvious extreme values or peaks.

The kurtosis value is -1.097, indicating that the kurtosis of the score distribution is relatively low, with a light peak and a relatively light tail. This means that the distribution of grades is relatively flat, without obvious peaks or concentration in a certain score range. A relatively light tail indicates that there are fewer extreme values in the higher or lower score range.

Overall, the given skewness and kurtosis values indicate that the score distribution is slightly skewed to the right, but the overall distribution is relatively symmetrical and flat, with no obvious peaks or extreme values. This may indicate that some students have achieved higher scores, but most students have relatively lower grades and a relatively uniform distribution of scores.

The first quartile is 64.00, indicating that 25% of students score below or equal to 64 points. This can be seen as the dividing point for the low scoring group, where students below this score perform poorly.

The second quartile is 72.00, indicating that 50% of students score below or equal to 72 points. This can be seen as the cut-off point for intermediate level students, where the scores of intermediate level students fall within this range.

The third quartile is 84.00, indicating that 75% of students score below or equal to 84 points. This can be seen as the dividing point for high scoring groups, where students above this score perform better.

Through these quartiles, we can understand the distribution of students' scores. The overall score of students shows a relatively balanced distribution, with most students' scores concentrated at a moderate level (around 72 points). At the same time, there are also some students who perform poorly (below 64 points), and some students who perform well (above 84 points).

5 Conclusion

From the analysis results, it can be seen that the design of this test paper is very reasonable, with the content closely centered around the teaching syllabus and objectives, and the proposition is very accurate and rigorous. The average score of the students is 74, indicating that they have a good overall mastery of various knowledge points. The test scores follow a normal distribution, and the results of this exam are reliable. Through this exam, it can reflect the students' mastery of the course "Web Design" and achieve the purpose of testing.

Based on the quantitative analysis of the final exam scores, the following improvements can be made to the teaching of the course 'Web Design':

(1) Provide more practical opportunities: Web design is a highly practical course that students learn through practical design and development of web pages. In order to improve students' grades and participation, teachers can increase more practical opportunities, such as designing projects, collaborating in groups, or simulating actual work scenarios. This can enable students to have a deeper understanding and mastery of practical operational skills in web design.

(2) Provide personalized feedback and guidance: For students with lower grades, teachers can provide personalized feedback and guidance. By evaluating students' design works, identify their strengths and areas for improvement, and provide specific suggestions and resources. Individual tutoring can help students overcome difficulties, improve design skills and creativity.

(3) Emphasize user experience and innovation: Web design is not only about appearance and layout, but also about user experience and innovation. Teachers can emphasize these aspects in the course and guide students to think about how to design web pages that meet user needs, and provide innovative design ideas. By cultivating students' user experience awareness and creativity, their design level and grades can be improved.

(4) Diversified evaluation methods: In addition to the final exam, teachers can use diverse evaluation methods to evaluate students' grades. For example, design work displays, oral speeches, team collaboration projects, etc. This can comprehensively evaluate students' design skills, communication skills, and teamwork abilities, providing a more accurate and comprehensive performance evaluation.

(5) Updating teaching resources and cases: Web design is a constantly evolving and evolving field, and teachers should constantly update teaching resources and cases to reflect the latest design trends and technologies. By introducing new cases and examples, students' interest in learning can be stimulated and they can be helped to keep up with the latest developments in the industry.

Overall, suggestions for improvement in the "Web Design" course include increasing practical opportunities, providing personalized feedback and coaching, emphasizing user experience and innovation, diverse evaluation methods, and updating teaching resources and cases. These improvement measures can promote students' learning and development, improve their grades and skill levels.

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