Penny for Your Thoughts

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Introduction

Evaluating recreation services, programs and facilities is an extremely important competency for recreation management students to develop. Typically, undergraduates first study evaluation when they are enrolled in a program planning course. During this course students measure the effectiveness of a program, the programs' goals and objectives, and determine whether change should occur in the next program (Kraus, 1997). Due to the demands for accountability in the discipline and the development of national accreditation standards, recreation evaluation has outgrown programming classes and for many universities it has become an entire course.

Appalachian State University is an NRPA/AALR accredited curriculum, and hence must meet specific professional competencies related to evaluation (8.24- 8.27). Competency 8.26 states: *students should have the ability to apply computer and statistical techniques to assessment, planning, and the evaluation processes.* The evaluation course offered in the curriculum examines the methods, techniques, and application of evaluation in a variety of functions normally found in recreation and leisure service management including clientele, programs, personnel, facilities, budgets, agency organization, needs assessments and economic impact estimation. A majority of students often fear the evaluation course because it demands a lot of work, they must grasp a basic understanding of statistics, and be able to use SPSS or Excel software to explain raw data scores.

From a teaching perspective, faculty are only asking students to understand simple descriptive statistics, however, students often cannot get beyond their fear of mathematics, inhibiting their comprehension of basic evaluation concepts. Rossman and Schlatter (2000) suggest a good statistical analysis organizes data into a meaningful pattern and should include the following statistics; distribution of scores (frequencies and percentage), measures of central tendency and measures of dispersion. Students who master these skills can better report the outcomes of a program and interpret its meaning. However, the successful facilitation of this skill development becomes more challenging each semester since students exhibit math anxiety and misperceptions about statistics.

Some students are disinterested from the start since the concept requires a mathematical procedure that they feel cannot possibly be linked to the field of recreation.

Some have the mindset that if the word *statistics* is used, the material to be covered must be extremely difficult. Faculty realize that evaluation syntax and terminology can create a problem for some of our students. Some are too busy trying to remember statistical symbols such as "n" equals the number of observations, while sum of "X" over "n" equals the mean score for the group. Granted this information is potentially confusing but it is certainly not impossible to comprehend. Rote memorization of information is important but seeing the larger implications will enable the student truly to appreciate the value of the evaluation process. To overcome this problem, faculty try to first explain the statistical theory and then provide an exercise that illustrates the theory.

Initially, students are assigned a reading in their textbook (Henderson & Bialeschki 2002) and the class begins by providing a review of the concepts of central tendency, measure of dispersion, skewness, and probabilities. Instructors break the class into their research groups, usually consisting of three students, and each group is given 10 pennies. To keep everyone involved in the process, each group member has a specific task: shaker, counter, and recorder. Students sit on the floor instead of using their desks. The shaker is reminded to use the same method for each coin toss. The shaker throws the pennies up in the air, the counter tallies the number of heads and the recorder documents the data. For each throw the number of heads is recorded as X, which equals the number of heads that occur.

After the group has completed 10 throws, the data is entered on the SPSS software program. Under "variable view", the variable of "head" is entered in the data view column and the numbers of heads are recorded. To analyze the data, instructors select "frequencies" and use the option for creating a histogram with a normal curve. Since SPSS allows many options, "central tendency" statistics, "dispersion" and "distributions" are selected since faculty want the students to comprehend these concepts during the lesson.

After running the program and obtaining the data output, faculty members lead a discussion related to interpreting the raw data set for one group. Depending on the amount of time available, faculty attempt to get at least one group to explain their data related to mean, median, mode, standard deviation, range of scores, and normal curve, allowing the group to determine whether the data is skewed. This permits students to begin thinking about statistics terminology and to become interested in seeing how theory relates to the actual practice of describing data and reporting results.

Next, instructors create two large groups and repeat the process using 100 pennies. Again, the more people actively involved in the process the better the experience. After the data has been entered and the outputs obtained, members of the various groups explain the results. The focus of the discussion should be related to three specific areas (distribution of scores, central tendency and measures of dispersion).

After the groups have successfully explained the three specific areas, discussion of the various raw data scores related to the two different data sets ensues. Questions such as: "what is the range of scores?" "Explain the difference in ranges of scores for

both data sets?" "what seems to happen in larger data sets?" are asked. Instructors summarize the activity by discussing sample size, normalcy of larger samples and representation.

Measures of central tendency related to the penny tosses are next addressed. Data can be explained many different ways and each explanation is specific to the type of data being measured. Riddick and Russell (1999) believed the objective in understanding central tendency was to describe the distribution with a single indicator and it should be the most representative of all the scores in the distribution. The penny toss activity provides examples of mean, median and mode related to the data set. The SPSS printout allows students to see the statistics without having to compute all the numbers. The objective of this exercise is to understand concepts, not mathematical properties. Having the students explain what the statistics represent enhances the learning process because they take on the role of the instructor.

Henderson and Bialeschki (2002) suggested the most familiar statistic used to calculate the dispersion between the scores is the standard deviation. This measurement provides a view of how the scores are scattered around the mean. The shape of the normal curve can be addressed as it relates to the standard deviation. Reality check questions like: "what does a tall, skinny normal curve indicate?" or alternatively; "what does a short, wide curve indicate?" are asked. These questions refocus the student's attention back to the normal distribution concept and provide an illustration of dispersion.

This activity has assisted our students in comprehending evaluation concepts since it focuses on several different learning styles: auditory (listening to a brief lecture), participatory (becoming an active learner) and retention (explaining what the data represents by using relevant terminology and examples).

Introducing the SPSS program with this exercise allows the students to have a more hands-on opportunity and provides them a practice session for entering and analyzing data. This exercise is used to introduce complex concepts, and it has improved students' learning and reduced the amount of frustration they experience when using calculators and hand calculating numbers. By the end of the semester, students can work independently with SPSS, and some graduates of the recreation management program have commented about how they wish other exercises in the class were as beneficial. Since SPSS is *Windows* based, it is recommended over Excel since students do not have to worry about programming syntax. With this foundation, additional exercises using the SPSS program and more complicated data sets can thus be introduced and more easily understood by students as the semester progresses.

References

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