

HOW MUCH STATISTICS DO MARKETING RESEARCH STUDENTS REALLY REMEMBER?

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Abstract

Marketing research courses have an important and somewhat unique role in the marketing curriculum. Success in marketing research for students depends on reasoning skills and the ability to apply basic statistics and math skills to client-oriented projects. Marketing students are having a problem, but math has not been found to be nearly as highly correlated with a student's performance in basic statistics as overall GPA or specific skills in science (Johnson and Kuennen 2005). Given that math is related to statistics, it is likely that this relationship would hold for math as well.

This research examines the question of whether students remember the statistics they learned in their business statistics coursework that is necessary for marketing research. In addition to personal factors, the experience of students in their course of study could also be a factor in determining the degree to which they retain statistics knowledge necessary for marketing research. Regardless of innate ability or motivation, students will forget course material over time. Also, student forgetting of statistics knowledge over time depends on the nature of the business statistics course they took. Business statistics courses that are too content-oriented, not allowing students to apply the knowledge they learned, think about how statistics really works or even just have fun with statistics are more easily forgotten (DiCarlo 2009). Students who have taken courses that teach to deeper knowledge will retain more of the knowledge they learned and be able to use it in their marketing research course. Thus, the following hypotheses are suggested.

Hypothesis 1: Those whose overall grade in business statistics is higher will retain more business statistics knowledge than those whose overall grade is lower.

Hypothesis 2: Those whose math skills are higher will retain more business statistics knowledge than those whose math skills scores are lower.

Hypothesis 3: The more time has passed after taking business statistics, the more knowledge students will have forgotten.

Hypothesis 4: The more students perceive they have applied the knowledge they learned in a business statistics course the more knowledge they will retain over time.

Method

This study used an in-class statistics quiz and a survey to measure the factors that impact on student retention of statistics knowledge necessary for marketing research. Data were collected in three sections of an upper division business capstone strategy courses in a Southwestern metropolitan area of the United States. There were no significant differences between from the three sections on any of the variables measured so they were combined. Altogether 68 students participated.

In the first part of the survey students were asked several questions about their statistics and research courses at the university. In the second part of the survey students were asked questions about their ability and interest in statistics. All items were measured with seven-point Likert-type scales anchored by “Strongly Agree” (7) and “Strongly Disagree” (1). Following this, students were given a scale of items measuring attitude toward mathematics. Lastly, students were given an inventory of items assessing student learning style.

Measurement

Perception ability and attitude toward statistics were measured by brief scale items, which were kept simple (Viciania et al. 2007). The measure for the perception of ability in statistics contained the items “I am really good at statistics,” “Statistics is my strength,” and “I do well at statistics” ($M = 2.89$, $\alpha = .91$). Attitude toward statistics was measured by “I love statistics,” “I really enjoy studying statistics,” and “Statistics is one of my favorite subjects” ($M = 2.38$, $\alpha = .94$). Attitude toward math was comprised of a modified number of items from Alken’s (1974) scale. Lastly, 15 items were measured using Fleming (2012) for learning style.

Results

First, the average score for students on the statistics quiz was very low, 18.6%. Marketing majors were in the lower half, but they were not the lowest. Some questions were tougher than others, but even the question which was tied for the highest score, “What is standard deviation?” was still answered correctly by only 34 percent of respondents. Then, a median split was done on the perceived ability ($M = 3.00$) and attitude toward statistics ($M = 2.00$) scales and subjects were grouped into high and low groups. Those who perceived themselves as higher in ability in statistics did better on the quiz than those who perceived themselves as low in ability ($X_{hi\ ability} = 23.8$, $X_{lo\ ability} = 14.5$, $F = 8.12$, $p < .01$). Similarly, those who liked statistics more

performed better on the quiz than those that did not ($X_{\text{like}} = 22.7$, $X_{\text{dislike}} = 15.0$, $F = 5.72$, $p = .02$) though the differences were not quite as large.

In order to determine which of the factors of a student's learning style and attitude toward math impacted the most on a score a backward elimination step-wise regression was run with all of the variables in the model, removing variables to maximize the R-square. The final result was significant (Std. $F=4.07$; $p = .00$, $R^2 = 0.47$). The most significant factors were the learning style items of being good with sign language (Std. $\beta=0.42$; $t = 3.63$, $p < 0.01$) and being nervous during lectures (Std. $\beta=0.38$; $t = 3.52$, $p < 0.01$) as well as the attitude of toward math scale item of enjoyment of studying mathematics (Std. $\beta=-0.53$; $t = -3.00$, $p < 0.01$). In addition, the learning style items of needing to study with loud music on (Std. $\beta=-0.32$; $t = -2.34$, $p < 0.05$) and needing quiet study time (Std. $\beta=-0.39$; $t = -2.85$, $p < 0.05$) as well as the math scale item of willingness to acquire further knowledge of mathematics (Std. $\beta=0.37$; $t = 2.17$, $p < 0.05$) were significant as well. Thus Hypothesis 2 is supported.

The GPA in the course, the years since business statistics was taken and the number of research courses taken contributes each toward the total variance explained, but they are not significant coefficients in the equation given the power. Thus, hypotheses 1, 3, and 4 were not supported.

Discussion

This exploratory study about student knowledge of business statistics raises more questions than it answers. Clearly, students are not retaining even the basics of statistics knowledge from their business statistics courses. The short-term implication is that instructors of marketing research courses will have to spend valuable time in the course re-teaching the basics of statistics so that students may proceed with research projects and understand how analyze their data.

These results also suggest that active interest in math can contribute to increased retention of statistics. Those who enjoyed math and actively pursued knowledge of it, were more likely to retain knowledge of statistics. Interestingly, perceived ability in math did not have this same effect. Perhaps statistics, as an application of math, was strengthened more by a student's interest and enjoyment of the subject than by their inherent skill in it. The basics of statistics may also be understood easily enough that raw math ability is not a factor.

The learning style measures seem to suggest that independent learners with even a bit of creativity retain more of the statistics that they learn. Perhaps these self-motivated students are better equipped to understand how statistics is applied in contexts outside of that to which they were exposed in statistics class. This finding also suggests that business statistics instructors who want students to retain what they learn need to teach it preferably with active learning projects or help students to somehow apply it to current events. Active learning projects helps not only to apply statistics knowledge in other contexts, aiding in knowledge retention, but also motivates students as well.

Lastly, it is also interesting what did not have a direct impact on scores. A better grade in the class, few years since the business statistics class had been taken and taking a research course did not directly help students to retain their statistics knowledge. Most students seem to forget most of the statistics knowledge they learn soon after the end of the class. This suggests that the answer to the problem of student retention of statistics lies not in imposing external requirements, but in how the class is taught.

References available upon request