

Learning Statistics: Experiences of Senior Citizen Students in the Social Sciences at Universiti Sains Malaysia, Penang, Malaysia

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Introduction

Learning statistics is difficult for many students especially those with little or no prior statistical or mathematical training (Onwuegbuzie & Wilson, 2003). Studies have shown that students in the social sciences often experience very high level of statistics anxiety and this negatively affects their learning process (Pan & Tang, 2004; 2005).

Onwuegbuzie, DaRos and Ryan (1997, as cited by Onwuegbuzie and Wilson, 2003) defined statistics anxiety as anxiety that happens when students encounter any form of statistics at any level and identified four components of statistics anxiety, i.e. instrument anxiety, content anxiety, interpersonal anxiety and failure anxiety.

Three major causes of statistics anxiety are dispositional, situational and environmental factors (Baloglu, 2003; Onwuegbuzie & Wilson, 2003). Environmental factors include factors such as gender, age, ethnicity, academic major and previous mathematics experience. Situational factors are factors related to the nature of a statistics course, e.g. instructor and instruction. Dispositional factors include factors such as attitudes towards statistics, perception and self-concept (Baloglu, 2003).

This paper is based on a study on statistics anxiety among social science undergraduate students in Universiti Sains Malaysia. This paper describes senior citizen students' learning experiences of statistics in the social sciences. In recent years, much research has been done in the area of statistics anxiety but none focused specifically on understanding this phenomenon among senior citizens students. Some studies have shown that older students experience higher level of statistics anxiety than younger students (Royse & Rompf, 1992). The findings of this study may help teachers understand statistics learning experiences among senior citizen students.

Data and Methods

The data for this study were collected from 12 senior citizen students at Universiti Sains Malaysia. These students were enrolled in a social science degree programme as part of life long education programme by the university. An introductory social statistics course is a compulsory course and it enables the students to identify various types of data, and various types of statistical analysis relevant to the data and, and interpret results from the analysis. These students were requested to submit written narratives regarding their experiences of learning statistics. In addition, the researcher

requested the students to provide some demographic information. These narratives were written mainly in Malay. Data was later analysed using qualitative data analysis software, NVivo. In analysing these narratives, the researcher paid attention to both the manifest content as well as the latent content of the texts.

Results

The students who participated in this study were between 52 and 66 years old. Only three students have some knowledge of statistics prior to enrolling in the programme. These students did not feel high level anxiety prior to taking the course. One student expressed mixed feelings regarding taking the course. The other eight students in this study expressed that they were worried about taking a statistics course.

Students gave various reasons as to why they were worried about taking the course. The two main reasons expressed by students are fear of mathematics and lack of prior knowledge in statistics. Some students express "fear" towards mathematics, numbers and formulas. Other students were worried because they do not have prior knowledge of the course. All the students identified that matching formulas and analysis as a very difficult task for them. Another problem faced by the students is "stress" related to examination and the semester system being used in the university. Other than describing their experiences in learning statistics, students also made some suggestions on ways that may help them learn statistics effectively. Some students suggested that they were given a basic mathematics skills course prior to the statistics course. Senior citizen student also felt that they should be given more hours of lectures to learn statistics effectively.

Discussion

The findings of this study indicate that senior citizen students in the social sciences experience statistics anxiety when taking a statistics course. The study echoes other studies that show older students and students with minimal or no statistics training have high level of statistics anxiety (Baloglu, 2003; Pan & Tang, 2004). It is important to note that these studies however did not focus on senior citizen students.

Students in this study display various components or elements of statistics anxiety as discussed by Onwuegbuzie and Wilson (2003), which includes elements of instrument, content and failure anxiety. For example, students fear of mathematics (numbers and calculation) and their perception

regarding their inability to do well in a statistics course shows elements of instrument anxiety. Students demonstrate elements of content anxiety when discussing the difficulty in recalling formulas and various statistical terms. Students also reveal elements of failure anxiety when discussing the high level of stress they experience when taking their test or examinations. The anxiety level may also be high because the course is compulsory and students are required to obtain a pass grade.

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Students identified two main causes of their anxiety: fear of mathematics, numbers and formulas, and lack of knowledge regarding statistics. Pan and Tang (2005) in a study among graduate in the social sciences identified “fear of math” as a factor contributing to statistics anxiety. Other than that, students also perceive themselves to be very weak in anything related to mathematics or calculation. Studies have shown that students’ perception regarding their ability is an important factor in determining level of statistic anxiety. Students who have very low perceived intellectual ability have high level of statistics anxiety (Onwuegbuzie, 2000). Another cause of their anxiety is their lack of knowledge regarding statistics. For many students this was their first experience of learning statistics. Students with limited previous mathematics experience have high level of statistics anxiety (Baloglu, 2003). In addition to this, these students have left school for at least 30 years prior to enrolling in this undergraduate degree programme. Therefore, many of them lack basic mathematical skills and this contributes to the high level of statistics anxiety among them.

The findings of this study can help provide some useful strategies to reduce statistics anxiety among senior citizen students. Senior citizens in this study have left school for many years, therefore, it will be useful if they are able to attend a workshop or short course on basic mathematical skills (calculation, substitution, using calculator, etc.) prior to taking a statistics course. This suggestion was mentioned by four students in their narratives. They felt this will reduce their anxiety and help them in learning statistics. In addition, the use of innovative, interactive and application-oriented instructional methods are effective in reducing statistics anxiety (Mvududu, 2005; Pan & Tang, 2004). Interactive environment will enable the students to get attention and guidance from their course instructor. This is very importance because the needs of younger and older students are different

(Baloglu, 2003). Application-oriented instructional methods will be very useful for teaching senior citizen students as these students have many years of working experience. Instructors’ ability to relate statistical techniques to real life example will help students appreciate the importance of statistics and enable the students to learn statistics more effectively.

Conclusion

Senior citizen students in the social sciences experience statistic anxiety when taking a statistics course. They display elements of instrument, content and failure anxiety. Their anxiety is mainly caused by fear of mathematics and lack of prior knowledge in statistics. The understanding on statistics anxiety among senior citizen student is important in order to help them cope with their statistics anxiety. Introductory courses to mathematics and calculation may help reduce statistics anxiety among senior citizen students. Other than that, interactive, innovative and application-oriented instructional methods will make their statistics learning experience more enjoyable and meaningful.

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