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Gender Differences in Learning Style Preferences

Vijyendra Ramesh, Jessie Schreiber, Yoochan Hong, Ashish Tyagi, and Nolan Hale

Faculty Mentor: Dr. James N. Jensen

Hypothesis

We hypothesized that there would be differences in learning styles between genders and majors.

Background

One system of learning styles is the VARK system. The VARK system includes the following components:

- Visual (learning from graphs, charts, and flow diagrams)
- Auditory (learning from speech)
- Read-write (learning from reading and writing), and
- Kinesthetic (learning from touch, hearing, smell, taste, and sight)

Wehrwein and coworkers (2006) conducted a survey with college students at Michigan State University and concluded that females prefer the kinesthetic mode while males tend to be multi-modal. Choudhary et al. (2011) found that both men and women among first-year students at a medical university in India were multi-modal, but a higher percentage of women than men were kinesthetic or auditory. Kumar and colleagues (2011) also found that most medical students at a school in Mauritius were multi-modal, but found no statistically significant differences in responses between men and women. Slater et al. (2007) found similar results with first-year medical students in the U.S.. While they found female students had more diverse learning styles, differences between the genders were not statistically significant.

Methods

We asked volunteers to fill out VARK surveys. All volunteers were students at UB. Characteristics of the 214 sampled students are shown in Table 1. The sampled population was 75% male and 66% from engineering courses. However, 44% of the females were from engineering courses. The average age of the participants was 21.9 and 20.3 for males and females, respectively. majors.

Table 1: Characteristics of the Study Population

Discipline	Male	Female	Total
Engineering	117	24	141
Non-engineering	43	30	73
Total	160	54	214

Results: Gender Differences

The results for all students regardless of major are shown in Figures 1 and 2 for males and females, respectively. Male learning style preferences were A > R = K > M > V. Female learning style preferences were A > R = M = M > V. Few differences were observed between genders. Males had a slight preference for the kinesthetic learning style compared to females. Females were slightly more multi-modal than males.

Figure 1: Learning Styles of Male Students

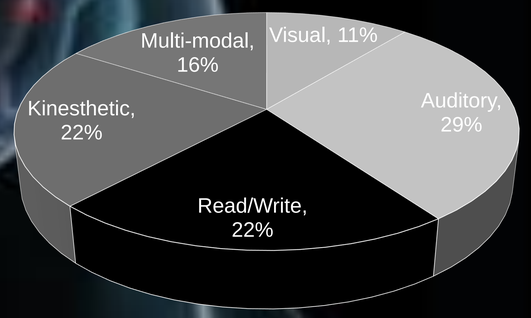
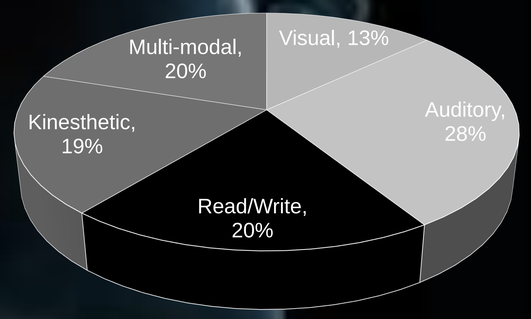


Figure 2: Learning Styles of Female Students



Results: Differences Between Majors

Preferred learning styles for make engineering students and female engineering students are shown in Figures 3 and 4, respectively. Preferred learning styles for male and female non-engineering students are shown in Figures 5 and 6, respectively,

Male engineering students prefer the visual and multi-modal styles and show less preference for the read/write style relative to their non-engineering male peers. Comparing male and female engineering students, make engineering students prefer the visual learning style and female engineers prefer the read/write style, relative to the opposite gender. For non-engineering students, males preference styles were more visual, less auditory, more read/write, more kinesthetic, and significantly less multi-modal than females.

Figure 3: Learning Styles of Male Engineering Students

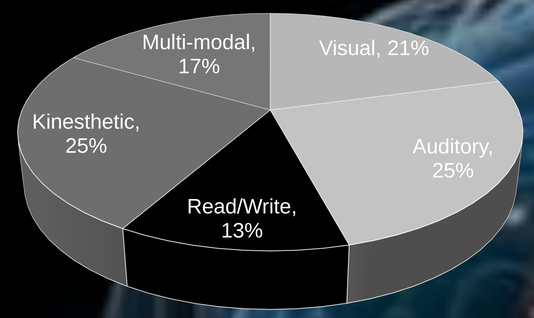


Figure 4: Learning Styles of Female Engineering Students

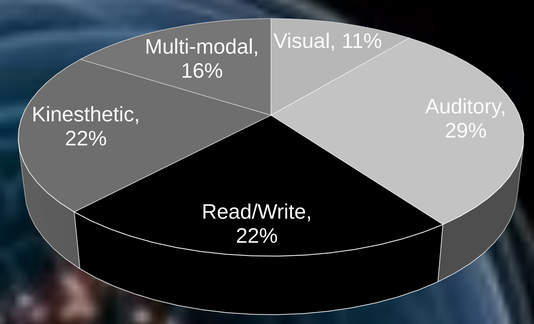


Figure 5: Learning Styles of Male Non-engineering Students

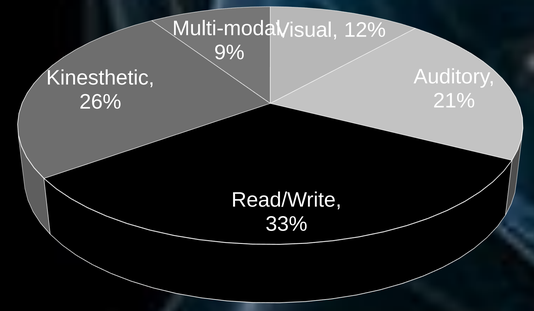
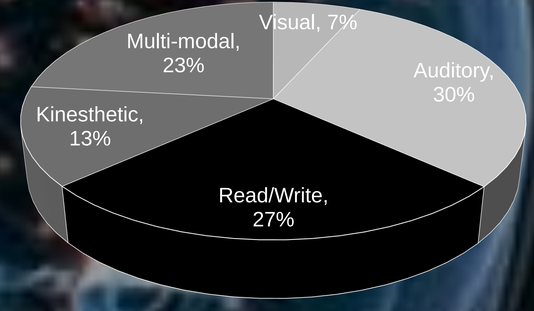


Figure 5=6: Learning Styles of Female Non-engineering Students



Discussion

Comparison with previous studies. Compared to previous studies, the students surveyed here appear to have a much smaller multi-modal preference. It is not known if this was influenced by the execution of the surveys.

Comparing groups. This study involved four groups of students: male engineers, female engineers, male non engineers, and female non engineers. It is possible to define an overall parameter to compare groups. If Group 1 had i_1 percent with preference to a style and Group 2 had i_2 percent, then the root mean square of the difference can be defined as: RME = $\sqrt{\frac{\sum(i_1-i_2)^2}{5}}$ where the sum is taken over all five learning styles. RMS values are listed in Table 2. Male and female engineers have more similar learning style preferences to each other than to non-engineers of their gender.

Table 2: Comparison of Study Subgroups

Comparison	RMS Value
Male engineers vs female engineers	6.0%
Male engineers vs male non-engineers	9.2%
Male engineers vs female non-engineers	6.2%
Female engineers vs female non-engineers	11.0%
Male non-engineers vs female non-engineers	9.9%
Male non-engineers vs female engineers	10.6%

References

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