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Matchmaker, Matchmaker, Make me a Match: Does Cognitive Style Make a Difference?

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What Did We Do?

Does my learning style matter?

The question of how to better match students' individual learning capabilities with instructional modalities, with a view to improving student performance, has increasingly attracted researcher and educator attention. Consistent with this trend, a team of faculty from the College of Arts, Sciences and Technology and International Institute for Innovative Instruction at Franklin University conducted a study that investigated whether differences between instructor and student learning styles may account for performance disparities as well as how students might perform differently as a result of their individual learning preferences.

Kolb(1984)'s experiential learning model provides a theoretical underpinning for the study. The model states that individuals learn out of experience through four different approaches: concrete experience, reflective observation, abstract conceptualization, and active experimentation. While an effective learning process engages all four approaches, an individual tends to have his/her own strengths/weaknesses in using experience, which results in preferred approaches. The image below illustrate Kolb's learning model and learning styles.
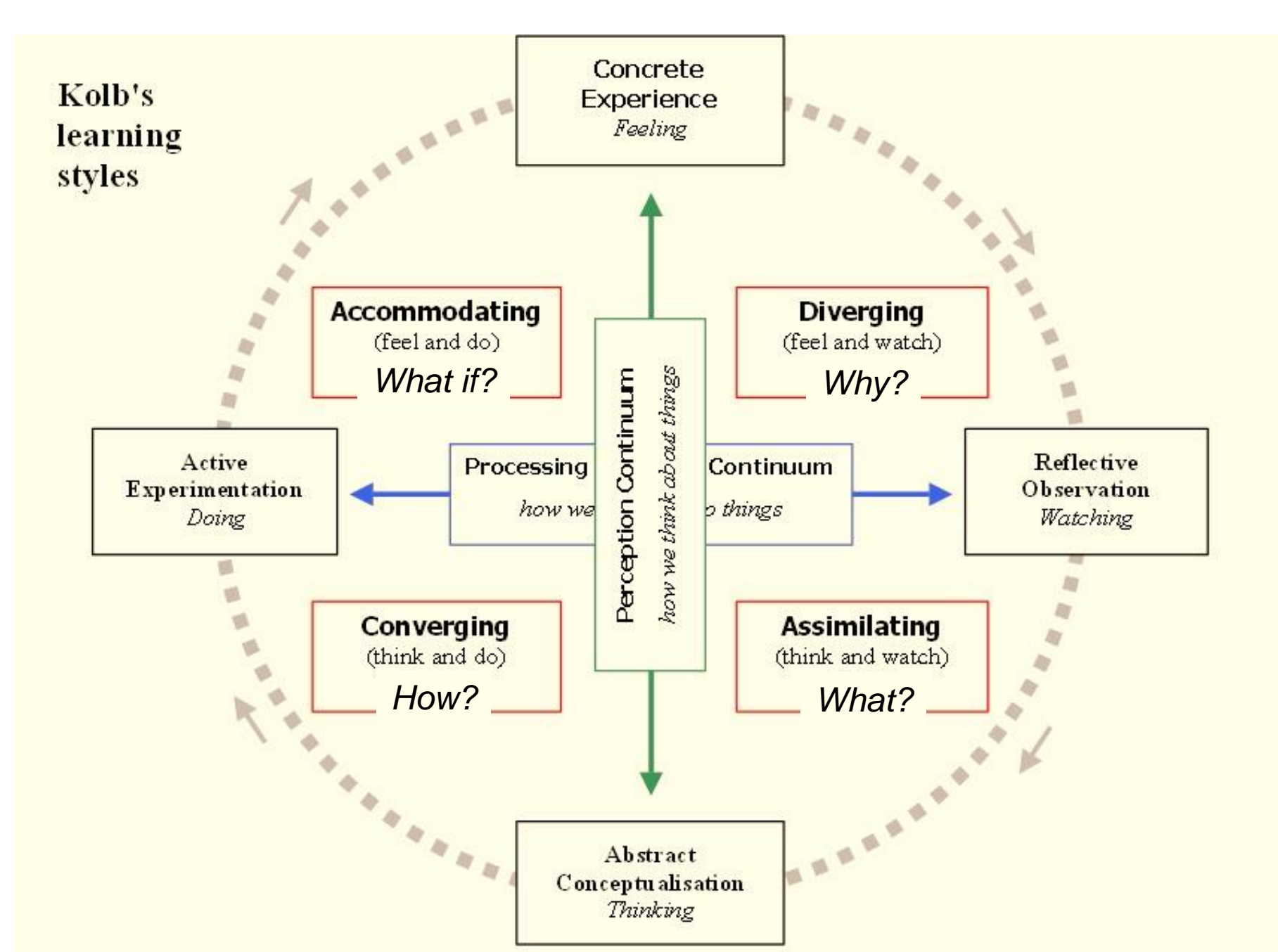
The study hypothesized that *a significant disparity between instructor and student cognitive learning style preferences will have a detrimental impact on student performance, specifically in MATH 215 Statistical Concepts*.

How Did We Do It?

Participants: A total of 161 college students from 8 MATH 215 Statistical Concepts classes participated in the study. Within these 8 classes, there were: 1 Diverger instructor, 3 Assimilator instructors, and 4 Converger instructors. No Accommodator style instructor was identified in this study.
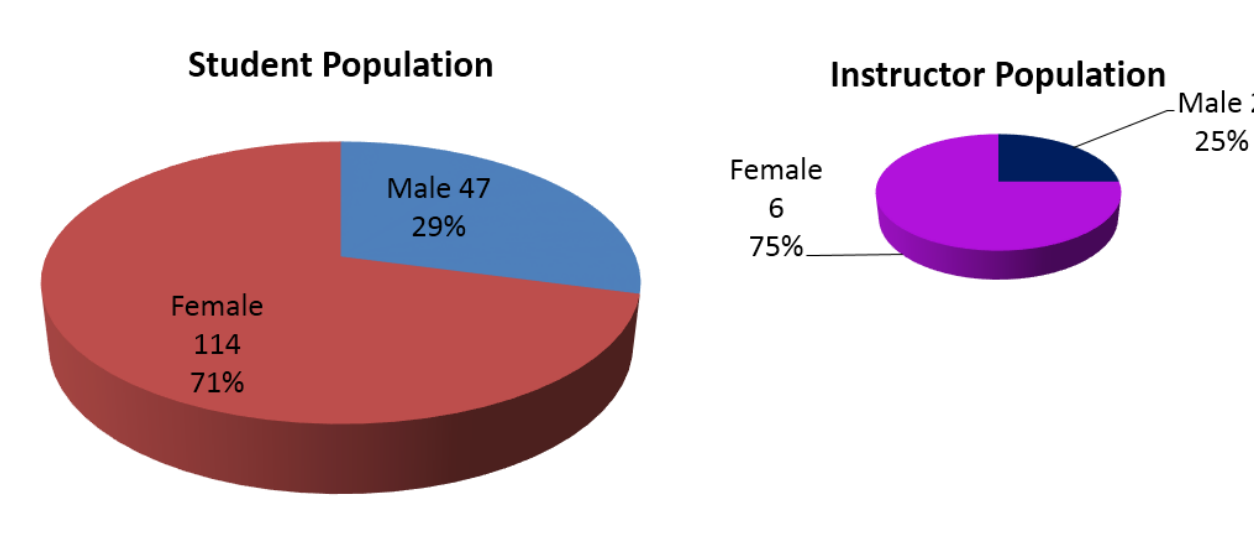
Instrument: The Learning Styles Inventory (LSI) was selected as the instrument to identify instructor and student learning style preferences. Two major factors include: four learning-style types (Diverger, Assimilator, Converger and Accommodator) and two matching conditions (whether instructor's learning style matches student' learning style or not).
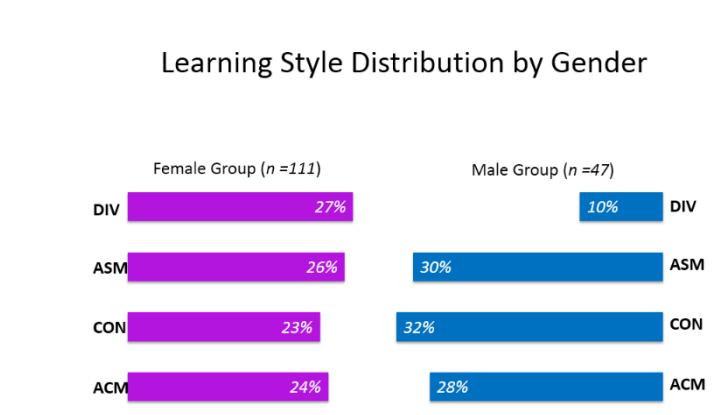
Diverger
People with this learning style are best at viewing concrete situations from many different points of view. They tend to have broad cultural interests and like to gather information. They are interested in people, tend to be imaginative and emotional, and often specialize in the arts. Working in groups, appreciating diverse viewpoints, and receiving personal feedback are some characteristics of the diverging learning style.

Assimilator
People with this learning style are best at understanding a wide range of information and putting it into concise, logical form. People with an assimilating learning style are less focused on people and more interested in ideas and abstract concepts. They tend to be effective in information and science careers. Lectures, readings, having time to think things through, and exploring analytical models are examples of some of the ways an assimilator prefers to learn.

Converger
People with this learning style are best at finding practical uses for ideas and theories. They are able to problem solve and make decisions by seeking appropriate solutions to questions or problems. People with a converging learning style tend to be effective in specialist and technology careers. They tend to learn best when given simulations, practical applications, lab work, and opportunity to experiment with new ideas.

Accommodator
People with this learning style have the ability to learn from primarily "hands-on" experience. They enjoy carrying out plans and involving themselves in new and challenging experiences. They are prone to acting on "gut" feelings rather than on logical analysis. People with an accommodating learning style tend to be effective in action-oriented careers such as marketing or sales. They enjoy setting goals, working with others, and using different approaches for completing a project.

LSI 3.1, HayGroup

Learning Style Distribution in the Study

Learning Style Distribution by Gender

Procedure:

- Arrangements were made with the HayGroup, publisher of the LSI, for online administration, automated scoring and results-capturing.
- MATH 215 instructors and students were sent an email invitation explaining the purpose of the study, and instructions for completing the LSI online during weeks 14 of the 15 week course. This procedure was followed for each of the three trimesters during 2013. Students' response rate was approximately 30%. Students' names were converted to a randomly generated code to protect their anonymity.
- The data were organized for analysis by grouping students with their respective instructors, including students' LSI learning style mode, gender and final course letter grade. A descriptive, independent sample t-test, and ANOVA were conducted to test the hypothesis.

What Did We Find?

Forty student styles matched those of their instructors' and 118 students had learning styles different from their instructors. An independent-samples t test was conducted to evaluate the hypotheses that whether the mean score of the match group is thought to be similar to that of the mismatched group. There was insufficient evidence that MATH 215 student performance differed significantly among the two conditions; whether student learning styles matched their instructors or not, $t(156)=.448$, $p=.65$.

Performance Comparison between Match and Mis-Match Groups

| Group	Mean	SD	N
Match	2.50	1.26	40
Mis-Match	2.40	1.23	118

$t(156)=.448$, $p=.65$

The results of the ANOVA analysis for the hypothesis that the four learning style groups would perform equally well was statistically significant, $F(3, 154)=4.16$, $p=.007$. This result indicated that the four groups differed as measured by their average grades. Convergers are the highest performers, and Divergers the lowest performers in learning statistical subject areas.

Descriptive Statistics of Four Learning Modes

Dimension	High M	High SD	High n	Low M	Low SD	Low N
CE	1.88	1.22	52	2.69	1.17	106
RO	2.34	1.26	105	2.58	1.18	53
AC	2.62	1.26	63	2.29	1.21	95
AE	2.59	1.21	99	2.15	1.24	59

Graphic Presentation of Student Performance by Learning Mode
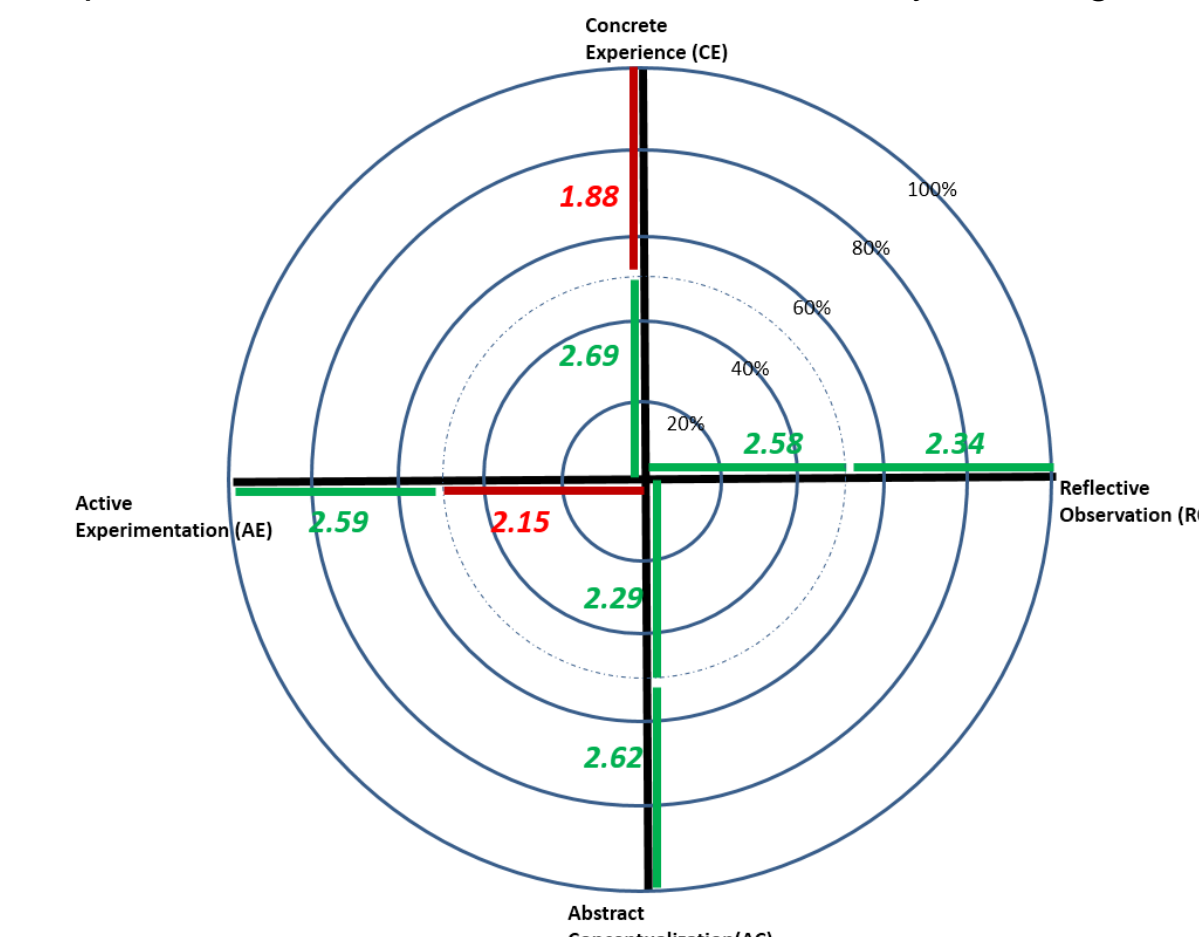
What Did We Learn?

- There is insufficient evidence that MATH 215 student performance differs significantly as to whether (or to what degree) their learning styles match their instructors or not, $t(156)=.448$, $p=.65$.

- The data does suggest that different learning style group perform differently, and especially there is significant difference between the Converger group and Diverger group.

- Students' performance (in MATH 215) is sensitive on the Concrete Experience (CE) and Active Experimentation (AE) dimensions.

What's Next?

- Use a holistic and adaptive teaching method
  - Help learners use all four stages on the learning cycle that is responsive to contextual needs.
  - Accommodate different teaching approaches (e.g. discussion, lectures, problem solving, discovery method, etc.)

- Use the LSI to:
  - Help identify the characteristics of divergent thinkers and how they might best learn and benefit from statistics instruction
  - Raise the awareness of mathematics instructors as to the impact on their students of learning style preferences.

- Identify realistic applications that:
  - Show how knowledge of statistics can be of benefit to individuals and groups
  - Create a real-life context and practical examples for presentation of the statistics material.

Our Sources

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