Connecting the Undergraduate Curriculum Guidelines to Your Program

Participation: www.StatsClass.org

Christopher Malone

cmalone@winona.edu

Beth Chance

bchance@calpoly.edu

WINONA STATE UNIVERSITY

CAL POLY SAN LUIS OBISPO

Background

BACKGROUND

- Working Group

  Beth Chance, Steve Cohen, Scott Grimshaw, Johanna Hardin, Tim Hesterberg, Roger Hoerl, **Nicholas Horton (Chair)**, Chris Malone, Rebecca Nichols, and Deborah Nolan

- Mission

  Update Undergraduate Curriculum Guidelines from 2000

The American Statistical Association endorses the value of undergraduate programs in statistics as a reflection of the increasing importance of the discipline. We expect statistics programs to provide sufficient background in the following core skill areas: statistical methods and theory, data manipulation, computation, mathematical foundations, and statistical practice. Statistics programs should be flexible enough to prepare bachelor's graduates to either be functioning statisticians or go on to graduate school.

Curriculum

CURRICULUM FOR MAJORS

- Statistical methods and theory

- Data-related topics and computation

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- Data-related topics and computation

- Mathematical Foundation

- Statistical Practice

KEY SKILLS

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- A statistician needs an integrated skill-set
    Theory, Applications, Data and Computation, Practice, Mathematics, Communication
- Curriculum should be based on a strong foundation which allows students to construct a scaffold for learning

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- Curriculum should be based on a strong foundation which allows students to construct a scaffold for learning

- This scaffold should permit student to **Make Connections** between concepts and theory and their applications to statistical practice

KEY CHANGES

- ### Increased importance of data-related skills
  Algorithmic thinking, higher-level languages, databases, computationally intensive methods, reproducibility

- ### Continue to enhance experiences that promote unstructured learning and enhance teamwork
  Research, Capstones, Internships, REU, etc.

Changes

Changes

KEY CHANGES

- ## Embrace a more comprehensive view of modeling
  Model building, explanatory models, predictive modeling, etc.

- ## Continue to promote communication skills
  Communication with technical and nontechnical audiences, ethical standards of practice

Question 1

Question #1

The ability to communicate and work effectively as a member of a team were key points identified in the guidelines.

Task: Identify ways in which the undergraduate curriculum, specifically in the first two years, could enhance statistical communication and teamwork.

Question #2

The guidelines emphasize the importance of data-related skills
Algorithmic thinking, higher-level languages, databases, computationally intensive methods, reproducibility

Questions: How might these skills be implemented into the undergraduate statistics curriculum? Should these be taught in stand alone courses or through an integrated approach? Should the first course for statistics majors be modified to incorporate elements of these data-related skills?

Question 2

Question #3

The guidelines discuss the importance of statistical methods and the importance of mathematical foundations.

What is an appropriate balance between methods and theory for undergraduates? How might a program achieve this balance? How does level of course, e.g. lower vs. upper division, affect this balance? Should methods and theory be taught in separate courses or through an integrated approach?

Question 3

Question #4

The guidelines suggest that colleges and universities may need to re-evaluate their introductory courses due to more-and-more students being exposed to statistics before entering a program (e.g. Advanced Placement, Common Core). Also, the impact of transfer students and articulation agreements may require changes. How should this changing demographic in students entering your major program be addressed?

Question 4

Question #5

The guidelines provide only marginal details for a minor or concentration. What curriculum (e.g., essential skills, experiences) are appropriate for a minor in statistics? How might this curriculum impact the curriculum for a major?

Question 5

Question #6

Suppose you have an opportunity to implement only one component of these guidelines into your program. What component are you likely to implement? How do you plan to make this change? What barriers do you foresee in your implementation?

Question 6

Question #7

How might you measure and evaluate whether or not the change specified above had a positive impact on your program?

Question 7

FINAL THOUGHTS

The guidelines should provide assistance and add value to the development of our curriculum moving forward. How might the statistics education community and/or the American Statistical Association ensure this will be the case?

Future

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Christopher Malone

cmalone@winona.edu

Beth Chance

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The End

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