EXPANDING YOUR TOOLKIT

Building Projects into Statistics Courses

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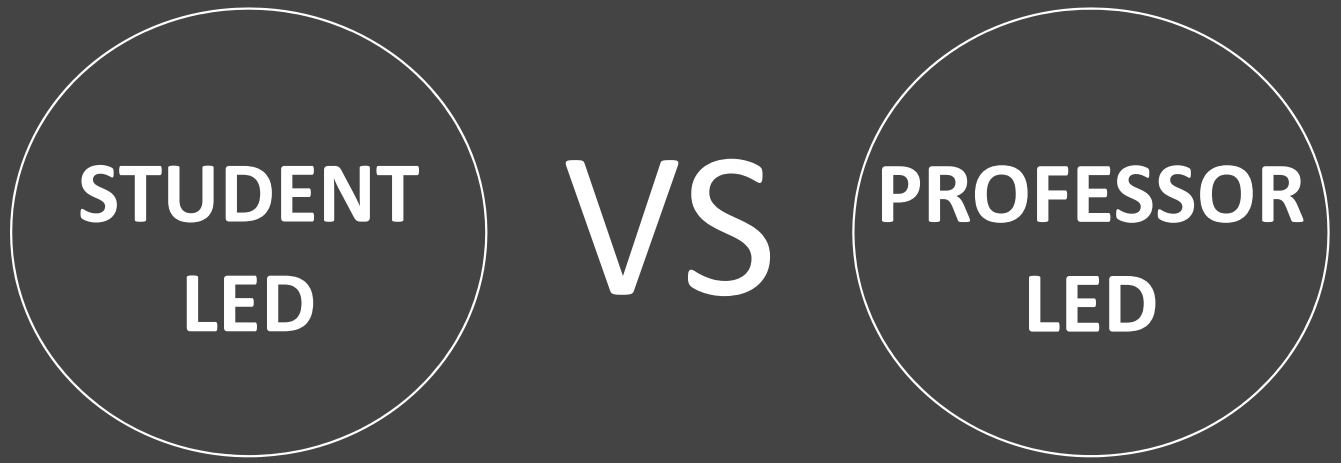
Literature Review

- “ Personal relevance appears to be important to the success of students in statistics education (Mvududu, 2003).
- “ Students are found to benefit in their learning by analyzing data they collected themselves, rather than data provided to them (Hogg, 1991).
- “ Although outcomes increased when student-led projects were used, these gains were not statistically significant (Spence, Sharp & Sinn, 2003).
- “ The findings to date seem to suggest a number of potential positive effects, though many of these do vary by instructor (Bailey, Spence & Sinn, 2013).



How are Projects Implemented?

- What are the benefits/drawbacks to students collecting the data?
- What are the benefits/drawbacks to professors providing the data?
- When should each type of project be used?
- How can each type of project be best implemented in your course?

STUDENT-LED PROJECTS

Benefits

Student-Led Projects

Creativity

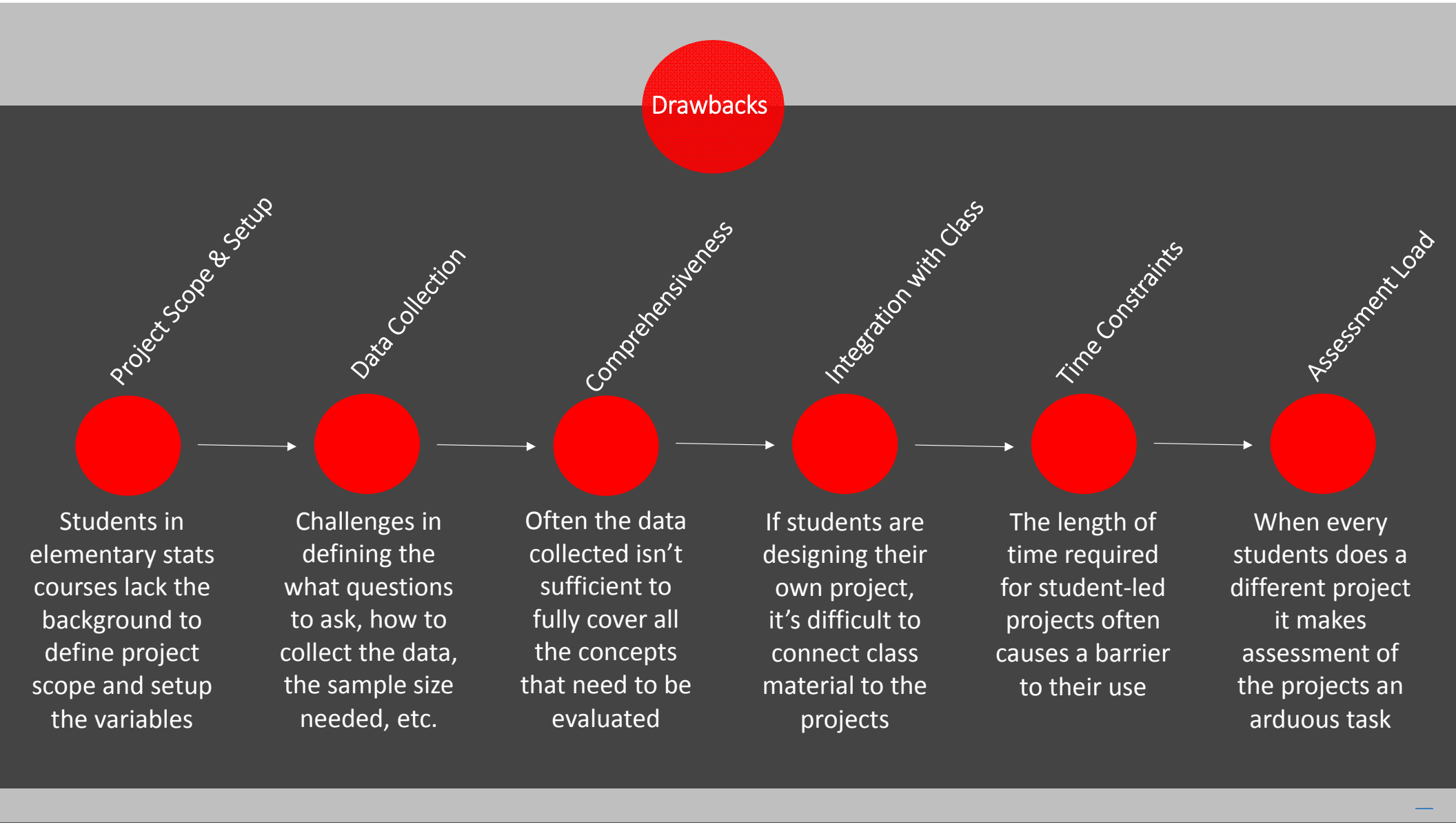
Students come up with their own ideas about what they want to study and how to apply core concepts

Research

Requires students to focus on how to do statistical research, including finding, gathering and organizing real data

Relevance

Students can gather data that is relevant to them, helping to increase buy-in and engagement


Drawbacks
Project Scope & Setup
Students in elementary stats courses lack the background to define project scope and setup the variables
Data Collection
Challenges in defining the what questions to ask, how to collect the data, the sample size needed, etc.
Comprehensiveness
Often the data collected isn't sufficient to fully cover all the concepts that need to be evaluated
Integration with Class
If students are designing their own project, it's difficult to connect class material to the projects
Time Constraints
The length of time required for student-led projects often causes a barrier to their use
Assessment Load
When every students does a different project it makes assessment of the projects an arduous task

PROFESSOR-LED PROJECTS

Benefits

Student-Led Projects

Creativity

Students come up with their own ideas about what they want to study and how to apply core concepts

Research

Requires students to focus on how to do statistical research, including finding, gathering and organizing real data

Relevance

Students can gather data that is relevant to them, helping to increase buy-in and engagement

Professor-Led Projects

Useful Data

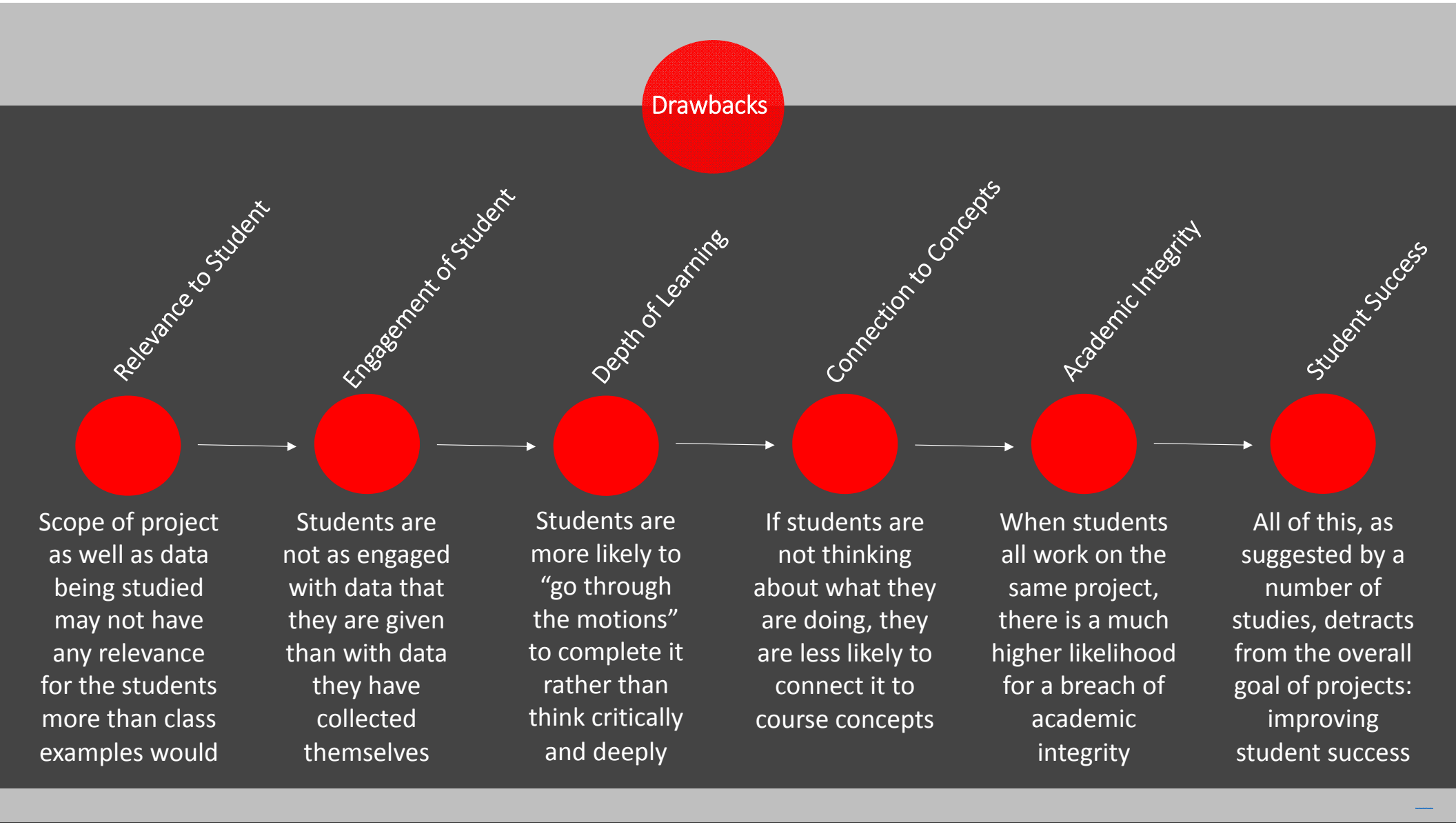
Data provided by professor is valid, appropriate for scope and goals of project, and easy to assess

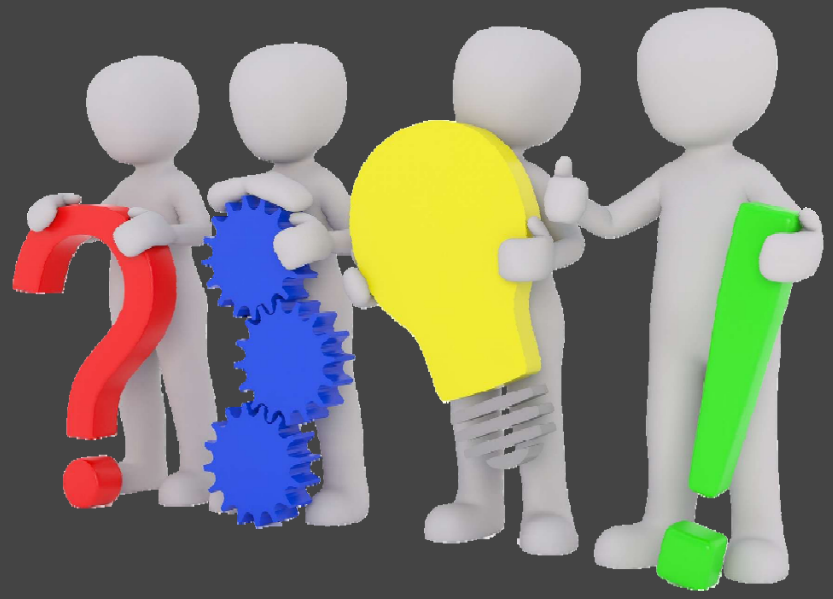
Software Tools

Requires students to focus on how to use various statistical tools and software to organize, analyze and interpret data

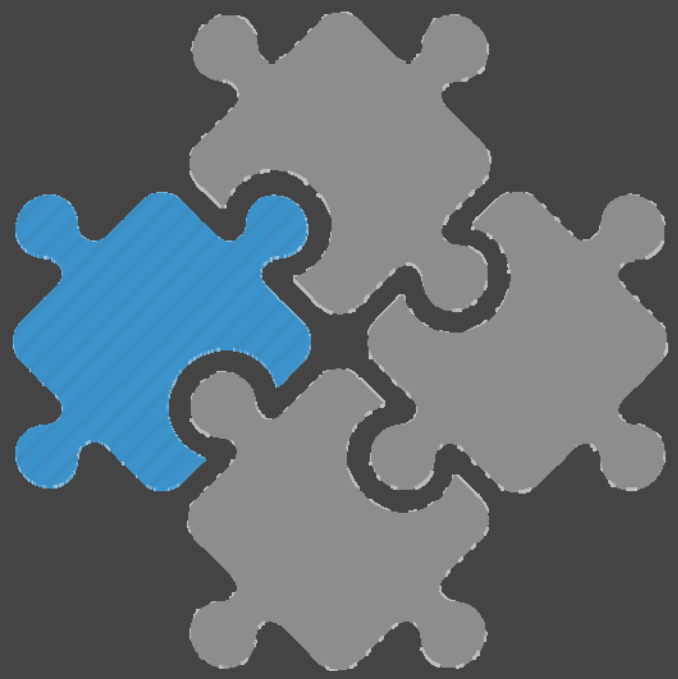
Skills Mastery

Students can focus on mastering skills that they studied in class, which reinforces and deepens learning


Drawbacks
Relevance to Student
Engagement of Student
Depth of Learning
Connection to Concepts
Academic Integrity
Student Success
Scope of project as well as data being studied may not have any relevance for the students more than class examples would
Students are not as engaged with data that they are given than with data they have collected themselves
Students are more likely to "go through the motions" to complete it rather than think critically and deeply
If students are not thinking about what they are doing, they are less likely to connect it to course concepts
When students all work on the same project, there is a much higher likelihood for a breach of academic integrity
All of this, as suggested by a number of studies, detracts from the overall goal of projects: improving student success



DISCUSSION OF EXPERIENCES



STRATEGIES FOR SUCCESS

Strategies

Student-Led Projects

Open-Ended

Focus on keeping the instructions broad, allowing students to focus on implementing the methods they learned

Capstone

Ensure your students have a sufficient grasp of the basic concepts through the use of other evaluation tools first

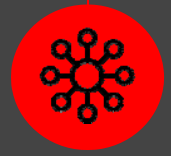
Invest Time

Make sure you structure the course so that students have the time to properly complete their projects well

Professor-Led Projects

Keep it Real

Know your students and ensure that you provide data that is relevant and applicable to their discipline



Mix it Up

Find ways to vary the data and tasks for students to ensure that students complete projects with academic integrity

Critical Thinking

Give students opportunities to think critically about their data analysis by asking questions that require reflection

Works Cited

- Hogg, R. V. (1991), “Statistical Education: Improvements are Badly Needed,” The American Statistician, 45, 342-343.
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