The Educational Impact of Working in a Statistical Collaboration Laboratory

Dr. Eric Vance[1], Thomas Metzger[1], Tonya Pruitt[1], Dr. Ayele Taye Goshu[2]

[1] Virginia Tech Department of Statistics, Blacksburg, VA, [2] School of Mathematical and Statistical Sciences, Hawassa University, Hawassa, Ethiopia

What is LISA?

The Laboratory for Interdisciplinary Statistical Analysis (LISA) was created at Virginia Tech in 2008. Its mission is to **train statisticians to become interdisciplinary collaborators**, provide research infrastructure to enable and accelerate high impact research, and engage with the community in outreach activities to improve statistical skills and literacy.

LISA Services

- **In LISA collaboration meetings**, statistical collaborators must identify and understand the clients' overall research goals and specific scientific questions before providing statistical advice or analysis.
- In **Walk-in Consulting**, statistical consultants answer clients' specific statistical questions regarding their research.
- In **LISA Short Courses**, collaborators teach statistical concepts and software that attendees can apply in their research.

**Since 2008: 223 Collaborators Trained
2735 Collaboration Projects**

Collaborator Training

LISA uses a combination of methods for training:
- "Communication in Statistical Collaborations" (a three-credit hour course)
- Weekly discussions on projects and statistics
- Video Coaching and Feedback Sessions
- Pod mentoring groups
- Collection of feedback from clients.

Training Topics Include:
- Listening and paraphrasing
- Asking good questions
- Managing a successful collaboration meeting
- Giving effective feedback
- Writing statistical methods sections of papers
- Explaining statistics to non-statisticians.

Research Study on the Impact on Collaborators

Current and former collaborators as of December 2014 (N=173) were sent a survey to gauge LISA's impact on their technical skills, non-technical skills, and career.

Example Questions: On a scale from 1 to 5, where 1 represents "Strongly Disagree" and 5 represents "Strongly Agree", my involvement in LISA…
1. …Led to a deeper understanding of the theory and methods of statistics.
2. …Improved by listening, paraphrasing, and summarizing skills.
3. …Was an important factor in helping me acquire the job I wanted.

Impacts were divided into five categories: classroom spillover, technical impact, nontechnical impact, computing skills impact, and job impact. Multiple survey items were analyzed together to determine each LISA's impact on each individual category.

Impact	Mean Response (out of 5)	n
Classroom Spillover	3.65	121
Technical Impact	4.02	121
Nontechnical Impact	4.07	121
Computing Skills Impact	4.23	120
Job Impact	3.95	104

Working in a Statistical Collaboration Laboratory Improves:
- **technical knowledge of statistics**
- **collaboration skills with non-statisticians**
- **enhances career-readiness and marketability.**

Quotes from LISA Collaborators

"Any time you can apply statistics to other disciplines, it is a win. It helps statistics students get visibility in how to use all of the things they're learning to apply outside of the classroom, and perhaps learn some new tools to apply to relevant problems."

"My involvement in LISA had a strongly positive impact on my professional career and personal life. Academically, it provided me with real-world applications of the statistical theory that we learned in our classes, which gave me a stronger understanding of the practical applications of the theory. Professionally, my time in LISA developed my ability to interact with clients, communicate statistical concepts in terms they understand, and provide results that they actually need rather than results they initially think they need."

Quantitative Results

- 88% of collaborators reported an increased desire to apply statistics in interdisciplinary settings
- 94% of collaborators reported that LISA improved their technical skills; 95% reported so for nontechnical skills
- LISA's impact on the technical skills of doctoral students is about 7% higher than the impact on masters students
- For every additional ten projects, LISA's impact on students' technical skills increased by 2%.
- Collaborators overwhelming (9.2/10) recommend involvement in LISA to prospective graduate students.
- Students view LISA as an important and positive aspect of their graduate careers.
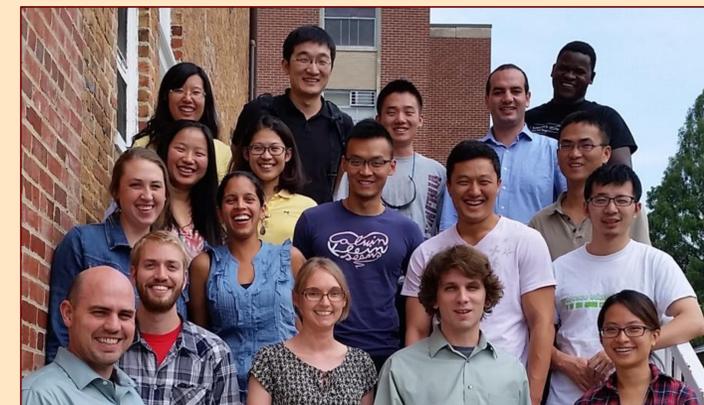
Recommendations

- We encourage other universities to create similar statistical collaboration laboratories for the benefit of both researchers as well as statistics students.
- We encourage a training model focused on communication and collaboration, as well as subject-specific proficiency.
- This model is adaptable for a variety of disciplines and student populations.