Research: Education Research Program   (Judson, **Mesa**, graduate student)

Education Research Program—Year 1 Pilot (4 test sites), Years 2–3 full implementation (12 test sites per year)

- Research Conditions
  - Linear Algebra Courses with online text, SageMathCloud and Sage Cell Server implementation
  - Linear Algebra Courses with less dynamic resource textbook
  - Abstract Algebra Courses with online text, SageMathCloud and Sage Cell Server implementation
  - Abstract Algebra Courses withless dynamic resource textbook
- Basic Data Collection-All Sites: Logs and pre- and post-surveys of students
- In-depth Data collection-Four case-study Sites: Interviews and observations with faculty and students
- Analysis of SageMathCloud usage data with enhanced course learning data
- Individual, cross, and longitudinal case analysis and Descriptives, Correlations, and HLM modeling

Evaluation: Evaluation and Critical Review   (**Lynds**)

- External evaluator review of research instruments and framework
- Annual formative evaluation reports (test-site faculty interview and SageMathCloud usage data)
- Advisory board annual recommendations

Resource Design and Development: Online texts, Sage Cell Server and SageMathCloud   (**Beezer**, **Farmer**, Judson, Novoseltsev)

For linear algebra and abstract algebra courses

- More formats for SL2X and MathBook XML outputs
- Improvements in Sage Cell Server stability, scalability, and hosting
- Enhance SageMathCloud for data collection (Instructor's Dashboard)

Evaluation: Evaluation and Critical Review   (**Lynds**)

- Guidance from Advisory Board
- Critical review by Editorial Board
- Annual evaluation of SageMathCloud usage analytics by external evaluator

Dissemination: American Institute of Mathematics Open Textbook Initiative   (**Morrison**)

- Editorial Board (experienced authors and editors)
- List of approved textbooks
- Editorial and practical guidance for open textbook authors

Evaluation: Evaluation and Critical Review   (**Lynds**)

- Front-end evaluation registration surveys to maximize effectiveness of workshops and meetings
- Formative evaluation daily surveys and observation data to enhance workshops in real time
- Summative evaluation reports, including pre/post analysis and recommendations for next event

Dissemination: Workshops and Professional Development   (Beezer, Hitchman, **Judson**)

- Sage Edu Days Workshops (in years 2, 3, and 4)—professional development for test site faculty and other stakeholders
- Author/Editor Workshop (in year 2) for online textbook authors and developers

Figure 4.1: Project Logic Model

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