Designing Authentic Assessments for Learning

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Enhancing Assessment Practices

- Scoping review of literature on assessment in STEM
- Results in 5 categories:
  1. Quizzes/Tests
  2. Assignments/Projects
  3. In-Class Assessments
  4. Self-Learning/Mastery Grading
  5. Communication/Other

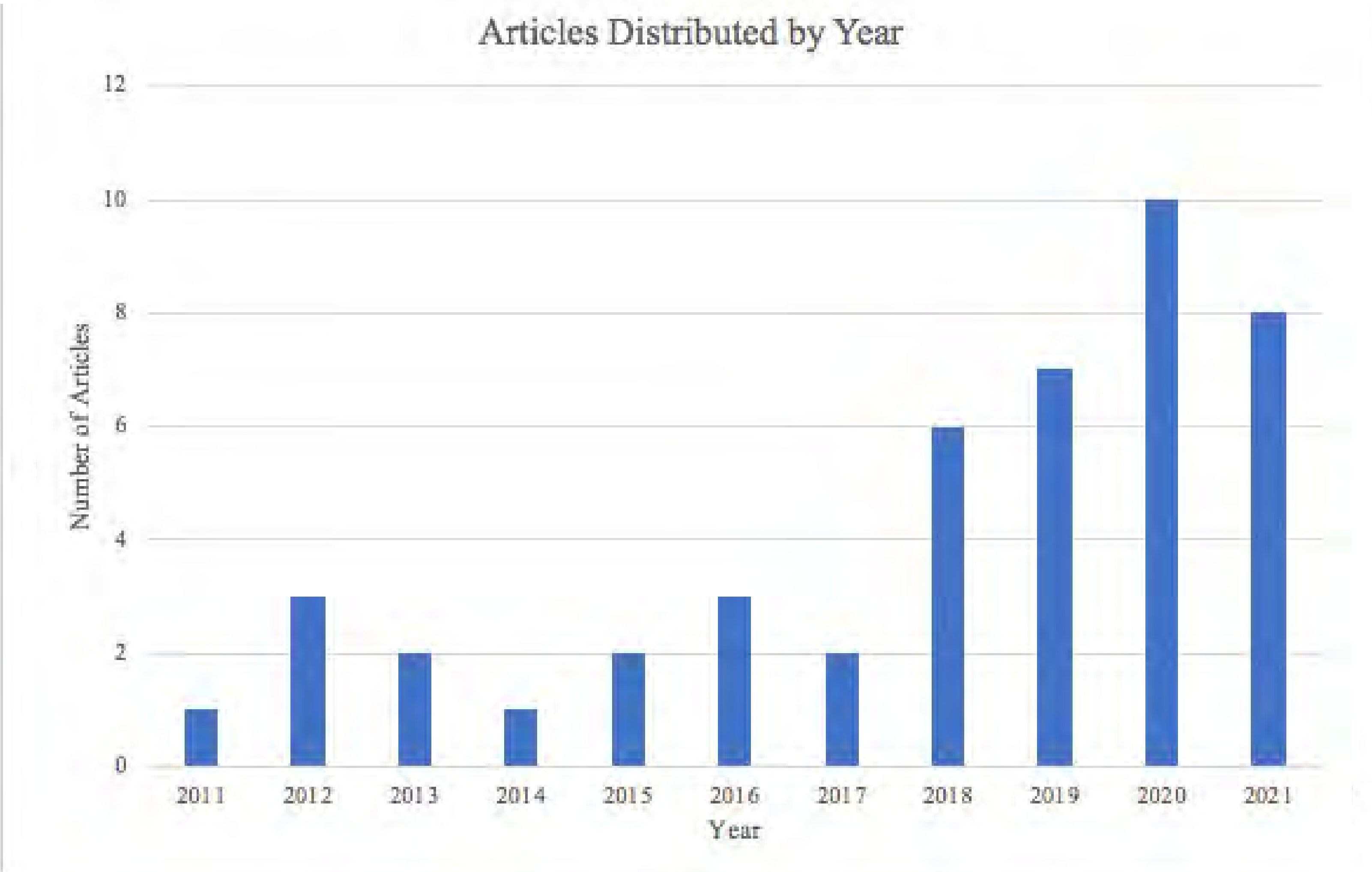
Scoping Review Process

- Research question:
  - What is known from existing literature about practices for educators to assess students in undergraduate STEM education?
- Search strategy and terms:
  - ERIC database, “Assessment” AND “STEM or Math”
  - Peer reviewed, higher ed, English only
- Screening process:
  - 766 abstracts read -> 103 papers fully read -> 45 included

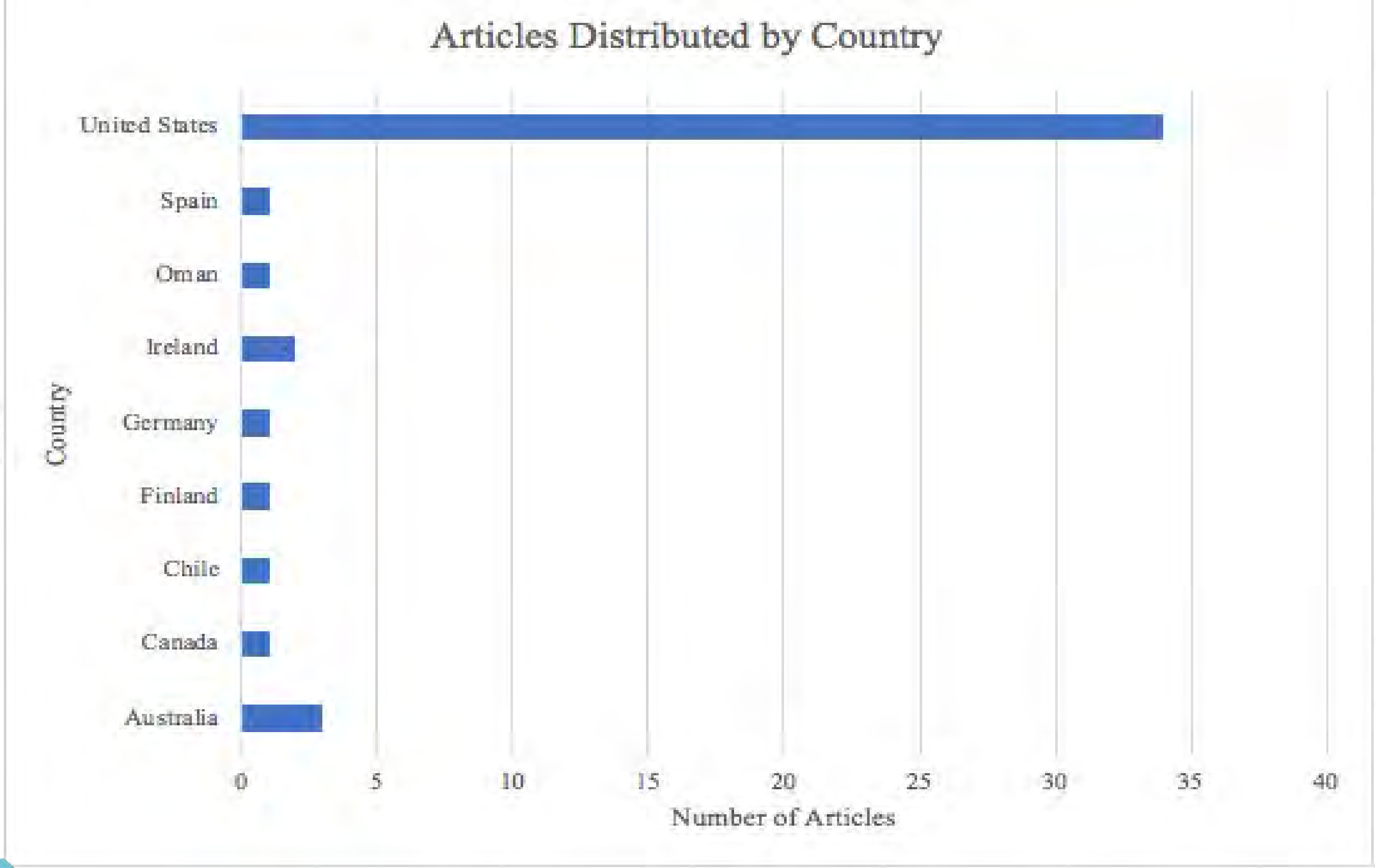
Data Charted

- Article info: title, author(s), year of publication, journal of publication, source
- Instructional context: subject(s) or course, class size, number respondents, institution(s), country, course delivery modality
- Study details: purpose of the study, type(s) of assessment used, the goal behind the assessment(s), results
- Potential application: extra resources, best practices, limitations, instruments used

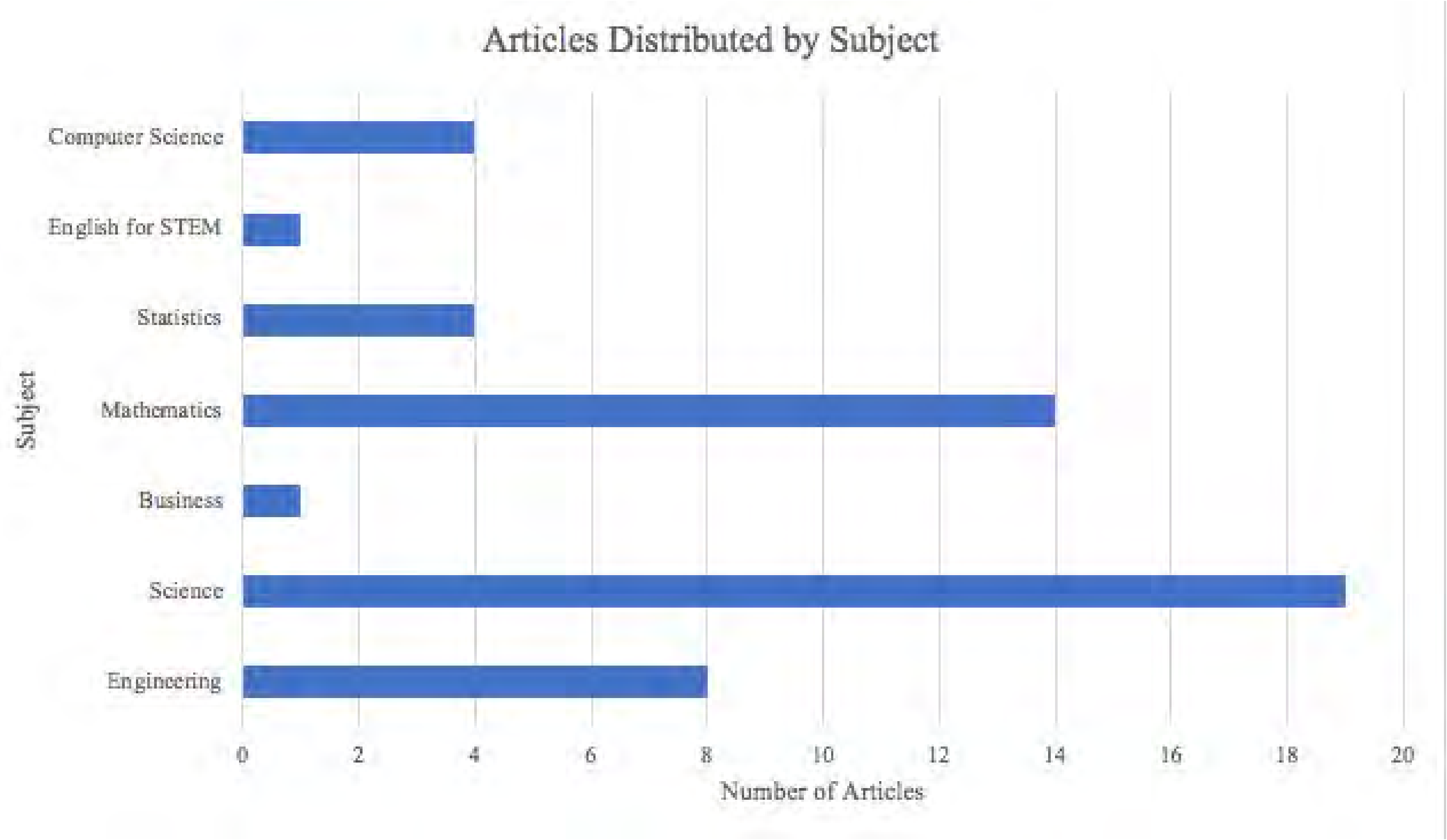
Paper Demographics



Paper Demographics



Paper Demographics



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Paper Demographics

1. Quizzes/Tests

- No performance gap in computer vs paper delivery
  - Some benefits of computer (multiple attempts)
- Questions
  - Student-written questions
  - Longer sentences hinder understanding
- Preparation
  - Practice tests/questions
  - Reference sheet vs open book

2. Assignments/Projects

- Topic choices
  - Student interests
  - Agency increases engagement
- Scaffolding
  - Provide support and feedback
  - Several short projects more effective than one long one
  - Exemplars

3. In-Class Assessments

- In-class multiple choice quizzes
  - No difference if images are present
- Hands-on activities
  - Labs, worksheets, scenario discussions
- Rubrics
  - Students clarify learning goals

4. Self-Learning/Mastery Grading

- Optional test re-takes
  - Various grading options, less inflationary pressure
  - Grades improved, mixed effect on anxiety, increased time
- Mastery grading
  - Multiple attempts to achieve mastery of learning outcomes
  - Reduced anxiety, requires clear objectives
- Self-assessment
  - Correlation with instructor grades mixed
  - Guidance and feedback essential

5. Communication/Other

- Oral exams
  - Students can better articulate understanding
- Writing exercises
  - Short in-class activities improved exam performance
- Group video assignments
  - Developed effective digital communication skills

Key Takeaways

- Research supports the use of authentic assessments to enhance student learning
- Perceived efficacy and quality feedback are essential
- Try it and encourage your colleagues to do it too!

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