

Use of G2C to Improve College Algebra at Gordon State College

Gateways to Completion

October 18, 2018

Overview

- The Math 1111 course specific committee started work in Fall 2016 to improve our College Algebra course as part of Gordon State's Quality Enhancement Plan (QEP).
- The use of Gateways to Completion was a major part of our reform effort.

Committee members

Dr. Bernard Anderson (Chair)

Solomon Betanga

Dr. Geoff Clement

Dr. Allen Fuller

Dr. John George

Dr. Nikita Patterson

Dr. Christopher Phillips

Other participants

- The support of Dr. Anna Higgins-Harrell, Britt Lifsey, and the Gordon State administration were fundamental to our success.
- We were also supported by Dr. Stephen Raynie and the first year course team, the QEP steering committee, the Math 1111 task force, and our pilot instructors for Math 1111.

Process and Changes

Faculty buy-in through transparency:

- Subcommittee met every 2 – 3 weeks in first year.
- Membership and attendance open to entire department.
- Proposals must pass vote at two consecutive meetings.
- Pending proposals and other documents emailed to all department faculty.

Changes

- We implemented over fifty proposals to change teaching and advising for Math 1111.
- Wherever possible, major proposals were based on research of best practices.
- We created a guidebook for pilot section instructors to help them organize documents we created and implementation of proposals.

Major proposals

- Limit class sizes
- Supplemental Instruction (SI) when funded
- Automated homework grading systems
- Clickers
- Metacognition lecture and handouts based on Teach Students How to Learn by Sandra McGuire
- Values intervention along the lines of Cohen

Major proposals (continued)

- Increased use of discovery, verification, and inquiry based learning
- Coordinated with creation of new first year course on helping students obtain a growth mindset, social belonging, grit, etc.
- Revised curriculum to remove some topics
- Every week instructors hold one office hour each in SSC and STEM center
- Every lecture is open to every math instructor

Implementation

- We started with three pilot instructors in Spring 2017.
- Currently have seven pilot instructors teaching a majority of our Math 1111 sections.
- Goal is to convert all Math 1111 sections to new format.

Assessment and Results

Assessments

Over ten assessments are used to measure the effectiveness of the program. We will discuss a few important assessments here:

- The end of semester direct assessment
- ABC rate of students in Math 1111
- ABC rate of students taking Pre-calculus (Math 1113) or first year Chemistry (Chem 1211K) the next semester.

End of semester direct assessment

- The end of semester direct assessment is a 50 minute test given at the end of the semester on the goals given by the QEP.
- The test has five sections, one for each goal: numerical intuition, basic algebra, fractions, graphing, and mathematical reading comprehension.
- 30 points possible per section, 150 total points possible.

Direct assessment results

Spring 2017:

Sections	n	Numeric	Algebra	Fraction	Graph	Read	Total
Pilot	26	12.5	20.7	19.0	26.9	11.6	90.7
Not pilot	201	9.3	17.2	12.1	19.6	4.5	62.7

Fall 2017:

Sections	n	Numeric	Algebra	Fraction	Graph	Read	Total
Pilot	64	12.8	21.1	15.8	25.8	6.7	82.2
Not pilot	335	10.9	19.0	14.0	17.2	5.1	66.3

Direct assessment results (continued)

Spring 2018:

Sections	n	Numeric	Algebra	Fraction	Graph	Read	Total
Pilot	47	14.7	21.7	18.3	25.2	6.0	85.9
Not pilot	77	10.5	19.1	12.9	18.0	3.9	64.4

- Difference between total scores highly significant in Fall 2017 ($p < 0.001$) and Spring 2018 ($p < 0.001$).

Math 1111 ABC rates

- Gains in student understanding have not been reflected in Math 1111 pass rates.
- For Spring 2018, the pass rate was 51% in the pilot sections, and 50% in the non-pilot sections.
- Not clear at this time what is causing the gap.

Future course ABC rates

Math 1113:

Math 1111 section previous semester	n	Math 1113 ABC rate
Pilot	11	73%
Not pilot	102	37%
Other (e.g. delayed taking Math 1113)	14	64%

Chem 1211K:

Math 1111 section previous semester	n	Chem 1211K ABC rate
Pilot	8	100%
Not pilot	112	68%
Other (e.g. delayed taking Chem 1211K)	8	50%

Conclusion

- Future course pass rate data is preliminary but strongly encouraging. The increased skills indicated in the end of semester direct assessment seem to have a noticeable effect on future student performance.
- We plan to continue innovating the way we teach College Algebra and increasing the number of participating instructors.