

# Pathways through Algebra

A California Community College faculty initiated project for student success in Algebra.

[www.algebrapathways.org](http://www.algebrapathways.org)

WHO ARE WE?

# Pathways

Pathways is a statewide community college faculty-based initiative, whose purpose is to identify, develop, and disseminate effective, replicable methods and strategies to increase the success rate in algebra courses across diverse student populations, while increasing understanding and mastery of algebra skills.

Who are we?

# Pathways

The Pathways through Algebra Project consists of a consortium of California community colleges together with the Center for Student Success, the Lumina Foundation and the California Community College Foundation, funded by the National Science Foundation.

# Why Beginning Algebra?

Beginning Algebra is recognized by the California State Chancellor's office as a 'gatekeeper' course. Students who are unable to pass Beginning Algebra are unable to:

- acquire certification in vocational programs
  - complete an AA or AS degree
    - transfer to a four year institution

RESEARCH

# Pathways

**The statewide success rate has been determined by dividing the total number of students completing the course with a Credit, or a C or better by the total number of students enrolled in a beginning algebra course as of the 1st census date.**

## RESEARCH

# Pathways

**Based on the 1997 – 1998 data  
supplied by the Chancellor's Office:**

**The student success rate statewide for  
Beginning Algebra was about 46%!**

**The statewide success rate for all  
community college classes is about 68%**

## RESEARCH

# Pathways

**Based on the data supplied  
by the Chancellor's Office:**

**The student success rate for the  
middle 50% of the colleges falls  
between 43% and 52%.**

## RESEARCH

# Pathways

**Based on the data supplied  
by the Chancellor's Office:**

The statewide success rate for African American students is about 13.3% lower than for White, non-Hispanic students.

The statewide success rate for Hispanic students is about 7.3% lower than for White, non-Hispanic students.

The concern:

Many students enter a math course  
with deficiencies in their  
mathematical background.

## The intervention:

ALEKS is a diagnostic computer system which identifies a student's weaknesses and presents them with the necessary remediation to be successful in their current math course.

What worked?

# Pathways

- 1 hour each week with two hours outside of class on Basic Math and Beginning Algebra.
- Linking ALEKS work with class work.

What didn't work?

# Pathways

- Asking students to work on ALEKS with no accountability.
- Letting students stay too long in Basic Math

## The concern:

Although peer tutoring has been shown to be successful in a variety of academic areas, including mathematics, developmental students are often intimidated by the tutors or afraid to go for fear of appearing 'stupid'.

## The intervention:

A center which actively encourages developmental students and supplies specially trained tutors may improve these student's confidence and grades.

What worked?

# Pathways

- Math Study Center Staff visited all sections of the beginning algebra class and give a short description of services offered at the MSC.
- Faculty hold office hours in MSC
- Hire a tutor who only works with Beginning Algebra students
- Hire and then train peer tutors who have just completed Beginning Algebra

What didn't work?

# Pathways

- Call each at-risk Beginning Algebra student and inviting the student to a workshop.
- Waiting for the students to find the Math study Center

The concern:

Research has shown that a standard college study skills course does not help with a student in their mathematics courses.

## The intervention:

Develop a math specific study skills course designed to help students review their mathematical background, face their fears and learn to use their personal learning styles to become successful mathematics students.

What worked?

# Pathways

- Students were surprised to find out about learning styles and multiple intelligences.
- Students were encouraged by others experiences with mathematics.
- Students were surprised by simple test taking techniques like brain dumps and eating breakfast!

What didn't work?

# Pathways

- Students did not want to sign up for 1 unit study skills course in addition to the 5 unit Algebra class
- Since it was linked to a specific section of Elementary Algebra, there were students that did not need to be there.
- If it was not linked, there were not enough students to run the course.

# Pathways

## Computer Assisted Learning

Results:	Control	Treatment	Total N
Success A-C, CR	48.6%	44.1%	49
No-Success D,F, W, NC	51.4%	55.9%	55
Total N	70	34	104

Study Center

# Pathways

Results:	Control	Treatment	Total N
Success A-C, CR	39.2%	60.3%	280
No-Success D,F, W, NC	60.8%	39.7%	367
Total N	521	126	647

## Study Skills Course

# Pathways

Results:	Control	Treatment	Total N
Success A-C, CR	53.6%	66.7%	31
No-Success D,F, W, NC	46.4%	33.3%	21
Total N	28	24	52

# Pathways

## Overall Success Rates by Ethnic Group

treatment vs. control

Asian – 60.0% vs. 46.4% N=102

Latino – 49.4% vs. 36.8% N=261

Black – 33.3% vs. 31.7% N=104

White – 56.1% vs. 46.8% N=582

Other – 50.0% vs. 54.0% N=83

# Pathways

## **Student focus group responses:**

- Teachers should be sensitive to their students.
- Teachers should be patient and not become frustrated.
- Ethnicity is not a factor, however an accent may be difficult to understand.

# Pathways

## **Student focus group responses:**

- Teachers should adjust their teaching to the level of the class.
- Teachers should show every step.
- Teachers should get the students involved in the class by having them work in groups or go to the board.
- Give frequent tests or quizzes.

# Pathways

## **Student focus group responses:**

Students are frustrated by the different expectations for high school vs. community college, especially the calculator issue.

## Current Research

# Pathways

<b>Level</b>	<b>Year</b>	<b>Enrollments</b>	<b>Retention Rate</b>	<b>Success Rate</b>
Beginning	2001	71,275	71.7%	47.5%
	2002	74,907	72.2%	49.7%
	2003	71,676	73.2%	49.2%
	Total	217858	72.4%	48.8%

## Current Research

# Pathways

<b>Level</b>	<b>Year</b>	<b>Enrollments</b>	<b>Retention Rate</b>	<b>Success Rate</b>
Intermediate	2001	60,484	73.1%	50.8%
	2002	63,344	73.2%	51.8%
	2003	62,022	73.7%	51.5%
	Total	185,850	73.3%	51.3%

# Current Research Beginning Algebra

# Pathways

<b>Gender</b>	<b>Enrollment</b>	<b>Retention Rate</b>	<b>Success Rate</b>
Female	296,237	73.5 %	51.9 %
Male	191,876	71.5 %	46.4 %
Total	488,113	72.7 %	49.6 %

Current Research  
Intermediate Algebra

# Pathways

<b>Gender</b>	<b>Enrollment</b>	<b>Retention Rate</b>	<b>Success Rate</b>
Female	237,711	75.2 %	54.8 %
Male	177,048	73.2 %	50.1 %
Total	414,759	74.3 %	52.8 %

# Current Research Beginning Algebra

# Pathways

<b>Age</b>	<b>Enrollment</b>	<b>Retention Rate</b>	<b>Success Rate</b>
19 or younger	186,295	74.4 %	46.3 %
20 – 24	152,736	70.6 %	46.4 %
25 – 29	51,666	72.4 %	54.7 %
30 – 34	32,026	73.2 %	57.7 %
35 – 39	24,054	73.3 %	59.0 %
40 – 49	32,449	73.2 %	59.4 %
50 or older	10,776	69.7 %	55.4 %
Total	490,002	72.7 %	49.7 %

# Current Research Intermediate Algebra

# Pathways

<b>Age</b>	<b>Enrollment</b>	<b>Retention Rate</b>	<b>Success Rate</b>
19 or younger	171,469	76.9 %	52.5 %
20 – 24	147,780	71.7 %	49.0 %
25 – 29	40,236	73.0 %	56.0 %
30 – 34	20,823	73.7 %	59.3%
35 – 39	13,608	74.5 %	61.5 %
40 – 49	17,299	75.2 %	63.3 %
50 or older	5,256	73.7 %	60.5 %
Total	416,471	74.5 %	52.8 %

# Current Research Beginning Algebra

# Pathways

Race	Enrollment	Retention Rate	Success Rate
African American	48,650	66.3%	40.0%
American Indian	5,138	69.5%	44.4%
Asian Pacific Islander	55,402	76.1%	54.8%
Hispanic	167,906	71.5%	46.8%
Other (non-white)	9,652	72.2%	47.9%
White	180,292	74.5%	53.5%

# Current Research Intermediate Algebra

# Pathways

Race	Enrollment	Retention Rate	Success Rate
African American	28,139	68.1%	42.5%
American Indian	3,833	70.0%	47.0%
Asian Pacific Islander	63,675	77.7%	57.0%
Hispanic	123,875	72.0%	48.6%
Other (non-white)	8,859	73.9%	52.5%
White	166,058	75.9%	56.0%

# Pedagogy vs. Curriculum Pathways

Pedagogy refers to the presentation of the material:

- Pedagogy may be determined by the individual instructor.
- Pedagogy may differ depending on concept.
- Pedagogy may determine contextual vs. symbolic presentations.

# Pedagogy vs. Curriculum Pathways

Curriculum refers to the topics, skills and concepts required for the course.

- Curriculum may be influenced by pedagogy.
- Curriculum is often determined at a department or district level.
- Curriculum dictates what we have to teach.

## Survey Responses

# Pathways

How many sections of beginning algebra are taught at you institution?

Under 6	2	2.94%
6-10	13	19.12%
11-15	8	11.76%
Over 15	43	63.24%
(blank)	2	2.94%

## Survey Responses

# Pathways

What percent of the beginning algebra sections are taught by full-time instructors?

24% and Under	7	10.29%
25%-40%	12	17.65%
41%-60%	25	36.76%
61%-75%	16	23.53%
76% and Over	7	10.29%
(blank)	1	1.47%

## Survey Responses

# Pathways

How many sections of intermediate algebra are taught at you institution?

Under 6	4	5.88%
6-10	12	17.65%
11-15	15	22.06%
Over 15	37	54.41%

## Survey Responses

# Pathways

What percent of the intermediate algebra sections are taught by full-time instructors?

24% and under	4	5.88%
25% - 40%	10	14.71%
41% - 60%	26	38.24%
61% - 75%	19	27.94%
76% or over	9	13.24%

## Survey Responses

# Pathways

Does your college use sequential or spiral curriculum?

Sequential	20	29.41%
Spiral	44	64.71%
Blank	4	5.88%

## Survey Responses

# Pathways

What format(s) does your college use in the beginning and intermediate algebra?

Lecture	64	94.12%
Blank	4	5.88%
Online	25	36.76%
Blank	43	63.24%
Calculator	8	11.76%
Blank	60	88.24%
Self paced	15	22.06%
Blank	53	77.94%

# Pathways

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