

Attitudes of Ball State Honors College Students toward  
their High School Mathematics Education

An Honors Thesis (ID 499)

by

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Attitudes of Ball State Honors College Students toward  
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The purpose of this study was to determine the attitudes of Ball State University Honors College students toward their high school mathematics education.

Data was collected by giving a survey (Appendix A) to each section of a required honors course (ID 199) during the 1983-84 school year. The survey was constructed by the author and broken into six sections.

Section one asked the students to note their sex, high school and graduation year. Seventy percent of the students who noted their sex were female. The other thirty percent were males. Not enough of them noted their high school or graduation year, so no generalizations could be drawn from those questions. Sex was used as a subgroup division to draw conclusions. The other subgroup used was whether or not they were education majors as noted in section six.

Section two asked the students to respond to a list of math courses by either telling what grade they got or saying they did not take the course. Their average math GPA was 3.58. The rest of the results for section two are noted in Table I.

Section three asked about the student's curricula. Ninety-five percent had been on a college preparatory curriculum. Eighty percent planned to take or had taken a college computer science class.

Section four contained the most important questions on the survey. These were the questions that determined their attitudes toward their high school mathematics education. This section had three parts. Part A asked the students about their high school mathematics teachers. Part B asked

them about how much mathematics and computer instruction should be required in high school. Part C asked them about their overall conclusions about their high school mathematics instruction. They were asked to respond to each question in section four using a scale where A (7) meant strongly agree down to D (4) 'no opinion' down to G (1) 'strongly disagree'. The results can be seen in Tables 2 and 3.

Table I — Math course information

general heading	courses listed	% who took	average GPA
general math	basic, general, consumer business, shop or vocational math	29	3.7
first-year algebra	introductory, freshman, or advanced freshman algebra or Algebra I	96	3.56
second year algebra	Algebra II	76	3.51
advanced algebra	Advanced, Abstract or College Algebra	43	3.43
basic geometry	Informal Geometry, Geometry	94	3.53
analytic geometry	(one or two semesters)	39	3.59
statistics	(one or two semesters)	4	3.71
trigonometry	(one or two semesters)	60	3.59
calculus	(one or two semesters)	22	3.43
advanced math	(one or two semesters)	14	3.65
computer math	(one or two semesters)	29	3.73

Table 2 — Opinions about mathematics teachers/instruction

	all	males	females	education majors	not education majors
teachers qualified to teach	6.04	6.28	5.92	5.98	6.05
teachers interested in material	6.04	6.08	5.95	6.03	6.03
teachers concerned I learned	5.78	5.75	5.75	5.71	5.80
teachers taught basics well	5.89	6.10	5.77	5.94	5.83
teachers taught theory well	5.45	5.44	5.41	5.41	5.45
teachers understood theory well	6.04	6.12	5.96	6.00	6.05
teachers used examples effectively	5.48	5.51	5.44	5.47	5.46
teachers made math interesting	4.94	4.87	4.93	4.94	5.01
instruction prepared me for college	5.26	5.19	5.18	5.05	5.29
instruction was useful in everyday life	4.95	4.98	4.83	4.70	4.96

Table 3 -- Amount of instruction which should be required

	all	male	female	education major	non education major
math - 1 year	3.99	3.58	4.15	3.90	4.07
math - 2 years	5.01	4.73	5.19	5.66	4.85
math - 3 years	5.39	5.33	5.34	5.47	5.40
math - 4 years	3.74	3.71	3.53	3.46	3.92
computer - 1 semester	5.64	5.27	5.89	6.00	5.58
computer - 1 year	5.58	5.46	5.58	5.19	5.83

Students felt quite strongly that their high school math teachers were qualified, interested and understood theory well. They felt a little less strongly that their teachers were concerned that they learned the material and taught the basics of the course well. The students felt even a little less strongly that their math teachers applied theory effectively and taught theory well.

Students slightly agreed that they were adequately prepared for college mathematics, that their high school math instruction was useful in everyday life and that their teachers made math interesting.

For the most part males rated their teachers and instruction slightly higher than the females did. Notable exceptions were in the areas of whether their teachers made math interesting and whether their instruction was useful in everyday life.

Non-education majors generally rated both the teachers and instruction higher than education majors. The only exception here was on how well their math teachers taught the basics.

Students were also questioned about how much math and computer instruction should be required in high school. (See Table 3). Computer instruction was very highly recommended with both one semester and one year garnering a nearly equal rating. The math question was more definitive. The most preferred was three years followed by two years. One year ranked in the middle at "no opinion" while four years pulled a "slightly disagree" vote.

The males reversed the order between four and one year of math while education major switched between two and three years of math. The females and education majors both pulled more strongly for one semester of computer instruction by a larger margin than the males and non-education majors rated one year of computer instruction.

In section five students were surveyed about what course they were placed into at the mathematics placement session at orientation. About one-third were placed into the first calculus or analysis course. Slightly less than one third said they did not attend, while another fifteen percent did not answer. Five percent were placed into more advanced calculus classes and another five percent were placed into an algebra class. Eight percent were placed into trigonometry and the remaining three percent were placed into analytic geometry.

Generally, the males were placed higher than the females (and more were placed) and the same goes for non-education majors over education majors.

Section six was where the student identified their major from among the 101 listed. The nine most popular responses were accounting (17), architecture (15), journalism and undecided (9 each), elementary education and mathematics education (8 each), and computer science, English teaching and visual arts teaching (7 each). Complete results from section six can be found in Appendix E. All raw data from sections two through five can be found in the following: Appendix B (all results), Appendix C (male/female breakdown) and Appendix D (education major/non education major breakdown)

Some problems were found with the survey instrument. First, in section one many students neglected to fill in high school, graduation date and even sex. That probably should have been stressed more so further

comparisons could have been made about Indiana schools versus other states, rural versus urban, and perspective about how long they have been away from school.

In section two many students counted one class under more than one name (or else they really did take basic, general, consumer, business, shop and vocational math), despite directions telling them not to.

The biggest problem was with the section dealing with the amount of math and computer instruction that should be required in high school. It didn't make them choose one over the others. If the survey instrument was being created now, the questions would be:

40. How much mathematics instruction should be required in high school?

- a. one year
- b. three semesters
- c. two years
- d. five semesters
- e. three years
- f. seven semesters
- g. four years

41. How much computer instruction should be required in high school?

- a. 6 weeks
- b. 9 weeks
- c. 12 weeks
- c. one semester
- e. one year
- f. three semesters
- g. two years

The conclusions the author has drawn are that: most honors students took three years of math in high school and did well and that the honors students generally seemed pleased with their math teachers performance and their math instruction in general. That fit the author's expectations because honors students would have been the brighter students in high school. Usually students who achieve well are more satisfied with their education.

# APPENDIX A-SURVEY INSTRUMENT

- INSTRUCTIONS: 1. Use only black leaded NO. 2 pencil.  
2. Mark no more than one response to each question.  
3. Fill in the circles completely.  
4. Erase cleanly any answer you wish to change.  
5. Erase any stray marks.

## SECTION I

Please put the name of your high school in the space marked name. Put your High School graduation date in the year portion of the birthdate section. Do not color in the circles beneath those blanks. Mark the appropriate box for Sex. Leave all other portions blank for the time being.

## SECTION II

1-28. Please use the following code to respond to your experiences with the following courses (do not count one class in more than one category):

- A- I received an "A" in this course.
- B- I received a "B" in this course.
- C- I received a "C" in this course.
- D- I received a "D" in this course.
- E- I received a "pass" or "credit" in this course (no grade).
- F- I received an "F", "fail", or "no credit" in this course.
- G- I did not take this course.

### MATHEMATICS

- 1. Basic Mathematics
- 2. General Mathematics
- 3. Consumer Mathematics
- 4. Business Mathematics
- 5. Shop Mathematics
- 6. Vocational Mathematics

### ALGEBRA

- 7. Introductory Algebra
- 8. Freshman Algebra
- 9. Advanced Freshman Algebra
- 10. Algebra
- 11. Algebra II
- 12. Advanced Algebra
- 13. Abstract Algebra
- 14. College Algebra

### GEOMETRY

- 15. Informal Geometry
- 16. Geometry
- 17. Analytic Geometry (1 semester)
- 18. Analytic Geometry (2 semesters)

### OTHER

- 19. Computer Mathematics (1 sem)
- 20. Computer Mathematics (2 sem)
- 21. Probability and Statistics (1 sem)
- 22. Probability and Statistics (2 sem)
- 23. Advanced Mathematics (1 sem)
- 24. Advanced Mathematics (2 sem)
- 25. Trigonometry (1 semester)
- 26. Trigonometry (2 semesters)
- 27. Calculus (1 semester)
- 28. Calculus (2 semesters)

## SECTION III

- 29-31. Darken A for yes or B for no.
- 29. Were you on a college preparatory curriculum in high school?
  - 30. Do you plan to take/have you taken any college math courses?
  - 31. Do you plan to take/have you taken any college computer science courses?

SECTION IV

This section uses the following scale:

- A. Strongly agree 7
- B. Agree 6
- C. Slightly agree 5
- D. No opinion 4
- E. Slightly disagree 3
- F. Disagree 2
- G. Strongly disagree 1

- A** 32-39. These statements begin with, "I feel that the majority of my high school mathematics teachers..."
- 32. ...were qualified to teach high school mathematics."
  - 33. ...were interested in what they taught."
  - 34. ...were concerned that I learned the material."
  - 35. ...taught the basics of the course well."
  - 36. ...taught the theory of the course well."
  - 37. ...understood theory well."
  - 38. ...applied theory to examples effectively."
  - 39. ...made the mathematics course interesting for me."

- B** 40-45. These statements begin with, "I feel that high school students should be required to take..."
- 40. ...1 year of mathematics(present law)."
  - 41. ...2 years of mathematics(law effective class of '89)."
  - 42. ...3 years of mathematics(recommended by a national commission)."
  - 43. ...4 years of mathematics."
  - 44. ...1 semester of computer instruction(recommended by commission)."
  - 45. ...1 year of computer instruction."

- C** 46-47. These statements begin with, "I feel that my high school mathematics instruction..."
- 46. ...adequetely prepared me for my first college math course."
  - 47. ...was useful in helping me to solve everyday problems and questions."

SECTION V

If you attended the mathematics placement session at orientation, which course were you placed into?

- 48.
- A- MATH 110- College Algebra 1
  - R- MATH 11i- College Algebra 2
  - C- MATH 112- Trigonometry
  - D- MATH 114- Analytic Geometry
  - E- MATH 123- Mathematics for Architects 1
  - MATH 131- Basic Mathematical Analysis
  - MATH 161- Applied Calculus 1
  - MATH 165- Calculus 1
  - F- MATH 124- Mathematics for Architects 2
  - MATH 132- Basic Mathematical Analysis 2
  - MATH 162- Applied Calculus 2
  - MATH 166- Calculus 2
  - G- MATH 167- Calculus 3
  - H- MATH 268- Calculus 4
  - I- I did not attend the placement session.

SECTION VI

Please find your major in this list. The major categories are listed in the center of each page. Please fill in only the circle corresponding to the number and letter to the left of your major. In the special codes section of your answer sheet, please write the number to the right of your major in blanks K and L. You should only fill in one blank between 50A and 60J. If you have a double major, please only fill in one.

NON-TEACHING MAJORS

TEACHING MAJORS

53 I undecided	3 1
	MISCELLANEOUS
50 A English	1 2
50 B French	1 2
50 C German	1 2
50 D Latin	1 2
50 E Spanish	1 2
50 F journalism	1 2
50 G Latin-American studies	1 2
50 H philosophy	1 2
50 I religious studies	1 2
50 J speech	1 2
51 A actuarial science	1 3
51 B computer science	1 3
51 C mathematics/computer science	1 3
51 D mathematics	1 3
51 G biology	1 4
51 H chemistry	1 4
51 I geology	1 4
51 J physics	1 4
52 A anthropology	1 5
52 B criminal justice/corrections	1 5
52 C geography	1 5
52 D history	1 5
52 E natural resources	1 5
52 F political science	1 5
52 G psychology	1 5
52 H social work	1 5
52 I sociology	1 5
53 A accounting	1 6
53 B economics	1 6
53 C finance	1 6
53 D general business administ.	1 6
53 E management	1 6
53 F marketing	1 6
53 G office systems administ.	1 6

MISCELLANEOUS

HUMANITIES  
AND  
LANGUAGE  
ARTS

MATH

SCIENCE

SOCIAL  
SCIENCES

BUSINESS

56 D early childhood education	2 1
56 E elementary education	2 1
56 F kindergarten/primary educ.	2 1
56 G school media services	2 1
56 H special education	2 1
56 I (HS) English	2 2
56 J (HS) French	2 2
56 A (HS) German	2 2
57 B (HS) Latin	2 2
57 C (HS) Spanish	2 2
57 D (JH/MS) French	2 2
57 E (JH/MS) German	2 2
57 F (JH/MS) Latin	2 2
57 G (JH/MS) Spanish	2 2
57 H (JH/MS) language arts	2 2
57 I journalism	2 2
57 J speech and theatre	2 2
58 A (HS) mathematics	2 3
58 B (JH/MS) mathematics	2 3
58 C health and safety	2 4
58 D (JH/MS) science	2 4
58 E biology (primary area)	2 4
58 F chemistry (primary area)	2 4
58 G earth space science (pa)	2 4
58 H general science	2 4
58 I physical science (p.a.)	2 4
58 J physics (primary area)	2 4
59 A (Soc. stud.) anthropology	2 5
59 B (SS) economics	2 5
59 C (SS) geography	2 5
59 D (SS) government	2 5
59 E (SS) psychology	2 5
59 F (SS) sociology	2 5
59 G (SS) U.S. History	2 5
59 H (SS) world civilizations	2 5
59 I (JH/MS) social studies	2 5
60 A business education	2 6
60 B distributive education	2 6

abbreviations: HS high school  
 JH/MS junior high/middle school  
 SS social studies  
 pa primary area

54 A art	1 7	FINE	60 D music/general music	2 7
54 B dance performance	1 7	ARTS	60 E music performance	2 7
54 C music history/theory/comp	1 7		60 F visual arts	2 7
54 D music performance	1 7			
54 E telecommunications	1 7			
54 F theatre	1 7			
54 G cooperative graphic arts mgt	1 8	APPLIED	60 H home economics	2 8
54 H home economics	1 8	ARTS AND	60 I industrial arts	2 8
54 I industrial education & tech	1 8	TECHNOLOGY	60 J physical education	2 8
54 J physical education	1 8			
55 A architecture	1 9			
55 B dietetics	1 9			
55 C environmental design	1 9			
55 D landscape architecture	1 9	PRE-PROFESSIONAL		
55 E legal administration	1 9			
55 F medical technology	1 9			
55 G nursing	1 9			
55 H physical therapy	1 9			
55 I pre-dental	1 9			
55 J pre-engineering	1 9			
56 A pre-medical	1 9			
56 B speech pathology	1 9			
56 C urban and regional design	1 9			







## Appendix E

## MAJORS

	All		Male		Female		Education		Non-Ed	
		%		%		%		%		%
49C	2	1	1	2	1	1	1	2	1	1
49I	1	1			1	1			1	1
50F	9	4	1	3	6	5			9	8
51A	3	1	1	2	2	2	1	2	2	2
51B	7	3	1	2	4	3			7	6
51C	5	2	2	4	2	2			5	4
51G	2	1	1	2	1	1			2	2
51J	4	2	1	2	3	3			4	3
52A	1	1			1	1	1	2		
52B	2	1			2	2			2	2
52F	3	1	1	2	2	2			3	3
52G	5	2	1	2	2	2			5	4
52H	2	1			1	1			2	2
53A	17	8	6	12	10	8			17	14
53B	1	1							1	1
53D	1	1			1	1			1	1
53E	4	2	2	4	1	1			4	3
53F	6	3			5	4			6	5
53G	1	1			1	1			1	1
53I	9	4	3	6	5	4				
54A	2	1			2	2			2	2
54D	3	1	1	2	2	2			3	3
54E	5	2	2	4	2	2			5	4
54G	1	1	1	2					1	1
55A	15	8	7	14	4	3			15	13
55E	1	1			1	1			1	1
55F	1	1							1	1
55G	6	3			6	5			6	5
55H	5	2	1	2	4	3			5	4
55J	2	1			2	2			2	2
56A	5	2	4	8	1	1			5	4
56B	2	1			2	2			2	2
56E	8	4			8	7	8	15		
56H	5	2			5	4	5	9		
56I	7	3			5	4	7	13		
56J	1	1			1	1	1	2		
58A	8	4	3	6	5	4	8	15		
58I	1	1			1	1	1	2		
59E	1	1			1	1	1	2		
60D	3	1			3	3	3	6		
60E	2	1	1	2	1	1	2	4		
60F	7	3	1	2	5	4	7	13		
60H	1	1			1	1	1	2		