2004-05 Academic Profile Results

Executive Summary

Brief methods:

The *Academic Profile*, a nationally-normed, standardized multiple-choice test measuring reading, writing, critical thinking, and mathematics achievement, was administered to a sample of 198 freshmen, 9 junior, and 31 senior volunteers at St. Ambrose University during the 2004 fall semester.

Brief results:

Freshmen: An analysis of the sample of 198 freshmen (45% of the 2004 incoming class) concludes the sample closely represents the entire freshmen class in terms of demographic characteristics.

Taking sampling/measurement error into consideration, the 2004 SAU freshman class earned scores similar to other freshman classes at similar institutions (49 Comprehensive Master's Colleges and Universities nationwide). Relative to similar institutions, SAU freshmen scored lowest in reading and the social sciences.

Compared to freshmen at similar institutions, the distribution of scores showed that SAU has a slightly higher percentage of average-scoring freshmen and a slightly lower percentage of freshmen scoring at the extreme ends of the scale.

Criterion-referenced scores demonstrate that fewer than half of SAU freshmen are proficient in Level 1 Mathematics (solving simple arithmetic word problems or gathering information from graphs). Only 1% of freshmen were found to be proficient in critical thinking skills (recognizing flaws and inconsistencies in arguments). Fewer than 10% of freshmen scored proficient in Level 2 writing (combining simple clauses into more complex combinations).

Seniors: An analysis of the sample of 31 seniors (approximately 14% of the graduating class) concludes the sample does not represent the population of SAU seniors in demographic characteristics. **With such a small, non-random, non-representative sample, *Academic Profile* scores for SAU seniors should be interpreted with caution**.

This sample of senior-class volunteers outscored 63% of senior classes at comparable institutions. The sample of seniors also earned scores significantly higher than the freshmen at SAU.

This sample of seniors scored slightly lower than a sample of SAU seniors who were administered the *Academic Profile* in 1996. This difference in scores may be due to lower achievement or may be due to sampling error.

Next Steps: Four years from now, the *Academic Profile* will again be administered to SAU freshmen and seniors. In order to longitudinally track the growth of SAU students in reading, math, critical thinking, and writing, the test will need to be administered to a large, representative sample of students. **The participation of all faculty will be needed to ensure a quality sample is obtained.**

The following pages of this report allow you to drill deeper into the results as you see fit.
Both descriptive and interpretive results are presented.

2004 Academic Profile Results

As an indicator of the University's success in meeting its General Education goals, the 40-minute abbreviated form of the Academic Profile was administered to 238 St. Ambrose students in 2004.

Test Information (User's Guide, 5/2003)

The Academic Profile is an objective multiple-choice test of general academic knowledge and skills developed by The College Board and Educational Testing Service. *It is intended for use by colleges and universities in assessing the outcomes of their general education programs to improve the quality of instruction and learning*. Because of the diversity of general education across and even within institutions, no single examination or assessment approach can meet every definition of general education outcomes. The Academic Profile focuses on the *academic* skills developed through general education courses rather than on the knowledge acquired about the subjects taught in these courses. It does this by testing college-level reading, writing, critical thinking, and mathematics in the context of humanities, social sciences, and natural sciences.

College-level reading questions measure students' ability to:

- _ interpret the meaning of key terms
- _ recognize the primary purpose of a passage
- _ recognize explicitly presented information
- _ make appropriate inferences
- _ recognize rhetorical devices

College-level writing questions measure students' ability to:

- _ recognize the most grammatically correct revision of a clause, sentence, or group of sentences
- _ organize units of language for coherence and rhetorical effect
- _ recognize and reword figurative language
- _ organize elements of writing into larger units of meaning

Critical Thinking questions measure students' ability to:

- _ distinguish between rhetoric and argumentation in a piece of nonfiction prose
- _ recognize the best hypothesis to account for information presented
- _ draw valid conclusions based on information presented
- _ recognize assumptions
- _ infer and interpret a relationship between variables

Mathematics questions measure students' ability to:

- _ recognize and interpret mathematical terms
- _ evaluate formulas
- _ interpret ratios, proportions, and percentages
- _ recognize and use equivalent mathematical formulas or expressions
- _ read and interpret tables and graphs
- _ order and compare large and small numbers
- _ read scientific measuring instruments

Each student was administered one of three 36-question abbreviated forms of the test (each representing one-third of the total Academic Profile). The structure of each of these abbreviated forms is illustrated in the following table:

	Type of Skill			
Academic Context	Critical Thinking	Reading	Writing	Mathematics
Humanities	3 questions	2-4 questions	9 questions	9 questions
Social Sciences	3 questions	2-4 questions		
Natural Science	3 questions	2-4 questions		
Total	9 questions	9 questions	9 questions	9 questions

The Academic Profile yields both norm-referenced scale scores (useful in comparisons with scores from other universities or with scores at different time periods) and criterion-referenced proficiency classifications (useful in determining the actual level of students performance). The Educational Testing Service states the following with regard to the technical quality of the Academic Profile:

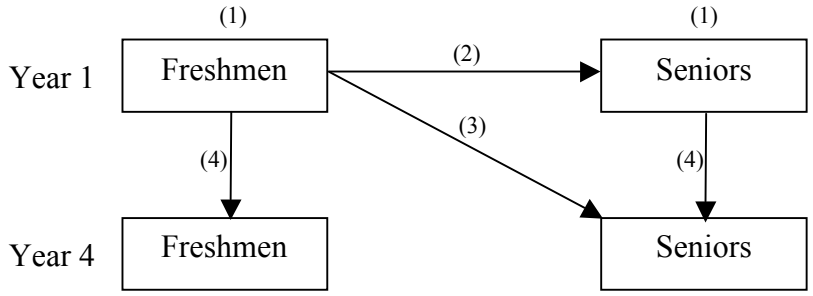
> The Academic Profile measures three clearly defined factors -- writing, mathematics, and reading/critical thinking, produces reasonable intercorrelations among the skills areas, and gives evidence of validity in terms of the relation of scores to other measures of performance, such as grade point average and class level. Individual scores on the Standard Form and the group data for both the Standard Form and Abbreviated Forms (for reasonable sample sizes) are reliable.

Student Sampling & Test Administration Information

As stated in the 2004 draft of the *University Assessment Plan*, the intention was to administer the Academic Profile to 150-200 first-year students and 100-150 graduating students during the 2004-05 academic year. This process would then be repeated every fourth year to provide us with the following information:

(1) A snapshot of the performance of our freshmen and seniors for the year in which the test was administered
(2) A comparison of the performance of freshmen and seniors for the year in which the test was administered
(3) A longitudinal comparison of the performance of the same students from their freshmen to senior years
(4) A longitudinal comparison of the performance of freshmen across time.

The following diagram illustrates the comparisons made from these analyses.



A total of 198 freshmen (approximately 45% of the incoming class) were administered the exam. A small sample of freshmen volunteers were given the test during Welcome Week, while the majority of freshmen took the exam as part of their New Student Seminar courses. With such a large sample, there should be no issues in generalizing the results to all freshmen at St. Ambrose. In fact, the Educational Testing Service advises "…a 25-33% sample size is recommended for obtaining valid results when analyzing larger groups of students." (*User's Guide*)

Getting seniors to agree to take the exam was more difficult. After offering to pay their graduation fee, a sample of 31 seniors (approximately 14% of the graduating class) were administered the Academic Profile. With such a small sample size, it is important to determine how well the sample represents the population. The following table summarizes the available demographic information obtained from the sampled students:

	Freshmen	Seniors	Total*
Sample Size	198	31	238
Female (%)	115 (58%)	23 (74%)	145 (61%)
Minority (%)	12 (6%)	5 (16%)	17 (7%)
Number of Different Majors	24	11	24
Mean Age (median)	18.11 (18)	24.33 (22)	--

* Total includes 9 juniors who were administered the exam

Comparing this to the institution as a whole (59% female; 7.8% minority; 75 majors offered), it is apparent that the sampled seniors are not representative of the entire senior class at St. Ambrose. Because of this, any generalizations made from this sample of data should be interpreted with caution.

The Academic Profile was administered to students in accordance with the standardized administration guidelines provided by The College Board and Educational Testing Service.

Scale Scores Reported

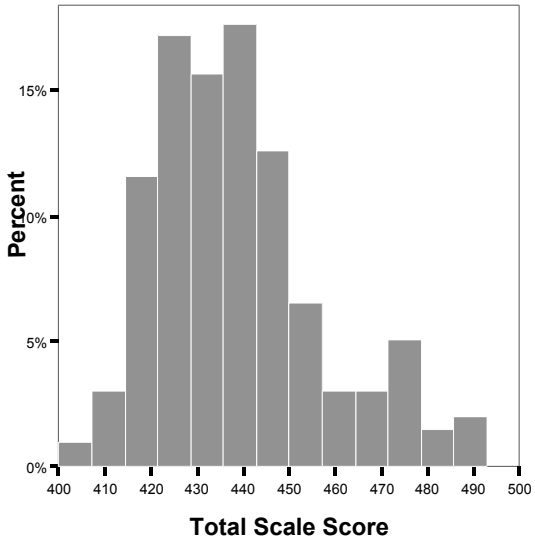
The following tables summarize the norm-referenced scale scores obtained from the sample of freshmen:

Freshmen	Mean Score*	95% Confidence Limits**	Std. Dev.	25th %ile	50th %ile	75th %ile	Possible Range
Total Score	438.93	437 to 441	17.78	427	436	448	400 to 500
Critical Thinking	108.98	108 to 110	5.42	106	108	111	100 to 130
Reading	116.44	115 to 117	7.12	111	117	122	100 to 130
Writing	113.49	113 to 114	4.95	111	114	118	100 to 130
Mathematics	112.82	112 to 114	5.24	109	113	115	100 to 130
Humanities	113.07	112 to 114	6.15	109	113	118	100 to 130
Social Sciences	111.68	111 to 112	5.66	107	111	116	100 to 130
Natural Science	113.17	113 to 114	5.55	109	113	116	100 to 130

* Mean scores cannot be compared across skills or content areas

** Confidence limits based on two assumptions: (1) questions are sampled from a much larger set of possible questions that could have been asked on the test, and (2) students are sampled from a larger set of possible students that could have been tested.

The following histogram displays the distribution of Total scale scores obtained from the sample of freshmen:

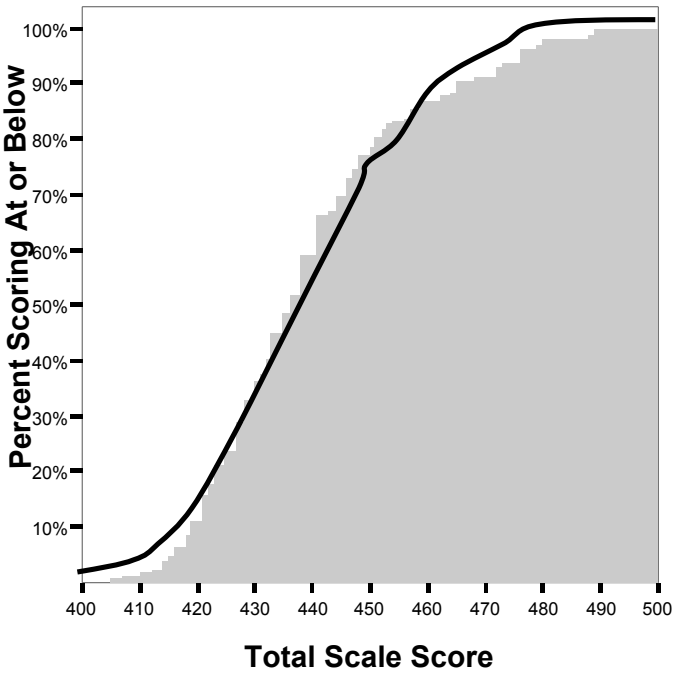


These scale scores can be compared to scores from comparable institutions (49 other Comprehensive Master's Colleges and Universities from around the nation). Student demographics at these other institutions (60% female; 93% under the age of 20) are similar to those of St. Ambrose with the exception of ethnicity (8% minority at SAU compared to 22% minority at the other 49 institutions).

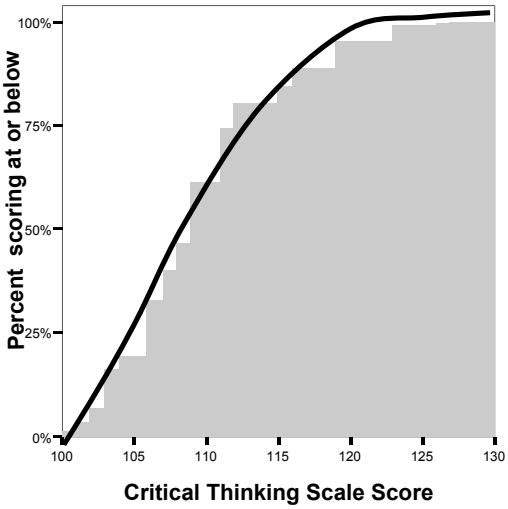
Freshmen	St. Ambrose (confidence interval)	Similar Institutions (average)	% of Comparable Institutions Below SAU's Average
Total Scale Score	437 - 441	439.48	34% - 48%
Critical Thinking	108 - 110	109.43	14% - 36%
Reading	115 - 117	116.86	16% - 28%
Writing	113 - 114	113.49	34%
Mathematics	112 - 114	112.86	26% - 46%
Humanities	112 - 114	113.32	18% - 42%
Social Sciences	111 - 112	111.94	22%
Natural Science	113 - 114	113.69	24%

Looking at the previous table, the freshmen class at SAU scored slightly below the average freshmen class at similar institutions. Taking sampling error into account (looking at the confidence intervals), SAU's freshman class did not score significantly higher or lower than the average freshman class across similar institutions. The final column of the table shows the percentage of institutions whose freshmen classes scored below SAU's freshman class. Relative to other institutions, the data show that SAU freshmen scored lowest in the skill of reading (only 16-28% of comparable institutions had lower scoring freshmen classes) and in the social sciences. The freshman class scored highest relative to other institutions in the writing skill, but still only managed to outscore 34% of comparable institutions.

Instead of simply comparing the average freshmen scores to averages at other institutions, the data can be used to compare SAU freshmen with the entire sample of 12,118 freshmen at comparable institutions taking the Academic Profile. The following chart compares the cumulative distribution of SAU freshmen scores (in grey) to the cumulative distribution of all freshmen attending comparable institutions (the black line).



The chart shows, for example, that fewer SAU freshmen earn extremely low scores than freshmen at comparable institutions. It also shows that fewer SAU freshmen, when compared to freshmen at comparable schools, earn extremely high scores. SAU has a slightly higher percentage of average-scoring students and slightly lower percentages of students scoring at the extreme ends of the scale. This trend appears across all skills and content areas, including critical thinking (pictured below):



The scale scores for SAU seniors are as follows:

Seniors	Mean Score	95% Confidence Limits*	Std. Dev.	25th %ile	50th %ile	75th %ile	Possible Range
Total Score	451.35	445 to 457	17.60	438	452	461	400 to 500
Critical Thinking	112.19	110 to 114	5.82	108	111	116	100 to 130
Reading	121.23	119 to 123	5.38	119	122	125	100 to 130
Writing	115.87	114 to 117	4.52	113	115	118	100 to 130
Mathematics	115.52	113 to 118	6.86	110	115	121	100 to 130
Humanities	116.81	115 to 119	6.34	113	118	122	100 to 130
Social Sciences	114.58	112 to 117	6.10	108	115	121	100 to 130
Natural Science	116.61	115 to 118	4.63	113	119	119	100 to 130

* Confidence limits based on two assumptions: (1) questions are sampled from a much larger set of possible questions that could have been asked on the test, and (2) students are sampled from a larger set of possible students that could have been tested.

With such a small (and apparently non-representative) sample, further analyses will not be conducted on this data. It should be noted that this sample of seniors outscored 63% of senior classes at comparable institutions. Also, SAU senior scale scores were found to be significantly higher than SAU freshmen scale scores even after controlling for gender, race, and GPA effects.

Subgroup Analyses

The sample sizes only permitted the comparison of male and female scale scores. The following table displays this information:

Freshmen	Average Scale Scores	
	Male	Female
Total Score	438.1	442.7
Critical Thinking	108.7	110.0
Reading	115.7	118.3
Writing	113.0	114.5
Mathematics	113.5	108.7
Humanities	112.8	115.7
Social Sciences	111.6	113.0
Natural Science	112.4	113.5

Although female students outscored males in all areas except mathematics, these differences were not of statistical or practical significance.

Criterion-Referenced Proficiency-Levels

The skills measured by the Academic Profile are grouped into three skill areas. There is a single skill area that includes both reading and critical thinking, a separate skill area for writing, and a separate skill area for mathematics. Within each of these three skill areas, the specific skills tested by the Academic Profile are classified into three *proficiency levels*, identified simply as Level 1, Level 2, and Level 3. Each proficiency level is defined in terms of a set of specific competencies expected of students. These definitions appear on the following page:

Proficiency Levels for Reading and Critical Thinking

At level 1, a student is able to perform the following tasks:

1) Recognize factual material explicitly presented in a reading passage
2) Understand the meaning of particular words or phrases in the context of a reading passage

At level 2, a student is able to perform the following reading tasks:

1) Synthesize material from different sections of a passage
2) Recognize valid inferences derived from material in the passage
3) Identify accurate summaries of a passage or of significant sections of the passage
4) Understand and interpret figurative language
5) Discern the main idea, purpose, or focus of a passage or of a significant portion of the passage

At level 3, a student is able to perform the following critical thinking tasks:

1) Evaluate competing causal explanations
2) Evaluate hypothesis for consistency with known facts
3) Determine the relevance of information for evaluating an argument or conclusion
4) Determine whether an artistic interpretation is supported by evidence contained in a work
5) Recognize the salient features or themes in a work of art
6) Evaluate the appropriateness of procedures for investigating a question of causation
7) Evaluate data for consistency with known facts, hypotheses, or methods
8) Recognize flaws and inconsistencies in an argument

Proficiency Levels for Writing

At level 1, a student demonstrates the following writing skills:

1) Recognizing agreement among basic grammatical elements
2) Recognizing appropriate transition words
3) Recognizing incorrect word choice
4) Ordering sentences in a paragraph
5) Ordering elements in an outline

At level 2, a student demonstrates the following writing skills:

1) Incorporating new material into a passage
2) Recognizing agreement among basic grammatical elements
3) Combining simple clauses into single, more complex combinations
4) Recasting existing sentences into new syntactic combinations

At level 3, a student demonstrates the following writing skills:

1) Recognizing appropriate use of parallelism
2) Recognizing appropriate use of idiomatic language
3) Recognizing redundancy
4) Recognizing proper constructions
5) Recognizing most appropriate revision

Proficiency Levels for Mathematics

At level 1, a student is able to perform the following mathematical tasks:

1) Solve word problems that would most likely be solved by arithmetic and do not involve conversion of units or proportionality
2) Solve problems involving the informal properties of numbers and operations, often involving the number line, including positive and negative numbers, whole numbers, and fractions
3) Solve problems requiring a general understanding of square roots and the squares of numbers
4) Solve a simple equation or substitute numbers into an algebraic expression
5) Find information from a graph

At level 2, a student is able to perform the following mathematical tasks:

1) Solve arithmetic problems with some complications, such as complex wording, maximizing or minimizing, and embedded ratios
2) Simplify algebraic expressions, perform basic translation, and draw conclusions from algebraic equations and inequalities
3) Interpret a trend represented in a graph or choose a graph that reflects a trend
4) Solve problems involving sets

At level 3, a student is able to perform the following mathematical tasks:

1) Solve word problems that would be unlikely to be solved by arithmetic
2) Solve problems involving difficult arithmetic concepts such as exponents and roots other than squares and square roots and percent of increase or decrease
3) Generalize about numbers
4) Solve problems requiring an understanding of the properties of integers, rational numbers, etc
5) Interpret a graph in which the trends are to be expressed algebraically or in which one of the following is involved: exponents and roots other than squares and square roots and percent of increase or decrease
6) Solve problems requiring insight or logical reasoning

Each question on the Academic Profile is associated with a particular proficiency level in a particular skill area (e.g., Level 2 in writing).

Each student taking the standard form of the Academic Profile is classified as *proficient*, *marginal*, or *not proficient* at each proficiency level. A student classified as marginal is one whose test results do not provide enough evidence to classify the student either as proficient or as not proficient.

The specific competencies have been grouped into proficiency levels in such a way that most students who are proficient at a higher level will also be proficient at lower proficiency levels in the same skill area. For example, most of the students who are proficient at Level 3 in writing will also be proficient at Level 2 in writing, and the rest are likely to be classified as marginal at Level 2.

Criterion-Referenced Proficiency-Levels

The following tables display the percentage of SAU freshmen proficient in each skill along with freshmen from comparable institutions:

SAU Freshmen	Proficiency Classification		
	Proficient	Marginal	Not Proficient
Critical Thinking	**1%**	6%	93%
Reading Level 2	**21%**	21%	58%
Reading Level 1	**54%**	22%	24%
Writing Level 3	**5%**	22%	73%
Writing Level 2	**9%**	35%	55%
Writing Level 1	**56%**	29%	15%
Math Level 3	**2%**	11%	86%
Math Level 2	**19%**	26%	55%
Math Level 1	**47%**	39%	14%

	% of Proficient Freshmen at Comparable Institutions
Critical Thinking	2%
Reading Level 2	24%
Reading Level 1	57%
Writing Level 3	6%
Writing Level 2	13%
Writing Level 1	58%
Math Level 3	4%
Math Level 2	22%
Math Level 1	50%

While a similar percentage of SAU freshmen and freshmen nationwide are proficient in each skill, it should be noted that:

1) Fewer than half of SAU freshmen are proficient in Level 1 Mathematics. This means fewer than half of SAU freshmen can solve simple arithmetic word problems or gather information from a graph
2) Less than 10% of freshmen are proficient in Level 2 Writing. This means fewer than one in ten freshmen can incorporate new material into a passage or combine simple clauses into more complex combinations
3) Only 1% of SAU freshmen are proficient in Critical Thinking. This means that one out of every one hundred freshmen can recognize flaws and inconsistencies in an argument or evaluate competing causal explanations.

The proficiency rates of SAU seniors are displayed in the following tables:

SAU Seniors	Proficiency Classification		
	Proficient	Marginal	Not Proficient
Critical Thinking	**3%**	16%	81%
Reading Level 2	**48%**	32%	19%
Reading Level 1	**84%**	13%	3%
Writing Level 3	**13%**	35%	52%
Writing Level 2	**19%**	52%	29%
Writing Level 1	**81%**	16%	3%
Math Level 3	**6%**	35%	58%
Math Level 2	**45%**	16%	39%
Math Level 1	**65%**	23%	13%

	% of Proficient Seniors at Comparable Institutions
Critical Thinking	5%
Reading Level 2	40%
Reading Level 1	73%
Writing Level 3	10%
Writing Level 2	22%
Writing Level 1	73%
Math Level 3	7%
Math Level 2	31%
Math Level 1	59%

With the small sample size, comparisons to the freshmen class or to seniors at comparable institutions should be made with caution.

Performance Over Time

The *Academic Profile* was administered to a sample of graduating seniors in 1996. The following table compares the average scores earned by that 1996 sample to the 2004 sample of SAU seniors.

	1995-96 SAU Seniors*	**2004-05 SAU Seniors**
	Mean Score	Mean Score
Total Score	453	451.35
Critical Thinking	113	112.19
Reading		121.23
Writing	117	115.87
Mathematics	117	115.52
Humanities	118	116.81
Social Sciences	117	114.58
Natural Science	118	116.61

Source: The Status of Student Learning in the General Education Program: A Report Submitted to the St. Ambrose Community, Spring 1997

Because the 2004-05 sample of SAU seniors is not representative of the entire senior class, differences in the above scores may be due to sampling error or due to actual declines in achievement.