Issue Brief

Curricular breadth

GRINNELL COLLEGE

Grinnell students pursue their liberal arts education through individualized mentoring and close advising. How do they choose to distribute their coursework across the curriculum? The figures presented in this paper provide an overview of one aspect* of curricular breadth: distribution of courses across the Humanities, Sciences, and Social Studies divisions of the College. Over the past ten years (1998 through 2007) Grinnell College graduated 3,365 students. The following information is based on the transcripts of these students. With a focus on how students spend their time *at Grinnell*, this analysis looks at successful completions of Grinnell College courses. Transfer credits are not included.

Findings

- Over the past decade, Grinnell College graduates completed, on average, 51 credits in the Humanities, 30 in the Sciences, 27 in Social Studies, five in General Education courses (Tutorial and service), and four in concentration (Interdisciplinary) courses.
- The average distribution of Grinnell credits across the three major divisions of the College was 47 percent in the Humanities, 28 percent in the Sciences, and 25 percent in Social Studies.
- Distributional patterns for students who were subject to the distribution requirements policy were not, on average, considerably different from students who were not subject to the requirements.
- The proportional distribution of coursework across the three major divisions varied more across majors than by off-campus study status.
- It should be noted that transcript analysis is not a measure of what students learn in their courses. However, it can be used to evaluate our advising system since we rely on that system to encourage students to make wise curricular choices.

Demographics

Figure 1 displays the count of graduates by entry type. Roughly 92 percent of the graduates entered Grinnell College as first-time students directly from high school and eight percent entered as transfer students. Figure 2 presents the count of graduates by entry type by division of major. All of the figures in this report aggregate majors up into divisions. Double majors and independent majors are shown separately.

* Other ways of describing curricular breadth include modes of inquiry, array of skills employed, and methods utilized. In this paper, breadth is treated as credit distribution across the divisions of the College.

K. Skerrett, Office of Academic Affairs & S. Baumler, Institutional Research. May 2008.

Figure 1: Entry type

Entry Type	Count of students	Percent
First-time	3,104	92.2%
Transfer	261	7.8%
Grand Total	3,365	100.0%

Figure 2: Entry type by major division

Entry Type	Student Major (Division)	Count of Students	Percent
First-time	Humanities	764	22.7%
	Sciences	876	26.0%
	Social Studies	896	26.6%
	Double Majors	498	14.8%
	Independent	70	2.1%
Transfer	Humanities	72	2.1%
	Sciences	70	2.1%
	Social Studies	91	2.7%
	Double Majors	23	0.7%
	Independent	5	0.1%
Grand Total		3,365	100.0%

Average number of credits

Data about coursework in the three divisions of the College — Humanities (HU), Sciences (SC), and Social Studies (SS) — are augmented by General Education (GE) and Interdisciplinary (IN) information as described in the *Procedural notes* at the end of this brief. Tutorials, service classes, and concentration courses are included in these latter categories.

Figure 3 presents the average number of credits earned in each area. The graph includes 12-credit reference lines to depict the expectation of a minimum of three courses in each of the three major divisions. This same information is produced in tabular form in Figure 4.

- On average, Humanities majors completed 76 Grinnell credits in the Humanities division, 13 in the Sciences, and 17 in Social Studies.
- Science majors earned an average of 34 credits in the Humanities, 58 in the Sciences, and 18 in Social Studies.
- Social Studies majors averaged 45 credits in the Humanities, 17 in the Sciences, and 43 credits in Social Studies.

Independent majors earned more General Education credits because each student must complete a thesis (coded as GE). General Education averages were around four for the other majors, reflecting completion of the Tutorial and a mixture of service courses.

Figure 3: Average number of credits earned in each division, all graduates, by student major

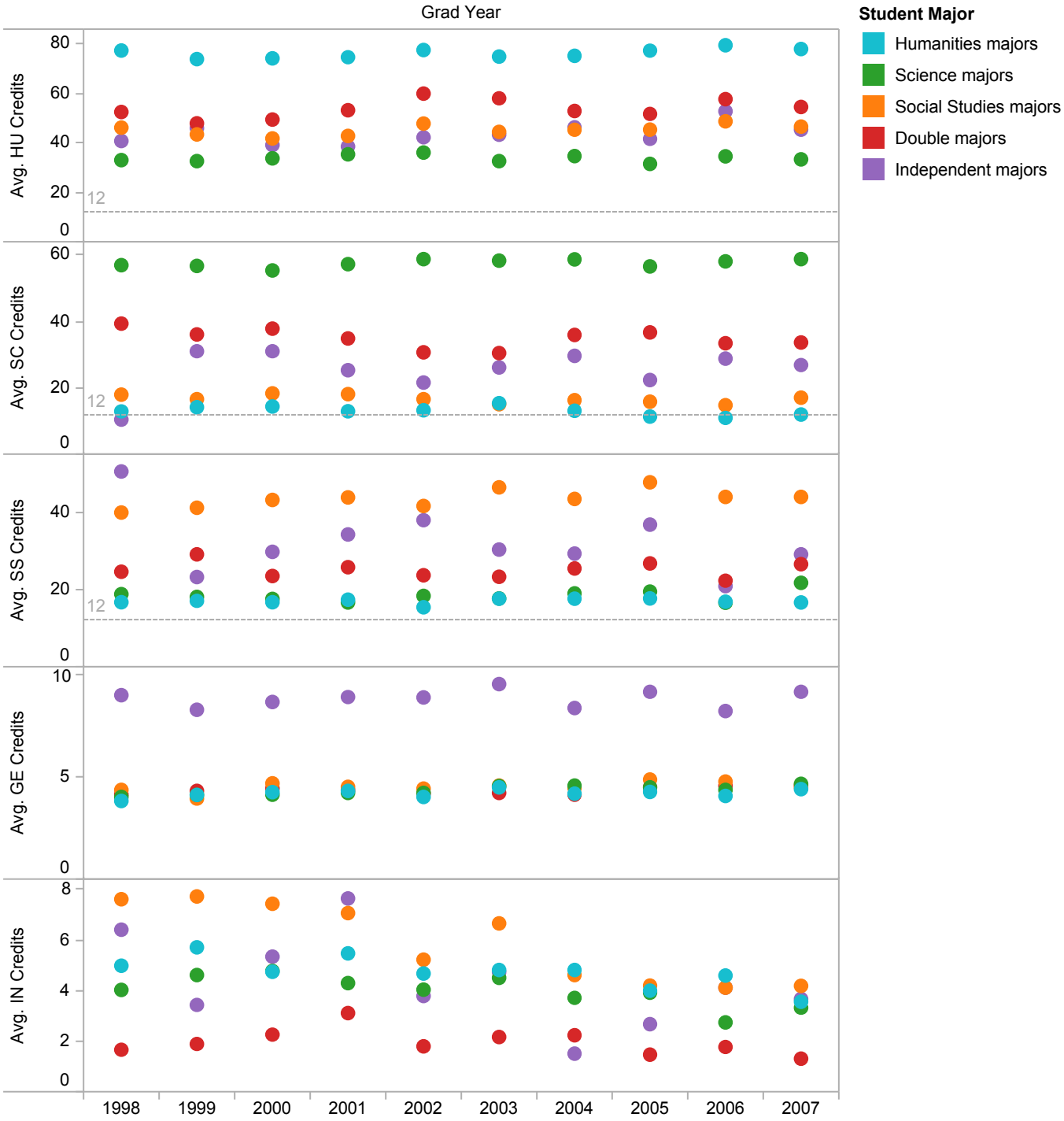


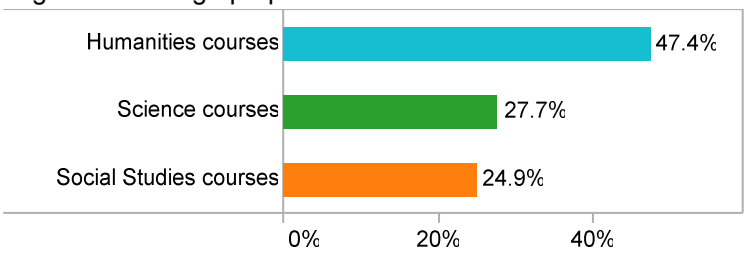
Figure 4: Average number of credits earned in each division, all graduates, by student major

		Grad Year										
Student Major		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	**Overall**
Humanities majors	Avg. HU	77.1	73.6	73.9	74.4	77.4	74.7	75.0	77.1	79.3	77.7	76.1
	Avg. SC	12.9	14.1	14.3	12.9	13.2	15.3	13.1	11.3	10.9	12.0	12.9
	Avg. SS	16.6	17.0	16.6	17.3	15.4	17.6	17.6	17.6	16.8	16.6	16.9
	Avg. IN	5.0	5.7	4.7	5.5	4.7	4.8	4.8	4.0	4.6	3.6	4.7
	Avg. GE	3.8	4.1	4.3	4.3	4.0	4.5	4.2	4.3	4.1	4.4	4.2
Science majors	Avg. HU	33.0	32.5	33.6	35.3	36.0	32.5	34.6	31.4	34.4	33.2	33.7
	Avg. SC	56.9	56.7	55.3	57.2	58.7	58.3	58.7	56.5	58.1	58.7	57.5
	Avg. SS	18.7	18.0	17.5	16.6	18.3	17.6	18.9	19.4	16.5	21.7	18.3
	Avg. IN	4.0	4.6	4.8	4.3	4.0	4.5	3.7	3.9	2.7	3.3	4.0
	Avg. GE	4.0	4.1	4.1	4.2	4.2	4.6	4.6	4.5	4.4	4.7	4.3
Social Studies majors	Avg. HU	46.0	43.3	41.6	42.6	47.6	44.3	45.2	45.2	48.6	46.5	45.0
	Avg. SC	17.9	16.5	18.3	18.1	16.6	15.0	16.3	15.8	14.8	17.0	16.7
	Avg. SS	39.8	41.0	43.1	43.7	41.5	46.3	43.3	47.6	43.9	43.9	43.3
	Avg. IN	7.6	7.7	7.4	7.1	5.2	6.6	4.6	4.2	4.1	4.2	5.9
	Avg. GE	4.4	3.9	4.7	4.5	4.4	4.6	4.5	4.9	4.8	4.5	4.5
Double majors	Avg. HU	52.3	47.7	49.3	53.0	59.7	57.9	52.8	51.6	57.5	54.3	53.9
	Avg. SC	39.3	36.1	37.8	34.8	30.6	30.4	35.9	36.6	33.4	33.6	34.6
	Avg. SS	24.5	29.0	23.4	25.7	23.6	23.3	25.4	26.7	22.2	26.5	24.9
	Avg. IN	1.7	1.9	2.3	3.1	1.8	2.2	2.2	1.5	1.8	1.3	1.9
	Avg. GE	4.1	4.3	4.4	4.4	4.2	4.2	4.1	4.5	4.6	4.6	4.4
Independent majors	Avg. HU	40.6	45.9	39.0	38.5	42.1	43.2	46.1	41.5	52.7	45.2	43.7
	Avg. SC	10.4	31.0	31.0	25.3	21.6	26.1	29.6	22.3	28.8	26.8	25.5
	Avg. SS	50.4	23.1	29.7	34.1	37.8	30.3	29.2	36.7	20.8	29.0	31.6
	Avg. IN	6.4	3.4	5.3	7.6	3.8	4.7	1.5	2.7	4.1	3.7	4.4
	Avg. GE	9.0	8.3	8.7	8.9	8.9	9.5	8.4	9.2	8.2	9.2	8.8
Overall	Avg. HU	49.8	47.8	49.0	49.3	53.4	50.2	52.2	49.8	55.0	51.8	50.9
	Avg. SC	32.3	29.9	30.6	30.1	29.7	30.5	29.2	30.6	28.7	30.7	30.2
	Avg. SS	25.3	27.2	26.1	27.4	25.8	27.0	27.0	28.1	24.8	27.7	26.6
	Avg. IN	5.1	5.6	5.1	5.4	4.2	4.8	4.0	3.6	3.5	3.2	4.4
	Avg. GE	4.2	4.2	4.4	4.5	4.4	4.7	4.4	4.6	4.5	4.6	4.5

Distributional patterns

Figure 5 displays the average proportional distribution of student credits across the three major divisions. That is, the percentage of divisional credits earned respectively in Humanities, Science, and Social Studies was calculated for each graduate (# credits in division ÷ sum of credits in HU, SC, & SS) and then averages were calculated across all graduates. This calculation was performed to determine how students distributed their Grinnell credits across the three divisions (expressed as a percentage to control for varying total completed credits). On average, 47 percents of their credits were earned in the Humanities division, 28 percent were in the Sciences, and 25 percent of their credits were completed in the Social Studies division.

Figure 5: Average proportional distribution across divisions



Distribution requirements

Over the period of time covered in this report, minimum distribution requirements were applied to students seeking special opportunities such as double majors, independent majors, and off-campus study. These students were expected to demonstrate curricular breadth by completing a range of courses across the three divisions. This requirement policy was eliminated in the spring of 2007.

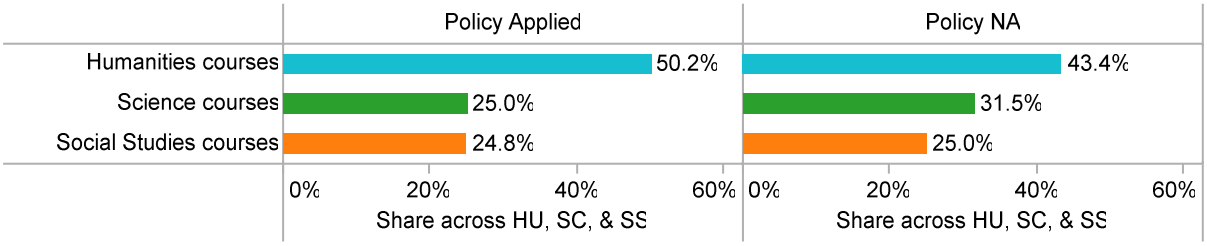
To get a feel for the impact of this policy (requirements applied by the Off-Campus Study Board, Committee on Academic Standing, and Academic Affairs) and to foreshadow implications, the records for double majors, independent majors, and students who studied off-campus were segregated from single major students who did not study off-campus. These groups are labeled *Policy Applied* and *Policy NA*, respectively, and the counts are presented in Figure 6.

Figure 6: Graduates subject to distribution requirements

	Policy Groups / Off-Campus Study					
	Policy Applied				Policy NA	
	Studied off-campus		Did not study off-campus		Did not study off-campus	
Student Major	Count of students	Row percent	Count of students	Row percent	Count of students	Row percent
Humanities majors	498	59.6%			338	40.4%
Science majors	357	37.7%			589	62.3%
Social Studies majors	552	55.9%			435	44.1%
Double majors	302	58.0%	219	42.0%		
Independent majors	43	57.3%	32	42.7%		
Overall	1,752	52.1%	251	7.5%	1,362	40.5%

Average proportional distributions were then calculated for the two policy groups. The results are depicted in Figure 7. The proportions for *Policy Applied* students were 50-25-25 (HU-SC-SS), while the proportions for *Policy NA* students were 43-32-25 (compared to the overall 47-28-25 distribution in Figure 5).

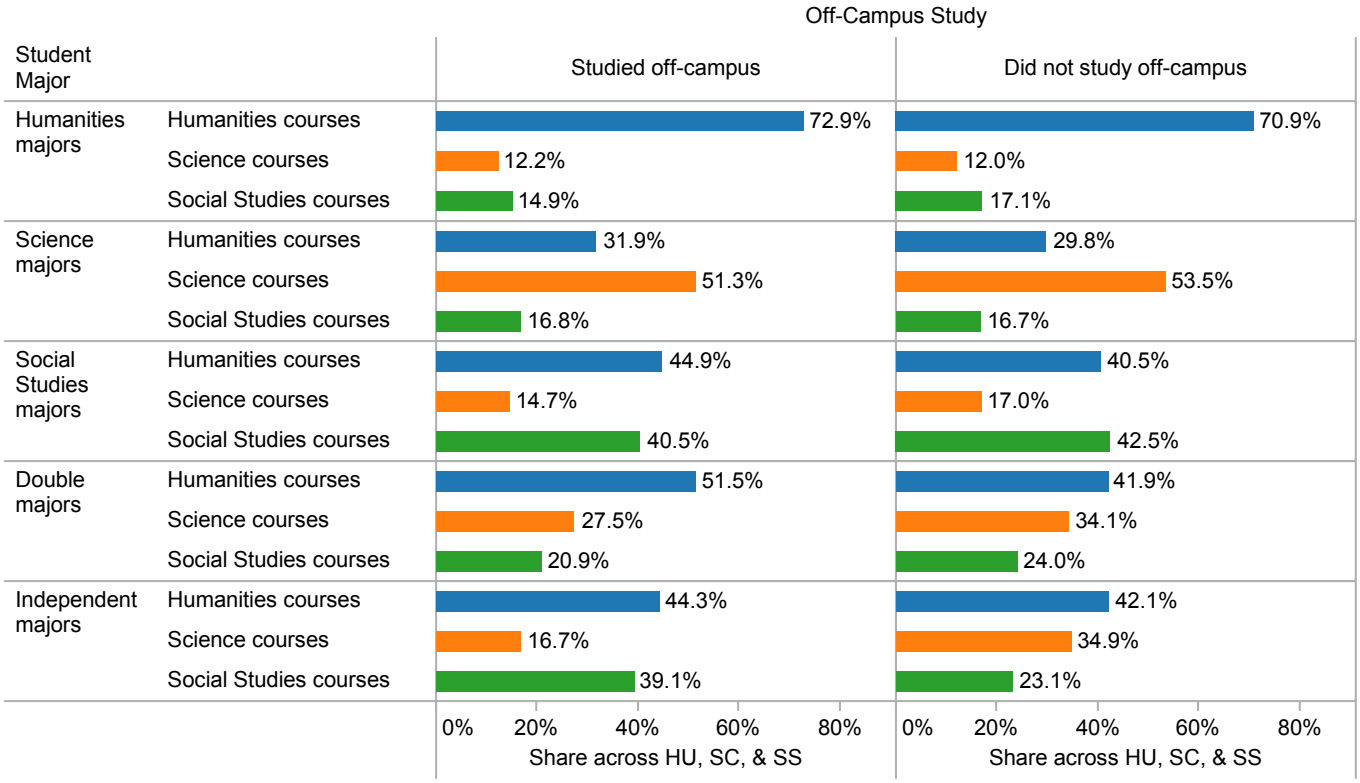
Figure 7: Average proportional distribution across the three divisions



The distributional averages for students who were not ostensibly subject to the distribution requirement were not all that different from their counterparts who were subject to the policy. Segregating the records into these two groups may separate students who had characteristically different curricular goals and plans, or the results may be related to simple scheduling opportunities (e.g., certain students who did not study off-campus had more time in residence to complete Grinnell-sponsored science coursework). The former issue can be illuminated by considering student major.

Figure 8 provides distributional averages by major by off-campus study status. Humanities majors who studied off-campus, for example, allocated 15 percent of their divisional credits to Social Studies courses. Humanities majors who did not study off-campus allotted, on average, 17 percent of their divisional credits to Social Studies courses.

Figure 8: Average proportional distribution across the three divisions by major by OCS experience



There are not large differences in distributional proportions that break along off-campus study lines (notably among single-major students who would/would not have been affected by the distribution requirement). Distributional patterns varied more across disciplines (major divisions) than by whether or not students studied off-campus.

Absent policy, advising, or cultural counterweights, and to the degree the faculty continues to expect curricular breadth from students, one would expect historical distributional patterns to persist. Key to this consistency is the effect of the divisional cap. Students cannot take more than 92 credits in any one division, which requires that credits be drawn from other areas of the College to generate enough credits to graduate (124). This maximum acts as a corollary to minimum credits requirements, which the College does not employ. The effect of the policy change on double and independent majors, however, remains to be seen. Student demographics, evolving learning goals, the Expanding Knowledge Initiative, and the propensity to study off-campus are also shifting factors to gauge. ❖

Procedural observations

- The College would benefit from a more robust, crosscutting course classification system. A pedagogically-inspired taxonomy would enable the routine production of summary information for faculty oversight. More importantly, the clear identification of different educational vehicles fosters communication and helps students think deliberately about their curricular plans. When students are active partners in the learning process they develop the skills to become more effective learners (cf. *Education in the Liberal Arts*, Grinnell College Academic Catalog).
- Information about EKI courses or courses considered interdisciplinary, and emerging course cluster arrangements, should be stored in the central data system to enable future reviews. *Interdisciplinary* courses identified in this brief simply reflect concentration subjects.
- The ability to link courses to respective key elements of a liberal arts education would strengthen this form of analysis. In the fall of 2007 the Tutorial and Advising Committee began reviewing the prospects for this approach.
- Elaborating electronic information about transfer credits would extend the capabilities of this type of analysis.

Procedural notes

Subject description	Subject designator	Division of record	Recast division	Course count	Sum of credits
Library	LIB	SC	GE	155	308
Reading Lab	RED	SS	GE	567	567
Thesis	THS	GE	GE	76	304
Tutorial	FRE	GE	GE	1	4
Tutorial	TUT	GE	GE	3161	12644
Writing Lab	WRT	SS	GE	1155	1155
Alternative Language Program	ALS	HU	HU	208	489
Art	ART	HU	HU	3727	14606
Chinese	CHI	HU	HU	862	2926
Classics	CLS	HU	HU	238	926
English	ENG	HU	HU	6214	24220
French	FRN	HU	HU	2524	10017
General Literary Studies	GLS	HU	HU	381	1516
German	GRM	HU	HU	1621	6428
Greek	GRE	HU	HU	219	1003
History	HIS	SS	HU	6592	25458
Humanities	HUM	HU	HU	1737	6597
Japanese	JPN	HU	HU	371	1613
Latin	LAT	HU	HU	572	2630
Music	MUS	HU	HU	10270	18090.5
Philosophy	PHI	HU	HU	3668	14545
Religious Studies	REL	HU	HU	3165	12480
Russian	RUS	HU	HU	1473	5739
Spanish	SPN	HU	HU	3401	13001
Spanish	SPN	IN	HU	87	348
Theatre	THE	HU	HU	2686	8570
Africana Studies	AFR	GE	IN	101	400
Africana Studies	AFR	IN	IN	68	190
Afro-American Studies	AAS	IN	IN	17	68
American Studies	AMS	GE	IN	1237	4706
East Asian Studies	EAS	HU	IN	1	4
Environmental Studies	ENV	IN	IN	817	3068
Gender and Women's Studies	GWS	IN	IN	946	3634
Global Development Studies	GDS	IN	IN	275	1074
Latin American Studies	LAS	IN	IN	25	92
Linguistics	LIN	IN	IN	235	918
Neuroscience	NRS	SC	IN	1	4
Russian & East European Stds	RES	IN	IN	100	364
Russian & East European Stds	RES	SS	IN	19	76
Technology Studies	TEC	IN	IN	57	218
Western European Studies	WES	IN	IN	32	94
Biological Chemistry	BCM	SC	SC	159	612
Biology	BIO	SC	SC	5013	19808
Chemistry	CHM	SC	SC	4065	15771
Computer Science	CSC	SC	SC	2127	8306
Mathematics	MAT	SC	SC	7546	29415
Physics	PHY	SC	SC	3378	12918
Psychology	PSY	SC	SC	3505	13947
Science	SCI	SC	SC	341	876
Anthropology	ANT	HU	SS	74	296
Anthropology	ANT	SS	SS	4438	17173
Economics	ECN	SS	SS	5106	19968
Education	EDU	SS	SS	1775	7324
Physical Education	PHE	SS	SS	7195	8064
Political Science	POL	SS	SS	4708	18214
Social Studies	SST	SS	SS	1113	3844
Sociology	SOC	SS	SS	3740	14733

GE = General Education
HU = Humanities
IN = Interdisciplinary
SC = Sciences
SS = Social Studies

Division of record refers to the divisional coding of courses as it currently exists in the central administrative database. *Recast division* refers to remapped divisions for the purposes of this brief. Subject (course) designators were used to recast the data to control for procedural or policy changes over time. Also, some of the divisional coding in the central data system reflects administrative divisions of the College that may not be useful for pedagogical analysis.

All concentrations were coded into *Interdisciplinary*. Reading and Writing labs, and Library courses, were coded into *General Education* as College-wide service courses. Math and Science labs were left in *Sciences*.

Aggregate statistics:

- 3,365 graduates (FY98-FY07)
- 113,345 Grinnell courses completed
- 392,363.5 Grinnell credits earned

⇒ 33.7 courses per student

⇒ 116.6 Grinnell credits per student

⇒ accounts for 94 percent of the total credits required for graduation

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Transcipt analysis

Fall 2004

Informal exchange of data with two key peer schools

Peer 1 has general education requirements
Peer 2 has an "open curriculum"

For the "divisional distributions" analysis, all Peer 1's courses and departments were re-coded to conform with Grinnell divisions. Those are:

Humanities:	Social Studies:	Sciences:
All foreign languages	Anthropology	Biology
English	Economics	Chemistry
Philosophy	History	Math/Computer Science
Religious Studies	Political Science	Physics
Art	Sociology	Psychology
Music	Education	
Theatre	Physical Education	

The divisional grouping of majors was done so that students with two majors in the same division are counted in that division, while students with two majors in different divisions are counted as cross-divisional double majors.

	Peer 1 College				Grinnell College			
	% of credits taken in humanities	% of credits taken in social studies	% of credits taken in sciences	% other credits	% of credits taken in humanities	% of credits taken in social studies	% of credits taken in sciences	% other credits
All graduates	37%	29%	29%	5%	38%	32%	26%	4%
2000 graduates	36%	30%	29%	5%	38%	31%	27%	4%
2001 graduates	38%	28%	29%	5%	36%	33%	27%	4%
2002 graduates	36%	30%	30%	4%	39%	31%	26%	4%
2003 graduates					37%	33%	26%	4%
2004 graduates					39%	32%	25%	4%
Humanities division majors	66%	16%	13%	5%	61%	22%	13%	4%
Social Studies division majors	29%	52%	14%	5%	28%	52%	16%	4%
Science division majors	24%	15%	57%	4%	26%	21%	49%	4%
Cross-divisional double majors	36%	32%	28%	4%	37%	28%	31%	4%

% of grads taking 3+ full-credit courses in each of the 3 divisions

	Peer 1	Grinnell
All graduates	58%	84%
2000 graduates	65%	84%
2001 graduates	50%	86%
2002 graduates	62%	86%
2003 graduates		82%
2004 graduates		83%
Humanities division majors	40%	69%
Social Studies division majors	66%	86%
Science division majors	69%	93%
Cross-divisional double majors	61%	92%

% of grads taking 3+ full credit courses in a single div

	HUM division	SST division	SCI division
Peer 1	98%	80%	75%
Grinnell	99%	96%	88%
Peer 2	98%	90%	63%

How to read the tables:

Peer 1's 2000 graduates took 36% of their credits in the humanities.

58% of Peer 1's graduates took 3 or more full-credit courses in each of the three divisions (see definition on final worksheet).

98% of Peer 1's graduates took 3 or more full-credit courses in the humanities.

Average number of credits in each division, by Grinnell division of students' major

Grinnell graduates, Grinnell method of counting credits

	n =	avg # HUM credits	avg # SST credits	avg # SCI credits
HUM majors	423	72	26	15
SST majors	468	33	62	18
SCI majors	429	32	25	60
Cross-divisional double majors	191	45	34	38

Grinnell graduates, Peer 1's method of counting credits

	n =	avg # HUM credits	avg # SST credits	avg # SCI credits
HUM majors	423	18	6.5	3.75
SST majors	468	8.25	15.5	4.5
SCI majors	429	8	6.25	15
Cross-divisional double majors	191	11.25	8.5	9.5

Peer 1's graduates, Peer 1's method of counting credits

	n =	avg # HUM credits	avg # SST credits	avg # SCI credits
HUM majors	267	18.9	4.6	3.9
SST majors	421	8.6	15.1	4.2
SCI majors	378	7.2	4.4	17
Cross-divisional double majors	33	11.4	10	9

Percent of Students Taking Courses in Each Area

	Grinnell			Peer 1		
	at least 1 course	at least 2 courses	at least 3 courses	at least 1 course	at least 2 courses	at least 3 courses
math/computer science	92%	62%	35%	83%	42%	23%
languages	86%	69%	49%	86%	56%	31%
arts	79%	58%	43%	93%	70%	39%
sciences	96%	75%	51%	98%	68%	51%
social studies	99.9%	99%	95%	96%	87%	76%
other humanities	96%	84%	64%	95%	80%	57%
physical education	41%	34%	17%	98%	65%	41%

	Peer 2 College				Grinnell College				Peer 1 College			
	0 courses	1 course	2 courses	3+ courses	0 courses	1 course	2 courses	3+ courses	0 courses	1 course	2 courses	3+ courses
Own culture	14%	16%	18%	52%	55%	29%	10%	6%				
Other culture	1%	4%	7%	88%	11%	15%	19%	55%	32%	49%	13%	6%
Past	8%	18%	19%	55%	28%	31%	15%	26%	5%	66%	17%	12%
Scientific method	18%	19%	16%	47%	16%	28%	17%	39%	2%	49%	21%	28%
Abstract/quantitative reasoning	5%	10%	13%	72%	4%	17%	25%	54%	2%	5%	37%	56%
Life of imagination	2%	4%	8%	86%	11%	22%	19%	48%	1%	5%	44%	50%
Creative activity	51%	20%	10%	19%	26%	22%	15%	37%	13%	52%	19%	16%
Ethical issues	<1%	2%	2%	96%	91%	9%	<1%	0%	4%	56%	18%	22%
Human behavior					4%	12%	13%	71%	3%	37%	26%	34%

Caveat: Each college did its own classification of courses. We may not have classified things the same way, so these comparisons are approximate. These discrepancies probably have a significant impact on the categories of "creative activity" and "ethical issues."

How to read this table:
52% of Peer 2's graduates took 3 or more courses in which they analyzed their own culture.

	Peer 2	Grinnell	Peer 1
Took at least one course in each of the first 8 areas	28%	1%	59%
Took at least one course in each of the following 6 areas	30%	21%	59%

own culture
other culture or past
scientific method
abstract/quantitative
imagination
creative activity

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Grinnell College

Office of Institutional Research Newsletter

Carol Trosset, Director
Scott Baumler, Senior Research Analyst **Issue 4, February 1999**

Transcript Analysis: Curricular Models for Advising

The analysis of student transcripts has been an increasingly important component of institutional research activities over the past 14 years. In the absence of distribution requirements or a core curriculum, the only way to know how our students allocate their academic work is to examine the transcripts that result from the curricular choices of large numbers of individuals. Former Director of Research and Evaluation Ruth Wheeler began this work in 1985-86 in preparation for the 1988 North Central Association self-study. Dean Charles Duke developed a database of registrar records beginning with the class of 1990, and performed analyses between 1995 and 1997. Carol Trosset and 1998 NCA Self-Study Coordinator David Lopatto continued this work in 1997-98. Dean Jim Swartz organized a summer faculty workshop on transcript analysis for Summer 1998, and oversaw an all-faculty survey followed by discussion groups in Fall 1998. 12 individuals participated in the workshop, and 83 were involved in the survey and the discussion groups. Results from all these efforts are summarized together in the report below, ending with the development of curricular models to help in advising students.

BREADTH

Nearly all faculty respondents (80/83) gave some importance to curricular breadth, and nearly all mentioned some specific components that they thought should be present in everyone's curriculum. Predictably, there is no overall consensus about what these components are. Many individuals begin by looking at a student's distribution across the divisions, and at the number of departments sampled within each division.

	All graduates of classes 1990-1997			Classes of 1990-94
	Humanities credits	Social Studies credits	Science credits	12+ credits in each division
Humanities majors	63%	20%	13%	65-40% (declining)
Social Studies majors	32%	48%	15%	c. 80%
Science majors	28%	19%	49%	80-85%

This table shows the average percent of total credits taken in each division. Science and social studies majors take half of their credits in their major divisions. Humanities majors take more than that. (These analyses all classify philosophy and religious studies in the humanities.) Humanities and social studies majors as groups take very little science, while science majors take relatively little social studies.

When people think in more specific terms about the components of a curriculum, there are three different ways in which they conceive of breadth: a range of topics, a variety of modes of thought and knowledge, or a range of skills. These, of course, are not fully separable; rather they represent different ways to think and talk about the nature of curricular breadth.

When workshop participants designed their ideal curricula, the following categories emerged (in no particular order): math, science, foreign (non-native) language, the analysis of created works (literature and other artistic creations), participation in the creative and performing arts, and social studies. The last category became subdivided into the study of the past of a particular culture, of the contemporary US, and of some contemporary culture outside the US, and the (theoretical and empirical) study of human behavior and social processes.

When 83 faculty commented on sample transcripts and what they would like to see students studying, members of all three divisions were equally likely to mention science, math, and foreign language as important components of a curriculum. Social studies faculty members were the least likely to mention the study of literature, while science faculty members were less likely than others to mention either social studies or the fine arts.

Several general issues emerged from the various discussions of curricular breadth.

- Over time, workshop participants realized that they often don't have a very good understanding of what kinds of learning take place in classes in other people's disciplines.
- Most people had trouble stating what they wanted students to learn from taking social studies. Thinking about the contributions of this division appears to be less focused than thinking about the sciences and the humanities.
- Some people perceived a double standard, according to which more and higher level humanities work is expected from science majors than humanities majors are expected to do in the sciences.
- It was suggested in the workshop that it might be possible for the Admission Office to predict which applicants would seek the full breadth of a liberal arts education, as opposed to resisting it.
- Is it a problem if international students avoid language study? if they don't take any courses about the US?
- What about weak students who don't have the skills to pursue a broad curriculum?

What do our students take?

A caveat: these data reflect only courses taken at Grinnell. Transfer, AP, and off-campus study credits are not yet in the database.

% of 1990-1997 graduates taking any credits in each area			
	Humanities majors	Social studies majors	Science majors
Biology/Chemistry/Physics	78%	71%	91%
Mathematics (not Computer Science)	75%	91%	96%
Psychology	38%	42%	46%
Sociology/Anthropology/American Studies	80%	84%	82%
History	71%	77%	58%
Political Science	44%	68%	35%
Economics	41%	73%	59%
Modern Languages	90%	88%	82%
Art/Music/Theatre	90%	85%	79%
Philosophy/Religious Studies	82%	81%	78%
English	77%	74%	66%
Classics	24%	11%	11%
Which mathematics is taken	Humanities majors	Social studies majors	Science majors
Calculus	64%	65%	90%
Only precalculus or statistics	22%	29%	9%
No Math courses at all	14%	6%	1%

Looking at the ten most heavily enrolled courses at the college in 1992, 1995, and 1997, there are nine courses that have always appeared on the list. They are Anthropology 104, Economics 111, English 107, Math 115, 131, and 133, Philosophy 111, Political Science 101, and Psychology 113. Humanities 101 has also made the list twice. These do not, however, constitute a shared curriculum, as over 50% of graduates between 1990-97 took four or fewer of these courses. Only about 20% took six or more of them (which would start to ensure significant overlap).

What do our students avoid?

1990-1997 graduates			
	< 12 humanities credits	< 12 social studies credits	< 12 science credits
Humanities majors		15%	33%
Social studies majors	2%		21%
Science majors	4%	15%	

Why do some students avoid science?

Since the largest group lacking three courses in a division was humanities majors that took fewer than 12 credits in the sciences, this group formed the focus of a special study in Spring 1997. The class of '97 had 100 humanities majors who were not also majoring in a science department. 73 of these completed and passed 3 or more courses in the science division; 27 did not. (This count includes courses being taken in the final semester, and assumes that all would pass those courses. ENV 111 was not counted. Only 3 of the 73 and 1 of the 27 had taken it.)

59% of the 27 students with 0-2 science courses were female, compared to 53% of all humanities majors, so gender is not a significant factor. There was no pattern as to the major department of the students. The science division courses taken the most frequently by them were Chem 100 (Chemistry is Everywhere), Psychology 113, Math 115 (Statistics), Math 119 (precalculus), and Physics 116 (The Universe and its Structure).The two groups had the same average cumulative GPA of 3.28 going into the final semester. The 27 had almost the same average science division GPA (2.91) as the others (2.95). Both groups used pass/fail and withdraw options at the same rate.

Carol Trosset interviewed 13 of the 27, and questioned five others by email. Only one had transferred any science credit from another institution. Only one claimed a learning disability (in math). Ten said they had arrived at Grinnell knowing they were not interested in science and didn't want to take any. Nine said math and science had been hard for them in high school. Many had negative (mis)perceptions of science, as uncreative with one right answer and no room for new ideas, as cold and distant and unconcerned about people, as very specialized and unrelated to their lives, and as pointless for anyone not planning a scientific career. Several either disliked labs or thought they took up too much time. Chem 100, Math 115, and Psych 113 were mentioned as "not really science courses," while two students said that they counted Economics as a science because it used math. Three had taken their 1-2 science division courses solely to meet requirements for off-campus study or teacher certification. Seven said they had actively resisted pressure from their advisers to take more science. Six others said their advisers had not particularly pressured them along these lines.

DEPTH

Depth outside the major is a controversial issue for the Grinnell faculty. Its absence is less likely to be noticed by people reviewing transcripts than is lack of breadth. It is viewed as anywhere from essential to undesirable. Those viewing it as important say that to be liberally educated, one must know more than just a little about more than one thing. Those viewing it as a problem are concerned because it limits opportunities for curricular breadth. This concern makes some people skeptical of both double majors and teaching certification.

What constitutes depth is variously defined. It can refer to the number of courses taken in a particular area and/or to the level of the courses taken in that area. Definitions mentioned by faculty members have included a 200-level course, a two-semester sequence, a two-semester sequence beyond the 100 level, a 300-level course, "the intermediate level," and 2-3 courses beyond the introductory course. This variety of definitions raises the additional problem of course numbering conventions across departments, which are highly inconsistent.

Most workshop participants, and about one third of the 83 faculty respondents, specified that at least some 200-level work should be done outside the student's major. Some of these people thought this should include some 200-level work outside the major division. Those who promoted the idea of depth outside the major usually said that this depth should be achieved in 2-3 very different areas. Several thought that double majors were only appropriate if the two majors were in different divisions.

Several concerns were raised either about inadequate depth or about depth that was perceived as wrongly focused. Issues of supposedly inadequate depth included students who take only the minimum number of courses required for the major, students who graduate with the minimum number of required credits, students who frequently take reduced course loads, especially in the senior year, and students who take a number of 100-level courses during the senior year. Issues of supposedly misdirected depth included concerns about students who took a large percentage of their total credits in either creative and performing arts or in physical education, and about students who received poor grades in their major field (possibly indicating a mismatch of student and subject).

How many credits do students complete in how many departments?			
	1986 graduates	1986 graduates	1990-97 graduates
# of departments	8+ credits / department	12+ credits / department	12+ credits / department above the 100 level
0	0%	0%	2% (see note)
1	0%	7%	52%
2	3%	30%	40%
3	8%	37%	6%
4	18%	22%	<1%
5	25%	4%	0%
6	28%	<1%	0%
7+	18%	0%	0%

Note: This table should be read as follows: "25% of the 1986 graduates earned 8 or more credits in 5 different departments." Those who graduated with 0 departments in which they held 12 or more credits above the 100 level were all American Studies, General Science, and Independent majors.

Credits by Course Level				
	1986 graduates			1990-1997 graduates
Course level	Humanities majors	Social studies majors	Science majors	
100	45%	46%	50%	49%
200	36%	38%	33%	36%
300	17%	14%	15%	13%
400	2%	2%	2%	2%

Note: This table should be read as follows: "The group of humanities majors who graduated in 1986 took 45% of all their Grinnell credits at the 100 level." The numbers reflect all credits taken throughout the college by majors in a particular division. They do not refer to credits taken in that division.

Enrollments in particular course levels and types (calculated as # students x # credits)		
Academic years 1989-90 through 1994-95		
Course level or type	% of college enrollments	Trend over time
100-200	81%	Slight decrease
300-400	12%	Stable
Independent study (all types)	2.6%	Stable
Performance (PE, fine arts)	3-4.5%	Steady increase
Internships	0.5-0.9%	Steady increase

Average credit hours per student per year have decreased steadily, from 32.6 in 1989-90 to 30.4 in 1994-95.

ALTERNATIVE CURRICULAR MODELS

The comments of the 83 faculty members who participated in the Fall 1998 project have been analyzed to determine whether there are any widely shared ideas of what constitutes a desirable curriculum. (The technique used was cluster analysis, which takes individual patterns of responses and identifies relatively homogeneous subgroups.) Three different visions emerged from this analysis. 80% of the participants expressed views that approximated one of the models described here. The remaining 17 individuals either agreed with part of one of these models or held idiosyncratic views. Therefore, each of the visions of curricular choice described below has a significant level of faculty support. It is possible to design a curriculum that satisfies all three of these models simultaneously, or that specifically resembles one of them.

A. Range of Skills. This model is based on the responses of about one third of the participants. It suggests the

importance of foreign language study, the development of quantitative skills, the analysis of texts, the study of foreign cultures, and the completion of 200-level work both outside the major and outside the major division.

B. Multiple Areas of Depth. This model also synthesizes about one third of the responses. It encourages either multiple areas of depth or the systematic coherence of a number of non-major courses, possibly through a concentration. It also stresses the importance of 200-level work in both a foreign language and the social studies.

C. Range of Disciplines. This model came from about 15% of the responses. It encourages study in a wide variety of areas--math or quantitative reasoning, lab science, social studies, history, study of a foreign culture, literature, creative and performing arts, and 200-level foreign language study--and also encourages depth in areas outside the major.

The findings reported here, about the behavior of students and about curricular models, have implications for how we advise our students.