Grinnell College

Office of Institutional Research Newsletter

Carol Trosset, Director Issue 2, May 1998

Student Perceptions of Academic Disciplines at Grinnell College

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Introduction

In 1959, C. P. Snow noted that "the intellectual life of the whole of western society is increasingly being split into two polar groups" which he considered "literary intellectuals" and scientists (*The Two Cultures,* Cambridge U Press, 1993:3). Snow's observations have led to much discussion about the extent of these academic divides. Grinnell College, as a liberal arts institution, theoretically aims to decrease these divisions between fields as it encourages students "to increase their literacy: not only in their own language and its literature but also in those of other peoples and in the languages and principles of mathematics, the natural and social sciences, and the musical and visual arts" (Grinnell College Catalog p.4). However, as double-majors in biology/sociology and chemistry/English, we had noticed negative impressions of academic fields held by students. Students appear to feel that some fields are more challenging than others, that only some produce students who help society, and some are based entirely on either facts, emotions, or creativity. Often, these impressions were frustrating, because they appeared to represent misperceptions of fields, views that one hopes would not be prevalent in a liberal arts environment. During our senior year at Grinnell, we decided to study students' perceptions of academic disciplines to obtain a more refined understanding of the impressions we had informally observed, and to begin to promote ways to reduce commonly-held negative perceptions.

Methodology

All research was conducted during the Spring semester of 1998 at Grinnell College. Seniors were therefore members of the class of 1998, and first-years were members of the class of 2001. We began the research by doing pile-sort interviews, in which each interviewee was given a stack of index cards with an academic department on each card. Interviewees were asked to place the academic departments in whatever groups they found appropriate, explaining why they put certain departments together and how the groups were different from one another.

Several departments were almost always placed together while other departments moved between different groups or were kept alone. English is a good example of an inconsistently placed field, as it was placed with Music/Art/Theatre, Classics, the foreign languages or kept alone depending on which characteristics of English people saw as central. Any department that was not consistently placed in a group was used individually on the resulting survey. The common groupings from the interview stage which were used in the resulting survey are seen in Table 1. Since these groupings were common early on, we tried to interview at least one senior major from each of the different groups. For some of the smaller departments, this was not possible.

Table 1: Common groups from pile-sort interviews

Music/Art/Theatre	Biology/Chemistry/Physics	Psychology
Math/Computer Science	Religious Studies/Philosophy	English
Russian/Chinese/Spanish/French/German	Classics	Political Science
Sociology/Anthropology/American Studies	Economics	History

After interviewees had sorted the academic departments, we asked them several questions about each of their groups. These questions included why people major in these fields, how important a contribution these fields make to society, how important the fields are for any given individual's education and the interviewee's personal education, and how applicable the fields are outside of academia. Interviewees then were asked if any of their groups were more inherently challenging or required a special aptitude or talent more than other groups. Finally, interviewees were asked what characteristics they associated with a "humanities" type or "science" type person.

Twenty seniors and seven first-years were interviewed to see if their groupings of departments or interpretations of questions were radically different. There did not appear to be much difference, so we developed a preliminary survey based on the interview results. Interview responses generated two main reasons for choosing a major, career goals and intrinsic interest, and these perceptions were probed with two questions on the survey. The contribution to society, importance in individual education, applicable outside academe, inherently challenging, and special talent questions were retained, and a question asking

how much fields enrich the quality of life was added. Finally, a battery of questions dealing with attributes of fields was added, asking how much fields deal with such things as emotions, concrete facts, and developing communication skills. Each question was based on a 1 to 7 scale with 1 being the most positive or most important and 7 being the least. The preliminary survey was given on a one-to-one basis to twenty people identify any problems. The final survey was sent through campus mail to the remaining 228 members of the senior class, including those who graduated mid-year but were still accessible, and 211 first-years who were selected through random sampling. A copy of the final survey is attached.

Demographics of Respondents

A total of 27 people were interviewed, 20 seniors and 7 first-years. Of the seniors, there were 11 females and 9 males, 5 science majors, 7 humanities majors, 7 social science majors and 1 double major. 5 female and 2 male first-years were interviewed. The survey stage generated 108 senior responses, which was a 43% response rate. 44 (41%) of the senior respondents were male and 64 (59%) were female. Of these seniors, 48 (44%) were science majors (20 men, 27 women), 25 (23%) were humanities majors (11 men, 14 women), 26 (24%) were social science majors (9 men, 18 women), and 9 (8%) were double majors (3 men and 6 women). A total of 102 first-years responded, which was also a 43% response rate. Of these respondents, there were 37 males (36%) and 65 females (64%).

Results

Little difference between first-years and seniors

Consensus analyses were performed to determine whether there was an overall consensus on survey responses within the senior or first-year class. These tests showed that there was general agreement within each class for responses. In other words, people within one class generally gave a similar pattern of answers to questions in the survey. To compare the consensus answers for the two classes, we performed a one-way ANOVA. (All tests of significance were performed at the 0.05 confidence level.) The senior and first-year means were significantly different for only 19 of the 168 responses, showing that seniors and first-years had essentially the same perceptions towards the academic fields. An interesting difference was that first-years felt that career goals were more important reasons for students choosing to major in English, classics, history, and sociology/anthropology/American studies. As well, compared to the first-years, seniors believed that some groups (economics, history, sociology/anthropology/American studies, math/computer science, and the lab sciences) involved more creativity and other groups (economics, English, classics, foreign languages, and history) were more involved with developing theories. Nonetheless, because of the overall similarity of students' responses, averages reported in Table 2 (insert) are for both classes combined.

Factor Analysis

A factor analysis was performed for the senior responses to see whether there were underlying factors that accounted for the covariation observed among responses to the 168 questions. Three important factors were identified, with the first being nearly six times more important than the second. The first factor included student responses dealing with how much groups of disciplines contribute to society, foster communication skills, help with understanding people, involve feelings and emotions, involve creativity, and improve the quality of life. Our interpretation of this factor is that it measures how much students see the discipline(s) as being concerned with "the human condition." Thus, it appears that students' perceptions of the "humanness" of a discipline play a very important role in how that discipline is perceived and valued at Grinnell. Interestingly, four of the questions loading onto this factor deal with defining the attributes of a field, which seems to indicate that Grinnell students may agree more about what fields involve than about how challenging or valuable they are.

Trends on questions

Lists of where the groups of fields fell in relation to one another for different questions are shown in Table 2. Lines are drawn between fields with significantly different means as determined by independent t-tests. Some of the more interesting trends and findings will be discussed below. It should be noted that some of the department groupings may obscure differences between departments placed in the same group. As well, these are student perceptions of departments and do not necessarily reflect any inherent value of the departments. When student perceptions of the importance of career goals are compared to the importance of intrinsic interest when deciding on a major, it is seen that students believe one can major in a field for interest or career but not necessarily for both. For example, the biology/chemistry/physics group is at the top of the list for career goals but then drops down to ninth out of the twelve groups for majoring in it because of intrinsic interest. This is also supported by interview data when several people stated there were more jobs available in these fields than others. Conversely, classics is last on the list for career goals but second on the intrinsic interest list.

Perceptions of which fields are inherently challenging and which require a special talent or attribute are very similar, although the music/art/theatre group moves up to the top of the talent list. In the interviews, it was found that both the inherently challenging question and the requiring special talent question were needed because students would often respond that all fields are equal or it depends on the individual for one of these questions and not the other. However, if both questions were asked certain departments emerged as being more challenging or requiring a special talent. The top four groups are the same on

both lists, and these were the only groups that were specifically stated in the interviews as being more challenging or requiring a special talent. All the various attributes of fields correlated well with the perception of a group's inherent challenge except for whether a field involved feelings and emotions, which had a much weaker correlation. This seems to imply that students feel that the extent of dealing with feelings and emotions has little relation to how challenging a field is. The challenging question also prompted several student complaints, often from students with majors that were considered less challenging. These complaints may reflect students' realization of a general campus consensus that certain fields are harder than others.

Students also seem to feel that the most challenging fields generally contribute the most to society, as could be seen by comparing top fields on both lists, such as math/computer science, biology/chemistry/physics, and music/art/theatre. However, an even stronger correlation was observed between student responses about a group's contribution to society and its applicability outside of academia. It seemed logical that students would feel the world is changed by academic pursuits that have a direct connection outside of pure academics. Surprisingly, there was not much correlation between contribution to society and either the importance of individuals studying these fields or how much the fields help one understand people. Students seemed to feel that English and history were most necessary for an individual's education; interviewees considered these "building block" fields which must be studied to do academic work in other fields most effectively. The lack of relation between fields understanding people and contributing to society is also interesting, as one would expect that people would associate helping society with the study and understanding of social interactions. Instead, students seem to feel that the anthropology/sociology/American Studies group, which is considered most involved with helping to understand people, makes less of a contribution to society than most other fields.

Students also seemed to define creativity fairly narrowly as the production of a creative work: the fine arts and English (creative writing) were considered more creative than other fields. The limits of this narrow definition are seen in the fact that fields considered highly involved with developing theories are not necessarily seen as creative, although developing theories is essentially a creative activity. Also, respondents rarely felt that fields that are creative deal with concrete facts; there was no correlation, and even some inverse correlation, between these qualities. Similarly, the fields that deal with concrete facts are not thought to deal with feelings and emotions. Overall, students seemed to have the impression that certain academic fields would deal with concrete facts or developing theories and others would deal more with emotions or creativity, while few could have all of these attributes.

Differences between divisions

Some of the negative impressions we had observed previous to this study had seemed to be based on students of one discipline holding negative opinions of another field of study. Therefore, a one-way ANOVA and Scheffé pairwise analysis was performed to determine if there was a significant difference between the responses of social science, science, humanities, and double majors in the senior class. First-year data were not used for this analysis as several first years had not yet decided on a major, and double-majors were included as a separate group since they can be considered to be socialized in two distinct divisions. The divisions are a somewhat arbitrary distinction between fields, but since none of the pile sort groups included fields from different divisions, it appears that students feel that divisional distinctions are somewhat valid. This analysis showed a surprising similarity between students in different divisions, with significant differences in only 20 of the 168 responses. Generally, significant differences existed between humanities and science majors with social science majors mediating somewhere between the two.

Table 3: Selected Significant Differences Between Divisional Perceptions

Question (divisions with difference separated by /)	Science	Social Science	Humanities
Need for talent in bio/chem/physics (Soc Sci/Hum)	3.26	2.77	4.12
Need for talent in math/computer sci. (Hum/Soc Sci, Sci)	2.59	2.46	3.92
Import for ind. ed. anthro/soc/Am. stud. (Sci/Hum, Soc Sci)	4.02	2.89	2.88
Import for ind. ed. history (Sci/Hum, Soc Sci)	3.23	2.22	2.28
Quality of life anthro/soc/Am. stud (Sci/Hum, Soc Sci)	3.67	2.38	1.96
Quality of life history (Sci/Hum)	3.37	2.30	1.79
Quality of life psychology (Sci/Hum)	3.61	3.04	2.42

A few of these specific differences were particularly interesting. For example, students in the humanities felt significantly less than social science majors that a special talent or attribute was necessary for math/computer science. Humanities majors also felt the same need for a special talent in biology/chemistry/physics significantly more than social science and science majors. As well, science majors felt that history and anthropology/sociology/American studies were significantly less important for any given individual's education than did social science and humanities majors. Science majors also felt significantly less than majors in both other divisions that anthropology/sociology/American studies improve the quality of life and significantly less than humanities majors that history and psychology improve the quality of life. In general, science majors had significantly more negative impressions of aspects of a few humanities fields than humanities majors, while social science majors generally were not significantly different from either of the other divisions on these responses.

Differences between genders

A one-way ANOVA test was run to see if there were any significant differences between the responses of male and female students. The majority of the questions did show statistically different responses between males and females. Considering average responses for the two groups, females answered with lower numbers (more positively) than males in essentially all cases where the means were significantly different. Thus, females gave fields higher ratings than did males on how important it is to study them or how much of a contribution they make to society. These trends were consistent enough that the differences may not be due to a difference in perceptions, but could result instead from a difference in how women and men use this type of scale to express their views.

However, there were patterns to which questions women answered more positively than men, suggesting that attitude differences do exist. For example, the women's responses were significantly more positive than those from men for at least 8 out of the 12 groups of disciplines when rating quality of life, contribution to society, importance for individual education and the importance of intrinsic interest when choosing a major. All of these questions relate to strong liberal arts ideals, such as studying many fields throughout college in order to go out and make a positive contribution to the world, in addition to majoring in a field for interest and love of the discipline. This may show that Grinnell women support the liberal arts ideal more than men. However, this is speculation and statistics that normalize the lower means of women need to be done in order to further investigate this hypothesis.

Discussion

Clearly, this study uncovered several surprising and unsettling perceptions held by Grinnell students. Senior and first-year responses were strikingly similar. This suggests at least two different cultural explanations. The first-years received this survey during their second preregistration process, so they could have already been socialized into the existing Grinnell culture. The other explanation is that students are coming into Grinnell with preexisting perceptions and these perceptions are not changed dramatically in four years at the college. A condensed version of the survey will be given next fall during new student days to help answer this question. If the first-years undergo a quick socialization process, the fact that there are so few changes in their perceptions in the following three years at Grinnell is worrisome.

However, the overall cultural consensus among students would not be so disturbing if students did not consider certain fields to be distinctly less challenging and others seemingly unimportant for one's education. As well, students appear to hold what we consider serious misperceptions about academic fields, some of which are apparently held about fields in a student's own division. Therefore, it seems that Grinnell needs to consider how to address some of these misperceptions among students. The inherently challenging perception was personally bothersome to one of us because there was such a wide split between her majors in biology and sociology on that question. From personal experience she has seen how it is challenging to consider the problems encountered in both these majors, although respondents did not feel sociology was nearly as challenging. Similarly, students consistently seem to feel that certain academic ways of knowing are more challenging than others. We believe requiring a senior project for graduation would help take away the stigma that some fields are more difficult than others because all seniors, regardless of major, would have to do a significant project to graduate. We do not think the project would necessarily have to be in the student's major (although students would need appropriate prerequisites for the field of their chosen project), and it could consist of a variety of things: a major research paper, a laboratory or social science research project, an art exhibit, or a senior concert. We realize that there are stereotypes outside of Grinnell revolving around how hard or challenging different disciplines are, but with a senior project all disciplines would become somewhat equalized because seniors in every field would have an equivalently rigorous requirement for graduation.

It seems that several of the commonly held misperceptions of fields could be best handled in entry-level classes, where students either gain or reinforce their impressions of fields outside of their major. Even if the college faces an uphill battle of combating student preconceptions of fields that are formed before college, it is disappointing that students' academic programs seemed to induce little change in their perceptions over six semesters of education at Grinnell. This stasis of student opinions should perhaps encourage a rethinking of entry-level curricula. These classes, regardless of discipline, need to engage students in using the discipline as a way of knowing and show them the combination of creativity, facts, theories, and other attributes that are essential to a wide variety of academic studies. Of course, students need to enroll in a broad range of courses to gain from these entry-level curricula. The fact that students perceive some fields as relatively unimportant for an individual's education seems to imply that many individuals may not readily enroll in a wide variety of courses. Under an open curriculum, which is presently an important part of the Grinnell experience, broad course enrollment can primarily be induced through consistent academic advising, across disciplines and within departments, which strongly encourages students to take courses representing a solid academic diversity.