

College Freshman to Sophomore Longitudinal Study Suggests Positive Classroom Influence on Value Formation

Ann Reisner and Gerry Walter

A longitudinal study of the opinions of University of Illinois College of Agriculture students showed that sophomores, as a class, held roughly the same beliefs about soil erosion seriousness and conservation policies as they did a year earlier. Sophomores also showed no indication that their value systems were particularly well-integrated. While the sophomores as a whole were more likely to offer opinions than freshmen, roughly 10 percent of the sophomore class offered no opinion on each of the various measures of erosion seriousness, erosion consequences, and policy. Sophomores from urban backgrounds were still more likely to abstain from offering an opinion than students from a rural background, but the differences between these groups had narrowed. Modest correlations between reported classroom presentation of issues and willingness to offer opinions suggests a positive influence of classroom work on value formation. The findings and discussion point out the need for more attention to opinion formation and values clarification in agricultural curricula.

Introduction¹

The need to improve baccalaureate education training in values, beliefs and ethics is a common theme of many of the major curricular reports of the last decade. Five major re-

Reisner and Walter are assistant professors in the Office of Agricultural Communication and Education, University of Illinois College of Agriculture, 1301 Gregory Dr., Urbana, IL 61801.

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ing more than 750 dollars remained enrolled in the CAHE at Washington State University.

Summary

Over fifty-nine percent (59.1) of the students enrolled remained in the CAHE with 13 of the respondents enrolled in the Animal Science area of the college. Faculty, staff and current students of Washington State University and the College of Agriculture and Home Economics are essential to the successful recruitment, enrollment and retention of students. Scholarships are an effective tool to use, but requirements must be established in order for the scholarships to be beneficial to the student and the CAHE. Too many students received scholarships that are no longer enrolled in the CAHE or really had no intentions of obtaining a degree from CAHE. The scholarship program needs to assess the dollar amount of the scholarships awarded. Once awarded, follow up on the student is essential to insure that the money

ports on the quality of undergraduate university education² recommend increased training in values, beliefs and attitude change along with related skills of problem-solving, synthesis and analysis³ as a necessary part of improving undergraduate education (5). The North Central Region Curricular Committee Project report, which specifically examines agricultural curricula, calls training in ethics an inherent part of a quality undergraduate education and the ability to analyze values a critical part of making informed policy decisions (5)⁴.

It is this latter need, agriculture's ability to articulate and defend its position on important policy issues, that adds special urgency to the North Central project report's call for increased attention to ethics and values training. Various, primarily urban-based, movements -- animal rights, environmentalists, consumer advocate groups -- are increasingly questioning the effects of agricultural practices. A substantial portion of their objections derives from value-frameworks which differ from those of conventional agriculture (1). To face such challenges, agriculturalists must

1. This survey was partially funded through the University of Illinois Experiment Station and the Office of Dean of Resident Instruction.
2. These reports are the Carnegie, Northeast, Bennett, Mortimer and American College reports (5, p.6).
3. The Bennett report alone is not listed as specifically calling for such skills (5).
4. For additional and more extensive rationales for the value of ethics training, see Baer (2) and Batie (3).

is used as it was intended. It appears that larger scholarships and repeated awards tend to keep students enrolled in the CAHE.

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be able to articulate and defend their positions to legislators, the general public and activists. In so doing, agriculturalists must have not only excellent communications skills, but also the ability to critically analyze their own and others' value positions and beliefs (4).

Agricultural colleges are also recruiting relatively large proportions of urban students (4), although the proportion of urban students ranges considerably from university to university and from major to major (12, 18, 19). The influx of students lacking agricultural experience or a farm background means that the make-up of students' values entering colleges of agriculture is also changing. Students from a rural background tend to have a generalized interest and orientation to agriculture and tend to retain that support over time. Students from urban backgrounds, however, tend to be more consumer than production-oriented (20). Agricultural colleges will need to integrate urban-based and rural-based students, groups that could reasonably be expected to differ not only on knowledge, interest and orientation, but also willingness to process and seek information and to form opinions on agricultural issues (8, 9, 14, 20).

Kruglanski's lay-epistemology model (8, 9) suggests that perceiving a need or a problem is a primary motive for actively searching for information about the problem. When an alternative hypothesis weakens their confidence in currently held beliefs, people will seek information to help choose among competing statements or opinions. They continue to search for information until they satisfy some internal standard of 'good enough' or until other constraints -- such as a paper deadline -- force a decision. Those without formed opinions, on the other hand, may seek information only when they perceive a need to form an opinion.

This lay epistemology model suggests that universities could foster value development by challenging students to form and defend their opinions. A pilot study of University of Illinois College of Agriculture freshmen indicated such a challenge is necessary (21). A large proportion of entering students were unwilling or unable to indicate an opinion on questions about soil erosion and conservation. While urban students were significantly less likely than rural students to give opinions, a disturbing subset (approximately 10 percent) of rural students also gave no opinion. Furthermore, there was no strong connection among students' opinions on erosion severity, its consequences and acceptable conservation policies. This absence of a strong connection between various aspects of soil erosion as a problem suggests that even those students willing to give opinions had poorly integrated systems of beliefs. However, while looking at the values and value integration of students entering colleges of agriculture is an important baseline for examining the effectiveness of university instruction, the more important question is whether university-level training is in fact helping students develop well-articulated opinions on important agricultural issues.

The second phase of the longitudinal study at the University of Illinois College of Agriculture looked at whether students in the college's 1990 sophomore class were significantly more willing to offer opinions or, as a class, held

different opinions on soil erosion than they did as freshmen. The study also looked at additional factors that communication theories suggest might increase students' attention to various agricultural issues. Studies suggest that mass media can provide readers with information for building or reinforcing opinions, and agenda-setting theory suggests that frequent mention of an issue in the mass media can increase the salience of that issue for the reader (15).

Research Questions

1. How well-formed are the opinions of sophomores in the College of Agriculture?
2. Do sophomores from an urban background differ systematically from students from a rural background in the formation and direction of their opinions?
3. Do sophomores differ systematically from freshmen in the formation and direction of their opinions?

Procedures

The initial study of 1989 freshmen's conservation opinions is reported in Walter and Reisner (21). In 1990, the study was expanded to include both freshmen and sophomores, added four issues and questions about media use. The results reported here are that subset of the larger study that directly paralleled the 1989 instrument. To create the sophomore sample, we randomly sampled 62 percent of the sophomore class (150 respondents) from college rolls during the fall semester 1990. Two reminders and a follow-up questionnaire yielded 106 completed questionnaires, a response rate of 70.7 percent. A follow-up phone interview of nonrespondents showed no systematic bias in non-responses related to the questionnaire.

The wording of individual questions is included in the accompanying tables. All questions that called for an opinion also included a 'no opinion' option, which students were instructed to select if they had no opinion on the question, had not thought much about the issue, or felt that they lacked enough information to answer the question.

We analyzed the data with SPSS/PC+ Version 2.0.

Demographic characteristics

The most striking change over the 1989-1990 academic year was that the 1990 sophomore class retained more rural than urban students (Table 1). While entering students were relatively evenly divided between rural and urban, by the following year the percentage of students from an urban background dropped to roughly one-third of the student population. The largest percentage drop in enrollment was of students from cities or suburbs with a population of 100,000 or more, while students with a farm or rural non-farm background grew as a percentage of the total student population. The sophomore class also was more likely to report having an agricultural background (85 percent), a finding consistent with the relatively high loss of students from urban settings. The sophomore class's demographics also shifted slightly to majors oriented to commercial agricultural production.

Table 1. Demographic Characteristics.

	Fresh. 89	Soph. 90
Major		
Production-related ¹	42.7	46.6
Other ²	57.3	53.4
Residence		
Metro city (>100,000)	12.1	6.7
Suburb of metro city	20.2	12.4
Medium city (10,000-99,999)	17.0	16.2
Town or village	11.7	12.4
Rural nonfarm	3.6	5.8
Farm	35.2	46.7
Total Urban	49.3	34.5
Total Rural	50.7	65.4
Agricultural Background		
Have done farm work	55.2	71.4
Have worked for other ag. business	37.6	51.4
Parents or relatives have farm	53.2	64.8
Parents or relative have other ag. business	24.8	33.0
Have generalized ag. background	75.9	85.3

¹ Agronomy, animal science, ornamental horticulture, forestry, soil science.

² Ag. economics, ag. communication, ag. education, ag. science, food science, marketing.

Erosion Seriousness

The sophomore class did not significantly change its aggregate estimate of how serious a problem soil erosion is in the Midwest, in Illinois and in home town areas (Table 2). Sophomores consistently estimated soil erosion as more serious in areas farther from their home town area. Still, all groups called erosion a moderate to serious problem in all three locations. As in the previous year, sophomores from a rural background were significantly more likely to estimate soil erosion as a significant concern in their home area than sophomores from a urban background. The only change from 1989 to 1990 was that, as sophomores, they showed a slight, but consistent, tendency to estimate soil erosion a less serious problem than they did as freshmen. Sophomores were also more likely to offer an opinion than they were as freshmen, though, again, the differences were not statistically significant (Table 3). Students from an urban background were significantly less likely to offer an opinion during their freshmen year; by their sophomore year, this rural-urban difference was no longer statistically significant (Table 4).

Table 2. Mean estimates¹ of soil erosion seriousness by locus of problem (1.0 = not serious, 7.0 = very serious).

	Locus of problem		
	Midwest	Illinois	hometown
Freshmen 89			
n	181	183	199
All	5.4	5.1	3.9
Rural	5.4	5.1	4.5***
Urban	5.5	5.2	3.0
Sophomores 90			
n	87	89	93
All	5.1	4.9	3.8
Rural	5.1	4.9	4.3***
Urban	5.1	4.8	2.7

¹ Students with opinions only. *** Differs from urban at p <.001.

Table 3. Percentage of selected subpopulations giving 'no opinion' responses to erosion serious, policy option (freshmen=250, sophomore=106).¹

	Freshmen 89		Sophomores 90	
	Rural n=125	Urban ² n=122	Rural n=68	Urban n=37
Erosion seriousness				
Midwest	8.8	47.5**	10.3	32.4
Illinois	8.8	45.9**	10.3	27.0
Home town area	7.2	34.4***	7.4	21.6
Erosion consequences				
Nature replaces soil	8.0	35.2***	8.8	22.2
Erosion lowers H2O quality	25.6	42.1**	17.6	13.9
Technology offset erosion	20.8	36.4**	16.2	22.2
Policy options				
Education	12.0	28.7**	16.2	8.1
Yield insurance	12.0	24.6*	7.4	18.9
Soil loss fines	9.6	25.4**	7.4	18.9
Cost-sharing	12.8	25.4*	5.9	13.5
Cross-compliance	12.0	24.6*	11.8	21.6

¹ Items were worded as follows: Erosion consequences: In the United States, natural processes are replacing soil as fast as it is lost. Soil erosion is lowering water quality in many areas of the United States. Researchers will find new ways to increase crop yields, enough to offset losses due to soil erosion. Policy options: Spend more federal and state money to educate farmers about soil erosion. Provide low-cost crop yield insurance to farmers who use specified conservation practices. Make farmers who don't meet state-set soil-loss limits pay fine. Deny price-support and other government program benefits to farmers who don't have a government-approved conservation plan. Increase the amount of government cost-sharing funds available to help pay part of farmers' costs for using specified conservation practices.

² Asterisk (*) in column indicates significant difference between freshmen with a rural background and freshmen with an urban background.

Erosion Consequences

On all questions concerning erosion consequences the students were more inclined to the less optimistic picture of soil erosion (Table 3). Both freshmen and sophomores believed soil is being lost faster than it is being replaced and that erosion is lowering water quality. Though evenly divided over whether technological advances will offset yield losses from erosion, sophomores were significantly more likely to say that technology will overcome yield problems, a difference between classes that held after controlling for rural-urban background (R²=0.04, F=.001). For all other questions on erosion consequences and policy options, the

Table 4. Agreement with selected definitions of erosion consequences and conservation policy options, in percents.

	Freshmen 89				Sophomores 90			
	A ¹	D	NO	u	A	D	NO	u
Erosion consequences								
Nature replaces soil	6	73	21	1.9	5	82	12	1.9
Erosion lowers H2O quality	55	12	33	1.2	71	13	16	1.2
Technology offset erosion	18	54	28	1.7	36	46	18	1.6
Policy options								
Education	60	20	20	1.3	62	25	13	1.3
Yield insurance	67	15	18	1.2	81	8	11	1.1
Soil loss fines	36	46	18	1.6	38	3	9	1.6
Cost-sharing	60	21	19	1.3	65	17	18	1.2
Cross-compliance	45	37	18	1.5	56	28	16	1.3

¹ Abbreviations are as follows: A=agree, D=disagree, NO=no opinions, u=mean. * p<.05 ** p<.01 *** p<.001

Table 5. Correlations of erosion seriousness, erosion consequences and policy options, sophomores only.

	A ¹	B	C	D	E	F	G	H	I	J	K
Erosion seriousness											
Midwest (A)	--	.83***	.52***	.31***	-.45***	.27**	-.30**	-.18	-.24*	.04	.06
Illinois (B)			.61***	.35***	-.41***	.36***	-.24*	-.06	-.21	.02	.14
Home (C)				.27*	-.35***	.35***	-.09	-.05	-.02	-.07	.09
Erosion consequences											
Nature replaces soil (D)					-.16	.22*	-.12	.00	-.04	-.16	-.04
Lowers water quality (E)						-.19	.05	.05	.33**	.12	-.05
Technology offsets erosion (F)							-.05	-.07	-.10	.03	.07
Policy options											
Education (G)								.35***	-.01	-.18	.45***
Yield insurance (H)									-.01	-.15	.34**
Soil loss fines (I)										.38***	-.22*
Cross-Compliance (J)											-.14
Cost-Sharing (K)											

¹ Variables on the top row correspond to the variables on the left-hand column. * p<.05 ** p<.01 *** p<.001

majority opinion of sophomores was similar to the majority opinion held as freshmen and a larger proportion of the sophomores held that opinion (Table 3).

Policy

The only significant difference between classes was that sophomores were significantly more likely than freshmen to agree that government should offer yield insurance to farmers, a difference that held after controlling for rural-urban differences (R²=.02, F=.03). Among sophomores, those who considered soil erosion a relatively severe problem were consistently more likely to be less optimistic about soil erosion consequences (Table 5), suggesting some modest integration of conservation beliefs and opinions. On the other hand, there was no consistent relationship between the perceived severity of the problem and the measures sophomores were willing to sanction. As they did as freshmen, sophomores tended to support non-punitive measures of controlling soil erosion and to disagree with punitive measures such as fining farmers (Table 3). In all cases, sophomores were slightly more likely to offer an opinion than they did as freshmen, but in no case was the difference statistically significant.

Sophomores from urban backgrounds were consistently more likely to offer an opinion (Table 4) than they were as freshmen on all question items. For two items, urban stu-

Table 6. Correlation of opinion holding on soil and water conservation items with recent encounter by site of encounter, sophomores only.

	Farm Media	General Media	Class	Conver- sation	Special Events
Erosion consequences					
Nature replaces soil	.18	.18*	.27**	.08	.09
Erosion lowers water quality	.10	.10	.27**	.35***	.13
Technology offset erosion	.21*	.14	.22*	.25**	.17*
Policy options					
Education	-.07	.09	.01	.06	.12
Yield insurance	.17*	.14	.32***	.24**	.03
Soil loss fines	-.01	-.06	.09	.05	.00
Cost-sharing	-.04	.23**	.26**	.20*	-.01
Cross-compliance	.01	.02	.19*	.25**	.09

*p<.05 **p<.01 ***p<.001

dents were more likely than rural students to offer an opinion, a distinct difference from the previous year.

Communication

Virtually all of the correlations between various types of communication about soil and water conservation and opinion holding are positive, suggesting that recent communication is more likely to be associated with having an opinion than not having one (Table 6). Recent encounter with an issue in class or during conversation appears to be modestly associated with opinion-holding on both erosion consequences and policy items. Even with classroom activities and conversations, fully one-third of the items showed no significant relationship between opinion holding and encounters with issues. Student opinion-holding had no consistent significant relationship with farm media use, general media use or attendance at special events.

Discussion

Overall, the sophomore class of 1990 showed little change in its opinions about soil erosion after a year of instruction in the College of Agriculture. A relatively large proportion (10 to 20 percent) of sophomores again offered no opinion on erosion consequences and policy options, indicating that substantial progress could still be made in encouraging students to form opinions on conservation issues. Additionally, sophomore students showed no indication that their value systems were particularly well integrated in that their estimates of erosion seriousness were not strongly correlated with their policy preferences. Students who considered soil erosion a serious problem were still unwilling to sanction the more prescriptive measures for controlling erosion.

On a more encouraging note, the percentage of students offering no opinions decreased for every item. While urban students still were more likely to abstain from offering an opinion, the differences between rural and urban students decreased for every survey item. By their sophomore year, urban students were not statistically less likely to offer an opinion than rural students.⁵ Still, roughly one-fifth of the urban students offered no opinion for five of eight question items, and no-opinion responses from sophomores ap-

proached or exceeded 10 percent on all items.

According to the lay-epistemology model, it is not particularly surprising that urban freshmen might not have strongly integrated beliefs about soil erosion. It is unlikely that they consider soil erosion as salient a concern in their home area as freshmen from a more rural background or that they would have been exposed to agriculturally-relevant information in grade school or high school. Recent thrusts in developing agricultural information for elementary and high school students are based on the assumption that agriculture-related information is not a major part of current instruction. However, on entering a college of agriculture, urban students were exposed to agricultural issues in required introductory courses, were likely to have increased contact with students from an agricultural background, and may have felt an increased identification with agriculture through association with the college. These factors might explain why urban student were consistently more likely to offer opinions as sophomores than as freshmen.

The positive correlations between classroom discussions of soil erosion and opinion-holding, as well as conversations and opinion-holding, also indicate that university education may be having some effect on students' willingness to offer opinions on soil conservation. While the findings cannot isolate any single impetus for opinion formation, sophomores were more likely to give opinions on an issue if they had previously encountered it in class. This supports the need to get agricultural issues into the classroom, especially in discussion where students must then face the need to form, challenge and defend their beliefs and opinions and to examine systematically the relationship of their beliefs to the values implied by those beliefs.

While this study is of University of Illinois students, and hence of limited general scope, it points up four considerations that may vary from university to university: information processing ability, initial attitudes, media use, and college curricula. There is relatively little reason to believe that students' cognitive processing abilities change by location. However, the finding that students from different backgrounds differ in whether they have formed opinions suggests that universities with relatively higher numbers of urban students may need to more explicitly address forcing initial opinion-holding. Additionally states with an activist agricultural press may have students with better formed opinions on conservation issues.

The findings here indicate that college curricula, while of modest success in fostering opinion formation in this study, still play a dominant role. Currently, the University of Illinois' curricular design is roughly similar to those of other colleges in the North Central Region (10). The College's current core requirements include two specific courses, Introduction to Agriculture and Agricultural Economics, and a selection of introductory courses from such areas as soil science, forestry, animal science, food science

5. This finding could be related to the lower n surveyed or because those urban students least likely to offer an opinion were those students most likely to leave the College of Agriculture.

and agricultural engineering. These introductory courses tend to focus on basic information necessary for more advanced courses in a major rather than on an integrated look at agricultural issues and concerns. This type of core curriculum, typical of most colleges of agriculture, does not offer students a unified view of agriculture as a system. Unlike many colleges of agriculture, however, the University of Illinois requires an introductory course that focuses roughly one-third of its instruction on current agricultural issues. Hence, it is likely that University of Illinois students receive as much if not more instruction in agricultural issues than students in other North Central Region colleges.

Curricular Implications

The survey results offer qualified support for our position expressed elsewhere (21) that classroom work can help students form opinions about issues and policy options. Sophomores were more likely to have an opinion on an issue if they recently encountered communications about it. However, students from a rural background, as a group, showed no consistent improvement in their willingness to offer opinions and, in some cases, were even less likely to offer opinions on soil erosion problem definition and policy issues than they were as freshmen. Since all students were exposed to soil erosion as an issue during the fall of 1989 (in *Agriculture and Modern Society*) this lack of opinions is not due simply to an absence of classroom exposure to soil conservation issues. However, it might indicate a failure to systematically integrate issues, and challenging students on those issues, into the overall curricular design. We recommend an emphasis on issues and value/ethic formation not limited to one course, but integrated into the entire curriculum: one that explicitly calls for students to defend their values.

The College of Agriculture at the University of Illinois is currently attempting to address value training by restructuring the College core curriculum to emphasize a systems approach. This restructuring will expose students throughout their course sequence to agriculture as a food and production system. The proposed curricula will in its initial year involve four courses, three of which will examine the physical and technical structures of agriculture through a social science perspective. At least one will be a discussion section, led by university professors, that will challenge students to articulate and defend their opinions on agricultural issues. In their sophomore year, students will take an additional course in agricultural systems and ecology, followed by a capstone course their senior year. Altogether, students will take at least four courses as a college, rather than as individuals within majors, a structure that the college feels will force a more integrated approach to understanding agriculture and values connected with it.

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A LOTUS Futures Trading Game

Gisele F. Hamm, Stephen M. Ptasienski, and Thomas P. Drinka

Abstract

Lotus 1-2-3 is being used to maintain the accounts of simulated futures trades of students in the Department of Agriculture at Western Illinois University. This simulated trading activity is supported by real-time price quotation terminals.

Introduction

The WIU Trading Association--a student club--was formed to supplement instruction delivered in six courses related to fundamental and technical analysis for hedging and speculation using futures and options. The purpose of this club is to allow students to simulate day-, swing-, and position-trades. To support this activity, the students have access to four price quotation terminals which provide real-time quotations of futures prices and option premiums.

The purpose of this article is to describe the Lotus 1-2-3 spreadsheet used to maintain the accounts of simulated futures trades. Previously, a similar instructional use of a spreadsheet prepared with Apple Works on an Apple IIe was reported (Drinka, King, and Weishaar).

The Template

Figure 1 displays the spreadsheet fields, the column width, and the field contents. The Settlement Price Table (Figure 2) consists of Fields A through C. Field A contains standard futures contract codes; for example, "CZ" denotes Chicago Board of Trade December corn futures. Field B displays our futures contract identification code, which is specified as "LLE", where "LL" is the market lookup code, and "E" is the expiration month code; for example, the contract identification code of Chicago Board of Trade (hereinafter, "CBOT") December corn is "01.1". Daily settlement prices are entered into Field C; these prices are used to mark-to-market open market positions each trading day.

For open market positions, trading-account equity is reduced by initial margin: the market lookup code is entered in Field E, and the spreadsheet uses these lookup codes, which also appear in Field V, to select the market's initial margin (i.e., MARG) as displayed in Field X of the Trading Cost Table (Figure 3). Field F designates whether the trade results in an open or an offset futures position: the contract identification code is entered for open positions, while "99" is entered for offset positions.

Drinka is a professor and Hamm is a graduate assistant in the Department of Agriculture, Western Illinois University, Macomb, Illinois, 61455; Ptasienski is a farmer and independent trader, Libertyville, Illinois.

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