Toward Teaching at Higher Levels of Cognition: Teaching the Process of Agricultural Writing

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Abstract

Integrating the higher levels of cognitive learning with the process of agricultural writing is vital. This study investigated the behavior of a professional agricultural writer and how that information was transferred to students through four cognitive levels of learning.

The agricultural writing framework is based on the cognitive behaviors of planning, translating, and reviewing as well as the social behaviors of dealing with individuals and organization. Those behaviors were incorporated into the learning levels of cognition: remembering, processing, creating, and evaluating (Newcomb & Trefz, 1987). The investigator recommends a number of specific steps in designing learning objectives, activities, and evaluation for teaching novice agricultural writers.

Teaching agricultural writing needs to be approached from the higher levels of cognition, as inspired by Newcomb and Trefz (1987). Two aspects help to accomplish this pedagogical process: understanding the professional writing process and in turn teaching that process to novice writers.

This study is two-pronged -- it investigated the observed behavior of a professional agricultural writer and how that information was transferred to students through four cognitive levels of learning.

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Review of Study

A six week investigation of the social and cognitive behaviors of the writing process of a writer for The Farmer magazine of Webb Publishing in St. Paul, Minnesota was conducted (Elefson, 1990). The subject was a member and leader in the American Agricultural Editor's Association (AAEA), as well as his twelve year career in the agricultural writing field. Each story, comprised of writing behaviors, is taken as the unit of analysis in this study. Results dealt with the composite of the five stories.

Composite of Social-Cognitive Behaviors in the Ag Writing Process

A general composite of social and cognitive writing behaviors can be observed in the vertical bar chart (see Figure 1). The cognitive behaviors are interactions between various thought processes that plan and implement the writing process as well as the information that is obtained in the social context. The social behaviors are interactions between the writer and 1) people and 2) social artifacts. The most obvious result is that cognitive behaviors predominate. They tend to rise in importance as they progress toward the mid-point of story production. Both social and individual behaviors are interspersed with cognitive behaviors throughout the story writing process. Cognition occurred for 63.5% of the time and social behaviors occurred 36.5% of the time.

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that challenges students at higher cognitive levels, practicing, and evaluating the success of teaching at higher cognitive levels, college of agriculture and natural resources professors can begin to reach the higher cognitive levels of instruction to which they aspire.

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Figure 1. Composite of the Ag Writing Process.

Time Deciles : Five Stories
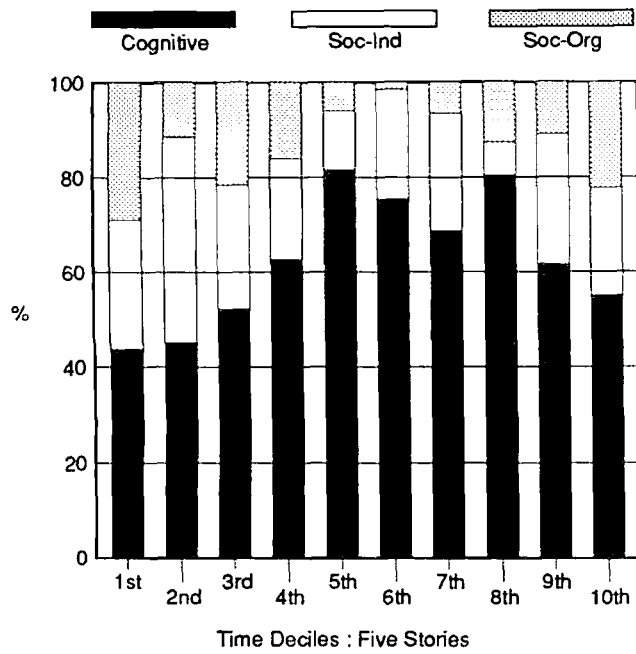
Ordered Patterns

There were 14 social and cognitive writing behaviors observed of the expert writer as seen in Figure 2. The figure shows the frequency of occurrence of those behaviors.

The ordered pattern for the five-story average shows a predominance of the cognitive behaviors of: organizing material, composing copy, finalizing copy, editing language, and generating ideas. The second most frequently occurring behavior was the social-individual behavior of talking with associates. The fifth most frequently occurring behavior was the social-organizational behavior of consulting documents.

The Social-Cognitive Framework of the Agricultural Writing Process

The Social-Cognitive Framework of the Agricultural Science Writing Process was developed (see Figure 3). The social categories were found to be at two levels: social-indi-

Figure 2. Ordered Patterns of Soc-Cog Behaviors for Ag Sci Writing Process.
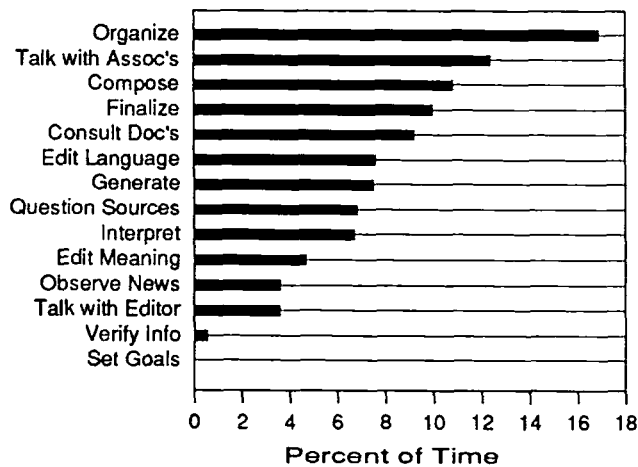
vidual and social-organizational. The social-individual level dealt with interrogation: asking questions of sources of information, associates, and editors. Social-organizational behaviors revolved around consulting documents, observing news events, and verifying information.

The categories of cognitive behavior clustered around the traditional cognitive writing categories as developed by Flower and Hayes (1984): planning, translating, and reviewing. Planning included organizing material, generating ideas, and setting goals. However, within the translating and reviewing categories, this study refined behaviors from the Flower and Hayes' categorizations. In translating, behaviors were elaborated to include interpreting information, composing copy, and finalizing copy. In reviewing, behaviors dealt with the editing process, differentiating between editing for meaning and editing for language.

Teaching the Ag Writing Process

The behaviors of a professional agri-writer can be used as a foundation for teaching agricultural writing.

Figure 3. Social-Cognitive Framework for the Agricultural Science Writing Process.
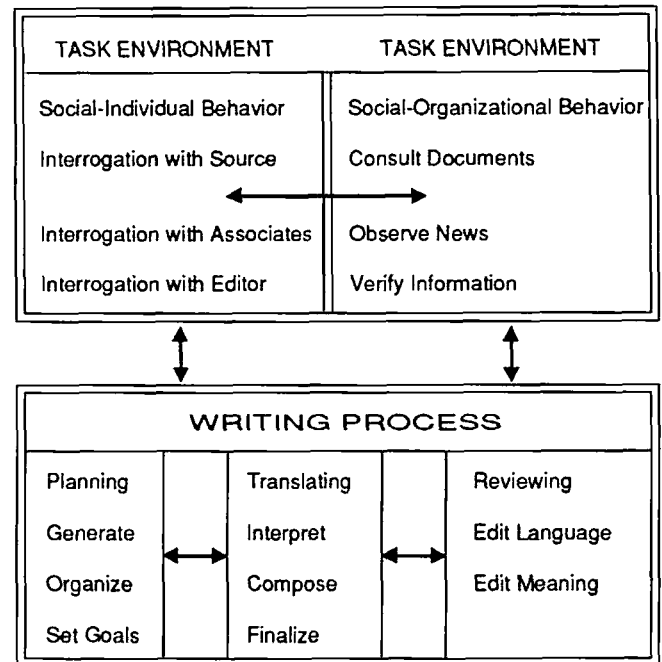
A potential limitation of the discovery of writing behaviors is that it includes only one individual case study. However, this limitation provides an advantage, also, of an in-depth investigation of writing. This research method is used often by researchers of composition. To actually have an observation of an agricultural writer provides an up-to-date and in-depth understanding of an expert writing process. This understanding of the writing process can be potentially adapted to "writing across the curriculum" demands for agricultural students.

Teaching the Agricultural News Writing Course

The purpose of applying the framework of the writing process to the classroom was to develop current instructional guidelines for agricultural news writing courses. As

Figure 4. Schema of Learning Objectives in the Agricultural Writing Process.

Remembering —
1) Recall the behaviors of the agricultural writing process in the social task environment and in the cognitive writing process.
2) Recall the observation of news events, mechanics of grammar, and style rules.

Processing —
1) Interpret news events through central ideas, paragraph flow, and transitions.
2) Consult documents and verfiy information for the story.

Creating —
1) Create questions for sources of information, associates, and editors.
2) Design ideas, orga nize material, and specify goals in backgrounding the writing process.
3) Prepare a writing style with use of rhetorical strategies, active voice, and verb tense.
4) Create a purpose for the story appropriate to the audience.

Reviewing —
1) Evaluate the written copy for language: style rules and mechanics of grammar.
2) Evaluate the written copy for meaning: organization, content, writing style, purpose, and audience.

Figure 5. Schema of Chronological Progression of Learning Activities for Agricultural Writing.

IN-CLASS LEARNING ACTIVITIES

Writing Lab Activities
• Boot up computer (Remember)
• Introduce self & print document (Remember)
• Use computer to think, plan, and organize your first story (Create)

Class Discussion
• Discussion with open-ended questions about writing (Review)

Individual Discussion
• As the instructor plays the role of teacher-editor, he/she conducts conferences with the student-writer on all levels of writing (Remember, Process, Create, Review)

OUT-OF-CLASS LEARNING ACTIVITIES

Story Production
• Develop specific questions for a story (Create)
• Conduct interview on tape for class discussion (Create)
• Write a story guide that provides story outline, background information, and interview questions (Create)
• Write agricultural stories for potential publication (Remember, Process, Create, Review)

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the educator viewed the behaviors of the writing process as associated with the learning levels, course objectives were developed, learning activities were designed, and a guideline for evaluating student assignments was completed. The instructional design was developed and revised according to responses from students and appraisal from the professor in the course terms of 1988-89-90.

Recommendations for Learning Objectives

In developing objectives, the social-cognitive framework was applied to the cognitive levels of learning: remembering, processing, creating, and reviewing. More specific aspects of the learning objectives were listed in the evaluation of assignments. It is important to present objectives to students as an overview of the evaluation of their writing. Also, "sugar-coat" it with examples from the current agricultural press, so that it's not too dull or overwhelming.

Recommendations for Learning Activities:

A variety of learning activities were created to provide a progression through the four levels of cognitive learning. The activities are recorded in a chronological progression through the course, based on Newcomb and Trefz' levels of learning. However, due to the nature of writing as a recursive process, the cognitive levels of learning are intermingled. Of necessity, using the computer is a vital part of the writing process and that is an important in-class activity.

Recommendations for Learning Evaluations

The in-class activities were open activities done in class with no evaluation. They were used to inspire and interest students in the agricultural writing process.

The out-of-class learning activities were evaluated by a developed set of criteria that consulted the work of previous

revision researchers: Daiute, 1986; Faigley & Witte, 1981; Kessler & McDonald, 1988; Murray, 1978; Purves, 1984; Selfe, 1984; Stollard, 1974).

Following is the set of criteria for evaluation of story production. The underlined information relates it to the Social-Cognitive Framework for the Ag Writing Process. It is organized according to the levels of learning: I. Remember, II. Process, III. Create, and IV. Evaluate.

Figure 6. Schema of Evaluation of Agricultural Writing Assignments.

EVALUATION OF WRITING					
1. Remember					
A. Observation of News Events (Observe News)	1 2	3	4	5	N/A
B. Mechanics of Grammar (Compose & Finalize Copy/Edit Language)	1 2	3	4	5	N/A
1. Spelling	1 2	3	4	5	N/A
2. Capitalization	1 2	3	4	5	N/A
3. Verb errors	1 2	3	4	5	N/A
4. Possessive "s" errors	1 2	3	4	5	N/A
5. Punctuation	1 2	3	4	5	N/A
6. Noun agreement	1 2	3	4	5	N/A
7. Word use errors					
Empty (really, very)	1 2	3	4	5	N/A
Vague (nice, sort of)	1 2	3	4	5	N/A
8. Pronoun reference	1 2	3	4	5	N/A
9. Tense shifts	1 2	3	4	5	N/A
10. Sentence structure errors					
Fragments	1 2	3	4	5	N/A
Run-ons	1 2	3	4	5	N/A
Awkward Sentences	1 2	3	4	5	N/A
C. Style Rules (Compose & Finalize Copy/Edit Language)	1 2	3	4	5	N/A

(Figure 6 continued from previous page)

	1	2	3	4	5	N/A
1. Titles of people	1	2	3	4	5	N/A
2. Figures and statistics	1	2	3	4	5	N/A
3. Addresses	1	2	3	4	5	N/A
4. Organizations	1	2	3	4	5	N/A
5. Names	1	2	3	4	5	N/A
6. Abbreviations	1	2	3	4	5	N/A
7. Copyreading marks	1	2	3	4	5	N/A
8. Anything else from Associated Press Stylebook	1	2	3	4	5	N/A
Overall Remember Rating	**1**	**2**	**3**	**4**	**5**	**N/A**

II. Process

A. Logic (Interpreting Information)

	1	2	3	4	5	N/A
1. Central ideas	1	2	3	4	5	N/A
2. Paragraph flow	1	2	3	4	5	N/A
3. Transitions	1	2	3	4	5	N/A

B. Content (Consult Documents/Verify Information/Edit Meaning)

	1	2	3	4	5	N/A
1. News	1	2	3	4	5	N/A
2. Facts	1	2	3	4	5	N/A
3. Appropriate agricultural sources	1	2	3	4	5	N/A
4. Appropriate use of ag terms	1	2	3	4	5	N/A
5. Identification of sources	1	2	3	4	5	N/A
6. Appropriate use of quotes	1	2	3	4	5	N/A
7. Objectivity	1	2	3	4	5	N/A
Overall Process Rating	**1**	**2**	**3**	**4**	**5**	**N/A**

III. Create

A. Development of questions (Interrogation of source, associate, editor)

	1	2	3	4	5	N/A
1. Questions for sources	1	2	3	4	5	N/A
2. Questions for associates	1	2	3	4	5	N/A
3. Questions for editors	1	2	3	4	5	N/A

B. Backgrounding the story (Generate ideas, organize material, set goals)

	1	2	3	4	5	N/A
1. Ideas	1	2	3	4	5	N/A
2. Organization	1	2	3	4	5	N/A
3. Goals	1	2	3	4	5	N/A

C. Writing Style (Organize material)

	1	2	3	4	5	N/A
1. Rhetorical strategies: Analogy, Metaphor, Parable, Comparison/Contrast	1	2	3	4	5	N/A
2. Active voice	1	2	3	4	5	N/A
3. Verb tense	1	2	3	4	5	N/A
Overall Create Rating	**1**	**2**	**3**	**4**	**5**	**N/A**

IV. Evaluate

	1	2	3	4	5	N/A
A. Purpose (Set goals)	1	2	3	4	5	N/A
B. Audience (Set goals)	1	2	3	4	5	N/A
Overall Evaluate Rating	**1**	**2**	**3**	**4**	**5**	**N/A**

In grading student performance in connection with a given story, attention was given to the processing and creating tasks of outlining, backgrounding, and interviewing as well as to the final production of the story (see Figure 7).

The final letter grade of one story, then, is based on the percentages of the background and drafts of each story. Each letter grade of one story is averaged among all other letter grades of stories to arrive at a final grade for the class.

In courses taught in 1989 and 1990, several students would have received lower grades if the first draft was taken as the final story written. However, the backgrounding of the story and individual conferences appeared to have posi-

Figure 7. Schema of Grading Writing Assignments.

GRADING WRITING ASSIGNMENTS

Questions and Background	20%
First Story Draft	40%
Final Story Draft	40%

tive effects on student outcome in the course. Following is a bar chart from the 1990 students that shows the student term grades on first draft versus final draft stories. (See Figure 8.) If the professor graded the students only from each first draft story in 1990, 88% would have received one grade lower. This spurs incentive for students to write questions/ background and first drafts for writing. Also, student publication of stories in the college newspaper increased each year as this teaching approach was refined.

Summary

This article explains the observed behavior of a professional agricultural writer (Elefson, 1990) and how that information was transferred to students through four cognitive levels of learning (Newcomb and Trefz, 1987).

The Social-Cognitive Framework for the Agricultural Science Writing Process is matched with Newcomb and Trefz' Levels of Learning: Remember, Process, Create, and Evaluate. These learning levels were incorporated into objectives, activities, and evaluation of the Agricultural News Writing course.

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Daiute, C. (1986). Physical and Cognitive Factors in Revising: Insights from Studies with Computers. *Research in the Teaching of English*. Vol. 20. No. 2. 141-159.

Figure 8. Student Term Grades on First Drafts and Final Drafts.