Written Communication Competencies: Strengths and Weaknesses of Agricultural Education Graduate Students

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Abstract

The purpose of this study was to assess and describe the written communication competency strengths and weaknesses of selected agricultural education graduate students. Content analysis techniques were used to analyze writing samples from 44 graduate students enrolled in two different courses at three universities. The instrument used to gather data was designed by Texas A&M University's Department of English's Writing Program's Office (WPO) and the researchers. The instruments were collected by the researchers and delivered to the WPO for analysis. The analysis consisted of an overall writing strength assessment and sentence level structure assessment.

Data showed a majority of graduate students who participated in this study had inadequacies in their writing abilities. Students had greatest difficulties with 1) development of a supported and logical argument, 2) development of a clear thesis and introduction, and 3) the ability to write a grammatically correct paper. Recommendations include a pre-acceptance assessment of student writing skills as an admissions criterion for graduate programs, professional development training in writing competence, and inclusion of writing assignments as a criterion for grading. Additional strategies for improving agricultural education graduate student writing are provided.

Introduction

Scholarship takes on many forms in academia. Boyer's (1990) original forms of scholarship (the scholarship of discovery; the scholarship of integration; the scholarship of application; and the scholarship of teaching), provided a starting point of discussion among faculty in the College of Agricultural Sciences at Oregon State University. Following a year of discussion, the group of faculty changed from the scholarship of teaching to the scholarship of learning and teaching, and added creative artistry as the fifth type of scholarship, resulting in scholarship defined simply as creative intellectual work that is validated and communicated (Weiser & Houglum, 1998). The American Psychological Association (APA, 2001) noted that "just as a disciplined scientific investigation contributes to the growth and development of a field, so too does carefully crafted writing contribute to the value of scientific literature" (p. 31). APA further noted that "the prime objective of scientific reporting" is to "achieve clear communication."

The ability of graduate students to express themselves correctly, clearly, and articulately may be the most important attribute for students to possess when entering a graduate program (Rajagopalan, 1999). The sole evidence of a student's performance in many graduate courses is measured by a single research paper or similar forms of advanced inquiry. Research indicates that there are many benefits of good writing. Writing supports learning through the whole brain processes of doing, depicting, and symbolizing (Emig, 1988). Students retain more information learned with writing-to-learn techniques than with traditional teaching methods (Reaves, et. al., 1993). Job success may also be dependent on oral and written communication skills (Sprecker & Rudd, 1997; 1998).

The ability to communicate information and ideas in writing so others will understand is essential for most academic endeavors in a graduate program (Lindner, et. al., 2001). These authors stated further that little is known about acceptable levels of written communication abilities needed by students to be successful in a graduate program. Low levels of writing competence may result in problems such as attrition among graduate students, or it may result in opportunities for faculty to gain a better understanding of student characteristics. In a study of agricultural education doctoral students' competencies, Lindner and Dooley (2002) found that

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doctoral students perceived growth in their writing abilities as they progressed through the program. Recognizing the limitations of self-reported data, these authors recommended that students' abilities be assessed using authentic assessments. This study used authentic assessments to assess the writing competence of agricultural education graduate students in order to describe their writing strengths and weaknesses.

Assessing Students' Writing Ability

The theoretical domain of writing ability may include one or more of the following constructs: reporting a news event, narrating a story, describing a scene, critiquing an argument, proposing a solution, revising a memo, deciding which grammatical construction to use, interpreting, analyzing, synthesizing, organizing, knowing effective ways of introducing a topic, and understanding linguistic structures (Breland, et. al., 1999). Assessing students' overall writing ability is a complex undertaking.

Chapman (1990) noted that authentic assessments covering the full range of writing ability constructs should be conducted. Ruth and Murphy (1988) addressed what they considered to be a "neglected variable" in writing assessment and research—that of the specific writing task and its interpretation by the writer as well as by the reader/assessor. These authors found that the topic, method and language with which the topic is introduced to the writer, rhetorical aspects demanded by the task, and several other variables may have major effects upon the quantity and quality of writing being produced. Therefore, an assessment of a student's writing includes not only the technical and creative quality of the written work, but also the topic being addressed, the format in which it is requested, and how the evaluator interprets the writing.

Given the complexity of the writing ability construct, however, the validity of a unitary assessment of student writing ability is negligible (Purves, 1992). Breland, et. al. (1999) stated:

Even if a unitary construct of writing could be defined, no single test could possibly assess the full domain. Therefore, testing programs need to be very clear about the specific skills and knowledge a test is designed to assess so that test users can determine whether the construct that is actually assessed is appropriate for a particular purpose and population. (p. 1)

Breland, et. al. (1999) identified seven key elements that should be addressed when assessing graduate student writing abilities: test design (defining the construct); task design (timing of tasks and topic choice); test administration (test delivery and response mode); scoring and reporting (scoring issues and reporting issues); consequences of writing test formats (bias and educational consequences); reliability; and predictive validity of writing assessments.

In designing a writing test, identify the specific writing construct that is to be assessed is critical. Threats to construct validity include irrelevant difficulty and under-representation (Messick, 1994). Construct irrelevant difficulty can be controlled by ensuring test subjects are familiar with the essay topic and testing format. Construct under-representation can be controlled by ensuring the specific construct to be measured is assessed in an appropriate context. Task design addresses issues such as the amount of time test subjects are given to complete the writing assignment and standardization of the writing assignment. The amount of time allotted for planning, writing, and editing an essay is influenced by the goals of the assessment (Powers & Fowles, 1996). These authors further noted that the interpretation of essay scoring was not adversely affected by time limits. Breland, et. al. (1999) indicated that there are no discernable benefits from allowing test takers to choose the writing topic. The central concern about test administration focuses on test delivery and response mode. A study by Powers, et. al. (1992) found that handwritten essays tended to receive higher scores than word processed essays.

When a variety of test delivery methods and response modes are used, the authors recommend particular attention be given to training of test scorers. Accurate scoring and reporting of student writing samples is necessary to ensure the validity and reliability of the test. Breland, et. al. (1999) noted "careful reader training and monitoring appear to be the only effective ways to minimize the problems of discrepant scoring" (p. 8). The authors further noted that some testing formats are more likely to introduce biases that have significant educational consequences. Hand written essay tests tend to show fewer differences by gender and ethnicity than do word processed essays (Breland, et. al., 1999).

Reliability of written assessment tests is a function of both the number of readers (scorers) and the number of tasks completed (Dunbar, et. al., 1991). The use of multiple readers and multiple tasks increases test score reliability. The establishment of predictive validity is a necessary component of assessing student writing (Breland, et. al., 1999). Essay tests consisting of one essay have been shown to predict student success on the College-Level Examination Program' (College Board, 2004a) composition test (Ashe, 1994).

As noted earlier, assessing a student's writing ability is a complex endeavor. No single test exists to measure the full domain of writing ability. Assessments of student writing ability should be targeted to a specific writing construct and should be "appropriate for a particular purpose and population" (Breland, et. al., 1999, p. 1). This study

attempts to authentically assess the writing abilities of selected agricultural education graduate students for the purpose of describing their ability to write an argument paper.

Methods

The purpose of this study was to assess and describe the written communication competency strengths and weaknesses of agricultural education graduate students. Specific objectives of the study included the following.

1. Describe students' overall writing ability in writing an argument paper.

2. Describe students' writing ability by the following writing competencies: coherence, audience awareness, argument, summary, source, and grammar.

3. Describe students' papers that received a failing grade by primary reason for failure.

Content analysis techniques were used to analyze writing samples from 44 graduate students (Fraenkel & Wallen, 1996). The students were enrolled in two different courses at three different universities. A course entitled Advanced Methods in Agricultural Education was delivered to 15 on-campus students at Texas A&M University, while 17 students were taking a separate section of the course at a distance through a joint degree program offered by Texas A&M and Texas Tech Universities. There were 12 students enrolled (4 on- and 8 off-campus) in the course entitled Research Methods in Agricultural Education offered by Oklahoma State University. Due to the nature of data collected and potential for negative impact on participants, the Texas A&M University's Institutional Review Board suggested that data be collected anonymously. Personal characteristics of participants were, therefore, not collected.

The instrument used to gather data was designed by Texas A&M University's Department of English's Writing Program's Office (WPO). The researchers identified the articles to be read and helped prepare the instructions and APA documentation guidelines. The authors considered using the GRE Writing Assessment (GRE, 2003a) because of its nationally-normed reliability, but wanted the level of detail available from a sentence level structure assessment. The GRE Writing Assessment provides only an overall assessment of analytical writing.

The instrument used in this study consisted of: two articles, instructions, and APA documentation guidelines. All students were given two articles discussing the role of computing technology in K-12 classrooms. One of the articles presented arguments in favor of using technology in the classroom (Pea, 1998), and one presented arguments against (Cuban, 1998). The instructions directed students to write a well-formed, grammatically correct essay based on their reading of the two position papers; to write this essay in the form of an argument; to consider the audience to be other graduate students; to begin with an overview; to use references in the essay following APA guidelines; and to proofread and correct their papers before submitting them for analysis. The APA documentation guidelines provided students with information on how to reference citations and use quotations.

All students were provided a copy of the articles and an informed consent document one week in advance of the writing activity. Students were instructed to read, mark-up, and think about the articles before coming to the next class. Students were told that they would be writing on the articles; they knew nothing in advance about the format or structure of the writing activity. Upon entering the testing situation (in-class or synchronously using video conferencing), students were given oral instructions, written instructions, APA documentation guidelines, additional copies of the articles if needed, and two bound and blank writing journals often called "bluebooks."

Before beginning the writing assessment, students were instructed to spend 15-20 minutes outlining and drafting their argument paper into one of the bluebooks, and then to spend 40-55 minutes writing, and 10-15 minutes proofing their final paper into the second bluebook. Students were also directed to carefully read the written instructions. Students had 90 minutes to complete the writing test. All students (n=44) completed the writing test and submitted their finished papers.

Papers were collected by the researchers and delivered to the Director of the Writing Center at Texas A&M University for analysis (Gibson, 2002). The researchers contracted with the Writing Center to hire two professionally trained evaluators to score each essay using an overall writing strength rubric and a sentence level structure assessment rubric. There were four possible scores on the overall writing strength rubric. These were as follows: 4=demonstrates adequacy; 3=suggests adequacy; 2=suggests inadequacy; and 1= demonstrates inadequacy. Evaluators reached agreement on each student's overall writing strength.

The sentence level structure assessment rubric consisted of six writing competency categories (coherence, audience awareness, argument, summary, sources, and grammar) that contained numerous specific writing competencies (see Tables 1-6). Coherence was defined as the development of a clear thesis and introduction that sets the stage for the argument and well-constructed paragraphs in the body of the text. Audience awareness was defined as the ability to write on an appropriate level for an identified audience and to make appropriate appeals using correct tone and voice. Argument was defined as the development of a supported and logical case about an issue with important consequences for both author and audience. Summary was defined as the development of a clear synopsis, drawing on the established argument and references. Sources were

defined as the appropriate use of references in the paper following APA guidelines. Grammar was defined as the ability to write a grammatically correct paper.

The writing program has a sustained positive reputation for scoring student writing tests using both the overall and sentence level structure assessment rubrics. Reliability and validity had been previously established by the Writing Program (Ashe, 1994). The instrument has been shown to predict students' success in later assessments of writing. In establishing predictive validity, 95% of the students who received a passing score (as judged by the Writing Program) also passed the National College CLEP College Composition Test (College Board, 2004b). Reliability was established by comparing the variability within an evaluator's score (r=.84), in scoring between pairs of evaluators (r=.76), and in scoring across all students over time (r=.83) (Ashe, 1994). Evaluator's scores tended to remain constant over time. To ensure inter-rater reliability, evaluators must agree on a student's overall writing strength assessment. Sentence level assessment was based on the individual evaluator's judgment and they did not have to agree on a student's sentence level assessment.

While the data were gathered from three groups of students taking one of two courses, the researchers recognized the sampling limitations of using intact classes. Caution is warranted against generalizing these findings beyond the sample population. Additional research is needed to support a generalization of the findings and recommendations. The instrument, for this study, was field tested by the Writing program for content and face validity. Inter-rater reliability (r=1.0) was established through both evaluators' agreement for each student's overall writing strength assessment. Data were analyzed using SPSS (2004), and appropriate descriptive statistics (e.g. frequencies and percentages) were presented.

Results

The first objective was to describe graduate students' overall writing ability for an argument paper. For this objective, both professional evaluators agreed on each student's score. Using the overall writing strength rubric discussed previously, three students (6.8%) demonstrated adequacy in competence to write an argument paper. Fifteen students (34.1%) suggested adequacy, 22 students (50.0%) suggested inadequacy, and four students (9.1%) demonstrated inadequacy.

The second objective was to describe graduate students' strengths and weaknesses by specific writing competencies. Using the sentence level structure assessment rubric, students' writing tests were assessed in six competency categories (coherence, audience awareness, argument, summary, sources, and grammar) that contained numerous specific writing competencies.

Three sub-categories (thesis, introduction, and body) were in the competence category coherence. Regarding thesis, both evaluators indicated that

Table 1. Agricultural Education Graduate Student Assessment on Coherence Competence (n=44)

Competence: Coherence	Number of Evaluators who Identified Item as a Significant Problem					
	Neither		One		Both	
	f	%	f	%	f	%
Thesis						
Other problems[a]	43	97.7	0	0	1	2.3
Thesis makes no argument	42	95.5	0	0	2	4.5
Thesis is missing	42	95.5	0	0	2	4.5
Unclear thesis	25	56.8	2	4.5	17	38.6
No significant problems	20	45.5	0	0	24	54.5
Introduction						
Introduction missing	42	95.5	0	0	2	4.5
Introduction is melodramatic	37	84.1	7	15.9	0	0
Fails to introduce topic	40	90.9	3	6.8	1	2.3
Introduction is trite	35	79.5	3	6.8	6	13.6
Introduction overgeneralizes	33	75.0	7	15.9	4	9.1
Other problems[b]	20	45.5	11	25.0	13	29.5
No significant problems	27	61.4	8	18.2	9	20.5
Body						
Paragraphs lack topic sentences	39	88.6	3	6.8	2	4.5
Paragraphs exhibit weak transitions	33	75.0	9	20.5	2	4.5
Other problems[c]	18	40.9	14	31.8	12	27.3
No significant problems	20	45.5	10	22.7	14	31.8

Note. [a]Vague; [b]Rhetorical, incomplete, development, organization, lopsided, no context, egocentric, short summary, rambles, no discussion of argument, transition, and/or long; [c]Organization, long, development, confusing, does not get to point.

there were no significant problems in 24 student papers (54.2%). Table 1 shows specific student writing competencies with respect to thesis, introduction, and body.

Additional analyses in the thesis coherence revealed that neither evaluator identified other problems in 43 student papers (97.7%). Neither evaluator identified problems with missing thesis or no argument in thesis in 42 student papers (95.5%); both evaluators identified missing thesis or no argument as a problem in two student papers (4.5%). Neither evaluator identified an unclear thesis as a problem in 25 papers (56.8%), while both identified unclear thesis as a problem in 17 papers (38.6%). Concerning introduction, both evaluators agreed that no significant problems existed in nine student papers (20.5%). With respect to body, both evaluators agreed that there were no significant problems in 14 papers (31.8%).

Table 2 shows that for the writing competence audience awareness, both evaluators agreed that there were no significant problems in 18 student papers (40.9%). Specific student writing strengths and weaknesses were also identified. Neither evaluator identified passive voice as a problem when considering its use in all 44 student papers (100%). When considering making appropriate appeals and using sarcasm, neither evaluator identified problems with their use in 42 student papers (95.5%). Neither evaluator identified sentence structure unvaried as a problem in 38 papers (86.4%). Neither evaluator identified hyperbolization as a problem in 37 papers (84.1%). When considering other problems such as pompous and melodramatic language, neither evaluator identified such problems in 34 papers (77.3%). Neither evaluator identified informal tone as a problem in 25 student papers (56.8%). Students tended to have problems with tone (too informal),

hyperbolized, sentence structure unvaried, and other problems.

Regarding argument, both evaluators agreed that there were no significant problems in ten student papers (22.7%). Table 3 shows student writing strengths and weaknesses. Neither evaluator identified forecasting as a problem in 43 student papers (97.7%). When considering illogical arguments, neither evaluator identified problems with its use in 39 student papers (88.6%). Neither evaluator identified that the argument: did not exist in 35 papers (79.5%); rambled in 31 papers (70.5%), had other problems such as weak support and over generalization in 29 papers (65.9%), was unclear in 28 papers (63.6%), and was unsupported in 27 papers (61.4%). Students tended to have most problems with unsupported, unclear, and other problems in argument development.

Concerning summary, both evaluators agreed that there were no significant problems in 18 student papers (40.9%). Table 4 shows specific student writing strengths and weaknesses. Students tended to have problems with overly developed, unclear, and not adequately developed summaries.

As shown in Table 5, both evaluators agreed that there were no significant problems on the writing competence sources in 35 student papers (79.5%). Students tended to have strong writing competencies with respect to sources.

Both evaluators agreed that there were no significant problems with grammar in 14 student papers (31.8%). Table 6 shows specific student writing strengths and weaknesses. With respect to grammar, students tended to have most problems with faulty sentence construction, punctuation errors, and weak pronoun reference.

The third objective was to describe graduate students' papers that received failing grades by each paper's primary reason for failure. If a student had an overall score that suggested or demonstrated inadequacy, then a primary reason for such a failure was recorded. For this objective, both professional evaluators agreed on the primary reason.

Table 2. Agricultural Education Graduate Student Assessment on Audience Awareness Competence (n=44)

| Competence: Audience Awareness | Number of Evaluators who Identified Item as a Significant Problem | | | | | |
| | Neither | | One | | Both | |
	f	%	f	%	f	%
Voice is predominantly passive	44	100.0	0	0	0	0
Makes inappropriate appeals	42	95.5	2	4.5	0	0
Uses sarcasm	42	95.5	1	2.3	1	2.3
Sentence structure unvaried	38	86.4	3	6.8	3	6.8
Hyperbolizes	37	84.1	4	9.1	3	6.8
Other problems[a]	34	77.3	10	22.7	0	0
Tone is too informal (slang, etc)	25	56.8	10	22.7	9	20.5
No significant problems	15	34.1	11	25.0	18	40.9

Note. [a]Melodramatic, pompous language, not appropriate audience, answered like an exam question.

Table 3. Agricultural Education Graduate Student Assessment on Argument Competence (n=44)

| Competence: Argument | Number of Evaluators who Identified Item as a Significant Problem | | | | | |
| | Neither | | One | | Both | |
	f	%	f	%	f	%
Does not forecast points	43	97.7	1	2.3	0	0
Illogical	39	88.6	3	6.8	2	4.5
Does not exist	35	79.5	3	6.8	6	13.6
Rambles	31	70.5	8	18.2	5	11.4
Other problems[a]	29	65.9	11	25.0	4	9.1
Unclear	28	63.6	9	20.5	7	15.9
Unsupported	27	61.4	14	31.8	3	6.8
No significant problems	31	70.5	3	6.8	10	22.7

Note. [a]Weak support, generalizes, underdeveloped, inappropriate, repetitive, unorganized.

Table 4. Agricultural Education Graduate Student Assessment on Summary Competence (n=44)

| Competence: Summary | Number of Evaluators who Identified Item as a Significant Problem | | | | | |
| | Neither | | One | | Both | |
	f	%	f	%	f	%
Other problems[a]	41	93.2	3	6.8	0	0
No Summary	40	90.9	1	2.3	3	6.8
Overly developed/too detailed	39	88.6	2	4.5	3	6.8
Unclear	38	86.4	4	9.1	2	4.5
Not adequately developed	29	65.9	6	13.6	9	20.5
No significant problems	21	47.7	5	11.4	18	40.9

Note. [a]Summary does not include introduction; does not refer to references; overuse of quotes.

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The primary reason for 22 (86.6%) of the 26 students' failing papers was a problem with the argument. Three students' papers (11.5%) failed due to problems with summaries, and one student's paper (3.8%) failed because of grammatical problems.

Discussion and Recommendations

Assessing students' writing ability is a complex task (Chapman, 1990; Ruth & Murphy, 1988). The validity of assessing students' writing ability across

Table 5. Agricultural Education Graduate Student Assessment on Sources Competence (n=44)

| Competence: Sources | Number of Evaluators who Identified Item as a Significant Problem | | | | | |
| | Neither | | One | | Both | |
	f	%	f	%	f	%
Over-introduced	44	100.0	0	0	0	0
Cited incorrectly	43	97.7	0	0	1	2.3
Not cited/plagiarized	43	97.7	0	0	1	2.3
Not introduced	40	90.9	2	4.5	2	4.5
Misused	42	95.5	2	4.5	0	0
Other problems[a]	41	93.2	2	4.5	1	2.3
No significant problems	5	11.4	4	9.1	35	79.5

Note. [a]Overused quotes.

Table 6. Agricultural Education Graduate Student Assessment on Grammar Competence (n=44)

| Competence: Grammar | Number of Evaluators who Identified Item as a Significant Problem | | | | | |
| | Neither | | One | | Both | |
	f	%	f	%	f	%
Pronoun-antecedent agreement errors	43	97.7	1	2.3	0	0
Word confusion	41	93.2	3	6.8	0	0
Spelling errors	41	93.2	2	4.5	1	2.3
Other problems[a]	40	90.9	3	6.8	1	2.3
Subject-verb agreement errors	38	86.4	2	4.5	4	9.1
Weak pronoun reference	30	68.2	11	25.0	3	6.8
Punctuation errors	29	65.9	9	20.5	6	13.6
Faulty sentence construction	28	63.6	7	15.9	9	20.5
No significant problems	19	43.2	11	25.0	14	31.8

Note. [a]Wordiness, confusing, fragments, repetitive, expression, verb construction, rhetorical questions, word choice, word confusion, awkward phrasing.

the entire theoretical domain of writing is problematic (Purves, 1992). Given this complexity, assessment of student writing abilities should focus on a specific and well-defined construct that "is appropriate for a particular purpose and population" (Breland, et. al., 1999, p. 1). This study assessed the writing abilities of selected agricultural education graduate students for the purpose of describing their ability to write an argument paper. Caution is warranted against generalizing these findings beyond the sample population or to other tasks in the writing domain.

Based on agreement of the professional evaluators, over 40% of the students in this study either demonstrated their ability to write a well-formed, grammatically correct essay in the form of an argument or showed potential to do so. Fifty percent of student papers revealed weaknesses in writing an argument paper and approximately 9% revealed major deficiencies. Although strong written communication abilities may be essential for agricultural education graduate students to successfully complete a program, minimum writing performance standards have not been established (Lindner, et. al., 2001). We recommend that studies on writing performance standards be conducted.

Based on the findings of this study, graduate students in agricultural education exhibited weaknesses in several of the writing competency categories assessed. Listed in order from most to least prevalent, weaknesses were identified in: argument, coherence, grammar, summary, audience awareness, and sources. Graduate students in this study had greatest difficulties with three competency areas: argument, coherence, and grammar.

An analysis of the GRE's (2003b) Analytical Writing Measure scores provides some insight into nationally-normed data on students' abilities to write analytically. These data were gathered from students taking the test during October 2002 and November 2002: 18% sustained insightful, in-depth analysis of complex ideas; 37% provided generally thoughtful analysis of complex ideas; 30% provided competent analysis of complex ideas; 10% demonstrated weaknesses in analytical writing; and 5% demonstrated fundamental deficiencies in analytical writing. While results of GRE's findings and the findings of this study cannot be compared statistically, students in this study appeared to have achieved lower levels of overall success than did students taking the GRE's assessment. Implications exist that substantially different writing tasks were measured, vigor of analysis differed, or students in this study have weaker overall writing skills than those taking the GRE's assessment. We recommend that studies be conducted to compare students' GRE Analytical Writing Measure scores and WPO's scores. Data for such studies will become possible as potential graduate students are required to take the GRE's Analytical Assessment that is included in the General Test.

The following recommendations are made, based on the findings and conclusions of this study. We recommended that this study be replicated in other graduate programs to extend generalizability of these findings. Further studies are needed also to determine if the reliability of WPO's instrument could be enhanced by including multiple measures of writing (Dunbar, et. al., 1991).

In the two courses and three universities included in this study, targeted writing development

programs could be established to improve students' writing abilities. Further, selected graduate students in this study need immediate assistance with the writing competencies of argument, coherence, and grammar. We recommend that systematic efforts be undertaken to understand and/or improve the writing abilities of graduate students at these universities.

We recommend the following steps to accomplish goal of improving graduate student writing ability. First, a pre-acceptance assessment of student writing skills as an admission's criterion for graduate programs could be implemented to identify students who may need additional help. For example, students applying to graduate schools which require GRE scores may be required or elect to take the GRE Writing Assessment as a part of the application process (GRE, 2003c).

Second, faculty members should consider assessing their own writing abilities to further help graduate students develop competence in writing. Stressing the importance of this issue is a recent decision by American Association for Agricultural Education (AAAE) leadership to include professional development activities in scholarly writing at national research meetings. Because scientific inquiry is enhanced by good writing (APA, 2001), faculty members have a responsibility to ensure their competence in scholarly writing is taught to graduate students so they can communicate, clearly and competently, their own scholarship through written communications.

Third, to enhance the writing abilities of agricultural education graduate students at Texas A&M, Texas Tech, and Oklahoma State, we recommend that graduate courses include demonstrated writing skills as a criterion for grading. Faculty should increase the amount and quality of feedback they provide with respect to writing assignments. Additional strategies for enhancing writing abilities include: having graduate students peer review others' writing prior to submission for grading; having one or more 'writing intensive' courses be identified and required on degree plans; and developing a writing for publication course as either a stand-alone unit, or as a component of an existing agricultural education course. Procedures could be implemented to direct deficient students to remedial programs to improve their writing. This may be accomplished through additional coursework or by collaborative work with the writing program within each institution. This recommendation is perhaps the most challenging in terms of implementation. As one anonymous reviewer of this manuscript wrote…"as a teacher of writing, I know this is easier said than done [emphasis ours]. Faculty and peer reviewers need help in knowing what to look for and how to constructively review writing." While not a specific purpose of this study, future research may elucidate the written communication competency strengths and weaknesses of faculty members and peer reviewers.

Because strong written communication skills are essential for most academic endeavors in a graduate program, we further recommend that graduate programs of agricultural education at other universities assess their own students writing abilities (Lindner, et. al., 2001; Rajagopalan, 1999). These efforts should include systematic assessment and development efforts that begin before admittance and continue throughout the graduate program.

Literature Cited

America Psychological Association. 2001. Publication manual of the American Psychological Association. Washington, DC: American Psychological Association.

Ashe, D.L. 1994. Testing the test. Unpublished Master's Thesis. Texas A&M Univ.

Boyer, E.L. 1990. Scholarship reconsideredPriorities of the professorate. Princeton, NJ: The Carnegie Foundation for the Advancement of Teaching.

Breland, H.M., B. Bridgeman, and M. Fowles. (1999). Writing assessment in admissions to higher education: Review and framework. (ETS Research Report No. 99-3). Princeton, NJ: Educational Testing Service.

Chapman, C. 1990. Authentic writing assessment. Practical Assessment, Research & Evaluation, 2(7). Retrieved May 1, 2002, from http://ericae.Net/pare/getvn.asp?v=2&n=7

College Board. 2004a. College level examination program (CLEP). Retrieved June 8, 2004, from http://www.collegeboard.com/highered/clep/

College Board. 2004b. College level examination program (CLEP). Retrieved June 8, 2004, from http://www.collegeboard.com/student/testing/clep/ex_ec.html

Cuban, L. 1998. The pros and cons of technology in the classroom. Speeches delivered at the Bay Area School Reform Collaborative Funders Learning Community Meeting, Palo Alto, CA. Retrieved on April 24, 2002, from http://www.tappedin.org/info/teachers/debate.html

Dunbar, S.B., D.M. Koretz, and H.D. Hoover. 1991. Quality control in the development and use of performance assessments. Applied Psychological Measurement, 4(4): 289-303.

Emig, J. 1988. Writing as a mode of learning. In G. Tate and E. Corbett (Eds.) The Writing Teacher's Source Book. (2nd ed.). (pp. 85-93). New York: Oxford Univ. Press.

Fraenkel, J.R. and N.E. Wallen. 1996. How to design and evaluate research in education. New York: McGraw-Hill.

Gibson, J. 2002. The writing programs office. Retrieved April 24, 2002, from Texas A&M Univ.: http://www-english.tamu.edu/wprograms/

GRE. 2003a. Interpreting your GRE scores.

Retrieved February 27, 2003, from ftp://ftp.ets.org/pub/gre/992636.pdf

GRE. 2003b. Interpreting scores on the GRE analytical writing measure. Retrieved February 27, 2003, from http://www.gre.org/interpret.html

GRE. 2003c. GRE writing assessment. Retrieved February 27, 2003, from http://www.gre.org/writtest.html

Lindner, J.R., and K.E. Dooley. 2002. Agricultural education competencies and progress toward a doctoral degree. Jour. of Agricultural Education, 43(1): 57-68.

Lindner, J.R., K.E. Dooley, and T.H. Murphy. 2001. Differences in competencies between doctoral students' on-campus and at a distance. American Jour. of Distance Education, 15(2): 25-40.

Messick, S. 1994. The interplay of evidence and consequences in the validation of performance assessments. Educational Researcher, 23(2): 13-23.

Pea, R. 1998. The pros and cons of technology in the classroom. Speeches delivered at the Bay Area School Reform Collaborative Funders Learning Community Meeting, Palo Alto, CA. Retrieved on April 24, 2002, from http://www.tappedin.org/info/teachers/debate.html

Powers, D.E. and M.E. Fowles. 1996. Effects of applying different time limits to a proposed GRE writing test. Jour. of Educational Measurement, 33(4): 433-452.

Powers, D.E., M.E. Fowles, M. Farnum, and P. Ramsey. 1992. Will they think less of my handwritten essay if other word process theirs? Jour. of Educational Measurement, 31, 220-233.

Purves, A. 1992. Reflection on research and assessment in written composition. Research in the Teaching of English, 26(1): 108-122.

Rajagopalan, R. 1999. Getting the most out of graduate school. Chemical Engineering Education, 33, 258-261.

Reaves, R., J. Flowers, and L. Jewell. 1993. Effects of Writing-to-Learn Activities on the Content Knowledge, Retention, and Attitudes of Secondary Vocational Agriculture Students. Jour. of Agricultural Education, 34(3): 34-40.

Ruth, L. and S. Murphy. 1988. Designing Writing Tasks for the Assessment of Writing. Norwood, New Jersey: Ablex Publishing Corp.

Sprecker, K. and R. Rudd. 1997. Opinions of instructors, practitioners, & alumni concerning curricular requirements of agricultural communication students at the Univ. of Florida. Jour. of Agricultural Education, 38(1): 6-13.

Sprecker, K. and R. Rudd. 1998. Opinions of practitioners concerning curricular requirements of agricultural communication students at the Univ. of Florida. Jour. of Applied Communication, 82(1): 31-42.

SPSS 12.0 for Windows. 2004. Chicago, IL: SPSS, Inc.

Weiser, C.J. and L. Houglum. 1998. Scholarship unbound for the 21st century. Jour. of Extension, 36(4). Retrieved August 29, 2002, from http://www.joe.org/joe/1998august/a1.html