

Perspectives of Writing Related to Critical Thinking and Knowledge Creation

**H.R. Leggette¹, B. McKim²,
M. Homeyer³ and T. Rutherford⁴**
Texas A&M University
College Station, TX



Abstract

The purpose of this study was to use Q methodology to understand the subjective views of faculty, students and administrators about the perspectives of writing related to critical thinking and knowledge creation in the social sciences of agriculture. Writing as content development guided by feedback and the knowledge of society, writing as an application and a development of thought and writing as an advanced skill guided by complex reasoning emerged as perspectives of writing and the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. Writing is complex, but learning how to write and teaching someone how to write is even more complex. Using the three perspectives of writing to guide classroom instruction will help instructors teach students how to write and help students learn how to write. The statements that defined each perspective could be used as guides in developing writing assignments and assessments, initiating course discussion, establishing guidelines for peer review and developing supplemental course curriculum. The three perspectives of writing, backed by the statements that support them, provide faculty with a starting point for teaching writing because unprepared faculty produce unprepared college graduates.

Introduction

The writing demands of industry, the call to sort through mass amounts of relevant and irrelevant information and the need to broadly disseminate information have caused a shift in the definition of an effective and efficient writer (Hawisher et al., 2004). Reynolds (2010) claimed that writing is "central to educational and professional success in our globalized society" (p. 3). In a study conducted by Crawford et al., (2011), communication skills, including effective written communication, were ranked as an important soft skill

cluster for college graduates to possess. Students can increase their job prospects by developing strong writing skills in their disciplines and gaining an understanding of communicating within their disciplines' (National Commission on Writing, 2004).

Students become more effective writers through "*deepening engagement and commitments, in lively association with other students and teachers, in fields of study they want to write about*" (Gottschalk and Hjortshoj, 2004, p. v). Runciman (1998) explained that separating writing instruction from content development is counterproductive. "*Writing in a relevant context promotes discovery of linkages among existing ideas, the reshaping and reorganization of old ideas and the creation of new ones*" (Ryan and Campa, 2000, p. 175). Writing-intensive courses offer students the opportunity to not only improve their writing skills but also their understanding of how knowledge is organized and created in their specific discipline (Strachan, 2008).

Writing instruction should no longer be taught as the different types of writing modes but as a "*complex cognitive activity, which involves solving problems and deploying strategies to achieve communicative goals*" (Deane et al., 2008, p.1). Davies and Birbili (2000) claimed people need two types of knowledge to transfer and adapt basic literacy skills, like writing, to different contexts: "*metacognitive knowledge about the best ways of solving the problems of writing [and] conceptual knowledge about the nature of writing*" (p. 441). Formal education should set the foundation for students to gain the two types of knowledge and the workplace should help employees cultivate and develop the two types of knowledge (Davies and Birbili, 2000). Short writing assignments with multiple revision points give students more opportunities to solve problems than one large assignment at the end of the semester does (George,

¹Assistant Professor, Department of Agricultural Leadership, Education and Communications, 262 AGLS, Mail Stop 2116 College Station, TX 77843-2116; Tel: 979-458-3039; Email: hollileggette@tamu.edu

²Assistant Professor, Department of Agricultural Leadership, Education and Communications, 267 AGLS Mail Stop 2116 College Station, TX 77843-2116; Tel: 979-845-0794; Email: brmckim@tamu.edu

³Graduate Student, Department of Agricultural Leadership, Education and Communications, 272 AGLS, Mail Stop 2116 College Station, TX 77843-2116; Tel: 979-458-2304; Email: mhomeyer14@tamu.edu

⁴Professor, Department of Agricultural Leadership, Education and Communications, 264 AGLS, Mail Stop 2116 College Station, TX 77843-2116; Tel: 979-458-2744; Email: rutherford@tamu.edu

Perspective of Writing Related to

1986; Grimes, 1986; Orr, 1996). The final assignment should be a culmination of shorter assignments completed throughout the semester (Grimes, 1986).

Ryan and Campa (2000) defined effective writing as the ability to make an argument, think critically, identify an audience and utilize revision and feedback. Effective writing comes from practice (Orr, 1996; Schneider and Andre, 2005). Writing is a learned behavior (Emig, 1977) developed through practice and revision opportunities (Cobia, 1986; Orr, 1996; Schneider and Andre, 2005) and guided by multiple drafts, assessments, reviews and edits (Epstein, 1999; White, 1991). *"No single course... can transform undergraduates into skillful writers. ... Real proficiency ... requires sustained practice"* (Bok, 2006, p. 87). To encourage students to become effective writers, writing assignments should be centered on gathering and reporting fact-based content, conducting research and drawing inferences based on the evidence provided (Schneider and Andre, 2005; Zhu, 2004). Writing is more effective when students understand the reason for the assignment, relate it back to a job-specific context and write for a specific, realistic audience (Motavalli et al., 2003).

Students in science fields should be prepared to write for two types of audiences (professional and layman; Orr, 1996) and have an understanding of how to write technical reports, research journal articles, fact sheets, project proposals and Web text for a variety of audiences (Motavalli et al., 2003; Schneider and Andre, 2005). Emphasizing grammar, spelling and punctuation over writing process is a misrepresentation of writing, thereby, limiting critical thinking and human development that occurs during key stages of the writing process (Foster, 1983). Additionally, collaborative writing assignments (Schneider and Andre, 2005) and peer review (Lopez et al., 2006; Ryan and Campa, 2000) opportunities should be implemented into writing instruction. Collaborative writing assignments help graduates develop skills needed for working as a member of a team with multiple writers and readers (Schneider and Andre, 2005). Whereas, peer review helps students improve the final product by soliciting feedback from and providing feedback to their peers (Lopez et al., 2006; Ryan and Campa, 2000).

Although the need for written communication skills has been documented throughout the literature, stakeholders (Crawford et al., 2011) have differing views of effective written communication. Therefore, the purpose of this study was to use Q methodology to understand the subjective views of faculty, students and administrators about the perspectives of writing related to critical thinking and knowledge creation in the social sciences of agriculture. Two research questions guided this study:

- What three views of writing represent the identified perspectives of faculty, students and administrators? and
- What diverse perspectives are held by the faculty, students and administrators in higher education regarding the writing factors that augment critical

thinking and create knowledge in the social sciences of agriculture?

Method

The method described in this study was part of the reporting for a larger dissertation research project, A model to augment critical thinking and create knowledge through writing in the social sciences of agriculture (Leggette, 2013).

Q methodology was chosen as the research method to develop an understanding of individual points of view (Tuler et al., 2005) that represent the identified perspectives of faculty, students and administrators about writing and the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. William Stephenson developed Q methodology in 1935 to systematically study human subjectivity as it relates to communication, psychology, political science, health and environmental sciences (Brown, 1993).

Q methodology provides researchers a way to systematically analyze *"the phenomenological world of the individual (or small numbers of individuals) without sacrificing the power of statistical analysis"* (Stephen, 1985, p. 193). It is the correlation of people and not tests (Stephenson, 1935). It adds to and increases the power of qualitative data (Shemmings, 2006; Watts and Stenner, 2005) but is similar to traditional correlation research methods because it uses factor analysis techniques (Shemmings, 2006; Stephenson, 1935; Watts and Stenner, 2005). *"The method employs a by-person factor analysis in order to identify groups of participants who make sense of (who hence Q 'sort') a pool of items in comparable ways"* (Watts and Stenner, 2005, p. 68).

Participants

Members of the P set (research participants) should be selected based on the different perspectives or viewpoints they represent (Tuler et al., 2005). *"By inquiring of people with unique points of view, Q researchers can reveal patterns in how elements of perspectives are related"* (Tuler et al., 2005, p. 250). Because the factor matrix is rotated during the statistical analysis of a Q sort, the number of statements is more important than the number of participants. Unlike typical factor analysis, Q methodology is not dependent on sampling adequacy because the number in the P set can still be low and yield the same results (McKeown and Thomas, 1988).

The P set for this study included 10 individuals, four females and six males, who have or have not had a direct involvement in the writing intensive course program at Texas A&M University. All 10 participants represented the College of Agriculture and Life Sciences. The study included four students, three faculty members and three former or current administrators. P set members were purposefully chosen (Wiersma and Jurs, 2005) based on the needs of this study, their past or current

experience with the writing-intensive course program and their unique perspectives on the writing factors that augment critical thinking and create knowledge. Each participant received a unique identifying number (e.g., S01 = first student to participate in the Q sort; F01 = first faculty member to participate in the Q sort; A01 = first administrator to participate in the Q sort).

The four students included in the P set were identified using a purposive sample and were recruited using email and face-to-face methods. The student participants completed at least one writing-intensive course, graduated between May 2013 and May 2014 and were enrolled in one of three departments—agricultural economics; agricultural leadership, education and communications; and recreation, parks and tourism sciences. Students enrolled in agricultural communications and journalism were eliminated from the population because writing is the core component of their program.

The three faculty members included in the P set were purposefully chosen based on the following criteria: taught one or more writing-intensive courses since 2009, was a faculty member or graduate student in one of the three departments and was not a faculty member in agricultural communications and journalism. Because the search criteria yielded more than three participants, a simple random sample of the sub sample was selected to narrow the participant number. Of the four who replied to my email saying they would participate, three followed through and set up interview times to conduct the Q sort.

The administrators included in the P set of the study were purposively chosen because of their current or former administrative positions in the College of Agriculture and Life Sciences and their role in the planning, development, implementation, management and evaluation stages of the writing-intensive course program. Five administrators were identified and sent an email. Three agreed to participate.

Instrument Development

The concourse (Stephen, 1985), which represents the possible perceptions, opinions, or beliefs (Brown, 1993) about a topic, contains the raw data of the study. The statements used in the Q sort were mined from and modified based on the raw statements of perspectives, opinions and beliefs. The concourse was assembled using theoretical and naturalistic methods—a review and evaluation of writing theories and conceptual models as well as eight interviews and three focus groups with stakeholders in the College of Agriculture and Life Sciences at Texas A&M University.

The theories and conceptual models illustrated were models of the writing process (Hayes and Flower, 1980); cognitive process theory of writing (Flower and Hayes, 1981); writing development model (Bereiter and

Scardamalia, 1987); social cognitive theory of writing (Flower, 1994); new model of the writing process, revision of Hayes and Flower’s 1980 model (Hayes, 1996); model of working memory in writing (Kellogg, 1996); sociocultural theory of writing; conceptual model of writing expertise (Beaufort, 1999); and writing proficiency as a complex integrated skill model (Deane et al., 2008). Interview data were collected from eight faculty members and 15 students who were not participating in the Q sort but represented one of the three departments. Each person included in the interviews was asked to describe writing, the teaching of writing in the social sciences of agriculture and the writing factors that augment critical thinking and create knowledge.

The data collected from the review and evaluation of writing theories and conceptual models were combined with the interview data to establish the theoretical structure of writing in the social sciences of agriculture. The three groupings that emerged from the review and evaluation and the interview data were: writing process, writing instruction and the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. The statements were organized by five homogenous groups: writing process, critical thinking, context, mechanics and resources. Within each

Table 1. Q set Statements

No.	Statement
1	Help from the instructor should be available and students should take advantage of it.
2	Writing elicits emotions.
3	Strong writers should tailor what is written to their audience.
4	Strong writers should know when to write a lot and when to condense information.
5	Rubrics benefit student writers.
6	Writing is subjective and a more trial by fire approach.
7	Grammar is critically important.
8	Content is critically important.
9	Research increases challenge in a writing intensive course.
10	Students should be given real-world assignments in their disciplines because they will have the necessary topic knowledge.
11	Writing is a chore.
12	Writing should be concrete and applied.
13	Writing augments critical thinking.
14	Many short related written assignments that require data gathering and analysis improve critical thinking skills.
15	Writing intensive courses should be 200-level courses.
16	Writing intensive courses should be 400-level courses.
17	Examples of well-written work help students become better writers.
18	Well-written examples discourage student critical thinking and creativity.
19	Writing should be reflective.
20	Peer review activities promote writing and critical thinking skills.
21	Using writing to apply relevant information to evaluate a problem promotes critical thinking.
22	Writing is a product of critical thinking.
23	Critical thinking is a product of writing.
24	Good research leads to well-thought-out, well-articulated prose.
25	Writing labs support student writing efforts.
26	Lots of writing practice is what students need throughout the four years of their college education.
27	Societal knowledge is a key component of the writing process.
28	Taking a position and making an argument is critical thinking.
29	Writing is the development of clear thoughts and the window to the brain.
30	Timely instructor feedback is critical.
31	Writing is about understanding how things fit together.
32	Writing is important, but writing intensive courses are not.
33	Reading is critical to writing success.
34	Writing is a process.
35	Writing is a stream of consciousness.
36	Writing instructors are coaches and facilitators.
37	Writing instructors are critics and proofreaders.

Perspective of Writing Related to

element, heterogeneity was sought so that all beliefs and opinions about the specific category were included.

A total of 58 statements were collected from the literature, interviews and writing theories and models. One teacher and researcher of writing and two agricultural communications and journalism faculty members who did not participate in the study reviewed the 58 statements for representation of theoretical and conceptual constructs, redundant statements and full range of perspectives and viewpoints represented in the constructs. Thirty-seven statements were retained for the sort (Table 1).

Additionally, a forced-choice, Q sort distribution (Stephen, 1985; Tuler et al., 2005) form board (Figure 1) was used to assist the P set with sorting the 37 statements. The Q sort form board had nine columns and the placement of statements was 2, 3, 4, 6, 7, 6, 4, 3 and 2. Therefore, two statements were placed in the first column, three in the second column and so on. The array positions for the columns had the values of -4, -3, -2, -1, 0, +1, +2, +3 and +4 for statistical analysis. The number of statements that were placed in each column, the statistical value of each column and the sorting position of each column are displayed in Table 2.

Procedure

Each student in the P set completed a demographics questionnaire before he or she started the Q sort. Demographics data were not collected from the faculty and administrators because it could be obtained using the Texas A&M University website. Each participant completed the Q sort individually and sorted the statements based on one condition of instruction: "What writing factors do you believe augment critical thinking and create knowledge in the social sciences in the College of Agriculture and Life Sciences?" As recommended by McKeown and Thomas (1988) and Tuler et al. (2005), the participants were asked to read through the cards and become familiar with the statements and to sort the cards into three piles: (1) statements they agreed with on the right, (2) statements they disagreed with on the left

and (3) statements they neither agreed nor disagreed with but felt neutral about in the middle.

After the participants sorted the cards into piles, they distributed the cards on the form board (Baker and Montgomery, 2012; Tuler et al., 2005). The participants identified the most important statements and placed them on the extreme right (+4), identified the least important statements and placed them on the extreme left (-4; Baker and Montgomery, 2012; Tuler et al., 2005; Watts and Stenner, 2005) and identified the neutral statements that they neither agreed or disagreed with and placed them in the middle (Webler et al., 2009). The participants continued the process moving back and forth from the right to the left until the distribution was completed with the middle being the last part of the distribution to complete.

Once the participants completed the form board, the responses were recorded on a response sheet for data analysis. The data collector sat with each participant while he or she sorted the statements to take notes during the sorting activity, to encourage the participant to talk about his or her experience and ideas and to observe the participant sorting the Q sample (Baker and Montgomery, 2012; Watts and Stenner, 2005).

Data analyses, using PQmethod 2.32, involved three statistical procedures: a correlation matrix of Q sorts, factor analysis of the correlation of Q sorts and the calculation of factor and difference scores (McKeown and Thomas, 1988; Shemmings, 2006). Unlike R methodologies, such as survey research, participants in the Q methodology classify themselves when expressing their viewpoints, which results in the factors rather than items or statements (Brown, 1980). The interpretation of the factors was derived from the theoretical array of statements using the comparison of consensus and distinguishing items among the factors, interview data, demographic information, previous literature and experience teaching and researching writing-intensive courses (Brown, 1980).

The most statistically common method for determining factor retention is analyzing each factor's eigenvalue, the "substantive importance of that factor" (Field, 2009, p. 639). McKeown and Thomas (1988) recommended that for an eigenvalue to be significant it should be greater than or equal to 1.00. Although eigenvalues are a preferred method of determining the statistical significant factors in a study, the statistical procedure can sometimes overlook theoretically important factors or determine significant factors that are without meaning (McKeown and Thomas, 1988). The initial analysis yielded eight factors—three of which were retained. Factors 1, 2 and 5 were retained and Factors 3, 4, 6, 7 and 8 were discarded. Although Factor 5 had an eigenvalue of 0.8662, it contained three significant loadings and a higher explanation of variance than Factors 3 and 4 did.

Because the Q sorting process is based on the respondent's internal frame of reference, the traditional valid-

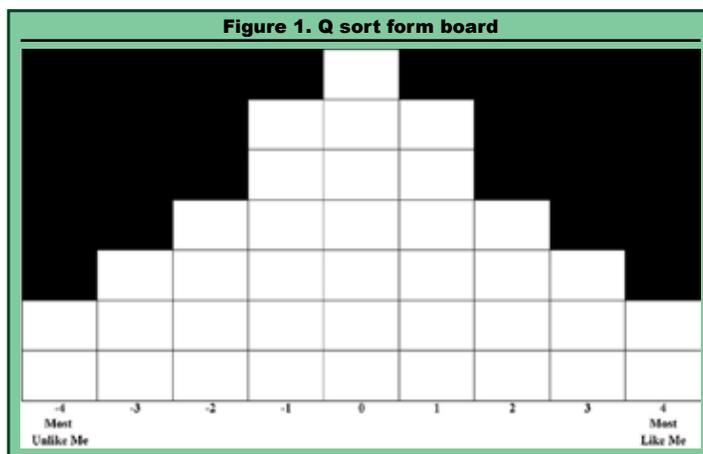


Table 2. Q sort range and distribution

Number of statements in each column	2	3	4	6	7	6	4	3	2
Statistical value of each column	-4	-3	-2	-1	0	1	2	3	4
Sorting position of each column	2	4	6	8	9	7	5	3	1

ity and reliability in R method research is nonessential in Q methodology (McKeown and Thomas, 1988). However, Brown (1980) stated test/retest is an acceptable method to measure reliability because it measures the consistency of the person with himself/herself. Brown (1980) and McKeown and Thomas (1988) said the test/retest reliability coefficient should remain stable and high at .80, which is built into the Q methodology data analysis software to calculate each factor's composite reliability (Krysher, 2010). Using replicability, the reliability coefficient for Q methodology (van Exel and de Graf, 2005), each factor was considered reliable (≥ 0.80 ; Thomas and Baas, 1992-1993; van Exel and de Graf, 2005): Factor 1 (0.89); Factor 2 (0.89); and Factor 3 (0.92). Because the "relationship between a variable (such as a preference or significance) and a stimulus (such as a Q statement)" (Brown, 1980, p. 174) is the focus of Q methodology, the need for validity does not exist. Q methodology is subjective and only represents the participant performing the Q sort (Brown, 1980; McKeown and Thomas, 1988).

Results

Three diverse perspectives emerged as factors from the analysis of faculty's, students' and administrators' perspectives on writing and the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. Writing theories and conceptual frameworks assisted in the interpretation of the three perspectives. The three perspectives were interpreted as writing as content development guided by feedback and the knowledge of society, writing as an application and a development of thought and writing as an advanced skill guided by complex reasoning. The findings for each perspective were reported by statement number (SN), statement position on the factor array (FA) and z score (z).

Writing as Content Development Guided by Feedback and the Knowledge of Society

Of the 10 Q sorts, two explained the Writing as Content Development Guided by Feedback and the Knowledge of Society factor, which accounted for 17% of the variance in the analysis. This perspective had an emphasis on the statements that define writing as content development guided by feedback and the knowledge of society. Holistically, the statements represented different defining steps of writing process models (e.g., Hayes and Flower, 1980). Participants who loaded on Factor 1 believed that writing is developing content using examples and application of relevant information while receiving peer and instructor feedback and using proper grammar. The writing process should be guided by societal knowledge (Beaufort, 1999; Flower,

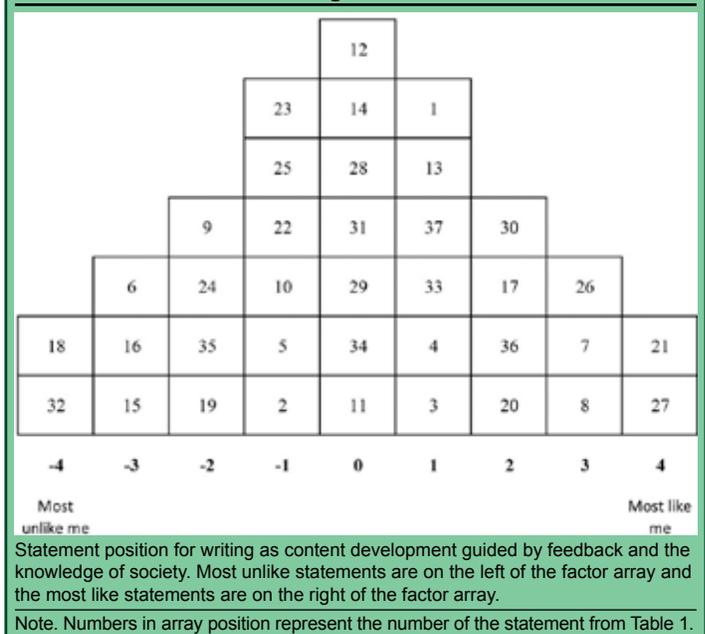
1994) and improved through writing practice. Unique to this factor is the inclusion of grammar in the "most like" statements. One administrator (A3) said writing-intensive courses should help students with proper grammar and mechanics of writing and provide them tips on how to avoid grammar and mechanics pitfalls.

Two of the administrators loaded on Factor 1. The primary beliefs of Writing as Content Development Guided by Feedback and the Knowledge of Society are the application of relevant information to a problem is critical thinking (SN = 21, FA = +4, z = 1.78) and applying this information requires knowledge about society (SN = 27, FA = +4, z = 1.62). Additionally, writing that is focused on students' development of content and grammar should be included in writing curriculum for all four years of students' college education (SN = 26, FA = +3, z = 1.58; SN = 7, FA = +3, z = 1.38; SN = 8, FA = +3, z = 1.26). The issue is not the level of the course—it is that students need practice writing (A2). A

Table 3. Writing as Content Development Guided by Feedback and the Knowledge of Society

No.	Statement	Array Position	z score
21	Using writing to apply relevant information to evaluate a problem promotes critical thinking	+4	1.78
27	Societal knowledge is a key component of the writing process	+4	1.62
26	Lots of writing practice is what students need throughout the four years of their college education	+3	1.58
7	Grammar is critically important	+3	1.38
8	Content is critically important	+3	1.26
30	Timely instructor feedback is critical	+2	1.22
17	Examples of well-written work help students become better writers	+2	1.10
36	Writing instructors are coaches and facilitators	+2	0.73
20	Peer review activities promote writing and critical thinking skills	+2	0.69
9	Research increases challenge in a writing-intensive course	-2	-0.89
24	Good research leads to well thought out, well-articulated prose	-2	-1.02
35	Writing is a stream of consciousness	-2	-1.09
19	Writing is reflective	-2	-1.22
6	Writing is subjective and a more trial by fire approach	-3	-1.26
16	Writing intensive courses should be 400-level courses	-3	-1.38
15	Writing intensive courses should be 200-level courses	-3	-1.58
18	Well-written examples discourage student critical thinking and creativity	-4	-1.78
32	Writing is important, but writing intensive courses are not	-4	-1.78

Figure 2.



Perspective of Writing Related to

secondary belief of the Writing as Content Development Guided by Feedback and the Knowledge of Society perspective is that assistance and feedback are important writing factors. Overall, this perspective defined writing as a process that is guided by feedback and improved with practice.

Table 3 provides a tabular representation of the statements with an array position of +4 to +2 and -2 to -4, which are the top 18 statements for Factor 1. Figure 2 provides a factor array for Factor 1.

Writing as an Application and a Development of Thought

Of the 10 Q sorts, two explained the Writing as an Application and a Development of Thought factor, which accounted for 17% of the variance in the analysis. This perspective had an emphasis on the statements that defined writing as a technique to transform thought into information. Participants who loaded on Factor 2 believed that writing is using real-world scenarios to apply relevant information, solve problems, understand systems, develop clear thoughts and target specific audiences. Writing is a way for students to understand social sciences in agriculture and solve problems related to their professions. Real-world scenarios help students understand the reason behind the assignment and how it relates to projects they may be required to do in the workforce.

One student and one faculty member loaded on Factor 2. The primary beliefs of Writing as an Application and a Development of Thought are the application of relevant information to solve a problem is critical thinking (SN = 21, FA = +4, z = 1.76) and students should use writing as a way to solve problems throughout their college education (SN = 26, FA = +4, z = 1.71). One student (S3) stated that writing is a product of critical thinking. Writing is an analytical technique that writers should use to develop thought, understand systems and convey specific information (SN = 29, FA = +3, z = 1.71; SN = 31, FA = +3, z = 1.24; SN = 4, FA = +3, z = 1.19). One faculty member (F2) was intrigued by the concept of writing is the window to the brain and the mental picture portrayed by that phrase.

Secondary beliefs of this perspective are reading is an important part of writing success and using real-world scenarios and knowledge about society is important to understanding and writing to a specific audience. One student (S3) noted that societal knowledge is key because "the best writers are the smartest writers." Additionally, grammar is important but not because argument is more important (S3), which would provide some explanation of why grammar loaded as a -4. Overall, this perspective defined writing as a tool to apply and develop thought, which promotes critical thinking.

Table 4 provides a tabular representation of the statements with an array position of +4 to +2 and -2 to -4, which are the top 18 statements for Factor 2. Figure 3 provides a factor array for Factor 2.

Writing as an Advanced Skill Guided by Complex Reasoning

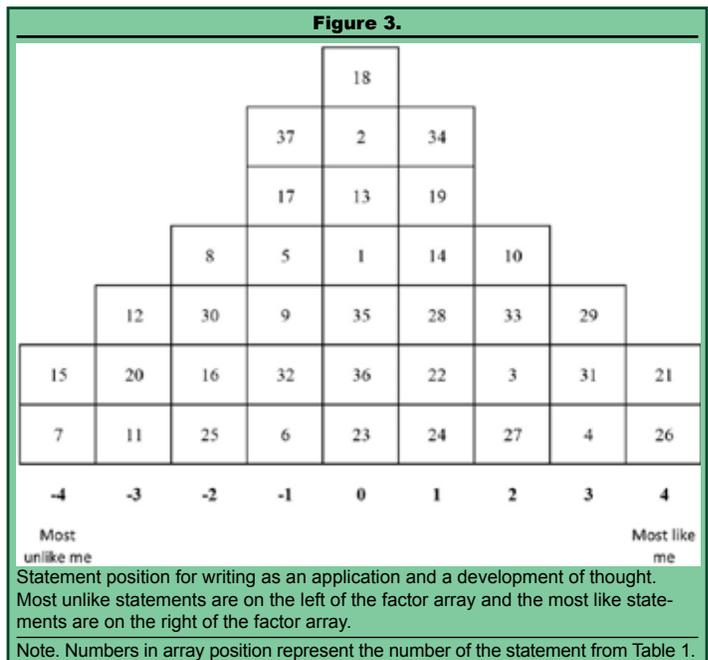
Of the 10 Q sorts, three explained the Writing as an Advanced Skill Guided by Complex Reasoning factor, which accounted for 17% of the variance in the analysis. This perspective had an emphasis on the statements that defined writing as an advanced skill guided by writers' consideration of their audience during research and content development. Participants who loaded on this factor believed that content should be developed through research and that writing, which should be taught in upper-level courses, is one way of

Table 4. Writing as an Application and a Development of Thought

No.	Statement	Array Position	z score
21	Using writing to apply relevant information to evaluate a problem promotes critical thinking	+4	1.76
26	Lots of writing practice is what students need throughout the four years of their college education.	+4	1.71
*29	Writing is the development of clear thoughts and the window to the brain.	+3	1.71
31	Writing is about understanding how things fit together.	+3	1.24
4	Strong writers should know when to write a lot and when to condense information.	+3	1.19
10	Students should be given real-world assignments in their disciplines because they will have the necessary topic knowledge.	+2	1.10
33	Reading is critical to writing success.	+2	0.91
3	Strong writers should tailor what is written to their audience.	+2	0.85
27	Societal knowledge is a key component of the writing process.	+2	0.80
8	Content is critically important.	-2	-0.66
30	Timely instructor feedback is critical.	-2	-0.66
16	Writing intensive courses should be 400-level courses.	-2	-0.85
25	Writing labs support student writing efforts.	-2	-1.38
12	Writing should be concrete and applied.	-3	-1.38
20	Peer review activities promote writing and critical thinking skills.	-3	-1.43
11	Writing is a chore.	-3	-1.76
15	Writing intensive courses should be 200-level courses.	-4	-1.90
*7	Grammar is critically important.	-4	-1.90

*Denotes a distinguishing statement; $p < .05$.

Figure 3.



understanding complex information. “Research sparks interest in thinking and background. It gives you a foundation for your own ideas. You need to know what is out there about your topic” (S4). Further, audience is an important factor that should guide research and content development.

Two students and one administrator loaded on Factor 3. The primary beliefs of Writing as an Advanced Skill Guided by Complex Reasoning are the ability to

understand the target audience is important (SN = 3, FA = +4, z = 2.14) and writing instruction should be in advanced, senior-level courses (SN = 15, FA = +4, z = 1.41). Writing instruction should become more advanced as students progress through their education. Although students should become effective writers as undergraduates, a master’s program is when students really start learning how to write and connect concepts. Writing instruction is important, but writing-intensive courses are not important (SN = 31, FA = +3, z = 1.31). Additionally, research increases the rigor in a writing course, which contributes to the content of the course (SN = 7, FA = +3, z = 1.16; SN = 8, FA = +3, z = 1.10).

A secondary belief of the Writing as an Advanced Skill Guided by Complex Reasoning perspective is that writing can be a chore because of the complexity of understanding how things fit together. However, students can and should use instructor feedback to mitigate the complexity of writing. One student (S4) said his favorite assignment is understanding a policy and writing a paper about the policy because it fits together like a puzzle. “When you write, you can transfer the information. What is the point of knowing something if you can’t convey it to someone else?” (S4). Additionally, writing is a stream of consciousness. Overall, this perspective included statements that defined writing as an advanced skill that includes research and the construction of complex content.

Table 5 provides a tabular representation of the statements with an array position of +4 to +2 and -2 to -4, which are the top 18 statements for Factor 3. Figure 4 provides a factor array for Factor 3.

Similarities among Perspectives

Although the three perspectives were different, they did have similarities, which are the consensus statements in Q methodology. Consensus statements had similar placing in each factor but are not significant statements because they do not distinguish any one factor. However, they help define the three factors.

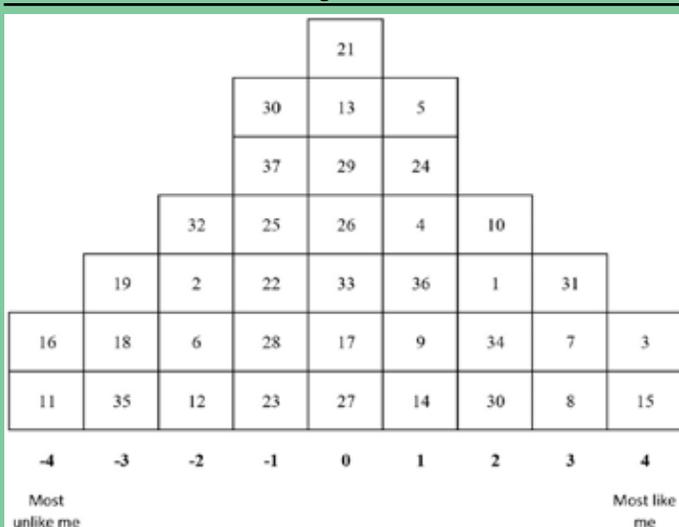
This study had seven consensus statements that were ranked similar by participants (Table 6). The z scores of the consensus statements for each factor were reported. Statement 1 and 36 provide evidence that faculty should assist students with becoming better writers and improving their writing ability and that instructor feedback is an important component of writing in the social sciences. Also, statements 13 and 33 provide evidence that writing is a process, which should include short, related assignments that require students to gather and analyze data. However, participants rejected two statements: 16 and 23.

Table 5. Writing as an Advanced Skill Guided by Complex Reasoning

No.	Statement	Array Position	z score
*3	Strong writers should tailor what is written to their audience.	+4	2.14
*15	Writing intensive courses should be 400-level courses.	+4	1.41
31	Writing is important, but writing intensive courses are not.	+3	1.31
7	Content is critically important.	+3	1.16
8	Research increases challenge in a writing intensive course.	+3	1.10
10	Writing is a chore.	+2	1.10
1	Help from the instructor should be available and students should take advantage of it.	+2	0.98
34	Writing is a stream of consciousness.	+2	0.93
30	Writing is about understanding how things fit together.	+2	0.79
32	Reading is critical to writing success.	-2	-0.88
2	Writing elicits emotions.	-2	-0.93
6	Grammar is critically important.	-2	-1.10
12	Writing augments critical thinking.	-2	-1.15
19	Peer review activities promote writing and critical thinking skills.	-3	-1.31
18	Writing should be reflective.	-3	-1.37
35	Writing instructors are coaches and facilitators.	-3	-1.59
16	Examples of well-written work help students become better writers.	-4	-1.76
11	Writing should be concrete and applied.	-4	-2.14

*Denotes a distinguishing statement; p < .05.

Figure 4.



Statement position for writing as an advanced skill guided by complex reasoning. Most unlike statements are on the left of the factor array and the most like statements are on the right of the factor array.

Note. Numbers in array position represent the number of the statement from Table 1.

Table 6. Consensus Statements

No.	Consensus Statement	z score		
		Factor 1	Factor 2	Factor 3
1	Help from the instructor should be available and students should take advantage of it.	0.69	0.05	0.98
13	Many short related written assignments that require data gathering and analysis improve critical thinking skills.	0.65	0.19	0.27
14	Writing intensive courses should be 200-level courses.	0.16	0.47	0.28
16	Examples of well-written work help students become better writers.	-1.38	-0.85	-1.76
23	Good research leads to well thought out, well-articulated prose.	-0.33	-0.14	-0.72
33	Writing is a process.	0.53	0.91	0.22
36	Writing instructors are critics and proofreaders.	0.73	0.00	0.43

Perspective of Writing Related to

Discussion

The three extracted factors—Writing as Content Development Guided by Feedback and the Knowledge of Society, Writing as an Application and a Development of Thought and Writing as an Advanced Skill Guided by Complex Reasoning—represented perspectives held by stakeholders in the College of Agriculture and Life Sciences. Each factor uniquely described a different perspective and provided guidance for the interpretation because it was not highly correlated with the other factors.

Writing as Content Development Guided by Feedback and the Knowledge of Society

Participants with this perspective believed that writing promotes critical thinking when used as a tool to evaluate problems using relevant information and that societal knowledge is a key component of the writing process. Students should use writing to evaluate problems; however, they must have knowledge about society to complete the process. Having content knowledge, understanding grammar and mechanics and getting writing practice are all important parts of content development. But, students cannot increase their ability to think critically without having knowledge of society, which Beaufort (1999) also described in her writing expertise model.

Additionally, students should be exposed to writing practice, grammar techniques and content development throughout college and not just in writing-intensive courses. Writing instruction should not be confined to one or two courses on a degree plan. Therefore, all collegiate-level instructors should work to incorporate writing components into all courses. Instructors who believe strongly in writing education will implement writing into their courses and others may not, which could cause confusion between students' actual level of expertise and the level of expertise they are expected to have.

Research was not an important component of this factor, but without research, students cannot obtain relevant information to evaluate a problem. Participants who loaded on this factor may not be aware that research is an important part of the writing process and should not be overlooked if writing to increase critical thinking is about applying relevant information.

Writing as an Application and a Development of Thought

Participants with this perspective described writing as a technique to apply thought and transform thought into information. To augment critical thinking and create knowledge, students must apply relevant information to evaluate a problem, but they must engage in writing throughout their college career. Writing should not be confined to just one or two courses during a student's junior or senior year. Writing practice should be incorporated into the course curriculum throughout student's undergraduate education. Additionally, students should use real-world scenarios to apply relevant information,

solve problems, develop an understanding of systems and target specific audiences.

Real-world scenarios increase students' ability to think critically because they have to apply and defend the information to a larger population, which Irani and Telg (2005) found that real-world projects were one way of integrating critical thinking into course curriculum. Writing, when viewed as the window to the brain, is a unique perspective because a student's written material is a direct reflection of what he or she is thinking. In 1983, Foster stated writing is connected to the thought process. Essentially, writing is one way to understand another's thought process; therefore, writing is unique because of its capability to explore the human mind.

Exploring the human mind includes considering others' thought processes and knowing how to connect with them. Connecting with an audience is important because some want a synopsis of the project and not an extended version. Students must analyze the audience before condensing the information. Additionally, writing is about understanding how concepts are connected and connecting additional concepts using writing. As Bereiter and Scardamalia (1987) said, the ability to connect and transform information is a trait of a knowledge transformer.

An interesting contrast from Factor 1 is that the participants in Factor 2 loaded "grammar is critically important" as a statement most unlike how they think and content also fell on the left side of the array. Therefore, the participants of Factor 2 believed writing is more about critical thinking and thought than about using correct grammar and developing content. Essentially, if students can apply and develop thought, they can think critically.

Writing as an Advanced Skill Guided by Complex Reasoning

Writing is one way to understand complex information. Participants with this perspective described writing as an advanced skill guided by complex reasoning in which the consideration of audience guides the research process and the development of content. Students must identify, understand and write to a specific audience, which is an essential step in the writing process. Because audience guides content and project development, starting a project without understanding the audience could lead to a project that lacked a solid foundation and concrete parameters.

Additionally, participants believed that writing-intensive courses should be senior-level courses. By the end of students' undergraduate program, they have learned the content and subject matter required for their program and can transform and create knowledge using writing. Therefore, students should master content before they take two writing-intensive courses, which lends well to the idea that participants think content is critically important. Participants also thought, however, that learning how to write is important but writing-intensive courses are not.

The application and use of research in the writing process increases rigor and challenge because students are required to sift through information and materials, determine what is relevant and apply it to writing assignments as a way to transform knowledge (Bereiter and Scardamalia, 1987). Because content development is a critical part of the writing process, research should be used as a method for students to develop content and build on the knowledge base through research studies. In addition to students using research to develop content, students should be taught how to conduct research and find facts and literature related to the content of the course.

Recommendations

Writing is complex and learning how to write and teaching someone how to write is even more complex. Using the three perspectives of writing to guide classroom instruction will help instructors more effectively teach students how to write and help students learn how to write. The statements that comprise each perspective could be used as guides in developing writing assignments and assessments, initiating course discussion, establishing guidelines for peer review and developing supplemental course curriculum. Writing instruction often lacks consistency, perhaps because most instructors teach writing the way they were taught—right or wrong. Therefore, students may be, because of their writing instructor, completing four years of college without understanding how to write effectively. The writing factors will help provide consistency across curriculum and disciplines by establishing guidelines for incorporating writing components into a course where writing is not the content of the course. Also, the writing factors could increase the rigor of the course because faculty members can develop the courses using the statements as curriculum guides.

This study provides a research base for future studies related to writing instruction. For example, some statements are vague and need further explanation. “Strong writers should tailor what is written to their audience” could be interpreted as a vague statement that could mean a multitude of things. What does tailoring to an audience mean and how is that done? We recommend more research on how to target a specific audience. What are the best methods to reach an audience? To answer specific questions, each statement within the Q sort could be broken down and a Q sort could be conducted on the statements to determine the meaning of the statement.

Additionally, a similar study needs to be conducted in the bench sciences of agriculture to determine the writing factors that are consistent between the social sciences and the bench sciences. Similarities will exist because certain factors will remain consistent. In certain situations and under certain conditions, some factors will be more influential than others. However, it is important to create consistent statements that will guide writing instruction and education. The statements identified as part of this Q sort could be used to develop writing

assessments and assignments to prescriptively address students’ writing needs.

Implications

College faculty are in a unique position because many of them are required to integrate oral and written communication concepts into their course curricula. However, many faculty do not have training in communication, which could leave them unprepared to teach students how to be effective communicators. The three perspectives of writing, backed by the statements that support them, provide faculty with a starting point of teaching writing because unprepared faculty produce unprepared college graduates. Knowing how to write cannot be mistaken as the ability to teach writing.

References

- Baker, M.A. and D. Montgomery. 2012. Examining the agricultural education fishbowl: Understanding perceptions of agricultural education stakeholders in higher education. In: Proc. Annu. Mtg. of Western Region Agr. Educators, Bellingham, WA, 17–20 April.
- Beaufort, A. 1999. *Writing in the real world: Making the transition from school to work*. New York, NY: Teachers College Press.
- Bereiter, C. and M. Scardamalia. 1987. *The psychology of written composition*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Bok, D. 2006. *Our underachieving college: A candid look at how much students learn and why they should be learning more*. Princeton, NJ: Princeton University Press.
- Brown, S.R. 1980. Political subjectivity: Applications of Q methodology in political science. New Haven, CT: Yale University Press.
- Brown, S.R. 1993. A primer on Q methodology. *Operant Subjectivity* 16(3/4): 91–138.
- Cobia, D.W. 1986. Incorporating writing in agricultural courses. *NACTA Jour.* 30(2): 22–25.
- Crawford, P., S. Lang, W. Fink, R. Dalton and L. Fielitz. 2011. *Comparative analysis of soft skills: What is important for new graduates?* Washington, DC: Association of Public and Land-grant Universities.
- Davies, C. and M. Birbili. 2000. What do people need to know about writing in order to write in their jobs? *British Jour. of Educational Studies* 48(4): 429–445.
- Deane, P., N. Odendahl, T. Quinlan, M. Fowles, C. Welsh and J. Bivens-Tatum. 2008. *Cognitive models of writing: Writing proficiency as a complex integrated skill* (Report No. ETS RR-08-55). Princeton, NJ: Educational Testing Service.
- Emig, J. 1977. Writing as a mode of learning. *College Composition and Communication* 28(2): 122–128.
- Epstein, M.H. 1999. Teaching field-specific writing: Results of a WAC survey. *Business Communication Quarterly* 62(1): 26–38.
- Field, A. 2009. *Discovering statistics using SPSS*. 3rd ed. Los Angeles, CA: SAGE Publications.
- Flower, L. 1994. *The construction of negotiated meaning*:

Perspective of Writing Related to

- A social cognitive theory of writing. Carbondale, IL: Southern Illinois University Press.
- Flower, L. and J.R. Hayes. 1981. A cognitive process theory of writing. *College Composition and Communication* 32(4): 365–387.
- Foster, D. 1983. *A primer for writing teachers: Theories, theorists, issues, problems*. Upper Montclair, NJ: Boynton/Cook Publishers, Inc.
- George, D.L. 1986. Carnegie-Michigan Technological University: Freshman English program. In: Connolly, P. and T. Vilardi (eds.). *New methods in college writing programs: Theories in practice*. New York, NY: The Modern Language Association of America.
- Gottschalk, K. and K. Hjortshoj. 2004. *The elements of teaching writing: A resources for instructors in all disciplines*. New York, NY: Bedford/St. Martins.
- Grimes, D.G. 1986. University of Montevallo: University writing program. In: Connolly, P. and T. Vilardi (eds.). *New methods in college writing programs: Theories in practice*. New York, NY: The Modern Language Association of America.
- Hawisher, G.E., C.L. Selfe, B. Moraski and M. Pearson. 2004. *Becoming literate in the information age: Cultural ecologies and the literacies of technology*. *College Composition and Communication* 55(4): 642–692.
- Hayes, J.R. 1996. A new framework for understanding cognition and affect in writing. In: Levy, C.M. and S. Ransdell, (eds.). *The science of writing: Theories, methods, individual differences and applications*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Hayes, J.R. and L.S. Flower. 1980. Identifying the organization of the writing process. In: Gregg, L.W. and E.R. Steinberg (eds.). *Cognitive processes in writing*. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Irani, T. and R. Telg. 2005. Integrating critical thinking into agricultural communications curricula. *Jour. of Applied Communications* 89(3): 13–21.
- Kellogg, R.T. 1996. A model of working memory in writing. In: C.M. Levy and Ransdell, S. eds. *The science of writing: Theories, methods, individual differences and applications*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Krysher, S. 2010. Using time allocation to understand the perceived teaching ability of student interns in agricultural education: A Q-method study. PhD Diss., Dept. of Agr. Education, Communications and Leadership, 448 Agr. Hall, Stillwater, OK.
- Lopez, R.R., K.B. Hays, M.W. Wagner, S.L. Locke, R.A. McCleery and N.J. Silvy. 2006. From the field: Integrating land conservation planning in the classroom. *Wildlife Society Bulletin* 34(1): 223–228.
- McKeown, B. and D. Thomas. 1988. *Q methodology*. Thousand Oaks, CA: SAGE Publications.
- Motavalli, P.P., M.D. Patton, R.A. Logan and C.J. Frey. 2003. Promoting environmental writing in undergraduate soil science programs. *Jour. of Natural Resources and Life Sciences Education* 32: 93–99.
- National Commission on Writing for America's Families, Schools and Colleges. 2004. *Writing: A ticket to work ... or a ticket out: A survey of business leaders*.
- Orr, C.L. 1996. Communication across the curriculum in animal science. *Jour. of Animal Science* 74(11): 2828–2834.
- Reynolds, D.W. 2010. *Assessing writing, assessing learning*. Ann Arbor, MI: The University of Michigan Press.
- Runciman, L. 1998. Ending composition as we knew it. *Language and Learning Across the Disciplines* 2(3): 44–53.
- Ryan, M.R. and H. Campa, III. 2000. Application of learner-based teaching innovations to enhance education in wildlife conservation. *Wildlife Society Bulletin* 28(1): 168–179.
- Schneider, B. and J. Andre. 2005. University preparation for workplace writing: An exploratory study of the perceptions of students in three disciplines. *Jour. of Business Communication* 42(2): 195–218.
- Shemmings, D. 2006. 'Quantifying' qualitative data: An illustrative example of the use of Q methodology in psychosocial research. *Qualitative Research in Psychology* 3(2): 147–165.
- Stephen, T.D. 1985. Q-methodology in communication science: An introduction. *Communication Quarterly* 33(3): 193–208.
- Stephenson, W. 1935. Correlating person instead of tests. *Jour. of Personality* 4(1): 17–24.
- Strachan, W. 2008. *Writing intensive: Becoming W-faculty in a new writing curriculum*. Logan, UT: Utah State University Press.
- Thomas, D.B. and L.R. Baas. 1992–1993. The issue of generalization in Q methodology: "Reliable schematics" revisited. *Operant Subjectivity* 16(1): 18–36.
- Tuler, S., T. Webler and R. Finson. 2005. Competing perspectives on public involvement: Planning for risk characterization and risk communication about radiological contamination from a national laboratory. *Health, Risk and Society* 7(3): 247–266.
- van Exel, N.J.A. and G. de Graaf. 2005. Q-methodology: A sneak preview.
- Watts, S. and P. Stenner. 2005. Doing Q methodology: Theory, method and interpretation. *Qualitative Research in Psychology* 2(1): 67–91.
- Webler, T., S. Danielson and S. Tuler. 2009. Using Q method to reveal social perspectives in environmental research. SERI rep, 09–001.
- White, E. 1991. Assessing higher order thinking and communication skills in college graduates through writing. In: *Proc. Annu. Mtg. Of National Assessors*, Washington, DC.
- Wiersma, W. and S.G. Jurs. 2005. *Research methods in education: An introduction*. Boston, MA: Pearson Education, Inc.
- Zhu, W. 2004. Faculty views on importance of writing, the nature of academic writing and teaching and responding to writing in the disciplines. *Jour. of Second Language* 13: 29–48.