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Perceptions of science and engineering majors' L2 academic writing

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School of Humanities and Social Sciences

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A Thesis Submitted to

The Department of Teaching English to Speakers of Other Languages

In Partial Fulfillment of the Requirements

For the Degree of Master of Arts

By

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ABSTRACT

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Perceptions of Science and Engineering Majors' L2 Academic Writing

By
Erika L. Meyer Lewko

Under the supervision of
Dr. Amira Agameya

Writing in different disciplines can be challenging for students whose second language is English. While this issue has received some attention in the literature, it has not been addressed in a Middle Eastern context. This study, carried out at an English-medium university in Egypt, was undertaken to examine the perceptions of undergraduate students majoring in science and engineering disciplines and their professors of the quality of the students' writing. In the first part of the study, 35 undergraduates completed an online questionnaire containing both Likert scale and open-ended items about writing for classes in their major. Six student participants were also interviewed, as were five professors from the science and engineering departments. Questionnaire results were analyzed with descriptive statistics. The questionnaire contained items addressing student attitudes about their writing and training, their use of strategies and resources, and views of their own strengths and weaknesses in writing. The results suggested that students generally recognized the importance of writing and were positive about their training, that they were using certain strategies and resources but not others, and that they were generally confident in their abilities. The student interview participants recognized their strengths, but also noted areas that they felt needed more emphasis in their respective departments. The faculty participants were less positive about student writing and also noted areas of weaknesses where students were not applying what they had learned in previous writing classes. It also appeared that there was a gap in which there were areas possibly not being covered because it is unclear where the responsibility lies for teaching it. Overall, the results suggested that students are generally confident in their writing abilities, although they have some criticisms of their training, while professors had more mixed views of their students' technical writing abilities, but also acknowledged that changes in the students' instruction might be needed.

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CHAPTER 1

INTRODUCTION

Background and Rationale

The adjustment to academic writing can be difficult for many students as they enter college. They may be faced with unfamiliar writing tasks in new areas of study, and as they become immersed in their chosen field, they will have to cope with learning the writing norms specific to that field. The variety of challenges can come as a surprise even to students writing in their first language (L1), and some instructors and researchers have compared the learning of discipline-specific writing with learning to write in a second language (L2) (Matsuda & Jablonski, 2000; McCarthy, 1987). Taking these perspectives into consideration, it is clear that difficulties adjusting to academic writing may be exacerbated for students writing in their L2.

There are many difficulties in defining exactly what constitutes academic writing, and this has led to a number of different approaches for teaching it (Spack, 1988). Adding to these difficulties, it has been noted that what is generally taught as academic writing consists of what Steinman (2003) refers to as "Western notions of rhetoric" (p. 80). Academic writing also has been described as a cognitive and social process (Belcher & Braine, 1995, p. xiii) whereby the social aspect involves the role of academic writing within a discourse community. A discourse community shares certain common characteristics among its members, including common goals, methods of internal communication, genres used for communication, participation largely concerned with disseminating information and reacting to it, common terminology, and a portion of membership with some degree of expertise (Swales, 1990). Academic discourse

communities exist within specific disciplines (e.g. biology, philosophy), and some hold the view that the academic community as a whole has some shared characteristics (Johns, 1997). However, Elbow (1991) argues that there is no single form of academic discourse (1991), and the findings of Hyland and Tse (2009) in their corpus analysis of the use of academic vocabulary also suggest that there are differences across disciplines. Thus, when students arrive at the university, one of the challenges they face is working their way into the discourse community of their chosen field. This process includes learning to read and understand the discourse of the community as well as being able to write in a way that is acceptable to its senior members (professors), and this can be a long and difficult process for L2 learners (Spack, 1997).

Many English medium universities offer courses to assist L2 English learners with the adjustment to university work. These programs vary, but most are aimed at incoming students, regardless of academic interest. Some programs are classified as content-based instruction (CBI), English for Academic Purposes (EAP), or English for Specific Purposes (ESP), all of which are concerned with integrating language teaching with other subjects based on student needs, while other programs are based on the teaching of general writing skills. There has been debate about whether the discipline-specific or more general approaches are more appropriate in the university, with some arguing that general writing skills should be emphasized first and that English teachers should not be responsible for introducing students to discipline-specific genres (Spack, 1988; Zamel, 1995). Others have argued that content should not be divorced from writing because students need to be introduced to the genres that are appropriate for their disciplines (Hyland, 2002; Parkinson, 2000). Zhu's (2004) interviews with business and

engineering faculty at an American university revealed two perceptions of academic writing that illustrated the underlying ideas of these two arguments. One view was that academic writing was achieved through the transfer of general writing skills to an academic context, while the alternative view maintained that particular patterns of thought and processes were essential for academic writing in specific disciplines (Zhu, 2004). However, in considering both sides of the argument, it should not be ignored that science courses have specific demands in writing assignments, suggesting that students may need additional guidance in approaching these tasks (Braine, 1989; Horowitz, 1986; Jackson, Meyer, & Parkinson, 2006).

Various aspects of the academic challenges and needs of English as a Second Language (ESL) undergraduates from the points of view of students and professors have been addressed in the literature. Students at an English medium of instruction university in Hong Kong surveyed by Evans and Morrison (2010) identified writing skills as being among the most difficult for them to master. In a survey of undergraduates and their professors at a Canadian university, both the students and professors identified writing as the most important set of skills, but students tended to rate their writing skills higher than the professors (Huang, 2010). Ostler's (1980) study examined the academic needs of ESL students based on their area of study and found that the writing of laboratory reports was identified as an important skill specific to the science and engineering majors. Leki and Carson's (1994) study of ESL undergraduates suggested that while students generally felt prepared for academic writing following completion of ESL classes, discipline-specific writing needs were among the areas in which the students indicated that additional instruction would be helpful. Zhu (2004) examined professors' impressions of

student writing in business and engineering in an interview study, where participants from both fields viewed writing as an important skill, particularly for future career success, but some engineering faculty were of the opinion that not very much emphasis was placed on writing in undergraduate studies. Some faculty acknowledged that they should play a role in helping students with writing, although others saw that as mainly the job of English and writing teachers. Collectively, these studies suggest that writing is an area of major concern to ESL[1] students and their professors, but it is not entirely clear in many cases who is responsible for addressing the discipline-specific writing needs of the students.

Much of the emphasis on writing in undergraduate science and engineering programs in the United States has been the result of the Writing Across the Curriculum (WAC) initiatives popularized in the 1970s. These programs were developed not only to emphasize writing in all disciplines, but also to encourage the use of writing as a learning tool (Freisinger, 1982). WAC programs continued to influence the creation of new writing programs and projects within undergraduate engineering curricula over the next few decades (Baren, 1993; Ford & Riley, 2003; Manuel-Dupont, 1996; Sharp, Harb, & Terry, 1997; Waitz & Barrett, 1997). But while there is literature describing these programs, there have been few efforts to describe students' impressions, how they fared in subsequent courses, or the impressions of professors. Of the aforementioned studies, only Waitz and Barrett (1997) included any evaluation of the program from the students who participated. They reported on a communications practicum offered concomitantly with a project course in an undergraduate aerospace engineering program. The

[1] The term ESL is meant to include both ESL and EFL (English as a Foreign Language)

communications practicum was an opportunity for students in the project course to work on communication skills needed for their project work. In general, the students who opted to take the communications practicum course as well felt that it improved their performance in the projects course and helped them develop better communication and organization skills.

Similar limitations exist in the literature on student writing in the other science disciplines. Computer science is another area in which efforts have been made to include more writing under the influence of WAC (Hoffman, Dansdill, & Herscovici, 2006; Kaczmarczyk, 2003; Taylor & Paine, 1993; Venables & Summit, 2003). Again, not all of these descriptive efforts contain an evaluative component. Venables and Summit (2003) reported the incorporation of a writing project with a peer review component and included student ratings of the project, and students had generally good ratings for the usefulness of the assignment. Kaczmarczyck (2003) conducted a study with a technical writing class in which she looked at the change in student perceptions of their skills and found students' perceptions of their abilities in reviewing and understanding journal articles increased significantly. However, student perceptions of their own writing abilities, particularly in grammar, were high at the beginning of the study and remained high, in contrast with the views of the instructor and teaching assistant. In biology, Carter *et al*. (2007) conducted an interview study with students in a laboratory course, and their results suggested that students found the process of writing laboratory reports useful in learning biology. However, the focus of the study was more on demonstrating that writing in the disciplines (WID) could have a similar effect on learning as WAC,

rather than focusing on how the students were learning to write in their discipline (Carter, Ferzli, & Wiebe, 2007).

While writing in the science and engineering disciplines has clearly gained some attention due to programs like WAC, there is a deficit of information about how students progress as a result of the emphasis on writing. In addition, it is unusual for the challenges of EFL/ESL students to be addressed at all.

Research Problem

The existing literature has addressed EFL/ESL students' perceptions of the challenges of academic writing to some extent, but there have been few efforts to examine student and professor views in specific fields, particularly in the sciences. Existing literature does not adequately address the perceptions of EFL/ESL science and engineering undergraduate students and their professors of the students' academic writing, but does suggest that discipline-specific writing skills are a concern for EFL/ESL students. Examining the perceptions of these two groups is an important step in identifying where changes need to be made in the process of training the students. Further, most of the data in this area have been generated in ESL contexts, with only a few studies in EFL contexts. Finally, there is also a dearth of literature addressing these questions in the Middle East. This study is intended to address the views of science and engineering EFL students and their professors regarding the discipline-specific writing of the students at an English medium university in the Middle East.

Research Questions

1. How do students (primarily third year and above) majoring in science or engineering at the American University in Cairo (AUC) perceive their preparedness for academic writing tasks in their science and engineering courses?
    a. What are the students' attitudes about writing and the training they have received?
    b. What strategies and resources are students using to assist them with their writing?
    c. What do students see as the strengths and weaknesses of their writing?
2. How do professors teaching upper-level science and engineering courses at AUC perceive their students' preparedness for the assigned academic writing tasks?
    a. What are the professors' expectations of their students' writing?
    b. What do professors see as the strengths and weaknesses of their students' writing?

Delimitations of the Study

This study focuses on the perceptions of undergraduates majoring in the sciences at AUC and their professors' perceptions of their preparedness for academic writing tasks in their major. The study does not include undergraduates in other majors or graduate students. In addition, this study does not attempt to evaluate students' writing in their classes.

Definition of Constructs

Academic writing

Theoretical: a type of writing specific to a discourse community and part of the social and cognitive processes important to participating in the community (Belcher & Braine, 1995; Johns, 1997; Swales, 1990)

Operational: writing tasks assigned to students by professors for the purpose of communicating information specific to the discipline

Preparedness

Theoretical: the level at which the student can undertake the assigned work and succeed (Conley, 2008)

Operational: the extent to which attitudes of the students and/or their professors reflect satisfaction with the students' discipline-specific writing

Writing ability

Theoretical: the extent to which the writer produces work that clearly communicates in a way appropriate to the context and audience (Huot, 1996; Weigle, 2002)

Operational: the extent to which professors are satisfied with the students' work

Abbreviations

AUC = American University in Cairo

EFL = English as a foreign language

ESL = English as a second language

SSE = School of Sciences and Engineering

WAC = Writing Across the Curriculum

WID = Writing in the Disciplines

CHAPTER 2

LITERATURE REVIEW

Academic Writing

Academic writing is widely considered the medium of communication of the academy, from the undergraduate to the professorial level. When students first encounter academic writing as undergraduates, it is often difficult for many to adjust to the different expectations for which secondary school writing may not have prepared them. This also holds true for science and engineering majors, although these concentrations are often assumed to not involve a great deal of writing at the undergraduate level. All students will need to acquire the language, vocabulary, and norms of the discipline they have chosen, including specific analytical skills and the ability to communicate in the style of the discipline, using the correct jargon. This adjustment is particularly difficult for students for whom English is not their first language (Zamel, 1995). For this student population, writing has been identified as a particularly problematic skill (Evans & Morrison, 2010).

Academic writing tasks. Among the challenges that many new university students face are writing assignments in genres with which they may not be familiar. Eblen (1983) carried out a questionnaire study on student writing at an American university, whereby faculty in the sciences reported giving writing assignments in each of the following genres: essay tests, analytical papers, abstracts of readings, documented papers, essays/themes, teaching materials, journals, lab reports, case reports, technical reports, and book reports (p. 346).

Horowitz (1986) attempted to identify and classify the tasks that constituted academic writing at the university level by analyzing actual exams and assignments given across multiple departments. He identified seven classifications of assignments, but based on the small data set, was not able to make any distinctions about which tasks were more common in different areas of study. Horowitz avoided the use of labels found in previous studies, such as laboratory report, case report, and essay examination, (e.g. Eblen, 1983; Ostler, 1980) because these labels tend to have different meanings in different disciplines. While this concern is valid and was considered in the design of the current study, it has also been pointed out that the use of labels may make the questionnaire easier to understand (Arrigoni, 1998). For this reason, labels were used along with definitions in the questionnaire for the current study.

Braine (1989) brought the focus to science and engineering using Horowitz's classification system, noting that these academic concentrations generally have substantial proportions of students for whom English is not the first language. He found that most tasks fall into four of Horowitz's categories (summary of or reaction to readings, report on a specified participatory experience, case study, synthesis of multiple sources) and also created a new category (report on a simulated participatory experience). Using this type of classification system avoids the confusion that can result when multiple labels are used for the same task type (Braine, 1989; Horowitz, 1986; Nesi & Gardner, 2006). Both studies observed that tasks were highly controlled, variably specifying topics, procedures, and organization of the final written output (Braine, 1989; Horowitz, 1986).

Braine (1989) noted that in tasks for science and technology courses, the assumed audience for the task was often outside of the classroom. This raises the question of how students learn these tasks in the university setting. Jackson et al. (2006), investigating undergraduate science tasks at an English-medium South African university, found that the laboratory report was the major writing assignment that most students received. They also reviewed typical reading assignments across the science departments and concluded that the preponderance of textbook readings rather than original literature was not supportive of the typical writing assignments. Thus, students may not be getting appropriate reading or writing assignments in content courses to support development of discipline-specific writing skills (Jackson, Meyer, & Parkinson, 2006). This study raises an excellent point about supporting student writing with appropriate models in their reading assignments, and this was addressed during interviews in the current study.

Nesi and Gardner (2006) interviewed faculty in 20 departments across three United Kingdom universities about undergraduate student writing and writing tasks in different disciplines. They found that there were several genres from which many disciplines drew assignments, and the labels of different writing tasks were not necessarily consistent across disciplines. The assignment types used in science, engineering and other disciplines were essays, reports, laboratory reports, project reports, research projects, dissertations, group projects, posters, website evaluations, problem sheets, case studies, reflective writing (journals or blogs), critical evaluations, and marketing plans or proposals (p. 104-105). Genres only assigned in the science and engineering disciplines included the rather surprising mixture of patient case reports, press releases, fact sheets, technical abstracts, persuasive writing, and a letter of advice

written from a past perspective (p. 104-105). Nesi and Gardner classified academic assignments into three categories: pedagogic genres (represented mainly by the essay), research-academic genres (genres closer to the academic research article, such as a laboratory report), and professional genres (genres closer to written work of practicing professionals in areas such as law or medicine, such as case reports) (p. 106-109). These lists are somewhat more expansive when compared to those of previous studies and many genres categorized by Nesi and Gardner do not fit neatly into previous systems of categorizing tasks (Braine, 1989; Eblen, 1983; Horowitz, 1986).

The array of genres represented here illustrates some interesting trends highlighted by the authors, particularly the inclusion of assignments in science disciplines that tended to be more reflective (e.g. journals) or examples of "empathy writing" (p. 110) in the sciences, in which students write for audiences not familiar with the subject matter. Assignments such as these give students opportunities to think more deeply about their experiences and demonstrate their true level of understanding (Nesi & Gardner, 2006).

It is important to consider the types of writing tasks that students are assigned in their discipline, as some may be closer than others to the types of professional writing they will ultimately be expected to do. Engaging in appropriate writing tasks is crucial to the students' training and preparation for writing at later stages of their academic and professional careers.

Writing to learn and Writing Across the Curriculum (WAC). At the undergraduate level, writing can be both a tool to inform and demonstrate and also a method of learning (Freisinger, 1982). Writing to learn has been the thrust of WAC

programs popularized in the United States in the 1970s. These programs have resulted in a greater focus on writing in a variety of disciplines, including those considered less writing intensive, such as the science and engineering disciplines. Over time, many WAC programs experienced a gradual shift to emphasis on WID. Some have suggested that this shift also resulted in a shift from "writing to learn" to "learning to write," but there is preliminary evidence that a focus on writing in the disciplines also promotes learning, as seen with biology students' experiences with writing laboratory reports formatted to be similar to research articles (Carter, Ferzli, & Wiebe, 2007).

Wheeler & McDonald (2000) make the case for more writing in engineering education by pointing out the similarities between the writing process and the design process in which engineers engage. Writing is also crucial because it enhances students' understanding of the material and allows faculty a better opportunity to assess student achievement. Communication skills are important not just professionally, as demonstrated in Keane and Gibson's (1999) work surveying professional engineers, but also for giving students a well-rounded education (Wheeler & McDonald, 2000).

The advancement of writing and communication skills in the science and engineering disciplines is not always considered a high priority, and this has been a larger issue in some disciplines than in others. Burton and Morgan (2000) note that mathematicians receive less writing training than those studying in other areas of science and technology. The heavier concentration of articles describing efforts to include writing in engineering and computer science courses suggests that these are areas in which communication skills have traditionally also been neglected. As a result of the spread of WAC programs, a number of redesigned or new engineering courses including

substantial writing components have been reported in the literature (Baren, 1993; Ford & Riley, 2003; Manuel-Dupont, 1996; Sharp, Harb, & Terry, 1997; Waitz & Barrett, 1997). Little follow-up on the effectiveness of these courses has been published, but in Waitz and Barrett's (1997) article describing a communications practicum course offered concomitantly with a project course, they included results of a survey of students who had taken the practicum. Results indicated that students had largely found the course helpful and felt it had improved their performance in the project course (Waitz & Barrett, 1997).

Similarly, there have been efforts to include more writing in computer science classes (Hoffman, Dansdill, & Herscovici, 2006; Kaczmarczyk, 2003; Taylor & Paine, 1993; Venables & Summit, 2003). Kaczmarczyck (2003) conducted a study with a technical writing class in which she looked at the change in student perceptions of their skills and found students' perceptions of their abilities in reviewing and understanding journal articles increased significantly. However, student perceptions of their own writing abilities, particularly in grammar, were high at the beginning of the study and remained high, in contrast with the views of the instructor and teaching assistant. Venables and Summit reported the incorporation of a writing project with a peer review component (2003). Students had generally good ratings for the usefulness of the assignment (Venables & Summit, 2003).

WAC and WID both represent attempts to acknowledge that not all disciplines treat writing in the same way. Consideration of those differences should be part of the writing training of all students. In addition, the existence of these programs highlights the neglect of writing in many science and engineering programs.

Writing in the Science and Engineering Disciplines

Discourse communities. A discourse community shares goals, methods and ways of communicating, terminology, and some members considered to be experts (Swales, 1990). It may be as large as an entire discipline (e.g. biology) or as small as a single class. Given the characteristics that discourse communities have in common and how similar types of discourse communities differ from one another, one would expect to see some degree of variation when comparing disciplinary areas. This can be observed at the university level, looking at academic writing as the mode of communication. Nesi and Gardner (2006) observed in their study of writing tasks at British universities that while there is a core set of tasks widely used across disciplines (e.g. essays, reports) there are differences between disciplines in emphasized genres, focus on academic versus professional writing, and the role of the student voice.

In a comparison of essays by arts and sciences majors in a history of science course, North (2005a) found that the humanities and social science students' essays were graded significantly higher. Textual analysis, interviews, and a short survey about the students' attitudes toward writing revealed that the humanities and social science students tended to go through a more extensive revision process, include more citations and differing viewpoints, and have more difficulty staying within the assigned word limit. Science students, by contrast, tended to write one draft with some revision, wrote as if most of their statements were accepted facts, and spoke of having to "pad" their essays to be long enough. Humanities and social science students also tended to include non-subject themes as additional information before the subject theme, while science students usually began clauses with subject themes (North, 2005a, 2005b). North suggests that

these tendencies may become ingrained early in study, based on disciplinary differences, as some of these variations parallel differences seen at the level of professional academic writing.

At the professional level, Yore, Hand, and Prain (2002) sought to examine scientists' ideas of themselves as writers and perceptions of writing. Data from a questionnaire and interviews suggested that many of these scientists, all from either science or applied science departments of a large university, thought of writing as more of a "knowledge-telling" than "knowledge-building" exercise (p. 689). Despite this, several participants described instances of working with other authors or with journal reviewers that suggest that they have experienced writing as knowledge-building. A similar study by Yore, Hand, and Florence (2004) with a group of Canadian scientists and engineers suggested that there was some recognition of the role writing played in thinking about the research, even if it was not explicitly acknowledged as "knowledge-building."

Differences in discourse communities can be observed at the classroom level as well. Herrington (1985) observed two different chemical engineering courses. She found that in the lab course, in which students carried out several experiments and wrote a report for each, there was a substantial amount of confusion as to what role the students should be filling and who the audience for their reports would be. In contrast, students in a design course involving two long-term projects had a better sense from their assignments of the role they were to play in the project and for whom they were ultimately writing (Herrington, 1985). This suggests that even within a discipline, there are differences in discourse, and the purpose of the text may influence the genre.

Discourse communities, large or small, are a way that members of a discipline can be tied together. Undergraduates can become part of these communities within and outside of their individual classes. Part of being in the discourse community is learning the community's way of communication. In this way, writing becomes part of how a new member, like an undergraduate, integrates into these discourse communities.

Characteristics of discipline-specific writing. The argument that discipline-specific writing needs to be taught is based on the assumption that writing varies significantly between different disciplines. Analysis of both professional and student texts has been used to tease apart some of the differences in academic writing between disciplines, and several of these studies have highlighted characteristics either unique to or more prominent in texts from science and engineering areas.

Structure is one aspect of written texts that appears to vary across disciplines, even at the undergraduate level. Undergraduate writing samples were analyzed for structure as manifested in use of section headings. All biology and engineering assignments had sections, while five assignments or fewer contained sections in anthropology, classics, psychology, history, and English, suggesting that the structure of academic writing varies across disciplines (Gardner & Holmes, 2010).

Pronouns and self-mention have also been prime areas of investigation in academic writing. Harwood (2005b) looked at exclusive (including the writer or writers, but not the reader) and inclusive (including both the writer and reader) pronouns in research articles across four disciplines and found that use of *we* was nearly always inclusive in articles in the social science disciplines (business and economics), but was inclusive only about a third of the time in computer science articles and 10% of the time

in physics articles. In addition, there was a greater trend in the social sciences toward using 'I' to refer to the author, while 'we' was often used to refer even to a single author in the science and engineering disciplines. Similarly, Hyland (2001) analyzed self-mention in 240 research articles in four humanities and social science disciplines (applied linguistics, marketing, philosophy, sociology) and four science and engineering disciplines (electrical engineering, mechanical engineering, microbiology, physics). Most of the pronouns in his corpus occurred in the humanities and social science papers. His results indicated that more self-mention seems to occur in articles from humanities and social science disciplines, apparently due in part to more frequent use of first person pronouns. As in Harwood's (2005b) study, *we* was used more in the science and engineering disciplines, even for single-authored articles.

Another study by Harwood (2005a) investigated the self-promotional use of pronouns in research articles from the same disciplines as the previously mentioned study (Harwood, 2005b). In this corpus, self-citation in the humanities and social science disciplines tends to be fairly obvious due to the use of styles that include the author name in parenthetical citations. That style of referencing is not commonly used in the science and engineering disciplines, but an author can make it obvious that he or she is referring to his or her own work by using a personal pronoun (Harwood, 2005a). Thematization of the pronoun can also differ in writing norms. Hyland (2001) observed that having a first person pronoun as the theme of the clause was common in all disciplines, but occurred somewhat more frequently in the humanities and social sciences. However, because thematization of the first person pronoun was somewhat less common in science and

engineering, it also tended to have a more significant impact, making the statement stand out (Hyland, 2001).

Academic lexis may also differ across the disciplines. A corpus containing research articles, textbook chapters, science squibs, academic book reviews, graduate dissertations, and undergrad research projects across multiple disciplines was analyzed for occurrences of words on the Academic Word List (Coxhead, 2000; Coxhead & Nation, 2001), generated for use in English for Academic Purposes (EAP) instruction (Hyland & Tse, 2009). Words on the list were unevenly distributed across the disciplines, with fewer words from the list appearing in the science texts (not including engineering). Based on this, Hyland and Tse suggest that "writing in the sciences demands a more specialized and technical vocabulary" (p. 114).

Citation practices are also of interest when comparing academic texts between disciplines, particularly since this is an important skill that most students develop fully during their undergraduate education. Hyland (1999) analyzed citations (excluding self citation) in 80 research articles from four humanities and social sciences (applied linguistics, marketing, philosophy, sociology) and four science and engineering disciplines (electronic engineering, magnetic physics, mechanical engineering, molecular biology). The humanities and social sciences tended to have more citations, although interestingly, molecular biology articles had a similar number of citations to some of these disciplines. Most cited material was summarized, and direct quotes were not found in articles from the science and engineering disciplines. Hyland argued that science and engineering may generally have fewer citations because they are building on previous knowledge in a fairly linear fashion, whereas in the humanities and social sciences,

authors may be drawing on multiple fields to develop their arguments and cannot assume that their audience shares those backgrounds. This may also explain why molecular biology citation levels were more similar to the humanities and social sciences, as it originated as a hybrid discipline.

Thompson and Tribble (2001) take a similar approach to Hyland's (1999) in their corpus analysis of doctoral theses from agricultural botany and agricultural economics and compare the results of both studies. Overall, they found that the citation density in the theses was somewhat lower than that of the research articles Hyland analyzed. Citations were then classified using Swales' division of citations into integral citations, in which the author name is part of the sentence, and non-integral citations, in which the author name is either in a parenthetical citation or referred to by a number (Swales, 1990). Only philosophy research articles and agricultural economic theses contain more integral than non-integral citations. The authors suggest that this may have more to do with genre, as the theses are longer than the research articles and allow for more in-depth discussion of various researchers and their work. However, this does not provide a satisfactory explanation for why philosophy research articles would also show the same preference for integral citations, nor for why the agricultural botany theses would not. In looking at direct quotations, though, the results appear to be in line with Hyland's, in that direct quotations are not used substantially in the science discipline (agricultural botany), and in fact are only used in providing definitions. Direct quotations were more commonly found in the agricultural economics theses, similar to the humanities and social science research articles in Hyland's study.

Thompson and Tribble (2001) also examined a set of EAP student assignments and reviewed three EAP textbooks to evaluate the information provided on citation practices. The student texts contained very little variation in citation forms. The authors note that very little information appears to be available from EAP texts regarding different forms of citations and how they might be effectively used in academic writing, suggesting that this is an area in which more explicit instruction may be required to help EFL/ESL students become familiar with the typical citation practices of their chosen fields.

Imperatives and directives also play a key role in the construction of argument in academic texts. Use of these might also be assumed to vary between disciplines. Swales et al. (1998) investigated the use of imperatives in a corpus consisting of five articles from each of ten disciplines (art history, chemical engineering, communication studies, experimental geology, history, linguistics, literary criticism, philosophy, political science, and statistics). When looking at raw numbers of imperatives and density of imperatives, no patterns emerged in usage when comparing natural science, social science, and humanities fields. The authors do note that the three fields with the highest density of imperatives (statistics, experimental geology, and linguistics) "are all those which tend to produce texts that not only consist of paragraph blocks, but also contain mathematical, experimental, or illustrative elements, and which, in consequence, may require rather more specific forms of reader-text management" (Swales et al., 1998, p. 103). Also interesting to note is that political science and communication studies articles contained no imperatives at all, while art history (a field chosen for the expectation that it would contain a great deal of imperatives and literary criticism) articles contained very few.

The authors also note that imperatives tend to be ignored in EAP textbooks and even in style manuals used by many writers.

Imperatives are included among the directives that Hyland (2002a) examines in his study of research articles and textbook chapters from applied linguistics, electrical engineering, marketing, mechanical engineering, microbiology, philosophy, physics, and sociology, as well as undergraduate project reports from biology, economics, information systems, marketing, mechanical engineering, public administration, social science, and teaching English as a second language (TESOL). These genres were chosen for the different interactional relationships they represent between author and audience. Imperatives were the most common directives in the overall corpus, and unsurprisingly, were somewhat more concentrated in the textbook chapters. Imperatives were rare among the student reports, where the most common directives referred readers to tables or other sections of the text. Looking at disciplinary variation, it was observed that the science and engineering disciplines had substantially greater numbers of directives for every 10,000 words. The majority of directives in textbooks and student reports were found in science and engineering texts. Similar results were obtained for the research articles, except that philosophy articles contained more directives than articles from the other humanities and social sciences, while biology articles contained fewer directives than the other science and engineering disciplines. While these results were closer to finding a fairly clear-cut difference in usage along disciplinary lines than those of Swales et al. (1998), it is worth noting that the science and engineering category included two of the top three imperative-heavy disciplines from Swales *et al*. Hyland speculates that the more "impersonal" (p. 232) nature of writing in the sciences may lead to more frequent

use of directives, potentially because among the rhetorical devices used in academic writing to engage with the audience, directives are really the only ones that writers in science and engineering utilize.

The studies discussed above demonstrate the substantial differences that have been observed in writing across various disciplines. The existence of these differences demonstrates the need for discipline-specific training and guidance in writing.

L2 Academic Writing

Content-based instruction (CBI), English for Academic Purposes (EAP), and English for Specific Purposes (ESP). CBI, EAP, and ESP are all interrelated terms that are often used in different ways. *CBI* focuses on the teaching of both language and a particular subject area (Stoller, 2004). Johns (1997) has outlined a relationship between CBI and ESP that encompasses both similarities and differences. Both are concerned with keeping language and content from being separated in L2 education by using content to engage in language use and using the language to learn the content. CBI has been more common in schools in ESL settings, while *ESP* is often targeted to adult learners who have very specific needs and is more widespread (Johns, 1997). *EAP* is considered a category of ESP for academic English in universities (Hyland & Hamp-Lyons, 2002). The development of EAP curricula tends to be very research-oriented and centered around the idea of discourse communities (Hyland, 2002b; Hyland & Hamp-Lyons, 2002).

The issue of who bears the responsibility of introducing EFL/ESL students to the varied discourse communities of their chosen fields has been hotly debated in the literature. Spack (1988) asserted that programs like WAC had ignited a trend that had led

to the expectation that English and composition teachers would teach discipline-specific writing. She argues that English teachers should be teaching general writing skills, and all other discipline-specific training should occur in content-based classes. Responses from Braine (1988) and Johns (1988) suggested that even if English teachers were not going to engage in teaching discipline-specific writing, there was still a need for EFL/ESL students to receive writing training more in line with the work they would be required to do in content classes. Interestingly, Spack later acknowledged that transfer of skills from ESL classes might be a more complex transaction than previously assumed (Spack, 1997; Zhu, 2004).

Zhu (2004) conducted an interview study with faculty from the disciplines of business and engineering regarding the role of writing and teaching of writing. Participants tended to view writing either as something that was discipline-specific, building on general skills, or as a general skill that transferred to different disciplines. Those that viewed writing as something of a more general skill also tended to think that it was the responsibility of English teachers. Professors who saw writing as a more discipline-specific skill felt that responsibility for the discipline-specific aspects of writing did lay with content faculty, ideally building on general skills students would have learned in English classes.

In Hyland's 2002 reassessment of the issue, he states that specificity is key to ESP education and should involve "teaching the literacy skills which are appropriate to the purposes and understandings of particular communities" (p. 386). He further asserts that content area professors are not necessarily trained to be or interested in teaching these

skills to their students, a view supported by some of the faculty participants in Zhu's interview study (2004).

These studies demonstrate the difficulty of determining who is responsible for teaching students various aspects of writing. Another complication in training students to write in their discipline is the reluctance of some professors to take on the task of teaching writing on top of content.

Student L2 writing and the disciplines. As noted previously, one of the many challenges for L2 English learners attending English-medium universities is adapting to language challenges as well as the added layer of language challenges in their specific disciplinary area. The latter can also be difficult for native speakers of English, prompting comparisons to second language writing (Matsuda & Jablonski, 2000), and it has been noted that even native speakers of English often do not interpret writing assignments in the way their professors intended (Nelson, 1990). This is evident in McCarthy's 1987 case study of a college student (Dave) learning to deal with writing in the different disciplines of the curriculum over three semesters. Although McCarthy viewed the participant's writing assignments across three courses (Freshman Composition, Introduction to Poetry, and Cell Biology) as fairly similar to one another, Dave viewed them as completely different from one another and also different from other writing he had done. As such, he focused on different aspects of writing for each of the classes with varying levels of success, leading McCarthy to dub him "a stranger in strange lands" (p. 234), with each class seeming to Dave to be a different place with a different culture and language.

The additional struggles that can occur for L2 English students are illustrated by Spack's (1997) three-year case study of Yuko, a Japanese student attending college in the US. Despite her good scores on the Test of English as a Foreign Language (TOEFL), Yuko requested placement in an ESL composition course. She struggled with both the reading and writing assignments in social science classes in her major, international relations. Although she did well with subsequent English classes, she considered changing her major and registered for classes with less reading, including economics, math, and computer science. Notably, she worried about finding the right major and did not want to major in a science just to avoid "language." Ultimately, she tried again to take reading-intensive courses and over time, her reading strategies improved. With writing, like Dave in McCarthy's (1987) case study, when she was able to understand the assignments and the professors' expectations, she was more successful.

Writing is frequently identified by EFL/ESL students as a particularly difficult skill. Evans and Morrison's (2010) large survey of EFL undergraduates at an English-medium Hong Kong university indicated that writing was seen as the most difficult skill, a result corroborated in interviews with students. Among the problems cited were difficultly understanding the assignments, lack of experience with the genres and appropriate referencing, integrating sources, and using an appropriate writing style. ESL undergraduates at multiple US universities were also surveyed about tasks within reading, speaking, listening, and writing that were considered important to academic success. Of the top ten sub-skills rated most important, four were writing skills (Rosenfeld, Leung, & Oltman, 2001). Huang (2010) surveyed professors and ESL students at a Canadian university using a questionnaire based on that developed by Rosenfeld and colleagues

(2001). The results indicated that while writing was seen as an important skill by undergraduates, when responding to items regarding their language skill status, the undergraduates on average indicated that they were not in need of developing any skills. By contrast, the professors rated several items related to writing as needing improvement (Huang, 2010).

In an attempt to better understand what students learn from ESL classes and what their needs are, Leki and Carson (1994) surveyed ESL students at two universities. Overall, most participants seemed to feel at least adequately prepared for writing in content courses. The data as reported do not reflect whether there were differences in responses between the disciplines. However, when asked about what should be included in EAP classes, "discipline-specific needs" (p. 89) were among the top requests, suggesting that students may have been encountering challenges in their content courses for which EAP classes had not prepared them.

As part of the 1994 study, Leki and Carson gathered information about the writing tasks that students were assigned both in their EAP classes and content courses. They found that while most of the assignment types involved the use of source texts, few assignments from the EAP classes involved either only responding to a source text or no source use at all.

When Leki and Carson (1997) interviewed students about their experiences with each type of writing, they found that students tended to feel that writing without any source text gave them more freedom, but they also noted disadvantages, such as time limits and unfamiliar topics. Writing in response to a source text that they did not have to use in the writing task itself was the type of writing that the participants encountered

primarily in their EAP classes, but not in content courses. While students saw the text as a useful model, they also had concerns about avoiding plagiarism, understanding the text, and distancing themselves from the text enough such that they could write about their own ideas.

When writing with sources in content courses, one view that emerged was that content became more important than language. As one student noted, "They don't pay attention to your English" (p. 56). This view has been mentioned by ESL students elsewhere as they are dealing with writing in content area courses (Evans & Morrison, 2010). Undergraduate participants tended to find the sources useful, but their overall impressions of the task had more to do with whether or not they enjoyed the subject area than the type of task itself. New content-specific vocabulary and genres were challenging for students, although students found writing for the audience to be somewhat more straightforward in the content classes (Leki and Carson, 1997).

One participant in Leki and Carson's study (1997) mentioned learning certain bundles of words that were useful "phrasal formulas for research papers" (p. 58). Research by Cortes (2004) has examined use of lexical bundles in corpora of research articles and student writing in history and biology. She identified the most common four-word lexical bundles in the research article corpus (e.g., *on the other hand, in contrast to the*) and then analyzed the student corpus to ascertain how these target bundles were used in student writing. Lexical bundles in history tended to fall into two structural groups (noun phrases and prepositional phrases), while the lexical bundles in biology were more structurally variable. The student-written history and biology texts contained fewer target lexical bundles, and the bundles were often used differently in the student texts than in

the research articles. These results suggest that use of these bundles by both L1 and L2 English-speaking students may require some guidance and that this may be an area that has been neglected in writing training.

The subtle language cues involved in crafting a text that includes statements appropriately modified to reflect their strength can also be difficult for second language writers to learn, even from model texts. Hyland (2000) gave a reading task with a set of questions about particular sentences to a group of English L2 undergraduates. The task was designed to test the participants' attention to hedges (qualifications used to soften statements) and boosters (terms used to make a statement stronger) within the text and what meanings those devices brought to the statements. The participants were also interviewed in a retrospective think-aloud protocol. Overall, the students did not notice many of the boosters and hedges, although they tended to be more successful at recognizing and interpreting boosters. Results suggest that these devices may be "invisible" (p. 179) to second language students (Hyland, 2000).

Some students may also have difficulty developing appropriate strategies to deal with certain writing tasks in content courses. Chimbganda (2000) focused on strategies used by a group of undergraduate biology students at an English-medium university in Botswana in writing responses to short-answer essay questions. Strategies used by the students in constructing their answers were classified as "risk taking," "risk avoiding," "second language based," or "semantic simplification" (p. 312). Risk taking and L2-based strategies were used by higher proportions of students whose answers were rated as average or better. Chimbganda concluded that the students who were willing to risk grammatical and other types of errors in order to work out a way to convey their meaning

were benefiting the most from strategy use, and these strategies should be emphasized for language learners. It should be noted that some of the students in the sample with poorly written responses were given good grades for their work if it contained correct information, consistent with the idea that language is not a significant consideration in writing for content classes (Evans & Morrison, 2010; Leki & Carson, 1997).

Finally, the use of other resources can be key to EFL/ESL students' success at the university level, and this might include seeking assistance at a university writing center. Traditionally, writing centers have been somewhat stigmatized, due in part to their origin at US universities as remedial centers. Williams and Takaku (2011) followed six undergraduate classes over eight years to look at relationships between help-seeking, self-efficacy, and writing center assistance. They found that while English L1 students had higher self-efficacy than English L2 students, the L2 students made more use of the writing center and earned significantly higher grades than the L1 students. Another interesting result to note was that students who sought help at the writing center received better grades overall than students who did not.

These studies show some of the particular challenges for EFL/ESL students in writing in different disciplines, as well as some of the strategies they may adopt for coping with these difficulties. Strategies and use of available resources can be important to student improvement in writing. This issue will be addressed in the current study.

Professor issues with second language writing. It is important to examine the roles of professors and their expectations in the development of undergraduate student writing abilities, as well as to consider student writing from the professors' point of view.

In her survey of faculty across disciplines in a US university, Eblen (1983) found that the reported problems in student writing could be categorized as either problems with communication or language and style issues. Under communication, organization of the writing was the most frequently reported problem, while basic writing conventions such as grammar, spelling, and punctuation were the major language problem. These results suggest that many of the issues commonly noted in the writing of EFL/ESL students may also be an issue for all students, although it is difficult to speculate on which students faculty may have had in mind when responding, as they were not asked specifically about EFL/ESL students.

Santos (1988) investigated the reactions of professors to writing by English L2 students. The professors, themselves a mix of English L1 and L2 users, were asked to rate two essays written by English L2 students on both content (using scales of holistic impression, development, and sophistication) and language (using scales of comprehensibility, acceptability, and irritation). On both essays, content was rated lower than language. This is consistent with other studies that have suggested that content is a higher priority in assessment of writing outside of English and writing classes (Chimbganda, 2000; Evans & Morrison, 2010; Leki & Carson, 1997). In language ratings, both essays received the highest marks for comprehensibility, followed by irritation, and the lowest marks were for acceptability. Professors in the sciences tended to rate acceptability lower than professors in the humanities and social sciences (grouped together in this study). Santos also observed that while science professors rated language lower, they did not tend to rate content lower than the humanities/social science professors. Age and language status of the professors were shown to affect their ratings.

Older professors tended to show less irritation and professors who were non-native speakers of English tended to give lower acceptability ratings.

In Huang's (2010) questionnaire study of Canadian professors and ESL students, the professors rated 35 out of 45 skills listed as needing improvement in their undergraduate students, and ten of those were writing skills. The top ten skills needing improvement from the professors' point of view included three writing skills: "produce writing that effectively summarizes and paraphrases the works and words of others," "organize writing in order to convey major and supporting ideas," and "demonstrate a command of standard written English, including grammar, phrasing, effective sentence structure, spelling, and punctuation" (p. 529). As noted previously, the undergraduates surveyed in this study did not rate any of the skills as needing improvement in their self-assessment. In Rosenfeld, Leung, and Oltman's (2001) study in the US, over a quarter of the faculty surveyed (29%) considered audience awareness and ability to write for a particular audience as unnecessary for an undergraduate chemistry student. Only one writing skill was in the top ten rated skills by the faculty, although all skills were rated as important.

Ganobcsik-Williams (2004) conducted a survey and interviews of faculty across multiple universities in the United Kingdom, focusing on academic writing in the disciplines of education, English, engineering, and counseling. Ninety-eight percent of respondents indicated that they expected students to show substantial improvement in writing by the time they graduated. Among the characteristics of writing expected to improve in the course of the students' education were ability to formulate arguments, write appropriately for a specified audience, and use "language and argumentative

structures appropriate to disciplinary conventions" (p. 13). A number of different types of tasks were included in the assignments reported, but the most common tasks were essays, essay examinations, case studies, and extended dissertations. A majority of respondents did spend time discussing writing with students, but it was not clear from the questionnaires how many professors only met with students having problems with writing. Interview responses suggested that most one-on-one interaction with students regarding writing was targeted to weaker writers. Approximately half of the respondents felt that quality of student writing had decreased during the time they had been teaching.

In Nesi and Gardner's (2006) interview study in the United Kingdom, faculty across disciplines expressed the opinion that undergraduate writing should progress toward greater similarity to professional journal articles, especially on assignments in the research-academic genres. Faculty views on the characteristics of good student writing were fairly similar across disciplines and consistent with the findings of Ganobcsik-Williams (2004). Argument, clarity, originality, and style were among the characteristics that faculty were interested in when assessing student writing. It was noted that while a number of characteristics of good writing were valued across very different disciplines, the professors' expectations also included writing appropriately for their particular field.

Zhu (2004) conducted an interview study with professors from the fields of engineering and business regarding student writing and its place in their respective disciplines. These disciplines were chosen because they tend to be popular concentrations for international students. Faculty in both fields affirmed that writing was important in their areas, particularly at the professional level. Business faculty generally believed that the importance of emphasizing writing in education was recognized, but not

necessarily always acted on in curriculum planning, while the engineering faculty expressed the view that writing was not emphasized enough in the curriculum. Some engineering faculty indicated that students were not very interested in writing because they failed to recognize its importance in their future careers. One professor even said he kept writing assignments short because students were not interested, also pointing out, "Again, remember we are engineers. We are not English majors" (p. 36). They did acknowledge that they should have some responsibility in training the students to write, but considered this less important than teaching content.

Previous work on writing in the disciplines has been conducted at AUC (Arrigoni, 1998). Professors across all departments were surveyed about writing tasks in their courses (tasks from Eblen, 1983) and the writing of their students. A variety of writing tasks were assigned in the science and engineering departments overall, including essay tests, analytical papers, abstracts of readings, documented papers, essays/themes, journals, laboratory reports, case reports, and technical reports. It is more difficult to generalize about the attitudes of the science and engineering professors about their students' writing due to the small numbers of respondents from each department, but overall, professors across disciplines found lack of organization and critical thinking to be significant problems with student writing.

Professor views on student writing are important because they may impact the additional instruction or guidance that students will receive. In the disciplines, professors are also the more senior members of the discourse community, so they are likely to have mastered at least some aspects of communication in their chosen fields. In this way, they become the judges of the discourse of the newer members of the community.

Conclusion

Academic writing refers to many different types of discourse that vary across the disciplines. While programs like WAC have placed the focus on writing as a learning tool and brought a greater emphasis on writing to certain disciplines, the shift to WID has highlighted the need to address the differences that exist within the category of academic writing. The literature has shown that differences in discourse communities, writing characteristics, and typical writing tasks in the university setting support the idea that writing in the disciplines requires some level of discipline-specific instruction in writing. Some programs developed under WAC to focus on writing in the sciences have been described in the literature, but there is little follow up on the success of the programs or the impressions of students and professors of how student writing has been impacted. Few studies examine L2 writing in the disciplines, and much of what has been reported in the literature on L2 academic writing originates in ESL settings.

This study aims to describe both student and professor perceptions of L2 undergraduate academic writing in science and engineering in an EFL setting.

CHAPTER 3

METHODOLOGY

This study was a mixed methods descriptive study. This design was chosen because the information needed to answer the research questions would be best obtained through questionnaires and interviews.

Participants

This was a convenience sample from the School of Sciences and Engineering (SSE) at AUC. Declared majors in the science and engineering programs in the junior and senior year were the preferred target population, based on the assumption that these students will be taking or will have already taken some of the higher-level courses that are likely to require more writing. In order to try to ensure a higher response rate and for possible comparisons, all students majoring in the sciences and engineering were surveyed. Most of these students were Egyptian, but native English-speaking students in the target population were also included. While the sample was not necessarily representative of a population of L2 science and engineering majors in English-medium universities, it is possible that some findings may have implications for other contexts. Data from the AUC Office of Institutional Research as of Fall 2010 indicated that there were 312 juniors and 457 seniors majoring in science and engineering fields during the 2010-2011 school year, for a total of 769 students in the preferred target population (Appendix A).

Professors were invited to participate based on responses to the questionnaire in the pilot study done in the spring of 2011. If the student participants listed classes that they had found useful in improving their academic writing, the current professors of those

classes were contacted. Recommendations of professors to interview were also solicited from the instructor of the Technical Writing course in the Rhetoric and Composition department. In addition, some faculty interviewees made suggestions of other professors to contact. In all, 12 professors were contacted and five agreed to be interviewed. One interview was ultimately conducted via electronic mail due to schedule constraints. Written informed consent was obtained from all interviewees.

Instruments

Student questionnaire. The student questionnaire (Appendix B) consisted of a short section asking for demographic information including age, gender, nationality, year of study at AUC, native language, and major. Participants were also asked to identify the writing courses they have taken in the AUC English Language Institute and the department of Rhetoric and Composition in order to ascertain what formal writing instruction they have received since commencing their studies. In addition, participants were asked to identify different types of writing assignments they have done in courses in their major. Assignment labels were based on those used in previous studies, including a study at AUC (Arrigoni, 1998; Eblen, 1983).

The demographic section was followed by a series of statements and open-ended items. There were 35 closed items to be rated on a 5-point Likert scale for either agreement or frequency. Twelve items were related to sub-question 1a (What are the students' attitudes about writing and the training they have received?), eight items were related to sub-question 1b (What strategies and resources are students using to assist them with their writing?), and 15 items were related to sub-question 1c (In what areas do students see their abilities as lacking?). Four open-ended items were also included.

This format was chosen mainly for its utility in obtaining a large amount of data from many participants and for ease of use and convenience for participants. Most of the closed items were developed specifically for this questionnaire, but some items were based in part on items that have appeared in other published questionnaire studies, particularly the items addressing students' perceptions of their abilities (Dalgety, Coll, & Jones, 2003; Huang, 2010; Leki & Carson, 1994; Pittam, Elander, Lusher, Fox, & Payne, 2009; Rosenfeld, Leung, & Oltman, 2001). Open-ended items were included in order to give participants the opportunity to give more in-depth information on their particular experiences.

Student interviews. Based on their questionnaire responses and willingness to be interviewed, a select number of participants were contacted for interviews. The interviews were semi-structured and focused in part on the responses participants gave on the open-ended questionnaire items. For example, based on a response to "What do you find most challenging in writing for classes in your major?" a participant might have been asked to discuss the response in more detail and give examples. Potential sample questions based on possible responses to open-ended items are provided in Appendix C. Due to the range in both year of study and experiences of the interviewees, the original student interview guide questions, based on potential responses to the open-ended survey questions, were not always relevant. Consequently, they were modified or eliminated in favor of other questions, depending on the survey responses of the individual interviewee. These changes made categorizing the interview data difficult; instead, the data are organized in themes related to the research questions.

Administering a set of semi-structured interviews with a limited number of participants was intended to obtain more detailed information about the participants' perceptions and attitudes about their academic writing as well as to give the researcher an opportunity to obtain clarification on questionnaire items if needed.

Professor interviews. Professor input on the research questions was obtained through semi-structured interviews. The semi-structured format was chosen as a way to collect information-rich data from professors regarding their views on students' academic writing in their respective fields. Ten questions were developed for these interviews (Appendix D). Six questions were related to sub-question 2a (What are the professors' expectations of their students' writing?), and four questions were related to sub-question 2b (What do professors see as the strengths and weaknesses of their students' writing?). Some of these questions were adapted from the interview guide used in Zhu's semi-structured qualitative interviews with business and engineering faculty regarding student academic writing (2004).

Procedures

The student questionnaire was administered online and distributed through AUC email lists. In order to try to increase response rates, the researcher contacted professors including professors participating in the study and other professors at their suggestion, for help in disseminating information about the study in classes and via email. The researcher visited five classes in three different departments to try to encourage more participation. There was an opportunity at the end of the questionnaire for student participants to provide contact information if they were willing to be interviewed. Interviews were recorded and transcribed.

Professor data was collected via semi-structured interview. Professors teaching in the SSE departments were contacted by email about their willingness to participate in the study. Interviews were recorded and transcribed.

Data Analysis

In order to answer the first research question concerning student perceptions of their preparedness for academic writing in the science and engineering majors, data were needed on the students' attitudes toward writing and the writing training they have received at AUC, use of strategies and resources that have helped them with writing, and their perceptions of their own writing abilities. The numerical data generated by the closed questionnaire items were analyzed by descriptive statistics. Verbal data generated by the questionnaire items and collected in the interviews were organized into themes relating to the research sub-questions.

For the second research question, which focused on professor perceptions of student preparedness for academic writing in the science and engineering majors, data were needed on the professors' expectations of student writing and their perceptions of areas in which student writing needs improvement. Verbal data generated by the interviews was coded by the researcher. The coding scheme was developed based on the responses received.

This was an exploratory study, but possible findings were conjectured from the related literature prior to data collection and are described below.

While the science and engineering majors are generally not viewed as writing-intensive at the undergraduate level, previous research at AUC has suggested that a substantial amount of writing, including essay exams, is assigned across the disciplines.

In fact, some engineering departments assign more writing than some humanities and social science departments (Arrigoni, 1998). It is possible that this study will find that by the junior and senior years, students generally feel adequately prepared for their academic writing and not in need of improvement. Huang's questionnaire study suggested that the students largely felt that they were not in need of improvement of language skills, including writing skills (2001), while participants in a longitudinal study by Evans and Morrison (2010) indicated that writing at a Hong Kong English medium university indicated that writing was a major difficulty during their studies. On the other hand, participants in Leki and Carson's (1994, p. 89) study of ESL undergraduates felt that they were adequately prepared for their content courses, but among the top items suggested for improvement of the ESL writing program was "discipline-specific needs", suggesting that some students did not feel adequately prepared for some aspects of writing in their content classes. Either outcome is a possibility in this study, and if there are enough respondents across the departments, it is also possible that different trends might be seen in different majors. If students are comfortable with their writing, it is unlikely that very many of them will report using resources available on campus for writing assistance. It is also possible that social acceptability factors will interfere with student reporting on their own abilities and use of resources.

It has been noted anecdotally that some students at AUC may be drawn to these majors because their writing in English is weak, and they want to avoid having to do a great deal of it. It would be difficult to ascertain if this is a contributing factor to the choice of major for these students, but inclusion of items on students' attitudes toward writing may shed some light on this issue. In fact previous research has suggested that

students with high apprehension about writing tend to choose majors that are perceived as involving less writing (Daly & Shamo, 1978). Relatedly, if some science and engineering majors do feel that their writing is weak, it will be important to note their use of resources to help them.

Professors in the science and engineering departments may be critical of their students' writing, either for weaknesses of grammar, mechanics, or discourse. Faculty at an English medium university in Singapore criticized their students for weakness in critical evaluation (Allison & Mei, 2001). It will be important to note in the current study if professors' perceptions line up with those of their students. In Huang's (2010) study, while the undergraduates overall felt that their language skills were adequate, their professors rated the majority of the language skills in question as being in need of improvement.

Alternatively, it is possible that the SSE professors will not place a great deal of importance on writing skills at the undergraduate level. In a survey of undergraduate faculty at Canadian and US universities, skills rated highest in importance were mainly reading and listening skills (Rosenfeld, Leung, & Oltman, 2001). While the engineering faculty that Zhu (2004) interviewed felt that writing was an important professional skill, they did not think that it was emphasized very much in engineering coursework.

CHAPTER 4

RESULTS

The overall aim of the study was to examine the attitudes of undergraduate SSE students and their professors regarding the technical writing abilities and training of the students. Data from students were collected through a questionnaire including both Likert scale and open-ended items distributed early in the Spring 2012 semester and subsequent follow-up interviews. Data from professors were collected through interviews.

Questionnaire

The questionnaire (Appendix B) was posted on www.kwiksurveys.com in early February 2012 and distributed to undergraduate students majoring in a field in SSE via AUC email list. The initial distribution of the questionnaire link was to a total of 1515 students. The link was sent out again one week later to the same students as well as to undeclared undergraduates in order to reach students who might be planning to major in a science or engineering field and already be taking classes, but undeclared. The second email was sent to a total of 2975 students. Fifty-two students initiated work on the questionnaire, but only 27 questionnaires were completed. All participants who had at least started the Likert scale section of the questionnaire were included in the analysis, resulting in a total of 35 participants for a response rate of 1.18%. Written informed consent was obtained from each respondent as part of the questionnaire.

Demographics. Eighteen males and 17 females were included in the analysis. Demographic data are shown in Table 1. The participants ranged from 16 to 23 years of age. Twelve were freshmen, five sophomores, eight juniors, seven seniors, and three

graduating seniors (students who had spent more than four years on their degree and were in the final year). Although students in the junior year and above were the preferred target population, there were similar numbers of these students compared with freshmen and sophomores. Most participants (29/35) identified themselves as Egyptian, with two more identifying as Egyptian-American, and one each identifying as Egyptian-Irish, Lebanese, Moroccan, or unspecified. The majority (31/35) were native speakers of Arabic, and the remaining four were native English speakers. Twenty-eight had attended private high schools, and seven had attended public schools.

Table 1

Demographics of the Questionnaire Respondents

Characteristic	n
Sex	
Male	18
Female	17
Age (y)	
Mean (SD)	19.24 (1.5)
Range	16-23
Nationality	
Egyptian	29
Egyptian-American	2
Egyptian-Irish	1
Lebanese	1
Moroccan	1
Unspecified	1
Native Language	
Arabic	31
English	4
Type of secondary school attended	
Private	28
Public	7
Year of study	
Freshman	12
Sophomore	5
Junior	8
Senior	7
Graduating Senior	3

Majors represented by the participants including architectural engineering, biology, chemistry, computer engineering, computer science, economics, electronics engineering, mechanical engineering, Management Information and Communication Technology (MICT), and petroleum and energy engineering. Although economics and

MICT are not majors in SSE, these two respondents were included in the analysis in order to increase numbers. Previously, the inclusion of two social science majors in the analysis of the pilot study did not affect the results. Total numbers of participants from each represented major are shown in Table 2.

Table 2

Majors of the Undergraduate Participants

Major	*n*
Architectural Engineering	5
Biology	7
Chemistry	1
Computer Engineering	2
Computer Science	2
Economics	1
Electronics Engineering	6
Mechanical Engineering	8
Management Information and Communication Technology (MICT)	1
Petroleum Engineering	3
Double Majors	2

Note. One of the double majors was majoring in two engineering disciplines and was counted once in each category.

Twelve of the participants had taken at least one class in the ELI before taking the required series of classes in the Rhetoric and Composition department. Nine participants responded that they had taken or planned to take Technical Writing (RHET 321). Fifteen participants reported having used the Writing Center (Table 3).

Table 3

Writing-Related Courses Taken and Writing Center Use

Characteristic	*n*
Courses Taken in English Language Institute and Rhetoric & Composition	
English 98	1
English 99	2
English 100	11
Rhetoric & Composition 101	22
Rhetoric & Composition 102	29
Rhetoric & Composition 201	24
Taken or planning to take Technical Writing (RHET 321)	
Yes	9
No	25
Use of the Writing Center	
Yes	15
No	20

Participants were asked about the types of writing assignments they had done in classes in the department of their majors. Choices included laboratory or technical report, essay examination, research paper, summary or abstract of readings, journal, annotated bibliography, and review article. Participants were also given the option of writing in additional types of writing assignments. One participant listed a progress report. The total numbers of participants who had done each type of writing assignment are shown in Figure 1.

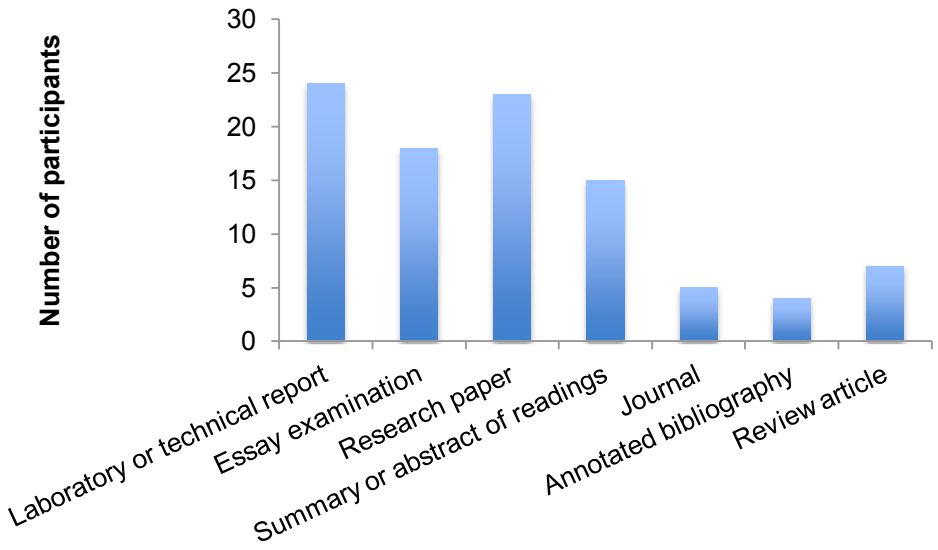

Figure 1. Writing assignments the participants reported having been assigned in classes for their majors in SSE.

Laboratory or technical reports and research papers were the most common writing assignments that these participants had encountered, while the journal and annotated bibliography were familiar to the fewest participants.

Finally, the participants were asked to rate themselves as technical writers. The responses are shown in Figure 2. A large majority of participants rated themselves as good or fair, with very few selecting excellent or poor.

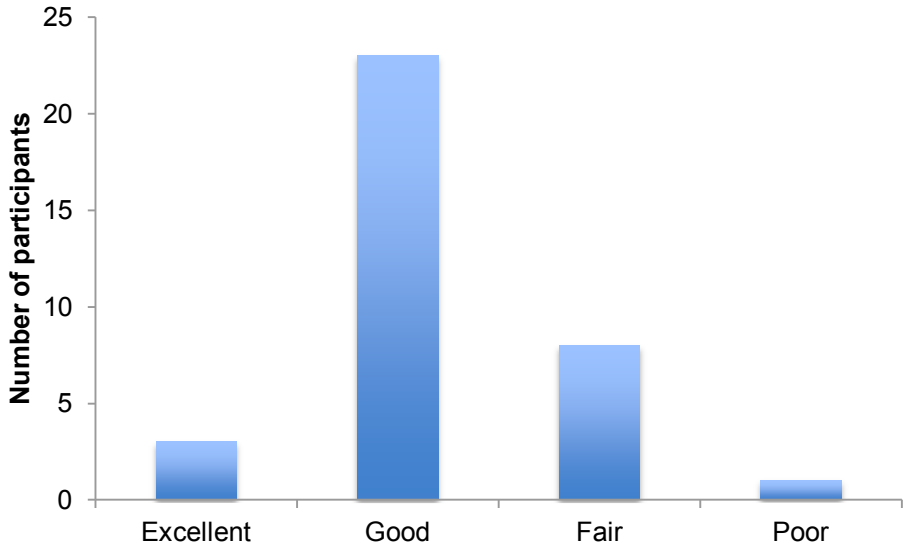

Figure 2. Participants' self-assessment of their technical writing skills.

Likert scale items. Based on the pilot study results and changes made to the questionnaire in the interim period, items 7 (The amount of writing assigned in my major was more than I expected), 10 (I would prefer to do less writing in the classes required for my major), 20 (I find it difficult to write in English for the classes in my major), and 23 (Difficulties with writing have affected my grades in classes for my major) were reverse scored for the correlation and reliability analysis of the Likert scale items. In the analysis of the pilot study, item 8 (Too much emphasis is placed on writing at AUC) was also reverse scored, based on the wording. However, upon additional review of the items, it seemed possible that the wording of item 8 might be unclear, so it was rewritten for the final questionnaire as: "More emphasis should be placed on writing at AUC." The final item was determined to not need reverse scoring.

Pearson's correlation was used to look at the behavior of each item relative to the whole questionnaire, as well as to look at the individual sections of the questionnaire

designed to answer the three research sub-questions. For each item correlated with the item total and total average, all of the values were positive, suggesting that the correct items were chosen to be reverse scored (Table 4).

Table 4

Correlations of Items with Item Totals and Total Averages for All Likert Scale Items

Item		Item Total	Total Average	Item		Item Total	Total Average
1	Pearson Correlation	.510	.670	19	Pearson Correlation	.467	.487
	Significance (2-tailed)[2]	.002	.000		Significance (2-tailed)	.006	.004
	N	35	35		N	33	33
2	Pearson Correlation	.281	.524	20	Pearson Correlation	.452	.545
	Significance (2-tailed)	.102	.001		Significance (2-tailed)	.008	.001
	N	35	35		N	33	33
3	Pearson Correlation	.588	.594	21	Pearson Correlation	.423	.528
	Significance (2-tailed)	.000	.000		Significance (2-tailed)	.013	.001
	N	35	35		N	34	34
4	Pearson Correlation	.530	.553	22	Pearson Correlation	.488	.513
	Significance (2-tailed)	.001	.001		Significance (2-tailed)	.003	.002
	N	34	34		N	34	34
5	Pearson Correlation	.361	.499	23	Pearson Correlation	.275	.327
	Significance (2-tailed)	.033	.002		Significance (2-tailed)	.116	.059
	N	35	35		N	34	34
6	Pearson Correlation	.376	.550	24	Pearson Correlation	.454	.560
	Significance (2-tailed)	.026	.001		Significance (2-tailed)	.007	.001
	N	35	35		N	34	34
7	Pearson Correlation	.138	.079	25	Pearson Correlation	.144	.160
	Significance (2-tailed)	.437	.657		Significance (2-tailed)	.409	.360
	N	34	34		N	35	35
8	Pearson Correlation	.246	.287	26	Pearson Correlation	.278	.424
	Significance (2-tailed)	.161	.100		Significance (2-tailed)	.106	.011
	N	34	34		N	35	35
9	Pearson Correlation	.105	.179	27	Pearson Correlation	.599	.587
	Significance (2-tailed)	.556	.311		Significance (2-tailed)	.000	.000
	N	34	34		N	35	35
10	Pearson Correlation	.101	.129	28	Pearson Correlation	.399	.312
	Significance (2-tailed)	.582	.481		Significance (2-tailed)	.026	.087
	N	32	32		N	31	31
11	Pearson Correlation	.415	.533	29	Pearson Correlation	.418	.456
	Significance (2-tailed)	.015	.001		Significance (2-tailed)	.022	.011
	N	34	34		N	30	30
12	Pearson Correlation	.493	.520	30	Pearson Correlation	.318	.483
	Significance (2-tailed)	.003	.002		Significance (2-tailed)	.081	.006
	N	34	34		N	31	31
13	Pearson Correlation	.550	.570	31	Pearson Correlation	.147	.135
	Significance (2-tailed)	.001	.000		Significance (2-tailed)	.440	.475
	N	34	34		N	30	30
14	Pearson Correlation	.539	.545	32	Pearson Correlation	.572	.574
	Significance (2-tailed)	.001	.001		Significance (2-tailed)	.001	.001
	N	34	34		N	30	30
15	Pearson Correlation	.660	.643	33	Pearson Correlation	.335	.321

[2] Significance is assumed to be $p < .05$. Significance was not a focus of the correlation analyses, but is included here for completeness.

Item		Item Total	Total Average	Item		Item Total	Total Average
	Significance (2-tailed)	.000	.000		Significance (2-tailed)	.070	.083
	N	34	34		N	30	30
16	Pearson Correlation	.384	.398	34	Pearson Correlation	.412	.401
	Significance (2-tailed)	.025	.020		Significance (2-tailed)	.026	.031
	N	34	34		N	29	29
17	Pearson Correlation	.730	.706	35	Pearson Correlation	.403	.410
	Significance (2-tailed)	.000	.000		Significance (2-tailed)	.030	.027
	N	34	34		N	29	29
18	Pearson Correlation	.472	.532				
	Significance (2-tailed)	.005	.001				
	N	34	34				

For sub-questions 1a (What are the students' attitudes about writing and the training they have received?), 1b (What strategies and resources are students using to assist them with their writing?), and 1c (In what areas do students see their abilities as lacking?), each of the individual items included in each section correlated positively with the item total and total average for the section, and these correlations are shown in Tables 5, 6, and 7.

Table 5

Correlations of Items with Item Totals and Total Averages for Sub-question 1a Likert Scale Items

Item		Item Total	Total Average
1	Pearson Correlation	.613	.706
	Significance (2-tailed)	.000	.000
	N	35	35
2	Pearson Correlation	.357	.522
	Significance (2-tailed)	.035	.001
	N	35	35
3	Pearson Correlation	.716	.710
	Significance (2-tailed)	.000	.000
	N	35	35
4	Pearson Correlation	.538	.542
	Significance (2-tailed)	.001	.001
	N	34	34
5	Pearson Correlation	.492	.592
	Significance (2-tailed)	.003	.000
	N	35	35
6	Pearson Correlation	.553	.636
	Significance (2-tailed)	.001	.000
	N	35	35
7	Pearson Correlation	.133	.136
	Significance (2-tailed)	.453	.444
	N	34	34
8	Pearson Correlation	.555	.575

Item		Item Total	Total Average
	Significance (2-tailed)	.001	.000
	N	34	34
9	Pearson Correlation	.268	.294
	Significance (2-tailed)	.126	.092
	N	34	34
10	Pearson Correlation	.228	.269
	Significance (2-tailed)	.209	.137
	N	32	32
11	Pearson Correlation	.465	.480
	Significance (2-tailed)	.006	.004
	N	34	34
31	Pearson Correlation	.239	.190
	Significance (2-tailed)	.203	.316
	N	30	30

Table 6

Correlations of Items with Item Totals and Total Averages for Sub-question 1b Likert Scale Items

Item		Item Total	Total Average
25	Pearson Correlation	.252	.383
	Significance (2-tailed)	.144	.023
	N	35	35
27	Pearson Correlation	.456	.634
	Significance (2-tailed)	.006	.000
	N	35	35
28	Pearson Correlation	.489	.542
	Significance (2-tailed)	.005	.002
	N	31	31
30	Pearson Correlation	.421	.576
	Significance (2-tailed)	.018	.001
	N	31	31
32	Pearson Correlation	.548	.567
	Significance (2-tailed)	.002	.001
	N	30	30
33	Pearson Correlation	.602	.596
	Significance (2-tailed)	.000	.001
	N	30	30
34	Pearson Correlation	.670	.649
	Significance (2-tailed)	.000	.000
	N	29	29
35	Pearson Correlation	.632	.649
	Significance (2-tailed)	.000	.000
	N	29	29

Table 7

Correlations of Items with Item Totals and Total Averages for Sub-question 1c Likert Scale Items

Item		Item Total	Total Average
12	Pearson Correlation	.576	.562
	Significance (2-tailed)	.000	.001
	N	34	34
13	Pearson Correlation	.673	.664
	Significance (2-tailed)	.000	.000
	N	34	34
14	Pearson Correlation	.684	.668
	Significance (2-tailed)	.000	.000
	N	34	34
15	Pearson Correlation	.816	.808
	Significance (2-tailed)	.000	.000
	N	34	34
16	Pearson Correlation	.435	.432
	Significance (2-tailed)	.010	.011
	N	34	34
17	Pearson Correlation	.823	.802
	Significance (2-tailed)	.000	.000
	N	34	34
18	Pearson Correlation	.721	.726
	Significance (2-tailed)	.000	.000
	N	34	34
19	Pearson Correlation	.577	.595
	Significance (2-tailed)	.000	.000
	N	33	33
20	Pearson Correlation	.652	.662
	Significance (2-tailed)	.000	.000
	N	33	33
21	Pearson Correlation	.699	.700
	Significance (2-tailed)	.000	.000
	N	34	34
22	Pearson Correlation	.610	.592
	Significance (2-tailed)	.000	.000
	N	34	34
23	Pearson Correlation	.480	.508
	Significance (2-tailed)	.004	.002
	N	34	34
24	Pearson Correlation	.539	.581
	Significance (2-tailed)	.001	.000
	N	34	34
26	Pearson Correlation	.452	.562
	Significance (2-tailed)	.006	.000
	N	35	35
29	Pearson Correlation	.375	.355
	Significance (2-tailed)	.041	.054
	N	30	30

The item totals and total averages of each section also correlated positively with the item total and total average for the entire questionnaire (Table 8).

Table 8

Correlations of Item Total and Total Average Likert Scale Section with Item Totals and Total Averages for Each Sub-question

		Questionnaire Item Total	Questionnaire Total Average
Sub-question 1 Item Total	Pearson Correlation	.843	.784
	Significance (2-tailed)	.000	.000
	N	35	35
Sub-question 1 Total Average	Pearson Correlation	.716	.840
	Significance (2-tailed)	.000	.000
	N	35	35
Sub-question 2 Item Total	Pearson Correlation	.757	.522
	Significance (2-tailed)	.000	.001
	N	35	35
Sub-question 2 Total Average	Pearson Correlation	.648	.694
	Significance (2-tailed)	.000	.000
	N	35	35
Sub-question 3 Item Total	Pearson Correlation	.848	.782
	Significance (2-tailed)	.000	.000
	N	35	35
Sub-question 3 Total Average	Pearson Correlation	.613	.811
	Significance (2-tailed)	.000	.000
	N	35	35

Cronbach's alpha was used to calculate the reliability of the questionnaire (Table 9). With the aforementioned items reverse scored, $\alpha = .857$. Reliability was also calculated without the reverse scoring, and $\alpha = .819$. In both cases, Cronbach's alpha was based only on the 24 complete responses included in the analysis.

Table 9

Questionnaire Reliability

	Cronbach's α
Without reverse scoring	.819
With reverse scoring of items 7, 10, 20, and 23	.857

Descriptive statistics were performed for the Likert scale items on the questionnaire. The highest mean (with standard deviations in parentheses) levels of

agreement were 1.77 (.97) for item 1, "Writing is important to my academic success at AUC," and 1.86 (.94) for item 5, "I enjoy writing about topics that interest me." The strongest mean (with standard deviation in parentheses) levels of disagreement were 3.53 (1.01) on item 31, "My professors have provided comments on style and grammar as well as the content of my writing," and 3.46 (1.22) on item 33, "I have asked for help from my professor(s) for writing assignments I do not understand."

Grouping the means by sub-question, the means (with standard deviations in parentheses) for items related to sub-question 1a range from 1.77 (.97) for item 1, "Writing is important to my academic success at AUC," to 3.53 (1.01) for item 31, "My professors have provided comments on style and grammar as well as the content of my writing" (Table 10). The mean for item 31 was the only one above three, except for two reverse-scored items, suggesting that the participants generally have positive attitudes about both writing and the training they have received at AUC.

Table 10

Descriptive Statistics for Sub-question 1a (Student Attitudes About Writing and the Training They Have Received)

Item	N	Minimum	Maximum	Mean	SD
1 - Writing is important to my academic success at AUC.	35	1.00	5.00	1.77	.97
2 - Writing is important to professional success in my career.	35	1.00	3.00	1.91	.74
3 - Previous writing classes have helped me with writing assignments in classes required for my major.	35	1.00	5.00	2.43	1.07
4 - Assigned readings in my classes have included original journal articles as examples of writing in my field.	34	1.00	5.00	2.91	1.19
5 - I enjoy writing about topics that interest me.	35	1.00	4.00	1.86	.94
6 - I have had adequate opportunities to write in the field of my major.	35	1.00	5.00	2.89	1.11
7 - The amount of assigned writing in my major is more than I expected.	34	1.00	5.00	3.32	0.94
8 - More emphasis should be placed on writing at AUC.	34	1.00	5.00	2.68	1.01
9 - The sense of authorship I feel about papers I have written is important to me.	34	1.00	4.00	2.15	.99
10 - I would prefer to do less writing in the classes required for my major.	32	1.00	5.00	3.10	1.04
11 - My professors provide clear guidelines for writing assignments.	34	1.00	4.00	2.56	.89
31 - My professors have provided comments on style and grammar as well as the content of my writing.	30	2.00	5.00	3.53	1.01

For sub-question 1b, the means (with standard deviations in parentheses) ranged from 2.32 (.79) for item 28, "On essay examinations, I spend time planning my answer before writing," to 3.47 (1.22) for item 33, "I have asked for help from my professor(s) for writing assignments I do not understand" (Table 11). The range for these items was

higher overall, suggesting that participants may not be making full use of the strategies and resources available to help them with their writing.

Table 11

Descriptive Statistics for Sub-question 1b (Strategies and Resources that Students Use to Assist Them in Their Writing)

Item	N	Minimum	Maximum	Mean	SD
25 - Professors in the department of my major have been willing to assist me with my writing.	35	1.00	5.00	3.17	.79
27 - Reading journal articles in my field has helped my writing.	35	1.00	5.00	2.60	.98
28 - On essay examinations, I spend time planning my answer before writing.	31	1.00	4.00	2.32	.79
30 - The instructions given by professors are clear and help me understand the task requirements.	31	1.00	5.00	2.35	.84
32 - The professors clearly explain their expectations and scoring criteria.	30	1.00	5.00	2.63	1.03
33 - I have asked for help from my professor(s) for writing assignments I do not understand.	30	1.00	5.00	3.47	1.22
34 - The Writing Center is a good resource for assistance with writing assignments.	29	1.00	5.00	2.93	1.25
35 - I have looked at examples of writing in my field to help me with my writing assignments.	29	1.00	5.00	2.97	1.32

For the final sub-question, the means (with standard deviations in parentheses) ranged from 1.92 (.75) for item 17, "I can paraphrase and accurately cite sources," to 4.09 (1.10) for item 20, "I find it difficult to write in English for the classes in my major"

(Table 12). These results suggest that the participants are fairly confident in their abilities.

Table 12

Descriptive Statistics for Sub-question 1c (Student Perceptions of Their Own Writing Abilities)

Item	N	Minimum	Maximum	Mean	SD
12 - I understand the purpose of each section of a research article.	34	1.00	5.00	2.41	1.02
13 - I consider my audience when I am writing.	34	1.00	5.00	2.09	1.03
14 - I can logically organize my ideas into a research paper.	34	1.00	4.00	1.94	.78
15 - I can support my ideas with appropriate sources.	34	1.00	4.00	2.00	.92
16 - I am familiar with using hedges (such as seem, might, or appear) to “soften” the impact of a statement.	34	1.00	4.00	2.15	.89
17 - I can paraphrase and appropriately cite sources.	34	1.00	4.00	1.91	.75
18 - I can present data in appropriate tables and figures.	34	1.00	4.00	2.09	1.06
19 - I am comfortable with the vocabulary commonly used in the subject of my major.	33	1.00	4.00	2.06	.79
20 - I find it difficult to write in English for the classes in my major.	33	1.00	5.00	4.09	1.10
21 - I am comfortable with describing experimental procedures in writing.	34	1.00	4.00	2.06	.69
22 - I can relate the results of an experiment to relevant literature.	34	1.00	4.00	2.50	.86

Item	N	Minimum	Maximum	Mean	SD
23 - Difficulties with writing have affected my grades in classes for my major.	34	1.00	5.00	3.71	1.36
24 - My writing reflects my thoughts and ideas.	34	1.00	4.00	2.06	.78
26 - I am a strong technical writer.	35	1.00	5.00	2.83	.82
29 - The writing tasks assigned are useful and similar to tasks I might encounter in a future job.	30	1.00	5.00	2.70	1.02

Open-ended items. The questionnaire also contained open-ended items that were answered by few participants. The overall purpose of including these items was to give participants an opportunity to say more about their own individual experiences in writing in their respective majors. The first open-ended item, "What do you find most challenging in writing for classes in your major?" was included to try to get a specific idea of what some students were finding difficult in technical writing, related to the third research sub-question, "What do students see as the strengths and weaknesses of their writing?" The next question, "Do you think that a writing class offered in the department of your major would be helpful? Why or why not?" addresses resources and whether or not the participants think that more could be done to help them with discipline-specific writing. The final two open-ended items, "Please list any classes you have taken in the department of your major that have improved your technical writing abilities," and "Please list any suggestions you have for new courses or changes to existing courses that would be helpful in improving writing for your major," were included to address participant attitudes about their current options in learning academic writing. The open-ended items were also the foundation for the sample student interview guide (Appendix C).

In response to the question, "What do you find most challenging in writing for classes for your major?" most of the participants focused on aspects of academic writing, including finding appropriate sources, moving between text and other data representations, writing a professional research paper, managing technical content, including all appropriate information and analysis, and tying all of the components together. Others were concerned with external factors such as time, not having a grading scheme, and knowing the professor's expectations. One participant, a biology major, was apparently generally frustrated with writing and responded, "Everything!!!"

Participants were also asked if they thought a writing class offered in the department of their major would be helpful. Of those who responded, 17 said yes, and nine responded no. Among participants who responded positively and gave reasons, all either expressed the opinion that it would be useful for writing later in college and in their careers, or were interested in learning specialized technical writing for their field of choice. Three of the participants who responded negatively felt that the current offerings of the Rhetoric and Composition department, including Technical Writing, were sufficient. Another participant did not think a department-specific writing class would be helpful because all professors have different standards. Other reasons given for why a department-specific writing class would not be helpful included lack of writing in some majors, concern that it would lower grades, and that writing was not that difficult.

Finally, the participants were also asked to list any suggestions they had for new courses or improvements to existing courses. Engineering specific suggestions were an engineering-specific writing course, having professional engineers come to classes to talk about the role of writing in their work, and technical writing seminars in the introductory

engineering course. Another suggestion from a double major in architectural engineering and art was more instruction on linking writing to visual forms, such as drawings and photographs, and vice versa. A less enthusiastic response came from an electronics engineer, "None just keep it as it is. Please think of adding technical courses not writing and stupid core courses." A biology major suggested that students should be taught how to write before being assigned essays.

Student Interviews

Nine students who completed the questionnaire agreed to be contacted for interviews. All nine students were contacted via email and six agreed to be interviewed. The interviews ranged from approximately 10-25 minutes in length. Demographic information about the interviewees, including the code used to refer to them in the text, is reported in Table 13.

Table 13

Demographic Data of Student Interviewees

Reference Code	Sex	Age (y)	Major	Nationality	Native Language	Year of study
ME1	M	21	ME	Egyptian	Arabic	Senior
CS	F	20	CS	Egyptian	Arabic	Senior
EE	M	20	EE	Egyptian	Arabic	Senior
PE	M	18	PE	Egyptian-American	English	Freshman
ME2	M	19	ME	Moroccan	Arabic	Sophomore
AE	F	23	AE	Egyptian	Arabic	Graduating Senior

Note. M = male; F = female; ME = mechanical engineering; CS = computer science; EE = electronics engineering; PE = petroleum engineering; AE = architectural engineering. Graduating Senior = student who has spent additional time on the degree and is in the final year

Emphasis on writing. Based on the student interviews, there was variation across and within disciplines in the level of emphasis placed on writing. The students in their early years of study had not had as much experience, although the freshman in

petroleum engineering (PE) had already written a research paper of approximately 1500 words, and the sophomore in mechanical engineering (ME2) had written weekly laboratory reports for Engineering 101, an introductory engineering course. A senior in mechanical engineering (ME1) reported mainly doing lab reports, projects, progress reports, and key performance indicators as writing assignments in mechanical engineering courses. The senior in computer science (CS) had done substantial writing for projects in certain classes. The senior in electronics engineering (EE) had barely done any writing and noted that the small amount of writing done for projects was not emphasized and was more of a formality:

> The main part of the project is the technical part and the mathematical part, how we going to design, how are we going to make things work? And mostly one of the students writes the report using Wikipedia. It's not focused; this is the smaller part of the project. How you can make things work is the main part, making things work already, you have received almost all the grade, and you're required maybe to write one page as a supplement…so that it is said that you have written a report, not to make sure that this report explains anything. We explain verbally to the professor what we have done, or how have we reached the results that we have reached so far. The reports are supplements as our names are under it. (EE)

A senior in architectural engineering had done some writing in her major, but said that more of her writing training came from her minor (Islamic architecture): "I feel that writing is important, and it lacks in my department, so I took Islamic architecture to make up for this. Not everyone does that" (AE). In architectural engineering, most of the writing was done on presentation boards and was considered fairly minimal:

It's, uh, mainly the writing is the concept. For example, like, the first part of the, of the presentation board is if it's about the concept, my ideas, how I came up with this, what's the process of the work. And, um, what's creative about this. And then later on, I'd put the plans or something, and then analysis. Just a small piece of analysis in front of every-, inspirational pictures maybe. Yeah, that's it. The rest of the thing is just pictures and datas and, eh, just a teensy weensy piece of introduction. And that's it. (AE)

Professor feedback and guidance. In mechanical engineering, ME1 commented that feedback on writing was nearly always focused on content rather than formatting or language. But for group projects, language might be commented on if multiple members of the group contributed to the writing:

Therefore, there are four different types of writing and four different uhh, levels of English writing in the same essay. Then certain professors will, uh, will deduct marks for that, like in the thesis, they told, they told us that they would do that. So we try to do, is we assign one person who takes everything and then tries to read through it and write it in one language and one format. So it doesn't sound kind of awkward when they go through it. (ME1)

By contrast, ME2, who had only taken general engineering courses but no mechanical engineering courses, observed that format seemed to be the most important aspect of the reports for his first engineering course, but that lab reports for his current class were being graded on all aspects by a strict teaching assistant.

AE also felt that there was not a great deal of concern about writing in architecture. She described where the focus would be for someone reviewing a

presentation board: “But they don't really focus on how you present your work in writing other than the, the board, how it looks, presentation, how it's organized, but not the, no one really reads what you have on the board” (AE).

In computer science, CS noted that professors often gave very useful feedback, but that students needed to be proactive in seeking it:

> …here at AUC, the education is like, the doctor gives everything in class and he does his best, but then, if you asked for more, you will be given. So when you're writing a document, if you keep it until the last minute, then it's your problem that you didn't have time to take feedback. But if you started working on it and asking the professors for feedback, what do you think about this diagram and this explanation--is that clear? Then they give you useful feedback, I think. (CS)

Class readings and examples of professional writing. The participants also reported variable experiences with assigned readings and examples of professional writing in their majors. Neither EE nor ME2 had been assigned readings, and EE stated that this was typical in his department:

> Mostly in the engineering departments, we are not even required to look into the lib-, go to the library and we are not required to look over the internet. It's very minor and even the books that we use--when we use the textbook it is more than enough. Even most of the courses we are not required to use the textbook for readings from the textbook. This is more than, more than the required, much more than the required when you read the textbook. Resources are not, I, I, I'm sure that no one in the engineering and the electronics engineering department uses resources for any of the courses; maybe for the thesis, I do not know. But

> I'm sure that no one uses any resources from the library or from the internet. Very minor applications or very minor researches. (EE)

PE reported that in at least one of his classes, the professor did show the students examples of data and graphs from research articles and had them work on interpreting them in class. One of the exams in the same course had been based on similar examples. CS started doing reading to support major projects in her advanced classes and her thesis, but reading assignments were largely absent from earlier classes in computer science. In architectural engineering, AE stated that there were readings in the syllabus, both from textbooks and journal articles, but readings were not stressed or even discussed in any of her classes except one. She also thought that the library was not often used by architectural engineering students: "In our department, they don't really force you to, to go to the library, so most of the students haven't even been in the library before. I've never been to the architecture section, except like twice" (AE).

Discipline-specific aspects and challenges of writing. The participants were also asked about some of the differences and challenges they had encountered in learning to write in their chosen discipline. Both ME1 and CS commented on the differences between technical writing in their respective disciplines and writing done in English classes or in other areas. ME1 represented writing in mechanical engineering as lacking a message:

> In mechanical engineering, it stresses most upon the technicalities, and then the conclusion is based the technicalities, so there is no actual message to be conveyed. But writing in mechanical engineering, I wouldn't call it writing as much, I would call it just throwing all your ideas on one piece of paper and

handing it to the professor and that's it. And they actually accept it, which is weird, compared to what we did in English. (ME1)

CS also saw technical writing as less expressive than writing in other areas:

> But the engineering or computer science kind of stuff is different because it doesn't have that space that makes you express yourself in a, in a way that you enjoy. So this space is the one that makes writing in engineering or science disciplines more rigid than writing in the social sciences. So I guess that's the big major difference. (CS)

Some challenges in technical writing that the participants mentioned included formatting of reports (particularly tables and graphs), finding sources, converting a visual design into words, and citation. EE pointed out that in electronics engineering, students were not taught how to write or format reports or how to construct tables and graphs properly. He also mentioned that he had learned some of it in secondary school, but when he applied that to work on assignments, he was questioned about why he had made tables that way. Since he was not offered any alternative ways of doing it, he concluded that no one in his department knew of the appropriate way to format data.

PE mentioned that conducting literature research was difficult, particularly since he was just starting out in his field. He expressed some frustration with professors who did not suggest possible resources, such as particular journals, for finding information: "It'd be nice if they pointed to some, some of the journals or some of the things that we should look at. […] If they can recommend some of these places and stuff, hint, hint, wink, wink, look here" (PE).

Although she did not find it difficult to write about her work, AE commented that some people in architectural engineering did have a problem with it. She also noted that because there were no courses dealing specifically with this issue, she would not know who would be the best professor to approach for help. Another area of difficulty that AE mentioned was citation:

> We have also a problem with the reference. They, we have works, we put our work, but we rarely reference them. That's a problem, I know, 'cause now in the thesis, every single picture, every single data, every single everything, you have to reference. But this is stressed now, not before. (AE)

Writing skills and resources. Interestingly, while two of the participants (ME2 and EE) reported having used the Writing Center in the past, both of them had used it for assignments in their Rhetoric and Composition courses, not for courses in their majors. PE, CS, and EE all mentioned ways in which they felt that the Rhetoric and Composition courses they had taken had proved to be useful. PE mentioned that the Rhetoric and Composition course on research writing, with its focus on compiling sources and narrowing topics, had been relevant and helpful in assignments in his petroleum engineering classes. CS stated that she had learned in Rhetoric and Composition classes how to organize her thoughts in order to construct paragraphs and essays. EE found consideration of the audience and outlining to be particularly useful:

> …it's the things that you think about that, as a normal person that did not take class. I did not think about the things that I learned when writing a paper. For example, uhhh, putting the audience in mind... This is very important, and I have never looked into this. Ummm, the second thing is uh, outlining. Outlining helps

me in, through all the papers, through all the core papers that I do. Uh, outlining helps a lot, and I think it helps a lot through the, anything that I'm going to write in the future. (EE)

As mentioned previously, the Rhetoric and Composition department offers RHET 321, Technical Writing, although it is not a requirement for most SSE majors. Of the six students who were interviewed, only one (ME1) had taken the course, although ME2 stated that he plans to take the class next year. The only other participant to mention the course was EE, who thought that none of the electronics engineering students had taken the course. ME1 reported that he had found the course very useful and still often referred back to the textbook for assistance with writing assignments. Learning the appropriate formats and style of referencing used in engineering were especially helpful to ME1. He also thought that Technical Writing should be a course requirement:

In English, it was, there had to be a series of thought. There had to be an output in the end. In engineering they don't stress upon it. That's why I think 321 should be compulsory. Because not only is it building you in the sense of writing, but it also teaches you how to write within your field.

Improvements in technical writing in the major. Some of the participants who had some experience with writing in their chosen discipline identified aspects of their technical writing that had improved as a result of assignments in certain classes.

CS's first real experiences with technical writing in computer science came in her Software Engineering class. She commented that it was difficult to organize the technical ideas logically in the same way she had been able to organize essays in Rhetoric and Composition classes, with the task of explaining diagrams while considering an audience

(such as a customer) who will not understand the diagrams without the right kind of explanation. CS felt that the work she did in that class helped her to improve in this area. The project she worked on in that class was also her first experience with doing research in the literature.

ME2 had not yet taken mechanical engineering classes that required him to write, but he had some experience with technical writing in two introductory engineering classes, Introduction to Engineering (ENG 101) and Strength of Materials (ENG 229). He commented that there was not anything in particular that had improved over other aspects of his writing, but that learning about the reports overall had been beneficial. He mentioned learning the steps of writing the reports and the importance of each of the sections that had to be included, from the abstract to the references.

Need for discipline-specific writing courses. Some of the participants were asked if they thought a writing course in the department of their major would be useful, and if so, what such a course ought to focus on. The idea was generally agreeable to the participants, who each had their own perspective on why a department-specific course would be needed and what it should offer.

CS stated that as computer science majors begin to write in their program, there is a tendency to write in a very repetitive manner in order to take up more space, and she explained why this was a problem that a writing class might help to solve:

> It's not that professional, and you're just doing your work, in, in a sneaky way to make it look big and neat and, and something appealing to the one who read it. But it, it, it doesn't work this way because when you work in a company with real customers, you can't, you can't have your technical writing that terrible. Some

> people have problems with writing, are not that great in writing in general, will be terrible and more terrible in technical writing, because if you have been writing something to, to, to explain different ways or to go around with it, in technical writing you don't have this. […] So I guess writing class can be helpful, especially if it's not just a technical writing for engineering students or for the science building. I guess every major made a technical writing course related to the majors, that would be very helpful to the students.

When asked at what point in the major a writing course should be taken, CS thought it would be better to take it earlier, even though many students might not appreciate the significance of it until they were taking more advanced courses and working on the thesis.

EE was interested in having a class that focused on writing professional reports, since the electronics engineering department does not currently emphasize writing. In a similar vein, ME2 thought that a writing class in mechanical engineering should emphasize the standards of writing professional reports, possibly linked to a course in which there was a project required to write the report on. He also noted the importance of communication in engineering:

> So we have a feel of the use of technical writing and, if, if you're gonna need that skill, I'm sure you're gonna need it like, for, uh, if you're going to work as a mechanical engineer. 'Cause, like, you're not a robot, like, uh, like, you have to communicate somehow with other people. (ME2)

AE was in favor of a writing class for architectural engineering students. She pointed out that there was an unsatisfactory ratio of students to professors in her

department, leading to a focus on the architecture courses without as much variety in the electives, and the electives have not included writing. She was of the opinion that writing in architecture is about marketing the design, and that is what an architecture-specific writing course should emphasize. She was also concerned about preparation for the thesis:

> They don't really prepare us well for the, for the thesis. And mostly the thesis, my thesis this semester, the first part is research. So it's all writing. So how can you link writing and data with architecture and visuals? We don't have that in architecture. We don't have a course. So we have to learn it on, on our own. (AE)

Attitudes about the significance of writing. Some of the participants made statements indicating their sense that writing had significance for them in their respective majors and beyond. ME1 related a cautionary tale he had heard about a student who got a job with a multinational company but was ultimately fired because he was unable to write reports in the expected format and style. CS was also looking ahead to employment and communicating with customers who might not have the technical know-how to understand all the aspects of what they had requested:

> The problem is basically in, in writing these technical stuff. If you're working in a software company and then you have to deliver these to your customers who might be asking for a website or an application and he doesn't have any idea about the technical details, you have to deliver the functionalities without being too technical nor too vague. So, that's the problem in writing. (CS)

On the other hand, AE commented that in previous work she had done, including an internship, everything was conducted in Arabic, so she did not think that writing in English would necessarily play a large role in her future work. However, she recognized that the language skills assumed to come with an AUC degree were at stake if students were not given sufficient training in writing:

> But I think that's important cause AUCians, what makes them better than the rest of this, general students, is our language and writing skills. So if we don't focus on this, we will lose one point of advantage, I guess. (AE)

Despite the participants' convictions that writing was important for their success, they were not convinced that their views were in the majority:

> I guess it's hard to convince the programming geeks and students in our major that you need writing. Because, yes, this is the fact, we have, we have in our major this programming geek culture, that you, you stick to your computer and you do ten hours of coding and you have a working system and wooooooo, I did it. But they can't write two pages--writing like thousands of lines of code is more fun than writing two pages of explaining that code. (CS)

> But like, I don't know, like, sadly like, for like, my friends, I think most of my friends wouldn't like another writing class. They'd be like, "Ahgh, I get it, writing, I get it" you know? So maybe I might be an exception. (ME2)

> (*Referring to an increased emphasis on reading and writing*) Definitely, for me. I know people will hate me if we do this. But yes, for me, 'cause I want to learn,

yes. I have said this before, and people would like, look at me and say, "No, this is just what you want. We don't want that." But, come on, you have to. (AE)

Professor Interviews

Eleven professors were invited to participate, and five agreed. The faculty participants came from mechanical engineering, architectural engineering, and computer science, and included one native English speaker. There were three females and two males. Years taught at AUC ranged from five to 11. Complete demographic information, including codes used to refer to each professor in the text, is shown in Table 14.

Table 14

Demographic Data of Professor Interviewees

Reference Code	Sex	Department	Years teaching at AUC	Nationality	Native Language
ME1P	M	ME	10	Egyptian	Arabic
AE1P	F	AE	5	Egyptian-Canadian	English
CS1P	M	CS	11	Egyptian	Arabic
ME2P	F	ME	5.5	Egyptian-American	Arabic
AE2P	F	AE	11	Egyptian	Arabic

Note. M = male; F = female; ME = mechanical engineering; CS = computer science; AE = architectural engineering; P = professor.

Writing assignments. The amount of assigned writing by these five participants varied widely. ME1P focuses mainly on drawing and teaching students to use certain software programs, so students in his classes generally do not do more than two pages of writing in a semester. AE2P generally assigns approximately 30 pages of writing per semester, while her colleague AE1P assigns about 70 pages in her class. ME2P also assigns about 70 pages of writing. CS1P assigns up to 20 pages in one course, but 60 to 90 pages in another.

Faculty expectations and grading. The faculty participants were asked about their expectations for the students' use of English in their writing. Both ME1P and AE1P mentioned appropriate use of technical vocabulary. AE1P and CS1P both wanted to see use of scientific language and citation. AE1P was particularly concerned with citation:

> I have a zero tolerance for any forms of plagiarism whatsoever, and I've been kind of crusading for this for a while. We, because of our discipline, we sometimes have this feeling that plagiarism doesn't apply to architecture because it's such a creative discipline, but I'm trying to fight that kind of assumption and make sure that anything that's written is written scientifically, properly, and well cited and everything else. (AE1P)

CS1P also expected clarity and style and formatting appropriate to technical writing, while AE1P also mentioned selection of good sources and forming a sound argument. AE1P and ME2P both pointed out the importance of the students being able to put information into their own words.

In the grading of writing, all of the participants except ME1P said that they considered language as well as content. However, both CS1P and ME2P clarified that language was a fairly minor consideration in their scoring of student assignments. AE1P weighted language at 30% of the scoring, while AE2P weighted it at 20%.

Weaknesses and strengths of student writing. The participants were asked if they thought students in their departments got enough writing experience to support their post-AUC goals (e.g. graduate school or employment). All of the professors except for AE2P thought that the students in their departments were getting enough writing

experience, but with some caveats. CS1P thought that students might need more experience specifically with technical writing:

> I think, you know a lot of our students have, I think, quite good writing skills. What I think is sometimes lacking is an understanding of scientific writing and technical report writing (*inaudible*). So there, there's a lot of good writing, good essay writing, I think, going on, but my impression at least is there isn't enough technical writing, and, and technical document formats and, and the, the, type of structure you'd expect in a scientific document isn't always there. (CS1P)

AE1P noted that students often failed to apply what they had learned in Rhetoric and Composition classes to the writing they did later, a point also made by AE2P. ME2P pointed out that the project group work that commonly occurs in engineering may obscure how much writing experience the students are getting:

> [T]hey do work in pairs or in groups, so, so, maybe, they end up using that as a way to, like, divide the work so that they don't have to do the he-, so they don't have to do all the writing. And maybe one's really good at the calculations, so it can continually be that guy that's doing the calculations and somebody else is already really good at writing, so it'll be that guy that, or that gal that's always doing the writing. I don't know. That's just speculation on my part. (ME2P)

For major weaknesses of the students' writing, problems with citation and plagiarism were mentioned by three participants (ME1P, ME2P, AE2P). ME1P and CS1P thought that the students had problems with writing in the appropriate style, while AE1P and ME2P thought that organization was a problem in student writing. AE1P also mentioned clarity as well as the students' tendency to overstate evidence and deficiencies

in building arguments as weaknesses she often sees in student writing. ME1P commented that both grammar and vocabulary were issues with some of the theses he had overseen.

The participants had also observed the major strengths in their students' writing. ME1P thought that students tended to have difficulty in expressing their own ideas, but that they were very good at describing the work and ideas of others, as in a literature review. AE1P noted that the students often had a good grasp of the important vocabulary needed, while ME2P thought that students generally did a good job with content. CS1P thought that the students were strong in critical thinking.

Improvement of student writing. When asked if they thought the students in their respective departments read enough original literature, all of the participants responded in the negative. AE1P felt that students did not read much in general and that this was partly a generational problem. ME1P noted that journal articles in mechanical engineering would be too challenging for most students.

> No, journals in particular, there is another problem there. Usually, journals, scientific journals in engineering, their level of uh, the equation level is far beyond whatever we get in the undergraduates. So if students in the undergraduate feel like you're, you'll be cracking their skulls. Even, by the way, in uh, in all other universities across uhh. If you asked them to go for uh, for journals, for example like the American Society of Mechanical Engineering, um, no, they wouldn't be able to read those. (ME1P)

ME1P felt that this was a universal issue for undergraduates in mechanical engineering. ME2P thought that was a problem that could be overcome. When asked if she felt that

the students were at the level where they would be able to read and understand journal articles, she responded: "And if they're not, then the first one will be hard, the second one will get a little bit easier, and so on" (ME2P). Both ME1P and CS1P expressed the concern that the students were already substantially burdened by work in their majors, so adding more reading might not be effective. Most of the professors generally agreed that reading would be helpful for improving writing, but CS1P and ME2P pointed out that they placed greater importance on reading for the sake of acquiring information.

The participants were asked to suggest other measures that would be needed to improve student writing. Both AE1P and ME2P thought that it was very important to emphasize to the students that what they learned in Rhetoric and Composition courses should continue to be applied even when they were done taking those courses. AE1P also stated that the standards of what was expected of students should be raised. CS1P suggested that if mid- and end-of-program assessments were implemented, they could include a writing component to better monitor student progress in that area. AE2P thought that students should be encouraged to do more reading and writing, and ME2P concurred that faculty should place more emphasis on writing. She noted that it was not clear exactly when students were supposed to learn the engineering-specific aspects of writing, or who was supposed to teach them:

> [T]here's no engineering specific thing I've found that they're taught early on. So when they come to do citations and have like a lab report template, and I teach them how to do citations in engineering. And then, I don't know if there's, th-, uh, if I'm supposed to do that or if the expectation is by now they would know that,

but I find that at the beginning, I have to say that you don't put things alphabetically by last name and all that stuff. (ME2P)

The participants had a variety of ideas about what types of writing assignments were most important for developing the writing skills needed in their respective fields. Both ME1P and ME2P believed that lab reports were important for mechanical engineering students. ME2P also thought that writing trip reports on field trips was a valuable experience for the students because it is similar to the reports she writes on conferences after receiving a grant to attend one. She also mentioned the thesis as an important writing experience. AE1P thought that it was important for students to write self-reflection pieces about their work and to annotate readings to show how they were being used in their research. CS1P stated that survey work and literature reviews were important.

The participants were asked how many and what types of writing assignments they would give during a semester if time and resources for grading were no object. ME1P said he might want to have students write up the steps of their designs, based on their drawings. AE1P and ME2P would both have students do more writing on projects done for class. AE1P also stated that she would like to break the writing of the thesis up into a series of shorter assignments to be completed throughout the semester. CS1P responded that he would assign the students to write more reviews on others' work.

When asked if they thought a department-specific writing class would be useful, the participants' responses were somewhat mixed. AE1P was in favor of it, particularly given the more unique composition of architecture as a discipline. CS1P thought that some specific instruction in writing would be useful, but that such a course need not be

specific to the department, but perhaps aimed at engineering students instead. He did not seem to be aware of the existence of the Technical Writing course in the Rhetoric and Composition department. ME2P also agreed that something else was needed to support the development of students' technical writing skills, but she was also concerned that an additional course might not work out well with the already demanding course schedule that engineering students have.

CHAPTER 5

DISCUSSION

In the current study, both student and professor perceptions about undergraduate student writing in the science and engineering disciplines have been examined through questionnaire responses and interviews, revealing a range of attitudes and expectations on the parts of both students and professors.

SSE Students

The first research question, "How do students majoring in science or engineering at the American University in Cairo (AUC) perceive their preparedness for academic writing tasks in their science and engineering courses?" was broken down into three sub-questions that will each be addressed in turn.

Student attitudes about writing and training. Sub-question 1 asked, "What are the students' attitudes about writing and the training they have received?" In the Likert items intended to address this question on the questionnaire, most of the means for the responses were below three, indicating that participants were mainly in agreement with the statements and therefore were generally positive about writing and the training they have received at AUC.

The most positive response was for item 1 on the questionnaire, "Writing is important to my academic success at AUC," while a fairly positive response was also given for the statement, "Writing is important to my professional success in my career." These reported attitudes were supported for the most part by the participants who were interviewed. Many of the interviewees seemed to be looking ahead to employment and recognizing the role that writing and presentation skills might play in their work. Even

AE, who felt that writing in English might not be a prominent part of her later work, acknowledged the importance of writing to having a desirable set of language skills to offer. But it must be acknowledged that these participants, who volunteered to continue to be part of this study following the questionnaire, are a self-selected group of students who apparently see the topic of writing in their majors as one of importance. Their responses may not be typical of other students, a fact that some of them acknowledged explicitly.

Reading as it relates to writing was an area in which questionnaire participants had a wide range of responses, resulting in a middling mean for the statement, "Assigned readings in my classes have included original journal articles as examples of writing in my field." Similarly, the experiences of the participants interviewed varied widely. According to these participants, reading seemed to be a relatively low priority in their respective departments, or in some cases, it was not stressed except in upper-level or thesis courses. It is interesting to note that neither EE nor ME2 had been assigned readings in their engineering courses. In ME2's case, this might be dismissed because he is a sophomore and may encounter readings in courses he takes later on. EE, however, is a senior who by his own account has encountered little to no reading or writing in his electronics engineering classes. Both EE and AE, senior students, reported that the library was used very little or not at all by students in their departments, and little research was required for most classes. This suggests that, at least in some departments, there is not much emphasis on training undergraduates to participate in their fields as researchers-in-training by reading appropriate literature for models and performing authentic writing tasks.

On the questionnaire, the statement, "Previous writing classes have helped me with writing assignments in classes required for my major," did not meet with an overwhelmingly positive response, suggesting that some participants may not have found ways to apply what they had learned in more general writing classes to the writing they did for classes in their majors. This is also supported by the comments of professors who felt that students needed to be told explicitly that what they learned in writing classes needed to be applied in their majors. This may reflect differences between writing for an "English" class and writing for other disciplines. In the interviews, participants who commented on these differences noted the rigidity and impersonal nature of technical writing as compared with writing they had done in other classes. It is possible that these differences make some of the writing training that students undergo at AUC seem irrelevant to writing tasks in science and engineering courses.

Some of the challenges in technical writing mentioned by participants on the questionnaire and in interviews included citation, formatting, and searching the literature. These concerns echoed those of the professors interviewed. It seems that it is not clear to either students or professors where the responsibility for making sure that students receive the appropriate instruction on these skills. For many SSE departments, it is necessary for students to switch from the style of citation they have learned previously (usually MLA) to the appropriate style for their field. One engineering professor noted that she was never sure whether she was expected to teach this or not, but because the students did not seem to know how to cite correctly, she taught it as needed. It also seems that based on AE's experience in architectural engineering, citation is not emphasized for earlier assignments, but is heavily emphasized for the thesis. Instruction

early on in how to cite appropriately would doubtless be useful for students learning how writing works in their chosen discipline, as Thompson and Tribble (2001) and Hyland (1999) have found evidence suggesting that different disciplines structure in-text citations differently. It has also been observed that EAP textbooks often do not address various forms of citation, so depending on what resources students have had in their writing courses, they may not be fully aware of citation variation (Thompson & Tribble, 2001). Taken together, it appears that there is a "no man's land" in between the instruction the students receive in Rhetoric and Composition courses and the writing expected of them in SSE courses where discipline-specific skills are not being explicitly taught.

The question of whether or not discipline-specific writing classes would be useful was raised in both the questionnaire and in interviews. Overall, department-specific classes seemed to be favored, possibly indicating that these participants feel that more is needed in their writing training. In the questionnaire responses, reasons for supporting the idea of such a class were mainly concentrated on potential usefulness in later classes and future work. Similar responses were given by the interviewees, with particular emphasis given to their interest in learning to write reports properly and prepare for writing the thesis. These responses suggest that at least some students see the need for additional attention to writing in their respective departments.

Strategies and resource use. Sub-question 2 asked, "What strategies and resources are students using to assist them with their writing?" On the Likert scale items related to this sub-question, the range of means was somewhat higher than for the previous sub-question. This may suggest that the participants are not taking full advantages of possible strategies and resources that could help them with writing.

A possible strategy that students could use to help them in discipline-specific writing would be to try to apply skills learned in writing classes. Some of the interviewees were able to identify specific skills they had learned in rhetoric classes that they continued to find useful for SSE courses. These skills included research, outlining, organization, and consideration of the audience. This suggests that this particular subset of students has had some success in identifying skills that can be applied to any type of writing. It is notable that two professors pointed out that students seem to have difficulty in applying what they have learned in Rhetoric and Composition courses.

According to the questionnaire results, only nine participants had taken or planned to take Technical Writing. As noted previously, this course is only a requirement for one major in SSE. Of the interviewees, only ME1 had taken the course, and ME2 stated his intention to take the course soon. ME1 appeared to have gotten a great deal of use out of what he had learned in the class and even stated that he thought the course should be a requirement. For him, this was a useful resource, but it is unclear whether the availability of the class is widely known. EE did not believe that anyone in his department had taken the course or that professors had encouraged it. Among the professors interviewed, some mentioned the course as a possible opportunity for students to work on technical writing skills, but others seemed unaware that it existed. Taken altogether, this suggests the possibility that not only is writing not a very high priority in some SSE departments, even the professors who put some emphasis on writing may not be aware of resources that their students could be taking advantage of.

The Writing Center was not a resource that participants seemed to be using for writing assignments in SSE classes, and it seemed to be viewed somewhat neutrally

overall as a resource. The mean for responses to the statement, "The Writing Center is a good resource for assistance with writing assignments" was 2.93, suggesting that there was no overwhelming opinion one way or the other. Of the 35 questionnaire respondents, 15 reported having used the Writing Center. Interestingly, both of the two interviewees who had used the Writing Center had gone for assistance with assignments in rhetoric and composition classes, but not for assignments in SSE classes. This might be suggestive of a view among students that the Writing Center is merely for help with writing classes, not for assignments in other disciplines. The low level of reported use of the Writing Center is not particularly surprising, given other evidence that there can be a stigma attached to seeking help from such a center (Williams & Takaku, 2011).

Feedback from professors is another resource available to students and seeking it can be a strategy. The two highest means in the sub-question 2 section of the questionnaire were for the statements, "Professors in the department of my major have been willing to assist me with my writing," and "I have asked for help from my professor(s) for writing assignments I do not understand," suggesting that many of these participants may not consider their professors to be helpful resources and are reluctant to seek them out for assistance. The interviewees who commented on this issue seemed to have had the experience that professors were primarily concerned with formatting in writing assignments. ESL/EFL students have made similar assertions in previous studies (Evans & Morrison, 2010; Leki & Carson, 1997). Only CS felt that she got helpful feedback from professors, but she pointed out that the onus was on the student to ask for that level of feedback. The reluctance of students to ask for help from professors could stem from any number of causes or combinations of causes, including embarrassment,

uncertainty about what to ask, feeling intimidated by the professor, or laziness on the part of the student (or less harshly, the expectation that feedback or help should be forthcoming without having to ask). These results seem to suggest that professors are largely an untapped resource for these participants.

Student perceptions of the strengths and weaknesses of their writing. The third research sub-question on students asked, "What do students see as the strengths and weaknesses of their writing?" Means for this section of the questionnaire were relatively low, indicating that the participants were fairly confident in their abilities. When asked on the questionnaire to rate themselves as technical writers, most of the participants rated themselves as "Good." Interestingly, these views varied somewhat from views that some of the faculty interviewees held about student writing. This discrepancy may be explained in part by the different perspectives of faculty and students, as it is more difficult for less experienced students to accurately judge their own abilities. Also, the faculty interviewees were considering a larger pool of their students, while the questionnaire responses reflect the views of a small subset of SSE students. The difference in faculty and student evaluation of writing is similar to the students in Huang's (2010) study who thought they needed no improvement, contrary to the opinion of their professors. A contrast of opinions between technical writing students and their teachers was also seen in Kaczmarczyck's study (2003).

The level of confidence of student participants was reflected in other data as well. At least one interviewee commented that he did not think there were any aspects of technical writing in which he needed to improve. But some of the interviewees were also able to identify weak areas in which they had improved. CS thought that assignments she

had done in computer science classes had helped her to work on organizing the information and relating it to any diagrams that needed to be included and described. This is related to AE's assertion that more attention needed to be paid in her department to connecting visual and textual elements of assignments. Interviewees were also quick to point out areas in which they thought that their peers struggled. CS's mention of students trying to "pad" their writing to make it seem longer and more impressive was consistent with observations of North (2005a) of science students trying to write for a history of science course. AE did not feel that she had writing problems, but felt that others did because they had not had the advantages that she gained by seeking more instruction in her other concentrations.

In most cases with the interviewees, any sense of weak areas was related to areas or aspects of technical writing that they felt they had not been taught adequately. Overall, this gives the impression that these interviewees feel that they have developed their abilities very well with the training that they have had, but they think more is needed.

SSE Professors

The second research question, "How do professors teaching upper-level science and engineering courses at AUC perceive their students' preparedness for the assigned academic writing tasks?" was also broken down into two sub-questions that will be discussed separately.

Expectations of student writing. The participants overall had high expectations for student writing, although some of them appeared to feel that their expectations were often not met. They discussed many of the concerns about student writing that are

common to university professors, including citation, plagiarism, and organization. But some of them were also concerned about the style of the writing, use of scientific writing and appropriate vocabulary, and formation of arguments. This indicates that the participants are thinking about the discipline-specific aspects of the writing that students produce. The expectations of these faculty participants are also similar to those reported in previous studies (Ganobcsik-Williams, 2004; Nesi & Gardner, 2006). Most of the participants also considered language to some extent in their grading of students' writing, suggesting that these professors are placing at least some emphasis on language in their requirements for assignments, rather than focusing solely on content.

The participants were mostly in agreement that undergraduates in their respective departments were getting enough writing experience to prepare them for their future endeavors, but with some reservations. Some seemed to think that if the students were fulfilling their requirements, then they would have enough writing experience, but not necessarily with technical writing. This is somewhat consistent with the views of the engineering professors in Zhu's (2004) study, who expressed the opinion that writing was not emphasized enough in engineering curriculums. The concern that group work on projects may limit the writing experience that some students get was also raised, and this is an important consideration in light of ME1's assertion that professors tended not to care about language in the project reports unless the language was inconsistent due to multiple writers. So in trying to avoid this difficulty, some students may be consistently depriving themselves of opportunities to work more on writing in favor of having the best writer in the group do the writing in order to preserve the grade.

All of the faculty participants reported that students do not do enough reading, and this is consistent with the observations of the student interviewees about reading assignments (or lack thereof) in their respective departments. Combined with the student participant statements about the types of readings they had when they had them at all, this indicates that students are likely lacking in appropriate models (such as journal articles) that could help them address some of the weaknesses in their writing. Lack of appropriate reading and writing assignments in content course has been noted previously as a deficiency in training students to write in their area of concentration (Jackson, Meyer, & Parkinson, 2006). All of the faculty participants agreed that more reading could be helpful in improving student writing, although two were more concerned with stressing reading for the sake of compiling information. It is interesting that a couple of faculty participants felt that students were already overburdened and that they would not do the reading anyway. It may be that many faculty feel this way and have given up on assigning appropriate readings and making students responsible for doing the work.

Weaknesses and strengths of student writing. In discussing the weaknesses they had observed in student writing, the participants mentioned many of the same characteristics that they had listed as being part of their expectations of student writing. These included citation, lack of plagiarism, organization, appropriate style, clarity, grammar, vocabulary, and building an argument. These mirror the concerns expressed by professors in previous studies (Eblen, 1980; Huang, 2010). One participant also stated that students tended to overstate evidence in their writing. This last is a somewhat disturbing observation because it suggests the possibility that the students do not fully understand the sources they are using to support their writing and need additional work

on appropriately using sources in their arguments. This relates to another weakness identified by the faculty participants, building an argument.

It is interesting that so many of the weaknesses are aspects of writing that one might expect would have been covered sufficiently in previous writing classes. It is clear from the comments of the faculty participants that there is a degree of frustration with the students who have not managed to apply material from Rhetoric and Composition classes to other classes. As mentioned previously, it also appears that there is some amount of confusion as to where the ultimate responsibility lies for ensuring that students have mastered these skills at the level required to write effectively in their chosen fields.

The faculty participants also noted strengths that they had observed in student writing, although interestingly, some of these overlapped with weaknesses, demonstrating how diverse the profiles of student skills can be from individual to individual. Strengths mentioned included reviewing the literature, vocabulary, content, and critical thinking. The variation and overlap between the observed weaknesses and strengths in student writing may highlight the different sets of values the faculty participants, and by extension, their fields may have when it comes to writing. It is interesting that one faculty participant considered literature review to be a strength in student writing, considering the relatively dismal outlook the participants seem to have about reading.

With the ideas faculty participants expressed for improving student writing, it should be noted that many of the ideas included increased emphasis on writing, indicating that these professors see a deficit in emphasizing the importance of writing skills in their departments. There is also a suggestion of explicitly instructing students to use what they have learned in rhetoric classes in their current assignments, echoing the views of the

professors that Zhu (2004) interviewed, who felt that discipline-specific writing was a venture that should build on skills students should have already learned. Taken together, this paints a picture of disconnected training for students in writing in which students receive initial instruction in writing in their required Rhetoric and Composition courses, but when they continue into other classes, there is little continuity because of the diminished or lack of instruction in the type of writing they are supposed to be doing.

Most of the faculty participants seemed interested in giving more writing assignments similar to the assignments they currently give, since these are the types of writing assignments they believe to be most beneficial to the students, but are mainly constrained by time and resources. The focus on more self-reflection assignments that AE1P would like to implement was very interesting in light of Nesi and Gardner's (2006) observation that these types of assignments were becoming more common in the sciences. Some were in favor of a dedicated class in their department to teach writing skills specific to that discipline, but some felt that less extreme measures might be sufficient, particularly since the science and engineering majors have many requirements to fulfill and adding an extra class would not be simple. It is notable that AE1P was most in favor of the idea for architectural engineering, a discipline somewhat set apart from others in the SSE by its bridging of engineering and the humanities.

Limitations

In the interpretation of these findings, it is critical to acknowledge the limitations of the study. The use of questionnaires and interviews has limitations that are likely to have influenced the outcome.

Questionnaires have many well-known limitations. The low response rate in this study makes it difficult to generalize findings even to the target population of SSE students, as all of the departments in SSE were not even represented by the student respondents. The respondents are somewhat self-selected because they are volunteers, meaning that they may be more inclined to be interested in the role of writing in their majors than the undergraduate SSE population as a whole. The sample that was ultimately analyzed consisted of participants who had the attention span to at least start the Likert scale items.

Self-reported questionnaire responses are also not necessarily accurate. The respondents may answer the way they think the researcher expects them to or the way that they think puts them in the most positive light, even though the responses are anonymous. Many of the items dealt with the participants' abilities, and it is likely that at least some participants would have given a more favorable assessment of themselves than might be the case.

Participants who filled out the questionnaire were given the option of including their contact information if they were interested in being interviewed. Due to this, the student interviewees were a highly self-selected group of SSE majors. Some of them expressed a particular interest in writing, and that may set them apart from their peers and imply that their responses may not be typical of the average SSE undergraduate. Also, due to the small number of student participants who were willing to be contacted for an interview and the even smaller number of student participants who responded to the request for the interview, the student interviewees only represent four departments within SSE.

The interviews with professors were similarly limited by willingness of the professors to participate, as well as by time and schedules. The faculty who were ultimately interviewed only represented three departments in SSE. The same argument might be made that the professors who were willing to participate were those who take a particular interest in the writing of their students. This bias is further supported by the manner in which the professors to be contacted for interviews were selected. While some views on undergraduate writing may be similar across fields, it is a stretch to imagine that the specific concerns of professors in architectural engineering, mechanical engineering, and computer science would necessarily represent those of professors in the many SSE departments not represented here.

Conclusions

The data presented here have suggested that while the student participants generally feel confident in their ability to write effectively for classes in their respective majors, both student and faculty participants recognized weaknesses in student writing and possible deficiencies in their training (or perhaps just a lack of application of their training). In addition, the majority of students seem not to be taking advantage of the resources available to assist them. Overall, these data present a picture of SSE undergraduates who have many of the tools they need to be successful in their technical writing, but may not be able to put them all together and apply them as needed.

Implications

There seemed to be a consensus on the part of the faculty interviewees, as well as some of the student interviewees, that something was needed to assist students in bridging the gap between their required writing classes and the technical writing they

would need to do in SSE courses. There was not, however, a consensus on how this should be accomplished. Some participants were in favor of a department-specific class that would address the needs of undergraduates in that department, while others thought that an engineering-specific writing class or making Technical Writing in the Rhetoric and Composition department mandatory for SSE majors might be sufficient. It should be noted that the vast majority of the interviewees were from engineering disciplines, so it may be difficult to generalize to departments like Biology, Physics, or Mathematics. Both student and faculty interviewees also expressed the concern that tight student schedules may not be able to accommodate an additional mandatory writing course.

Another possibility might be for SSE or each department to have a writing center of sorts, perhaps in the form of a tutor who would be available to assist students with assignments and maybe hold a workshop once in a while. This would provide additional assistance while not placing the burden of an additional class on the students. It would also give them a resource that they could be confident would be useful to them. As noted previously, use of the Writing Center was not particularly common among participants, and among the student interviewees, the Writing Center was only used for Rhetoric class assignments. It is possible that in addition to any stigma that might be attached to seeking help from the Writing Center, students may also perceive it as a place entirely separate from what they are studying, and they may think that there will not be anyone there with background or expertise in technical writing who can assist them.

Finally, it seems crucial that there needs to be more awareness on the part of the SSE faculty as to what students have learned with regards to writing and what gaps in their knowledge still need to be filled. The faculty would then be in a better position to

recognize what they need to place emphasis on, and also what other resources on campus they could be encouraging students to take advantage of. This would be beneficial to both faculty and students in SSE.

Depending on the department, writing is expected of SSE students, and there are both professors and students who see the importance of emphasizing writing. Even if this is not representative of SSE as a whole, it still dispels the notion that SSE is a homogenous institution where calculations are always valued at the expense of communication skills, and students no longer need to worry about writing. The professors interviewed in this study were largely in agreement on the important role they felt writing should play in their respective programs. A larger sample of professors might have revealed two schools of thought, as in Zhu's study (2004), with one group of the opinion that all writing teaching is the responsibility of English teachers and the other thinking that English classes should cover the general skills, but that training must continue within the student's chosen discipline. Regardless of which camp other professors might be in, it is clear that students are expected to apply what they have learned in English and writing classes. This expectation highlights the importance of both the ELI and the Rhetoric and Composition department in providing students with their introduction to academic writing.

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Appendix A

Numbers of students per major and professors in the associated departments in the School of Science and Engineering (Fall 2010)

Major	Juniors	Seniors	Professors
Actuarial Science	11	15	10[a]
Architectural Engineering	55	59	17[b]
Biology	13	7	8
Construction Engineering	56	96	17
Chemistry	7	4	8
Computer Engineering	12	14	11[c]
Computer Science	17	34	11
Electronics Engineering	28	76	6
Math	4	2	10
Mechanical Engineering	65	119	19
Petroleum & Energy Engineering	34	21	4
Physics	10	10	12

[a]Actuarial science and math majors are in the same department. [b]Architectural and construction engineering majors are in the same department. [c]Computer engineering and computer science majors are in the same department.

Appendix B

Student Questionnaire

Academic Writing Student Questionnaire

This is a questionnaire about academic writing in science and engineering at the American University in Cairo (AUC). All information you provide will be kept confidential, and your participation will not impact your grades or academic standing. Thank you for participating!

1. Year of study at AUC (please select one):

Freshman Sophomore Junior Senior Other (please specify):_____

2. Gender: _____Male _____Female

3. Age: _____

4. Nationality: _____ Egyptian

_____ Other (please specify) _____

5. First (native) language: _____ Arabic

_____ Other (please specify)_____

6. Which type of school did you attend prior to AUC?

_____ Public

_____ Private

7. Which of the following classes have you taken (please select all that apply):

English 98 English 99 English 100 Rhetoric 101 Rhetoric 102 Rhetoric 201

Other RHET courses (please specify): _____

8. Have you taken or do you plan to take Technical Communication (RHET 321)?

Yes No

9. What is your major?

_____

10. Have you ever used the Writing Center? Yes No

11. Please consider the classes you have taken **within the department of your major** as you answer this question (for example, if you are a physics major, please only consider classes you have taken in the physics department).

Which of the following types of writing tasks have you done in courses in the department of your major (please select all that apply):

- ☐ Laboratory or technical report – report on an experiment or procedure/project
- ☐ Essay examination – exam requiring written answers of a paragraph or more
- ☐ Research paper – paper written based on sources found through library research
- ☐ Summary or abstract of readings – written summation of source(s)
- ☐ Journal – regular log of personal impressions or thoughts
- ☐ Annotated bibliography – list of related articles with detailed summaries
- ☐ Review article – article summarizing and analyzing peer-reviewed articles

Other (please specify): _____

How would you rate yourself as a technical writer? (circle one)

Excellent Good Fair Poor

Please consider the classes you have taken **within the department of your major** as you respond to each statement (for example, if you are a physics major, please only consider classes you have taken in the physics department). For each of the following statements, please circle a number to indicate the extent to which you agree or disagree with the statement.

5 = Strongly agree (SA)
4 = Agree (A)
3 = Neither agree nor disagree (N)
2 = Disagree (D)
1 = Strongly disagree (SD)

	SA	A	N	D	SD
1. Writing is important to my academic success at AUC.	1	2	3	4	5
2. Writing is important to professional success in my career.	1	2	3	4	5
3. Previous writing classes have helped me with writing assignments in classes required for my major.	1	2	3	4	5

		SA	A	N	D	SD
4.	Assigned readings in my classes have included original journal articles as examples of writing in my field.	1	2	3	4	5
5.	I enjoy writing about topics that interest me.	1	2	3	4	5
6.	I have had adequate opportunities to write in the field of my major.	1	2	3	4	5
7.	The amount of assigned writing in my major is more than I expected.	1	2	3	4	5
8.	More emphasis should be placed on writing at AUC.	1	2	3	4	5
9.	The sense of authorship I feel about papers I have written is important to me.	1	2	3	4	5
10.	I would prefer to do less writing in the classes required for my major.	1	2	3	4	5
11.	My professors provide clear guidelines for writing assignments.	1	2	3	4	5
12.	I understand the purpose of each section of a research article.	1	2	3	4	5
13.	I consider my audience when I am writing.	1	2	3	4	5
14.	I can logically organize my ideas into a research paper.	1	2	3	4	5
15.	I can support my ideas with appropriate sources.	1	2	3	4	5
16.	I am familiar with using hedges (such as seem, might, or appear) to “soften” the impact of a statement.	1	2	3	4	5
17.	I can paraphrase and appropriately cite sources.	1	2	3	4	5
18.	I can present data in appropriate tables and figures.	1	2	3	4	5
19.	I am comfortable with the vocabulary commonly used in the subject of my major.	1	2	3	4	5
20.	I find it difficult to write in English for the classes in my major.	1	2	3	4	5
21.	I am comfortable with describing experimental procedures in writing.	1	2	3	4	5
22.	I can relate the results of an experiment to relevant literature.	1	2	3	4	5

		SA	A	N	D	SD
23.	Difficulties with writing have affected my grades in classes for my major.	1	2	3	4	5
24.	My writing reflects my thoughts and ideas.	1	2	3	4	5
25.	Professors in the department of my major have been willing to assist me with my writing.	1	2	3	4	5
26.	I am a strong technical writer.	1	2	3	4	5
27.	Reading journal articles in my field has helped my writing.	1	2	3	4	5

Please consider the classes you have taken **within the department of your major** as you respond to each statement (for example, if you are a physics major, please only consider classes you have taken in the physics department). For each of the following statements, please circle a number to indicate how often the event has occurred.

5 = Always (A)
4 = Usually (U)
3 = Sometimes (S)
2 = Rarely (R)
1 = Never (N)

		A	U	S	R	N
28.	On essay examinations, I spend time planning my answer before writing.	1	2	3	4	5
29.	The writing tasks assigned are useful and similar to tasks I might encounter in a future job.	1	2	3	4	5
30.	The instructions given by professors are clear and help me understand the task requirements.	1	2	3	4	5
31.	My professors have provided comments on style and grammar as well as the content of my writing.	1	2	3	4	5
32.	The professors clearly explain their expectations and scoring criteria.	1	2	3	4	5
33.	I have asked for help from my professor(s) for writing assignments I do not understand.	1	2	3	4	5
34.	The Writing Center is a good resource for assistance with writing assignments.	1	2	3	4	5

		A	U	S	R	N
35.	I have looked at examples of writing in my field to help me with my writing assignments.	1	2	3	4	5

What do you find most challenging in writing for classes in your major?

_____

_____

_____

Do you think that a writing class offered in the department of your major would be helpful? Why or why not?

_____

_____

_____

Please list any classes you have taken in the department of your major that have improved your technical writing abilities.

_____

_____

_____

Please list any suggestions you have for new courses or changes to existing courses that would be helpful in improving writing for your major.

_____

_____

_____

Thank you for participating. Follow-up interviews might be conducted with some participants. If you are willing to be contacted for a follow-up interview, please provide your contact information below:

Email: _____

Mobile: _____

Appendix C

Sample Student Interview Guide

You responded that work in the class _____ was helpful to you in improving your technical writing. What writing assignments did you have in that class? What aspects of your writing improved as a result of taking that class?

You listed _____ as being particularly challenging in writing in your field. What additional support (from your professors or otherwise) would be most helpful to you in improving in this area?

What would you like a writing class in your department to focus on? Are there particular forms of writing common in your field that you would want to work on, such as (_____)?

Appendix D

Sample Professor Interview Guide

Approximately how many pages of writing (including essay exam questions, research papers, lab reports, other) are students required to do in your class during a semester?

What expectations do you have for the students' use of English in their writing?

Do you consider language as well as content in grading your students' writing? If so, how is language weighted in the grading?

Do you use scoring rubrics? If so, do you prepare your own rubrics?

Do you think students majoring in (professor's department) get enough writing experience to support their post-AUC goals, whether those are to continue their education in graduate or professional school or to directly enter the workforce?

Do you think that students read enough original literature in your department? If so, how do you think this helps their writing?

What do you see as the major weaknesses in students' writing? What are the major strengths?

What other measures do you think are necessary to improve students' writing?

What types of assignments are most important for developing relevant writing skills in your field?

How many and what types of writing assignments would you give to students during a semester if time and resources for grading were no object?

Appendix E

Transcripts of Student Interviews

Student ME1 Interview – Mechanical Engineering

Researcher: Okay. So, umm, just tell me a little bit about writing in mechanical engineering, like typical assignments.

ME1: Typical assignments as in projects and lab reports?

Researcher: Mmm hmm.

ME1: Well each ------[3] content of the technical report. Uh, but, um, since I took the RHET 321 course, it showed me that there has to be a format to the way you write. So for example you start with things like KPIs and stuff like that. Usually other students don't do that, but professors don't mind if you do it or don't. So then it's the preference of the professor that matters.

Researcher: Right.

ME1: Usually there's also an outline that they give at the beginning of the assignment. They tell you what you are supposed to write and in every section what is supposed to be written. So in the end even for a person that didn't do technical writing finds it easy. But to me I feel privileged that I took 321--it helps me with the writing.

Researcher: Do you think that should be a required class in your major?

ME1: It depends. If it's going to be a mechanical course, that's different. If it wouldn't be mechanical, then, it would be like umm, a waste of resources. Like assigning different professors to different majors. But if 321 it's umm, compulsory to take like the rest of the English courses, 101, 102, it would have been better.

Researcher: Okay.

ME1: For example, when I finished my 321 course and I wanted to talk to my colleagues in the mechanical engineering department, even though they finished the required English courses, they still would like to take the 321 course. So they're trying to insert 3 credits on their own even as elective, because we have, in mechanical, only one elective we're allowed. They're trying to assign three credits for 321.

Researcher: So you found 321 pretty helpful.

ME1: Yeah, a lot, a lot.

Researcher: Can you tell me a little about the assignments you did in that class?

ME1: In RHET 321?

Researcher: Mmm hmmm. If you remember.

ME1: Yeah, I remember the first assignment, it was preparing the CV, which was very, very useful, because in the beginning, it was the first time I ever make a CV. In the beginning, you feel kind of embarrassed when you look at the other samples like all the ------ and yours is a little empty. It has to be two pages or one page, and yours is just a paragraph. But it

[3] Unintelligible speech is marked as ------.

helped, it helped, because when I applied to trainings before taking RHET 321 course, usually I got response of "better luck next time" and stuff like that, but after I did the 321 course, there was some positive feedback. Like, um, I applied at Siemans, the week after they called and said that they would like to interview me and everything and they said the CV was fine. So I felt, umm, overconfident or just a pulse of confidence that went through me like -----. But I remember something that we did was - well I remember the project. We were supposed to pick up a project, and then use technical writing skills throughout the whole project. And the problem statements, key performance indicators, stuff like that.

Researcher: Mmm hmm.

ME1: And so that also gave a way of thinking of how to look to, at, any mechanical or engineering project. And um, other assignments. There was one, it wasn't really an assignment, it was just something like an interview preparation class.

Researcher: Hmmm.

ME1: Well, Dr. ___ he was, I can't remember the other topic, but he asked if we wanted to do the interview or the other topic. The class voted for the interview preparation. I didn't attend that class, it's obvious. But umm, I remember it was useful to the people that attended. I had problems at that time and couldn't attend. But that was another one. Other assignments...mmmm. I guess that's it. That's all I can remember right now. I took it about a year and a half ago.

Researcher: Yeah. So, how have you been able to apply what you did in that class to your classes in mechanical engineering?

ME1: Well, usually, it wasn't assignments, it's in the reports. Umm, projects, and also the lab reports. Because in projects, usually you start off with something small, an idea, and you're supposed to build it up until you reach a conclusion, which is the fruit of the study itself. So, for example, there was a project management course where they required something like a work breakdown structure, and the way that you would, uhh, ah, how do you put this? The way that you would check that the work is being done.

Researcher: Mm hmm.

ME1: So my mind went back to the KPIs. So I went actually back to the book for 321 and I read how to do it, or recalled how to do it. I went through it, and the professor actually liked it because apparently I was the only one who knew about it in the class. So it was umm, an advantage on my behalf. Other parts I used 321 in...um. There was uhh, a really small project. Every single project, even if I might not need it, I go back to the book and check if there's a section that I have to look at. Like introductions, for example, the format they should be in, the objectives, how are they supposed to be stated, that they are supposed to start with verbs rather than action sentences. The timeline for the work, it had a certain format it should follow for ease of access and ease of understanding. Uhh, there's a part of the RHET courses, because it wasn't

that heavily stressed upon in the previous English courses, because usually previous English courses stressed upon the uhh, I forget what it's called. Uhh, what's the English format of referencing? MLA.

Researcher: MLA.

ME1: But in RHET 321 we have to use the engineering type, which helped also, and uh, make the references. I don't actually, professors in mechanical ---- actually notice that its different referencing, just see something referenced, they're happy. And uh, that's it I think. And the other thing, the formatting of the table of contents, tables, figures, all that helped.

Researcher: Yeah. So, um, tell me about mechanical engineering classes you've done writing in. What kind of feedback do you get from your professors?

ME1: Feedback. Well, the one thing is, the feedback always comes not on the formatting of the project itself or the report, but it's usually about the content. Which is just the technicalities and mechanics of the project itself. The formatting is usually fine. It's just little things that need uhh, correction, that's usually the feedback that comes, that's it.

Researcher: Mmm hmm. So the professor feedback is mainly on content--is there ever anything on style or language use?

ME1: No. Well, it's language when there are more than four people involved, because usually if there are more than four people, each person is, is asserted a different section of the project.

Researcher: Ah.

ME1: Therefore, there are four different types of writing and four different uhh, levels of English writing in the same essay. Then certain professors will, uh, will deduct marks for that, like in the thesis, they told, they told us that they would do that. So we try to do, is we assign one person who takes everything and then tries to read through it and write it in one language and one format. So it doesn't sound kind of awkward when they go through it.

Researcher: Right. Okay. So, tell me about yourself as a technical writer. What do you feel that you're very good at in technical writing?

ME1: Can you rephrase the question?

Researcher: Umm, when you are doing technical writing for your classes, what are the things within technical writing you feel you do very well?

ME1: Very well? It's the reports, usually, because um, the way that the project in technical writing was done, wasn't stressing upon the content as much as it does in mechanical engineering. It was the formatting. Which helps a lot in mechanical engineering or in any engineering sense, that is, I didn't do any other engineering courses, but... So usually, it's the, uh, it's more actually a book, I think it's, Dr. ___, he has an e-book or something that he keeps updating every semester when he gives the course. It's that, I still have the one I took a year and a half ago. I go back to it for references.

Researcher: Yeah, that's great. He'd probably be really happy to hear that.

ME1: I wasn't really a good student -----

Researcher: But you're still using it and finding it useful...

ME1: Yeah, I am, I am.

Researcher: ...which is really important. So, are there things within technical writing that you feel you need improvement in?

ME1: (mumbling, repeats question) Not really, not really.

Researcher: So you feel like things are going pretty well?

ME1: Yeah, they're fine. Well, it's because I use as a measure my fellow students, I don't use actually technical writers as a measure or as a reference to how good I am or how bad I am. So compared to my colleagues I'm fine. That's, that's all.

Researcher: That brings up a good point. Have you seen a lot of examples of professional writing in your field?

ME1: As in from the students or from the professors?

Researcher: From the professors, from, um, from original literature. Do the professors ever give examples of reports for examples that were written by an engineer at work?

ME1: Oh, okay. No, they don't.

Researcher: No.

ME1: They just, uhh, all to the tendencies upon the student, where the student is responsible for going through research and find out credible, credible references or credible sources of information. Usually the credible sources of information in engineering disciplines either science or an engineering professor writing. So we try to use the format from there, but usually students fail at that because the format is very, very complicated. Especially the references because they're used to the MLA and the references in the in the way the professors do it is different.

Researcher: Yeah.

ME1: But as mechanical engineering professors they don't stress much upon the technical writing part; all they care about is the content.

Researcher: Mmm hmm. So um, what forms of writing are particularly common in your field? You mentioned reports, anything else?

ME1: Mmm, forms of writing. I don't think so, it's just the reports, and that's it. It's just reports, projects, umm, cause what would we write about in mechanical engineering other than reports? It's the only thing you can write about and it's the only way you can express yourself in the form of report.

Researcher: Mmm hmm.

ME1: And that's the way that the uh, professors themselves accept it.

Researcher: Mmm hmm. Okay. In what class did you keep a journal?

ME1: A journal for what?

Researcher: Oh, when I asked on the survey, um, different forms of writing you've done in your major, and you checked journal. And I was curious.

ME1: Yeah, that's a problem. What do you mean by journal?

Researcher: Umm, a regular log of entries of progress or what you're working on maybe...

ME1: Ah, okay, so I understood it right, so that is a journal.

Researcher: Yeah, it's, it's...

ME1: So it's like just, umm, uhh, like, like a log book where you put the work that you did.

Researcher: Yeah.

ME1: You want the name of the course or how I did it or...

Researcher: Both.

ME1: Both? Well, there's a course called MENG 365. It's the, uh, I think it's Applied ------ Mechanics. No, sorry, sorry, Applied Thermodynamics.

Researcher: Ah.

ME1: It's umm, by, the doctor is Dr. ___.

Researcher: Mmm hmm.

ME1: And she insisted that we do it. So then I chose to do it, it was for the courses we had to do it. It was because she wanted to keep track of the students' work themselves because it's a group endeavor. She wants to make sure that every student does his part. Another course that I did that was 356 which was Design I in mechanical engineering. To keep uhh, it was trying using the CAD program. Using CAD program is very tedious. Therefore we have to keep track of the things that you have completed so you don't have to go back and check them and it keeps track of them as in not only completion, but how far did you get in the, how do you put it, in the assembly of the system itself.

Researcher: Okay. CAD program?

ME1: The CAD is um, that's a problem, they won't tell us what they stand for. It's umm, computerized assisted design, I think.

Researcher: Ah, okay, that makes sense.

ME1: So it's, it's like 3D design programs, like if you know 3BSmax, the programs that they used to make Shrek and stuff like that.

Researcher: Yeah. Okay. So you say you've mostly done a lot of progress reports, key performance indicators. Can you tell me a little bit about key performance indicators?

ME1: As in?

Researcher: Like, what, what, what do you write for something like that, because I've never done anything like that before.

ME1: Umm, well, one time that I used them extensively was in the management course, because there was part of the project where we had to assign work to for uh, the work, uh, the project itself was a company responsible for civil transport using helicopters. So it was the work distribution among the staff at that area, or at the business itself. So the way the key performances indicators were done was how to follow each engineer, technician, and um, monitor how to follow their progress. And if there were any forms involved. So these things were put, and then, uhh, that would be the, what was it called? Objective, I think? No, not objective, it was the...? Maybe it was called objective--task, sorry, it was the task at which the, the entity was supposed to do. And the other side would be the how would you measure, uhh, the level at which the task was done. For example, like the forms, or whether the work was done on time, work done at the right cost, whether the cost exceeded it, or the that part. Other

than that, I don't think I used it that extensively, but there was an assignment in a course, was Materials Studies, where we have to also manage something, but it was a factory. And in that sense you have to monitor all the engineers and technicians there who were working on the lathe machines and things like that. So it was also, they had to do that.

Researcher: How do you think writing in Mechanical engineering is different from other disciplines?

ME1: Different from --------. English, it's totally different.

Researcher: Yeah.

ME1: Because in English, as far as a ---------, it was stressing upon, not technicalities, but using the meaning and the message that you want to convey. In mechanical engineering, it stresses most upon the technicalities, and then the conclusion is based the technicalities, so there is no actual message to be conveyed. But writing in mechanical engineering, I wouldn't call it writing as much, I would call it just throwing all your ideas on one piece of paper and handing it to the professor and that's it. And they actually accept it, which is weird, compared to what we did in English. In English, it was, there had to be a series of thought. There had to be an output in the end. In engineering they don't stress upon it. That's why I think 321 should be compulsory. Because not only is it building you in the sense of writing, but it also teaches you how to write within your field.

Researcher: Yeah.

ME1: I'm not sure about other engineering disciplines, but I think they're supposed to be intertwined in how they work. It should be similar. Ummm, I don't know if you want to compare it to business writing, I'm not sure, but currently I'm taking an economics course because it's part of the core program. And, there is, apparently there is a different way to write in economics. I'm still not that good at it; I'm trying to learn it, but um, it's promising.

Researcher: So, um, what was I going to ask? So you said writing in mechanical engineering is sort of throwing your ideas on a piece of paper and handing it to the professor and they're okay with that.

ME1: Yeah, that's it.

Researcher: Do you think at a professional level, like if you're working at a company or something like that, do you think that that's really what you're--what you'd be expected to do?

ME1: That's a problem. Here in Egypt they don't stress upon that at all. In Egypt, no one cares about the quality of work that you do. All they care about is that the work gets done and it gets done at the minimum cost. But the ------ according to Dr. ___ outside it's totally different. Outside, every single detail is scrutinized, every single detail is ------, every single detail is important to the output. Doesn't matter if it goes over cost, as long as the quality of the work is fine. So, that kind of gave me a tendency to not work in this country, so I'm going to try to work outside. But for mechanical engineering professors--no, it's not that. They don't care.

Researcher: Do you think it would be valuable for the students if there were more emphasis on that?

ME1: Yes, it would, it would. Because I remember there was one student--this was according to Dr. ___, I think--who went and worked, I think it was a multinational company. But when he went there and started writing reports and umm, what was it called, the daily worksheets where he writes his daily work. He was actually fired because the way he wrote was incoherent to other people, not because of the language but because of the formatting of how he wrote.

Researcher: Mmm hmm.

ME1: And in the end the whole conclusion is he didn't take Technical Writing course and he doesn't have enough background in how to write in an engineering environment. He used his English background to write.

Researcher: Yeah.

ME1: And that's it.

Researcher: And that's very different.

ME1: Mmmmm, yeah.

Student CS Interview – Computer Science

Researcher: So, um, tell me a little bit about writing in computer science.

S2: Okay, umm, in computer science maybe the major is based on programming and coding more than writing stuff. However, there is big part of it in writing the technical details of a project you're doing. Like, for example, if you're working on developing a project for a customer, then you have to write documentation of all the requirements--it's more like technical writing. Then you have to write all the requirements in, in this project, and then explain every requirement and maybe have some diagrams and explain them. And at the ------ you have to do a design, which is technically, uh classes and something like that in computer science and then you have to explain every one of these.

Researcher: Mmm hmm.

CS: The problem is basically in, in writing these technical stuff. If you're working in a software company and then you have to deliver these to your customers who might be asking for a website or an application and he doesn't have any idea about the technical details, you have to deliver the functionalities without being too technical nor too vague. So, that's the problem in writing.

Researcher: And that's, that's a big one, too. So, umm, you said that um, Software Engineering was a class that was helpful in improving your writing for computer science.

CS: Yes.

Researcher: So what kinds of writing assignments did you have in that class?

CS: Umm, in this class, we were working basically on a big project for the group project. Aaahh, it was mimicking like real life in, in a way that we were designing ummm, an electronic online voting system.

Researcher: Mmm hmm.

CS: On this system, the customer can umm, vote, and can uhh, know news about candidates, stuff like that.

Researcher: Mmm hmm.

CS: Umm, that project was, actually the implementation was not a full implementation because it's just a course, but what was more important is writing two documents. One of them called SRS and the other called SDS.

Researcher: Okay.

CS: The SRS stands for Software Requirements Specification.

Researcher: Okay.

CS: And the SDS Software Design Specification. Uhh, these two documents are actually big ones. Like every one of them was more than 20, was uh, was 20 to 30 pages. So it was a bunch of work. It was a lot of writing steps. And the, that course actually was the first one that I write so much technical details and that size of papers in, in my major. Like I enjoyed writing but in the Rhet courses, umm, in the research -----, but this was a project and documenting it and delivering it in words was the first time to

do it, so it helped me a lot. Now I'm doing my thesis, and writing these documents I refer to the documents I wrote in this course because they helped me a lot.

Researcher: Yeah. Tell me a little bit about your thesis.

CS: My thesis is uh, about license plate recognition. Umm, it's umm an electronic system that using camera and image processing, you can recognize the, the plate number of the car and allows access for it or not if it's on a gate or, know the violations of the traffic and stuff like that.

Researcher: So as your thesis do you do all the programming for that?

CS: Yeah, it's uh, divided in two semesters. The first one is for the design and research and the other one for the implementation. And I'm now on the second semester, doing the, doing the implementation thing. And we have both documents, the SRS and the SDS also for this project. And we had also a proposal kind of thing.

Researcher: Mmm hmm.

CS: It was a document, but not tech-, not very technical, but it should deliver uh, a big idea about the project. This was actually the smallest one and the less technical.

Researcher: Yeah.

CS: But this uh, the, the SRS and the SDS will, will be more technical.

Researcher: Definitely. Good luck with that.

CS: Thank you.

Researcher: Definitely. So, for the project that you worked on, the project you worked on in Software Engineering and also your thesis, um, what aspects of your writing do you think are improving as you work on those types of projects?

CS: Yeah, um, I guess my tack of thinking about delivering ideas. I learned in the Rhet how to, like, organize my thinking and how to deliver an essay in paragraphs and stuff like that.

Researcher: Mmm hmm.

CS: But to, to make the same idea for technical things, that was kind of hard. Like how to segment the, the paper into meaningful parts leading to each other, that the reader wouldn't get lost reading these technical stuff. Uhh, connecting diagrams to words, like if I have a big diagram, how to explain it.

Researcher: Mmm hmm.

CS: That, that's was what improved actually, because when you draw the, the, the diagram for the first time, you say it's okay here's the diagram, it's very clear. What I'm going to say about it? But if you put yourself in the customer's shoes, they don't know anything about these diagrams. It's, mmm, can be simple but still it needs to be explained and you have to say that this case describes when the user interacts with the system in this specific way and the systems responds in that way. So simplifying the functionalities in, uh, in interaction, uh, uh, things that was something I learned, how to simplify diagrams in words.

Researcher: Great.

CS: Also, the research uh, thing. Umm, in my computer science major, the first three years, actually they didn't include any good research work. But in these two projects, the electronic voting system and the thesis, we're doing much research and we're doing hard work in documenting these research and like, summarizing the parts that we need in the paper. That's also, kind of a new thing to me. That was the first to learn it in this course.

Researcher: So as part of these projects, did you have to go out and read a lot of, you know, highly technical original literature in your field to, you know, form the foundation of what you were doing?

CS: Yes. Yeah, in the thesis, like, we are doing much readings and technical papers talking about this project. Techniques and algorithms. So we are reading a lot--there is much theory and research rather than just the coding.

Researcher: Yeah. So that's something you hadn't had much in previous classes before you took these.

CS: No, the previous classes were just about--you have uh, an assignment, a coding assignment. I want a system that delivers blah blah blah.

Researcher: Mmm hmm.

CS: And all you do is that you start with the coding part and if you need something you Google it or you find it online. And at the end, you write like, uh, one to two pages thing describing how your system works,---- and just write compliments (?) on the codes. But documentation and technical writing, that did not exist in the first two years.

Researcher: Okay.

CS: I learned also to write user manuals. I didn't do that before.

Researcher: Now that's a specialized skill. That's a, like--so you did that as part of these projects?

CS: Um, the user manual actually was ummm, yes, in the courses, in the Software Engineering course and another course taught by the same instructor, he asked for a user manual with any assignment or project, that I am the user, tell me how to handle your system. You're giving me a code, a running code, like, I have to tell the user, if you press C, something like that will happen. If you press uhh, on the uhhh, these ----, the system will interact in this specific way. The writing of the manual also is something that I learned in my courses.

Researcher: Yeah. So that would be very different--who is the professor?

CS: Dr. ___

Researcher: Ah, okay, I think I've met him, actually.

CS: He's the best professor ever! You were lucky to meet him.

Researcher: That's great. So you mentioned, um, in, and you mentioned this in the survey also, just sort of dealing with the technical content and explaining it to an audience that is not an expert with computer science, was particularly challenging. Um, what else do you think your professors, or what kind of support your professors or anybody else could give you that

would be helpful in improving in this area? For anybody taking computer science?

CS: Well, I guess, working on the documents, big documents like these, when we umm, when we go to the doctor for example and ask him, Can you help us with this? What about give us feedback about this thing? Then he, he can give feedback and say, This is not clear. This needs to be more elaborated or explained in a different way. Sometimes you write a big sentence and then, you understand it but someone else can read it and then, What does this mean? This is too complicated, though you think it's easy. So maybe showing the, the stuff you write to someone else with a different perspective, different experience, he can tell you that this is readable or not, this is understandable or not, for a non-technical audience. Because some of our professors have actually worked a lot with companies so they, they have dealt with real life and non-technical people.

Researcher: Yeah.

CS: And they know how this looks like. So making use of their experiences, I think is something very useful.

Researcher: Do the professors generally give a lot of feedback like that?

CS: When you go and ask, yes, but if you don't ask, like, here at AUC, the education is like, the doctor gives everything in class and he does his best, but then, if you asked for more, you will be given.

Researcher: Mmm hmmm.

CS: So when you're writing a document, if you keep it until the last minute, then it's your problem that you didn't have time to take feedback. But if you started working on it and asking the professors for feedback, what do you think about this diagram and this explanation--is that clear? Then they give you useful feedback, I think.

Researcher: Okay, great. So, um, so in your earlier classes, were you ever given examples of professional writing in computer science? Like before you took Software Engineering or your thesis course.

CS: Professional writing? Mmmm, I guess in the 106 course, the very introductory course, there was uh, a research thing that you choose a topic and write ummm, like uh, ten pages paper or something like that in research. But this was the most annoying assignment I had.

Researcher: Really?

CS: Because, umm, yes, we were still freshmen. We didn't know how to do research in a highly technical topic that we are not really knowledgable about.

Researcher: Mmm hmm.

CS: And also, it was a kind of copy-paste paper thing that was annoying me very much because I was taking the 101 and the 102 courses with interesting professors, so I was like, what is the purpose of doing this? I can give you something online to, to look at it. I, I didn't feel I had any touch in the paper, I have any voice, there was nothing like that, it was very terrible. So it was not a good experience in professional writing, but I guess the first professional writing experience was in the Software

Engineering course. Otherwise, it was just, mmm, you bring some stuff from online and put them together in a paper and format it and make it neat and submit it.

Researcher: And that's it.

CS: Yeah, and that's very ridiculous to do, -----just to collect other people's work and put it together, it's not a research thing or something interesting even to do.

Researcher: Do you think in general it's tougher to have, umm, your own voice come through in technical writing?

CS: Umm, yes. It's harder than if you're writing a paper about your, uh, the society in Egypt or some umm, social problems we have here. Then your voice will be very clear in the paper. You have your opinion, the argument you make, it says a lot about you, but in the technical stuff, what says a lot about you? Maybe it can appear in very small parts of describing the, the general ideas of the system, and making it appeal to the one who's reading. That may be the, the only part that can have your voice covering, the, your convincing skills. Something like that, but in, in the technical stuff, it's hard, I guess, to have your voice appear in the paper. And I'm not sure if it's, if it's professional to have it obvious or not. Because sometimes you have to be too professional or too technical that having your voice in, in the paper might not be that professional.

Researcher: So maybe it depends on what it is.

CS: Yes.

Researcher: Yeah. So, um, why do you think a writing class within the computer science department would be helpful?

CS: Ummm, well, I'll tell you something. In the computer science, when we start writing, we start learning by, have, have you heard that term before--Egyptian (fudge?), people trying to uhhh, write, uhhh, something like, I can't explain it; there is, there is no word equivalent for it in English. I guess, but, you can, uhhh, like explain the words in different ways to, to make it take a lot of space in the paper.

Researcher: Ahhhh.

CS: It's not that professional, and you're just doing your work, in, in a sneaky way to make it look big and neat and, and something appealing to the one who read it. But it, it, it doesn't work this way because when you work in a company with real customers, you can't, you can't have your technical writing that terrible. Some people have problems with writing, are not that great in writing in general, will be terrible and more terrible in technical writing, because if you have been writing something to, to, to explain different ways or to go around with it, in technical writing you don't have this. So it would be hard for them to work this way. I have a colleague in the thesis who has usually problems with writing. He, he can write very well, but it takes him a very long time to write a good paper. And that was his problem in the 201 courses. So when we were working on the SRS document last semester, he spent a lot of time in writing about the functionalities of the system. Someone else may find it, oh, okay, it's easy

I will write, uh, this stuff and explain to the user what's going on, but for him it was not that easy because he didn't learn how to deliver each piece of information to someone who is not technical. So I guess writing class can be helpful, especially if it's not just a technical writing for engineering students or for the science building. I guess every major made a technical writing course related to the majors, that would be very helpful to the students. They wouldn't suffer, I guess, with it.

Researcher: So when do you think, in, in the course of um, doing the work for the major that a class like that should be taken? Earlier, later?

CS: No, earlier, I guess the students in the first two years do not appreciate research that much.

Researcher: Mmm hmm.

CS: But by the junior year when they start doing a lot of research, then they can appreciate that course, like toward the end of the junior year, if you took the course, you would be very satisfied with it, and also it will help you a lot in your thesis and you will be towards your graduation, so it would be very meaningful. Would I tell you something, the one who taught us the SRS, Dr. ___, the, the, the Software Engineering course, always told us, Well, I always object to the way that this course is taught, because I talk to you about software engineering and systems and how to document these systems, and the problem is you're c-, you're coming from your sophomore year and you don't have an idea of what a big system is, and you will not appreciate this course until you graduate. He said that a lot. We don't have that knowledge to appreciate the material we are taking. But when the students take this course toward their thesis and they know they will do a lot of documentation things, and they're graduating and they will need this, then it can be appreciated. But before this time, I guess it's hard to convince the programming geeks and students in our major that you need writing. Because, yes, this is the fact, we have, we have in our major this programming geek culture, that you, you stick to your computer and you do ten hours of coding and you have a working system and wooooooooo, I did it. But they can't write two pages--writing like thousands of lines of code is more fun than writing two pages of explaining that code.

Researcher: Yeah, that's a good, that's a very good point.

CS: If you, if you make any interviews with any other computer science students, you will find this problem. That we enjoy coding more than any other thing, any other activity that they won't like.

Researcher: Well, I think that probably does make sense. So if there were a writing class in computer science, what would you want it to focus on?

CS: Ummmm, I guess it has to solve the challenges I was talking about--delivering the technical to the non-technical people, and also, I can, I think has to deal with delivering presentations. Like, in, in, in the thesis, we have four presentations.

Researcher: Ahhhh.

CS: So it's not just about writing, it's about delivering what you write to an audience.

Researcher: So maybe more, more generally like a technical communications class.

CS: Yes. That would be very useful. Because, you know, I have a colleague who can write very well, ummm, like an essay kind of thing. She, when she explains the technical details, she write it in an essay format. But when you come to represent it to the audience, if you say it in that, that essay formatting thing that's very nice when you're reading it, when it's said, it's very weird. Uhhh, like therefore we have to move to the uuhhumuu, this stuff that can connect the paper together, if said to the audience, it won't be that good. Like in connecting the, uhhh the content for the audience, it's different from writing it in a paper. That was a problem I noticed I ----- in my life before is to see someone presenting like writing.

Researcher: Yeah, yeah.

CS: That was boring in a way or another. You can say that if I am looking for someone who is saying too much beautiful words that's good for a paper, but it's no-, it's not for delivering to audience.

Researcher: Yeah. Very good point, definitely. So umm, the forms of writing most common in your field, would that be like the SRS, the SDS...?

CS: Yeah, I guess yes, and even about more, more general things than the SRS, or, uh, the SDS, how to document, uh, your work, because if you work with a, with a big group, usually in real life you don't work on a project in, on your own like you do at university. It's just a big joint project that everyone puts a stone in that big block.

Researcher: Exactly.

CS: So if you don't know how to read other people's documentation, how to document your own work in a way that makes other people understand your work and continue on it, then it will be terrible for y-, for you to work on a team.

Researcher: Mmm.

CS: That's a very important skill, to read other people's documentation, document yours as well.

Researcher: So the documentation is definitely a key form of writing.

CS: Yeah, with no documentation, it would be terrible to collect and integrate pieces of code in the, in the project together. You don't know what the stuff of everyone is doing. If you have seen a code before, the codes just, like the variables, and syntax, the words, if it's not well explained and well documented in the code and outside the code, then it's useless.

Researcher: Mmm hmm, yeah.

CS: You will be doing something like reverse programming to understand what this code is doing.

Researcher: Ahhh.

CS: And then try to, uh, understanding. Yanni, if I told you about a specific task and I asked you to write a code for it, it's much easier for you to do it

than read a code that you don't know what it's doing, and then figure out that it's doing that task.

Researcher: Right. Great.

CS: That's where writing is important.

Researcher: So what do you think the major differences are between writing in computer science and writing in the other disciplines, like even the engineering disciplines?

CS: Mmmm. Ummm, I guess I'll start by the other non-science disciplines because I enjoyed the writing of the two very much. Have you met Dr. ___?

Researcher: No, no.

CS: She's amazing. I took with her the 102 and 201 courses, and she always talked about your voice in your writings and how to be argumentative and how to have a strong writing style that's like speaking out of your paper. Some, in the social sciences and these disciplines, political science or any social science, it's enjoyable and easy to have this. Not easy, but you enjoy it when you're doing an argument, when you're working on your paper this way. But the engineering or computer science kind of stuff is different because it doesn't have that space that makes you express yourself in a, in a way that you enjoy.

Researcher: Mmm hmm.

CS: So this space is the one that makes writing in engineering or science disciplines more rigid than writing in the social sciences. So I guess that's the big major difference.

Researcher: For your thesis, is that an individual project?

CS: No, it's umm, it's a team...

Researcher: It is still a team project.

CS: Yes, it's from three to six people. Mine is four, four people group.

Researcher: Wow.

CS: It's kind of a good one, yes, but not all of us enjoy writing. That's another problem with it.

Researcher: Well, it's good that you do.

Student EE Interview – Electronics Engineering

Researcher: Okay. So first can you tell me a little bit about writing in electronics engineering.
EE: There's no writing in electronics engineering.
Researcher: None at all?
EE: No.
Researcher: Ever?
EE: No, yanni, we only take the three courses that we're supposed to take as students, the theoretical courses, bas, as opposed to this, yanni, we do not write, except for maybe in the thesis. And in the thesis, we are required to write a paper, but we did not have any introductory courses before this.
Researcher: So, in your classes, there are never any assignments that require you to write anything, reports, or...
EE: No, uh, they're mostly mathematical. Even no short paragraphs, no answers that require me to write anything.
Researcher: Really?
EE: Yes.
Researcher: Wow. So, do you feel that you need more opportunities to write in electronics engineering?
EE: Well, uh, I think maybe for reports, because as we go on in the field of working, we will need more reports. We will need to, uh, reports is a main thing in engineering that we do not get to practice here, and I know people in other universities who practice on reports, who do a lot of reports.
Researcher: What types of reading assignments do you have in your classes?
EE: Uhh, there is a class, it's an elective. A friend of mine takes it, and he told me that they have a, um, it's some pages of reading, but this is the only thing. We're not, we're not required to read anything.
Researcher: So um, you don't, also don't see any examples of professional writing in your field, like reports, or articles, or anything.
EE: I'm in my fourth year now, and I haven't so far seen anything. Uhhh, maybe in the thesis, but ahh, the course that I know are still coming, they're mostly technical courses requiring mathemat, math, and physics, and electromagnetics, not requiring any technical writing. Or reading.
Researcher: So, um, so if there were a writing class for your department...
EE: Mmmm.
Researcher: ...what would you like a class like that to focus on?
EE: Writing professional reports. ----- yes.
Researcher: So, primarily reports?
EE: Yes.
Researcher: So, um, that would be, not just um, the style of the writing, but the formatting of the report, dealing with items like that.
EE: Yes, sure, sure, yes.
Researcher: What kind of feedback would you want from the instructor on the writing?
EE: We haven't, yanni, we didn't take the course yet. I, I, I do not know yet.

Researcher: I mean, so say, say you wrote a report, you know, what, what kinds of things do you want the professor or the instructor to comment on?

EE: Mostly, mostly the format. But I have noticed in many parts in engineering since I came to university that a lot of things are not, aren't professional. Even in the reports and the one I have been, yanni, the one I studied in school, there is no, for example, a certain way to draw graphs, a certain way to outline tables. That I'm not focused on in anything in any, in any course in engineering since I came, since I've come to university.

Researcher: Okay.

EE: And these reports include graphs and they include tables that should be formatted in a certain way, in a certain professional way.

Researcher: Mmm hmm. Actually, if you haven't been giving, given any writing assignments, you might not know the answer to this, but, umm, is there a particular style guide, I wonder, that the engineering field follows? Like if you're in a social science and you're writing, you follow the umm, the manual of the American Psychological Association or something like that. It's a style manual that tells you how to format everything. So I, I think there's something similar in the engineering disciplines, but you've never been told to follow anything like that for graphs or tables?

EE: No. But, I just remembered. There is, for people who do not take the 101 course, you are required to take 3 courses, so there is a course of technical writing.

Researcher: Yes, 321, right?

EE: Yes, but, uhh, this is not a required course.

Researcher: Right.

EE: So most people do not take it.

Researcher: Mmm hmm. So you think most people probably don't take that class?

EE: Yes, I have...

Researcher: I've been asking about it in the survey and it seems like a lot of people haven't taken it.

EE: No, and the electronics engineering, umm, almost ----- that no, yanni, no student has taken this course.

Researcher: So it's not something that the professors are encouraging?

EE: No, the professors do not--we have never talked about writing or reading in classes. Mostly, uh, we focus even on notes, we do not read the books to begin with. Uh, and mostly the -----, yanni, the assignments are math. Even the theoretical parts and, parts are not focused on as the mathematical and calculational parts.

Researcher: So, umm, what classes are you taking right now?

EE: Uhhh, do you mean the electronics classes or the core classes?

Researcher: Yeah, yeah, your electronics engineering classes.

EE: I'm taking a class of networks, a class of communication, uhhh a class of microcontrolled, uhhh, system design, and a last class of uhh ------ design.

Researcher: So in, umm, you said networks was one of them, what, what, what's a typical assignment in networks?

EE: Uhh....

Researcher: You're designing networks? I, I, this is not an area I know a lot about, so I'm curious.

EE: Well, we ha-, we did not take any assignments yet, but they're mostly, as I've tried to to -----, they're mostly mathematical assignments.

Researcher: Mmm hmm.

EE: Uhhh, mathematical problems requiring uh formulas that we have studied so far or ummm, slightly theoretical questions talking about things that we have studied.

Researcher: Mmm hmm.

EE: These are the only assignments. The, um, mo-, ehh mostly in the engineering departments, we are not even required to look into the lib-, yanni, go to the library and we are not required to look over the internet. It's very minor and even the books that we use--when we use the textbook it is more than enough.

Researcher: Mmm hmm.

EE: Even most of the courses we are not required to use the textbook for readings from the textbook. This is more than, more than the required, much more than the required when you read the textbook.

Researcher: Okay.

EE: Resources are not, I, I, I'm sure that no one in the engineering and the electronics engineering department uses resources for any of the courses; maybe for the thesis, I do not know. But I'm sure that no one uses any resources from the library or from the internet. Very minor applications or very minor researches, and uhh very little courses (?).

Researcher: So you're in your fourth year, and so far you haven't taken any classes where you've had to umm, do a final project or anything like that?

EE: No, we do a final pro-, we do final projects, but mostly the projects uhh, are technical, so even the reports are not focused on this much. We might write, you're right, we might write.

Researcher: I was just wondering if there was a written component for that, is all.

EE: Yes, but usually, we focus, yanni, the main part of the project is the technical part and the mathematical part, how we going to design, how are we going to make things work?

Researcher: Mmm hmm.

EE: And mostly one of the students writes the report using Wikipedia. It's not focused, yanni, this is the smaller part of the project. How you can make things work is the main part, making things work already, you have received almost all the grade, and you're required maybe to write one page as yanni, a supplement. Not as a supplement that, to, so that it is said that you have written a report, not to make sure that this report explains anything. We explain verbally to the professor what we have done, or how have we reached the results that we have reached so far. The reports are supplements as...our names are under it.

Researcher: Yeah.

EE: ------

Researcher: So this isn't something that the professors really even give feedback on, it's just, you know, you've, you've done the report, so check?

EE: Yes, usually, yanni. If they ask you to write the report I'm sure that this is not the part they focus on.

Researcher: Mmm hmm.

EE: And this is not something that I'm criticizing, yanni, I'm just, saying.

Researcher: Mmm hmm. Yeah. So, umm, you mentioned that you have gone to the writing center at some point. For what class did you go?

EE: Umm, for uhh, the uhh, Rhetoric classes, the 102 and 201.

Researcher: For Rhet, okay. What kinds of um, what assignments were you working on at the writing center for Rhetoric?

EE: Uhh, research assignments for the 201, and uhh, the argument assignment, assignment for the 102.

Researcher: Umm, do you find the, um, the things you learned about writing in your Rhetoric classes useful for, you know, potentially writing reports, or for, umm, you'll have to do a thesis in your department?

EE: Yes.

Researcher: Uh, umm, do you think that that will, that that work that you've done in writing will be useful for your thesis?

EE: Definitely, yes. Definitely. It i--, uhh, the Rhetoric classes are very useful, very useful.

Researcher: So, umm, what, what characteristics of umm, writing that you've worked on in Rhetoric do you think will be most helpful when you write your thesis?

EE: It's not mainly the char-, it's the things that you think about that, as a normal person that did not take class. I did not think about the things that I learned when writing a paper. For example, uhhh, putting the audience in mind...

Researcher: Mmm hmmm.

EE: This is very important, and I have never looked into this. Ummm, the second thing is uh, outlining. Outlining helps me in, through all the papers, through all the core papers that I do. Uh, outlining helps a lot, and I think it helps a lot through the, anything that I'm going to write in the future.

Researcher: You mentioned audience. So, when you go and work, after you're done with university, umm, would you ever be working in a position where you would have to write something or describe something for somebody who wasn't an expert in your area?

EE: Mmm.

Researcher: So, umm, would you ever be, you know, writing something maybe for a client, like if you were working at a company, would you have to describe something that you were designing?

EE: Maybe, maybe, yes of course, maybe. That depends on the position that I'm going to take. I do not know this yet. But I think that it happens, yanni, in the field you are required to do such things.

Researcher: Okay. So that's something where audience would definitely be very important.

EE: Yes, mmm hmm.

Researcher: So do you think it would be, do you think it would be useful to have some more focus on writing in electronics engineering?

EE: Yes.

Researcher: For the future?

EE: Yes, of course, yes. Writing and reading in general. And, uh, looking into resources, extra resources, and, I think this is re-, would be very useful.

Researcher: Do you think, umm, writing in electronics engineering is umm, fairly similar to other engineering disciplines, or do you think there's anything that's unique about it?

EE: Electronics?

Researcher: Yeah.

EE: No, uhh, mostly the technical things that, uhh, anyone outside the fie--, you will need some explanation, for anyone outside the field. Uhh, but people inside the field will, generally understand each other or the general terms.

Researcher: Mmm hmmm.

EE: It's not very different than...

Researcher: So it's probably the same in most of the engineering areas, do you think?

EE: Yes, I think, yeah.

Researcher: How do you think it's different from the writing that you did in Rhetoric?

EE: Well, the reports are different. We did not learn how to write reports or how to ummm format reports. Especially the engineering part and the sciences part that I have told you about, the tables, and, and I have seen this in school and I know that other universities have had this. It is very important. To think that such a ----- how you format tables, how you put the units, how the, the number of decimal points. The uhhh graphs, how you format the graphs. We do this in reports in labs. But we never focus, yanni, no one has told me ever since I have come into university, how to uhhhh, wri- how to format the tables. When I have di- yanni, when I've done things that I have learned at school, uhh, I mostly have been, yanni, criticized after-wh-, why are you doing this? Or, uh, they ask me why are you doing this in the first place? Why are you writing, why are you having decimal uh, yanni, uh, fixed number of decimal places in all the tables, why are you doing this? These are things that we read in, these are the professional that I needed in the field.

Researcher: Mmm hmm. So instead of laying out what the requirements are ahead of time, you're being told afterwards, how to do it.

EE: No.

Researcher: Or just that it was wrong.

EE: No. I-, no. The, the, on the other hand, when I did things I learned about at school, I mostly find assistants, yanni, ummm, ho- what's the word, curious about why I did this. We are not, this is not ---- yanni, professionalism. You write reports as, you, you just try to, you just have

	the table. It does matter if you put units, it does not matter if you have decimal places. It is not focused on at all, and it is not even known in the department.
Researcher:	Interesting.
EE:	Yanni, I have learned this at school, and I, did not find any-, anyone who knows this, an-, yanni, the assistants -----.
Researcher:	Very interesting. And this, has this happened to you in multiple classes?
EE:	Yes, yanni, this is a general thing, yanni, I, I've, I'm focusing on the table thing because it's the general thing that is learned in secondary school.
Researcher:	Yes.
EE:	How to, uh, draw a table and how to draw a graph are general things that we learned in secondary school. Of course there are other things that I do not know about. But the, presence of things that I know about and that the department does not tell me about reflects that there is a whole side, or there is a whole way of formatting that is not, uh, taken into account when teaching any courses or uh asking people to do reports and so on.
Researcher:	Okay, all right.

Student PE Interview – Petroleum Engineering

Researcher: So where did you go to high school?
PE: _____ in Peoria, Illinois.
Researcher: So you grew up in the States and you're attending school over here.
PE: Yeah, I moved over there when I was three, so I've lived all my life in the States.
Researcher: Cool. How do you like it here?
PE: It's good, like, I already, I had the language, I speak Arabic well, and usually we come down here every other summer, so, like, I came down here, and not like all the, most of the other Americans who came knowing nothing. I had family, I have friends, I have a lot of cousins my age that introduced me to their friends and stuff.
Researcher: Yeah.
PE: So it wasn't really awkward when I came here, it was just my second home.
Researcher: Oh, that's great, that's great. So this is your first year, right?
PE: Mmmm hmmm.
Researcher: So, um, how many petroleum engineering classes have you been able to take so far?
PE: Umm, right now I'm taking my second.
Researcher: Yeah. How's that going?
PE: It's going pretty good, it's interesting. It drew me in in the beginning.
Researcher: Yeah. So tell me a little bit about writing in your petroleum engineering classes.
PE: Well, so far since I haven't gone really deep into it yet, I haven't done much. Uh, last, my first class, we had to write, uhhh, a research paper on any topic of our choosing. Uh, which was, we had like a two to three week turnaround when he told us and when it was due.
Researcher: Mmm hmm.
PE: Uh, he didn't give a length--it was more a quality over quantity, but in the end I think I wrote about 1500 words or so.
Researcher: Mmm hmmm.
PE: This, for the class that I'm doing right now, uhhh, well they changed things up. They kept changing the professor who was going to give the class. One of the professors who was going to give the class who's not giving it now--at the beginning he sent an outline for the whole course, and one of the things was at the end of the semester, we had to turn in, uh, I don't remember how long the paper was, but it was a, several-thousand words essay along with a ten-minute project presentation. I think it was maybe at least five thousand words, uh, research paper. So he gave that to us, he, before we even met the guy.
Researcher: Yeah.
PE: And so, he was expecting it at the end, he was expecting, definitely expecting quality, more than the first class where we only had two and write a topic.

Researcher: Mmm hmm.
PE: But he got switched, so, and I don't know if we're going to do writing in this course so far or not.
Researcher: Yeah. So what class was that that you would have had to do that paper for?
PE: Right now?
Researcher: Yeah.
PE: Uhh, petroleum, uh, 301?
Researcher: Okay
PE: Uh, I don't remember the exact title.
Researcher: That's okay. I can look it up and check. So would that have been an assigned topic, or...
PE: Yes. The topic was he was going to give us a country, some country, and we had to uh, talk about, like, the petroleum resources there, how did they extract it, what k-, how was it trapped, and details in that.
Researcher: Oh, okay.
PE: But yeah, he gave us the topic and such.
Researcher: So, you've had in these classes, essay exams, and you've had at least one research paper.
PE: Yeah, yeah, the first class, all the, all the exams, they were...partial multiple choice, but the big points, the majority of the test was, uh, long answer. Well -------, but it was a couple sentences.
Researcher: Yeah, yeah. What class was that?
PE: PENG 201. Or 200. It's called Introduction to Petroleum ----. I remember that one.
Researcher: Okay. Okay, so, um, what kinds of readings or examples of professional technical writing in your field have you seen in your classes so far?
PE: Uh, in the first class, uh, the 201 class, he often brought us the clippings from academic journals. Uh, from the American Petroleum Society. He, he brought us several, numerous graphs and representations about uh, and statistics about Egypt's oil, and we had to interpret them.
Researcher: Mmm hmm.
PE: So he really pushed us there. In this class right now, uh, the guy that we have right now, he, he had like 30 years of experience in the field, so we're getting more from that aspect. But in the other class we, he definitely brought us academic things, and gave us, part of the test came from what we had to read off the American Petroleum Society.
Researcher: Oh, great. So part of your test was based on a journal article?
PE: Yes.
Researcher: Excellent. So you listed gathering research from academic sources as being particularly challenging in your field. Um, what, what additional things could professors do that would be more helpful in that area?
PE: Ummm, it'd be nice if they pointed to some, some of the journals or some of the things that we should look at. With respect to, like, before I, in the previous class I did a presentation not much actually writing, but it was on boiled (?) shale, and he asked for specific information, but we couldn't

really find it anywhere. And he, he knew the information, he knew it was out there. He, he had it in his head, but we couldn't find it anywhere cause of the vast amount of information, and we're still new to the field. So we didn't know where to look exactly. So if they can recommend certain journals, or certain, like the American Petroleum Society, know----going into this place where he actually knows that they have valuable information. If they can recommend some of these places and stuff, hint, hint, wink, wink, look here.

Researcher: Yeah, exactly. So there's not really a lot of hints there. So, um, how do you think you have been so far able to apply skills that you did in the Rhetoric courses, for example, to the kinds of writing you're doing in petroleum engineering classes?

PE: In terms of something like effective argument, so far of course, you know, not really, not much to do there. But in terms of gathering, like, um, I'm taking 201 right now, the research writing, and in terms of gathering the information and looking for sources, narrowing down your topic, it's very relevant.

Researcher: So there was a statement on the survey that you strongly agreed with that kind of surprised me a little bit. Um, "Difficulties in writing have affected my grades in classes for my major"?

PE: I did?

Researcher: Yeah, and it seemed inconsistent with something else that you said, so I just wanted to check if that was just an error.

PE: Yeah, I think so.

Researcher: Okay, that's fine, that's fine. It's just, I think you had, um, rated yourself as...

PE: Yeah, I think I'm a decent writer.

Researcher: Yeah, yeah.

PE: -------

Researcher: Cause you had said that, you had graded yourself as a good technical writer, so that kind of stuck out to me. I just wanted to check the discrepancy a little bit. So going back to readings for a little bit, like, this doesn't have to be exact, but how frequently, roughly, did you think in the class you're taking now and the previous class you took in petroleum engineering, how often did you get assigned a reading of, like, you know, a journal article or something like that.

PE: Not very often at all. In the one we have so far, we haven't done any reading at all. In the other one, uh, in the beginning, when he was just giving us the basic information we needed, and so near the later half of the course, if you take in account reading maps, graphs, and those types of statistics, we did it quite often, that was, the last two weeks were just reading these types of charts and data, and things pulled off of academic sources. But in the beginning, we didn't do any of it at all.

Researcher: Okay. Do you have to do a thesis for your major?

PE: Yes. At the end, so I'm not even thinking about that yet.

Researcher: Yes, it probably seems very, very, very far away. So, um, what kinds of writing do you anticipate doing, do you think, in the classes you'll be taking?

PE: I feel like I'll be doing much more, a lot of this more, research-type writing. I probably won't be, you know, you know, breaking new ideas or something that, but I, I'll be taking information from here and there, and combining it, organizing and such.

Researcher: Mmmm hmm. What about reports and things like that? A lot of the engineering majors seem to sort of go into that direction. Is petroleum engineering similar?

PE: I don't know much about that.

Researcher: Yeah. You'll probably find out in the next couple of years.

Student ME2 Interview – Mechanical Engineering

Researcher: So, you're in mechanical engineering.
ME2: Yep.
Researcher: And tell me a little bit about writing you've done in mechanical engineering.
ME2: Basically, like the bulk of the writing that I did was in a course called Engineering 101.
Researcher: Mmm hmm.
ME2: Which is Introduction to Engineering. We're supposed to write reports like we were acquainted with the methodology of writing report, like table of content, abstract, umm, what you basically put in a technical report.
Researcher: Mmm hmm.
ME2: Uh, and now I'm taking a course called Engineering 229, which is Strength of Materials.
Researcher: Mmm hmm.
ME2: And we are, required to write reports each week, for each lab.
Researcher: For each lab?
ME2: For each lab, yeah. So it's, it's almost like 15 pages for each rport, but it's..
Researcher: Sorry, how many pages?
ME2: Uh, almost 15 pages.
Researcher: Almost fifteen?
ME2: Yeah. And it's, it's more detailed than what we took in Engineering 101.
Researcher: Mmm hmm.
ME2: It's like we have to include everything like our lab observations, ummm, and actually write something, which is, which is very different from, umm, like in Engineering 101, most the people would do, do is just copy paste. You know?
Researcher: Yeah.
ME2: But 229, I think it's more, it's more like actual, like creativity but uh, originality somehow.
Researcher: Okay. Great.
ME2: I think that's, that's most of the technical writing we did. For now.
Researcher: Yeah. So you said that, um, work in Engineering 101 was helpful to you in improving your technical writing.
ME2: Yeah.
Researcher: So, you did mostly technical reports in that class?
ME2: Mmm hmm.
Researcher: Umm, so what, what aspects of the technical writing do you think that class was most helpful for?
ME2: I think, on like the reports as a whole, I don't have any preference for anything. Just like, actually know how, how a report should be written, like the steps, the steps of writing reports, an actual report, the division of the report. Like, you, you need, uhh, like you have, you have to have, for example, the abstract first to summarize your work, and table of contents,

and then, ummm, you have to include references, annotated for example. These are very important things.

Researcher: Definitely. Definitely. So when you, um, when you get feedback on those reports from your professor, was it mostly on the content or on language, style, formatting

ME2: I think mostly on formatting.

Researcher: Yeah.

ME2: Because sometimes professors don't bother going into, like, the details. They would be overwhelmed with a lot of reports. I guess, well actually no, that was for 101. But 229, we have like a teaching assistant who is, who actually looks at everything.

Researcher: Ahhh.

ME2: Like format, and wording, and like everything. This should be ---- here, this should be here, for example. So she is doing pretty good job -----.

Researcher: So very, very thorough feedback.

ME2: Yeah. I don't know that all of the teaching assistants are like that, but she, like the one that I'm, that's responsible for our lab, she's strict.

Researcher: There's always the one TA that's strict, isn't there?

ME2: Yeah.

Researcher: So, umm, these are the major mechanical engineering classes you've taken so far?

ME2: Yeah, they're engineering classes, not mechanical engineering classes.

Researcher: Okay, you're not into the Mech E classes yet.

ME2: No, no quite yet.

Researcher: Okay. So, what kinds of readings or examples of technical writing have you seen in your classes so far?

ME2: In my, like, in the class?

Researcher: If any.

ME2: Almost close to none. Like everything, like, uhh, the reports that we, that we looked at. There wasn't even a sample.

Researcher: No?

ME2: No, like we had to check, like outside our mind for example. There wasn't any reports discussed inside the class.

Researcher: Okay, so that's never been part of assigned readings or anything.

ME2: No, never. No, no.

Researcher: What kind of assigned readings do you have? If any?

ME2: None.

Researcher: None.

ME2: None. None.

Researcher: So you just, you probably get a lot of assignments and...

ME2: Yeah, like, for, for the 229 class, you would do the, the, experiment, the actual experiment.

Researcher: Mmm hmm.

ME2: And then you, like, later you have to turn in the lab report for the next week for example. The 101, was basically, a lot of theory and everything. Nothing about the report itself. Then, after a certain moment, the

professor explained to us how to do reports. And then we had to do it our, ourselves.

Researcher: Okay.

ME2: There weren't any readings, -------

Researcher: Okay, yeah. So, you said in the, umm, survey, that you had used the Writing Center. Umm, can you tell me about the assignments you went there to work on?

ME2: I, I went once, but for an English class. Not-nothing technical.

Researcher: Yeah. For a, like a Rhet class?

ME2: I was like, I was a freshman back then, and it was my first semester, and I was, and I had a very strict professor. She was like, uh, like, you need to, to write, like, put your references and make sure that they are like, they conform to, like, the ML, the MLA standards, like, exactly. So I went there, and they, I, I think they helped me, if I remember. Yeah.

Researcher: Okay. Was that for one of the Rhetoric classes, or...?

ME2: Yeah.

Researcher: So you agreed that more emphasis should be placed on writing at AUC. How do you think that should be done?

ME2: Ummm, I think more readings, like putting things that we learned into context.

Researcher: Mmm hmmm.

ME2: And, uhh, and yeah, like more reports, uhhh, writing them. Like focusing, because like, I can feel we're doing reports, but we're not following any particular standards. It's like, I think, like, uhh, teaching us all about th-, any technical writing standards to like, teach us --. I did, I still didn't take the 321 course, which is Technical Writing, but I want, uhh, we ------ in the course.

Researcher: So you're hoping to take that class?

ME2: I'll take, I'm gonna take it. I wanted to take it, but I'm a sophomore now--this is my second semester in my second year. I wanted to take it, uh, the first semester of my sophomore year because I already finished English.

Researcher: You jumped all the way to 201.

ME2: Yeah, I emailed Dr. ____, and he told me, like, I have to be a junior to take it. So I'm taking it next semester, hopefully.

Researcher: Great, great, that's very good. Um, if you had a writing class in your department, writing for mechanical engineering, what would you think a class like that should focus on?

ME2: Ummm, the standards, pretty much. Uhh, like link things to an actual project ----- that would be nice. Like having a project that that you use to write technical reports about it. So we have a feel of the use of technical writing and, if, if you're gonna need that skill, I'm sure you're gonna need it like, for, uh, if you're going to work as a mechanical engineer. Cause, like, you're not a robot, like, uh, like, you have to communicate somehow with other people.

Researcher: So you'd say definitely focusing on reports, and...

ME2: Yeah, integrated into the -----

Researcher: Yeah, yeah. So actually what you're suggesting sounds like what I think some universities have done, which is to have sort of a project class, and they run a writing class concurrently with it, so as you work on your project, you work on developing your reports.

ME2: Yeah, that would be nice.

Researcher: So you think something like that would work well for mechanical engineering, and the type of work....

ME2: Yeah. Or maybe like, do a class, and it's focused on, on a project, like an engineering project, like, and in the same class, teach, uhhh, technical reports.

Researcher: Mmm hmm

ME2: So like, people wouldn't, wouldn't be obliged to take two different classes, for example. And it would be more coherent between technical writing and the project itself.

Researcher: Yeah. That was a good idea. I imagine your um, schedules are pretty....

ME2: Yeah, it's a lot.

Researcher: So you made another interesting in the survey about, ummm, having engineers actually come and talk about the role of writing in their work and how important....

ME2: Yeah, that would be nice.

Researcher: Um, do any of the professors emphasize the importance of writing, so far?

ME2: I think, yeah, I think, ummm. Like, the Engineering 229 class, we have, we have a lecture part which is like the class theoretical and the lab part. The professor in our theoretical part emphasizes the importance of technical writing like in, uh, in the lab.

Researcher: Okay, great.

ME2: Some professors even, um, in other engineering classes where where there is no tech- there are no assignments for technical writing. Like, for example, if was to emphasize that we would actually write, the,---- communicative way, for example.

Researcher: Mmm hmm. Okay,

ME2: But just like numbers, equations, ----, you know?

Researcher: Yeah.

ME2: But like, I don't know, like, sadly like, for like, my friends, I think most of my friends wouldn't like another writing class. They'd be like, "Ahgh, I get it, writing, I get it" you know? So maybe I might be an exception.

Researcher: But do you think that ---- that would be important later on, like when you go out and work?

ME2: I would definitely take it. Very, very important. That's what I think.

Researcher: And the professors, mention this or emphasize this, or talk about their experiences?

ME2: They talk about their experiences, but they never mention technical writing in their experiences. I think, not yet.

Researcher: Okay, all right.

Student AE Interview – Architectural Engineering

Researcher: Okay, so first, um, please tell me a little bit about writing in architecture--you're a double major, right? Architecture and art.

AE: Yeah, and a minor. Islamic civilizations.

Researcher: So can you tell me a little bit about writing in architecture.

AE: we, we usually have boards that we have to write analysis, cause the content itself is important in architecture. So that's one of the exercises of writing in architecture. But in art it's more like analysis, cause we get like umm, an architect that we have to write about his art, analyze, so that's one thing. And of course, in the Islamic civilizations, I take Islamic architecture. That's all writing. I have to do analysis for the whole building, everything.

Researcher: Ahh. That sounds fascinating.

AE: It's fun.

Researcher: So you mentioned on the survey that work in a few different classes were helpful to you in improving your technical writing. You mentioned um, Architectural Engineering 314, 334, 490, and you mentioned a general engineering course also, I think, engineering 229.

AE: Yeah, yeah, that one. Cause we have to write uh, lab reports. It's another, it's different form of writing, but it is analysis also, so we get different types of, we have to write a, a report about the lab work, and, and then, sometimes we need to do a presentation of what we did. So that's also another thing. And um, what else? Trying to remember other courses. Oh, the, that 414 is mostly, uh, behavioral science.

Researcher: Mmm hmm.

AE: So we need to analyze uh people's behavior in order to create, um, to create a space. So we do surveys and interviews.

Researcher: Okay. So um, what other types of assignments have you had in those classes that you thought were useful?

AE: I did write, however, that um, they have to focus more on writing. Like the history courses. In Architecture, we don't really have history courses. At all. So I did write this in one of the reviews that I have to write about the architecture in our department. So that's one negative point. And I'm already going to graduate this year, so I'm not gonna have that.

Researcher: Yeah, yeah. So what aspects of your writing do you think improved as a result of taking some of the classes that you mentioned, that did a lot of writing?

AE: The logic of putting out the information like, I can take a big piece of writing and summarize it to the point. So I can understand what it's about. Cause there are tons of books that are a hundred or two hundred pages that you have to read, and come up with that idea about in the book. So that's one thing. And I took philosophy classes, philosophy in art, and the core courses also.

Researcher: You've been very busy haven't you?

AE: Yeah, since seven years.

Researcher: Wow, so you're probably very happy to be near the end now.

AE: It feels like forever, I swear. But I'm applying to do masters, so the journey's gonna continue. And PhD, hopefully.

Researcher: I understand. I have both of those as well. So, umm, in your architecture classes, what kinds of reading assignments do you have?

AE: They really don't focus on reading assignments. Like, they put it in the syllabus, just to have a reading assignment, but we rarely discuss them, to be honest. There was one, one only course, I can't remember the, the name of the course, but I do know the doctor, Dr. ___, yeah?

Researcher: I know Dr. ___.

AE: Yeah? She's the only one that focused on discussing the wri-, the readings that we did. But the others -----, no we don't really. If you want to learn, you'll learn, but they're not gonna give you assignments to read.

Researcher: So they're not discussed, but what kinds of readings are they? Are they, is it, textbook, or articles...?

AE: Both articles and textbooks, yeah. For the, the 456 --- class, she, the first assignment was to uh, read a certain book and criticize it. So that's the purpose. I think it was Dr. ___. 456 ------.

Researcher: So you've seen examples of professional writing in your field through those assignments.

AE: Yes.

Researcher: So you mentioned, um, going between words and other forms of representations as being um, challenging in your field. Can you tell me a little more about that?

AE: Some people have problems with translating their design into words. Umm, so um, yeah, that's a problem. But they don't really focus on how you present your ork in writing other than the, the board, how it looks, presentation, how it's organized, but not the, no one really reads what you have on the board. I know. I have a problem with being too honest.

Researcher: I'm looking for honesty, so please go right ahead. Um, so, what additional support from your professors or whoever in the department would be most helpful in improving in that area?

AE: I'm thinking. I don't know. It's never been a problem for me, so I've never approached anyone with this problem because I don't have it. But I guess if I have it, I wouldn't know who to go to really. No. Cause we don't have a course that's specifically targets this problem.

Researcher: Mmm hmm.

AE: So I don't know which doctor can address it.

Researcher: Yes. So do you think it would be useful to have a course in writing specifically for architecture?

AE: Yes, of course. We have elective courses, and they're always related to landscape and so on. We do have a problem with the department because they're, umm, the doctors are not, the ratio of doctors and students, it's not really good so. They try to focus more on the architecture courses, cause we only have one landscape course, one sustainability course. So by the

electives, they try to put more of these courses, but they forgot, they forget about the writing.

Researcher: Mmm hmm.

AE: But I think that's important cause AUCians, what makes them better than the rest of this, general students, is our language and writing skills. So if we don't focus on this, we will lose one point of advantage, I guess.

Researcher: Yeah. So, um, if there were a course like that, um, are there particular forms of writing common in architecture that yowould want to focus on, in a class like that?

AE: Mmmm. Well, cause it's architecture, it's mainly about marketing your project. Um, so if you got, you need visuals of course, but you need to convince your uh, audience of your project, by writing and by the presentation skills. Also some people have a problem with presentation skills. And we don't have a course about this also. Like, um, I do my thesis presentation like, last Saturday, and most of my group had a problem with being brave and talking, cause it's a big hall. It was scary. So yeah, that's umm, a course that we need also in our department. They don't teach-, yes, we do a lot of presentations, but it's different. They don't really prepare us well for the, for the thesis. And mostly the thesis, my thesis this semester, the first part is research. So it's all writing. So how can you link writing and data with architecture and visuals? We don't have that in architecture. We don't have a course. So we have to learn it on, on our own.

Researcher: That sounds challenging.

AE: It is, it is.

Researcher: So, um, so in your classes you, you do designs and you have to write about them. When you write about them, what do you need to include?

AE: It's, uh, mainly the writing is the concept. For example, like, the first part of the, of the presentation board is if it's about the concept, my ideas, how I came up with this, what's the process of the work. And, um, what's creative about this. And then later on, I'd put the plans or something, and then analysis. Just a small piece of analysis in front of every-, inspirational pictures maybe. Yeah, that's it. The rest of the thing is just pictures and datas and, eh, just a teensy weensy piece of introduction. And that's it.

Researcher: Okay. Um, on the survey, you were neutral about whether the professors provide clear guidelines for writing assignments. Um, what do you think you, they could do to make them more clear?

AE: Mmm. I, hmmm. With the doc-, with the 456, the assignment wasn't really clear. I think the doctor didn't understand the assignment. Cause I was, I was, con-, confused about do I analyze the book, or do I analyze the writing itself, or the topic? It was confusing. So even the way they explain the assignments is a bit confusing.

Researcher: Yeah. So it's not really clear what you're supposed to do or what they're asking for.

AE: Exactly. You have to ask around and collect ideas and then you do it.

Researcher: Now, if you ask the professors, do they give you more clarity, generally?
AE: Yes, of course, yes, generally.
Researcher: Okay.
AE: We have also a problem with the reference. They, we have works, we put our work, but we rarely reference them. That's a problem, I know, cause now in the thesis, every single picture, every single data, every single everything, you have to reference.
Researcher: Mmm hmm.
AE: But this is stresed now, not before.
Researcher: What style of referencing do you use?
AE: MLA.
Researcher: MLA.
AE: And we usually use the citation machine.
Researcher: Yes.
AE: We don't do it ourselves, even. I know I took it in English, but it's easier to just use the MLA with the citation machine.
Researcher: Yeah, yeah. No, that's, that's a good, helpful thing.
AE: Yeah.
Researcher: So you're actually using the, the same that you would have used in English, the MLA style.
AE: Yeah, yeah.
Researcher: Yeah.
AE: And cause I take Islamic architecture courses, I have to write really good papers. And I have to use, umm, footnotes and everything. Otherwise it's gonna be plagiarized.
Researcher: Yeah.
AE: But not everyone takes the minor as I'm doing.
Researcher: Right.
AE: I, I feel that writing is important, and it lacks in my department, so I took Islamic architecture to make up for this. Not everyone does that.
Researcher: Very true, very true.
AE: They're never going to do history courses now. I have to take it somewhere else.
Researcher: Yeah, yes. So um, so you've experienced writing, really, in a few different areas now, so, how do you feel that writing in architecture is different from writing in your other concentrations.
AE: Well, the Islamic architecture is a bit related because I'm doing Islamic architecture. I was surprised that it had to be a different, uh major, or minor. I thought it would be the same, but no, it's a different department.
Researcher: I'm kind of surprised, too, I would, I would have thought you could've concentrated within your major. That's very interesting.
AE: Yeah, exactly, right? It's so strange. But I found the link, so I took it.
Researcher: Yeah, definitely.
AE: Yeah. What's different? Mmm. Well, the papers, of course, in architecture we don't have huge papers. I have to do papers, and, like

minimum thirty pages or so. And I do museum pieces, I have to do tons of field, field trips, tons of field trips.

Researcher: So when you do those, what do you need to write about?

AE: Uhh, like if I go to a museum, I have to pick a piece and write an analysis about it. So I, I have to search for the history of this piece, the, the, umm, origins and write about it, and then do some analysis. Some basic analysis of how it looks, the object itself, the materials and so on. And then I have to add my analysis, my own opinion of it. Yeah. So it helps me with research, cause now I'm really good at research, I can find anything, thank God. And at the same time, this is another problem people have. They don't really find the, um, the materials they want. And they never taught us how to use--I passed my LLT course, I took the exemption exam, but most of the people, one of my friends didn't take the course yet, and she's graduating. She's ha-, she's been having searching since then.

Researcher: And so which course is that?

AE: The LLT, it's the library?

Researcher: Ah, okay.

AE: Yeah. I went there, I didn't even know there's an exemption exam going on. But I just went in. And I found out that they just ask you to research for things. So I started researching. Apparently I passed. And, so, oh, and another thing. Uh, in our department, they don't really force you to, to go to the library, so most of the students haven't even been in the library before. I've never been to the architecture section, except like twice.

Researcher: Mmm hmm.

AE: But my Islamic, um, I, my Islamic, um, minor, I live in the rare books library. Really. Like, I've read tons of books because of this minor, not because of architecture. It's a shame. It's a really sh-, it's a shame. I would've wanted to read books, but...I don't know. Cause we have a lot of loads on us, I don't have time to read except if it's an assignment.

Researcher: Right, right. So do you think if, in architecture, there was some more emphasis placed on the readings and analyzing the readings, that would be helpful with writing and research?

AE: Definitely, for me. I know people will hate me if we do this. But yes, for me, cause I want to learn, yes. I have said this before, and people would like, look at me and say, no, this is just what you want. We don't want that. But, come on, you have to.

Researcher: So, do you expect in um, whatever work you do, obviously you're gonna go to graduate school first, but eventually you'll be working, you'll be doing a lot of writing?

AE: Thirteen years! I don't know about that. I did an internship in construction, and I'm gonna do one in architecture in the summer. And um, it's basically Arabic. Everything is in Arabic. I did work in an NGO before, and um, I just did translat-, translation. And, but usually, I don't think in work I need to write a lot.

Researcher: Hmmm.

AE: No, one, some of my friends, they graduated already, they just tell me about hilarious emails that they get from their bosses and from respectable people. The writing is horrible.

Researcher: So eve-, even for just basic communication, the English...

AE: Yeah, even, yeah, basic. Like I have samples on my, because it's funny, on my phone. They send me pictures of what is written. Weird English. So it's funny. Yeah, it's a problem in Egypt, I don't think, umm, it's used a lot. Although we do work with foreign countries, I don't know how, how they manage to communicate. Strange.

Researcher: In your classes, do the professors speak English mostly, or do they slip into Arabic also?

AE: No, they do speak English, but that's because we're architecture. I took engineering courses. Engineering courses are all in Arabic.

Researcher: Yes, I think somebody told me that before.

AE: Yeah, oh my god, it's all in Arabic. Like um, hmmm, what sort of courses? The 229, the, um, yeah, it's totally in Arabic. Unless there is a foreigner in the course, but usually they don't take uh, course in engineering.

Researcher: Yeah.

AE: Yeah. People in mechanical engineering, they all, I had a, a friend from America, and he, he was taking a mechanical course. He, he had a problem cause the teacher would always speak in Arabic. And, cause it's easier, I guess.

Researcher: Yeah.

AE: Yeah.

Researcher: Yeah, it does happen.

AE: Especially in engineering. The terms are really hard.

Researcher: Yeah.

AE: But no, in architecture it's all in English. We have a lot of, uh, professors from different countries, so, that's one thing. Like from Germany, yeah.

Researcher: Yeah.

AE: I don't think that's a problem.

Appendix F
Transcripts of Professor Interviews

Professor ME1P Interview – Mechanical Engineering

Researcher: So you are Egyptian?
ME1P: Yes, of course.
Researcher: And your native language is Arabic, of course?
ME1P: Yes.
Researcher: How many years have you been teaching?
ME1P: My entire life?
Researcher: Sure. Or teaching mechanical engineering.
ME1P: Umm, faculty member and TA both?
Researcher: Sure.
ME1P: Since 1989?
Researcher: How many years have you been teaching at AUC?
ME1P: Since 2002.
Researcher: So, about how many pages of writing are students required to in your classes during a semester including essay exams questions and things like that, papers, lab reports.
ME1P: The problem is that I am teaching some ki- uh, let me phrase it. Ummm, in the undergraduate, looking at the grads or undergrads?
Researcher: Undergraduate.
ME1P: Okay. My own courses in particular are not uhhh, like essay -----, because um, I teach designs. In designs, we communicate in drawings.
Researcher: Yes.
ME1P: And the drawings have to go to the workshop, so, it's almost, maybe I'm the least in the whole, uhh, in the whole department. But I look after the umm, final graduation thesis.
Researcher: Mmm hmmm.
ME1P: I'm its coordinator--that's where I know Dr. ___ from. And uh, there we have to, we ask the students to uh, to write something like uh, actually the reports are, are about between 80 and 150 pages.
Researcher: Mmm hmm.
ME1P: But of course that was decided, I'm just the coordinator. But within in my courses, uhhmm ----, the amount of writing is really uh, -----. But mainly uh, one thing about AUC in particular is that, uh, there is high emphasis on, umm, the core courses.
Researcher: Mmm hmm.
ME1P: So that um, limits the amount of time I will ---- for the students to get trained on the machines and the drawing. So I have to redo again, or at least press much in that direction so that I can compensate for the amount of time I have. I'll give you an example. I know that ------- main thing...
Researcher: It's okay.
ME1P: For example, uh, in the Egyptian universities they have for example for the drawing, something like a full year. Here we get one term only. And

then in the design, they get the whole year, here we get one term only. So uh, I ---- on that too much. The amount of writing is really -----, because they have to do it on, on the computer, and then I, I do the, the marking directly on the computer.

Researcher: Mmm.

ME1P: So uhh, they have to file, maybe in the very end, they have to write something, maybe like a description of what they did, but that wouldn't go further than, more than, uh, maybe two pages or so.

Researcher: So it's a very brief report at the end.

ME1P: Really brief report. And I think that, uh, your best bet if you go for one of the professors here, that uh, teach materials engineering.

Researcher: Okay.

ME1P: Because there they have to present repor--they have to report in writing.

Researcher: Okay. So in the writing that the students do, what expectations do you have for their use of English?

ME1P: Ummm, well mainly, umm, the umm, technical terms are my main concern. Ummm, and umm, and I wouldn't say, I wouldn't say more than that because uh, actually after-, afterwords, uh, ----- this part, like English language part, the part where they will write reports and so on, are covered in many courses. But I have to preserve my own time because it's so, like, you know, crushed down. I have to put emphasis on the drawings, because we have, we've been having havoc, because of that, and we have uh, ------ allocation. And at the same time you have to teach them to use the software on the computer.

Researcher: Mmm.

ME1P: So, uhh, I wouldn't say that uh, but my main emphasis here is the technical, the technical terms that are used in the, uhh, uhhh, in the real life practice, more than anything.

Researcher: Okay. That makes sense. So um, in the writing they do do, do you consider language as well as content? Is that weighted at all in grading the writing that they do?

ME1P: Umm, no.

Researcher: No. Umm, do you use scoring rubrics at all?

ME1P: Do I what?

Researcher: Use scoring rubrics? When they write?

ME1P: Ummm, you want, you like, you like to see how, how do I mark them? ---

---

Researcher: Sure, sure.

(*on the computer--just shows the grade sheets and how the designs are scored, not really related to writing, also phone interruption*)

ME1P: I think for your own class, maybe you have come to the umm, to the most ---- professor. It's because of the nature of what I teach

Researcher: Okay.

ME1P: Because the rest of the professors are not like that by the way. It's totally, uh, it's totally different. But, uh, it's the flavor of the subject itself, which doesn't, uh, maybe um, within 16 or 17 professors in the uh, of faculty

members in the department, I would say I'm the least one who um, has to go through uh writing essays or uh, reports.

Researcher: Okay.

ME1P: Maybe, maybe I can give you names.

Researcher: Yeah, that would be very helpful. Do you mind if I ask you just a few general questions?

ME1P: Oh, sure, sure.

Researcher: Um, so do you think that students majoring in this department get enough writing experience to support their goals whether it's to go to graduate school, or professionally.

ME1P: From other professors, from other professors, yes. But, in particular, me, I don't think, uh, well, it's not only because of me, by the way, it's...

Researcher: Well, you're constrained.

ME1P: Yeah. I have to make sure that they're coming out with good drawings.

Researcher: Do you think students read enough original literature in your department?

ME1P: No.

Researcher: No. Do you think that would help--?

ME1P: Original--what do you mean by original literature?

Researcher: Umm, journals, journal articles...

ME1P: No, no. Actually, uhh, they develop a habit of uh, like, uh, wanting to go to the least amount of uhh, of reading.

Researcher: Mmm hmm.

ME1P: The main reason is that, you know, engineering by itself is, uh, is cumbersome in its uh, projects and uh finals and so on. It, uh, it takes too much time. So when I have the students umm, try to read and umm, get new ideas through reading, by most you'll find something like, uh, if I just tell it like this, I'll be lucky if I get two out of forty reading it on their own. If I press for it, uhh, if you don't do it you're not going to be getting marks and so and so, you'll get something like from the forty, you get like twelve. And the rest will just assess how much, how many marks are we putting on this one.

Researcher: Right.

ME1P: If you don't, if you do not find, you know, they are very smart ----, so if they do not find too much marks, then okay, who, who cares. I'm just shooting for the B+ or the A- or something like that, by, by ------, so why should I care about that?

Researcher: Ahhh.

ME1P: If I press too much about it, they'll start screaming, but they wouldn't again do it. If I press even more, they'll do it, but uhh, I tried it once, but actually still those who want to do it were the good ones. So, uhh, but in, in the, maybe I can, I cannot tell for some of the, some other courses because, because I didn't get, like, in deep with the, with the professors and what did they do. Uhhh, but I presume reading uh, textbooks and so on, you asked about reading journals.

Researcher: Mmm hmmm.

ME1P: No, journals in particular, there is another problem there. Usually, journals, scientific journals in engineering, their level of uh, the equation level is far beyond whatever we get in the undergraduates. So if students in the undergraduate feel like you're, you'll be cracking their skulls. Even, by the way, in uh, in all other universities across uhh.

Researcher: Mmm hmmm.

ME1P: If you asked them to go for uh, for journals, for example like the American Society of Mechanical Engineering, um, no, they wouldn't be able to read those.

Researcher: Okay.

ME1P: But umm, I wouldn't worry about that because this is the situation here, it's the same situation at the University of _____, the same in ___, the same in _____ University, --------

Researcher: Okay, um, what types of assignments would you think would be most important to develop good writing skills in mechanical engineering?

ME1P: Okay, umm, I would say those who have courses, okay, sometimes you have, in, not in my own courses, the two courses that I regularly teach. But in some other courses, actually in the majority of them, the students, they have to uhh, like, file the reports about uhh, how did they find, uh, the calculations.

Researcher: Mmm hmmm.

ME1P: So uh, courses on industrial engineering they might develop something like that. Definitely those of materials, because they, they, they write reports.

Researcher: Yeah.

ME1P: Yeah. And for example, when they do, like, uh, materials -----, on the machines, they have to write the procedure of uhh, I know they do that. Umm, I believe also, ummm, courses like maybe, you met Dr. ___, the one who brought you here.

Researcher: Mmm hmm.

ME1P: I believe in his courses they, uh, submit uh, like written, written projects, not big ones, but uh, still uh, they get something out of there. Uh, actually most professors, I would say, except, unfortunately, me and Dr. ___. We are the only ones who have to stress too much on the drawings, -------

Researcher: So, if, if time and resources for grading and everything else were no object, um, what kinds of writing assignments would you give your students?

ME1P: Uh, in my own, in those two, uh, I wouldn't.

Researcher: No?

ME1P: No, uh, actually I, I, I taught at uh, at ____ University before coming here, I stayed in Canada for, for about uh, seven years, and I was also teaching in Canada, and I, I never went into that, because, usually, I in, in Design, the course that I am teaching, I have to stress much on the drawings, because at the very end, uhh, the engineers, they have to submit a drawing that will go to the workshop, and then from reading the drawing, it's their

guidebook (?). So from reading the drawing, they have to, uh, manufacture. So uh, this is the part that I'm, I have to stress.

Researcher: Mmm hmm.

ME1P: But umm, okay, I'll tell you something. For example, I had to teach uhh, the MENG 229, which is the, umm, ----- Materials course, but I taught it only once as a replacement of another professor. No, there I have to make them write.

Researcher: Yes.

ME1P: Yeah. It's uhh, it's imperative. I can't just take some numbers and uhh, and they throw it in my face, so uhh, in, in a course like that, yes, but in these two weirdo courses, I mean they can write in very good language, but at the same time they can produce drawings that when we go uhh, to the workshop to manufacture, it will mean that the, um, everything will collapse. So they, so I have to ---- that. But uh, in this particular course, I don't think that it's umm, ummm, it can be--I'll tell you something, maybe if I had more time. Maybe if I had more time, I would uh, ask them for example to describe umm, uhh, the steps of their designs. But again, when they do so, it will be umm, they wouldn't be hav-, having too much room for you know, being flamboyant in what they uhh, they tell. They would just be a little bit mechanical.

Researcher: Well, that's an aspect of technical writing.

ME1P: Yeah. But it would, even more dry what they--because the steps are known. It wouldn't differ from one student to the other, so uhh, so I gue--, but still it can, it can, it can be helpful that they get like a technical report of what they have designed and so on. So that might be of help. But given that we have only three months, and I ask them to uh, to learn like two pieces of software, and at the same time, umm, like, uh, cover up for the limited time slot that they have put and ummm, in the drawings that they take it in the early courses and they are so crushed, so I have to release some things to make room for it. But, uhh, as I told you, umm, this is not the case at all with the rest of the, maybe, the person who will be, who will be in the same problem, and not fully, would be Dr. __, who teaches the drawing course.

Researcher: Mmm hmmm.

ME1P: Because when they submit drawings, the drawing is the drawing.

Researcher: The drawing, yeah.

ME1P: Yeah, nothing is to be told about the drawing. But in, for example, manufacturing courses, no, they make experiments on the machines, and they have to submit reports.

Researcher: Mmm hmm.

ME1P: And in their reports, they have, they have to write, and they have to talk. It's just, if I had known it was something like this, maybe I should have told Dr. ____, who directed you to come and, -----. It's just because I'm teaching, uh, the peculiar courses inside the department.

Researcher: Mmm hmm. Do you oversee undergraduate thesis writers, as an advisor?

ME1P: Yeah, I mean, I can talk much about this.

Researcher: Yeah, yeah, I mean, that would be great, too.

ME1P: But uh, on those, on those two particular courses...

Researcher: So in the thesis writing, what do you see as the major weaknesses?

ME1P: Okay. A lot. A lot. And I can't believe that these are students at AUC, because umm, the grammar mistakes.

Researcher: Mmm hmm.

ME1P: I would say, I would say because uh, students, umm, and I guess that would be a problem in engineering. Even when I taught in Canada, I found that engineering students are having this kind of a problem more than other students. Uhhh, I guess I talked to other students, but it's from, from talking. It's because they are obsessed with getting a final answer right, so, they keep writing about anything til the very last, not minute, but second.

Researcher: Mmm hmm.

ME1P: And then, they were absorbed seeing someone who wrote about it, and just to ----- they will look at it, get excerpts, and then try to ---- it by any means----and then -------.

Researcher: Mmm hmm.

ME1P: The, the problem with uh, writing is that you, that there is some kind of um, artistic flow of uhh, and you have, you have, you have to have your heart relaxed when doing it. And by engineering ----- are not into that direction because they are bulky. And we can't not, we cannot make them bulky. So, and the tendency of the students of leaving things until the very last end.

Researcher: Yes. Of course.

ME1P: This is really bad. So, um, unfortunately, you find that the students, when they come to the last, to the final levels, ummm, especially the grammar mistakes, you find a lot of them. Sometimes you find that the style itself does not reflect what they should say. Uhhh, sometimes they are short of vocabulary. Uhh, no, you know, you have all sorts of uhh. And I don't know if we didn't have Turnitin, what would I have done, what would they have done? But the thing ---- from time to time, actually most of the time they have one of the, or two of their colleagues who are good writers. So if you have a group of six, they will just, you know, assign this good writer, and he will take care of things, but that doesn't mean that the rest are good.

Researcher: Right.

ME1P: And for, for the, for the good reports that I have seen, uhh, it's because they have the, someone who is having an artistic flavor in his life. And, they just, uh, go to him and he is helpful and can help you and that's it. But for the rest, for the rest it's not just -----. And I don't think it's because of, that's my own opinion, I don't think it's yanni, the main reason, uhh, it that the professors, uhh, their professors for example, in engineering they don't ask them to write reports. Or that in the core courses their professors did not do their job. It's because of the nature of what they have to learn.

Researcher: Mmm hmm.

ME1P: It's too indulging, and uhh, unfortunately, -------, then we will harm them, but there's too much depth that they have to bear compared to other disciplines, puts them at, you know, writing things at the very last minute. Unless they change the behavior of the ----- -------

Researcher: Doesn't seem very likely.

ME1P: But definitely, um, we have, I think we have problems. ------

Researcher: What do you think their major strengths are in their writing?

ME1P: Their major?

Researcher: Major strengths.

ME1P: Oh, strengths. Umm, making literature, literature review. When they reflect the ideas of others. The problem is always when they want to reflect their own ideas. Because, again, they have to have it, in uhh, when they talk to each other, they wouldn't uhh, let me give you an example.

Researcher: Mmm hmm.

ME1P: In umm, in some cases when they use, uhhh, umm, technical terms, they wouldn't say the technical term as it is. They will just resort to its symbol. Maybe this is something symptomatic of Egypt in particular. Umm, when I taught in Canada, uh, students used to say, uh, I used this so and so material with an ultimate tensile strength of uh, 150 megapascals. Ultimate tensile strength. Here in Egypt they would say, sigma ultimate. Cause when they write, they write the symbol sigma, and some of them ------. Okay, I believe this has to do, again my own humble opinion -----. It has to do with our Egyptian dialect in speaking Arabic. Umm, the Egyptian dialect always resorts to the easiest thing to be said. For example, Tunisians, or the, umm, the Syrians, or the uh, Kuwaitis, will be speak-, yanni, sometimes they will use the harsh parts of the Arabic. We'll just get rid of it and see the easiest thing to pronounce it. So we have like tendency of even by the way, there are some parts of the Arabic that we speak here in Cairo, when you go to the peasants in the umm, countryside, you will find them like lazy to continue the letter until the very end. They will just, uhh, like, you know, take away some letters. So it's like, it looks like this kind of culture is even ----- in the engineering area. So they will just use symbols. So, uhh, when they write, for, for example, you will find, I'll give you an example. In, in the United States in particular, they are so obsessed with abbreviation.

Researcher: Yes.

ME1P: You, I, you wouldn't find it in England, okay, uhh, Canada I would say halfway but more to the United States side. But the thing is that, umm, if you have in the speaking, you just capture abbreviation and then you keep going, and then ---- okay, what is this? ------- It's the same thing.

Researcher: Mmm hmm.

ME1P: So they usually like to resort to uhhh, using accepted abbreviations. And then when they write, uhh, like a set of equations or something like that, uhhh, they just get rid of many things and here is the thing that you make use of and go away. So uh, why was I answering, I forgot, what did I answer--?

Researcher: Oh, we were talking about major strengths of the students' writing and we sort of drifted back to weaknesses.

ME1P: Oh, yeah, yeah, back to weaknesses. Umm, I would think that when they describe the work of others. Now, there they do not have to, like, describe numbers. They describe ----- stuff like that, so like if they have to uhh, just you know like, uhh, read about them, get new way of thinking about what, uh, the others have done, and when they express it, you feel that they are at ease with it. But when they have to describe whatever they have done, usually because they do not have their own, really their own ideas, they are just you know, ------ or get the pieces from here or there, so, they will just recalculate it like this and here is the application. Uhh, like for example I remember, uh, one of the professors started shouting, one of those ----- exams. They used to get abbreviations from a piece of software, assuming that the software is well known to everybody. So, ----- but keep that away and let them speak about, for example, the ---- that others have done that they can find on the net, stuff like that. That's where you get the, that's my impression --------.

Researcher: So what measures do you think would be necessary to improve students' writing, especially in, um, dealing with their own ideas, describing those?

ME1P: Maybe I have an idea, but ummm, maybe in the courses, there should be something like uh, an exam when they have just to write, not calculate.

Researcher: Mmm hmm.

ME1P: But unfortunately, unfortunately, that wouldn't be (*someone else comes in*) --no, no we need you! (*Other irrelevant conversation*) I believe this might be happening in some, some courses. Maybe, I'm not so sure about it, but uhh, maybe in the materials group, they ask them to do that kind of writing I believe. But again, if we allocate, for example, ---- midterms for all, for, for each course, and if the professors allocated a midterm, one, calculations here and another set of calculations there, how can he inject a piece of writing? That would be a challenge.

Researcher: Right.

ME1P: Because in the exam they have to just sit down and do it themselves.

Researcher: Mmm hmm.

ME1P: If you just assign it to them, and then they go home, they just go for the net and then look, whatever have others done, and then to go away from plagiarism and Turnitin, you know, they will just try to -----.

Researcher: Yes, yes.

ME1P: By the way, there is something else that might help. Is that if they uh, grasp the materials that they study really properly.

Researcher: Mmm hmm.

ME1P: Actually it was ____, we asked him to uh, come here and tell them about technical writing. And then what he told them that the idea that you can speak about easily is the one that you really understand. Now we have a problem here is that in, in, especially it's epidemic, not only in Egypt, but it's epidemic to engineering, is that you have some of the students who really understand like, the, the, spirit, or they grasped uh, the whole thing

of what they are studying, and these are very few. Others, they know how to go to exams and get the marks, and it's really different, okay if you get uhh, a problem asking for so and so and so. Then you have to do so and then do so. Okay fine, but how do you find out what's that? Was it like we were sleeping and someone came and uh, during our dreams and told us about it? Usually, the student who will be able to express his ideas is the one who really grasps the, like the basics of the whole thing. And these are unfortunately very few. I think I'm pessimistic.

Professor AE1P Interview – Architectural Engineering

Researcher: Are you Egyptian?
AE1P: Yes, Canadian as well.
Researcher: Egyptian-Canadian. Is Arabic your first language?
AE1P: No, English.
Researcher: How many years have you been teaching Architectural Engineering?
AE1P: Here or anywhere?
Researcher: Anywhere, and then here at AUC.
AE1P: Um, how many years total? Eighteen.
Researcher: Okay. And you've been at AUC?
AE1P: At AUC, um, teaching architecture for, since 2007, so that's five years now.
Researcher: So approximately, very approximately, how many pages of writing like including essay exam questions or research papers or assignments like that are students required to do in classes that you teach per semester?
AE1P: That I teach? Umm, one of them, none at all whatsoever, it's a ---- graphics course. The other I would say about… The final they have to submit about 70 pages, but then that's done in drafts throughout the semester.
Researcher: Mmm hmmm. What expectations do you have for the students' use of English in their writing?
AE1P: High expectations. I don't always get them, though.
Researcher: So when you say high expectations, what are you looking for?
AE1P: A high level of scientific use of the language, appropriate use of terminology, just a mature way of communicating ideas. I expect them to be able to form a logical argument. Umm, I expect them to have an ability to select appropriate sources, and to be able to use those and cite those in text. Umm, I have a zero tolerance for any forms of plagiarism whatsoever, and I've been kind of crusading for this for a while. We, because of our discipline, we sometimes have this feeling that plagiarism doesn't apply to architecture because it's such a creative discipline, but I'm trying to fight that kind of assumption and make sure that anything that's written is written scientifically, properly, and well cited and everything else.
Researcher: Okay. So you probably consider language as well as content when you are grading students' writing?
AE1P: Yes, yes.
Researcher: How do you weight that?
AE1P: Language versus content?
Researcher: Mmm hmmm.
AE1P: Umm, I would say if you include within language citations and referencing and things like that, technical aspects. Is that what you mean by language?
Researcher: Sure. Grammar, mechanics,...

AE1P: Yes, grammar mechanics... I would say I weight it 70% content, 30% grammar and mechanics. But there's kind of a hidden value to the grammar and mechanics that influences my assessment of their content, because when something is so badly written, even if the content is really good, I usually tend not to ... it's difficult to look past that to read into the content. It's a little bit frustrating, so I'm sure that it's actually 30% but probably a little bit more because of this inferred influence of the grammar on my assessment of the content.

Researcher: Especially if the meaning is obscured.

AE1P: Right. Exactly.

Researcher: Do you use scoring rubrics for writing?

AE1P: More recently, yes, because umm, writing is fairly new to our program because we don't require, or at least the classes I teach don't require much in writing component until they get to their thesis level, and we've only graduated two groups of students so far, so we've only run two thesis classes. So, yes, moreso now than before. There was an assumption that the students were a little bit better prepared with writing skills than they actually are, so after our first experience, our grading criteria and what we expect of students is much, much clearer now.

Researcher: Do you prepare your own rubrics or does the department prepare rubrics?

AE1P: No, I prepare my own.

Researcher: Do you think students majoring in architecture get enough writing experience to support their post-AUC goals whether they're planning to go to graduate school or work...

AE1P: No, no. They, the credits that they're given should be enough. What's on paper should be enough, but for some reason they don't transfer that skill into architecture. Or they do it so early on in their careers at AUC that they forget it.

Researcher: So you think they're having trouble applying what they've taken from their Rhetoric classes and actually using it here.

AE1P: Yes, I do.

Researcher: Do you think they need more specific classes on writing in a technical...

AE1P: Yes, definitely. Writing for engineering and writing for architecture, I think, is unique. It's a humanity and a science at the same time, so depending on what subject you're specifically writing about, it can take a very technical language or more of a social science approach to the problem. So it depends. I think they need even more than a typical engineering student would, umm, similar to what they take in the humanities with all the writing that's required of them.

Researcher: Right. It's very interesting because I have an undergraduate questionnaire component to this study as well, and when I piloted it I had a number of architectural engineering students and a lot of them said they felt they needed more writing because they were having trouble going from the visual to the written component.

AE1P: Right.

Researcher: Do you think students read enough original literature in your department?

AE1P: No. Definitely not.
Researcher: Everybody is answering no.
AE1P: Again, I think this is a generation thing. I think just as a generation they don't read particularly the way we expect them to read, and, and they're used to dealing with material digitally only, and so our wonderful library collection is not being taken advantage of at all, practically, so that's a problem.
Researcher: So do you think that something that would go a certain way towards helping their writing if they were doing more reading in their field?
AE1P: Of course. And, I mean, we assume we assign a research project because our work is very individualized, so each student will be working on something different within a class. We don't assign one large subject for everyone to do. So because it's so individualized you can't really give them a selected list of readings for each of thirty some-odd students. So we expect them to generate their own sources and find their own sources, and that doesn't happen. Usually that list is a bunch of websites.
Researcher: Mmm hmm.
AE1P: So I've started being much more structured in... in either giving them more, some kind of overriding list of readings that everyone has to do and then also showing them specifically how to get sources and what sources to use.
Researcher: So that's a serious weakness as well, just doing the searching.
AE1P: Yes, yes, of course. I mean, for them, I call it the Google is God syndrome. They just Google everything and whatever comes out, that's it.
Researcher: Mmm hmm.
AE1P: End of the line. Umm, and despite all these wonderful databases that we have, and there really isn't a reason that...if it's published somewhere in the world they should be able to get it with document delivery and everything else that we have. It'll take a little longer, but they should be able to get everything that they need. So there's no excuse, and despite that, it's still Googling everything.
Researcher: Yes.
AE1P: I do Google-free assignments sometimes, where they're not allowed to Google at all, and I have my assistant run the keywords in Google and the top 100 hits are out.
Researcher: Ahhh.
AE1P: They have to find something else. So that kind of pushes them to look for real information.
Researcher: I like that idea. I think I might borrow that.
AE1P: They'll hate you for it, though. They struggle big time on this. It's amazing that they don't know what the next step would be if they can't use Google.
Researcher: Mmm hmm. Well, I'm teaching in the IEP right now, and we're trying to get them to prepare research for their oral presentations, and you know, even just allowing them to use Google but trying to teach them, this is a bad site, this is a site you should use. It's quite a struggle.

AE1P: It's a challenge. But I think it's a generational thing. I don't think it's something specific to here or anywhere else.

Researcher: I agree.

AE1P: I think it's just a digital generation.

Researcher: I agree. Umm, what do you see as the major weaknesses in the students' writing?

AE1P: Organization. Ummm, usually they can present their thoughts much better orally.

Researcher: Mmmm.

AE1P: They're actually quite good at it. They're great salesmen. So they're good at selling you on what they're thinking. Umm, and they can present an argument fairly well orally, which surprises me. But writing it down or putting it on paper, it, it isn't as clear as it is when they present it orally, or maybe because it's more time consuming they rely on filling in the blanks with blah, blah, blah, and then whatever's on the paper is much weaker. So organization is a huge issue.

Researcher: Mmm hmm.

AE1P: Umm, just building an argument, the clarity of tying one idea to the next, and interpreting information, and umm, there's a lot of uhhh, overconfidence in their writing where they make statements kind of, this is a fact, or the truth of the matter is, or whatever, those kinds of statements, and they're completely unsupported. So the use of evidence, they're not very good at supporting their arguments. I mean, they may have it, they may say it, but they lack a lot of, how to support it.

Researcher: Mmm hmm. Now if they're writing about other people's ideas, like in a literature review sort of way, how do they do with that?

AE1P: Umm, that's better, but again we have to remind them about citations. They do this works cited list at the end and then they forget about the in-text citations.

Researcher: Mmm.

AE1P: And for me it's not so much a plagiarism issue as it is uhhhhh just so you know who's saying what and who thinks what and, and just, you learn so much more when you are sure that you associate the right idea to the right architect or the right philosopher or whatever.

Researcher: Mmm hmmm.

AE1P: So, I mean, I know a lot of them think it's just that we don't want them plagiarizing and we're kind of being strict with the technical parts of writing, but it's not, I think it's, it helps them learn a lot better when they do that.

Researcher: Right. What about the major strengths of their writing?

AE1P: Not all of them, but a few of them can communicate their thoughts well. I mean the language that they use, their vocabulary is usually, ummm, better than what you would expect from some students, but the style of their writing, their use of vocabulary and terminology. But that's a small percentage of students. Generally speaking, I would say, and there's been

this degeneration of the quality of writing. It used, it seems to be deteriorating every semester.

Researcher: Hmmm. Would you attribute that also to the amount of time they spend only reading online or....

AE1P: I think so. I think it's what they're exposing themselves to and what they're spending their time on. I think that just, ummm, just quality of writing things as silly as emails, and just the professionalism of using language and abbreviations and, and slang, and I mean, there's a casualness to how they communicate in writing that I think is because of this Tweet, SMS, BBM, culture that is an epidemic here.

Researcher: Mmm hmm.

AE1P: And it's carrying through to the way they write everything.

Researcher: Yeah.

AE1P: I mean, like, even just emails are written like it's a text message.

Researcher: Yes, yes, I've seen that a lot too. When you mention their vocabulary, does that mean just, like, the specific vocabulary to the field or even their general use vocabulary?

AE1P: Umm, both, but more the specific vocabulary of the field. There are a few, and I've found that there is a direct relationship between the groups of students who were required to do heavy reading and the quality of their writing. It's very clear that there's a direct relationship. We had this one group of students who were very fluent in using proper terminology and everything else, and we found out later that they were a group who had take previously a course with a professor who required it, and they told us that in their end of semester surveys, that it was because of all the readings that they were forced to do that they were able to use this vocabulary later on. But these were senior students.

Researcher: Mmm hmmm. Okay. So what measures do you think are necessary to improve students' writing?

AE1P: I think we have to be much more rigorous in what we require of them. I think we have to definitely raise the benchmark that we expect in written material of our students. In everything, but particularly the written material. I think we, we, we shouldn't, but we sometimes have to explicitly spell out that what you are taught in your Rhet courses are not exclusive to Rhet courses. They have to be applied in their discipline. Even if you don't do a lot of writing as an architect, at least in what we're doing here in our studio work, you still have to apply it. We have to, sometimes we assume that they'll make that connection, but they don't. You have to explicitly say, remember what you did in Rhet? This is what you're going to be using to write this. I mean, it seems like a very small point, but it makes a big difference when you point it out to them.

Researcher: Right. So they tend to take their Rhetoric courses immediately when they come into university...

AE1P: They do, and I've talked to ___ about this. That, ummm, with the last change to the core curriculum, ahhh, the 300-level Rhet course was part of what they call a primary level of core, which means that a student needs to

finish it before they are a sophomore. So that means in the first two or three semesters while they're here. And because we're a longer program than most, we're a 5-year program, so that means they take Rhet 300-level courses in semester 3, and then when they really need to apply it, it's semester nine.

Researcher: Yes.

AE1P: So that's almost three years later that they are applying it, so they've forgotten everything they've learned. And most of the other writing that they've done in our courses, it's very technical, like lab reports, and uhh, umm and very, very technical, not narrative, not, not, it's very dry kind of reporting.

Researcher: Mmm hmm. So I know there's a technical writing class that ___ offers-- do you think it would be valuable to have a class specific to architecture in this department?

AE1P: Of course, of course. Because I don't, I don't think, like I said, that it is like the other engineering disciplines, I think writing as an engineer is very different, unless you're taking in the engineering part of architecture. But there is also the history, humanities, philosophy side of architecture that has to be written in a different way.

Researcher: Yeah.

AE1P: So I think that there needs to be something specific to uhhh, technical writing for architects and research methodology for architects. Uh, because they're very different than other disciplines.

Researcher: What types of assignments do you consider to be most important for developing the relevant writing skills for your field?

AE1P: Umm, I think reflection, self reflection assignments on their own work, uhh, is a good place to encourage them to learn how to express themselves, architecturally, with proper terminology. Ummm, this semester I've added to what I normally do for the research portion of one of the classes I teach, that they have to submit, umm, the annotated readings that they've done for their research. So they have to show me how they extracted whatever information they did from the reading. So we teach them how to read the material, and what is relevant, and what is important and things like that. And then they have to demonstrate that, it's part of the deliverables for the course.

Researcher: How many and what types of assignments, writing assignments, would you give to students during a semester if time and resources for grading were no object?

AE1P: That's a really good question. See, I always hesitate to give them written assignments because of how long it takes to give them the good feedback. Uhh, if it were no problem, how many pages would I require, in pages or numbers of assignments?

Researcher: Like pages, or how many and what types of assignments would you want to give?

AE1P: I mean, in the typical design studio that I teach, I would give three, one for each project that we do. One would be more research-oriented and the

other two would be more reflective. For the thesis, I would break the thesis down into mini papers. So each stage had to be submitted almost separately and then it would be like maybe four or five sections.

Professor CS1P Interview – Computer Science

Researcher: So, just to start off with the easy stuff, umm, what's your nationality?
CS1P: Egyptian.
Researcher: Egyptian. And Arabic is your native language?
CS1P: Yes, indeed.
Researcher: How many years have you been teaching in Computer Science and Engineering?
CS1P: Since 2001. Uh, sorry actually it's before that, as a full-timer since 2001, but I've been doing, uh, some part-time courses since 1995.
Researcher: And how long have you been at AUC?
CS1P: Uhh, since 1985, with the exception of four years in between when I went to grad school.
Researcher: How long have you been teaching as a professor at AUC?
CS1P: Uhh, that's from 2001.
Researcher: That's from 2001.
CS1P: Before that I worked at the computer center, so I was uh, I did --- jobs there.
Researcher: So you've been at AUC in some capacity for quite a while.
CS1P: Yes, yes, playing cards from time to time. --------
Researcher: So in the classes you typically teach, about how many pages of writing, and this could include essay questions, research papers, lab reports, things like that, are students required to do, like per semester?
CS1P: Hmm, I think it would vary. For example, I, I teach a software engineering course, and that involves a fair amount of uh, reporting, so I, I, I think they would write somewhere between 60-90 pages. Uhh, but, but it's not all like, uh, just writing, there are lots of diagrams and kind of engineering stuff in there. But, but I guess that would be the estimate. Other courses, like, I teach a course called CS, uhh, 317, it's uhh, ---- Analysis, uh ------ Programming, I should say, and that hardly has any reporting in it, it's, it's a programming course, essentially, so it's mostly writing computer programs and so forth.
Researcher: Mmm hmm.
CS1P: Other courses are in between, so I teach a computer security course, and it's, so I, I expect the amount of writing there wouldn't exceed 20 pages as a maximum. Typically it would be like ten pages or so. And the rest of it is setting up experiments and working in the lab, and that sort of thing. Uhh, other courses I've taught, uhh, would be an advanced course in software engineering for graduate students, and then would also involve a fair amount of writing. They would have to end up by writing a paper or, or, or at least something that's in a paper format, that would be like fifteen pages or so.
Researcher: Mmm hmm.
CS1P: But, but it would take a fair amount of work to actually produce those fifteen pages because it's, it's, a more considered type of writing.

Researcher: Right, right. Umm, what expectations do you have for undergraduate students' use of English in their writing?

CS1P: Uhh, I expect them to be able to, to write in scientific language, to write clearly, to the point, and, and also to have some understanding of technical writing, the typical formats of documents, and obviously things like cita-, proper citations and so forth. Umm, yeah, that, that would be be my expectation.

Researcher: So when you're grading your students' writing, do you consider language as well as content in giving them a grade?

CS1P: Uh, uh, I, I, I would say that I do consider it, but it's not a very major consideration. Uh, so the content is really important. But I'd also have to say that it, it, in my experience if it, it had never gotten to the point where it's, it's, it, uh the language is in the way. So there might be, some linguistic mistakes in there, but it's rarely the case that the language is an issue. But, the same isn't true for graduate students by the way, particularly those that come from, umm, that don't come from AUC or English-speaking institutions. Some of them have serious language issues.

Researcher: Mmm hmmm, yes. So do you weight language in the grading at all?

CS1P: Uh, not directly. Uh, so, so it's indirectly part of document format and so forth, so it's not really uh, uh, so if I find a spelling mistake I'm not going to be, not taking a grade off, but it certainly be part of the factor of, uhh, presentation quality -----.

Researcher: Okay. Umm, do you use scoring rubrics for scoring writing?

CS1P: Uhh, yeah, we do use rubrics for scoring papers that are submitted in general, but usually this is used for the asse- our assessment process, not necessarily for the grading. Obviously to reduce the amount of work we have to do, we try to apply them, you know, twice, and uh, or apply the same thing rather than invent two different things. But it's not always the case that there are, uh, um, explicitly declared rubrics.

Researcher: Mmm hmm. Do you prepare your own rubrics when you do use them?

CS1P: Uh, yes.

Researcher: Um, do you think students in your department, um, undergraduate majors in this department get enough writing experience to support their post-AUC goals, whether that's to go to graduate school or to enter the workforce?

CS1P: Uh, I, I, I think, I think, you know a lot of our students have, I think, quite good writing skills. What I think is sometimes lacking is an understanding of scientific writing and technical report writing ------. So there, there's a lot of good writing, good essay writing, I think, going on, but my impression at least is there isn't enough technical writing, and, and technical document formats and, and the, the, type of structure you'd expect in a scientific document isn't always there. So, I'd find people writing a scientific paper that's like five pages of paragraphs of, of, of well structured text, but that's not usually ----- because people don't necessarily read it sequentially, they might want to, jump to, if they want, you want to

structure it so the structure is more explicitly visible so people can take out the part they're interested in so it's ------

Researcher: So you think students need more training in the technical aspect of that type of writing.

CS1P: Yeah, I believe so, I believe so. It might not be a major thing, because, oftentimes when I explain it to them, they're very able to kind of pick up on it very quickly. So it's a question of understanding the orientation of things--the basic skills are there. It's a question of knowledge of the needed format and so on, I guess.

Researcher: Um, do you think that students read enough original literature in your department.

CS1P: Umm, good question. I, I, it's really hard to assess. Oftentimes we have kind of informal discussions, and I think, uh, my impression would be the only a minority of them read things outside, uhh, their formal reading requirement. Perhaps it's because we ask so much of them, uhh, and perhaps because the culture of reading is just fading away, in retreat (?).

Researcher: Do you require a lot of reading in your classes?

CS1P: Yeah, well, we, we, we, yeah, yes, yes. Umm, again, it would vary form one course to the other, so the higher level, kind of methodology, heavy courses will require more reading. And the other courses are really skill based like programming courses don't require as much reading. And even the books used are really look up references to find out how to express a certain construct, or so, rather than something you would read cover to cover.

Researcher: Mmm hmm. So is the reading typically from, um, textbooks or from, um, original articles?

CS1P: Uh, it's a mix, really, uh, uh, it's a mix. Uh, some courses that are introductory in nature, it's mostly textbooks, more advanced ones will have a mix of sources.

Researcher: Um, how do you think the reading helps their writing?

CS1P: Uh, I think obviously it helps a lot, uh, they, you know, you see good examples and it rubs off on you, uh, one way or the other. But, but that not at least my direct, uhh, objective of having them read. It's mostly for knowledge acquisition and being critical about certain ways to express ideas or design systems and so forth. Uhh, uh for this ---- it is really important to see other people's work and think critically about it, uh, so that should be the objective.

Researcher: What do you see as the major weaknesses in students' writing?

CS1P: Uh, uh, again, I think the technical writing aspect isn't, uh, isn't uh, really a very good one. And I think occasionally you find a student that slipped through the cracks and, and, is really, uh, diff-, at a different level from everybody else. Um, most of the students we get, at least the ones I get, so I usually teach 300 and 400 level courses or graduate courses, so usually people that, that are at that stage doing computer science are really very smart, accomplished people that are very serious and purposeful about what they want to do. So in this group, it's really hard to find somebody

who hasn't benefitted from their English courses and so forth. They're just serious ab-, about what they're doing. But occasionally you find somebody who's, uh, uh, slipped through the cracks and, and, and is, you know, uh, finds it really hard to write, finds it really hard to express what it is, but I'd say it's a minority, so I can get one every few semesters, ----.

Researcher: What are the major strengths of their writing?

CS1P: Uh, I, I think in general, uh, the kind of a core curriculum at AUC does a great job for the students, so by the time they come to us, they understand critical thinking really, uhh, well, and, and, uh, and, uh, that reflects on everything they do, uh, not just on their reading or writing, but also on how they tackle the subject matter, uhhh, itself. There's also another, uh, I think, negative bias, or uh, I'm not a very big fan of our pre-university education in this country because a lot of it is completely the opposite of critical thinking. So you still get some of that that's still left, like, show me the shortcut, you know, what do I have to memorize to get out of here safely, uhh, kind of thing. But, but, but in general, I think, uhhh, uh, I, I think they're well prepared to tackle the scientific uh, subjects. Obviously language skills are part of it, your accurate understanding and expression of yourself, is a big part of coming across correctly and understanding it correctly. But it's also the critical thinking skills that are really, uh, very important.

Researcher: So when the students write, do you think they express their own ideas well, in general?

CS1P: I think they do, I think they do. I think they express them, umm, reasonably well.

Researcher: What about when writing about someone else's work?

CS1P: Yeah, umm, a lot, a lot of, particularly undergraduate work, a lot of it involves survey work, and knowledge acquisition type of things like, classifying a certain group of works, or figuring out what were the best approaches to tackle this particular, uh, problem. And I, I think they, they do a good job at that. But sometimes the writing standard in the sense of doing proper citations, uh, and, and, and quoting things properly, and making sure you haven't plagiarized, perhaps unintentionally, is, uh, is, is, is not at it's best I think. I think maybe they can, they can do, uhh, better, and uh, sometimes I think because they're not consistently asked to do so, it's not like there's uh, kind of a consistent front where everybody forces them to, uhh, to write in a certain way. So, I'd often get papers with no citations of figures, and they're clearly declaring it's not their own figure but it's just not done properly, and that's what I think. I, I, I've used Turnitin for some time to help students kind of give them feedback about what's missing, but usually if you give a warning at the beginning of the class or before an assignment is due that you need to watch out for those things, usually, it's taken care of. It's a question of consistency, I think, on their parts.

Researcher: Yeah. Do you think a class in technical writing that was specific to your department would be useful for students?

CS1P: I, I, I think that would be really useful, but I don't necessarily think it would have to go that far, because I think uh, uh a scientific uh, writing class for engineering disciplines in general would be very useful. It may be useful also for them to see writings from other disciplines, and that, that would be useful as well. So, I think uh, uh, technical writing for engineering students would be a wonderful idea. Science and engineering ----

Researcher: Mmm hmm. What other measures do you think are necessary to improve students' writing?

CS1P: Umm, I don't know, it's, it's really a hard uhhh question to ask. Uhh I, I think in general in our department we debate assessment in general a lot. And sometimes we're thinking maybe we should do, uhh, kind of pre-graduation comprehensive exam where we, kind of look at the skill set, kind of like a GRE, but, but kind of a softer version of it. And, and, uh, today we were even discussing doing that somewhere, you know, after the second year of our program. So maybe such a, uh, uh, a kind of an assessment would include writing assessment as well. To make sure that if, if there are those that fall through the cracks, we could catch them while they're still in the process of, well, you know, just bringing -----. It's a serious issue.

Researcher: Yeah. Would the purpose for that be as much to let you know how students are doing as it is to let them know how they're doing, to give them additional feedback beyond their classes?

CS1P: Yeah, yeah, obviously yes, uh, obviously it's it's for the mid-stage thing it would be useful for everybody. For the exit one, it's more for the department than for them. They, they will still get the feedback, of course, but the department benefit from it more, we'd know what we're not doing right and, uh, whoever's assessing us would be more happy with us -----.

Researcher: Um, what types of assignments are the most important for developing relevant writing skills in your field?

CS1P: Uh, uh, I think, uh, writing and survey assignments are, are the most important, for, for, for, for that type of thing. Uhh, I'd expect that if you talked to others who work more in experimental areas, they would say things about collecting data, presenting data, and so forth. But, uh, I don't really work in that type of area, so for me, uhh, doing survey work, being able to understand and classify others' work, and also to be able to express your own ideas or write a proper survey--these are the two, uhh, most important things.

Researcher: Now the survey work, is that more like literature reviews?

CS1P: Yeah, literature reviews. Sometimes, there ar, there are some tools reviewed, like, looking at different tools----figuring out what they do, which is the best one, but actually not a, a, a very common thing. Literature review is most, more common.

Researcher: Okay.

CS1P: There might be some fi-, field visits, but actually mostly graduate students -----studies on companies and how they develop software-----. So that

might be included as well, but that's really a very small niche, as far as I'm concerned, anyway.

Researcher: If time and resources for grading were no object, and I know they always are, um, how many and what types of writing assignments would you give to students during a semester?

CS1P: Yeah. Uhh, uh, there are things that are almost always required, uhhh, so for example I think of my software engineering students, usually they get to write like a ----- like three, three major, uh documents. If more time was, was, uhh, available, I'd actually have them write more uhh, reviews about other people's work. I used to do that in the past, but it just get, got too much for everybody, myself and the students. So I would take them to other project presentations about ------- technique and critiques about the work types presentation, what was wrong, what was right with it and so forth. I think it's a very valuable thing, but it's just really hard to do, so, so, I, I'd do that a lot. I'd take them on field trips and show them software companies and have them write papers about what they're doing wrong, but uh, uh that would need an additional semester, I think, another course.

Researcher: Okay.

Professor ME2P Interview – Mechanical Engineering

Researcher: So, first, the really easy stuff. Your nationality?
ME2P: Egyptian-American.
Researcher: And what was your first language?
ME2P: Umm, English. Well, I guess Arabic. I, I was uh, I went, I stayed in Egypt until I was five years old. I guess Arabic is my first language.
Researcher: Okay. Um, how many years have you been teaching engineering?
ME2P: Umm, since fall of 2006. I guess five years, five and a half.
Researcher: And how long have you been at AUC?
ME2P: The same.
Researcher: Same, great. Umm, about how many pages of writing, this can be really approximate, like including essay exams, or research papers, lab reports, that kind of stuff, are students required to do in your classes during a semester?
ME2P: Umm, how many pages?
Researcher: About.
ME2P: During a week, or total?
Researcher: Um, during the semester.
ME2P: Umm, 700? There's like about 7 lab reports, or maybe six, and each one about 10 pages.
Researcher: Okay. What expectations do you have for the students' use of English in their writing?
ME2P: Ummm, in the eng-, I've taught different things, starting from Engineering 101 to now the graduate course, and it'll depend on where they are in the AUC cycle. So for the Engineering 101, um, I, I guess I overexpected what they were capable of in terms of their ability to write, especially to pro-, not just the writing, it's the processing and putting in your own words and sometimes you can't put it in your own words cause you haven't processed all the information. So there's a little bit of plagiarism, things like that. Umm, um, but I'm hoping that by the time they're in the 200, 300 level courses, that they should have, they should be able to write. And that we only just fo-, we can just focus our efforts on the engineering and not on the writing.
Researcher: So when you're grading your students' writing, do you consider language as well as content?
ME2P: Umm, in, uh, the content has a numerical value, so for instance in the lab report we have an abstract that's worth one point, introduction's worth two points, etcetera, but then there's, um, extra point at the end-it's not extra, it's one of the ten, if I'm grading out of ten, but there's one point that's for, umm, overall quality, and part of that is the, the quality of the writing, that this thing wasn't haphazardly put together, that, um, yeah, So all the engineering that's there is not necessarily at a hundred percent ---- the score.
Researcher: Okay. Do you ever use scoring rubi-, rubrics to grade writing?

ME2P: Um, I don't grade their writing, I grade the engineering, but yes I do use, uh, I guess, is a rubric like, is the same, yes I do. Yeah, I've used rubrics.

Researcher: And you prepare your own?

ME2P: Yes.

Researcher: But that would be based more on the engineering than the writing itself.

ME2P: Right.

Researcher: Okay.

ME2P: The writing comes in as, uh, like presentation, I consider that part of the presentation.

Researcher: Um, do you think students majoring in your department get enough writing experience to support their post-AUC goals, whether that's to go to graduate school, or to, um, directly enter the workforce?

ME2P: Umm, I, I think, the-, they, I mean, the program by design has them writing everything, but what happens after they leave, it depends on how seriously the student took all the things that they have to do throughout the course of their education here. So I've had students that are now working for _____ that come back and say, you know this has been great. They didn't say that when they were taking the course, but ---- they are certainly able to write reports and things like that. And then, um, and then I'm sure others struggle because I see, like, I, I'm supervising a thesis, uh, undergraduate thesis, and this the, their capstone, this is, you know, the, the final of everything, and I'm still seeing errors that, that, we, that shouldn't be happening at this late in the game-not knowing how to cite, not knowing how to or-, order-, organize thoughts, and um, and so I guess some are leaving not having fully, uh, gotten everything. I think some-, sometimes also maybe part of it is that there's, I don't know if this is really the reason. There's group work, so even though there's 700 pages of lab reports, they do work in pairs or in groups, so, so, maybe, they end up using that as a way to, like, divide the work so that they don't have to do the he-, so they don't have to do all the writing. And maybe one's really good at the calculations, so it can continually be that guy that's doing the calculations and somebody else is already really good at writing, so it'll be that guy that, or that gal that's always doing the writing.

Researcher: Mmmm.

ME2P: I don't know. That's just speculation on my part.

Researcher: Sounds possible. So you mentioned with the thesis writers, um, being problems with citation, organization ----. What else comes up as an issue?

ME2P: Ummm. Mmmm. That's just pretty much it. I mean the, even the literature survey, umm, being able to go out and get all sorts of references, um, that they could use some improvement on. And, the easy thing is to resort to Wikipedia.

Researcher: Mmm hmm.

ME2P: And so I'm, I was hoping that by the time, they're at this stage, where they're graduating, that they've, they've gotten to know a little bit more of the uh, engineering specific sources that you can go to and, I don't think that happened. I think maybe they use the library for their En-, English

courses, Rhetoric courses or whatever, but somehow, they tend to stop doing that when it comes to engineering. They don't even go as far as even referencing their own textbook. Umm, yeah. Not all, but I mean, that's, that's some of them.

Researcher: Well, sure, sure. Well, that-, that's definitely related to my next question. Do you think students read enough original literature in your department?

ME2P: No, no.

Researcher: I have yet to have someone say yes to that question.

ME2P: Yeah.

Researcher: So you thi-, do you think more reading would be useful in helping them along with their writing.

ME2P: I think, um, I think it-, reading for information that you haven't gotten before. Umm, even if it's easier to just come and ask, just the task of being able to go through a piece of work, and, and read it, and understand it, and absorb it, and write about it, and make it part of you, without the hand-holding of somebody doing it for you, and without the abridged edition that you get on the internet, is, I think-and it's not just here, I mean, it's just, it's people in general wanting, you know, the short, I mean the YouTube videos are even getting shorter and shorter, people's attention spans. And so when you come and you man-, you, you require somebody to read difficult-, a journal paper or something like that, and then they get ---- that's about it.

Researcher: Do you think they're at the level where they, they should be able to get through the paper if they put the effort into it?

ME2P: And if they're not, then the first one will be hard, the second one will get a little bit easier, and so on. I think at the thesis I was expecting more of that, more of, like, the independence. And I do, like I have three groups; one of them is, is on their own, you give them some direction, at least like the name of the journal and who's working on it, and they go and, and they do that. Others will require, like, a lot of-they have to have seen it before in a class in order to, to apply it, and things like that.

Researcher: Mmmm. So, I think you mentioned some of these already, but major weaknesses of the students' writing, like citations, organization mostly?

ME2P: Umm, yes, pretty much.

Researcher: What about major strengths in their writing?

ME2P: Ummm, the content is some of the time actually pretty interesting cause they're sources and references that I wouldn't normally go to myself. And so um, and so, and perspective is slightly different, too, so it's interesting to read the, because of the content.

Researcher: Mmm hmm.

ME2P: And then also, umm, umm, like they umm, the use of image, like in the PowerPoint presentations, the images that they find and the, the videos that they find to support the, their umm, their writing, is, is interesting, it's a strength.

Researcher: Umm, when they're writ-, especially, like, for a thesis, where they have to do fairly extensive literature survey and things like that, umm, is their

writing stronger when they're writing about someone else's work or when they're expressing their own ideas?

ME2P: Mmm, umm. It's an interesting question. Umm, each one-, their writing is stronger when they're expressing their own ideas, but it's like, tech, the technical writing of it is weaker. So, like, for instance, in the thesis, they had to talk about different waste water treatment systems and they did that just fine, it was kind of boring to read, but it was fine. Umm, but then when they started writing about the, the system that they're developing based on what they've read, then it started being "I" and "we" and it lost its technical flavor. Umm, even though it was more interesting to read, but it could be that their engineering is more interesting to me, and so I'm kind of reflecting my own--the other stuff I had already seen, and uh, okay, this is, and then I get to their stuff and it's more, just more interesting, but it's worse, it's not as well-written as the, the survey of the different systems that they had -------.

Researcher: Okay. Um, what-?

ME2P: They also do trip reports, it's kind of interesting...

Researcher: They do...?

ME2P: Trip reports? Which is a different kind of writing; I had ___ come in and give them a talk on how to write a trip report when you go out and go on a field trip, you shouldn't just be expecting to uh, sit there and watch, you have to report back, and that makes them more attentive on the trip and, and I think it's, uh, it's, that's interesting writing, cause then they have, then that's their own experience, there's no just dictating what we saw. And so that's, I like, I like to read that. It's what they're writing and it's their own original thoughts.

Researcher: Did they do well with that?

ME2P: Yeah, I think so. It's very guided, though, because ____ does a great job of putting together this template, and so there is no, like, umm, the thesis is a little bit more disorganized because there's so much information, and there's no parts, but this one, it's a memo: part 1, part 2, part 3, so it's, it's um, the structure is there already, so it's not, there's no distractions because of lack of structure when you read it.

Researcher: Right, yeah. Yeah, ___ is great. I know ___. Umm, so what other measures do you think are necessary to improve student writing?

ME2P: Umm, [*interruption*]

Researcher: So I was asking um, what other measures do you think are necessary to improve students' writing?

ME2P: Measures to improve... Hmm. I don't know, like a general consensus and push to say that this rhetoric stuff is part of everything, not the first one and half years and, and then call it quits. Oh, maybe even some of the faculty, maybe they, need to get, get more instruction and emphasis on, on writing, and there's no, there's like, there's no engineering specific thing I've found that they're taught early on. So when they come to do citations and have like a lab report template, and I teach them how to do citations in engineering. And then, I don't know if there's, th-, uh, if I'm supposed to

do that or if the expectation is by now they would know that, but I find that at the beginning, I have to say that you don't put things alphabetically by last name and all that stuff. So, I think that's how they learn it, the MLA system in, in rhetoric courses, but then there's a big nothing and a void, and then they come into engineering and nobody really has been asked to give specific instructions on engineering-specific writing. Umm, so we do it haphazardly as whoever comes by needs it.

Researcher: Yeah. So do you think it would be useful in your department to have, or even in the engineering school, to have a more engineering-specific focused writing class that would cover things like that in technical writing?

ME2P: Umm, I don't know if an additional course would, would solve the problem. I think they, uh, they would just take it as another course, and then unplug and go on with their engineering. Umm, so I don't know what the solution is. But I hear, I hear from ____ that they do do like, they offer in the Rhetoric Department, courses on like technical writing for engineers and things like that, but it's not mandatory?

Researcher: No, I think there may be one engineering department that does make it mandatory, it might be computer engineering, I can't remember now. But yeah, it's, it's an elective for everybody else.

ME2P: Yeah. So maybe the solution then is if there are, they already have, especially if you come in with no English, you, you get a lot of, of years of writing. So maybe at the end of that or integrated into that, maybe not at the end like ------, not everybody goes through that. But try to do it in one of the writing courses so that it's not an extra burden and that, ummm, I don't know how you do that when you have engineers and non-engineers, too, I'm not sure. But I don't think an additional course would be the, the answer -----.

Researcher: Mmm hmm What types of assignments, um, do you think are most important for developing the really relevant writing skills for mechanical engineering?

ME2P: Umm, the lab reports are important. Umm, the thesis reports are important. Umm, then I also think that the trip report is also helpful, um, cause I tell them from my own personal experience that if I go on a, if I get a conference grant and I go on a conference, I need to be able to report back, umm, because that's part of the funding. Somebody has awarded me money to do that. Likewise here, somebody has awarded us money to take a bus and to go out there and, so we've got to report back.

Researcher: And so, here's the big hypothetical question. How many and what types of writing assignments would you give to students during a semester if time and resources for grading were no object?

ME2P: Hmmm. Umm, I sort of don't really worry about the time or grading, I just find a way, so I have, -------, so right now for instance, the student that came in just a minute ago-I gave them a project that I, umm, for the first time, so I'm trying it out, and, it's to umm, find out how they, each group would power the, the university. I'm not sure if you know it, back there in

parcel 17 we have a small power plant, so we draw power from the electric grid and we generate our own power, and then we gave them some numbers about how much energy we consume at AUC, then I gave them some weather data so they can begin thinking wind, solar, etcetera, and then it's up to them to, umm, come up with a proposal either to replace the natural gas systems that we have, or to reduce our dependency on the national electric grid or whatever, and then they have to put together a whole story. And the more open-ended it is, the more important the writing becomes, because I need to be able to understand where their thoughts are going with this. So, umm, we'll see how that works. That was, this would be the kind of thing I would like to do more of. And so um, yeah.

Professor AE2P Interview – Architectural Engineering (conducted electronically)

Researcher:	What is your native language?
AE2P:	Arabic
Researcher:	How many years have you been teaching in your field?
AE2P:	30 years
Researcher:	How many years have you been teaching at AUC?
AE2P:	11 years
Researcher:	Approximately how many pages of writing (including essay exam questions, research papers, lab reports, other) are students required to do in your class(es) during a semester?
AE2P:	30 pages
Researcher:	What expectations do you have for the students' use of English in their writing?
AE2P:	I expect them to do well.
Researcher:	Do you consider language as well as content in grading your students' writing? If so, how is language weighted in the grading?
AE2P:	Language 20%
Researcher:	Do you use scoring rubrics? If so, do you prepare your own rubrics?
AE2P:	No
Researcher:	Do you think students majoring in architectural engineering get enough writing experience to support their post-AUC goals, whether those are to continue their education in graduate or professional school or to directly enter the workforce?
AE2P:	I think they get enough writing experience, however I feel that they take writing courses too early in their course plan and tend to forget about them when they really need them!
Researcher:	Do you think that students read enough original literature in your department? If so, how do you think this helps their writing?
AE2P:	I think student do not read enough lately, if they do it will help them
Researcher:	What do you see as the major weaknesses in students' writing? What are the major strengths?
AE2P:	The major weaknesses are the structure of the research, and the referencing.
Researcher:	What other measures do you think are necessary to improve students' writing?
AE2P:	Encourage students to write more and read more
Researcher:	What types of assignments are most important for developing relevant writing skills in your field?
AE2P:	Research writing
Researcher:	How many and what types of writing assignments would you give to students during a semester if time and resources for grading were no object?
AE2P:	The type of writing assignments that are suitable to our department is scientific research writing

Appendix G

Chart for Coding of Professor Interviews

Question	**Answers**	**# responses**
Approximately how many pages of writing (including essay exam questions, research papers, lab reports, other) are students required to do in your class during a semester?	2 pages	1 (ME1P)
	70 pages	2 (ME2P, AE1P)
	60-90, up to 20	1 (CS1P)
	30 pages	1 (AE2P)
What expectations do you have for the students' use of English in their writing?	Technical vocabulary	2 (ME1P, AE1P)
	Use of scientific language	2 (AE1P, CS1P)
	Technical style/format	1 (CS1P)
	Selection of sources	1 (AE1P)
	Citation	2 (AE1P, CS1P)
	Clarity	1 (CS1P)
	Forming an argument	1 (AE1P)
	Putting the information into one's own words	2 (AE1P, ME2P)
Do you consider language as well as content in grading your students' writing?	Yes	2 (AE1P, AE2P)
	Yes, but it's a minor consideration.	2 (CS1P, ME2P)
	No	1 (ME1P)
How is language weighted in the grading?	70/30 Content/Language	1 (AE1P)

	Not done directly.	1 (CS1P)
	Language 20%	1 (AE2P)
Do you use scoring rubrics?	Yes	1 (AE1P)
	Yes, but not necessarily for writing or grading.	2 (CS1P, ME2P)
	No	1 (AE2P)
Do you think students majoring in (professor's department) get enough writing experience to support their post-AUC goals, whether those are to continue their education in graduate or professional school or to directly enter the workforce?	Yes	2 (ME1P, ME2P)
	Yes, but not necessarily in technical writing	1 (CS1P)
	Yes, but they fail to transfer skills learned in writing courses	1 (AE1P)
	No, and they fail to transfer skills learned in writing courses	1 (AE2P)
Do you think that students read enough original literature in your department?	No	2 (ME2P, AE2P)
	It may be too much additional work	2 (ME1P, CS1P)
	Generational lack of reading combined with focus of reading digitally	1 (AE1P)
How do you think this helps their writing? (Or if not, do you think it would help?)	Yes	2 (AE1P, AE2P)
	Yes, but reading is more important for the information	2 (CS1P, ME2P)
What do you see as the major weaknesses in students' writing?	Grammar	1 (ME1P)
	Citation/ Plagiarism	3 (ME1P, ME2P, AE2P)

	Style	2 (ME1P, CS1P)
	Organization	2 (AE1P, ME2P)
	Clarity	1 (AE1P)
	Vocabulary	1 (ME1P)
	Overstatement	1 (AE1P)
	Building an argument	1 (AE1P)
What are the major strengths?	Literature review	1 (ME1P)
	Vocabulary	1 (AE1P)
	Critical thinking	1 (CS1P)
	Content	1 (ME2P)
What other measures do you think are necessary to improve students' writing?	Exam with just writing and no calculation	1 (ME1P)
	Emphasize that skills from Rhet courses have to be carried through	2 (AE1P, ME2P)
	Raise standards	1 (AE1P)
	Mid- and end-of-program assessments	1 (CS1P)
	Encourage more reading and writing	1 (AE2P)
	Faculty should emphasize writing more	1 (ME2P)
What types of assignments are most important for developing relevant writing skills in your field?	Lab reports	2 (ME1P, ME2P)
	Self-reflection assignments	1 (AE1P)
	Annotated readings	1 (AE1P)
	Survey/literature review	1 (CS1P)
	Thesis	1 (ME2P)
	Trip reports	1 (ME2P)
How many and what types of writing assignments would you give to students during a semester if time and resources for grading were no object?	Describing steps of designs	1 (ME1P)

	Writing on a project	2 (AE1P, ME2P)
	Break thesis into mini-papers	1 (AE1P)
	More reviews about others' work	1 (CS1P)
Department-specific writing class?	Yes	1 (AE1P)
	Engineering-specific	1 (CS1P)
	Something needed, but maybe should not be an additional class	1 (ME2P)