Considerations for Helping Korean Students Write Better Technical Papers in English

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국문요약

영어 논문의 작성 능력은 오늘날 공학도들에게 필수적으로 요구되는 자질이다. 주요 해외 저널에 얼마나 많은 논문이 게재되었느냐가 학문적 성과를 평가하는 주된 척도라는 점과 주요 해외 저널들이 보다 많은 논문 작성 대상으로 하기 위하여 영어로 쓰여진다는 점에 따라 영어 논문 작성 능력에 대한 필요성은 한국을 포함한 영어 구문어에 대한 도달이 아님 모든 국가들로서 강조되고 있는 실정이다. 그러나, 불행히도 한국에 있는 이공계 대학생들은 석/박사 연구원들의 영어 논문 작성 능력 향상을 위한 정규적인 교육 과정을 제공하고 있는 설정이다. 그러나, 불행히도 한국에 있는 이공계 대학생들은 석/박사 연구원들의 영어 논문 작성 능력 향상을 위한 정규적인 교육 과정을 제공하고 있지 못하다. 이러한 상황을 더욱 악화시키는 것은 구체적인 기술 논문 작성 방법론에 대한 문헌이 부족하다는 점이다. 원어민(Native Speaker)을 위한 기술 논문 작성 방법론에 대한 문헌이나 EFL 학습자들은 위한 일반적인 원어 학습자들에 대한 문헌은 많이 있지만, EFL 학습자들을 위한 기술 논문 작성에 대한 저 침성의 문헌은 찾기 힘들다. 따라서, 본 보고서의 목적은 두 가지로 나누어 볼 수 있다. 첫째, 영문 기술 논문 작성에 대한 교육 방법론이 생소한 한국에서 이공계 연구원들 대상으로 강의를 하고 있는 EFL 강사들에 게 제시될 수 있는 일반적인 논점을 제시한다. 이 논제들은 적절한 강의 접근법(Teaching Approach), 최적의 학생 배치(Class Arrangement), 그리고 컴퓨터 학습 도구의 활용뿐만 아니라 대조 수학적(Contrastive Rhetoric)의 중요성에 대한 내용을 포함한다. 둘째, 실험적인 강의 제안서도 제시한다. 본 강의 제안서는 기술 논문 작성 방법론의 수강생들의 작문 샘플에 대한 분석 결과와 기술 논문 작성법에 대한 자가 진단 설문 응답 분석 결과를 근거로 작성하였고, 한국인 EFL 학습자가 기술 논문 교육 과정을 통하여 문법(Grammar), 과정(Process), 장르 기술(Genre Skills) 등을 곁들이 개발할 수 있도록 하였다. 본 보고서는 EFL 기술 논문 과정의 개발에 대한 여러 일반적인 논점을 공유함으로써 기술논문 교육방법론 연구가 부족한 한국의 공학 교육계에 하나의 사례를 제시하였다.
Abstract

For Korean researchers, English is essential. In fact, this is the case for any researcher who is a non-native English speaker, as recognition and success is predicated on being published, while publications that reach the broadest audiences are in English. Unfortunately, university science and engineering programs in Korea often do not provide formal coursework to help students attain greater competence in English composition. Aggravating this situation is the general lack of literature covering this specific pedagogical issue. While there is plenty of information to help native speakers with technical writing and much covering general English composition for EFL learners, there is very little information available to help EFL learners become better technical writers. Thus, the purpose of this report is twofold. First, as most Korean educators in science and engineering are not well acquainted with pedagogical issues of EFL writing, this report provides a general introduction to some relevant issues. It reviews the importance of contrastive rhetoric as well as some considerations for choosing the appropriate teaching approach, class arrangement, and use of computer assisted learning tools. Secondly, a course proposal is discussed. Based on a review of student writing samples as well as student responses to a self-assessment questionnaire, the proposed course is intended to balance the needs of Korean EFL learners to develop grammar, process, and genre skills involved in technical writing. Although, the scope of this report is very modest, by sharing the considerations made towards the development of an EFL technical writing course it seeks to provide a small example to a field that is perhaps lacking examples.

Keywords: EFL (English Foreign Language), Technical Writing, Engineering Education

I. BACKGROUND & CONSIDERATIONS

1. Why teach EFL-technical writing?

Whether it is for business or science, for competition or cooperation, global communication and success depend on English. Recognizing this, Korean society places English education as a high priority. However, in the past, English education in Korea was primarily centered on developing “receptive” language skills (i.e. reading and listening), due to the priority of acquiring information from abroad. This has changed in recent years, as current domestic and international trends have shifted the focus towards “productive” language skills (i.e. speaking and writing) in Korean EFL (English as Foreign Language) pedagogy.

More specifically, this refocus mirrors developments in the educational and research environments of Koreans. As greater numbers of students study abroad, and more researchers contribute globally to science and engineering, the ability to speak and write
effectively in English has become a key asset. Thus, in order to pass standardized exams, or to share new discoveries with the world, Koreans must now rely more upon “productive” English language skills.

The concerns for this report relate to the importance of EFL writing for researchers in Korea, particularly, for graduate students of science and engineering. In research communities, it is understood that researchers must publish their work to be relevant, and they must publish in English to be successful. Consequently, any strategy to globalize engineering education and strengthen research in Korea should ensure that future researchers are competent writers of technical English. To support such strategies, an EFL technical writing course which addresses the distinct needs and priorities of Korean learners must be considered.

2. What are some considerations?

A. General Concerns

Writing is difficult even in one’s native language, but FL (foreign language) writing poses considerably greater challenges. As Myles (2002) explains it, not only must FL writers perform the arduous tasks of composing, developing and analyzing ideas, but they must also acquire adequate FL skills, and adjust to the particular rhetorical traditions or writing standards of the foreign language.

Unfortunately, teaching strategies for EFL writing have for the most part been based on studies in ESL (English as Second Language) writing pedagogy (Hollliday 1994). As a result, many of the methods prescribed for ESL students have later been found to be less effective for the distinct needs of EFL learners. As Muncie (2002) particularly notes, “…the ESL writing methodologies that EFL learners often rely upon place meaning and communication above grammar, while in contrast these learners place the grammatical concerns as the forefront of their needs.” Not surprisingly, EFL learners are more concerned about the grammar than about style and rhetorical standards. Ultimately, teaching strategies are difficult to generalize and are best developed with consideration of the needs and goals of the specific learners. Teaching EFL writing is no exception to this rule.

Teaching methodologies for EFL writing should recognize the distinct cultural influences surrounding the learners, and address their specific educational priorities. Furthermore, as writing is a creative process, plenty of opportunities for actual writing practice must be provided, in conjunction with productive and continued feedback. While in support, relevant materials and new applications should be researched, and used appropriately to complement teaching strategies.
B. Contrastive Rhetoric

A key field of study supporting the importance of learner specificity in FL writing pedagogy is contrastive rhetoric (hereafter CR). Pioneered by Kaplan (1966), CR is explained by Mao (2003) as “the cross-cultural study of rhetorical traditions as they exist or have existed in different societies around the world.” The relevance of CR for FL writing pedagogy includes the following corollaries: 1) methodologies should consider the specific cultural, educational and rhetorical traditions of the learners in order to help them adapt to the rhetorical standards of the target language; and 2) more accurate and unbiased assessment of a learner’s FL writing skills is possible by recognizing CR.

By referring to CR, teaching English composition effectively to a Dutch, Spanish or Chinese learner becomes three distinct challenges. For instance, while a Dutch EFL writer may need to be reminded to expand their writing with more description, a Spanish counterpart may need to be advised to minimize use of descriptive devices (Burrough-Boenisch, 1999). With respect to Chinese learners, the adjustments they face are often greater than those of “western” EFL writers (i.e. Dutch and Spanish writers, who possess relatively similar rhetorical traditions to English). As CR studies have shown, the rhetorical traditions of “eastern” and “western” writing are intrinsically different, and classified respectively, as inductive and deductive. Chen (2003) describes the distinction by generalizing English as having a composition structure of “introduction–body–conclusion”, and Chinese as having “beginning–following–turning–concluding.” That western rhetoric follows “linear” logic, while eastern follows “spiral” logic, is another distinction used to contrast the two writing styles. When combined, these differences can span a wide gap that Chinese learners must cross to meet the standards of English rhetoric. As is more often the case, rather than making modest adjustments to their writing styles, Chinese EFL writers are often required to make dramatic changes to their familiar patterns of composition, as well as to their traditional concepts of logic and argument.

Thus it is important for rhetorical differences to be recognized and understood, in order for any FL writing pedagogy to effectively bridge the gap between learner and target language. In particular, CR should be referenced to accurately evaluate an EFL writer’s ability and development. By this light, some of the awkwardness and mistakes in the writing can be correctly diagnosed, as influenced by the native rhetorical traditions of the learners and not necessarily due to the lack of skills or grammatical knowledge of the target language. In this way, development of a course of study can be better suited to the progress of the specific learners.

C. Product, Process or Genre Approach

In tailoring writing pedagogy to the needs and priorities of learners, consideration must
be given to the teaching approach to be used. There are three generally recognized ways, namely, the “product”, “process” and “genre” approaches. The “product” approach is described by Pincas (1982) as primarily about linguistic knowledge, with focus on the appropriate use of vocabulary, syntax, and cohesive devices. As the traditional approach, it emphasizes the written “product”, by placing grammar and accuracy above all else. Perhaps as a backlash to rigidity, which can constrain and inhibit writing, the “process” approach rose to prominence by de-emphasizing accuracy, and focusing on the writing process. In this approach, planning, drafting and editing skills are placed above explicit knowledge of grammar and linguistic forms. Instead of concentrating on accuracy and form, it focuses on guiding the learner through the writing process. However, the “process” approach also has its share of detractors and critics. Horowitz (1986) criticizes the “process” approach as ineffective in preparing students for writing tasks requiring specific standards and highly structured formats (e.g. academic and technical writing). In response to this, the “genre” approach has become increasingly utilized as a third approach. By focusing on the distinct qualities of specific writing tasks (i.e. genres), and placing emphasis on the written product, this approach is very similar to the traditional “product” approach, and thus also poses similar pedagogical weaknesses.

So which approach is the best? Not surprisingly, the rising consensus recognizes all three approaches as being complementary and not to be used exclusively. Writing pedagogy is most effective by incorporating all three approaches in accordance to the goals and capabilities of the learners (Badger & White 2000). For EFL-writing, teaching approaches must balance the need for learners to acquire the necessary linguistic knowledge (i.e. “product”), with their need to acclimate to the different rhetorical standards of English (i.e. “genre”). It must also remember to guide learners through the “process” of writing, by lowering inhibitions and fears, as well as instilling the necessary skills for planning, drafting and editing.

D. Self & Group–Mediated Learning

In addition to the teaching approach, another important pedagogical consideration is the grouping or arrangement of the class to be used. In FL writing pedagogy, there have been various studies regarding the merits of group and self-mediated learning.

Notably, the benefits of group arrangements include the opportunity for peer evaluation and cooperative feedback (Rollinson 2005). As mentioned earlier, receiving comprehensive and continued feedback are critical aspects for learning to write better. However, it is often difficult to provide FL writers with adequate volume of feedback in classes with high learner-to-teacher ratios. Rollinson (2005) advocates utilizing peer-review activities to give learners more evaluation/feedback, and develop the editing/evaluating skills essential
for the writing process. It is however stressed that adequate training and guidelines be provided to learners prior to peer-review activities, in order to maximize the benefits and avoid confusion. In particular, for learners with cultural predispositions that dismiss the benefits of non-teacher centered class arrangements (e.g. East-Asian students), it is important to acquaint them with the necessary evaluation skills, if they are to be shown the merits of group-mediated learning. Although, Sengupta (1994) has questioned the viability of peer-evaluation and collaborative construction of knowledge in “an examination-driven, accuracy-oriented L2 curriculum”, perhaps it is exactly in such environments (i.e. East-Asian classrooms) that group/peer arrangements are most needed for achieving long term EFL education goals.

For self-mediated learning, the merits relate to the development of “autonomous language learning” habits, and self-monitoring by students (Cresswell 2000). As reviewed by Vickers & Ene (2006), learner autonomy is “a pedagogical ideology in favor of teaching that ultimately turns control of the task of learning over to learners so that they become empowered to engage in learning independently.” By self-monitoring and taking control of the learning process, learners can improve grammatical accuracy and structure organization, as well as, maximize the benefits derived from evaluation & feedback (Xiang 2004). In being “production” oriented, writing skills depend more upon creative and interactive processes. As such, attaining competence in writing involves more than just passive acceptance of rules and following established forms. By necessity, the learner must take active control of the learning process, in order to gain greater control over the process of writing.

Thus, as with other pedagogical decisions, the exact class arrangements to be used should correspond to the distinct needs and goals of the learners, and allow flexibility to meet the teaching strategies of the course.

E. Computer-Assisted Language Learning

The various uses and benefits for computers in a FL writing classroom are extensively covered in research literature and will not be covered here in depth. Instead, a review will be given to some of the popular uses and to a relatively recent development in the use of corpus/concordance computer applications.

For the most part computers and related tools (e.g. internet) have been used in EFL pedagogy as a means for communication oriented learning. As Warschauer (2003) reviewed, popular uses include: computer assisted discussions (e.g. chat boards), emails, and web-based writing. These facilitate communicative acts between learners, as well as between learners and teachers; with the acts providing opportunities for practice, review and correction. They can occur in real-time and over more extended periods, and also can be
performed anonymously.

These examples of computer assisted learning provide notable benefits for FL students. For instance, spontaneous and anonymous communication lowers inhibitions and fear of mistakes (e.g. real-time chat boards), encouraging learners to participate and write more freely (Chun 1994; Kern, 1995). In addition, when individualized time periods are given for completing assignments (e.g. emailed, instead of class activities), students can explore their ideas and ask questions more fully (Wang, 1993), as well as spend the needed time to edit and revise their writing more thoroughly. Although computer assisted learning cannot replace traditional face to face learning, the additional tools it provides can only help the teacher tailor a more effective EFL-writing course.

A recent and notable development in ESL/EFL pedagogy has been the use of corpora and associated computer applications (e.g. concordance software). To define briefly, a corpus is a collection or database composed of authentic texts (Fagan, 2005) that can vary in size (e.g. from hundreds to millions of words), as well as category of content (e.g. newspapers, legal documents, academic texts, transcribed conversations, mixed, etc.). They were first used by linguists who wished to study authentic samples of language in their research. By varying the size and content of a corpus, varied and creative ways can be devised to observe and study a target language.

With regard to FL pedagogy, use of corpora is very new and relatively unexplored: even though there is great potential and relevance for its use (O’Sullivan & Chambers, 2006). Foremost, it can be used as a source of authentic language that better matches the communicative acts that occur in the real world (as opposed to the contrived dialogues and texts often used in the classroom). In particular, it has great potential for teaching and learning genre writing, as well as other special purpose writing. This is because the corpus can be comprised of samples from the target genre or writing task to be learned. For example, Weber (2001) examined the use of a corpus composed of authentic texts to teach legal essay writing to L2 (non-native, second language) law undergraduates. In the study, students were able to better recognize and adapt to genre standards associated with legal writing by being able to access a large database of authentic texts that demonstrate and contrast the target language items.

The use of corpora in FL pedagogy is relatively unexplored. In the future, creative applications of this tool will likely bear great benefits for FL learning. As mentioned, corpora provide a source for authentic language and text, which better match the real world needs of an L2 learner. However, what is also very promising is the application of this tool for encouraging students to self-assess their learning and take greater autonomous control of their FL education. The following internet links provide a starting point for research into corpus as well as access to downloadable software:
II. COURSE PROPOSAL

1. Assessment of Student Writing Samples

To better assess the learning needs and English composition skills of the prospective engineering graduate students, writing samples from several departments at Yonsei University, College of Engineering, were reviewed. Unfortunately, due to time constraints and availability of writing samples, the sampling size was small (15 papers) and did not include all departments in the school of engineering. Although it was not a systematic assessment, but rather involved a personal review of student (M.S. and Ph.D. candidates) manuscripts performed by this author, the limited survey was still informative in providing some insight into areas of difficulty to be tackled in the proposed technical writing (TW) course. Due to the diversity of student backgrounds, a wide range of skill levels were observed. However, a few common issues were present in the majority of manuscripts and allowed some generalizations to be made.

A. Common Errors

The grammatical errors observed were similar in most of the manuscripts and included common items that Korean EFL learners often have difficulty with. These included articles, verb–subject agreement (tense, plural), prepositions, punctuation (e.g. commas), and misuse of conjunctions to start sentences (e.g. And, But). In terms of sentence constructions, the most common issue was the frequent use of overly complex, lengthy, and run-on sentences. Notably, another difficulty observed in the majority of manuscripts was the misuse of language devices that add subtlety and depth in academic writing. For example, “hedging” was often lacking or overly used, resulting in awkward sentences that appeared too strong or too weak in opinion and conclusion.

However, more than grammatical issues, the prevailing difficulties that these student writers appeared to have were at the paragraph and higher levels of composition. As a result, there were many cases where sentences exhibited good grammar and construction yet still yielded incomprehensible paragraphs. These were primarily due to disorganized paragraph structure and erratic flow of ideas. Often the hierarchical organization of the manuscripts was unclear, while the flow and presentation of information were jumpy and incoherent.
2. Personal Assessment of EFL Technical Writing Skills by Student Survey

In addition to the review of student writing samples, students were surveyed to obtain their personal assessment of their individual EFL technical writing abilities. Survey questions were given to graduate students from the departments of chemical, electrical, and mechanical engineering at Yonsei University. 125 graduate students participated (out of approximately 2000 students in the College of Engineering), but only 92 questionnaires were retained, with the remaining discarded for being improperly answered.

Overall, there were no clear consensuses in the survey results (Table 1). For example, when asked to rank four areas of technical writing (grammar, paragraph structure, writing process, and genre writing) in order of difficulty with 1 being easiest and 4 being the hardest, equal percentages (28% & 28%) of students found grammar and genre to be the most difficult. Genre writing was listed as the easiest topic by 36% of the responders.

Looking at each topic individually, grammar had the most equal distribution of scores with 26%, 18%, 28%, and 28% for rankings of 1, 2, 3, and 4, respectively. For the topics of paragraph structure and writing process, students appeared to give them mostly scores of 2 or 3 (Table 1) in terms of their difficulty. The scores for genre were interesting in that most students found it to be either the easiest (36%) or the hardest (28%) topic.

<table>
<thead>
<tr>
<th>RANK</th>
<th>GRAMMAR</th>
<th>PARAGRAPHS</th>
<th>PROCESS</th>
<th>GENRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (easy)</td>
<td>26%</td>
<td>16%</td>
<td>21%</td>
<td>37%</td>
</tr>
<tr>
<td>2</td>
<td>18%</td>
<td>33%</td>
<td>34%</td>
<td>15%</td>
</tr>
<tr>
<td>3</td>
<td>28%</td>
<td>30%</td>
<td>22%</td>
<td>20%</td>
</tr>
<tr>
<td>4 (hard)</td>
<td>28%</td>
<td>21%</td>
<td>23%</td>
<td>28%</td>
</tr>
</tbody>
</table>

3. Course Plan

The course plan was made based on the review of student writing samples and their personal assessment surveys. Both the assessment and surveys showed great diversity among graduate students in their English language ability as well as their individual perceptions of competence with English composition skills. Although some common areas of difficulty were noted from the assessment of student writing sample (see above: “Common Errors”), common areas of perceived difficulty were not evident in the student survey. This incongruence between the assessment and survey results was unhelpful in delineating specific areas to focus the course content. However, it did indicate the important need for this technical writing course to be able to accommodate a heterogeneous class of English skills. The following course plan is thus a basic design of a Technical Writing course for Korean engineering graduate students, with emphasis in accommodating a diverse group of language skills.
A. Content and Materials

The course content is outlined in <Table 2>. For ease of reference, the course content can be divided into four categories of topics, namely: grammar, sentence, paragraph, and process. Topics in each category represent trouble areas revealed in the writing samples assessment and the students’ personal assessment surveys.

The lack of any strong general trends in the assessments and surveys suggests a great diversity of writing skill levels and learning priorities. Thus, the selected course topics will seek to cover a broad area of study by balancing the development of both product and process skills, as well as review of the genre topics for scientific writing. Although students mostly did not view paragraph structure and writing process skills as particularly difficult, based on the observed weaknesses in the reviewed writing samples, both topics

<Table 2> Technical Writing Course Content

<table>
<thead>
<tr>
<th>GRAMMAR</th>
<th>SENTENCE</th>
<th>PARAGRAPH</th>
<th>PROCESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Articles a, the</td>
<td>- Sentence Structure subject + predicate</td>
<td>- “Orienting” topic sentence</td>
<td>- Outlining organizing, planning</td>
</tr>
<tr>
<td>- Verbs tense, subject agreement</td>
<td>- Sentence Types simple, compound, complex</td>
<td>- “Cutting down” simplifying technical details avoiding unnecessary info</td>
<td>- Drafting rough drafts, writing without correcting</td>
</tr>
<tr>
<td>- Prepositions</td>
<td>- Modifiers / Clauses independent, dependent</td>
<td>- “Arranging” logical order of sentences spatial, temporal, steps, complexity, hierarchical</td>
<td>- Editing peer and self-editing</td>
</tr>
<tr>
<td>- Punctuations</td>
<td>- Dependent Clauses adverb, adjective, noun</td>
<td></td>
<td>- Corpus concordance wordlists</td>
</tr>
<tr>
<td>- Conjunctions coordinators, subordinators conjunctive adverbs</td>
<td>- Sentence Clarity simple words concrete nouns active verbs passive &amp; active voice</td>
<td>- “Linking ideas” connects intensives theme &amp; rheme</td>
<td></td>
</tr>
<tr>
<td>- Parallel Structures</td>
<td>- Sentence pitfalls &amp; tips fragments run-ons, long sentences analyze not catalog</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Hedging / Qualifications</td>
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</tbody>
</table>
will also be covered extensively. The course will also review rhetorical standards of English composition by contrasting them to the native standards of Korean learners. Particular emphasis will be placed on reviewing English academic standards for organization and flow of information.

With regards to the materials and resources to be used in the course, effort will be made to maximize the use of authentic (i.e. published articles) and peer-materials (i.e. student writing). These materials will be more relevant for reviewing the particular expectations and difficulties faced by these learners in their various research fields, as well as providing examples of mistakes made by peers to propose areas for them to focus their study efforts upon. Lastly, a general review of Corpus use in language study will be given to the students. The relevant software and tools available will be discussed, and various exercises will be conducted to promote the learners to actively engage in self-assessment and study.

B. Structure and Approach

The course structure will revolve around a final project, culminating in a completed research paper. <Table 3> is the syllabus/schedule of the course. Foremost, the ten course meetings are structured to review genre aspects of scientific papers. Thus, the “IMRAD” structure for research papers will be reviewed including the sections of abstract, introduction (background), methodology (experimental), results (data), and discussion (conclusion). Each meeting will center on the review of a section and involve approaches that repeatedly cover the relevant “product” and “process” skills utilized in each section.

Lecturing will be minimized and instead emphasis will be placed on offering greater opportunities for students to write and edit. For this, the class format will utilize group and peer work, as well as individual assignments.

C. Sample Meeting Format

Meeting Topic - “Discussion (Conclusion)”

A - Lecture: discuss general principles of the section, the common language forms used, and review common difficulties and mistakes encountered.

B - Pair Task: write up a sample discussion section using provided information.

(e.g. using sample introduction and results sections; which are first reviewed by the class)

C - Individual Task: worksheets or computer-mediated tasks covering common grammar and other language items commonly used in the “discussion” section.

(e.g. “hedging” conclusion statements)

D - Group Task: Review and compare the written “discussion” sections from the previous pair task.
### Table 3: Technical Writing Course Syllabus

<table>
<thead>
<tr>
<th>Meeting Topic</th>
<th>Grammar</th>
<th>Sentence &amp; Paragraph</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meeting 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Intro &amp;</td>
<td></td>
<td>Sentence structure &amp; types</td>
<td></td>
</tr>
<tr>
<td>“Abstract” (Part 1)</td>
<td></td>
<td>Modifiers &amp; Clauses</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Breaking down sentences &amp; simplifying</td>
<td></td>
</tr>
<tr>
<td><strong>Meeting 2</strong></td>
<td>Articles</td>
<td>Sentence Clarity: (simple words, concrete nouns, active verbs)</td>
<td>Outlining</td>
</tr>
<tr>
<td>“Methods” (Part 1)</td>
<td></td>
<td>Paragraph: “Orienting” the reader</td>
<td></td>
</tr>
<tr>
<td><strong>Meeting 3</strong></td>
<td>Prepositions</td>
<td>Sentence: Passive &amp; Active voice</td>
<td>Corpus</td>
</tr>
<tr>
<td>“Methods” (Part 2)</td>
<td></td>
<td>Paragraph: “Arranging” ideas</td>
<td></td>
</tr>
<tr>
<td><strong>Meeting 4</strong></td>
<td>Verbs</td>
<td>Paragraphs: “Linking” ideas</td>
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<td>Conjunctions</td>
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<td>&amp; Course Review</td>
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(e.g. edit for grammar, organization)

E - **Individual Task**: write up a discussion (toward Final Project)

Corresponding Author: Yeejin Kim
[ACKNOWLEDGEMENT]

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Appendix
Self-Assessment Questionnaire

공과대학 국제부에서는 대학원생들의 영어논문 작성에 대한 Technical writing class를 운영하였습니다. 이에 현재 학생들이 느끼고 있는 어려움을 반영하여, 보다 발전적인 class를 구성하고자 합니다. 다음 설문에 답변 부탁 드리는 바입니다.

학과 ______________________, 학위과정/학기 ______________________

1. Please number these topics for technical writing in English in order of difficulty from easiest (1) to hardest (5).
   ____ Grammar: articles, vocabulary, tense, prepositions, etc.
   ____ Paragraph/Paper structure: writing smoothly and logically.
   ____ Writing Process: getting started, organizing, drafting, editing, etc.
   ____ Journal/Science Genre: writing journal style/sections (abstract, results, etc.)
   ____ Other: ______________________ (한글)

2. Which grammar point do you find most difficult (circle) and least difficult (X)?
   a) Articles (a / the / no article)
   b) Prepositions (of, for, on, at, etc.)
   c) Verb Tense (past, future, present perfect, etc.)
   d) Sentence Tense (conjunctions, punctuations, run-on/incomplete sentences, etc.)
   e) Other: ______________________ (한글)

3. Which parts of paragraphs/papers are most difficult (circle) and least difficult (X)?
   a) Orienting: starting and ending your paragraphs with good (intro/conclusion) sentences.
   b) Arranging: writing your information in logical order and structure.
   c) Linking: making your sentences connect smoothly (transition phrases).
   d) Other: ______________________ (한글)

4. Which process of writing do you find the most (circle) and least (X) difficult?
   a) Beginning: getting starting with your paper
   b) Organizing: collecting and outlining your information into a rough structure.
   c) Drafting: writing your first complete copy of paper.
   d) Editing: reviewing and correcting your mistakes and style.
   e) Other: ______________________ (한글)

5. What do you think is the most difficult part of writing technical papers compared to writing normally in English? (영어 또는 한글 답변)

6. What is your weakest and strongest point in writing technical papers in English?
   (영어 또는 한글 답변)

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