Target Discourse in Oral Presentations by Science and Engineering Graduates in the U.S.

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The present study explored the actual target discourse of oral presentations in science and engineering graduate classrooms. First, three target tasks were identified from the combination of class observation, interviews with instructors, and surveys of students: to report the research in a logical way, to clarify ideas, and to deliver the speech in an interactional speaking style. Second, the analysis of target discourse addressed how the language was used in carrying out each task. The native speakers employed a mixture of the rhetorical structures of the research article, conference presentation, and lecture introduction to organize ideas in a logical way. Also they utilized syntactic structures and lexical devices unique to oral presentations to help the audience better understand main points of the research; however, the nonnative speakers often failed to perform well-organized presentations and delivered in written text style. Pedagogic implications were suggested for the specific needs of science and engineering graduate students.

Key words: oral presentation, target discourse, target task

I. INTRODUCTION

Most needs analyses of ESL students in English-speaking universities have established the importance of oral academic communication such as oral presentation (OP) or small-group oral discussion for academic success (Ferris, 1998; Ferris & Tagg, 1996a, 1996b; Hwang, 2012; Kim, 2006; Mason, 1995; Ostler, 1980). Many nonnative speaker (NNS) students, especially those from Asian countries, however, face persistent and tremendous difficulties with oral academic communication (Kim, 2006; Lee, 2009; Liu, 2001). There are many instances of students’ unwillingness to participate in small group discussions or being intimidated by OPs. Various reasons for these difficulties include students’ lack of confidence, insufficient practice, and cultural differences (Johns,
1999; Lee, 2009; Morita, 2000). These findings suggest a clearly perceived need for the development of oral academic communication for NNS of English.

Among the oral academic tasks required of graduate students is OP. OP is usually encouraged in graduate classes in order to give students opportunities to present their research and get feedback from others and to hear some other interesting research. For their academic career, graduate students in science and engineering fields are increasingly required to give presentations at international conferences in order to gain recognition for their work on long-term research projects; however, the demand for OPs must be more challenging for science and engineering graduate students compared to humanities students because they have seldom been exposed to such oral academic environments (Hwang, 2012; Long, 2011). Their classes are mostly given in the form of lecture or lab work, where little oral communication is needed; therefore, professors try to help their students prepare for their future work by requiring them to take a credit-bearing course titled Seminars, where they can experience formal academic presentations or by having them practice giving OPs of their term paper research at the end of the course. Unfortunately, NNS students still suffer from linguistic, cultural, and practical obstacles in giving OPs.

While a large body of EAP (English for Academic Purposes) literature has focused on research article (RA), there have been only a few studies on the development of OP (Dubois, 1980a, 1980b; Flowerdew & Peacock, 2001; Jordan, 1997; Swales, 1990, 2004). Textbooks currently used in EAP courses were not specifically designed for the OP NNS students would need. Also, NNS students failed to differentiate between written and spoken modes of scientific research, memorizing RAs for their presentations (Thomas & Rowley-Jolivet, 2001, 2005; Weissberg, 1993). The inappropriate use of rhetorical structures could finally weaken cognitive processing and persuasiveness in OP. Thus, the lack of OP materials and problems of NNS’ OPs support the need of more research on the topic.

Acknowledging that the types of oral academic tasks vary a great deal across course levels and academic disciplines, the present task-based study attempts to address this need by focusing on OPs performed in science and engineering graduate courses. This study first aims to identify the target tasks needed in a particular academic speaking task, the OP, and then to analyze the target discourse with authentic samples of the specialized group of students. A further aim is to examine how NNS students deviate from NSs’ target discourse by making a comparison between NS’ and NNS’ OPs.
II. LITERATURE REVIEW

1. Oral Academic Communication

Students have to master a wide range of both oral and written academic communication skills in order to achieve academic success. The requirement may vary depending on academic disciplines, class level, and class size. In English-speaking university classrooms, this academic demand often poses many difficulties and frustrations for NNS students.

Oral academic communication is perceived as the most persistent and difficult problem for NNS students. Surveys of order of difficulty showed that speaking had become first ranked by the middle of the academic year although listening comprehension was the biggest problem on arrival (Blue, 1991; Jordan & Mackay, 1973). It is perhaps not surprising, given the reported reason that NNS students usually spent little time, one hour or less, speaking English on a typical day.

An awareness of the importance of active, oral participation in the U.S. classroom suggests a growing focus on oral academic communication. In three consecutive surveys, Ferris and Tagg (1996a, 1996b) and Ferris (1998) examined the types of listening/speaking tasks required in university content classrooms and ESL students’ problems with those tasks from instructors’ and ESL students’ views, respectively. Although the instructors and the learners did not agree on the order of requirement of aural/oral skills, there was an agreement as to students’ problems with oral skills. Ferris and Tagg (1996b), after analyzing 234 instructors’ responses from four different tertiary institutions, reported that instructors pointed out ESL students’ perceived inability to participate in class discussions or to ask or respond to questions. Similarly, Ferris (1998) claimed, from 476 responses of ESL students, that students were very concerned with OPs, whole-class discussions, and note-taking.

Interestingly, such oral academic tasks seem more problematic with Asian students. Several studies insist that Asian students’ passive attitude or lack of skill to participate in oral academic tasks has much to do with culture and previous educational experience, in which a student’s role has long been regarded as paying attention to the teacher’s speech instead of being encouraged to raise a question during the class (Jones, 1999; Lee, 2009; Morita, 2000).

In her study of the relative importance of listening/speaking skills in non-science and non-engineering graduate courses, Kim’s (2006) result indicated that East Asian students perceived formal OPs and strong listening skills as the most important for academic success whereas pronunciation of English and note-taking skills the least important. It also demonstrated that students’ main concerns were about leading class discussions and
participating in whole-class discussions.

On the other hand, this oral academic skill has been neglected in science and engineering fields where interpersonal oral communication is little required during the class. With a professional expectation that science and engineering graduate students need to present their research in English at international conferences or laboratory meetings, their poor oral performance is frequently recognized as disadvantageous. Two studies dealing with science and engineering students’ problems are worth mentioning as relevant to the rationale of this study.

As requested by The National Institutes of Health (NIH), Long and his students (2010) conducted a needs analysis in order to determine international post-doc students’ communicative needs. The main purpose of this survey was to provide useful information in designing an English curriculum for international students’ specific needs and finally to help improve their oral communication problems. At an interview with principal investigators (PIs), they commented that some incoming post-docs from Asian countries felt it hard to explain their research logically in English, and were often afraid to open up the conversation.

Bearing in mind Asian students’ reluctance to participate in oral activities, Hwang (2012) devised a task-based needs analysis of oral/aural academic communications with Korean and Chinese international students in U.S. graduate schools. Students ranked the following three tasks as both the most important and difficult: giving formal presentations, answering questions or expressing opinions spontaneously, and participating in whole-class discussions. Recognizing significant evidence that science and engineering students struggled most with giving formal presentations, she strongly recommended that they should be taught to present their research in scientific English for their academic career.

As indicated by the above studies, OPs must be the most demanding and difficult task for science and engineering students. Their remarkable research must not be left behind due to English communication problems. In other words, NNS science and engineering students need to overcome this lack of proficiency in giving oral performances in order to meet academic and career expectations and gain better benefits.

2. Research Article (RA) vs. Oral Presentation (OP)

The scientific OP differs from the scientific RA in various ways according to its purpose and nature (Carter-Thomas & Rowley-Jolivet, 2001; Dubois, 1980a). Although OP may follow the structure of RA, its delivery can be significantly differentiated by time limitation and dynamic interaction with the audience; however, much of the EAP research has concentrated on the issues of academic writing, exclusively RA, without
addressing OP, a similar but distinctive genre. As OP evolves as a professional need to communicate research which has already been presented in RA, it is inevitable to review substantial studies on RA for reference and comparison.

Generally, RA is composed of the four standard sections in the linear order: Introduction (I) – Method (M) – Results (R) – Discussion (D). Different linguistic and rhetorical features are distributed across the four sections. In his study of the rhetorical organization of RA introductions, for example, Swales (1990) offered a schema for introductions in many leading journals, what he termed as the Create a Research Space (CARS) model (Table 1).

| TABLE 1 |
| A CARS Model for Article Introductions (Swales, 1990) |
|-----------------|------------------|
| Move 1          | Step 1            |
| Establishing a territory | Claiming centrality and/or |
|                  | Step 2            |
|                  | Making topic generalization and/or |
|                  | Step 3            |
|                  | Reviewing items of previous research |
| Move 2          | Step 1A           |
| Establishing a niche | Counter-claiming or |
|                  | Step 1B           |
|                  | Indicating a gap or |
|                  | Step 1C           |
|                  | Question-raising or |
|                  | Step 1D           |
|                  | Continuing a tradition |
| Move 3          | Step 1A           |
| Occupying the niche | Outlining purposes or |
|                  | Step 1B           |
|                  | Announcing present research |
|                  | Step 2            |
|                  | Announcing principal findings |
|                  | Step 3            |
|                  | Indicating RA structure |

By taking the ecological analogy, Swales (1990) claimed that three-part moves within RA introductions are basically designed for the three following purposes: “need to re-establish in the eyes of the discourse community the significance of the research field itself; the need to situate the actual research in terms of that significance; and the need to show how this niche in the wider ecosystem will be occupied and defended” (Swales, 1990, p. 142). Each Move is associated with several components of steps in which cyclical patterns are frequently identified.

As to the remaining sections, some general findings were also provided to characterize particular features. The Method section is a listing of procedural formulae in which the past passive is consistently used. The Results section seems to choose repetitive regularity deliberately to exclude any of the researcher’s comments or observations (Swales, 1990). The final Discussion section, like the Introduction, demonstrates the cyclic nature in re-describing each result in relation to previous findings or the expected outcome (Hopkins & Dudley-Evans, 1988).

In contrast to abundant literature on RA, there could be only a few studies on OP.
Dubois (1980a) proposed its rhetorical structure model of biomedical research presentations (Table 2).

TABLE 2
Dubois' Model of Conference Presentations (Dubois, 1980a)

<table>
<thead>
<tr>
<th>Section</th>
<th>Subsections</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Introduction</td>
<td>A) Listener orientation</td>
</tr>
<tr>
<td></td>
<td>B) Content orientation</td>
</tr>
<tr>
<td>II. Body (one or more episodes)</td>
<td>A) Situation</td>
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<tr>
<td></td>
<td>B) Event</td>
</tr>
<tr>
<td></td>
<td>C) Commentary</td>
</tr>
<tr>
<td>III. Termination</td>
<td>A) Content orientation</td>
</tr>
<tr>
<td></td>
<td>B) Listener orientation</td>
</tr>
</tbody>
</table>

According to her model, the Introduction consists of the two parts: The listener orientation outlines the frame with remarks to the chairman, the audience, and the projectionist. The content orientation "sets up the intellectual stage for the body of the presentation and seems to be broadly similar to RA introductions" (p. 183). The Body includes the string of episodes in which what was done and what was found are described in a cyclic pattern. The Termination provides a summary of the results and conclusions drawn from them.

Thus, OP has been established as a genre of its own and NS students have knowledge of distinct differences between OP and RA. Carter-Thomas and Rowley-Jolivet (2001), from the comparison between NS scientists' presentations and the corresponding articles, displayed that they used the syntactic structures very differently in the two modes. For example, extraposition was employed more frequently in RA as it could redistribute the heavy information in a more balanced way, thus respecting the principle of end-weight. On the other hand, inversion and pseudo-cleft occurred frequently in OP. Inversion had a function of directing audience's attention to the visual display by the use of the deictic elements (e.g., here's, on this axis) and commenting the new information in the rest of the clause, and pseudo-cleft played a role of encouraging listeners to pay attention to the forthcoming information.

In their following comparative study (2005), Thomas and Rowley-Jolivet found that NNS scientists differentiated far less the syntactic behavior between RA and OP modes than NS ones. Influenced by RA patterns, NNSs consistently overused extraposition and passive structures even in their presentations, where inversion and pseudo-cleft could be more suitable structures. According to their explanation, the absence of inversion and pseudo-cleft in NNS presentations was due to the fact that both structures were never employed in the RA.
Weissberg (1993) also observed that NNS graduates’ seminars consisted of memorized written text, as opposed to the professors’ expectation, an audience-friendly speaking style. The similar phenomenon was addressed by Dubois (1980a) at a biomedical conference, “some speakers have the article in mind as modal, . . . not only because it is, no doubt, perceived as the “correct” way to present scientific findings, but also because there is no other pattern readily at hand for consultation” (p. 143).

In summary, NNS students have been found to be much less aware of different ways of communicating scientific research in written and oral modes than NS ones. In order to overcome the disadvantage of inability to give OPs in scientific English and gain academic accomplishment, NNSs need to “acquire the pragmatic competence needed to manipulate information structure in genre-specific ways” (Thomas & Rowley-Jolivet, 2005, p. 60).

III. METHOD

The goal of the present study is to meet science and engineering graduate students’ oral academic communicative needs, giving OPs. This study, as a preliminary step, covers only the identification of the target tasks that science and engineering graduate students need to be able to carry out and the analysis of its target discourse.

1. Identification of the Target Tasks

To identify the target tasks that function efficiently in giving an OP, the present study involves the combination of the three methodologies and sources: observation of oral academic presentations, informal interviews with instructors, and surveys of NNS students.

1) Observation of Oral Academic Presentations

Toward the end of the 2011 fall semester, class observations were conducted on the OPs of three graduate classes at the University of Maryland: two offered by College of Computer, Mathematical, and Natural Sciences, and one by School of Engineering. Each graduate class consisted of 10 to 15 students. An OP was assigned to every student as one of evaluations to present a research project which required either developing published research articles or creating one’s own interesting research.
2) Informal Interviews with Instructors

The researcher conducted an informal, ten-minute oral interview with three instructors individually. Three instructors were all male and American in the mid-forties or late-fifties. They were asked what was expected of students giving the assigned OP and what problems they recognized with NNS’s performance. The specific questions were as follows:

(1) What is the goal of having students perform presentations on their projects?
(2) What do you think is the most important thing in giving a presentation?
(3) How do you evaluate students’ presentations?
(4) What criterion do you have on good/bad presentation, if any?
(5) Do you agree that some international students have difficulties in performing oral presentation? Please specify it if they need to improve.

3) Surveys of NNS Students

Twenty one NNS students from three classes were asked to complete a short survey. Most of NNSs were Asian, among whom Chinese was the biggest ethnic group: Chinese (9), Korean (4), Japanese (1), other Asian(4)\(^1\). The survey questions, revised from Hwang’s (2012) study, involved NNSs’ personal language backgrounds and importance and difficulties they felt in performing an OP.

2. Analysis of the Target Discourse

To explore the actual target discourse of NS and examine NNS’ performance with a comparison of NS’, two NSs’ and two NNSs’ performances were chosen for analysis. To help select four samples as representations of the tasks, the researcher consulted with instructors to select the most standard NSs’ and problematic NNSs’ presentations. Of the NNSs, one was from Korea and the other from China, all of whom were reported to be one of the largest international student groups perceived as being reticent in western classrooms. Thus, the researcher made audio-recordings of four twenty-minute-long OPs and transcribed them.

For data analysis, the four samples of OP discourse were analyzed with respect to rhetorical, syntactic, and lexical structures and features, focusing on how language was used to accomplish the target tasks. Rhetorical and lexical structures were analyzed using

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\(^1\) They were from India or Pakistan, in which English is spoken as a second or official language.
earlier genre-based frameworks (Dubois, 1980a; Swales, 1990; Thompson, 1994) because they allowed the repeated communicative functions and their linguistic exponents to be exploited. Syntactic structures were examined to determine the relative frequency of occurrence of the specific syntactic structures in OP, following Carter-Thomas and Rowley-Jolivet (2001, 2005).

Furthermore, to better understand NNS students' deficiencies, the study investigated how the NNSs' discourse deviated from the NSs' target discourse, which could offer information on NNSs' lack in performing an OP.

IV. RESULTS AND DISCUSSION

1. Identification of the Target Tasks

The study examined class observation, interviews with instructors, and surveys of NNS students through triangulation in order to identify the target tasks that students need to do with language in performing an OP.

Class observations illustrated that in computer science and engineering graduate classes, OP was one of the important oral activities for the requirements of the course and the apprenticeship into the professional disciplinary discourse. OPs usually occurred to see other students' work and get feedback from diverse perspectives in either of the two academic settings. In the content class, every student was required to present research; it could be a pilot research or a proposal developed from a published article, in which case the performance was evaluated on how well other students understand the research. In the other seminar class, graduate students from the department were required to present their PhD proposals, in-progress reports, preliminary literature reviews, or their finished research reports, where opportunities to practice formal presentation and get critical comments from professionals were provided. The present study involved only the first type of presentation, class presentation, to exclude variations among subgenres.

Interviews with instructors revealed that they claimed it to be essential in giving an OP to communicate clearly what problem is being addressed and how the approach addresses that problem. One of the instructors interviewed mentioned that some NNS students were very vague in their presentations on what they did and what had been done before. Another one indicated that giving an OP seemed problematic for his two international students with the biggest English language challenges. They were from South Korea and Japan. He added, "both students had difficulty in communicating the higher level ideas, partly because they focused more on low level details. This could be a combination of both English language problems and less experience in communicating
their work – as many junior computer science students have this same difficulty, even native English speakers.” The third instructor commented that he uploaded files of “tips for a good conference talk” and “OP advice” on his class website for his students to read and improve their speaking skills.

Surveys of NNS students indicated that all of NNS students have been studying in the U.S. for one to three years, and especially, Chinese, Korean, and Japanese students had not lived in English-speaking countries before. They also demonstrated that students ranked the following tasks\(^2\) as 4 or 5 on a 5-point difficulty scale: giving a well-organized presentation, clarifying ideas or questions, showing clearly when moving to a new point, and presenting an appropriate amount of information. Some students addressed the fact that they often faced challenges in making presentations flow smoothly or getting the correct word in English that expresses what they want to say.

Given the above facts from the different methodologies and sources, three target tasks were identified in giving OPs in science and engineering graduate classrooms; students need to be able to report their research in a logical way, they need to be able to clarify ideas, and they need to be able to deliver their speeches in an interactional speaking style.

Contrary to the assumption that a majority of NNS students struggle with answering questions, neither the instructors nor the NNS students considered the task of responding to questions effectively as important or difficult in giving an OP. The reason for this result could be explained by the fact that an instructor or graduate students in class were allowed to raise questions during any time of the presentation and tended to pose display questions to test the presenter’s knowledge or clarification ones to make some uncertain contents clear. As indicated in an interview, instructors expected their students to practice giving presentations and did not evaluate how well they did, but gave a separate grade for the quality of the research work itself. On the other hand, at professional conferences, questions or suggestions can be given only at the last part of the presentation and “some questions are referential; that is, sincere requests for unknown information, either factual/methodological (Why did you choose this particular genotype?) or speculative (What will you do if there is general nonresistance to low temperatures?)” (Weissberg, 1993, p. 25). In the former case, graduate students already know the answers to display or clarification questions and do not feel it hard to answer questions.

\(^{2}\) One of survey questions asked students to rate the following tasks in performing OP in English on a difficulty scale: (1) making objective clear, (2) well organized presentation (logical structure), (3) showing clearly when moving to a new point, (4) the appropriate amount of information, (5) making content relevant to topic, (6) making good use of visual support, (7) the appropriate speed of speaking, (8) the appropriate loudness, (9) body language, (10) eye contact, (11) clarifying ideas or questions, (12) supporting your argument with reasons and examples.
2. Analysis of the Target Discourse

The present study identified the three target tasks which students need to be able to do with language in order to give an effective OP: to be able to report the research in a logical way, to be able to clarify ideas, and to be able to deliver the speech in an interactional speaking style. The four samples of OP discourse, two NSs’ and two NNSs’, were examined to analyze target discourse with respect to rhetorical, syntactic, and lexical structures and features. Also, while addressing the results, how the NNSs’ discourse deviated from the NSs’ target discourse was discussed.

1) Logical Structure of OP

OP is a genre of its own, still similar but distinct from other genres. OP has evolved as a communication need to report the RA but at the same time, is differently performed due to the time constraint and the oral nature. OP can also share some character of lecture discourse because both tell the audience about information in the oral mode. In particular, class OP, the focus of this study, needs to be investigated how similar it can be to conference OP. So in order to exploit the logical structure of class OP\(^3\), our samples of OPs were compared to earlier genre-based frameworks from RA (Swales, 1990), lecture (Thompson, 1994), and conference OP (Dubois, 1980a).

At the beginning of class OPs, analysis of data revealed that class OPs started with the topic and structure of the OP, resembling the lecture introductions. Thompson (1994) suggested, from the investigation into the generic features of lecture introductions, that “two complementary functions, which establish for the audience a \textit{framework} for listening to the lecture and a \textit{context} within which to place the new topic,” were identified with their related sub-functions, (p. 180). In case of class OPs, two sub-functions of the \textit{framework} function, that is, \textit{announce the topic, outline the structure}, were shown in a fixed order at the beginning of all class OP samples, which could provide “a mental map for the audience to rely upon as they listen to the rest of” the OP (Thompson, 1994, p. 176). For example:

\begin{enumerate}
\item [Announce the topic] This is the second presentation based on a paper, “A Very-
High Output Impedance Current Mirror for Very-Low Voltage Biomedical
Analog Circuits.”
\end{enumerate}

\(^3\) The analysis focused on introductions among the four standard sections of the research (Introduction-Method-Result-Discussion). That’s because “Introductions are known to be troublesome” (Swales, 1990, p. 137) and complex in contrast with simple Method and Result.
[Outline structure] So a quick review of what I’m going to cover today. First do a quick review of the circuit operation: both the Super Wilson current Mirror and the Proposed Current Mirror, which is based on the Super Wilson. The small signal analysis that we can verify the author’s calculations of the output impedance, and then some of the simulation results. (NS-1)

A NS gave the title and structure of OP from the beginning, which helped the audience to make predictions about what the OP was going to address. This sequential order was also seen in a NNS’ OP:

(2) Hello, everyone! My name is O O O. [Announce the topic] My topic is the same as Jules XXX, Low Over-shoot Low Drop Out regulator with a detector but I do a different. This is my own topic and [Outline structure] the first thing that we have and get some review of the DR and then I’ll introduce a basic Low Drop Out regulator topology and then the enhanced circuit and then I will give out my simulation results and then based on that, compare them with the paperwork and then I will give out conclusion. (NNS-4)

Thompson (1994) explained this distinctive function of lecture introduction, comparing the goals with the RA introduction. The RA introduction focuses on “the establishment and defense of one’s research territory to “convince a potentially hostile readership of peers and superiors in the research field that her research is of interest and value” (p. 181). On the contrary, the lecture introduction specifies the formal and conceptual terrain of the lecture to “create a framework to support her novice audience in comprehending the topic of the lecture” (p. 181). As a result, announce the topic and outline the structure are distributed in different positions in the RA and lecture introductions: at the end of RA introductions vs. at the beginning of the lecture introductions. Considering the fact that both NSs and NNSs addressed the topic and structure of their OPs at the beginning of the introductory section, these framework functions can be identified as the obligatory rhetorical features of the class OP introductions which occur exclusively at the beginning.

On the other hand, Dubois (1980a) identified the listener orientation at the beginning and end of the conference OP. Conference OPs initiated with remarks to the audience or a chairman or a projectionist as “a consequence of the face to face nature of the presentation” (p. 152). Such listener orientation, however, was found to be omitted in the beginning part of the class OPs.

After the topic and structure were presented, the remaining parts of OP introductions were shown to employ the framework of RA introductions as problem-solution texts. The Create-a-Research-Space model for RA introductions (Swales, 1990) suggested
three parts of “moves” that performed coherent communicative functions: *establishing a territory, establishing a niche, and occupying the niche*, and their “steps” by which the function of each move was realized. For example, Swales (1990) proposed that counterclaiming, raising a question, indicating a gap, or continuing a tradition was identified as a logical step of *establishing a niche* for about-to-be-presented research, among which steps *indicating a gap* was most commonly used. In a similar way, both NSs’ OP introductions involved these moves and steps:

(3) This is our Super Wilson Current Mirror, so M2 and M4 make our basic Current Mirror structure. And there is negative feedback loop here comprised of M3, M4, M2, M1. That basically compares the output current to the input current. And there’s a difference, adjusts the gate voltage of the output transistor to get them back in line. And the effectiveness of that, the negative feedback loop is determined by gain of that loop. → *Unfortunately*, the gain of the loop is limited by the M1 because its diode connected, so it’s impedance that you see is actually one $g_{m}$, which is fairly small. So our output impedance is $r_{o3}$ times the gain of the loop, which is just $g_{m}r_{o2}$. → Now, this is the proposed Current Mirror from the paper. (NS-1)

(4) So, sort of, standard recommendation system technique is to ask Users what sorts of ratings, their preference for certain items, their songs in this case, or music. And a lot of systems ask Users to tag songs with key words so that you can make contact, so like my Teddy song, something like that. → *The problem* with that sort of philosophy is that Users are really lazy. They want to do sort of the least amount of work possible. And a lot of these systems suffer from, sort of data scarcity issues. They don’t have enough ratings. They don’t have enough tags to get all of the knowledgeable recommendations that they want to give out to music. → So my goal is to sort of harness the same concepts with preferable contacts, but to acquire the music all implicit feedback. (NS-2)

Both NSs were making a logical journey to get to their purpose or the aim of the research, following Swales’ (1990) prototypical framework of RA introductions: [Move 1] making topic generalization(Step 2) or reviewing items of previous research(Step 3) → [Move 2] indicating a gap(Step 1B) → [Move 3] outlining purposes(Step 1A) or announcing present research(Step 1B). What is quite prevalent is that the NSs employed the linguistic exponents (unfortunately, is limited, the problem with, suffer from) of *indicating a gap* to create a research space as their RA introductions illustrated. Such linguistic signals can help the audience follow the logical reasoning of the research, thus
paying better attention to the OP.

By contrast, a Chinese NNS’ OP introduction indicated listing of individual facts, not displaying the rhetorical structure of RA. He might have not been aware of how to connect individual ideas to make a rationale of the goal, problem, and solution:

(5) The basic definition of a LDO is a Low Drop Out regulator. The basic to realize this device is as shown on the screen. And then this is the basic Drop Out regulator and the (.) My LDO is aimed to produce much lower power consuming and need smaller area to layout and much economic than Mr. XXX’s \(^5\) LDO because he is aimed to produce a more robust LDO. (NNS-4)

A NNS did not provide any information on what problem the previous model had and how he could develop his model. Thus, the audience could not tell how different his model was from the old one and cast doubt on whether his model was worthwhile.

The lack of logical structure in the NNS’ OP could be further supported by the evidence that the NNS seemed to create many sentences by filling the words into basic, structural templates, like my topic is __, the conclusion is __, and here is __:

(6) Here is the results that we had and the regular detect signal that after the trigger. But we got something like this. Oh, here (…) here I showed a measure regulator output wave for 10 volts input with a run time of 10 nanoseconds. So here (.) we can see the spike and we’ll choose to be stable along the (.) three volts as the output voltage. And the conclusion is the paper present a normal topology aiming to reduce the output voltage over-shoot by adding a current feedback low and this current feedback low is very small and don’t greatly increase the circuit arrow… (NNS-4)

The NNS might not be capable of making a logical structure of the research presentation due to his deficiency in English proficiency and feel obliged to resort to the basic template of the OP. For example, here is has the deictic function in the OP and helps the speaker to integrate the visual (slide) and the verbal (speech) of information (Rowley-Jolivet & Carter-Thomas, 2005). With the use of the deictic unit here is, the speaker can direct the audience’s attention to the slide and then keep providing more information; however, in the above example, the NNS used this deictic whenever he pointed out each consecutive list. He did not detail or develop the information listed on each slide. So the

\(^4\) A dot enclosed in a bracket indicates a brief pause.

\(^5\) XXX indicates the presence of an unclear section on the recording.
frequent use of a deictic template could give an explanation of NNS's enumerating lists without relating the previous list to the next one logically (e.g., cause-effect, contrast, etc.). As a result, it could make it hard for the audience to catch what the presenter wants to say about the research.

Interestingly, the listener orientation occurred anywhere throughout the class OPs, which opposes Dubois' (1980a) suggestion that it is a part of the introduction and termination of conference OPs as a way of interacting with the audience. This finding might reflect the difference in the goals of the class OPs and conference OPs. Generally, the main goal of OP at a conference is to entice the audience into getting interested in the research and reading the paper afterward; in which situation, questions are usually allowed after the presentation because of the very restricted time. In graduate classrooms, on the other hand, the chief goal is to make peers or instructors understand what the research is about and get feedback from them, where more interactions are highly recommended. So our samples of the class OPs show several sequences of raising questions and answering questions: in (7), a sudden request and its instant response were observed when a student was explaining the difference, asked by an instructor to make the point clearer.

(7) NS: And then we brought down the output current back down to the matching input currents.
I: Can you go back to the previous one and show us the difference where I-in XXXX.
NS: Okay, ((pointing to the slide))⁶ so in this one I_in is coming in this branch here instead of that branch there.
I: Well, essentially there a switch between I_B and I_in and (..) the feedback (.).
NS: Right. And that goes along with the way ((pointing to the slide)) . . . (NS-1)

Another example of listener orientation is that the NSs demonstrated more interpersonal relationships with the audience by using the definite you directed to the audience in explaining the experiment or model:

(8) I don't want to go into all the details of algebra behind all of it but there they are. If you're really interested in the algebra, I have it all worked out for you.
(NS-1)

(9) It's interesting over in the context area. So a typical thing is, you know, you tag

⁶ A description enclosed in double brackets indicates a non-verbal activity.
a song with a keyword like ‘jogging’, and then all of those songs with that keyword are sort of laid together. But, as it turns out, it doesn’t really matter when you’re listening to a song, like, what you’re doing, if you’re jogging or you’re sleeping. (NS-2)

These evidences suggest that unlike conference OPs, the listener orientation is frequently given at any section of class OPs to invite the audience into the research and to get interested in it.

In summary, the class OP initiated with the topic and structure of presentation as lecture introduction and then followed the problem-solution schema of RA in the remaining part of introduction. Unlike conference OP, the class OP involved listener orientation anywhere throughout it, allowing questions and answers. These findings conclude that the class OP is a genre of its own, still similar but distinct from the rhetorical structures of the RA, lecture introduction, and conference OP.

2) Clarification of Ideas

Given that around twenty minutes are imposed on each OP, it is quite impossible to put the whole content of RA into OP. So students need to slice out the information and focus on what is essential about the research. In addition, the audience is required to listen to several OPs continuously at conferences or graduate classrooms. As the audience cannot remember all things from the many presentations, it is expected that an OP speaker let his audience get the gist of his research. This requirement for clarification of ideas was evidenced by instructors’ interview. They all suggested that students have to convince the audience of the three key points of their research: what the problem was, how it was solved, and what the findings were. A clear example of NS’ OP demonstrated how her proposed model was working:

(10) The other thing is you probably want to commit some sort of decay factor so as to account for spikes and so you’re not herding this giant tail. But basically, what you end up with is something like this, which I’ve been calling the listening profile. And then you get a list of all the songs that are correlated and some number representing the string of the correlation. And what’s important here is that all this can be done off-line. (NS-2)

A NS described what the exact result was when manipulating one part of the model to achieve some goal or explained what was important about the result. Apparently, frequent occurrences of Wh-clefts (e.g., what you end up with, what’s important here)
were found in the NS’ OP. Carter-Thomas and Rowley-Jolivet (2001) suggested that the Wh-cleft can be considered as “an interactive strategy that the speaker can use to prepare his audience for the upcoming information, thus helping them to assimilate the most important points of the talk” (p. 28). Thus, the NS clearly presents the main points to the audience, giving more salience.

By contrast, one instructor pointed out that his NNSs often included all the details, which consequently might lead the audience to get bored and to focus their attention away from the OP. Sample (11), taken from the presentation made by a Korean graduate student, illustrates this feature.

(11) This is the external template of CT Arcade it has some XXX – also we’re going to add more like videos, some more on the page. And the top bar is a navigation and the drop-down list of the games in CT Arcade platforms so we’re thinking about what games, some are really simple, some might be slightly more complicated. So we have this (.) the Tic-Tac-Toe is the first game we developed and there are the following names are four some pages currently selected game, we have in the corner the introduction page and the lobby, and trainer, trainer mode, and match review. ( . . ) We have put on (.) Okay, on the right side of the, kind of, bar shows the user menus and in the trainer screen, trainer mode, they’re at ( . . ) there’s a board, at the center, it’s a Tic-Tac-Toe board, so User can play with their AI, his own AI like, with the board. (NNS-3)

The NNS enumerated unimportant low-level details or just read the names of the components of the model. He did not mention what was interesting or novel about his creative model which represented high-level understanding of the model.

The comparison of NS’ with NNS’ OP indicates that NNSs should avoid telling all the details or peripheral information and need to present the appropriate amount of contents from the entire research in order to give a clear picture of the research in a twenty-minute OP. One of the tips for OP uploaded on the class website suggests the OP be presented as an advertisement for the paper that gives the key ideas, intuitions, and results.

As another requirement of clarification of ideas, an OP speaker needs to make what he tells understood clearly. Since the OP provides only one chance to listen, the audience cannot go back and forth when they get confused. So this circumstance required ideas of the research to be clearly transmitted. With the analysis of NS samples, NSs were found to paraphrase what they have said repeatedly or give some examples to clarify ideas during the OPs:
(12) And I’m not too concerned about the difference because when we use the assumption that the $g_{m}$ terms are much greater than the $g_{s}$ terms that term’s going to drop anyways. So if we use that assumption, that turns small, this disappears. (NS-1)

(13) And the result is that it gets really complicated behind the scenes. And what happens is when you push these recommendations out, the Users don’t really understand where they came from or how they were arrived at. And they get a list and they’re not really sure, like “how do I get more things on the list,” like “what’s next?”; like “what’s previous?” And so, this sort of turns out to be sort of the fundamental failing of these current systems as sort of a browsing interface. (NS-2)

As illustrated, NS-1 alternated drop with small, disappear to emphasize that terms became an insignificant difference. NS-2, after announcing the main result, described in detail how the result got complicated (e.g., what happens) and consecutively gave specific examples (e.g., how do I get more things on the list, etc.), all of which can contribute to audience a clear understanding of the main idea.

On the contrary, NNSs just repeated parts of words or phrases with hesitation or pauses, failing to restate properly what they wanted to tell:

(14) So the lobby shows all the rankings, the rankings of all the players. Actually, there are not the ranking of players, it (.) the ranking of players. All. (NNS-3)

(15) While usually we have a current spike in the V-in (.) we have spiking in the V-in and usually it’s a large current and through the transistor MP13 and we use others through the MM3 and we use the (.) these… (NNS-4)

The NNS’ samples reveal that NNSs struggled with finding words and phrases for replacing what they have said in the middle of a fast-paced oral speech. Lack of English proficiency prevented them from being able to elaborate on the information. Consequently, the occurrence of repetition and hesitation could make the audience distracted from the speech and make it difficult to follow the main points.

From the analysis of discourse, it is also notable that even a NS, who demonstrated a clear picture of the research, did not seem to be confined to the allotted time. She spent a considerable amount of time reporting results and explanations and terminated her presentation very abruptly when the time was up:
(16) So these are the other concerns I address in my paper, but I’m not going to dig into it here because I only have one minute. That’s it. (NS-2)

A hasty closing did not make the OP perfect even if other requirements were satisfactorily met. In order to give a successful OP, a professional speaker needs to plan very carefully what he can cover in the allotted time, not exceeding the time allowance.

In summary, a carefully planned speech can provide the most important information clearly presented in the allotted time. Effective syntactic and lexical strategies for salience of main ideas and clarification were found from NSs’ target discourse.

3) Interactional Speaking Style

Weissberg’s (1993) in a study of research-process genre noted that graduate seminars should be “a speech to communicate directly with an audience, as opposed to a memorized or read-aloud paper,” pointing out a noticeable discrepancy between professors’ expectations and students’ performances (p. 27). His suggestion runs parallel with instructors’. Three instructors who participated in the study strongly advised their students not to read slides or prepared transcripts but to interact with other students in performing OPs. To meet these expectations, graduate students need to be aware of different syntactic structures required for both the written and oral research genres.

Rowley-Jolivet and Carter-Thomas (2001) identified considerable syntactic differences between the written and oral modes of scientific communication; passives and extraposition occurred more frequently in the proceedings articles; on the other hand, inversion and pseudo-clefts were distributed very significantly in the presentations. The NS samples illustrated the same syntactic features as found in the oral mode:

(17) And you can see the biggest difference here is M1 is no longer diode connected. What they’ve done is the gap hole to the output transistor is now derived from the drain of M1. And M1 is now in a sort of self-biased cascade with M2. So, What this does is it increases this negative feedback loop by a gain of $g_m f_o$. (NS-1)

(18) What matters is that ten minutes later, when the song changes, you’ll probably be doing the exact same thing .... And then, what we can do is sort of bulk upload it to the online recommender system. (NS-2)

What is more revealing from the NS’ discourse is that the Wh-cleft was encountered very frequently throughout the whole OPs. As discussed earlier in (2), the Wh-cleft
involves two principal functions: it slows down the discourse by dividing the information into two parts and thus helps the audience to follow it more easily, and it notifies the audience what is going to be told and thus helps them to understand it clearly (Rowley-Jolivet & Carter-Thomas, 2001). These functions adequately support the prevalent occurrence of the Wh-cleft in the NS’ OPs.

In the following study, Rowley-Jolivet and Carter-Thomas (2005) found that these distinctive differences between the RA and the OP were absent from NNS scientists. For example, NNSs showed more reliance on the use of the passive and extraposition, which were typical of the RA, in their OPs, not being able to differentiate syntactic features suitable for the genre. Unlike these findings, the NNSs of the present study seldom used the passive or extraposition in their OPs but instead preferred using the pronoun “I” or “we” to address the presenter as the experimenter himself, as the NSs did:

(19) If I bring it, I can beat my own AI (.) my own AI’s .... So I can (.) I can keep them playing. (NNS-3)

(20) Here is level detector circuit, which I do not (.) I did not simulate because of this snitch trigger seemed too hard to work well with the (.) with that as part of the circuit. But XXXX is simple. And here (.) here as my simulations results and (.) this is condensed simulation of the basic typography and we detected V-in and V-out and I also detected the voltage of the (.) of this transistor. (NNS-4)

However, it is striking that the NNSs of our samples never employed the Wh-clef in the OPs. As Rowley-Jolivet and Carter-Thomas (2005) have shown, the NNSs failed to emphasize the new, important information due to the little use of the Wh-cleft. Since the NNSs did not give any salience on specific content, their OP structure seemed flat, which could weaken the claims of the research.

Also, the NS displayed other interactional strategies of speaking to communicate with the audience: they often expressed their personal opinion or feeling about the research:

(21) And I’m not too concerned about the difference…. It’s funny, some of them are saturation they play games with the bias voltage… (NS-1)

Or they used a rhetorical question to attract the audience’s attention to the speech:

(22) So, first thing is what do we need from the User? (NS-2)

Besides, as the common characteristics of speaking style illustrate, the NSs used
excessive amounts of devices to compensate for the verbal pause: *sort of, you know, like*, and colloquial idioms: *bear with me, this evil genius says*:

(23) My project was designed for a pull-based system using music recommendation from *sort of* a big use or a big data concept so it’s a designed proposal not an actual implementation, so *bear with me*. Of course, this project was *sort of* the observation by Jonathan Herlocker that browsing was actually this really important task associated with using recommender systems. So *this evil genius* says, “we’ve discovered that many users use this site even when they have no purchase imminent.” (NS-2)

In contrast to the NS’ OP, these speaking features were not evident in the NNS’ OP. Rather, they very often gave pauses between the words, or sentences, which indicated speaker’s discomfort with the presentation and also made the audience irritated.

In summary, a conversational or “audience friendly” speaking style is required to encourage a direct relationship with the audience in the OP. The syntactic structures and other rhetorical devices more suitable for the OP were identified in comparison with the RA.

V. CONCLUSION

The present study explored the actual characteristics of class OPs by identifying the target tasks that students need to perform and by analyzing the target discourse of NS’ OPs.

First, for the identification of the target tasks, the results from the combination of the three methodologies and sources suggested that there are three target tasks that graduate students need to carry out and master for an effective scientific presentation. The three target tasks were to be able to report the research in a logical way, to be able to clarify ideas, and to be able to deliver the speech in an interactional speaking style.

Then, for the analysis of the target discourse, two NS’ and two NNS’ OPs were examined with a respect to rhetorical, syntactic, and lexical structures and features, addressing how the language is used in performing each target task.

Of the three aspects of target discourse, logical structure in OPs revealed the mix of the RA, conference OP, and lecture introduction, suggesting the class OP as a genre of its own, still similar but distinct from them. The class OP initiated with the information of topic and structure to provide a mental map for what the audience was going to hear, which might follow the framework function of lecture introductions (Thompson, 1994).
The remaining parts of OP introductions were organized as the RA’s model suggested (Swales, 1990): the speaker established the field of the research, prepared for present research addressing a gap, and finally introduced present research. Also, the listener orientation of conference OP components was found throughout class OPs. Unlike the strong formality of conference OPs, class OPs facilitated interaction with peers or instructors to raise questions or suggestions even in the middle of OPs.

The second aspect analyzed in target discourse is clarification of ideas. The transient nature of speaking can make it more difficult for the audience to follow the main points from a long thread of new information; so, the NSs frequently employed the syntactic (e.g., Wh-cleft) and lexical devices (e.g., paraphrase) to help the audience anticipate what the forthcoming information would be and to understand it very clearly.

The last consideration in target discourse is interactive speaking style. The Wh-cleft was identified as the typical and appropriate syntactic structure for the class OP because it could function to slow down the flow of the discourse and help the audience concentrate on the specific information. Also, other effective communication devices or strategies were found to compensate for silence or to cause the audience to better relate to the speaker.

On the other hand, the NNSs often had trouble explaining the research logically in English, particularly in the introduction, and failed to use the syntactic structures and lexical devices more suitable to the oral genre of scientific research.

The results from the study can help teachers or practitioners of EAP learn what is expected of students, how NS and NNS students engage in an OP in class, and what difficulties NNS students have in performing the task.

Generally speaking, it seems inevitable that more variation could be expected from the oral genre when compared with the written genre due to speakers’ spontaneous decisions. Unlike lectures, however, OPs in class or at conferences require conventionalized genres of presentation which graduate students or scientists should follow (Thompson, 1994). Thus, the findings of the present study can suggest pedagogic implications for teaching materials designed for science and engineering graduate students.

First, the mastery of the RA rhetorical structures should be an essential prerequisite for carrying out the OP. Since the OP is derived from the RA as a communicative need, their overall rhetorical structures are quite similar. If the RA were not organized in a logical way, the OP could not achieve its rhetorical function due to the lack of logical structure. Therefore, students with a low proficiency of writing skills should be provided with writing practice before being initiated into speaking practice.

Second, EAP instructors should emphasize to NNS students to be aware of syntactic or lexical features unique to OPs. Some NNS delivered their OPs in written text style even though they prepared well with creative visual aids. They did not seem to be able to
differentiate between the syntactic structures of the RAs and the OPs of scientific genre. What is worse, they felt insecure with any extemporaneous comments which had not already been made at rehearsal. To compensate for their linguistic problems, greater emphasis should be placed on teaching of syntactic and lexical features required in OPs; students should be given practice summarizing a large part of RA content into short speaking formats, or orally restating the text.

Third, more investigation of OPs on scientific research should be done to provide pedagogically useful tasks and materials specifically for science and engineering students. As mentioned earlier, oral academic communication must be more challenging for science and engineering students, compared to humanities students. As its importance has been deemphasized, studies on scientific research presentation are extremely scarce. Currently, there is an urgent need of fairly explicit descriptions of OPs that enable NNS scientist, particularly Asian scientists with a relative lack of oral proficiency, to comprehend and produce. The apprenticeship of OP in graduate classrooms can help improve OP skills, which finally can provide NNS scientists with a wider opportunity to advertise their research to larger members of the scientific community for their future careers. The present study is only preliminary because of relatively small samples and overall shallow analysis. So future research should be extended to a larger amount of data and be focused on every sub-section of the OP to scrutinize its characteristics.

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