
Poster Presentation

Bringing Science Research into the English Classroom: An Example Using Unmanned Aerial Vehicles

Brent Wright

Kanazawa Institute of Technology

Martin Wood

Kanazawa Institute of Technology

As English language educators, we are continually looking for ways to bring engaging content into the classroom. We chose Unmanned Aerial Vehicles (UAVs) for this because the topic is interesting, current, and easy enough for students of all backgrounds to understand. This paper will describe how two English instructors and a professor from the Aeronautics department at their institution collaborated to create a series of activities about UAVs, which culminated with students giving a short presentation demonstrating what they had learned. Giving students the opportunity to talk about current research topics in English will be beneficial for their future careers in science and engineering fields. In addition, we will discuss students' opinions about the topic. Finally, we will suggest ways this process can be implemented with different topics.

Our goal as English language teachers should be to provide students with the opportunity to use English in a practical way. This is most effectively accomplished when students interact with relevant and engaging English content, and then produce meaningful English verbally or in writing. Students have a variety of interests and areas of expertise and they will need to be able to talk about those things in English.

At our institution, two class periods are set aside each term for teachers to implement lessons they feel would be useful for students. We took this

opportunity to develop a lesson that would serve several important functions. First, we wanted to introduce a topic that would engage the students. Second, we wanted to provide students with the opportunity to talk about the content in a meaningful way. Third, we wanted to show students that English is useful and necessary not only in the English classroom but, most importantly, for their future careers. We hoped to achieve these goals with the help of a content area expert, which in this case was a professor from the Department of Aeronautics at our institution.

We focused on the language learning and teaching concepts of motivation (Lightbown & Spada, 2006), student output (Swain, 1985), and differentiated instruction (Tomlinson, 1999) as we developed the materials. Crookes and Schmidt (1991) provide several examples of how teachers can present content in a positive way to students. A teacher's attitude toward the content, including how it is presented and whether the teacher seems interested in the content can lead students to have a high level of interest. If the activities, tasks, and materials are varied it can increase student interest. When tasks and activities are cooperative, rather than competitive, students work together towards a common goal, which leads to confidence that they can accomplish a task in English, as well as the motivation that comes from others being dependent upon them.

Students worked through a series of reading comprehension and listening activities. The final output was to have the students produce a poster and present it to their peers. This is consistent with the Comprehensible Output Hypothesis (Swain, 1985) which states that in order for learners to successfully learn a language, they need to produce oral or written output. Swain (2000) expands on this hypothesis to suggest that learners working collaboratively to complete a task in the target language can lead to enhanced language learning.

The basic steps we took in completing this lesson are as follows: i) Choose an engaging topic, ii) Learn about the topic from an expert at our institution, iii) Develop engaging materials, iv) Implement the lesson and provide the opportunity for meaningful output, and v) Survey students for their impressions of the activities and for future activity ideas.

Method

Materials Creation

Our first task was to learn about UAVs from an expert in the field. We consulted with a professor from our institution's Department of Aeronautics to learn more about UAVs and the research he is conducting. Using what we learned, we wrote a level appropriate text that deals with several different aspects of UAVs. Second, we video recorded an interview with the professor about UAVs and his research. Third, we developed a poster presentation activity that would serve as the output for students.

Text. Based on our preliminary investigations we decided that the text should be divided into four parts (History, Current Applications, Current Challenges, and What's Next?). We aimed to make the reading level easy enough so that most students could grasp the basic idea of the text without a dictionary and challenging enough that they would need to read certain sections several times to understand the details. We included several pictures so that students' understanding of the text would be enhanced with visual support.

Interview. A professor from the Department of Aeronautics agreed to video record an interview conducted in English about his UAV research and his experience working with English. We emailed several interview questions to the professor, and he wrote his responses in English. We then went over his answers with him to confirm key grammar and pronunciation points. We wanted the responses to be clear and concise so that students would be able to understand the content. The interview was conducted and recorded by the authors on an iPad. During the editing process, the interview questions were inserted into the video so students could read them before they were asked. The entire interview was about five minutes in length.

The interview served two purposes. One was to disseminate new information and reinforce what was covered in the text. The other was to show students one of their professors speaking English and talking about the necessity of being able to communicate in English for their future careers.

Comprehension exercises. We wrote a comprehension check worksheet

for both the text and interview and used three different formats: true-false, fill-in-the-blank, and open response. For advanced students who were able to understand the content after one reading, the questions served as confirmation of their understanding. For students who did not understand it after one reading, the questions and searching for the answers provided the opportunity for deeper understanding.

Poster and script. The final activity was a poster presentation where students prepared a poster and short presentation to talk about what they learned from the text and interview. We created a poster and script template which were both differentiated for students' interest and English ability in that they could decide on the content for the poster and what text to include for the script. The script gave the option for students to use a sample sentence structure (with the first half of the sentence provided) or to write original sentences.

Results and Discussion

Students' Responses

One week following the activity, we asked students what other topics they would be interested in learning about. Responses fell into two categories, either a specific topic in their field of study (for example, applications for semiconductors in the Department of Electrical and Electronic Engineering) or general interest topic outside of their field of study (for example, satellite technologies, for which our institution has no major). These two responses indicate that whatever kind of topic we choose there will always be some students who will be interested in the topic and others that may not be. With strategic pre-lesson activities (to generate students' interest) there can be positive outcomes for any topic. If a topic is outside of a student's field of study, they might find it interesting to learn something new. If a topic is already familiar to students, they will already possess the content knowledge and be able to focus more on how to express that knowledge in higher level English.

Lesson Materials

The general outline of the materials we developed can be applied to other topics and areas of research. It is beneficial for students to interact with a variety of types of materials (e.g., scaffolded texts, authentic texts, and videos). It is important to differentiate the types of comprehension activities to the English level and different interests of the students.

The activity which required the most collaboration was the interview. It took about 90 minutes of rehearsal and actual filming to come up with a five-minute interview. The content was easy enough to understand, but could be improved for future activities. We would suggest using higher quality recording equipment than what is available on an iPad. Video recording on an iPad made the editing and displaying aspects relatively simple, but the audio quality was not consistent. If possible, requesting the audio visual department do the filming would result in higher quality footage. It would also enhance the interview if footage of members of the Department of Aeronautics actually operating UAVs were included in the video.

Conclusion

The purpose of this activity was to present an engaging topic to students based on research that is currently being conducted at our institution. This gave the instructors the opportunity to collaborate with a different department and bring current and relevant content into the English language classroom. With help from the Department of Aeronautics, we were able to create a lesson based on current research and give students the opportunity to produce meaningful English output about the topic. In students' future careers, they will need to be able to talk about their area of expertise in English, both as a means of conveying knowledge and as a way to continue improving their English.

The activities described in this paper can be easily adapted to other topics. The key driving force behind the creation of such materials is the motivation of the English language instructor to collaborate with professors from other departments at his or her institution.

References

- Crookes, G., & Schmidt, R. (1991). Motivation: Reopening the research agenda. *Language Learning*, 41(4), 469-512.
- Lightbown, P., & Spada, N. (2006). *How languages are learned*. Oxford, England: Oxford University Press.
- Swain, M. (1985). Communicative competence: Some roles of comprehensible input and comprehensible output in its development. In S. Gass and C. Madden (Eds.), *Input in second language acquisition* (pp. 235-253). Rowley, MA: Newbury House.
- Swain, M. (2000). The output hypothesis and beyond: Mediating acquisition through collaborative dialogue. In J. P. Lantolf (Ed.), *Sociocultural theory and second language learning*. Oxford, England: Oxford University Press.
- Tomlinson, C. (1999). *The differentiated classroom: Responding to the needs of all learners*. Alexandria, VA: Association for Supervision and Curriculum Development.

Author bios

Brent Wright is an English language instructor at Kanazawa Institute of Technology. Before teaching in Japan, he taught Japanese as a foreign language in the United States. His research interests include computer assisted language learning, smartphone use in the classroom, and vocabulary acquisition. brentwright.kit@gmail.com

Martin Wood is an English language instructor at Kanazawa Institute of Technology in Japan. He received his PhD in groundwater science from Flinders University of South Australia in 2011. He is currently interested in motivation and academic English for science and engineering students. martinwoodkit@gmail.com

Received: November 15, 2014

Accepted: December 6, 2015