

Interdepartmental Collaboration to Bring Current Research into the English Classroom: An Example Using UAVs (Unmanned Aerial Vehicles)

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As English language educators, we are continually looking for ways to bring engaging material into the classroom. We chose to highlight UAVs (Unmanned Aerial Vehicles) 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 an instructor from the Aeronautics department collaborated to create and implement a series of activities about UAVs. In addition, we will summarize the results of interviews administered to gather student opinions about the activities. Finally, we will suggest ways this process can be implemented with different topics. Our goal was to explore ways to increase collaboration with other departments at KIT and to bring current and interesting topics into the English classroom.

Keywords: Collaboration, Motivation, Small Group Presentations, Current Research, Differentiated Instruction and Learning

1. INTRODUCTION

Our goal as English language teachers is to provide students with the opportunity to use English in a practical way. This means having students interact with English content, ideally in a variety of mediums, and then produce English either verbally or in writing. Students have a variety of interests and areas of expertise. They will need to be able to talk about those things in English for their future careers.

In English Topics III, IV, V, and Academic Reading I classes, the content is primarily decided by the required textbooks (*Reading Explorer 1 and 2* (Douglas, 2009) and *Reading Science and Technology* (*Reading Science and Technology*, 2013)) and students' understanding of the material is assessed by quizzes following each reading. A wide range of history, culture, and nature topics are covered in the *Reading Explorer* textbooks and science topics are included in *Reading Science and Technology*.

In these courses, two class periods are set aside each term for Integrated Learning. These two classes offer the opportunity for teachers to implement lessons they feel would be useful for students. The authors took this opportunity to develop a lesson that would serve several important functions. First, we chose a topic that would be interesting and relevant enough that students would find the topic engaging. Second, we wanted to provide students with the opportunity to talk about the content in a meaningful way. Third, through interdepartmental collaboration, we wanted to show students that English is useful and necessary not only in the English classroom, but most importantly, in their future careers.

Each year, KIT publishes a research guide which highlights the different innovative areas of research that are being conducted at KIT. We read through the 28 different articles introduced in the magazine and decided on the topic of UAVs (Unmanned Aerial Vehicles) (Akasaka, 2014) and reached out to the author of the article, Dr. Takeshi Akasaka of the Aeronautics Department, to learn more about the topic and to solicit his help in creating classroom materials.

We focused on the language learning and teaching concepts of motivation (Lightbown and Spada, 2006), student output (Swain, 1985), and differentiated instruction (Tomlinson, 1999) as we developed the lesson materials. Crookes and Schmidt (1991) provide several examples of how teachers can present content in a positive way to students. Teachers' attitude toward the content, including how it is presented and whether the teacher seems interested in the content can lead students to have a higher 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 increases motivation that comes from others being dependent upon them.

The Comprehensible Output Hypothesis (Swain, 1985) states that in order for learners to successfully learn a language, they need to produce meaningful 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 is as follows: Choose an engaging topic → Learn about the topic from an expert at KIT → Develop engaging materials → Implement lesson and provide opportunity for meaningful output → Survey students for their impressions of the activities and ideas for future activities.

2. PROCEDURE

2.1 Materials creation

Our first task was to learn about UAVs from an expert in the field, Dr. Akasaka. He was kind enough to give us several hours of his time to help us learn more about UAVs and the research he is conducting. After summarizing what we learned from Dr. Akasaka, we decided to use several different ways to introduce the topic and present new information about UAVs to students. First, we wrote a level appropriate text that deals with several different aspects of UAVs. Second, we video recorded an interview with Dr. Akasaka about UAVs. Third, we developed a poster-presentation activity that would serve as the output for students.

2.1.1 Text

Based on our preliminary investigations and what we learned from Dr. Akasaka, we decided that the text should be divided into four parts (History, Current Applications, Current Challenges, and What's Next?) each dealing with a different aspect of UAVs (Appendix 1). 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.

2.1.2 Interview

Dr. Akasaka agreed to video recording an interview conducted in English about his research and his experience learning English. We emailed eight questions to Dr. Akasaka and he wrote his responses in English and emailed them back to us. Then, we went over his answers with him to confirm key grammar and pronunciation points. We wanted the questions and responses to be concise so that students would be able to understand the content. The interview was conducted and recorded on an iPad by the authors. During the editing process, the questions that would be asked were displayed on the screen. The entire interview was about five minutes in length (Appendix 2).

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 use English.

2.1.3 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 in the text lead to deeper understanding.

Sample questions:

- 1) UAV refers to aircraft both with and without pilots. TRUE / FALSE
- 2) Look at the pictures. Write which application is best for each UAV. _____
- 3) How could a UAV be used in a disaster area? _____
- 4) Keywords from this section: _____

2.1.4 Poster and script

The final activity is a poster presentation where students prepared a poster and one-minute presentation to talk about what they learned from the text and interview. Student worked in pairs or groups of three to complete a poster and to prepare a script to use for the presentation (Appendix 3).

The poster and script were differentiated for students' interest and English ability in that they could decide what content to include on the poster (picture or text) and what text to include in the script. The script template gave the option of using a sample sentence structure (where the first half of the sentence is provided) or of writing an original script.

2.2 Implementation

We began the lesson by showing a video of a helicopter UAV involved in aerial photography. This was intended to raise students' interest in the topic. Then students read the text, one section at a time, either out loud to a partner or silently, and completed the comprehension questions. After each section, students compared answers with a partner. The teacher elicited answers from the class and confirmed that everybody understood the answers. A similar process was used for the interview and comprehension questions. Students then worked in small groups to complete the poster and script. The final part of the class was used for presenting the posters. Each small group showed their poster and gave their presentation to one other group. We believe that students would feel less inhibited and nervous if they were only presenting to a small audience.

3. RESULTS AND DISCUSSION

3.1 Materials

The general outline of the materials we developed can be applied to other topics and areas of research. The exact same type of texts and activities do not need to be used, but it would be useful for students to interact with a variety of types of materials (e.g. scaffolded texts, authentic texts, and videos). It would be important to differentiate the types of comprehension activities to the English level and different learning styles of the students.

The KIT Research Guide has 27 more topics that can be explored and certainly new topics will emerge in the coming years. An extension of this activity would be for students to conduct their own research, either in their own field or in a field unrelated to their area of expertise, and give a presentation to the class or a small group of students.

We asked students what other topics they would be interested in learning about, and the responses fell into two categories, either a specific topic in their specialty or outside of their specialty. These two responses indicate that whatever 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 get students interested in the topic) there can be positive outcomes for any chosen topic. If a topic is outside of a group of students' specialty, they might find it interesting to learn something new. If a topic is already familiar to a group of students, they will already possess the content knowledge and be able to focus more on how to express that knowledge in English.

If we are able to create more of these lessons, and continually update the older lessons to keep them relevant, the topics should be of interest to the majority of students.

3.2 Implementation

Overall, the implementation was successful. However, the authors felt that the amount of material that was presented in the lesson was too much for one 90 minutes class period. The instructors felt rushed trying to get through all of the content and comprehension exercises so there would be enough time for students to prepare and present their posters. This lesson would have been more effective if it were conducted over two class periods and if students were given the chance to work on their poster and presentation outside of class.

3.3 Student survey

The UAV lesson described in section 2.2 was conducted during the 15th week of the first term in 2014. On the final day of class (16th week), we asked 31 students from seven different classes to answer some questions about the activity. The questions were asked and answered orally, in Japanese, and the students were aware that the answers to their questions in no way affected their course grades. The following are the questions and some key answers we received.

1. What did you think about the poster-presentation activity?

Answers: Need more time. Do as homework activity. Relaxed activity (good). Interesting to see others' posters. Difficult to work with partner (the partner was not the student's friend).

2. Did you know about that UAV research was conducted at KIT?

Answers: yes (2), no (29)

3. Would you be interested in learning about other areas of research at KIT?

Answers: yes (30), no (1)

4. What other areas of research at KIT would you be interested in learning about?

Answers included topics outside of students' specialties and specific topics students are learning about in their other major classes.

Electronic Engineering: Solar cars, linear motors, battery, wireless communication, satellites, and helper robots.

Biology: biofuels, environmental issues, and cloning.

3.4 Collaboration

The authors are grateful to Dr. Akasaka for giving his time at such short notice to help with this project. We learned a lot about UAVs from Dr. Akasaka and the students enjoyed seeing one of their professors speak in English about his research. We hope that more professors and instructors from other departments will work with us to bring current research into the English language classroom.

The activity which required the most collaboration was the interview. It took about 90 minutes of rehearsal and actual filming to record the footage for the five-minute interview. The content was clear and easy enough to understand, but there are a few ways it can be improved for future activities. First, the interview was recorded with an iPad, which made the filming and editing a relatively simple process. However, the audio and video quality could be improved if we were to request that the AV department do the filming. Second, the interview could have been enhanced with pictures and videos of UAVs in action. For example, footage of Dr. Akasaka operating one of his UAVs could have been shown while he was responding to interview questions. Third, the interview could have been broken into shorter components, each dealing with a different aspect of UAVs. This would give students a smaller amount of content to deal with at once. Five minutes of continuous listening may have been too much for the students to understand at one time.

4. CONCLUSION

The purpose of this activity was to present an engaging topic to students based on research that is currently being conducted at KIT. This gave the instructors the opportunity to collaborate with a different department and to bring content into the English language classroom. With Dr. Akasaka's help, we were able to create a lesson based on current research at KIT 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.

It is the authors' hope to expand this collaboration to other departments to give students additional opportunities to learn and talk about new research being conducted at KIT.

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Appendix 1: Sample Text

UAVs: Past, Present, and Future

Can a remote controlled aircraft help people? New applications and technology allow these kinds of machines to do things that are too dangerous or difficult for people to do. The people who thought of the first UAV (Unmanned Aerial Vehicle) probably had no idea of the many possible applications.

History

UAV refers to aircraft which do not have a pilot onboard. The UAV's can be either autonomous or remotely controlled from the ground. The first recorded use of unmanned vehicles was in 1849, when the Austrian army launched balloons carrying bombs, against the city of Venice, in Italy.

UAV technology has come a long way since the mid-1800s. Today UAVs come in many shapes and sizes for different applications.

Current Applications of UAVs

UAVs are smaller and cheaper to operate than aircrafts with pilots. Filming television or movie scenes from the air might require the use of a helicopter, which can be expensive, dangerous, and need a lot of open space to operate. Filming from a UAV platform solves these problems.

In Japanese agricultural, many tasks such as planting seeds and spraying crops are made easier by using UAVs. Using GPS and advanced flight control systems, UAVs can be programmed to do many of the time consuming tasks autonomously, saving the farmer time and money.

UAVs are also able to carry sensors to monitor and collect air and land quality data in remote environments. All of these applications are making it easier, cheaper, and safer for scientists to collect information and to learn more about the world around us.

Current Challenges

UAVs can do many amazing things, but they still need to be improved. Powerful batteries that can withstand cold temperatures need to be developed. Propellers that are lightweight and aerodynamic can help UAVs work more efficiently. These things will allow them to operate for longer periods of time in extreme environments. In stormy or windy conditions, UAVs need to adjust how they fly so they can continue to do their job. However, sometimes a UAV will get damaged or malfunction. Some UAVs use a parachute to land safely if this happens. As with any research, mistakes or malfunctions provide scientists with the opportunity to investigate what went wrong and continue to improve the technology.

What' Next?

Researchers are always looking for new ways to use UAVs to improve people's lives. A UAV fitted with special sensors could fly around disaster areas to search for survivors. It could then send the location information to rescue workers who could send people to help the survivors. In another disaster area application, a network of UAVs with antennas could be sent to create a temporary cell phone or Internet network so people could communicate.

UAVs can be used for jobs that are too dangerous or too boring for people to do. Some companies are exploring ways to monitor power lines, bridges and oil pipelines in remote areas.

Researchers will continue to look for ways to improve UAV technology and for new applications to make people's lives better.

NOTE: Figures have been removed to condense the text to one page

Appendix 2: Interview Transcript

1. What is a UAV and how long have you been researching them?

UAV stands for Unmanned Aerial Vehicle. We also call them UAS, which means Unmanned Aerial Systems. I have been researching them about 12 years.

2. Why did you choose to research UAVs?

When I worked at KAWADA Industries Incorporated, which is a helicopter company, we started UAV research in my department.

In that time, UAVs started to be used in dangerous and restricted areas of the world, where there was a lot of trouble.

3. In your opinion, what is the most interesting application of UAVs?

I am interested in incorporated UAV flight. The UAV can carry machines, such as robots or UGV (Unmanned Ground Vehicles), to dangerous areas. When the machines work in these areas, they can relay radio waves from the ground to the air and communicate.

4. What are some of the issues with current UAV technology?

The issues of the UAV is that they can't fly in strong wind and storm.

5. What kind of research are you doing now?

My research is to develop UAVs which can fly in these difficult conditions and I hope to save the lives of many people using UAVs.

6. How do you think UAVs will be used 10 years from now?

The Amazon company idea is to carry goods to customers using UAVs

7. How has English helped you in your life?

To study aeronautics, we can read many English articles.

English can broaden my thinking and my possibility.

8. Can you give your students any advice about studying English?

When you have a chance, you go on a trip abroad alone.

Maybe you will want to get some information, good restaurants, cheap hotels.

So you must speak English.

Speaking English helps you expand your mind and become less shy.

I wish you the best.

Appendix 3 – Script and Poster Template

Script

Introduction:

*UAV stands for _____.

* The key word is _____. It means _____.

** _____

History:

*The first UAV was _____

* The key word is _____. It means _____.

** _____

Applications:

*Some applications of UAVs are _____

* The key word is _____. It means _____.

** _____

Challenges:

*UAVs need _____

* The key word is _____. It means _____.

** _____

What's Next?:

*In the future, UAVs might be used for _____

* The key word is _____. It means _____.

** _____

* *You can use this sentence.*

** *Write your own sentence for an extra challenge!*

UAV



History

Applications

Challenges

What's Next?



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