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The CALL classroom as a window to systemic literacy

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The CALL classroom is an ideal environment to help students develop their systemic literacy by accessing an ever expanding world of openly available materials and websites that are continually being updated. A university education should not aim for the complete mastery of a discipline because disciplinary knowledge quickly becomes obsolete. Rather it should make students aware of the great currents of human thought which can offer guidance in their encounters with the unknown. Until recently, using a CALL classroom could have entailed the use of expensive software and dedicated e-learning materials and tools. Today, there is a cornucopia of excellent language-study materials freely available for those who know how to use them. Described in this paper are specific examples of how Web materials have been incorporated into an English for specific purposes (ESP) class to help science majors develop their systemic literacy..

Introduction

"The focus is not so much on *what* we learn but on *how* we learn." (Brown, 2008: vii)

This is what Brown states in the foreword to *Opening Up Education* (Iiyoshi and Kumar, 2008), a volume of 30 essays by 38 scholars involved in promoting open education opportunities, such as the MIT (Massachusetts Institute of Technology) Open-CourseWare project. He discusses the need to cope with not only traditional literacy but also a new "systemic literacy" which can be interpreted to mean the understanding of the processes and consequences of complex social systems (Brown, 2008: xi). University students today need to go beyond the "what" of learning to the "how" of learning for a lifelong experience of personal development, simply to keep up with an ever advancing and complex global society.

The relationship between these concepts and English study lies in the fact that language is an important key to gaining access to "systemic literacy." A university education should not be to "program" students with established knowledge, which will most probably become obsolete in three to five years in rapidly advancing science and technology fields. Instead, a university education should make students aware of the great currents of human thought and knowledge development so that when they encounter something for which there seems to be no answer, they will know what resources they can call upon to search for or formulate an answer. In an increasingly globally connected world, having sufficient command of English is becoming more and more important to make this type of university education a reality.

With these concepts in mind, let us turn to what can be done in the classroom to help students acquire the skills they need to further develop their language abilities.

A case study in promoting systemic literacy

How can an English class aim at the development of systemic literacy? The answer is by having the students learn "how" rather than trying to teach them "what." Two activities used in a class of English for science will be introduced: (1) website listening and recitation and (2) Google Spreadsheets for grammar and sentence writing practice. The class is offered to science majors who are in their senior undergraduate year and first-year graduate school students. Most of the students are master's degree students and the class usually has about eight students, making possible ample listening and speaking

opportunities.

To encourage the students to learn how to learn about giving oral presentations, a series of listening and recitation activities are done using three types of listening websites. The first type, websites for learning English, is represented by Randall's Cyber Listening Lab, which offers a range of listening events from easy to difficult with one to several speakers. Students are asked to choose a dialogue that they can practice with a partner and present to the class. Working with a partner eases the anxiety of standing up in front a class and presenting in English. The dialogues come with scripts that the students can used to mark off pauses and stressed words to aid their recitation practice. The next step is individual recitation from a news site, e.g., Breaking News English, VOA Special English or CNN Student News. Students are again told to do the prosody marking and also to check the pronunciation of problematic words. This can be done using dictionaries, including online dictionaries available at the OneLook Dictionary Search site, where some of the dictionaries offer audio presentation of search word. When the students present their recitations, the other students evaluate them for pronunciation, prosody and pace (the speed should be neither too slow nor too fast) while listening for key words and concepts. The evaluations may not be as accurate as a trained instructor's but being given the responsibility of peer evaluation makes the students pay attention and become aware of what they need to do to be heard and understood.

By the time the students have done two recitations in front of the class, they have usually lost their apprehension of talking before an audience and are ready to attempt a more challenging task. The next assignment is to choose a podcast from the Nature or Science website to listen to, analyze and recite from. These sites, operated by top-ranking scientific journals in the UK and the USA, respectively, present the latest research from their namesake journals as weekly podcasts. Students use the scripts for listening practice as well as simplified genre analysis to identify the "moves" and expressions used by scientists to describe their research to those outside their field of discipline. A "move" is a section of text that expresses the intention of the writer or speaker. For example, in the example below, the first move is one which introduces a researcher and the research done. Expressing moves in suitable order and using appropriate expressions is important for professional communications. Effective explanation of one's research is extremely important to obtain funding for further research, to convince the reviewers of professional journals that the research merits publication and can enable the researcher to take advantage of collaboration opportunities with other scientists, researchers and even corporate and industrial interests.

Here is an example from the 30th April 2009 Nature podcast (http://www.nature.com/nature/podcast/v458/n7242/nature-2009-04-30.html) with the genre move analysis and highlighting of expressions that indicate the move:

Script with hint expressions highlighted	Move
Kerri Smith: Many genetic studies over the past few years have tried to find out what genes contribute to autism. ...Now a large international team has conducted the biggest ever study into the genetics of autism. ***To see what they turned up I called*** Hakon Hakonarson of the Children's Hospital at Philadelphia.	Introducing researcher and study
Hakon Hakonarson: There had been several candidates put forward but ...	Describing research
Kerri Smith: ***And I suppose in order to make it more clear that's*** where this pair of papers come in, so in one of them you've looked at what you were just mentioning that common variants to see if you could find any of those ...	Confirming details
Hakon Hakonarson: ***That's correct.***	Responding to question
Kerri Smith: ***So can you talk us through how*** they add to the picture then? What's different about these studies that previous studies haven't been able to do hand picked up?	Asking about procedures
Hakon Hakonarson: ***So the major difference is perhaps that*** ...***This has never been done before for*** any of the variants ***that had been reported in the literature.***	Pointing our novelty of procedure

The announcer Kerri Smith continues asking about procedures, results, applications of the work and further work that can be done. Each 30-minute podcast features several sections of about 4 to 5 minutes. A student chooses a 1- to 2-minute section of interest from an archive of weekly podcasts with transcripts dating from April 2006. They do both the prosody marking and a simple genre analysis. This genre analysis data is pooled so that all students can utilize the database to plan a podcast to describe their own research. The students are asked to follow the move pattern of introduction of researcher and research to the questions about details and projection about applications and further work. They are told to try to use examples from the hint expressions to guide the listener through the explanation. This is thus an exercise in learning how to describe one's research by using examples from the scientific community that they someday hope to join.

In parallel with this global type of listening and speaking activity, attention is also paid to word choice, grammar and sentence structure. The Google Docs & Spreadsheets (http://www.google.com/google-d-s/hpp/hpp_co_jp.html), which enable simultaneous sharing of a document or spreadsheet, are used for an interactive exercise in which students compose sentences using words from the class textbook. The lessons focus on the pronunciation of words and expressions used in science and technology (e.g. numbers and units, element and compound names, laboratory equipment, descriptions of figures and table). Before coming to class, the students are expected to listen to the CD for the

Student sentences	Editing suggestions
How many picograms of DNA does the sample include?	
The Large Hadron Collider is intended to collide opposing particle beams of lead nuclei at an energy of 574 TeV per nucles.	The Large Hadron Collider is designed to collide opposing particle beams of lead nuclei at an energy of 574 TeV per nucleus.
The speed of light is three hundred mega meter per second.	The speed of light is 300 mega meters per second.
Our blood contains 3 micro grams of silver per liter.	Our blood contains 3 micrograms of silver per liter.
Silicon is a semiconductor.	
Much electlicty is required to make aluminium.	Much electricity is required to make aluminium
One angstrom is one hundred picometer.	One angstrom is 100 picometers.
Pt is contained in the anticancer agent.	

lesson before coming to class and think of sentences to express what they would like to say. As can be seen from the examples below, the editing includes spelling, article usage and the appropriate use of singular and plural.

Doing this sentence writing exercise with everyone participating hands-on makes it possible to have everyone offer suggestions for improvement. The real-time aspect also makes students aware of what to be careful about when writing their own sentences. The sentences gradually became more complex and covered more content as the semester progressed. Again, this exercise incorporated the learning of how to edit and polish one's work as well as working with peers to aid the development of systemic literacy..

The final grade for the class is based on class attendance, individual recitations, participation in peer evaluation and the final conference-style presentation with PowerPoint® slides. The recitations and sentence construction exercises all contribute to this final project.

The class this year is still ongoing and student comments are not yet available. Last year's anonymously answered questionnaires indicated that the students found the work challenging but useful. Trouble with computer usage and losing interest when the focus was on another student's work were mentioned. To resolve such issues, the class this year was planned to engage all students while commenting on individual work. Some realized the importance of explaining their research to others while one did not. This year more time was spent on explaining why scientists and researchers need to be able to explain the reasons for their research and its place in society.

Conclusion

The overall aim of the class is not to simply have students learn the words, expressions and grammar of science and technology but to learn about what is available to aid their learning and how they can take advantage of these websites. Another very important aspect of the class is to learn how to actively participate in shared learning experiences with their peers. This approach should lay the basis for a good grasp of systemic literacy which is essential for anyone who wishes to be an active participant in the knowledge society of today.

References

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Breaking News English (http://www.breakingnewsenglish.com/)

CNN Student News (http://www.cnn.com/studentnews/).

Nature (http://www.nature.com/nature/podcast/archivetranscripts.html)

OneLook Dictionary Search site (http://www.onelook.com/)

Randall's Cyber Listening Lab (http://www.esl-lab.com/)

Science (http://www.sciencemag.org/about/podcast.dtl)

VOA Special English (http://www.voanews.com/specialenglish/programs.cfm)

システミック・リテラシー育成に向けての CALL 授業

現代社会では、IT 技術の発達により情報は一瞬にして世界を駆け巡る。特に科学技術の分野では、大学で学んだ知識が、たちまち陳腐化してしまうような状況となっている。こうした高度情報化社会における大学教育では、単に知識を伝達するだけではなく、学生が社会に出てのちに未知の情報に遭遇しても自力で解答を見つけることのできる能力、すなわち、知の体系を読み取る能力（システミック・リテラシー）も育成しなければならない。CALL 授業においてウェブ素材を活用すれば、このシステミック・リテラシーを育成する授業が英語教育でも可能となる。本稿では、大学学部生および大学院生を対象とした理系 ESP の CALL 授業例をとりあげ、ポッドキャストや英語学習サイトなど、インターネット上のウェブ素材をどのように利用すれば、システミック・リテラシー育成に役立つのかについて、その具体的授業方法を紹介する。