Learning Safety Education on an Open Course Ware

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Abstract

This paper discusses a part of the safety education materials we are creating as content for our e-learning system called SNOWBALLS®. The long-term vision for content development within the SNOWBALLS project includes teaching academic engineering vocabulary for both Japanese and international students (i.e., both English and Japanese versions), as well as safety education, and training of teaching and office staff. The Great East Japan Earthquake in March of this year made us decide to prioritize the development of a part of the safety education materials, since the raised awareness and (media) attention for this topic provided increased motivation and a rich source of ideas and vocabulary to teach. In a seminar style class, 9 students and 2 student teaching assistants developed e-learning modules under the supervision of the authors. The topics were natural disasters, safety in buildings, communication, reconstruction, and energy. We highlight the outcomes of this class, and also discuss our motivation for creating e-learning content on these topics in the wider context of safety education.

Introduction

The Global Ware Project at the University of Tokyo has been making contents for our e-learning system called SNOWBALLS. SNOWBALLS is a student-oriented system, and students take the lead in designing and developing the system, as well as its content.

Due to the trend of globalization, the School of Engineering at the University of Tokyo intends to increase the number of foreign students who come to study in Japan. To globalize the Japanese students at the University of Tokyo as well, the School of Engineering set the ambitious target to offer up to 70 % of all the lectures in English by 2020. For the junior students who just enter their specialty area, academic terminology is one of the obstacles that prevents the students from understanding their field, especially when English terms are used.

We started SNOWBALLS as a Global 30 project in October 2009 with funding from MEXT to help the junior engineering students learn scientific English terminology. However, the e-learning platform is sufficiently generic, and we plan to develop additional content to teach international students (academic) Japanese, to teach academic staff the English they may need in their lectures or academic papers, and to teach office staff how to effectively interact with foreign students and researchers. On top of that, we will support the various departments to develop major-specific courseware.

Soon after the start of the project, we decided to give students a central role in the development of the e-learning platform and its content, because we need to be sure that our system meets their requirements and that our content can motivate them and meet their interests.

To achieve such close collaboration, we formed a seminar style credit course open to all students from all engineering departments.

After the discussion and development of the platform itself in the first year, we are now in the phase of creating content. Students come to the class once a week and discuss on what topic(s) they should make contents for SNOWBALLS. After setting the topic and brainstorming for keywords, they discuss what writing and presentation style will keep learners motivated when studying the e-learning content they make. Then they start to write textbooks and make questions on those topics. The general course outline is shown in Table 1.

Table 1. Course outline for the seminar-style SNOWBALLS class.

Wk	Description
1	Explanation of SNOWBALLS & course outline. Self-intro & topics brainstorm → HW: submit brainstorm results
2	Brainstorm topics/keywords → HW: submit topics/keywords
3	Choose topic, decide scope of each section, write keywords → HW: Create first version of text (backbone)
4	Discuss backbone & Note copyright issues → HW: Work on images & copyright issues
5	Add detailed text & Example sentences → HW: Finish draft version
6	Discuss & Rewrite text/rearrange blocks after feedback → HW: Finalize text
7	Think of 10 questions, be creative → HW: Finish 10 questions
8	Discuss good/bad questions → HW: Finalize questions
9	Review final questions & Explain uploading text → HW: Correct questions according to comments
10	Upload text → HW: Finalize uploading
11	Review uploaded texts & Explain uploading questions
12	Uploading Questions + Finalizing uploaded text & questions → HW: Finalize uploading
13	Extra day for finishing up / View and discuss course results
14	Prepare for final presentation

Up to now, students made e-learning modules consisting of explanatory text with pictures and quiz questions teaching basic engineering vocabulary on over 20 topics, such as the names of the shapes, angles, lines, manufacturing tools, laboratory equipment, measuring tools, reading equations, matrices & vectors, statistics, and so on. These modules are currently being checked by a native speaker of English with an engineering background, after which a final check by the teachers will be conducted before making them available to the learners.

Safety Education as e-Learning

Generally, safety instructions are relayed by providing a thick manual, or by requiring students to listen to a dry recital of all safety rules and procedures. We believe that e-learning can make a difference here, by providing all information online, any time. This means students can study any time convenient for them, and they may skip through parts they already know or which are not required for them. Additionally, the e-learning material can be used as a reference at any time, and the central, online storage provides the possibility to update information, in contrast to printed procedures, which may quickly become outdated.

The e-learning platform also offers the possibility to test whether the student actually knows the rules and understands the procedures. Even when one took a safety course previously, a quick test could help one to identify whether his knowledge is still on the required level, and if not, which points should be studied again.

Content for Safety Education

Safety education spans a wide range of areas. The most apparent might be the rules and instructions for working in a (bio)chemistry laboratory and for operating machines in a manufacturing workshop. However, engineering ethics and the responsibility of engineers to think about the safety of end-users (providing back-up systems, using safety factors in calculations, etc.) are surely also topics that every engineer should learn about.

Although we are currently also creating e-learning courseware on some of the above mentioned topics, we will focus on (public) safety in cases of emergency and natural disasters in this paper. As more and more international students come to The University of Tokyo, disaster preparedness and knowing vocabulary to communicate with foreigners in case of an emergency is very important, particularly in a country as earthquake prone as Japan.

Safety education and thinking of safe engineering solutions to world problems are current topics that every student in the world should learn. By publishing such materials as Open Course Ware, anybody in the world can learn from them and share the knowledge, and we can create a safer future.

Seminar Style Course to Develop Safety Education e-Learning Modules

The 2011 summer session started in May, and because of the huge impact of the Great East Japan Earthquake and subsequent tsunami that occurred on the 11th of March, 2011, the students made e-learning content about natural disasters, safety in buildings, communication, reconstruction, and energy. The students decided on these topics after discussing their experiences and thinking about the vocabulary one would need to act adequately in such a disaster situation.

Students worked together in pairs and picked up some important vocabulary relating to these topics. In the modules they created, they introduced and explained these keywords and showed how to use this new vocabulary in context. Finally, they also made quiz questions so learners can self-assess their understanding.

In total 9 students took part in this semester's course, 5 of whom were international students (all non-native speakers of English) and 4 were Japanese students. We also hired 2 Japanese students as teaching assistants to facilitate the discussions. The resulting e-learning modules are all in English, with only the (main) vocabulary given in Japanese as well.

Students were divided into three groups and each group chose one topic. In the group discussion, they picked up ten words which they think are appropriate to be taught in the text book. Then, they wrote some texts around those keywords to show their use in context, and to introduce some additional (but less valuable) words. We encouraged the students to create or take their own pictures to illustrate the texts, or to search for copyright free pictures from the internet. There are some examples shown below.

Output of the Course

The students in the course chose for example the interphone on the highway (Fig. 1) or fire exit doors (Fig. 2) to teach how to communicate with other people in case of emergency, or how to keep their own safety. Interesting points came up while creating these materials, such as the

difference between a “fire door” and a “fire exit” or “fire escape” (the former being a door that should be kept closed in order to prevent a fire from spreading, and the latter being ways to evacuate from a building).

Talking of the damage they suffered in Tohoku area, they chose "rubble" (Fig. 3), "ground subsidence" (Fig. 4) and similar words they picked up in the media.

Communications	
emergency phone **interphone**	緊急電話 インターホン
Phones that are **dedicated** for emergency use are called emergency phones. Those are usually located along highways, or in **remote areas**, where it may be difficult to reach for help. Free of charge calls can be made to lifesaving services such as fire stations, **hospitals**, and police offices. Emergency **interphones** are a subset of emergency phones. They are usually found in elevators and in some modern buildings.	

Fig. 1 We dealt with communication. The students chose an interphone on the highway and explained how useful it is.

Emergency exit **Fire escape**	非常口 避難階段
The emergency exit provides an **alternative** escape if the regular exit is blocked by fire, etc. Usually exit signs leading to these exits are **strategically** located in a building. A fire exit is just another name for it. However a fire escape is a special kind of emergency exit, usually a ladder or staircase **connected** to the outside of a building. Sometimes a fire escape is located inside the building but separate from the main areas. Such exits should **be kept clear** under all **circumstances**.	

Fig. 2 Everyone should know the official signs to indicate fire exits. The students used the official ISO symbols, so they are copyright free.

rubble	瓦礫【がれき】
Rubble is broken stone, of irregular size, shape and texture.[i] Ex: After great Tohoku earthquake and tsunami occurred, a lot of rubbles were found in the devastated area. Self Defense Force or volunteers were used to help cleaning areas.	

[i] http://en.wikipedia.org/wiki/Rubble, Wikipedia

Fig. 3 Rubble was seen everywhere after the disaster.

	subsidence	地盤沈下【じばんちんか】
	Subsidence is the motion of a surface (usually, the Earth's surface) as it shifts downward relative to a datum such as sea-level.[ii]	

[i] http://www.flickr.com/photos/zenjiro/5522124372/, flickr, ”zenjiro”, CC BY
[ii] http://en.wikipedia.org/wiki/Subsidence, Wikipedia

Fig. 4 In the Chiba area, a huge subsidence occurred and people got injured. These students highlighted additional vocabulary that appears in a word-list at the end of the module in yellow.

Yet another team chose disaster preparedness as a starting point for their e-learning module. When foreigners come to study in Japan, generally Japanese students will help them to get settled, and have to make them aware of the particular dangers of natural disaster in Japan. As one example of the vocabulary needed in such a situation, the students chose to introduce the word “disaster supply kit“ and explained what kind of items such a kit could contain (Fig. 5) .

 (1)	disaster supply kit (N.)	防災用品キット
	A disaster supply kit contains important things that you may need in case of a disaster or evacuation, such as water, food, batteries, a radio, a telephone, cash, keys, and an ID card.	

Fig. 5 In case of emergency, you need a disaster supply kit. You should put everything you might need when you have to evacuate from your house.

We also discussed the energy problem (Fig. 6). Nuclear energy used to be thought of as a safe and reasonable solution. However, the main cause of the huge disaster in Fukushima was caused by the Nuclear Power Plant, and all of a sudden the myth of safe nuclear energy broke down.

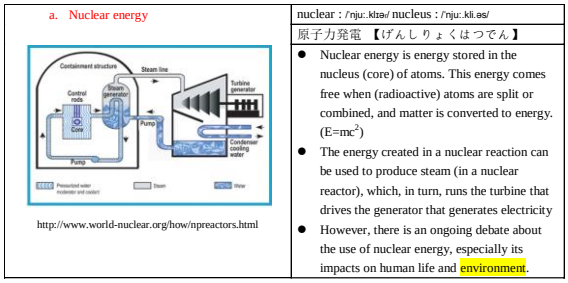

Fig. 6 Nuclear power plants were thought to be very safe and efficient means to produce a lot of energy at a reasonable cost.

Conclusion

It is important for everyone to learn about safety, accident prevention, and disaster mitigation. Whether for laboratory experiments or to support students in their daily life, the university has a responsibility to provide clear and accurate information to ensure students' safety at all time. Providing the students with the necessary vocabulary to understand and relay this information is the first step we are taking.

In our globalizing world, sharing information between people and relaying important safety information to international visitors is becoming a serious issue. It is therefore important that everyone shares a basic vocabulary and basic understanding of safety-related issues.

Although some specific rules and procedures may vary by country or institute, most of the safety education courseware will be generic and many could benefit by its availability.

In this paper, we highlighted a few of the e-learning modules we are currently developing. These modules, created by and for students, will form a basis for our safety curriculum. Written from the students' perspectives, we believe these texts will not only raise students awareness of safety issues, but also elicit further talking and study about ways to create a safer living environment for all.

References

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Related Web sites

Global Ware Project: http://gwp.t.u-tokyo.ac.jp/