Discussing Climate Change in a CLIL Approach to Engage Technology Students in English

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Abstract

This is a proposal to employ a CLIL approach to English language teaching with the topic of discussing Climate Change, in an effort to improve student engagement. Enabling students to engage in discussions of climate change will provide students a sense of relevance for the English being learned. The CLIL approach emphasizes that the learning be directed towards a final goal: in this case, the statement of informed opinion supported by reasons and examples. A further benefit of this approach is to engage students in authentic English as much as possible.

Key Words : CLIL, English, authenticity, climate change, student motivation, active learning

Introduction

It is essential to overcome the traditional reservation among Japanese students to participate in classroom discussions, and to close the disconnect between English and the daily lives of our Japanese students. Kosen (National Institute of Technology) students are reluctant to contribute to classroom discussions for a variety of reasons. The most obvious reason is the belief that "tech people" are poor at communication. The stereotype that technology students are poor communicators, and even poorer, thereby, at speaking in a second language, is particularly strong in Japan, reinforced by images in popular media and social interactions:

> The field of engineering in particular has the reputation of harbouring people who do not like foreign languages, in fact, people who do not like to talk much at all. The image of the geek who will potter for endless hours in contented isolation, who is absolutely fascinated by the intricacies of technological problems and their solutions but averse to talking about them to the rest of the world, represents a powerful stereotype. All stereotypes do have some foundation in reality and so does this, but – like all stereotypes – it also draws its force from being habitually recreated by the discourses of society. These discourses can be personal conversations, media products, and movie characters or, indeed, the content of curricula designed for engineering and technology education. (Dalton-Puffer, Hüttner, Schindelegger, & Smit, 2009, p. 18) [1)]

This "introverted techno-geek" is further burdened by the common assumption in Japan that Japanese people are not good at English.

Survey to Measure Nature of Reluctance to Engage in English

In order to better gauge the source of students' reluctance to engage in English, we conducted a survey of Tokuyama Kosen students in 2017. The survey consisted of 20 statements, all in Japanese (the students' first language). Seven of the statements were target statements, thirteen were included to blind the students somewhat to the nature of what

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was being measured. On the survey, the statements were mixed together, but for clarity's sake the target statements are:

(S1) I will use English in my future career.
(S4) I want more chances to use English outside of school.
(S5) I see English as relevant to my daily life.
(S6) I make an effort to seek resources for studying English outside of my regular school work.
(S7) Learning another language helps me to be a better person.
(S9) My friends and peers see English as important to our future.
(S10) People outside of school (parents, friends, members of my community, etc.) do a good job of helping me understand how English is relevant to my life after graduation.

Students indicated their agreement or disagreement with each statement on a scale of 1 to 6, with 1 being most strongly disagree and 6 being most strongly agree.

We collected data from 493 students across all grade levels of the National Institute of Technology, Tokuyama campus. A summary of the data specific to the target statements is below:

Table 1 2017 Student Motivation Survey (*N*=493)

	Mean	*SE*	Median	Mode	*SD*
S1	3.89	0.07	4	4	1.48
S4	4.21	0.06	4	4	1.27
S5	3.44	0.07	3	3	1.49
S6	3.57	0.06	4	3	1.4
S7	3.7	0.07	4	4	1.51
S9	3.63	0.06	4	4	1.43
S10	4.47	0.06	5	5	1.29

Note. SE=Standard Error, *SD*=Standard Deviation.

S4 and S10 received the highest average "agree," while S5 and S6 received the highest average "disagree." Most Tokuyama Kosen students agreed that they want more chances to use English outside of school (S4), and that people outside of school do a good job of helping them understand how English is relevant to their lives after graduation (S10). Most Tokuyama Kosen students disagreed that they see English as relevant to their daily lives (S5), and that they make an effort to seek resources for studying English outside of their regular school work (S6). From these statements, we can conclude the following:

1. The students perceive that English is important to learn (S4 and S10).
2. The students do not perceive that English will be useful in their life after or outside of school (S5 and S6).
3. "English is important" is a message they received from various people and sources, but it is divorced from their daily experience.

Considering the above conclusions in conjunction with the often self-determined student "weakness" to engage in English, it is in the best interest of our students to focus English lessons on subjects with which the students already feel a measure of confidence yet which meet their current learning goals. We should emphasize communication, not the mastery of technical terms, deemphasize grammatical accuracy and build the perceived authenticity of the English by which students engage the teacher and each other. Furthermore, in order to establish relevancy between English as a language of communication and the students' lives, the materials being studied in the classroom need to selected and presented in a manner that increases their perceived authenticity.

Increasing Authenticity through CLIL

In the world of TESL, "authenticity" is usually taken by teachers and administrators to mean realia, which the Cambridge Dictionary defines as "real objects or pieces of writing, used to help teach students in a class." However, "authenticity" might better be phrased as "authenticity of purpose," meaning there is a reason to engage in the process of language acquisition. In the context of this essay, the word "authenticity" is weighted towards this connotation.

Establishing a perceivable authenticity is essential to engaging students in English as a second language, especially with students who are focused more on the practical applications of their education, such as technical college students. Students at Kosen want to learn subjects that relate to their future careers. As students of technology in Japan, the majority of students see subjects such as

math and science as being more valuable to their futures than English. They may recognize the importance of English in theory, but they don't perceive the English they learn in a typical "English class" as being authentic, because such classes are focused more on vocabulary and grammar than on actually using the language as a tool of communication. If students perceive the language as being useful both in the present and their future, they are more likely to engage and participate in the learning process. But achieving authenticity does not mean simply throwing "real objects or pieces of writing" into the classroom. Such practice may decrease the effectiveness of lessons as they might be too challenging for the students, or not incorporated effectively into the curriculum. Students need to be introduced to such materials in a structured way, one which builds familiarity with the material so that students steadily gain confidence to engage, and so that students perceive a reason for engaging with the material. This is where a CLIL methodology can be most useful.

As a method of non-native language instruction, Content and Language Integrated Learning (CLIL) foregrounds *language* as a tool of communication: "the CLIL distinct methodology…presents a challenging curriculum in which language learning skills and concept knowledge are presented to learners in meaningful concepts" (Guillen, 2019, p. 68) [2]. Meaningful concepts and the promise to do something with the language are key distinctions of CLIL: "Students are not only expected to develop the skills related to the subject consent but also to do something with that knowledge using the language" (Guillen, 2019, p. 68). In a language classroom informed by a CLIL methodology, the purpose of learning the language is to accomplish some goal or task; in a traditional language classroom not informed by such a methodology, the purpose of learning the language is to perform the language learnt for evaluation. In a traditional English lesson, students might find one day that they are learning the present perfect tense. The purpose of learning the present perfect tense is, here, to correctly answer the related questions on some sort of quiz or test. This type of learning lacks authenticity of purpose—in fact, it lacks any real purpose outside of the classroom. In the real world, people use language to accomplish tasks. Therefore, in order to increase the perceived authenticity of our English language lessons, the lessons themselves need to be task-focused. In the CLIL methodology "[l]anguage is not assessed as a separate entity, but as the vehicle for the accomplishment of production-based objectives (observable as tasks)" (Ball, 2015, p. 25). We increase the perceived authenticity of the English classroom by foregrounding that the purpose of learning the language is to complete certain tasks. Another, concomitant means of increasing perceived authenticity, is to center the lessons' focus on subjects related to the students' interests, not only on the foreign language. This is another strength of the CLIL methodology—that it is a way of exploring content *as well as* language. Of course, the best way to engage students is to choose content they are interested in, and since these are technical college students, it is good to choose science-related subjects—even better to choose science-related subjects that have an verifiable impact on their current and future lives. Climate Change is one such subject. By discussing Climate Change in English, students perceive the material as directly related to their personal and learning goals. Of course, a certain level of English skill is also required for graduation, but for the most part students do not perceive a need for English beyond graduation. We want to change that perception, so that students think of these classes as a chance to learn new materials related to their future and learn new skills for communication and for study, all of which appeal to the students' learning goals. Involving students in discussions on subjects they are interested in, and with which they are already in some respects familiar with, can greatly improve their confidence and positive outlook towards further English learning. As Lasagabaster and Manuel Sierra remind: "Marsh (2000) highlights that CLIL programmes can nurture *a feel good attitude* among students, as the higher proficiency level achieved (irrespective of how modest it eventually is) may have a positive effect on their desire to learn and develop their language competence" (2009, p. 5) [3] Furthermore, CLIL motivates students to improve their language skills:

> Students are as keen to learn about content areas as they are to improve their language skills. They are also interested in learning

> study skills, which perhaps indicates a disposition towards developing greater autonomy. The fact that content was the most important aspect in defining authenticity implies that CLIL, through 'authenticity of purpose' delivers a greater sense of engagement to the students and allows opportunities for language focus to arise organically in the classroom situation. (Pinner, 2013, p. 53) [4)]

CLIL classes can help students see English as a useful tool to understanding lesson content. Content can be a review of previously learned materials (wherein the focus is on the foreign language), or a slower, step-by-step examination of new content. This can address the problem that students and parents (and even other teachers) might view that any additional focus on learning English reduces time to focus on other subjects, subtracting from the limited resource of learning time. CLIL lessons can engage students more actively in learning, however, something that can appeal to both parents and teachers. CLIL courses may also help overcome the "teacher-centered" instruction that leads students to become less interested in school.

General Lesson Flow

The following description applies to an English Conversation course conducted at Tokuyama Kosen between March and September, 2020. Though the class was conducted online, the same general lesson flow would have been followed in face-to-face lessons.

First, attendance: students sign in to the lesson on Microsoft Forms, or the teachers calls the students' names, but is also asked a question related to today's topic

Second, the schedule for the day's lesson, in which the end-goal for the lesson is stated, so that students perceive some purpose of each lesson activity.

Third, a warm-up activity related to today's content. The main goal here is getting students to use English in the classroom, but also to provide some models of production for use later on in the lesson. Feedback is limited to praising production and using examples of student-generated English to illustrate how students can engage in the subject.

Next, recap of the previous lesson and, whenever possible, a brief explanation of how the warm-up activity relates to the previous lesson and to the end-goal of today's lesson.

After that, vocabulary introduction/review/practice: the vocabulary studied is key to understanding the reading and listening activities.

Then the students do reading or listening activities. To increase the perceived authenticity of the lessons, these reading and listening activities require students to engage with actual English-language news articles. Each activity, however, is designed to prepare students for the next, more difficult activity. For example, the vocabulary activities prepare students to read true/false statements about the article; the students then select whether the statements are true or false after reading only the headline of the article; students then listen to the article before taking the true/false quiz again; students then read the article to confirm their answers. The main purpose of these activities is to increase student familiarity with the language of the article, and to provide ample chances for them to test and confirm their understanding of the content.

Finally, students are asked to exhibit their comprehension of the article and their opinions. This may take the form of a group activity, small group discussions, question generation, role plays, presentations, debates, etc.

(Ideally, this final stage of the lesson would take up a significant amount of class time; unfortunately, from March to September of 2020, this class was conducted online and this meant all the build-up activities required more time for set up and completion.)

The above steps mirror the five conceptual sequencing steps outlined by Ball, et al., in *Putting CLIL into Practice*: establishing pre-knowledge/stimulating interest, introductory, main conceptual content, concluding the main conceptual content (pre-assessment), synthesis and/or assessment activity(ies). Why is such sequencing important? "The simplest answer … is to assert that a didactic activity—namely one that takes place for the purpose of learning—never exists in isolation" (Ball, 2015, p. 34) [5)]. As teachers, we create steps that help the students understand, become comfortable with, and feel some mastery over, the language necessary to reach the next step of the lesson.

Of course, the approach to specific lessons will vary. The main point here is to illustrate two

essential points in a CLIL lesson: *scaffolding* and *task-led activities*. First, scaffolding: each activity in this lesson is designed to prepare students for the next, more difficult activity. Second, task-led activities: each activity has the purpose of enabling students to successfully participate in the final activity of the lesson, an activity which requires conceptual and cognitive engagement with the topic.

Concrete Example of a CLIL English Conversation Lesson

For clarity's sake, the following is an actual lesson taught at Tokuyama Kosen on August 31, 2020. This is the 2nd lesson in a unit of 4 lessons on rapidly decreasing worldwide insect populations. The lesson is conducted online, in English, using Powerpoint and Kahoot!

Teacher asks the question, which will be asked again at the end of the lesson: "Should it be illegal to kill insects?" Most students say, "No," and are then prompted to provide reasons.

The day's schedule is shown and explained: attendance, listening quiz, vocabulary review, reading, small group question time, group discussion.

Students then sign-in on the attendance form via Microsoft Forms.

Listening quiz: students listen to the news article (this is their second time hearing it). While listening, they take a multiple choice quiz in which they choose the correct word or words to complete sentences from the article.

The key vocabulary from the news article is reviewed. If students struggled to remember the meaning of the words, we would take a vocabulary quiz on Kahoot! to refresh their memories. (This also provides a change of pace and gives the students a different method of participating in class.)

Students read the news article again (this is their second time). The teacher reminds the students to read carefully and ask questions because they will be participating in a small group discussion based on what they've read in the article.

The small group discussion is explained in the following steps: 1) break into small groups (this is done on Microsoft Teams by the teacher); 2) in your small groups, write three good questions about insects; 3) we will then come back into the big group; 4) each students will ask a question their group made, which all students will answer; 5) write down answers to the question you asked. This activity takes 15 to 20 minutes of class time.

The final activity is large group discussion. The students are asked the question from the beginning of the lesson: "Should it be illegal to kill insects?" The teacher then explains that while most people will say no, it is important to be able to predict and understand reasons people might say, "Yes." "Based on your readings and discussions so far, let's try to make a list of reasons people might say, 'It should be illegal to kill insects.'" Students then talk as a group to make a list of reasons it should be illegal to kill insects, and then a list of reasons it shouldn't be illegal to kill insects. Finally, still in plenary, the students are then encouraged to find a possible compromise, with some examples provided by the teacher, between the two opinions. This activity takes about 15 to 20 minutes of class time.

The teacher provides feedback on useful English, or mistakes in grammar or vocabulary, noted during the lesson. By the end of the 4th lesson in this unit, students will record a 3-minute presentation on FlipGrid of their response to the question "Should it be illegal to kill insects?" which will be assessed by the teacher.

Less is More: Increasing English Talk Time and Active Learning

It should be noted to that final two activities of the lesson described previously took 30 to 40 minutes of class time collectively—out of the 90 minutes allotted on the schedule, and that these activities focused more on student-generated production and interaction than on the teacher providing input. The reason for this design is quite simple: less teacher talk time, more student talk time.

To take the most advantage of the classroom environment as a place to use English, lessons should be kept focused on English for instruction and English through instruction (i.e., English learned through exploring content, not through the memorization of phrases apart from content). Any activities in the class will be kept to a minimum of new content, so that student production is kept focused on the use of English (hence, "less is more"). The English Conversation class described previously is structure around four units, with each unit

being divided into approximately four lessons, all centered on the theme of climate change. Because each unit has four lessons but only one news article per unit, the students have plenty of opportunities for repetition, and new content is kept to a minimum. This repetition increases both comprehension of the content and confidence using the English. Of course, students will encounter new content and new lexical items necessary for discussing this content, and in this situation they will need repair strategies for overcoming times when they don't know useful or applicable English. Hence, the teacher needs to anticipate these moments and provide useful patterns—and practice of these patterns—for repair strategies. Repair strategies can be taught as a regular part of the lesson—preferably at an early stage—or as the need arises. The key point is that they are taught, and that the students understand they are expected to use them. The students cannot passively sit in class and wait for the teacher to clarify everything for the students: the students must elicit clarification from the teacher or, preferably, from each other.

This highlights a problematic pedagogical issue in Japan—but also another opportunity to increase the amount of student talk time in English. In Japan, the burden of clearly communicating an idea is on the speaker, not the receiver. If something is not understood, the fault is seen as being on the part of the speaker, not the listener, and the burden of clarification is therefore on the speaker. As has long been the educational tradition in Japan, students perceive themselves as being in the role of listener. As Japanese listeners, if misunderstanding occurs, there is a a strong tendency to assume clarification will be provided by the speaker (usually the teacher). These assumptions are typical of passive learning and, unless changed by intentional practice, will continue to inhibit the learning of English as a tool of communication. So, the use of repair strategies—circumlocution, asking for clarification, using synonyms, etc.—needs to become a common part of our CLIL lessons. The necessity of this can be demonstrated to students by briefly exposing them to the different types of English throughout the world (different accents, different vocabulary, different intonation patters), and then explaining that outside of Japan, the burden of clarification is upon the listener: the listener must either ask for clarification, or indicate in some productive way a lack of understanding. In a classroom where the focus of education is strictly on content, the time a teacher can devote to requiring students to use repair strategies is limited; however, in a classroom where the main focus is on getting students to use English as a tool of communication, repair strategies become an integral item in the toolbox of classroom interactions, as students seek clarification not only from the teacher, but from their fellow students. This provides a shift in the students' expectations for the classroom, from passive receptor of information to active learning agent.

Communication takes place in a milieu of interactions, and one of those is misunderstanding. Students need to encounter misunderstanding in class and learn various strategies for overcoming it. This yet another way of bringing authenticity into the classroom: by helping students understand that their communicative ability does not depend solely on their mastery of vocabulary and grammar, but on their willingness to engage others in an effort to convey meaning.

Why Focus on Climate Change and CLIL?

So far, we've described various means of increasing the authenticity of purpose of our ESL classroom. A further venue for increasing this authenticity lies, of course, in the subject. Now, in a traditional English Conversation classroom, for example, the purpose for learning the subject (English), was, primarily, to pass the test, and, secondarily, to gain a communicative skill that might be used later in life. But as we have seen from our 2017 survey, Tokuyama Kosen students do not feel that the later plays a significant role in their lives. To reiterate:

1. The students perceive that English is important to learn (S4 and S10).
2. The students do not perceive that English will be useful in their life after or outside of school (S5 and S6).
3. "English is important" is a message they received from various people and sources, but it is divorced from their daily experience.

Therefore, if we wish to increase the perceived authenticity of purpose for learning English, it is imperative we focus less on learning English for its own sake, and focus more on learning English as a

means for engaging in subjects that the students see as having relevance both to their daily lives as students and to their future lives outside of school. Climate Change is just one such subject.

Climate Change contains the following elements that can directly appeal to a Kosen student's perception of authenticity: 1) scientific and technical vocabulary, 2) current events reflected in real news articles, 3) issues that have direct impact on society, and 4) events that have real consequences for the future.

Because we are discussing climate change in a CLIL style class, students may see these lessons as directly related to their educational goals and their future, thus increasing perceived authenticity and motivation. The English used to discuss these subjects can be tailored to fit student needs without becoming unnatural. Our students already have some mastery of the subject materials, and thereby can feel more confident approaching the subjects in English. By using English to study materials students are already somewhat familiar with, we teachers have the chance to provide a potential, beneficial review of the subject.

Furthermore, CLIL lessons can benefit struggling students by providing lots of visuals and step-by-step instruction. As Ute (2012, p. 42) [6] writes: "learning outcomes improve as more lessons are taught in the L2 (e.g. Bournot-Trites and Reeder, 2001)." In the process of exploring a topic in a second language, there are more opportunities for students to actively engage with the materials. But for CLIL to be most effective, teachers need to receive an adequate level of training, and additional training can improve overall lesson planning and implementation.

CLIL classes can also take some of the teaching burden off of teachers by having instruction focus more on scientific or mathematical content and less on "the nuts and bolts" of English, thereby allowing content teachers to design lessons on subjects they already have some expertise in, rather than having to struggle to create more content focused exclusively on learning English. An added bonus of this process might be that because CLIL teachers must focus on presenting material in comprehensible and useful English, lessons may become more effective in relaying content. Still, adjustments to teaching schedules will likely be necessary in order to provide CLIL teachers adequate preparation time. CLIL teachers can then seek input from English teachers instead of having to produce everything on their own. Collaboration can become an effective means of reducing an individual teacher's workload. According to Ute's study of the use of CLIL in schools in Europe, the collaboration necessitated by an increased use of CLIL can reduce the burden on teachers:

> In order to compensate for additional time spent on preparing CLIL lessons and materials, all participating schools granted each ProCLIL teacher a one-hour reduction in their teaching load. Additionally, the project team supplied teachers with published and team-created learning materials. Nonetheless, ProCLIL teachers unanimously reported having to spend considerable time in preparing CLIL learning materials. Half of the ProCLIL teachers worked alone at their schools and encountered more difficulties than those working in teams. (Ute, 2012, p. 43)

By discussing climate change in English, an English teacher is forced, by necessity, to create lessons that build progressively in support of students' learning goals and deficits. Of course, this increases the authenticity and productivity of lessons from the students' point-of-view, but also for the teacher:

> CLIL implementation is most successful when teachers are willing to start thinking outside of their field and consider key issues such as learner talk and scaffolding learning as a means to support their delivery of CLIL lessons…. CLIL training enables both language and subject teachers to develop innovative ways to deliver their curricula in a way that ensures accessibility of content to ALL learners. (Wiesemes, 2009, p. 45) [7].

Challenging the teacher can provide as much of an impetuous to learn methods of navigating different "languages" (academic, scientific, conversational, etc.,) as it can challenge students to engage in the process of learning. In this way, both the teacher and the students are learning together, which is another type of authenticity that can increase a student's motivation to engage in a foreign language.

Conclusion

The goal for discussing climate change in a flipped CLIL classroom is to increase our students' use of and exposure to English. The best means to achieve this is to increase the perceived authenticity of the English. By studying, in English, subjects the students recognize as directly related to their immediate learning goals and future lives, we seek to increase the students' motivation to learn, and engage in, English. The current educational climate of Japan fosters an image of English as important to academic success, even to future potential careers outside of Japan, but not necessarily an important tool within Japan. The self-perpetuating stereotype that Japanese people are not good at English further demotivates students to make additional efforts to learn this second language. Furthermore, in Japan, though the government is stepping up efforts to increase the amount of English education students receive in school, there is a sense from parents and teachers that this increased emphasis on English will detract from other, more necessary fields of study, fields of study that directly contribute to a student's future career. There is a sense, also, that studying other subjects in English may reduce the effectiveness of instruction. This reflects a stereotype in most cultures that bilinguals are less likely to achieve success in scientific and creative fields. But, as Hugo Baetens Beardsmore (2008, p. 4)[8] so aptly points out in "Multilingualism, Cognition And Creativity": "if we take a closer look at the number of creative people who were at least bilingual, if not multilingual, the implicit superiority of monolingual individuals can be challenged." Add to that the simple fact that most successful scientists tend to be multi-lingual—"When asked how many of his contemporary Nobel Prize winners were bilingual, Ilya Prigogine (Nobel Prize for Chemistry, 1977) who spoke Russian, French and English and taught through French and English, replied, « the majority »" (Beardsmore, 2008, p. 5)—and you have a formidable argument against the monolingual bias.

If we can expose our students to this fact that bilingualism does not need to detract from the gaining of specialized technical or scientific knowledge, and that an increasing number of Japanese engineers and scientists use English in their work despite living in Japan, we stand a better chance of overcoming the notion that English is simply a foreign language to be studied for entrance examinations or for writing grant or patent proposals. By using CLIL, we can increase our students' motivation to learn English, yes, but also increase their motivation to learn other subjects more actively and more independently:

> Students are as keen to learn about content areas as they are to improve their language skills. They are also interested in learning study skills, which perhaps indicates a disposition towards developing greater autonomy. The fact that content was the most important aspect in defining authenticity implies that CLIL, through 'authenticity of purpose' delivers a greater sense of engagement to the students and allows opportunities for language focus to arise organically in the classroom situation." (Pinner, 2013, p. 53)

By using a CLIL methodology to discuss climate change, we enable students to perceive English as a living, useful, tool of communication, one that is relevant and impactful both to their current educational career and to their future lives as citizens contributing to their societies. Engineers will play an increasingly important role in managing the changes to society wrought by climate change; as "social doctors," they will need to understand the subtleties of discussing such a complex issue with people who do not necessarily speak the same native language as themselves. Climate change is a global phenomenon, and in an increasingly globalized society and economy, providing students with the tools to both understand and discuss it is as essential to fostering their educational identities as it is to enabling their professional competencies.

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