

Chapter 10

Teacher-Based Assessment of Learner-led Interactions in CLIL: The Power of Cognitive Discourse Functions



Mark deBoer

10.1 Introduction

Entering the year 2000, Japan began to have a less global economic presence for a number of reasons. One in particular was that less Japanese university graduates were going overseas to engage in business activities. In 2010, the Japanese Ministry of Economy, Trade, and Industry (METI) released a report outlining these issues, also proposing a solution to this problem. Their solution, by putting the onus on the higher education system, was to create “Global Human Resources” (METI 2010, p. 8) with (a) *communication skills* (preferably in English as a foreign language [L2]), (b) *ability to work in teams*, (c) *planning skills*, (d) *thinking skills*, and (e) the *ability to take action*.

Tertiary-level English language education, through the use of daily conversation textbooks (e.g. Richards 2012), does not benefit a Japanese chemical engineer’s future of collaborating with foreign researchers or companies. It was recognised by the author that a syllabus could be conceptualised under the umbrella of language integrated with content to develop learners’ abilities to discuss scientific concepts in the English language as a starting point. Yet, language teaching faculty are not necessarily capable of teaching content such as chemistry, nor can it be assumed that content faculty have the abilities to teach their field of expertise in the English language (see Chap. 1, this volume). To meet METI mandates, conceptually, the integration of language and content would need to be a collaborative effort. First, the English language learning classroom would be the venue for the integration of language and content. Second, emphasis would be on action and interaction of the learners for an agency-based approach to their education (van Lier 2008). Third, infringing on content teachers’ beliefs of content and language integration (Skinnari

M. deBoer (✉)

English for Academic Purposes, Akita International University, Akita, Japan
e-mail: markdb@aiu.ac.jp

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and Bovellan 2016) by inviting content faculty to support learners' language learning process. Taking these all into account, a syllabus was designed and implemented, integrating content with language in the language classroom through assignments that were designed to foster learner agency.

In this chapter, I explore the learner-learner interaction in a course using this syllabus through the lens of assessment practices, focusing on the mediation that occurs between the learners, with the goal to suggest what the teacher, through observation of learner interaction, can learn about their learner abilities. I will then discuss how this can inform the assessment cycle (Davison 2008; see Chap. 1, this volume), drawing on what I as the teacher of these learners learned from this experience.

When the learners were not co-located, they used an online asynchronous forum to collaborate. I will specifically examine their interaction in this environment to determine how they communicated while co-constructing a poster, basing my examination on the notions of language *of*, *through*, and *for* learning (see e.g. Coyle et al. 2010). This poster, henceforth improvable object (IO) (Wells 1999; Bereiter and Scardamalia 1996), was co-constructed in the online forum and shared as an attached file.

How the learners moved through the process will be examined through the language they used and how they mediated their learning as they assessed their IO at each shared iteration. In addition, I will discuss how the online forum can be useful for educators in assessment *for* learning practices (see Fig. 1.1 in Chap. 1, this volume), in particular unplanned assessment of learners during their face-to-face time in the classroom environment.

10.1.1 *Designing the Syllabus*

A traditional syllabus in L2 educational context in Japan is one that focuses on teaching the grammatical structure of the English language and summative testing being the primary form of assessment (Green 2016). This performance-based approach to learning (Bernstein 2000) is one with pre-programmed knowledge or "inventory of standards" (Leung and Morton 2016, p. 236) in which there is a strong classification and framing (see Chap. 1, this volume).

However, to develop learner abilities to reach the objectives the METI has mandated, a competence-based approach to learning may be a better approach for a number of reasons. First, being able to communicate in a foreign language, preferably English, would require learners to learn to output the language, not through pre-scripted conversations, but through verbal actions about content; cognitive discourse functions (CDFs; see Chap. 1, this volume) to "let others know which cognitive steps they are taking in handling subject content" (Dalton-Puffer 2016, p. 32). Learners have 6 years of English at the secondary level of education, so they do not come to university as empty vessels (Engeström and Sannino 2012). Thus, building

on learners' natural proclivities would reinforce their learning through assignments that elicit centrifugal interaction (Bakhtin 1981).

The remaining METI mandates; *ability to work in teams*, *planning skills*, *thinking skills*, and the *ability to take action*, fall under the umbrella of 'fundamental competencies for working persons' (2010, p.7) in the METI report. To foster those types of abilities in a classroom setting requires to "emphasise participation in rich contexts of cognitively engaging content learning" (Leung and Morton 2016, p. 237) and place more emphasis on individual choice and agency. Group work, therefore, based around assignments that encourage learners to determine their own content, could foster discussions, planning, taking initiative, and taking action to reach objectives. This emphasises a competence-based approach and elicits centrifugal interaction through the integration of content into assignments. In this chapter, I focus on one particular assignment from the syllabus developed using an information and communications technology programme integrated into the learning management system (LMS) Moodle (Dougiamas 2011). The syllabus was informed by the guidelines outlined by the METI and informed by the CEFR benchmarks (see, e.g. deBoer 2017; O'Dwyer and deBoer 2015). In the assignment, learners were asked to research local environmental issues in groups over 15 weeks. They presented a poster in the target language at the midterm, which was attended by peers and invited faculty, who would discuss the poster and provide feedback. Using that experience and feedback, the learners made changes and further developed their research for the remainder of the term, at the end of which, they had a group PowerPoint presentation. Each of the environmental issues was provided by the teacher.

10.1.2 Learning Environments

Two learning environments provided the learners with the means to interact: one was the online forum in the LMS, and the other was the face-to-face classroom once a week for 90 minutes.

The asynchronous online forums in the LMS were available for the learners to collaborate when they were not co-located. Each group had their own forum that could be used to send messages and/or upload files. The teacher had access to all group forums. It is the language that occurred in the online forums that is particularly of interest as it contained a complete record of the dialogue and shared files between the learners. The online forum interaction provided details of the process to help the teacher understand how the learners were able to create the final product, much more than what might be learned by the teacher only observing the groups by walking around the classroom.

Saying that, though, the classroom time was used for learners to work face-to-face on their group projects and for them to explore what other groups were doing by talking with them face-to-face. The teacher was also available for discussion if needed, but it is the observation of the online forums that provided the teacher with

assessment opportunities during this face-to-face time. I discuss in this chapter the conceptual understanding of the teacher utilising both learning environments to understand and guide the learning process.

10.1.3 *Online Forum Interaction*

The asynchronous forums can be used to communicate in two ways. Learners can write in the message area of the forum and send that to the others in their group and they can also send files attached to their message. The attached file can be multi-modal, i.e. can contain images as well as text, and can be shared and edited by learners through many iterations; an IO (Scardamalia et al. 1994) as the focus of learner collaboration and ‘the transformation of that object by means of those actions’ (Wells 2000, p. 67). The IO is co-constructed through a process, and it is defined as an object that “can be reviewed, rethought and revised ... and engaged with dialogically” (Wells 1999, p. 115). Conceptually, the CLIL vehicular language used by the learners in the message area and the language embedded in the IO can be different from three interrelated perspectives (Coyle et al. 2010); the language of learning, language for learning, and language through learning (p. 36). The language *of* learning is the language that is needed ‘to access new knowledge and understanding when dealing with content’ (Coyle et al. 2010, p. 61), including new vocabulary and “the language of describing, defining, explaining, or hypothesising” (p. 61). Language *for* learning is the “language needed by learners to operate in a learning environment where the medium is not their first language” (Coyle et al. 2010 p. 62). This includes language to build arguments, answering and asking questions, and language for project work (Coyle et al. 2010). The language *through* learning, is language that emerges as a result of the development of new knowledge, skills, and understanding. This language is unplanned and is language that teachers “learn how to capitalise on, recycle and extend [new language] so that it becomes embedded in the learners’ repertoire” (Coyle et al. 2010, p. 63). This includes using feedback, recycling discussion skills, presenting evidence, and developing dictionary skills. How learners enact the content or knowledge in this competence-oriented assignment can be identified through the function of the language, i.e. cognitive discourse functions (CDFs) (Dalton-Puffer 2016).

The poster itself is important as a multimodal resource for constructing meaning in the CLIL classroom (for discussion of other such resources, see Eynitskaya and Morton 2011; Kupetz 2011; Nikula et al. 2013). The use of technology to co-locate learners beyond the spatial and temporal boundaries of the classroom is essential for creating a context for multimodality constructed meanings (Cope and Kalantzis 2017). Learners have access to a variety of multimodal sources (e.g. images, videos, and text) and bring these into the interaction through the use of the online forum or integrated into the IO. The role of multimodality should be, therefore, carefully considered in learners’ construction of meaning. In this chapter, mediated action (Wertsch 1994), will be used to understand how the learners’ forum contributions

were mediated by symbolic or physical tools, in particular when individuals determine how to use the information shared in the online forum (or IO) to mediate their actions to reach their objective.

10.1.4 Assessment Promoting Learning and Learner-Learner Interaction

What occurred in the online forum was based on the learners' understanding of how they reach their objective. Similar to Chap. 9 of this volume, there is no specific set of assessment strategies that can be offered in this online interaction where the assessment is entirely unplanned. Here, I will study the centrifugal interaction, not only from the teacher's perspective, but also from the learners'; after all, it is primarily the learners who are relying on their collective interaction in the online forum to reach their objective. There are a number of salient aspects that the online forums afford for both the learners and the teacher for assessment purposes. Each time a learner posts a message, content, and/or uploads an interim version of the poster, other learners in the group can view the messages and attached files. Learners used language to direct the process forward, as they suggested content, edited their work, and suggested edits.

Informed by the sociocultural theory (SCT) (see Chap. 9, this volume), learner interaction can be viewed as a mediated process, through *intentionality and reciprocity* and *mediation of meaning* (e.g. Feuerstein et al. 2010). The notion of *intentionality* in mediation is the attempt to guide the performance of the learner, or "deliberate efforts to mediate the world, an object in it, or an activity for another student" (Poehner and Lantolf 2005, p. 241). *Reciprocity* is the learner's response to that intentionality in such ways as "responding to task, negotiating mediation, use of mediator as a resource, creating opportunities to develop, seeking mediator approval, and rejecting mediation" (Poehner 2008, p. 42). In *mediation of meaning*, learners select specific information that is relevant and meaningful to the group. This information has no meaning to the members of the group unless it bears meaning to the mediator and provides a background "against which categorization becomes possible" (Lidz 1991, p. 76). During this learner-learner interaction, learners "complete tasks that would otherwise be beyond their level of ability" (Lantolf and Poehner 2014, p. 163).

Learners do assess the interim IO based on their understanding of the current iteration of the IO relative to their understanding of the content to determine how it can be improved further. To reach their objective, i.e. the completion of the IO, learners provide feedback to each other in the online forum through comments, or through direct edits to the IO which helps shape further iterations and fuels further dialogue. Through repeated efforts, this allows the learners to drive the process forward in such a way that the poster eventually forms a finished product that is agreed upon by all members of the group (see Bereiter 1994 for information on progressive dialogue).

The teacher can also observe the content and the language of each member of the group in the forum. The poster presentation is a planned assessment, but observations of the interaction in the forums although unplanned, can be used to collect information about students' learning through the process. There are a number of sources of information that can be used from the forum: (1) the poster iterations, which includes content and the language of that content, (2) the online forum dialogue from each learner, (3) the responses to that dialogue from other learners, and (4) how the content changes or was changed as a result of that dialogue. The teacher can examine learner performance and also the performance of the group working collaboratively. The teacher, from these observations, can make professional judgements (Davison 2008; see Fig. 1.1 in Chap. 1, this volume) about the content and the interactions between the learners. These judgements can then be used to provide feedback or advice as well as to inform the subsequent assessment cycles.

10.2 Research Questions, Data, and Method

10.2.1 Research Questions

In this chapter, I will address the following questions:

1. How do learners use language and content to mediate their interaction?
2. What insights into learner abilities emerge from their interaction?

To answer these questions, I examined learner-learner interaction in the online forums to determine how that shaped the development of the content. By examining the language that was used by the learners to manage the process, i.e. the language *for* learning, and by examining the language that emerged in the content (language *of* and *through* learning), I could determine how the learners used these to mediate their interaction. The interaction indicates their ability to make meaning and their understanding of the content through their co-construction of a coherent poster. This knowledge is then used to inform how assessment *for* learning practices can be implemented into this kind of assignment, as the teacher reflecting back on unplanned classroom-based assessment opportunities that were afforded to him.

10.2.2 Participants and Data

The university in Japan where the study took place has four faculties, Engineering, Agriculture, Humanities, and Education. Language courses are divided based on student scores of the TOEFL (Test of English as a Foreign Language) ITP (Institutional Testing Program) (Educational Testing Service 2018). The 36 students enrolled in this general English language course were from the Engineering and

Agriculture faculties and were placed in this class as a result of their TOEFL ITP scores (average 400 or equivalent of CEFR high A2). This was considered to be an advanced language class for this university. The learners were all first-year learners, just graduated from high school.

The assignment for the learners was to create a poster presentation in groups of 3–4 centred around an environmental issue. The learners worked on this mostly outside of the class face-to-face time, but some class time was dedicated to allow learners to discuss their assignment with the teacher and other groups. During times when the learners were not co-located, they had access to an online forum for collaborative purposes. At the end of the course, the data from the online forums were collected and anonymised. The data in this chapter come from one group who researched P.E.T. bottles (single use plastic bottles); S1 and S3 were male, and S2 and S4 were female. The forum discussion thread from the P.E.T. bottle group was analysed for contingency. The series of posts were chronological in order, but they were not necessarily contingent upon each other (see e.g. Longacre 1996). For example, in one post, learners may have been discussing data they have collected, but in the next post be discussing the layout of the poster. So, while the posts unfolded chronologically, and collectively each is a step towards the learners reaching their objective, not all of the learners' discussions occurred in perfect linearity.

Each post, considered a mediated action (Wertsch 1994), was examined for its relation to the previous posts, and those posts that were contingent on previous posts were labelled based on what the learners were doing. Identically labelled posts were strung together to provide 'threads' of dialogue. In other words, the connections among the posts were studied with the goal of exploring how the learner posts were mediated with the particular focus on the academic language they used and the content they brought in their posts. Furthermore, language *of*, language *through*, and language *for* learning was identified to indicate the language learners used to manage their process versus the language that emerged as a result of their interaction. Finally, I coded the learner posts using Dalton-Puffer's classification of CDFs, i.e. classify, define, describe, evaluate, explain, explore, and report (2016 p. 33) as well as the functions within each of these categories, informed by the revised Bloom's taxonomy (Anderson et al. 2001; see Chap. 1, this volume). In other words, I focused on examining the *function* of the language the learners used and how it shaped their interaction. This conceptual basis informed my assessment of learners' abilities. One point that needs to be made here is that in Dalton-Puffer's (2016) examples, the dialogues largely included the teacher. In this chapter, I study the functions of the learners' language, the teacher not intervening into learner-learner interaction.

In this chapter, I focus on three threads of dialogue (Excerpts 1, 2, and 3), each unique in how it contributed to the learners' overall objective and was useful for the teacher to understand the process of the learners' co-construction. The text of dialogue from the learners' online forum message area has been formatted for this chapter to identify the type of text: (a) if it is content-related, it is identified through

italicised text, (b) text shown in a **bold underlined** font is academic language, and (c) all other text that is used to convey information has been left unformatted. When the learners have uploaded a file with the message, I indicated that with (attached file: file name). If any text has been added to the uploaded file, I indicated that with {**Text added to file name:** text}. The data examined in this chapter were collected as part of a doctoral research project (deBoer [n.d.](#)).

10.3 Results

In this section, I illustrate how learners mediated each other in the online forum through the use of language in the forum message area and through the content embedded in the IO. I also illustrate how this interaction provided assessment opportunities for the teacher observing the forum to understand and promote the learners' abilities. I investigate three excerpts that show the progression of the learners' mediating each other to reach their objective of completing the poster presentation, guiding each other to a mutually agreed direction (Bereiter 1994). They did so through the use of language that is used to manage the interaction, i.e. the language *for learning* (Coyle et al. 2010). In this competence-based approach (Quadrant 4 of Leung & Morton's integration matrix; see Chap. 1, this volume), the roles of the learners oscillated between the mediator and the mediated as they made suggestions, edited, and introduced content to push the IO to completion. In essence, it was not just one learner's performance that determined the content of the poster, but a joint construction mediated by multimodal resources (images and text) that shaped their understanding. The three extracts represent 25 posts and 13 files shared out of a total of 123 posts and 57 files shared in this group over the four-month term.

The following Excerpt 1 illustrates the initial online interaction in the forum. At the outset, S1 provides the other learners in the group with a research instrument and instructions on whom to interview. The learners were to find out about the recycling policies and use of single-use plastic P.E.T. bottles on the university campus, so this research instrument is used to determine the amount of use. S1 also gives a deadline. Interview data is collected and shared by the members of the group which prompts S1 to research additional data, possibly from the Internet. One of the learners also gathers information from the campus store.

Excerpt 1: Collecting, Sharing, and Analysing Data

1-1. S1: Please interview the students of the subject same as ourself about next questions by next Tuesday. 1.How many pet bottles do you use in a week? 2.Do you have your own my bottle?

- 1-2. S1: I interviewed the students of the same department with me
 1. How many pet bottles do you use in a week? 0→4 people, 1→15 people, 2→12 people, 3→9 people, 4→6 people, 5→11 people, 6→3 people, more than→10 people. 2. Do you have your own my bottle? Yes→13 people. No→54 people
- 1-3. S4: I have 23 people's answers. How many petbottle do you use in a week? 0→1 people 1→5 people 2→4 people 3→9 people 4→no people 5→4 people ·Do you have your own my bottle? Yes→8 people. No→15 people
- 1-4. S3: I have asked 12people questionnaire. question1 1:2people, 2:3people, 3:1person, 4:1person, 5:2people, 7:1person, 0:2people. question2 have my bottle: 4people don't have my bottle : 8people. Some people have my bottles, but don't use it.
- 1-5. S1: I researched about annual consumption. The annual consumption of the 500-ml pet bottle per one Japanese amounts to 166 ones in 2006. Converting into per week, it is equivalent to 3.5 ones. Probably, it is more than 166 now, since the amount of consumption is increasing every year.
- 1-6. S1: About question 1. I calculated the University student's amount of pet bottle average used. The result is about 3.75 per one person. The amount is almost the same as the general average 3.5.
- 1-7. S1: About question 2 The ratios of the number of people with My Bottle and the number of people without it were 1:3. I found that many people don't have their own My Bottle, or not use it.
- 1-8. S4: I interviewed University cooperative. I did it without your decision, sorry. I asked: "How many petbottles do you sell in month?" The result is 2013. March: 3,425 petbottles. April: 8,950 petbottles. May: 9,911 petbottles (by 28th May)

S1 is the mediator in post 1-1; his intentionality is directed at the other learners to guide their performance. In other words, to find out about the use of P.E.T. bottles on campus, S1 describes a procedure to the other learners and includes a research instrument. Post 1-2 becomes a mediational means directing the others to share their data in the same fashion as S1 has reported. In posts 1-3 and 1-4, both S4 and S3 report that they have uploaded their interview data, mediated by both S1's initial instructions in post 1-1 and his uploaded data in 1-2. Yet, S3 reports additional data, namely 'Some people have my bottles, but don't use it', as there may have been some discrepancy between the data and what S3 discovered.

In post 1–5, S1 studies data from an external source which he uses to mediate his understanding of the group’s data. Through the use of academic language, ‘*annual consumption*’, ‘*converting into*’, and ‘*equivalent to*’, S1 presents his calculation of the annual consumption converted to weekly data, mediated by question 1 of the research instrument ‘*in a week?*’, and this calculation will be later used to make a comparison. The information from the external source indicates a trend over a longer period of time allowing S1 to estimate that ‘*probably, it is more than 166 now*’ as ‘*consumption is increasing*’. Mediated by the interview data units being per week, S1 essentially presents annual consumption as weekly consumption, the interview shaping his understanding of the group’s data. His next post, 1–6, is to present both sets of data (interview data and data from the external source), but the function of his language is to first *explain* how he arrived at the weekly consumption for the university students (3.75/person) and then *compare* that information with the external data (3.5/person), concluding that the data is almost the same. In post 1–7, S1, using the data from question 2 of the research instrument is able to calculate the ratio of people with their own ‘my bottle’ and those without. S3’s data from post 1–4 becomes the mediational means for S1 to draw conclusions. S4’s action in post 1–8 is mediated by the task but she approaches the task in her own unique way. She reports the sales data collected from the on-campus store. In this Excerpt 1, the learners used academic language to discuss content. Through this discussion, they gained a fuller conceptual understanding of P.E.T. bottle consumption.

The learners use this data to initiate the making of the poster, and it becomes evident that they have been influenced by the data, their language indicating their negative stance toward the use of P.E.T. bottles (Excerpt 2).

Excerpt 2: Creating the Poster

- 2-1. S3: Let's make poster together!!!!!!
- 2-2. S1: I made poster. Please check! As the deadline approaches, let's finish our poster as soon as possible!! (**attached file: *Pet bottles poster 1.docx***)
 {Text in *Pet bottles poster 1.docx*: Pet bottle is made of polyester and used oil to make it. Because it is easy to carry the pet bottle around, the consumptions of the pet bottle are increasing rapidly year by year. 80% of the mineral water and tea are sold in pet bottles now. Pet bottles have become essential for us.}
- 2-3. S4: Everyone good job! S2's idea is good, I think. I made scripts in the poster.(text omitted) (**attached file: *Pet bottles poster3.docx***)

- {Text in Pet bottles poster 3.docx:** The result of interview. Our group interviewed [Name omitted] University students. 1. How many pet bottles do you use in a week? 2. Do you have “my bottle”? This graphs show the result.}
- 2-4. S1:** Hello. I think that we should put the following contents into our poster. 1.Explanation about pet bottles. 2.About the influence of the environment on pet bottles, and recycling. 3.About the result of the interview. 4.About our opinions and the solution to the problem. What do you think about this? Please give me your opinions!
- 2-5. S4:** I made poster about influence of the environment on pet bottles and recycling. But I want to make simple and easy to see. Please check and give me advise. (**attached file: Pet bottles poster 6.docx**)
- {Text added to Pet bottles poster 6.docx:** Pet bottle makes CO2!! When pet bottles are made in factory, they emit a lot of CO2. For example: 500ml pet bottle water makes CO2 500 times as large as the same amount tap water. 2. Problem of recycling pet bottles Pet bottle which is made from oil costs 7.4 yen. Recycling pet bottle costs 27.4 yen}

The activity changes in post 2–1, when S3 invites the others to begin making the poster now that data has been collected. In the following post (2–2), S1 uploads a poster, responding to S3’s invitation. The language he uses in his poster has been recycled from his post in 1–5. He is effectively using the academic language to summarise and present information about P.E.T. bottles which indicates his understanding of the issue. In post 1–5, S1 uses the language to mediate his understanding of the interview data, but in his poster, the functional use of the language differs. To begin, to define P.E.T. bottles, chemical language (polyester) is used to indicate the manufacturing material and (oil) used in the process. He identifies a cause-effect relationship between the ease of carrying around a P.E.T. bottle with the increased consumption, concluding that due to the types of beverages sold in P.E.T. bottles, that they have become “*essential for us*.”

S4, in post 2–3, evaluates the previous posts (S2’s post is omitted), and has also added content to the poster, mediated by the language from the research instrument in post 1–1 (although the graphs were not added). The activity changes again in post 2–4, because here S1, indicating a fuller conceptual understanding of the issue, mediates the others by suggesting the poster be structured using four distinct areas. The content about P.E.T. bottles has already been added in post 2–2; and S4, in post 2–3, has added some information about the interviews. This list becomes a

mediational means for the others in the group to use as a resource when adding content to the IO (the poster).

In post 2–5, S4, responding to the task, recycles the language verbatim from post 2–4 to indicate what she has added to the new iteration of the IO. The language that has emerged in previous posts by S1 (see posts 1–5, 2–2, and 2–5) has helped develop S4’s conceptual understanding of the issue and this is reflected through her explanation of the manufacturing of P.E.T. bottles involving the use of oil which results in the emission of CO₂. She uses that explanation to compare CO₂ emissions and then using a cost analysis, compares recycling costs versus manufacturing costs, concluding that results in recycling problems. The learners’, mediated by the content in the previous excerpt, here use academic language to define and explain their conceptual understanding of the larger issues surrounding P.E.T. bottle use.

As the learners continue to add content to the IO, they instruct each other through the forum message area what they have done and suggest changes. The learners continue to build the IO and in the following excerpt (3), they use the IO to mediate each other. This excerpt follows directly after 2–5.

Excerpt 3: Putting the Poster Together

- 3-1. S1: Good job, S4! I think that it is easy to see. I put the graph of the interview. Let' think about the result!
(*attached file: File: Pet bottles poster 7.docx*)
- 3-2. S2: I think this poster is simple, but it doesn't have impact... Maybe, there are many sentences, so it is difficult to see a bit. How do you think?
- 3-3. S3: I suggest that we should write this " *We need to have my bottles to reduce emission of CO₂*" Please give another ideas!!!
- 3-4. S1: I made the part of the end. Please check it ! Let's make the remaining part! (*attached file: Pet bottles poster 8.docx*) {*Text in Pet bottles poster 8.docx: It is important that we don't use pet bottles as much as possible. You should use a canteen or my bottle!*}
- 3-5. S4: I made graph result. please give me some advises! It doesn't easy to see , I think... (*attached file: Pet bottles poster 10.docx*) {*Text in Pet bottles poster 10.docx: These graphs show that 50% students use 3 or more pet bottles in a week. Many students don't have my bottle. Bad effect on environment*}
- 3-6. S2: I changed the last of poster, "*It is important that we don't ~ possible.*" to "*We should not ~ possible.*" Also, I changed "*You should use a canteen or my bottle!*" to "*Let's use my bottles!!*" If you don't like this, please correct!
(*attached file: Pet bottles poster 14.docx*)

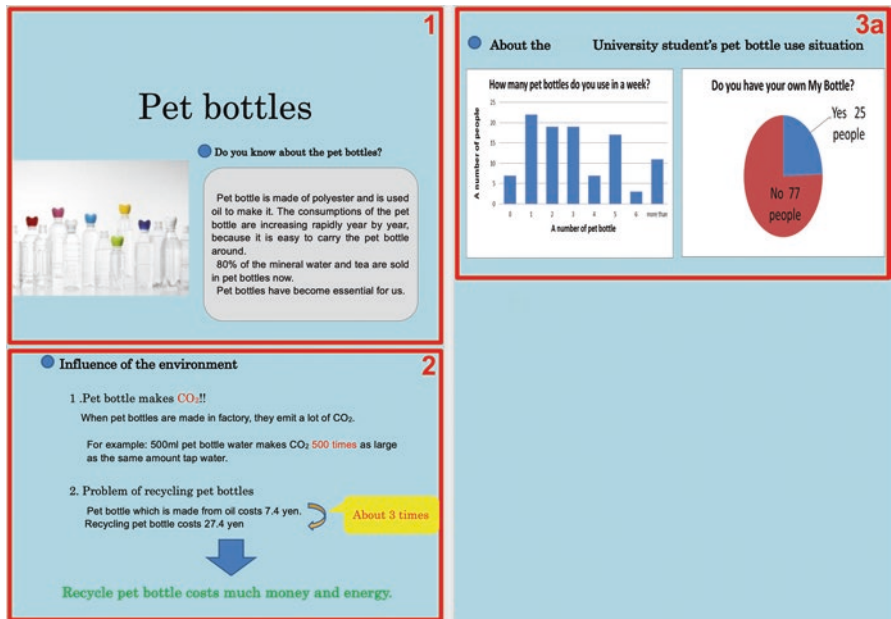


Fig. 10.1 The poster file Pet bottles poster 7.docx (see Post 3–1)

Continuing from 2–5, S1 in post 3–1 evaluates S4’s post and uploads a newer version of the IO with graphs added (mediated by S4 in post 2–3, i.e. “*This graphs show the result*”) (See Fig. 10.1). The numerical data collected has been changed to a different modality, i.e. graphs. S1 invites the rest of the group to ‘*think about the results*’, now that he has added the graphs. The focus of the following discussion is to illustrate how the learners co-construct the remaining part of the poster. For this chapter, I have divided the poster into three sections, each represented by a square and a number (1, 2, 3a), which have been populated with content, corresponding with the suggestions made by S1 in Post 2–4: 1. *Explanation about pet bottles.* 2. *About the influence of the environment on pet bottles, and recycling.* 3. *About the result of the interview.*

In post 3–2, S2 critically assesses the IO. Her comments are directed at the lack of impact of the poster, in particular, the language and the layout. In the following post (3–3), S3 suggests that “*we need to have my bottles to reduce emission of CO₂” be added. This is partially mediated by S1’s post 2–4, suggesting adding opinions and a solution to the problem, but notably, S3 explores the possibility that in order to reduce the emissions of CO₂, ‘*my bottles*’ are needed. While the language has appeared prior, e.g. S4 discussed CO₂ emissions in post 2–5, and the concept of ‘*my bottle*’ has been discussed since post 1–1, this is the first time that they have been brought together to allow S3 to predict what CO₂ levels “would be*

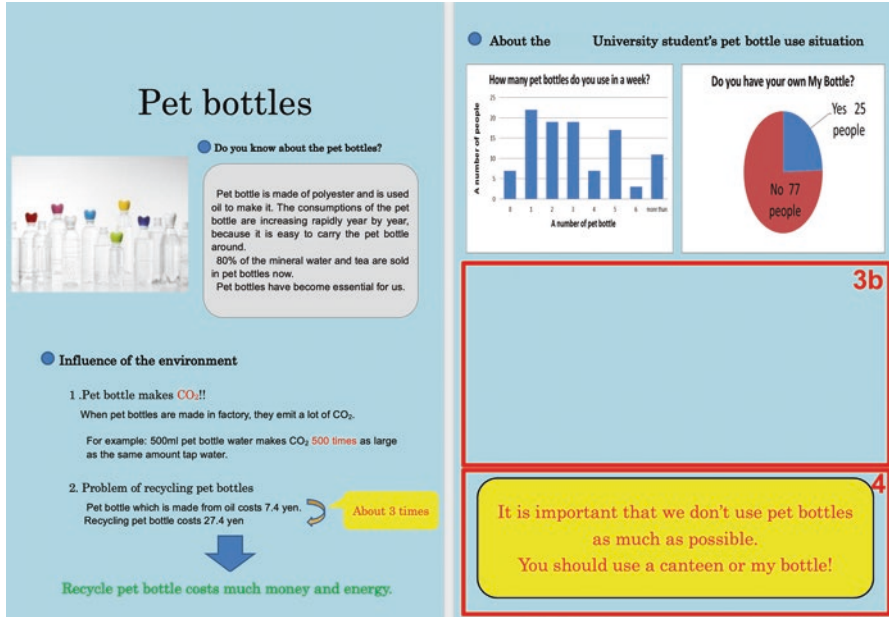


Fig. 10.2 The poster file Pet bottles poster 8.docx (see Post 3–4)

like if certain conditions are met” (Dalton-Puffer 2016, p. 47), i.e. the condition of more people using ‘my bottle’. S3 does not add his suggested statement to the IO, but this becomes a mediational means for S1 in the following post (3–4) (see Fig. 10.2, Sect. 4). In post 2–4, S1 suggested “*About our opinions and the solution to the problem*”, and here in post 3–4, mediated by S3’s suggested statement, adds a revised version, the first sentence presents an opinion and in the second sentence offers a solution.

It is S4 in Post 3–5 who responds to S1’s invitation in post 3–1 “*Let’s think about the result!*” by summarising the graphs through two statements, each of them corresponding to one of the graphs (Fig. 10.3, Pet bottles poster 10.docx). Her interpretation of the graphs shows her conceptual understanding of the problem, exemplified in her statement “*bad effect on environment*”. She was able to explain and describe the graphs and draw conclusions from their meaning. She has also used the graphs as mediational means to calculate the percentage of students that use three or more pet bottles a week. The data has now had representation in three different modalities; first the initial raw numerical data, then the graphs, and now the text to describe the graphs.

In the final post (3–6), S2 makes revisions based on her previous assessment of the IO in post 3–2 (see Sect. 4 of the poster in Fig. 10.4). First, her post builds on her emerging understanding of the issue, but it also shows how she can use language

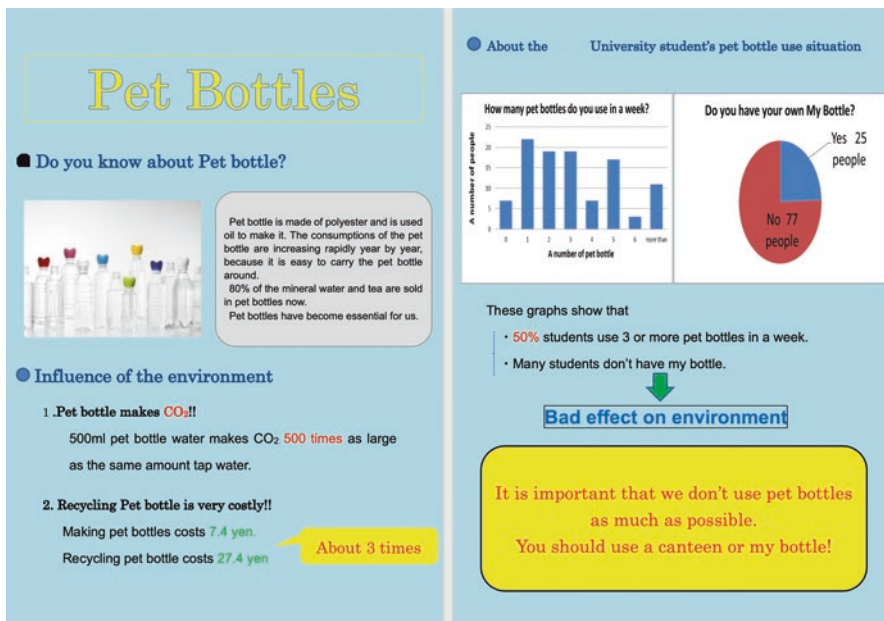


Fig. 10.3 The poster file Pet bottles poster 10.docx (see Post 3–5)

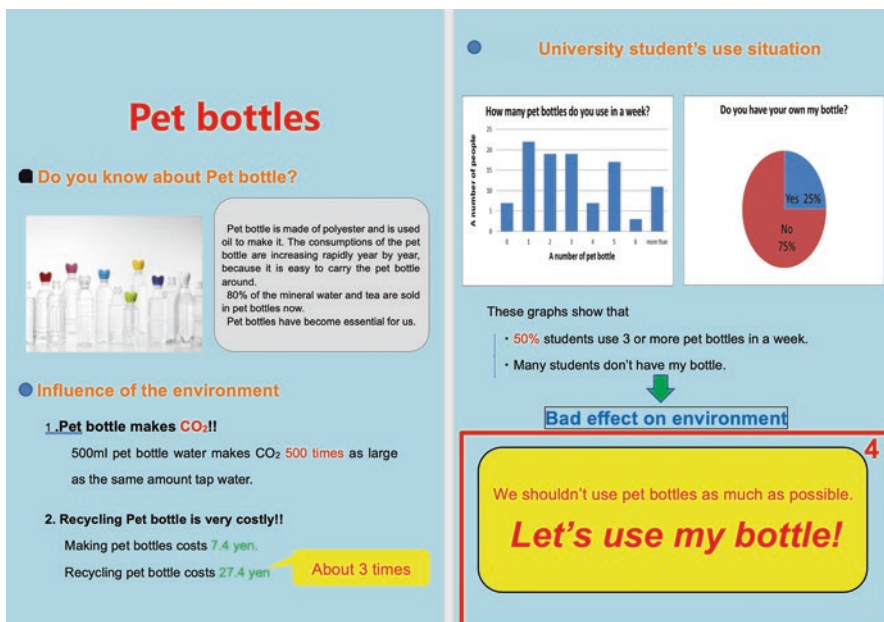


Fig. 10.4 The poster file Pet bottles poster 14.docx (see Post 3–6)

to make the message stronger; i.e. from “*it is important that*” to “*we shouldn’t*”, indicating a stronger stance on the issue, at the same time making it a shorter sentence. She also revises the second sentence into a friendly invitation to encourage students to use ‘*my bottle*’ and enlarging the font to make it stand out, giving it impact. S1’s post in 3–4 where he added a revised version of S3’s statement has become the mediational means for S2 to indicate her emerged conceptual understanding of the issue. In this excerpt, the learners have identified a cause-and-effect relationship between P.E.T. bottle use and environmental issues and recommended a solution to counter the issue.

What has been presented here is the learners’ use of language and content to mediate their interaction and the development of the poster. The intricacies of this will be discussed in the following section with regards to the function of the language. I will also discuss how the teacher can use this interaction as unplanned assessment, informing the subsequent classroom-based assessment cycles.

10.4 Discussion

In this present chapter, I aimed at showing my understanding of how learners mediate each other and how these interactions can be used by the teacher to promote learning through classroom-based assessment practices (see Fig. 1.1 in Chap. 1, this volume). This understanding emerged as I enriched my theoretical/conceptual knowledge, which enabled me to now approach these data differently from when I collected these data, especially with regards to assessing learners’ joint performance by the teacher. As a teacher turned researcher, I will discuss the findings from the forum entries and speculate what I could have learned from their interaction, what unplanned assessment opportunities were available, and how feedback could have impacted their learning.

Throughout the online forum discussion there are a number of salient observations that can be made about the learner-learner interaction and how it contributed to reaching their objective. These findings can be summarised as the following, though it should be noted that due to the small scale of the research, caution should be exercised with regard to their generalisability:

- The learners moving through the assignment show how they can use academic language to develop their understanding of the content. Centrifugal tendencies in the interaction were the result of learners using language to focus on the development of the content in their IO and the teacher giving them freedom in how they approach the assignment.
- Learner agency gave the learners the ability to work on their own objectives, working through areas that they found problematic. This is consistent with weakly framed pedagogy (Leung and Morton 2016).

- The language used was multidisciplinary, i.e. mathematics and chemistry language were evident in their interaction, as in weakly classified pedagogies (Leung and Morton 2016).
- The learners indicated their understanding of the language, i.e. the function of the language (see Dalton-Puffer 2016 on CDFs) to show their communicative intentions.

The objective for me was to create a syllabus to develop abilities in learners that would fulfil the mandates presented by the METI (2010). Creating activities within the syllabus with a focus on choice, creativity, and contingency resulted in the learners using whatever means at their disposal to reach their own objective. This is consistent with Quadrant 4 in the Matrix (see Chap. 1, this volume); and there are a number of key observations that I discuss which are evident in the interaction between the learners and are important to what they contribute to the understanding of learner-learner mediation in a CLIL pedagogy of this nature. Centrifugal interaction allows for unique insights into learner abilities to emerge. These insights would have not emerged should the task have been more structured and focused.

What begins to emerge from the onset of the learner interaction in the online forum is the language of learning (Coyle et al. 2010), or the language of the genre, namely about P.E.T. bottles and consumption. The proficiency level of language of the learners (in this case CEFR level A2) does not appear to hinder their ability to communicate or collaborate. As seen throughout their interaction, the learners have successfully used the language for specific functions, i.e. language *for* learning to “work successfully in groups, [and] carry out their research” (Coyle et al. 2010, p. 62). The un-formatted text (See Sect. 10.2.2) in each of the posts of the excerpts (1, 2, and 3) indicates the language that is used to manage the interaction. That being said, the learners are using this language with communicative intentions, which can be classified by function type (CDFs, see Dalton-Puffer 2016). The majority of that language has been used to report or inform the others what they have done, i.e. ‘*I interviewed*’, ‘*I researched*’, ‘*I changed*’, but in addition, there are other functions of the language that have emerged from the interaction. In post 3–1 for example, S1 uses the language to evaluate S4’s poster ‘*I think that it is easy to see*’, and in post 2–4, S1 suggests that the poster be divided into four separate categories of information. S2 in post 3–2 is using the language to evaluate, critiquing it and then explaining her reasons why.

Due to the centrifugal nature of the interaction, the academic language that emerges is unplanned and develops through learner interaction. An excellent example is S1 in post 1–5, where he uses the academic language he associates with P.E.T. bottles, the key concept being annual consumption. He informs the others that this is data from 2006, indicating that there is a cause/effect relationship, i.e. hypothesising that since consumption is increasing, more P.E.T. bottles are probably being used. It is in post 2–2 that language *through* learning emerges in S1’s initial upload of the IO. Here S1 essentially uses the same language that mediated his understanding of the issue to now describe the P.E.T bottle situation. He is recycling his discussion skills at a higher level (Coyle et al. 2010) by exploring reasons and possibly

attempting to justify the increase in consumption of P.E.T. bottles. His communicative intention (Dalton-Puffer 2016) is a mediational means to help the others conceptualise the issue.

Similarly, in post 2–5, language *through* learning has emerged in S4's explanation of the influence on the environment. Her communicative intention was to identify the connection between the manufacturing of P.E.T. bottles with CO₂ emissions, indicating a cause/effect relationship. Her example of CO₂ levels in manufacturing compared with drinking regular tap water is an argument against their use. Using a cost analysis comparison, she concludes that the problem with recycling is that it is too expensive, compared to that of manufacturing. The functions of her language clearly indicate to the teacher of her understanding of the issue and how it relates to the information S1 provided.

As the process continued, language *though* learning emerged in the content the learners share which could not have been planned for, gave a clear indication of the group's conceptual understanding of the issue. Indeed, there is evidence that all types of the language of the triptych (Coyle et al. 2010, p. 36) were apparent in the interaction between the learners. Based on the competence approach to the syllabus, the learners needed to use language to mediate their understanding of the issue. The language became the mediational means for the other learners to understand the issue and be able to co-construct the IO with that understanding in mind.

As the process unfolded, the interaction that occurred in the online forum afforded the teacher with unplanned assessment opportunities (Davison 2008; see Chap. 1, this volume) and also an insight into learner abilities. The forum interaction provided examples to the teacher about the learner abilities in both the academic and everyday language. Although Dalton-Puffer (2016) argued that teachers should make content, including the scientific language, available to the learners, I suggest that in a syllabus with less visible language pedagogy and a lower disciplinary orientation to language, learners need to be able to explore the language available to them and develop it based on their needs. It is the role of the teacher then to be aware of the emerging language and to capture, recycle, and develop it strategically through classroom interaction and dialogic activity (Coyle et al. 2010; Wells 1999). As the teacher, reflecting on this data, I next suggest how assessment of process involving learner interaction can be done with reference to classroom-based assessment cycles (see Chap. 1, this volume).

As stated, there were times when the learners were given time in the classroom in a face-to-face setting to discuss their assignment and research with the teacher. To begin, the teacher could collect information about the learners' through observing the online forums (Excerpt 1, for example). Then, face-to-face, the teacher could engage with the learners to discuss the data and data comparisons, using the academic language introduced by S1, with the goal to recycle the language from the forum. During this dialogic interaction, the teacher could use the CDFs the learners had used, with the intention of reinforcing their language use and conceptual understanding (Coyle et al. 2010). This would require "students to call upon their existing knowledge, concepts" (Met 1998, p. 38) to solidify the connections between the concepts and the language. The face-to-face dialogue could build on the forum

interaction and provide information about the learners' conceptual understanding and create more opportunities for unplanned assessment. The teacher could, for example, ask the learners to explain the steps they had taken so far, using this as an educational opportunity to expand the interaction in the classroom and have learners discover what other learners had done. To summarise, the teacher's role would be to collect information about the learners through observation (Davison 2008) and engage with the learners when unplanned assessment opportunities arise, e.g. having learners expand on their explanations, or even ask other groups to identify what they had learned, in order to assess their understanding of other groups' processes.

In order to gain insight into the learner abilities to develop learners' conceptual thinking, the teacher, could again engage in dialogic interaction about S1's decision about the content for the poster (post 2–5) above what the teacher observed in their forum interaction. The teacher could assess each learner's understanding of content, and where and how they intended to find that content. This would allow for providing feedback (Davison 2008) with the intention to *promote* learning. During the assessment of the actual poster presentation, insights from both the process and the final product could inform the teacher's decisions in the overall assessment process.

To a certain extent, a large part of the teacher's role would be to collect information through observation of the online forum interaction to discuss with the learners during the poster presentation. This holds true for understanding the process through which the learners went through to arrive at the final poster file. It would also indicate to the teacher of the extent to which the learners each contributed to the co-construction of the poster. S3 for example, did not contribute very much to the overall poster, but the teacher could also judge from his contribution that he had been actively involved in observing the interaction through his addition to the dialogue. The teacher could ask S3 to explain his contribution to post 3–3 through dialogic interaction, determining his understanding of the issue, and how that relates to a solution, or even other possible solutions.

Each assignment in the syllabus I designed focused on choice, creativity, and contingency. A more structured assignment could have also been used, based on a specific scientific concept and assessed using academic proficiency benchmarks (see Chap. 2, this volume). This would, too, develop the teacher's understanding of the reasons for the learners' strengths and weaknesses and allow for feedback intended to promote learning. Understanding how learners arrived at their final product, such as what content they included or did not include and why, would also help solidify both their understanding and the teacher's understanding of the learners' abilities. However, observing the centrifugal learner interaction allowed for unique insights to emerge.

10.5 Conclusion

The initial objective was to create a syllabus that would engage the learners in ways that would foster the abilities outlined in the METI report (2010). What has emerged from this process is an understanding of how learners in a CLIL classroom supported by an online forum can mediate each other through the process of co-constructing knowledge. In previous studies (see e.g. Ohta 2001), it has been shown that learners of a second language can mediate each other to understand the structure of the language, or in L1 content classroom studies (see e.g. Lemke 1990; Wells 2001) the role of language in the classroom plays a large role in helping develop learner understanding of the content. In the CLIL classroom in this study, the language and content both played a role in the interaction, the learners used L2 to co-construct content knowledge and vice versa. What it reveals is that, even with their low level of proficiency, the learners used the language for specific functions, which enabled them to make meaning and co-construct a poster that was cross-curricular in nature. The can-do lists of the CEFR scale (Council of Europe 2018) can inform the teacher of benchmarks achieved by the learners (see Chap. 2, this volume), but *how* the language is used, i.e. its function, can bring insights into the learners' abilities to use the language above and beyond their level of proficiency.

Saying that, in using an assignment as illustrated in this chapter, there is a danger of the outcome of learner interaction not being successful. The results of this course are not generalisable, i.e. what was successful in this case may not be successful in another classroom with different learners. Assessment-wise, it would still yield insights into learners' abilities, but it might not be the pedagogical outcome the teacher is expecting. Another limitation to the study is that it lacks transcripts of the classroom interactions among learners or between the learners and the teacher. Learners had opportunities to discuss their research with each other which may have helped generate ideas and advance their thinking. Feedback loops (see Kalantzis and Cope 2012) were built into the schedule to assist learners in reaching deadlines and to provide opportunities to share and practice explaining their research, opening the classroom environment to allow for mediation to occur between groups. Mehisto and Ting's (2017, p. 224) definition of assessment, which is to "help students become knowledgeable partners in the learning process" through "rich opportunities to assess and reflect on their own work and the work of others" is applicable here. Indeed, such interactions provide a multitude of assessment *for* learning opportunities for the educator.

What has been demonstrated in this chapter is that the CDF constructs are where the "conceptual orientations of content-subjects and language education intersect" (Dalton-Puffer 2016, p. 51). In other words, in these interactions, I have identified that the CDFs are not about the language and the content separately, they are about both. The insights into learners' abilities seen through the interaction of content and language show that the development of the learners' understanding of the content came from their development of the language to discuss the content and vice versa.

As a final note, this chapter brings forth of the importance of the collaboration between the teaching and research communities. Researchers and teachers need to collaborate so that more discussions occur that assist teachers in developing their assessment practices, which will feed back to the research community (see Chap. 11, this volume). Researchers can contribute with their theoretical understanding while teachers can contribute with their teaching experience. More research is needed to explore creativity and contingency in CLIL (see Leontjev and deBoer 2020) and its contributions to assessment of the process in CLIL classrooms.

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