Designing Assessment Tasks with Language Awareness: Balancing Cognitive and Linguistic Demands

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Abstract

In schools using English as the medium of instruction (EMI schools), students' performance in assessments may be hindered by the fact that they are asked to express their grasp of the content knowledge through their second language (L2). Hence, teachers may wonder whether students do not understand the concepts or whether they are not able to read the questions or write down their answers. This assessment issue is important yet under-explored. In this paper, we first highlight some issues concerning the validity of assessment in EMI education. Then, we propose a framework for teachers to evaluate the cognitive and linguistic demands of their assessment tasks. Finally, we suggest some strategies that teachers can adopt to provide scaffolding for students to attempt challenging assessment tasks. It is hoped that with the theoretical framework and scaffolding strategies, students' actual learning progress will be better understood.

Introduction

In EMI schools or classes, non-language content subjects (e.g. science, history, geography) are taught through English, which is the second language (L2) of most teachers and students in Hong Kong. The implementation of such a pedagogical practice, though can be attributed to historical and socio-economic forces (Lin & Man, 2009), is justified on the theoretical underpinnings and assumptions that content subjects provide authentic and communicative contexts for L2 learning, and that students can get more meaningful exposure to L2 input, engage in more interaction and produce more output (Gass & Mackey,

2007; Snow et al., 1989). The ultimate goal of integrating content and language learning is two-fold – students learn both the content knowledge and L2 in meaningful contexts.

However, the **balance between content and language learning** is not without challenges, especially concerning assessments. As Short (1993) succinctly puts, 'the difficulty with assessment centres on isolating the language features from the content objectives so one does not adversely influence the other' (p. 627). Yet, content subject teachers in EMI schools, who were mostly trained as subject specialists, may not be aware of such a challenge. Therefore, the assessment tasks they design may not be able to differentiate whether students have grasped the target concepts, or students are hindered by language barriers, or both (to varying extents).

Based on our analysis of some typical assessment tasks (or question types) in the science subject areas in Hong Kong secondary schools, together with our experience of working with local EMI teachers, we propose in this paper **a framework for analysing the cognitive and linguistic demands of assessment tasks**, and more importantly, how to **provide more language scaffolding for challenging tasks**, so that students are not put in a disadvantageous position when it comes to assessment in EMI education. Before a detailed illustration of the framework, certain issues related to assessment in EMI education will be discussed.

Assessment Issues in EMI Programmes

In content and language integrated learning programmes such as EMI education, when students are completing assessment tasks in content subjects (e.g. science), they have to master **two broad dimensions of knowledge – cognitive and linguistic**. The cognitive dimension mainly concerns whether students have mastered the knowledge or concepts of the subject, and then applied such knowledge to different situations or scenarios. It may also involve higher-order thinking skills such as problem-solving, evaluating, comparing and contrasting. These cognitive processes are hierarchically organised in Bloom's

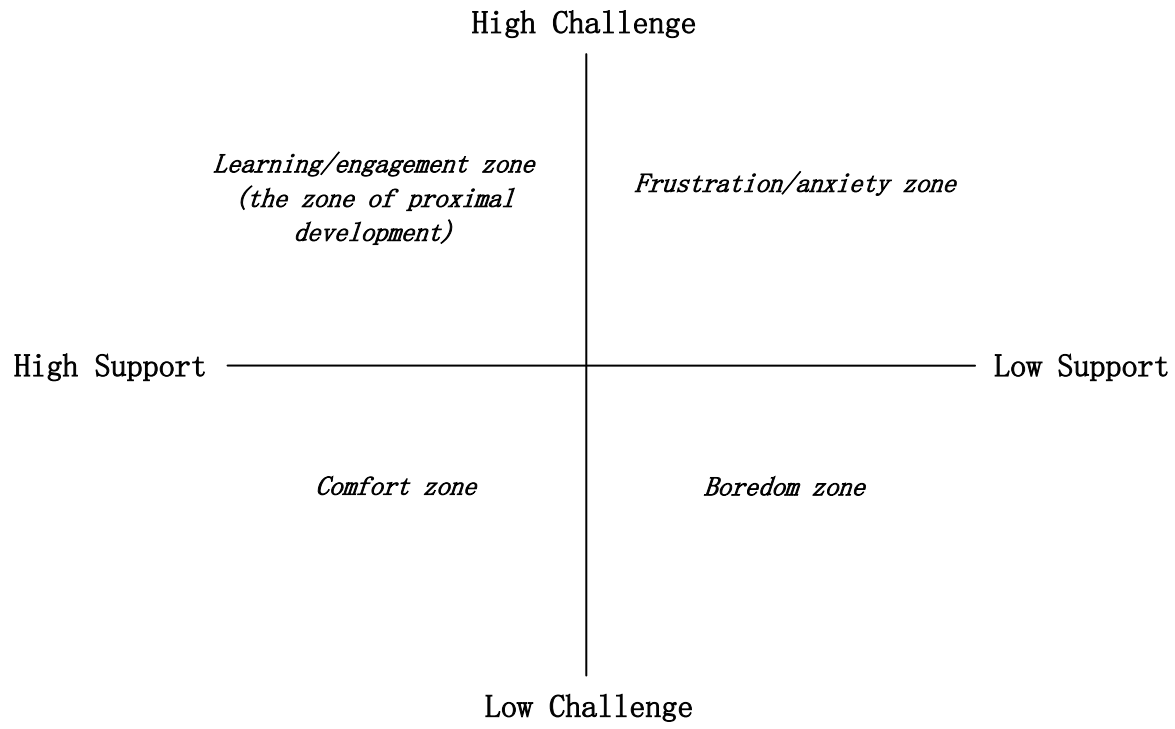
taxonomy (Bloom, 1956; Krathwohl, 2002). On the other hand, the linguistic dimension is involved when students are required to understand the assessment questions and then express their ideas. However, it has to be noted that the language that students are required to read and produce in content subjects is "**academic language**", which has distinct features regarding vocabulary items, grammar uses, sentence patterns and genres (Llinares et al., 2012; Schleppegrell, 2004). Hence, when teachers set assessment tasks, they need to ask themselves two basic questions: "*What to access?*" and "*How to access?*" (Coyle et al., 2010; Short, 1993).

The first question "***What to assess?***" concerns the balance (or indeed conflict) between content and language objectives. In the Hong Kong education system, where EMI students have to sit for high-stakes public examination in English, with the same exam syllabus as their peers studying through the mother tongue, it is not surprising that content subject teachers put more emphasis on content learning objectives (Lo, 2014). However, **language learning objectives should not be ignored**, since language is one major semiotic resource for students to demonstrate their content knowledge. Receptively, students have to understand the assessment questions or instructions; productively, students may be required to write sentences, short paragraphs or even coherent texts. Some language items (called "**content-obligatory language**") are particularly important for students to access content knowledge, whereas some other language items (called "**content-compatible language**") can be taught naturally within the context of content subjects but is not essential for content knowledge mastery (Snow et al., 1989). Very often students' small range of linguistic resources in L2 is likely to adversely affect their performance in assessments. This is exactly what Gablasova (2014) has recently shown – the choice of using L2 in assessment to a certain extent constrains students' ability to express their content knowledge.

The second question "***How to access?***" can be interpreted in two ways. First, it concerns the **purposes or goals of assessment**. That is, whether it is for teachers to diagnose students' progress and then provide feedback for students' ongoing learning (i.e. **formative assessment** such as homework, portfolio), or

whether it is for teachers to grade or measure the standard of students (i.e. **summative assessment** such as end-of-term tests or examinations) (Miller et al., 2009). Second, it can also be related to the **formats of assessments**. Short (1993) and Coyle et al. (2010) listed a range of assessment tasks, including matching, oral presentation, diagram labelling, teacher observations, anecdotal records, portfolios, essays and projects.

Undoubtedly, the two questions "*What*" and "*How*" should be closely related to each other, as the ways to assess students should align with the objectives of teaching and assessments (Orlich et al., 2013). However, whether content subject teachers are aware of this remains an issue. In particular, they may not understand the ways they assess students are actually challenging in both cognitive and linguistic aspects. More importantly, when students cannot complete the tasks satisfactorily, teachers may not be able to diagnose where the problems lie and hence provide feedback or scaffolding for continuous learning. Here, we would like to cite a quadrant (Gibbons, 2009, p. 16) which vividly depicts the relationship between challenges and support and the implications for students' learning. We would like to argue that for EMI teachers and students in Hong Kong, they all aim at "high challenge", given the requirement of the high-stakes public examination. Hence, if content subject teachers are less sensitive to the challenges of the assessment tasks and provide insufficient support, they are very likely to leave their students in frustration. On the other hand, if teachers become more aware of the need to **render support** for their students, they can facilitate students' learning within the **Zone of Proximal Development** (Vygotsky, 1978). That is why we are going to propose a framework for teachers to understand the demands they impose on students during assessments.



Source: Gibbons (2009, p.16)

Figure 1. Challenge vs Support: Different implications

The Framework: Assessment Grid

Short (1993) has proposed an assessment matrix, providing a framework for teachers teaching immigrant children in the US to understand the relationship between "*What to assess?*" (objectives) and "*How to assess?*" (assessment tasks). However, we would argue that this matrix has two limitations. First, on the dimension "what to assess", several objectives are listed, namely "problem solving", "content-area skills", "concept comprehension", "language use", "communication skills", etc. The general idea is to separate content and language objectives. Yet, we would point out that a delineation of the two sets of objectives is very difficult and in fact inappropriate for assessment tasks in content and language integrated learning programmes. As aforementioned, students are assessed both content and language knowledge in the very same assessment task, irrespective of the format it takes. Take the "matching information task" that Coyle et al. cite (2010,

p. 124-125; Figure 2) as an example. It may be believed that this task simply asks the students to match two sets of phrases about the Mathematical concepts of "coordinates" and so it does not target at any linguistic knowledge or skills. However, for students to be able to complete the task, they have to possess decoding and comprehension skills to understand the two sets of phrases in L2. Therefore, the framework we propose here is a matrix between the "cognitive/content demand" and the "linguistic demand" so that any assessment tasks can be analysed as a conjunction of the two dimensions of demands (Lin, forthcoming). The second limitation of Short's framework (1993) is that one dimension in the matrix is "how to assess", under which various assessment practices/measures (e.g. portfolios, teacher observations, oral presentations, essays) are listed. However, there can be infinite types of assessment tasks and the typical assessment tasks can vary in different educational contexts. Consequently, teachers need to adapt the matrix before they can use it.

Example: Identifying coordinates

Join the following heads with the correct tails (working in pairs, and later in a plenary):

The horizontal axis is called . . .	. . . positive x and positive y coordinates.
The point (−2,−3) is . . .	. . . 2 units to the left, 3 units up.
The first quadrant contains all the points with . . .	. . . the x-axis.
The fourth quadrant contains all the points with . . .	. . . 2 units to the right, and 3 units up.
The vertical axis is called . . .	. . . the y-axis.
The point (2,3) is . . .	. . . negative x and positive y coordinates.
The point (2,−3) is . . .	. . . 2 units to the left, 3 units down.
The point (−2,3) is . . .	. . . on the x-axis.
The second quadrant contains all the points with . . .	. . . negative x and negative y coordinates.
The point (2,0) is . . .	. . . 2 units to the left, 3 units down.
The point (0,2) is . . .	. . . on the y-axis.

Source: M. Luz Esteve (2007)

Link to worksheet [Accessed 27 April 09]: http://www.xtec.cat/cirel/pla_le/nottingham/mluz_esteve/worksheet1.pdf

Figure 2. A matching task (Coyle et al., 2010, p. 125)

Based on the various assessment issues identified in EMI programmes (and other content and language integrated learning programmes), we propose a three-by-three framework in the form of **a matrix between the dimension of linguistic demand and the dimension of cognitive demand** (Figure 3). The demand ascends when the matrix goes rightward and/or downward.

Linguistic\Content Demand	Recall	Application	Analysis
Vocabulary – Receptive Skills – Productive Skills			
Sentence patterns – Receptive Skills – Productive Skills			
Text – Receptive Skills – Productive Skills			

Figure 3. A framework to evaluate the linguistic/content demand of assessment tasks

As Figure 3 shows, the **cognitive dimension** includes three levels, each of which represents a cognitive process that content subjects typically demand, with reference to Bloom's taxonomy (Bloom, 1956; Krathwohl, 2002). There are six levels in Bloom's taxonomy, but for the sake of simplicity, the six levels are condensed to three in our framework. The level "**recall**" only requires students to report or repeat what they have learned and usually involves factual information only; the level "**application**" requires students to apply the factual knowledge to different situations, usually to solve some problems; the highest level of "**analysis**" further asks students to engage in high-order thinking processes such as synthesising, evaluating, comparing and so on.

Along the **linguistic dimension**, there are also three levels, "**vocabulary**", "**sentence**" and "**text**". These three levels are suggested with reference to the features of academic language identified in previous studies (e.g. Rose, 2012; Schleppegrell, 2004). To put it simply, when compared with everyday or communicative language, academic language usually consists of a set of subject-specific technical terms and semi-technical academic vocabulary, various sentence patterns performing such rhetorical functions as defining, explaining, describing, as well as text types which are structured in certain ways to achieve particular social purposes. In addition, each of the three language levels is further divided into **"receptive skills" (reading and listening)** and **"productive skills" (writing and speaking)**. Of course, from a functional view of language, these three layers of language and the two types of skills should not be treated as separate. What the framework does here is to help teachers become more aware of how assessment tasks may impose different kinds of difficulties on students. Each grid of the framework will be exemplified in the next section.

Illustration of the Framework with Typical Assessment Tasks Found in Local Materials

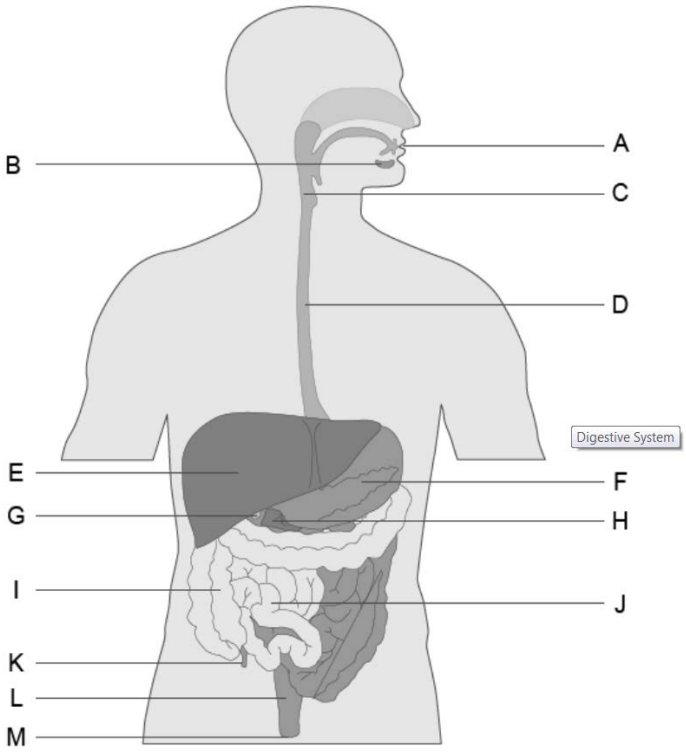
In this section, we have selected some typical assessment tasks or question types found in local materials in the science discipline. These tasks and questions are common for both formative and summative assessment. As local schools tend to focus more on reading and writing (instead of speaking and listening) in science assessment, the tasks presented below involve those two skills only.

Grid 1: Recall-Vocabulary

One typical way to check students' grasp of key concepts and technical terms is labelling diagram, as shown in Question type 1 below. For such type of task, students only need to recall the vocabulary items corresponding to the diagram, and hence the task belongs to the "Recall-Vocabulary" grid. If some words are provided for students to choose from, the task will involve receptive skills; otherwise, students have to produce the words on their own, and the task will involve productive skills instead.

Question type 1.

Name the structures labelled A to M in the diagram shwoing the human digestive system.



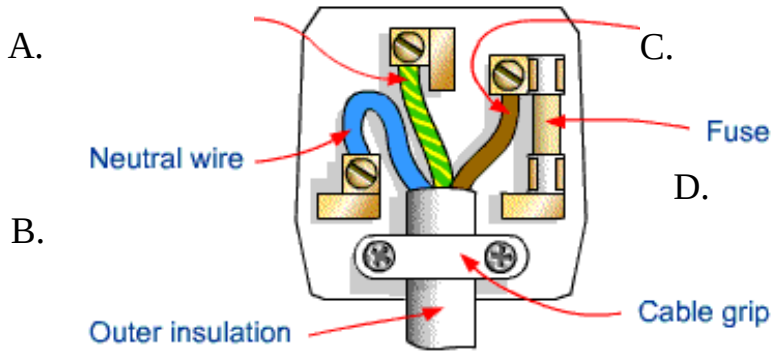
Source: http://www.helpteaching.com/questions/

Grid 2: Application-Vocabulary

Question type 2 shows another diagram labelling task. Then what makes Question type 2 more cognitively challenging requiring application skills, as compared with Question type 1 presented above? This is because students have to understand the way that the three-pin plug is shown (as being seen through from outside) in order to identify the three pins correctly. This requires some interpretation skills instead of a direct factual recall.

Question type 2.

The diagram shows a correclty wired three-pin plug. Label its key features A to D.



Source of the picture:
http://www.frankswebspace.org.uk/ScienceAndMaths/physics/physicsGCSE/wiringPlug.htm

Grid 3: Analysis-Vocabulary

It may be hard to perceive how students are asked to perform high-order thinking skills with vocabulary only. While this perception is, to a certain extent, valid, Question type 3 shows one possible way to do so. In this task, students have to compare and contrast breathed and unbreathed air, and what they have to write down is simply “more” and “less” or “higher” and “lower”, which have been given as an example in the row “Oxygen content”.

Question type 3.

Differences between unbreathed air and breathed air.

	Unbreathed air	**Breathed air**
Oxygen content	**more**	**less**
Carbon dioxide content	**1.**	**2.**
Water vapour content	**3.**	**4.**
Temperature	**5.**	**6.**
Nitrogen	**7.**	**8.**

Grid 4: Recall-Sentence

Along the row of “Sentence”, students will be asked to read questions and/or write their answers in sentence forms. Therefore, quite a lot of typical question types belong to this row, and it depends on the cognitive demand that further categorises the tasks. For example, Question type 4 shows a multiple-choice question which asks students to identify the main function of a food substance, which basically requires students to recall the information they have learned.

Question type 4.

What does the mineral phosphorus do for the human body?

A. It is used for the production of HCl in the stomach.
B. It is needed by hemoglobin to prevent anemia.
C. It is vital for nerve cell functioning.
D. It is a component of bone and teeth.

Source: http://www.helpteaching.com/questions/

Therefore, Question type 4 is a task of “Recall-Sentence”, mainly involving receptive reading skills. On the other hand, when students are answering Question type 5 below, they have to describe what they have seen in one or two sentences. So Question type 5 involves productive skills as well.

Question type 5.

Put an egg into a beaker of tap water and then into a beaker of salt water. Describe what you see.

_____

_____

Source: *Infusing process and thinking skills into Science lessons (p. 59).* (2003). Hong Kong: Science Education Section, Curriculum Development Institute.

Grid 5: Application-Sentence

Question type 6 is a multiple-choice question that requires students to read the information given and choose the correct answer. In order to do so, students are likely to apply their knowledge of the relationship among wave speed, wavelength and frequency. So the question is “Application-Sentence” involving receptive skills (as students need to understand the question).

Question type 6.

A wave has a velocity of 300 m/s and a wavelength of 3m, what is the frequency of wave?

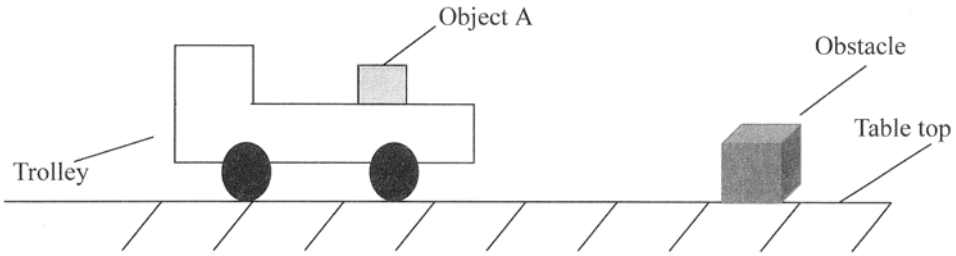
A. 100 Hz
B. 300 Hz
C. 50 Hz
D. 78 Hz

Source:http://www.helpteaching.com/questions/

On the other hand, when the students are required to explain some phenomena by applying what they have learned, such as an application of Newton's law of motion in Question type 7, their productive skills are used.

Question type 7.

An example of Newton's first law of motion or law of inertia:



1. What will happen to object A from the time when the trolley starts to move to the time when it hits the obstacle?

(i) When the trolley starts to move, object A_____.

(ii) When it hits the obstacle, object A_____.

Source: *Infusing process and thinking skills into Science lessons (p. 126).* (2003). Hong Kong: Science Education Section, Curriculum Development Institute.

Grid 6: Analysis-Sentence

To tackle Question type 8, students not only need to apply their knowledge of genetics and blood type profiles between parents and children, they also need to synthesise the given information and then deduce the correct answer. So the question fits the grid "Analysis-Sentence" and receptive skills. If students are further asked to justify their answers, productive skills will then be involved.

Question type 8.

A man with type A blood marries and has a child with a woman who has type B blood. The child has type O blood. What can be determined about the blood types of any future children this couple may have?

A. All future children will also have type O blood.
B. There is a 10% chance that most future children will be type AB.
C. The future children have an equal chance of having all of the four possible blood types.
D. The only blood type that is possible for the future children to have is type B.

Source: http://www.helpteaching.com/questions/

Grid 7: Recall-Text

Sometimes, students are required to tackle data-based questions. They have to read a piece of information (in the form of a short text) and then they have to answer some questions related to the data. For instance, in one Physics paper in the public examination, one question includes a piece of text describing "Bungee jumping". The first part of that question then asks the students to describe the acceleration of the bungee jumper during the first downward fall to the lowest point. Here, the cognitive demand does not look high, but it is linguistically challenging, as students have to understand the text and describe the process. Hence, this task involves both receptive and productive skills. One may wonder why this task belongs to the "text" level instead of "sentence" level. This is because when students attempt to describe the process, it is expected that they will organise their ideas in a coherent way, with connectives like first, then, next, finally, during, etc. This is then slightly beyond the sentence writing level.

Grid 8: Application-Text

To attempt Question type 9, students have to apply what they have learned about water cycle and the various processes involved. They then need to express their answers in a short paragraph/text. That explains why Question type 9 belongs to the "Application-Text" grid.

Question type 9.

How does water that has evaporated from the sea end up as rain on land many miles away?

_____

_____

_____

_____

Source: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA). Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College, Chestnut Hill, MA and International Association for the Evaluation of Educational Achievement (IEA), IEA Secretariat, Amsterdam, the Netherlands.

Grid 9: Analysis-Text

In Question type 10, students are asked to design and carry out an experiment and then write the lab report. Students have to draw on their knowledge of the topic and scientific investigation to design the experiment on their own. They also need to explain the results and draw some conclusions. All these require higher-order thinking skills. Therefore, this question falls into the most challenging grid in terms of both cognitive and linguistic demands. In addition, in the science papers of the public examination, the last question is usually an essay-type question, which expects students to write a piece of coherent text based on a given topic (e.g. discuss the impact of generating electricity with fossil fuels or nuclear energy on the environment). Explanation, discussion and evaluation are usually involved. Hence, those questions should also fall into this “Analysis-Text” grid.

Question type 10.

It is generally known that fruits, beverages and juices etc. contain Vitamin C. However, do they contain the same amount of Vitamin C? Design and carry out a simple experiment to test your ideas.

Hints: a. Vitamin C can decolorize dichlorophenol-indophenol (DCPIP).
b. In each of the Vitamin C tablets on sale in the market, there are 1000 mg of Vitamin C, you make take this as a standard in your test.
c. Some apparatus useful for this experiment are measuring cylinder, test tube, dropper and beaker, etc.

Write down the steps of your tests:

_____
_____
_____
_____

Write down the experimental results:

_____
_____
_____
_____

Write down your conclusions:

_____
_____

Source: *Infusing process and thinking skills into Science lessons (p. 205).* (2003). Hong Kong: Science Education Section, Curriculum Development Institute.

Some Innovative Tasks Found in Overseas Materials

The assessment tasks or question types shown in the previous section are typical in local EMI schools. However, it can be noticed that the questions are limited to a few formats with little variation (e.g. multiple choice questions; short questions; labelling diagrams). This section will introduce several question types found in overseas textbooks.

Question type 11. (Recall-Vocabulary)

Sequences

Here are some sequence puzzles. Think about how the three words in each line are related. Then add another word to one of the blanks to complete each sequence.

_____ oesophagus _____ stomach _____ large intestine _____

Question type 12. (Analysis-Vocabulary)

Analogies
Look at each line. The two words on each line that are separated by a single colon are related. Fill in the blank space with a word that shares the same relationship with the third word in the line.

frog: amphibian : : snake : _____

fuel: car : : _____: body

Question type 13. (Recall-Sentence)

Your order please
Four of the five sentences in each set are not in the correct order (one sentence does not belong with the other four). Write the number 1, 2, 3 or 4 before the sentences to indicate the right order) (one sentence will be left blank).

_____ **Food then passes through the small intestine.**
_____ **It travels to the left side of the heart.**
_____ **After being chewed, food passes down your oesophagus.**
_____ **While food is in the stomach, acids begin to break it down.**
_____ **The chemical particles can then pass into the bloodstream.**

Source of question types 11-13: Fredericks, A. (1991). *Science Brainstretchers: Creative Problem-solving Activities in Science*. Culver City: Good Year Books.

It may be worth noticing that the above questions do not impose very high linguistic demand on students, but they may assess different levels of cognitive skills. As long as the teachers explain the instruction clearly, students should

understand how to attempt those questions. These may give some new ideas for local content subject teachers.

Providing Support for Students to Attempt Challenging Tasks

To help students to attempt various types of questions or assessment tasks, sufficient scaffolding has to be provided, in **both** cognitive and linguistic aspects. As content subject teachers were trained as subject specialists and should be familiar with pedagogies of teaching content knowledge, the following discussion will focus on how content subject teachers can provide more support in the linguistic aspect to help their students to attempt challenging assessment tasks.

In the **Teaching-Learning Cycle** proposed by Rothery (1994), there are three important stages, namely "**deconstruction**", "**joint construction**" and "**independent construction**". For students to be ready to attempt assessment tasks on their own (i.e. the stage of independent construction), deconstruction and joint construction are indispensable.

During the deconstruction stage, content subject teachers should illustrate content knowledge and at the same time **unpack the complicated and unfamiliar academic language** for the students, so that students grasp how content knowledge is expressed through (second) language. As presented above, academic language is made up of vocabulary, sentence patterns and text structures. Content subject teachers can unpack these different elements of language for the students. First, **subject-specific technical terms** may cause great difficulties for students to memorise. To address this issue, teachers can analyse the words using some **word roots** (e.g. photo-, cardio-), **prefixes** (e.g. pre-, tri-, re-) or **suffixes** (e.g. -er, -tion). For long words made up of several syllables, teachers can divide the words up for students to remember the pronunciation and hence spelling more easily (e.g. oe/so/pha/gus). Teachers can also connect new words to students' existing lexicon, especially when the words belong to the **same word family** (e.g. convert, converter, conversion).

Second, the sentences in academic texts are condense, very often because of the use of "**nominalisation**", which is a grammatical process that re-present dynamic *processes* (verbal clauses) as stable *entities* (noun groups) (Halliday, 1993). For example, in the sentence "*Preservatives protect food from spoilage caused by mold, bacteria, and yeast; and from flavor and colour changes due to exposure to oxygen*", the noun groups "spoilage caused by mold, bacteria and yeast", "flavor and colour changes", "exposure to oxygen", together with the causal verband connective (e.g. caused by, due to), make it difficult for students to understand the meaning of the sentence. Therefore, content subject teachers may need to unpack these complicated nominalised sentences with everyday language in lessons.

In addition, for some **typical sentence patterns** expressing certain rhetorical functions, teachers can also draw students' attention to the structure of those sentences so that students can understand them more easily. Let's look at the function of "defining", which appears frequently in science subjects when technical terms are introduced. The defining sentence "*Conduction is a process by which heat is transferred*" can be divided into four main parts: (i) the specific term to be defined ("Conduction"), (ii) the verb ("is"), (iii) a general class word ("a process") and (iv) specific characteristics which are expressed with a defining relative clause ("by which heat is transferred"). Teachers can analyse the structure of such a sentence through **a sentence making table**, as Table 1 below. If students can visualise the major parts of a defining sentence, they will probably find it easier to understand and later produce this kind of sentence.

Specific term to be defined	**Verb**	**A general class word**	**Specific characteristics (relative clause)**	
Conduction	is	a process	by which	heat is transferred.

Table 1: Sentence making table of sentences that perform the function of defining

Third, a particular text type is structured in a particular way to achieve its social purpose. Hence, if teachers can analyse **the structure of a text type** with the students, students can better understand the flow of ideas in the text, and when they have to produce that particular text type, students will know how to organise their ideas. For instance, as mentioned above, when tackling an essay-type question, students may be required to write a discussion text. This particular text type aims at presenting more than one perspective related to the issue. Therefore, students are expected to present and illustrate several arguments. And finally, they are expected to summarise the main points and give a suggestion or express their personal opinions based on the arguments presented. Content subject teachers may help students to notice such a structure with some **model texts**. It has been observed that content subject teachers seldom incorporate these language teaching objectives or pedagogy in their lessons, especially beyond the vocabulary level (Koopman et al., 2014). However, these are necessary scaffolding for students to master the content-obligatory and perhaps content-compatible language related to content subject learning. Otherwise, students may find themselves hindered by the language barrier and their learning progress may be underestimated.

Very often, probably because of teachers' language awareness and/or limited time in content subject lessons, after discussing content knowledge with the students, teachers will ask the students to try attempting some questions (i.e. assessment tasks). Some of these questions, as illustrated by the above framework, are actually rather demanding in both cognitive and linguistic aspects. Therefore, in addition to unpacking language during the deconstruction stage, teachers may need to demonstrate how to produce the language (e.g. answering questions in complete sentences; drafting a well-structured paragraph or essay) and perhaps do it together with students (i.e. **joint-construction**). This can be achieved through designing "**parallel tasks**". Parallel tasks are tasks that are similar in terms of content and linguistic demands, but with some variation. The teacher does the first task together with students, and during the process, the teacher provides plenty of cognitive support and linguistics resources. This serves as an example and good scaffolding for students. Then, when students are asked to attempt the second task on their own (i.e. independent construction), they can refer to the cognitive processes they have gone through and draw on the linguistic resources practised in the first task.

For example, we once worked with a local secondary school. The science teacher was teaching the topic “Scientific investigation” and wanted to teach the students how to design a fair test and write up an experimental report. Such a task was actually rather challenging for secondary one students (it belongs to “Analysis-Text” level in our grid, similar to Question type 10 presented in the previous section). Therefore, the teacher designed two similar tasks, the first one about the relationship between candle size and flame temperature and the second one about comparing the water absorption capacity of tissue paper of different brands. The teacher did the first task together with the students, who then managed to complete the second one on their own. Such a practice of “**repetition with variation**” is a useful strategy to provide scaffolding during the joint-construction stage.

Teachers may express the concern that if they show students how to attempt a task or some questions, students may simply copy their answers and so teachers may not know whether students have achieved the target objectives or not. However, our argument would be the opposite – if students are not supported in the linguistic aspect and hence cannot express their content knowledge accurately with language, it will be impossible for teachers to know if students have achieved the target. It may be worth noting that ‘**scaffolding is not cheating**’ (Coyle et al., 2010, p. 131). This is particularly the case if teachers provide scaffolding with **formative assessment** (e.g. classwork and homework) and give students feedback, which will then enable students to tackle the summative assessment tasks.

Conclusion

Assessment, be it formative or summative, serves important functions in facilitating teaching and learning **(**Miller et al., 2009**).** However, the prerequisite is that assessment tasks are in line with objectives and instruction, and the tasks are valid evaluation of student learning. Such an issue becomes more complicated in EMI schools, where students are learning content subjects in their second language and facing dual challenges in cognitive and linguistic aspects. Hence, content subject teachers should be more aware of those challenges when designing assessment tasks. This paper presents a framework

which enables teachers to analyse the different kinds of demands of their assessment tasks. It also suggests some strategies of providing scaffolding for challenging tasks, especially in the linguistic aspect. It is hoped that with heightened teachers' awareness and more scaffolding, students can overcome language barriers during assessment and demonstrate their actual learning progress.

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References

Bloom, B.S. (1956). *Taxonomy of educational objectives, Handbook I: The cognitive domain*. New York: David McKay Co Inc.

Coyle, D., Hood, P., & Marsh, D. (2010). CLIL: *Content and language integrated learning*. Cambridge: Cambridge University Press.

Gablasova, D. (2014). Issues in the assessment of bilingually educated students: Expressing subject knowledge through L1 and L2. *Language Learning Journal*, *42*(2),151-164.

Gass, S.M., & Mackey, A. (2007). Input, interaction and output in second language acquisition. In J. Williams & B. van Patten (Eds.), *Theories in second language acquisition* (pp. 175-199). Mahwah, N.J.: Lawrence Erlbaum.

Gibbons, P. (2009). *English learners, academic literacy, and thinking: Learning in the challenge zone*. Portsmouth, NH: Heinemann.

Halliday, M.A.K. (1993). Some grammatical problems in scientific English. In M.A.K. Halliday & J.R. Martin (Ed.), *Writing science: Literacy and discursive power* (pp. 69-85). London: Falmer Press.

Koopman, G.J., Skeet, J., & de Graaff, R. (2014). Exploring content teachers' knowledge of language pedagogy: A report on a small-scale research project in a Dutch CLIL context. *Language Learning Journal*, *42*(2), 123-136.

Krathwohl, D.R. (2002). A revision of Bloom's taxonomy: An overview. *Theory Into Practice*, *41*(4), 212-218.

Lin, A.M.Y. (forthcoming). *Language across the curriculum: Theory and practice*. Dordrecht: Springer.

Lin, A.M.Y., & Man, E.Y. F. (2009). *Bilingual education: Southeast Asian perspectives*. Hong Kong: Hong Kong University Press.

Llinares, A., Morton, T., & Whittaker, R. (2012). *The roles of language in CLIL*. Cambridge: Cambridge University Press.

Lo, Y.Y. (2014). Collaboration between L2 and content subject teachers in CBI: contrasting beliefs and attitudes. *RELC Journal*, *45*(2), 181-196.

Miller, M.D., Linn, R.L., & Gronlund, N.E. (2009). *Measurement and assessment in teaching* (10th ed.). Upper Saddle River, N.J.: Merrill/ Pearson.

Orlich, D.C., Harder, R.J., Callahan, R.C., Trevisan, M.S., & Brown, A.H. (2013). *Teaching strategies: A guide to effective instruction* (10th ed.). Belmont, CA: Wadsworth Cengage Learning.

Rose, D. (2012). *Reading to learn: Teacher Resource Books*. [Online] Available: http://www.readingtolearn.com.au/

Rothery, J. (1994). *Exploring literacy in school English* (Write it right resources for literacy and learning). Sydney: Metropolitan East Disadvantaged Schools Program.

Schleppegrell, M. (2004). *The language of schooling: A functional linguistics perspective*. New York: Routledge.

Short, D. J. (1993). Assessing integrated language and content instruction. *TESOL Quarterly, 27*(4), 627–656.

Snow, C.M., Met, M., & Genesee, G. (1989). A conceptual framework for the integration of language and content in second/foreign language instruction. *TESOL Quarterly*, *23*(2), 201-217.

Vygotsky, L.S. (1978). *Mind in society: The development of higher psychological processes.* Cambridge, MA: Harvard University Press.

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