Observations on vocabulary development in Hong Kong high schools with English as the medium of instruction

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I have written in various publications for the Hong Kong Education Bureau (*Improving Language and Learning in Public-sector Schools*; and *Report on Modelling and Joint Construction*) about my classroom observations in publicly-funded secondary school classrooms. In those publications, I have focused on various aspects of teaching and learning; they have all discussed language in some manner or other.

Some further observations about vocabulary, in particular, made both in the classroom and during professional development courses, are that many teachers:

- suggest that their students develop their vocabulary by keeping a note-book in which they list new terms
- can find it difficult to "unpack" abstract concepts and technical terms in more commonsense, spoken English because they possibly have not needed to do this in their own education
- cannot see the role of talk in learning in their classroom so too many lessons still resemble lectures.

The development of vocabulary is an interesting area of concern for the following reasons:

- It is the one aspect of language most subject teachers talk about and usually the one aspect of their students' language they complain most about.
- It is, in my opinion, a misunderstood aspect of language and perhaps requires a different perspective so that vocabulary development is linked to learning and real success happens for a greater number of students.

What is vocabulary?

I am using the term, vocabulary, to refer to content words that name or represent such things as objects, ideas and phenomena in our world. They are expressed using nouns and the majority of adjectives and adverbs. We put all these content words together in many different ways using linguistic elements such as articles, prepositions, conjunctions and tense markers. This is an important distinction: we have content words, which we can call

lexical items, and we have the words that link the content words meaningfully, which we can call grammatical items. So when we talk about vocabulary, we are in the main talking about the lexical items. The set of lexical items is an open set with many new ones each year, whereas the set of grammatical items is, for our purposes here, a closed set with no new items added.

In this article, because my focus is on education, I am focusing on the kind of vocabulary that construes the increasingly technical and abstract meanings that schooling is concerned with. I am not concerned here with the vocabulary that construes everyday or commonsense meanings and which can be developed outside of educational institutions.

What is the relationship between a concept and the name of the concept?

If we want our students to learn a concept, is it sufficient to simply learn the name for it? Perhaps, if we see what a Russian psychologist, LS Vygotsky, had to say:

> *"The relation of thought to word is not a thing but a process, a continual movement backward and forth from thought to word and from word to thought. … Thought is not merely expressed in words; it comes into existence through them."*[1]

According to Vygotsky then, we learn a concept by using the words that construe the concept. It is a process that we are involved in, not a naming process but a process of development and, therefore, of learning. In other words, we could say that we use the lexical items to develop a thought, which in turn makes sense of the lexical items, which in turn further develops the thought, which consolidates the understanding of the lexical items. My contention is that asking students to simply list technical and abstract words in a vocabulary book is not necessarily helpful to the students.

If we agree with this then there are a number of implications and so we can ask ourselves the following questions:

- Whose role is it to develop the vocabulary?
- How do we apply this understanding in the classroom so that our students learn effectively through vocabulary development?

Whose role is it to develop vocabulary?

If vocabulary and thought are developed concurrently, then both are developed in a

[1] Vygotsky, L.S. (1986) *Thought and Language*. Cambridge, MA: MIT Press. p.218

meaningful context and the most meaningful are the classroom activities in which the teacher and the students are engaged in teaching and learning the subject. The more technical and abstract the meanings become, the more I think the answer to this question is one in which we could all easily agree on – it is the responsibility of the teachers with the expert field knowledge to develop the field-specific vocabulary. The issue, therefore, is not who but how, given all the constraints of time.

Developing vocabulary in the classroom – some suggestions

In the following suggested methods for vocabulary development, my intention is to show that it is the 'what' and the 'how' that is crucial:

- the tasks that the subject teacher has organized and how they are structured
- what questions the teacher asks
- how the class engages with the texts (spoken, written and visual) and activities.

It is the tasks and methods and interactions that shape how and if vocabulary is learned. And all of this should happen as an integral part of learning the content in any lesson.

SEMANTIC WEBS

One way of understanding the what and how about vocabulary development is to understand how lexical items function in a text. We can say that lexical items in texts form intricate webs of meaning, what I am calling semantic webs, which provide a text with the cohesion it needs for it to be considered a well-structured text. These webs are based on words that have similar meanings (synonyms), contrasting meanings (antonyms), words that form classifications and words that are connected because they are components of something. These webs determine the kinds of questions we ask students. We will use the following extract to illustrate what can be done. I am using a written text for my purposes here because of ease of use but, in the classroom, any discussion or presentation or activity would be relevant.

> '… Acid rain is a chemical phenomenon caused by the dissolution of nitrogen oxides and sulphur dioxide in rainwater to form nitric acid and sulphuric acid, respectively. The oxides are released during the combustion of fossil fuels by cars, factories and power plants. Acid rain has multiple adverse effects on ecosystems, where plants and soils are degraded, and on humans and property. Some of the ways acid rain afflicts people are, for example, the irritation of the human respiratory system and corrosion of human constructions such as buildings and car bodies.

> The greenhouse effect is the name given to the phenomenon where the atmosphere behaves in the same way as a greenhouse, which allows certain radiation to enter the glasshouse but prevents other radiation from escaping. In the earth's situation, objects on the earth absorb UV light and then in turn emit low-energy infra-red radiation, which is then trapped within the earth's atmosphere, resulting in increasing temperatures. The effect is worsened when the atmosphere is concentrated with air pollutants that are the result of combustion, such as water vapour, carbon monoxide, carbon dioxide and methane. …'

Rather than simply listing technical words in the text, for example, my suggestion is that learning the technical words is more efficient if the teacher and students focus on the function(s) of the technical and abstract words in the text. For example:

- Ask students to identify and list all the items in the extract that deal with chemical compounds in some way. Students might identify words that represent a major outcome (*acid rain, greenhouse effect*), others an abstract representation (*a chemical phenomenon*), while others name the chemical compounds participating in the reactions (*nitrogen oxides, sulphur dioxide, …*).
- Which words used in the extract classify (*acid, chemical, nitrogen, …*).
- Identify all the words in the text that realize negative meanings (*adverse, degraded, irritation, corrosion, afflicts, …*).
- Which words in the text express causal relationships (*caused by, effect, allows, resulting in*).

By doing the above tasks, the students, of course, will be including words they already know but it is the different relationships between the words they know and the new words that allow the student not only to develop the vocabulary but learn the content of the text they are reading. Because every well written text is lexically cohesive, then it does not have unlimited semantic webs. Generally, there are around four to five significant semantic webs in a text and this make the task of reading and understanding a text manageable.

VOCABULARY IN MATHEMATICS TEXTS

Mathematics is an interesting case because it uses three ways of making meaning: language, visuals and the symbolic (ie equations). Understanding mathematics is understanding all these three aspects but here I would like to focus on the patterns of language. For example, what are the patterns in a command such as:

Find the area of a triangle with base 10 cm and height 5 cm.

This example is typical of mathematical commands: it has a command (*Find*) at the front which expresses a mathematical operation and the rest is a dense noun group:

Find the area of a triangle with base 10 cm and height 5 cm.

The noun group itself has patterns: it starts with a mathematical concept (area) which is followed by providing a real-life situation (a triangle of a certain size) and then finishes with some data needed to carry out the mathematical operation. Similarly:

Calculate the sine of angle φ in the right-angled triangle ABC where AB is 8cm and BC is 16 cm.

To understand this, a student would understand they have to 'calculate' (Find, Solve, What is …) some mathematical concept and, in this case, it is 'sine' and then they consider the following questions:

1. What do I have to find? (sine of angle φ)
2. Where is angle φ? What is the specific situation? (in the right-angled triangle ABC)
3. What do I need to calculate the sine value? This is the 'invisible' mathematical operation being tested (opposite length over hypotenuse length)
4. What are the lengths of those sides? (8 cm and 16 cm respectively)

As we can see, our questioning is based on the structure of the noun group. So the issue is not remembering the list of technical terms but the teacher and students engaging with developing a strategy for understanding the problem — an appropriate pedagogical strategy would be the Teaching and Learning Cycle discussed in other articles. While engaged in using the strategy, the technical terms are used over and over again and, if the students are given opportunities to say the words, then they do what Vygotsky suggested learners do, engage in a process where concept and words collaborate so that learning happens and vocabulary development is a part of that.

These few examples highlight that vocabulary development happens during interaction with texts, constructing and processing them. As such, they are integral to the classroom. My argument is that a teacher who engages with texts in the suggested ways is acknowledging that language has an important role in developing the concepts and knowledge of their subject. In fact, I would say that they are developing the students' knowledge more efficiently by using their understanding about how language construes

the meanings, i.e. the knowledge of their subject. So, if we return to the observations listed at the very beginning of this article, we can see that the issues raised by teachers about insufficient time to focus on language because of a tight syllabus or lack of opportunities for effective oral interaction in class, for example, could be tackled successfully by using alternative methods. These methods are then taken up by the students so they carry them out 'implicitly' and are independent of the teacher, which means that new, deeper questions can be discussed in the class as the students spiral upwards in their understanding.