

The vocabulary challenge of the transition: new words, new meanings

'The linguistic challenges of the transition from primary to secondary school' project brings together academic and professional expertise from the University of Leeds and 13 schools in the north of England, including Huntington Research School, York. We worked with 5 secondary and 8 primary schools to collect language from Years 5 through to 8, across English, Maths, Science, History and Geography. Teachers advised us on what to collect to reflect students' experience of the academic language of school. We didn't collect spoken or written language produced by students, because our focus is on what they encounter.

We now have an electronic corpus, consisting of transcribed lesson recordings (teacher talk only), textbooks, worksheets, assessments, Powerpoint presentations and other written materials. We are able to split this into spoken and written sections, KS2/ KS3, different years, and different subjects. We can use computer software to compare different parts of the corpus against each other- for example, KS2 Science against KS3 Science. We have analysed this to find out which words are new, or much more frequent, in KS3 compared to KS2. We are **not** making value judgements about what we find. Teachers are the specialists here, and the job of our research is just to describe.

Linguists work with two different understandings of 'word'. When someone says they have to write a 3000 word essay, they mean the total number of words, which would include many repetitions. For example, it is likely to include several hundred occurrences of 'the'. 'Words' in this first sense are called **tokens**. In contrast, when we say that a young child learns about five new words a day, or that most adults have a vocabulary of over 20,000 words in their first language, we are referring to the second sense, **types**. Our corpus currently contains about 2.5 million **tokens**-- a word count roughly equivalent to 25 average length novels. We are still adding to it as we transcribe and process our final batches of data, and it will be complete by spring 2023.

Numbers of new word types

In every subject except for English, KS3 shows a huge increase in the number of word **types** over KS2. In our Maths data, there are around 7,000 types in KS2, and around 12,000 in KS3. Almost all of these new types are technical or academic words. In Science, there are around 10,000 types in our KS2 data and around 12,000 in KS3, and again, the new types are technical or academic. There is actually a slight drop in the number of types in English between KS2 and KS3. This seems to be because a narrower range of reading material is used in KS3, with fewer everyday words.

Polysemy

A second challenge is polysemy, or the capacity for words to have multiple meanings. The computer software that we use for identifying new words can't tell us much about this. To look at word meaning, we studied examples of words by hand. We found that a large number of words have both everyday meanings and academic meanings. Students may know the everyday meanings but be uncertain of the academic meaning. For an adult, the relationship between the meanings is clear, but it might be less so for a student. This was a particular issue in our Science data. To study everyday meanings, we looked at a corpus of everyday language. Some examples are *store*, *reaction* and *force*, but there are many others. Examples of these from KS3 Science and everyday texts are:

Your body's chemical *store* of energy decreases. (KS3 Science, Y8 teacher talk)
Does anyone know of an Apple *store* nearby? (everyday)

No atoms are lost or made during a chemical *reaction*, so the mass of the result equals the mass of the reactants. (KS3 Science, Y7 presentation)
... they kind of looked at me for a *reaction* (everyday language)

The regular pattern of particles and strong *forces* explain why solids keep their shape and cannot flow. (KS3 Science, Y7 presentation)
armed *forces*./ special *forces*./ /security *forces*./ /join *forces*./ /market *forces*
(everyday language)

KS3 Science also uses words in a very precise, specific sense, where the everyday use is more abstract, sometimes metaphorical. Again, we found many examples of this, including *solid* and *image*.

KS3 Science: Iodine is a brittle *solid* at room temperature.
Everyday use: DiCaprio's a really *solid* actor.

KS3 Science: The camera produces an *image*, just like your eye.
Everyday use: ... his clean *image* as a player.

KS3 English shows a similar tendency. For example, in everyday language these days, the word *device* usually refers to an electronic gadget such as a mobile phone, whereas in KS3 English it is more often found in sentences like 'poets will often use the literary devices we have discussed'.

Amount of language: tokens

The focus of the project is word **types**-- the different words that students may encounter. However, early on in collecting our data, we noticed something about **tokens** as well. In collating and transcribing, we saw that in a typical school day, a student in KS3 seems to be exposed to more language, in terms of tokens, than in a typical day in KS2 (even more so when homework is considered). Our data are not in a form where we can measure this precisely, but we think we are looking at many more words potentially encountered by students, through written texts especially, in the same period of time. This is because written materials tend to be much denser and longer at KS3 than in KS2: Powerpoint presentations, worksheets and textbooks are all often crammed with words. Our average written text length is higher for all subjects except Science at KS3 than KS2, in History 2.5 times higher. What we don't know without more research is how much time is spent working with a text on average at the different key stages.

Further, our lesson transcripts suggest that in KS3 teachers talk for a higher proportion of lesson time, and at a faster rate than in KS2, as the average teacher word count per transcribed lesson is higher at KS3 in all the subjects we looked at. This is consistent with Tobbell and O'Donnell's findings (2013). They followed students over a period of a year as they moved from primary to secondary school. They found that in secondary school 'by the final lesson [of the day], students may well have spent over half the day sitting in silence and listening to teachers talk', because teachers were

'understandably, focussed on delivering the curriculum objectives of the lesson' in a limited time (p. 20). The opposite is also likely to be true; each student probably produces fewer spoken words in class time in KS3. Detailed comparisons are needed to explore this.

Even if this language was all very familiar to students, the likely increase in quantity would pose an increased cognitive burden. However, as we have shown above, we know that the language is not the same-- there is a lot that is new.

We can see then that the texts and talk that Year 7 students encounter presents three different kinds of word challenge: new words, new meanings of known words, and the amount of words encountered. This is inevitable as students start to study disciplines in a more specialised way, and we hope that our research can help to support their progress.

Reference

Tobbell, J. and O'Donnell, V. (2013) The formation of interpersonal and learning relationships in the transition from primary to secondary school: Students, teachers and school context. *International Journal of Educational Research*, 59, pp. 11-23.