

Martin A. Hefti
Zurich

Biology in English - a challenging variety

L'auteur expose trois points, pour lui critiques, de l'enseignement en immersion: le travail à mettre en place pour développer des capacités linguistiques, pour activer les étudiants et pour trouver des matériels didactiques adéquats.

En révisant 23 leçons de biologie en anglais tenues dans sa classe d'immersion, il a estimé le temps consacré à chacune des quatre compétences. Écouter (39%) est la plus requise aux étudiants. Écrire (30%) prend près d'un tiers du temps et les étudiants passent 22% des leçons en lisant. Parler (4 minutes, 9%) vient en dernier. En effet, le plus souvent, c'est un seul étudiant qui parle, donc ces quatre minutes doivent être divisées par le nombre d'étudiants. Si 10 étudiants participent activement oralement, chacun a donc environ 25 secondes de temps de parole! L'article expose brièvement des stratégies permettant l'activation orale, la méthode "puzzle" et "la discussion des questions d'examen" (exam questions walkabout)". Mais pour l'auteur, prof. de biologie, trouver des moyens pour activer les étudiants devrait être une stratégie pour faire comprendre un sujet de biologie et pas un but en soi. Même si l'oral est une capacité entraînée sporadiquement, l'auteur remarque des progrès significatifs dans les compétences en anglais de ses étudiants grâce à l'exposition supplémentaire dans les leçons en immersion.

Introduction

At our school (Kantonsschule Wiedikon, Zurich), students in the immersion class are currently taught Mathematics from the 3rd to 6th form, Biology in the 4th and 5th form and history from mid 4th to 6th form in English. We started the immersion project in 2002 and in July 2005 19 of the 24 students from my first immersion class chose to write their Matura paper in Biology and thus in English. In this article, I take a look at the three main immersion issues that kept me challenged during the past two and a half years: working on language skills, activating students and finding appropriate educational resources.

Language skills

In my biology lessons, speaking is the language skill that is involved least. As an example, I reviewed 23 lessons of Biology in English held in my immersion class between September

and December 2005 and estimated the time spent on each of the four language skills: the receptive skills listening and reading as well as the productive skills writing and speaking. Figure 1 depicts the estimated percentage each skill was involved for all 23 lessons. As an illustration (indicated by arrows), lesson 10 was an exam and in lesson 19 the students worked on a selection of interactive narrated tutorials on cardiovascular diseases¹.

Figure 2 summarizes the estimated average time each language skill was involved. Clearly, listening is what students are required to do most; in other words, that's mainly the teacher talking.

Writing, a productive skill, takes up close to one third of the time and correlates mainly to times where students worked on handouts or on chapters in their biology book².

Speaking, on the other hand, comes last. Those 4 minutes are mostly spent on repetition phases and discussions

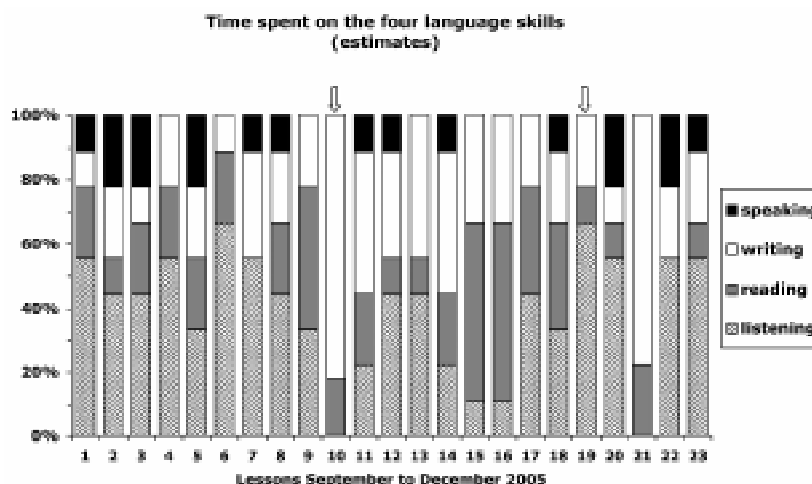


Figure 1. The estimated time (per 45min lesson) spent on each of the four language skills. n= 23 lessons of biology in English.

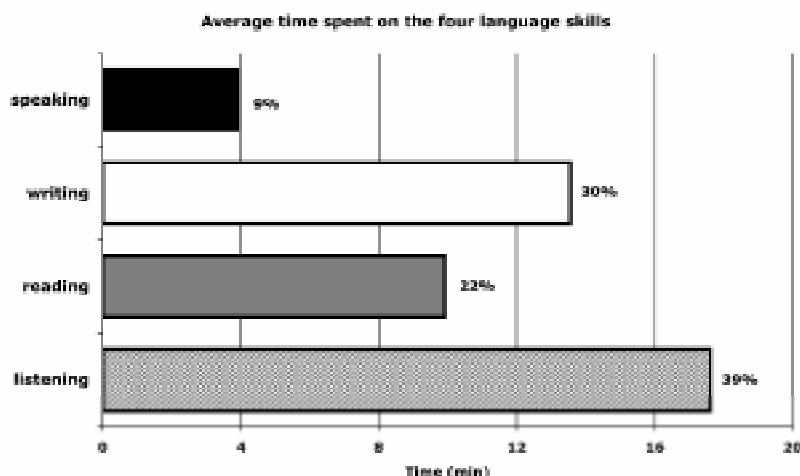


Figure 2. Calculated from reviewing 23 lessons of biology in English, this diagram visualizes the estimated average time spent per 45min lesson on the four language skills. Note that “speaking” reflects the contribution of all orally active students, so the actual speaking time of a single student in a normal lesson may be in the range of 0 to 25 seconds.

during the lesson. However, while all students are exposed to the spoken word when I talk, it’s mostly only one student at a time actually speaking. So those 4 minutes have to be divided by the number of actively participating students. Assuming a number of 10 orally active students, we get a figure of between 0 and 25 seconds of speaking per student per lesson. That’s not very much, and when I first started my immersion teaching, I found this a little troubling. I felt that I should be doing more to activate my students.

Activating students

There are indeed classroom strategies for oral activation that I can employ (and I have done so) in biology. The “puzzle” method, for example, is very useful (Fig. 3). In the first stage - the expert session - groups of students work on a particular topic of a theme and become “experts” therein. In a second stage - the teaching session - the students reorganize themselves into new groups with one expert for each topic. Then each expert presents his or her topic to the group.

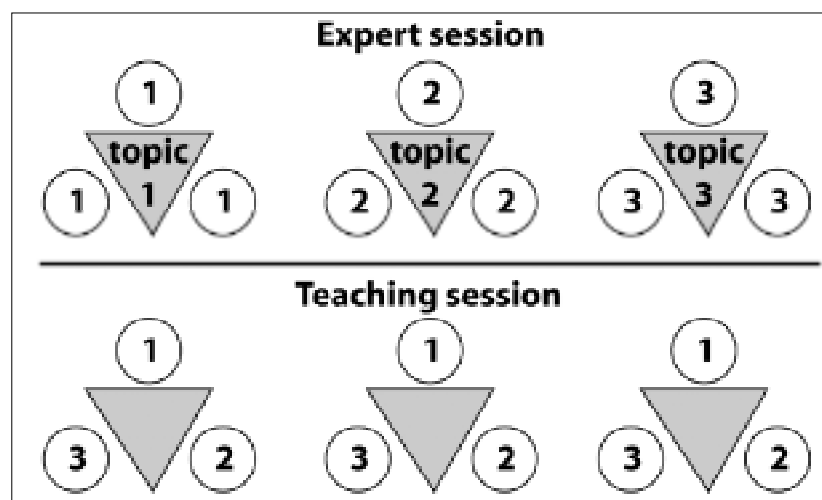


Figure 3. The concept of the Puzzle method.

Another easy way of activating students is what I call the “exam questions walkabout”. Here, every student prepares and writes down three short exam questions with answers covering the theme we have been studying. Then the students walk about the classroom and discuss their questions with other students in the class. The last time I did this, students prepared questions on nerve cell anatomy and the nerve impulse. It was great to walk

among the students and hear them all chatting away in English.

While spending time on implementing didactically challenging ways of how to activate students, I do have to remind myself that I am first and foremost a biology teacher and not a language teacher. Finding ways to activate the students should always be a means to further their understanding of the biological topic at hand and not be the end in itself. Even if speaking is a skill infrequently involved, I have no doubt that the students taking the immersion class greatly enhance all their English language skills, simply by being exposed to so many extra lessons in English.

Depth of coverage and resources

As colleagues have pointed out in this

journal on previous occasions (see e.g. Mascetti, 2005³), students in the immersion classes are usually bright and demanding. Even so, I tend to begin slowly when embarking on biology in English. In the first lessons I speak particularly slowly and repeat frequently. Within less than half a year, however, I move through the topics at the same speed and definitely to the same depth of coverage as I do with German speaking classes.

The search for educational resources is another thing that makes lesson preparation for biology in English demanding and time consuming. The standard biology collection (videos, DVD's, books etc.) at our school acquired over the past decades contains very few materials in English. In addition, I find that although there are many excellent books on the market for advanced level biology in English, there are none that really suit me ideally for my curriculum. I thus find myself creating most of my handouts from scratch myself. Thankfully, there are some very valuable classroom resources in English that make my life easier. Campbell "Biology"⁴, a US-American textbook, is something of a bible for biology teachers and it is also the book that is recommended for and used by biology students at the Federal Institute of Technology (ETH). The real treasure optionally accompanying Campbell "Biology" comes in the form of a media manager, a set of 8 CD-ROMs that contains all the photos and figures of the textbook labelled and unlabelled, as well as many excellent narrated animations of key biological processes. The textbook as such is too large, too heavy and too detailed for our immersion classes, but it's an excellent resource for my own preparations. There is a shorter and more

easily accessible version of the "big" Campbell, which I also find very good: "Biology - Concepts and Connections"⁵. This book is structured in neat conceptual topics that I can use directly in class and there is a media manager available for this book too. Another valuable biology book that I use for my own preparations and to which an excellent media manager can be purchased additionally also is "Life - the Science of Biology"⁶. Furthermore, I have found helpful audio-visual media at the BBC⁷, Channel 4⁸, the British Heart Foundation⁹ and on the Internet¹⁰.

Motivated and motivating

So, taken together, what's in it for me? Especially in our "pioneer" immersion class, I had highly motivated students that were eager to understand the more complex topics of advanced biology and to further their English. In such classes, it is in turn highly motivating to teach. I am challenged as a biology teacher in finding ways to help the students understand complex biological topics. I find it rewarding when I see students writing and talking in excellent English. I find it especially valuable that we can offer a stimulating learning environment to students who have voluntar-

ily chosen to make an extra effort. And I find appreciation for the work of us immersion teachers in statements of students at the end of their course, such as: „For me, it is a big success: I learn English without any special efforts - great“ - [Mischa P.] „It's more work, but I think it's worth it“ - [Patrick B.]. „At the beginning of each new subject it was quite difficult. Meanwhile, it's normal that the teacher speaks English. I think all this is very helpful for our future. I would say the immersion class is top“ - [Nikolai R.].

Postscriptum

I am always on the look out for new interesting and stimulating materials (books, films, Internet resources, etc.), so I would be very much interested to learn about what colleagues use and to share experiences.

Footnotes

¹ www.nlm.nih.gov/medlineplus/tutorial.html

² Kent, M. (2000): *Advanced Biology*, Oxford University Press, Oxford - UK. [£28.50, 600 pages]

³ Mascetti, G. (2005): *Enseignement bilingue: des élèves très demandeurs*, in: *Babylonia 2/2005*.

⁴ Campbell, N.A. and Reece, J.B. (2005): *Biology 7/e*, Benjamin Cummings, San Francisco. [About £45, 1250 pages]

⁵ Campbell, N.A. et al. (2006): *Biology Concepts & Connections 5/e*, Benjamin Cummings. [About £45, 800 pages]

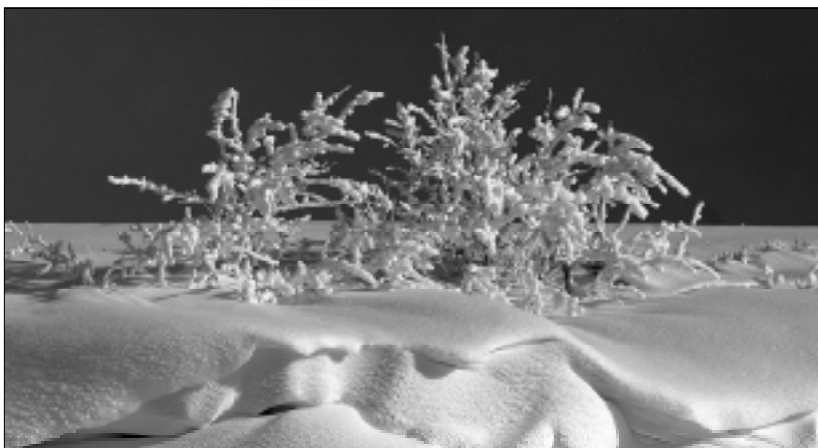
⁶ Purves, W.K. et al. (2004): *Life - The science of Biology 7/e*, Sinauer. [About £40, 1120 pages]

⁷ www.bbcshop.com/icat/11; e.g. The *David Attenborough series* or *The Human Body*.

⁸ www.4learningshop.co.uk > Science

⁹ www.bhf.org.uk

¹⁰ www.dnai.org, e.g. the excellent DVD "DNA interactive".



... nella neve.

Martin A. Hefti-Gautschi

studied biology at the University of Zurich and graduated with a PhD in cell biology. He is a teacher for biology - both in German and in English - at the Kantonsschule Wiedikon in Zurich.