

## **Metaphor usability in synthetic biology communication**

How are we supposed to communicate about synthetic biology? Since synthetic biology is an upcoming field of science, this question is more and more being asked. Due to this rapid growth of synthetic biology, also the communication about synthetic biology increases. For this communication metaphors are required. A recent study observed which metaphors are most suitable for communication with upper secondary school students.

In this study first of all an inventory was made of the metaphors most used for synthetic biology. This resulted in three metaphors: the book metaphor, the industry metaphor and the computer metaphor. The book metaphor can be described as: 'Scientists are moving from *reading* to *writing* the genetic *language*'. The following description applies to the industry metaphor: 'The *building bricks* of the DNA are *produced*, in order to *build* a cell as *designed* by the scientist'. And the computer metaphor is used as follows: 'The *software* (DNA) can be *programmed* and *installed* in the *hardware* (cell), thereby doing what the scientist intended'.

### **Experts**

In subsequent interviews with several experts in the field of synthetic biology the most important categories for communicating synthetic biology were determined. These categories were the underlying biological principles of synthetic biology and the social context, such as ethical considerations and the balance between positive and negative consequences. For a proper comprehension of synthetic biology, it seems therefore most important for students to have a proper basic knowledge of molecular biology and to be able to consider both the positive and negative aspects of this emerging field of science. In addition the experts themselves expressed a preference for the computer metaphor as they feel this metaphor describes the processes in synthetic biology best.

### **Students**

After the expert interviews, upper secondary school students reactions were determined. By filling in a questionnaire, 212 students from six different schools were asked about their associations and preferences related to the three metaphors. Afterwards some students were interviewed in order to gain more in-depth information about the given answers.

No differences in associations towards the several metaphors (book, industry or computer) were found. However, students appeared to have a strong preference for the use of the book metaphor. More than half of the students said to prefer the book metaphor the most (54,1%), relative to the industry (22,7%) and the computer metaphor (23,2%). The reason for this preference had to do with recognition: "This is how it is taught at school, so it is more '*normal*'", said a student. On top of that, a relative preference was found for the metaphor that's the first to be presented to a student.

### **Conclusion**

Since no differences in association were found, it seems wise to use the metaphor that is most preferred by the students (despite the fact that experts have a preference for the computer metaphor). Therefore, it is advised to use the book metaphor for synthetic biology communication towards upper secondary school students. Last but not least, it seems wise to use univocal language in order to make a metaphor more recognisable for the students.

This article is based on the following study: Sekeris, F. (2015). Metaphor usability for clarifying synthetic biology in upper secondary education. Master Thesis Utrecht University.

The complete research can be found and accessed freely on:

<http://studenttheses.library.uu.nl/search.php?language=nl&qry=synthetic+biology>