Visual Mathematical Dictionary

A didactical-humanitarian project

Antonella Perucca

The Visual Mathematical Dictionary is an ongoing collaborative didactical project aimed at breaking language barriers. Mathematical words are thematically sorted and illustrated. The material (including the source files) is provided on the website https://math.uni.lu/dictionary/.

Why?

Many people work or study in a language which is not their mother tongue. Several combinations are possible (e.g., a French person studying Finnish). Today, in Europe, the focus is Ukrainian, and the language support is obviously urgent. This project aims (in principle) to help millions of Ukrainian refugees and "shows that we care". It also aims at helping all pupils, who can profit of the material in their own language as a colorful didactical support. You (the reader) could use the dictionary to learn languages: for example, do you know how to say in English "überstumpfer Winkel"?

Who are we?

I am the initiator and (so far) the chief person responsible for the project, namely I am the lucky person who turned the "somebody should do it" into "let's do it NOW" and is working day and night since then. It's not a coincidence that I am in Luxembourg, as here multilinguism is every-day life.

There are many translators backing up the project (more than 20, mostly mathematicians). Many people are happy to help because this collaborative project is meaningful, and the translations are clearly only possible as a joint effort.

There are occasional contributions of people producing pictures, sharing ideas, providing valuable feedback, putting me in contact with other people. As I like to say, also "epsilon-contributions" are very welcome. As I cannot mention everyone, I refer to the webpage where all contributions are listed.

People who would like the project to be better or faster may help in various ways. Even just pointing out the existence of the material to some other person who might be interested (to use it or to contribute to it) is already helpful. In general, I am looking forward to thanking you in the contributor's page, whatever your contribution may be.

Intermezzo

How do you say „square" in Ukrainian? If you Google-translate „square" from English, are you sure that Google understands „Quadrat" and not „Platz"? As reading a Cyrillic alphabet is not that difficult, you can be fine with the translation „квадрат". But what about the same word in Chinese? It is „正方形": to find it you could open the Wikipedia page for „square" and change the language to Chinese (for an additional check you could copy-paste 正方形 into Google-translator, also getting the pinyin Zhèngfāngxíng).

In general, beware of false friends (namely, the words seemingly easy to translate). My favorite mathematical false friend is the German number "Billion" which you would tend to translate into American English as "billion", making a mistake of a factor 1000 (oops!).

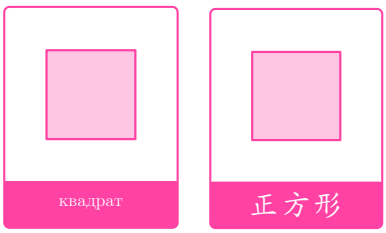

Figure 1. The word "square" in Ukrainian and Chinese

The material

The material so far consists of monolingual posters (where the words are illustrated by pictures) and bilingual word lists (one of the two languages being American English). The words are subdivided thematically into chapters, and there is a regular structure (the current choice is 12 words per chapter). The goal of the project is to produce approximately 500 pictures and up to 600 words (sometimes, to spare on space, a picture represents more than one mathematical object). Notice that the subdivision into chapters is very easy to be changed in the future.

The posters and the word lists are pdf files compiled by relying on LaTeX, a very flexible program known to every mathematician that easily supports all languages with additional packages.

The pictures are pdf files produced with TikZ and they can be considered as public domain. In fact, some words are planned, like "compass", that cannot be easily drawn by mathematicians. In this case, there will be an artist/designer either working on a voluntary basis, or paid to produce the images (with the unusual contract clause that the work is in the public domain). This can be practical also for other purposes: anyone needing the image of a compass can freely use, without attribution, the one that we provide. To be precise, the material is currently available under a Creative Common Licence (but only to avoid commercial use).

The main challenge about the pictures is that they are the same in all languages, so they may only contain international mathematical symbols that have no ambiguity. For example, an open debate is whether writing 1/2 as 0.5 or 0,5 or both (or opting for an alternative LaTeX symbol which is the mixture of a dot and a comma). Notice that the bottom of the posters has space for comments, in case clarifications are needed. And, in the end, we may resolve to alternative versions of selected pictures in exceptional cases. For sure there will be different versions of some pictures for the (oncoming) version aimed at children.

Notice that fine-tuning is postponed to better times. However, didacticians, educators, and language experts are already welcome to send us their comments.

Lost (and found) in translation

If you have some experience with mathematical terms in other languages, there is more than meets the eye. The translation is not a bijective function. I briefly explain some conventions adopted in the visual dictionary. Some words may not exist, so *"you write a substitute sentence"*. Or there could be two synonyms, both widely used, and then you write : *first synonym (second synonym)*. Or you may need a comment to illustrate a picture, which in the end is only an example: *object [comment to clarify].*

Beyond the obvious aim of teaching and learning mathematical terms, the visual dictionary easily allows one to compare languages. For example, one may wonder why some mathematical terms do not exist in other languages. On a more active level, one could take inspiration for a better (e.g., more informative or more coherent) terminology, and possibly go as far as changing the terminology in use. Languages, although based on tradition, do evolve, and carefully motivated changes could be meaningful at some point.

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Einladung: IntroMathEDigi gemeinsam gestalten

Fragen der Community zu Spektren im mathematikdidaktischen Diskurs

Felicitas Pielsticker und Gero Stoffels

Liebe Mathematikdidaktiker/-innen und Didaktiker/-innen der Mathematik,
in den vergangenen GDM-Mitteilungen (Nr. 112, 2022, S. 46–49) haben wir unsere Projektidee „IntroMathEDigi – Perspektiven auf Mathematikdidaktik digital erleben" vorgestellt. Das Projekt IntroMathEDigi (**Intro**duction in **Math**ematics **E**ducation **Digi**tal) vereint eine strukturell-inhaltliche Neugestaltung mit digitaler Innovation und wurde im Rahmen der Initiative Freiraum 2022 zur Förderung ausgewählt. Die Kernidee des Projektes ist es, eine Veranstaltung zur „Einführung in die Mathematikdidaktik" so zu gestalten, dass die Auseinandersetzung der Studierenden mit den mathematikdidaktischen Inhalten an Spektren im mathematikdidaktischen Diskurs ausgerichtet ist. Als Impulsgeber dienen Expert/-innenvodcasts (ca. 15 min. Clips) mit Mitgliedern unserer Community, die frei auf YouTube verfügbar gemacht werden sollen. So werden einerseits zentrale Arbeiten der Mathematikdidaktik und deren Entwicklung videographisch dokumentiert, zum anderen werden Positionen in der mathematikdidaktischen Forschung durch mathematikdidakti-