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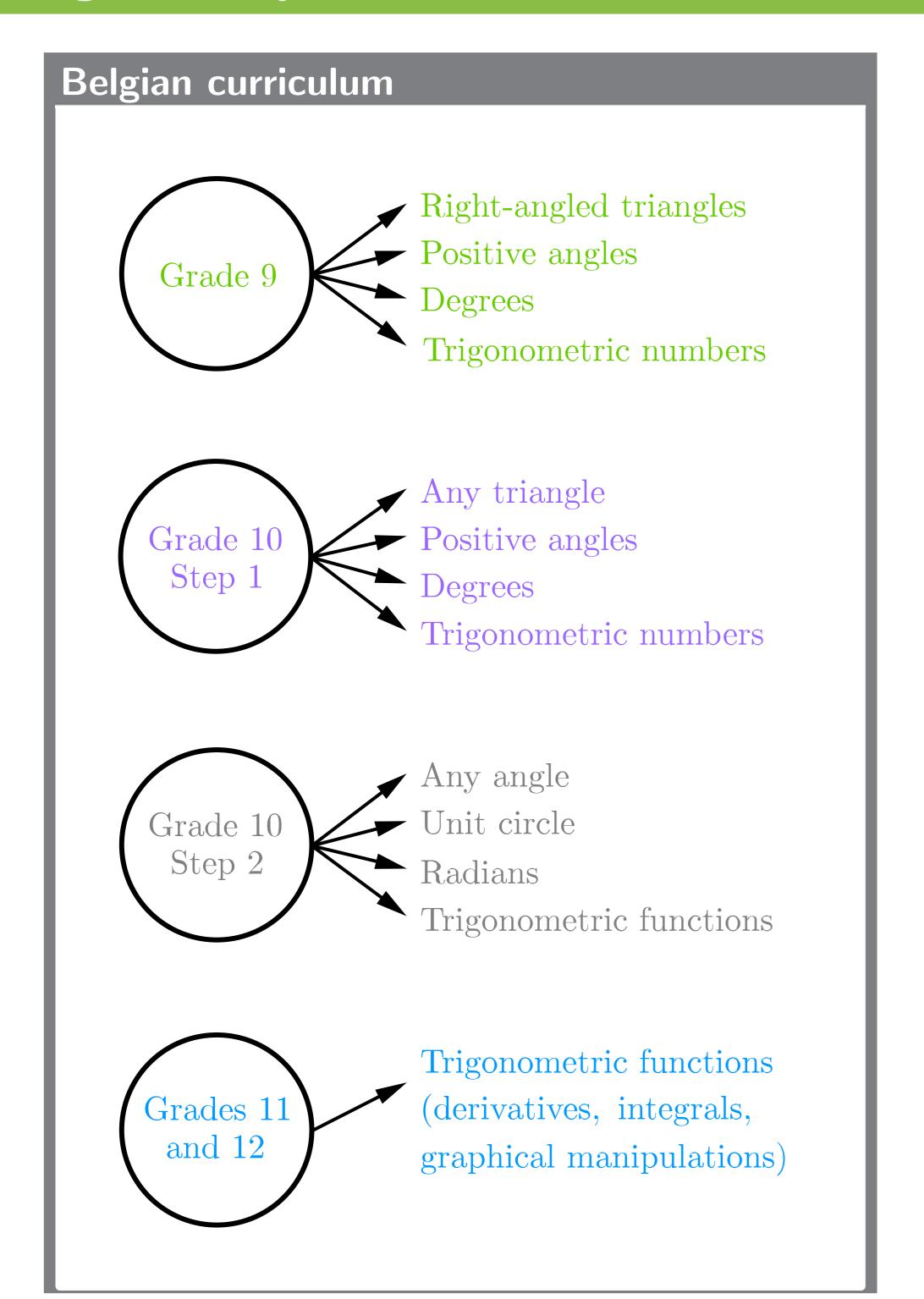
Teaching trigonometry with dynamic geometry

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Trigonometry in education



Student's difficulties and mistakes

In litterature [2][4][6][7]

- The length of an arc depends on both the angle and the radius.
- Angle of 0° and 90° are not easy to work with in triangles.
- Degrees and radians are proportional. Degrees are beautiful numbers, radians are irrationals, ugly numbers. Why changing?
- In the unit circle, cosine are abscissa but moving in the cosine function, cosine become ordinates.
- $\pi, \frac{\pi}{4}, \frac{\pi}{6}, \dots$ are writings, not real numbers.
- Angle measurement depends on the length of its sides.

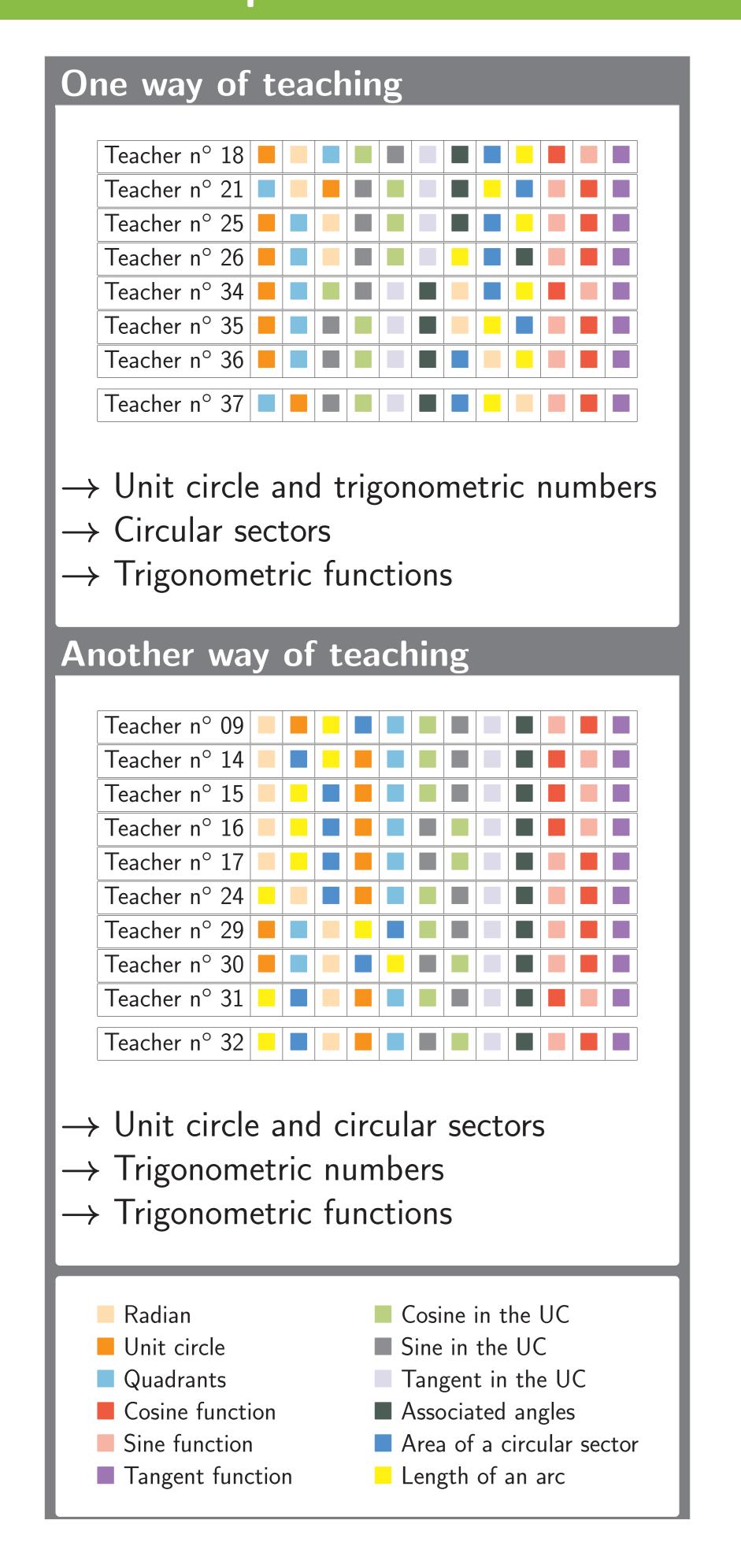
Our teacher survey

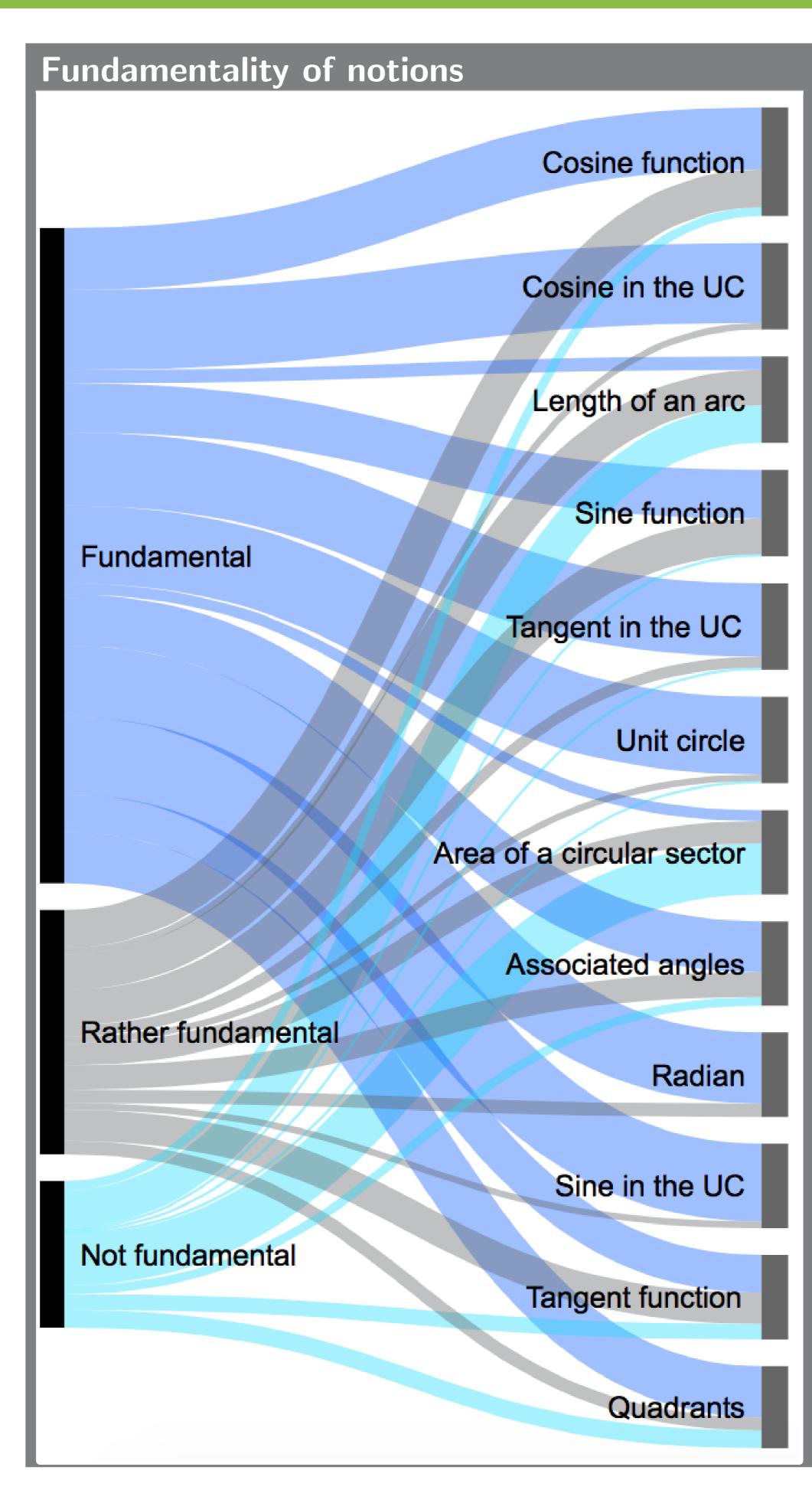
- The π fractions are hard to handle when graduating an axis.
- Angles and trigonometric numbers are hard to distinguish.
- An angle has only one sine, but a sine can be associated to several angles.
- Trigonometric functions are hard to associate to the unit circle.
- Radians are not concrete and $\pi = 180$.
- Units are mixed : $\cos(\pi) = -1$ radian.
- Usual algebra rules are misused : $\cos(a + b) = \cos(a) + \cos(b)$.

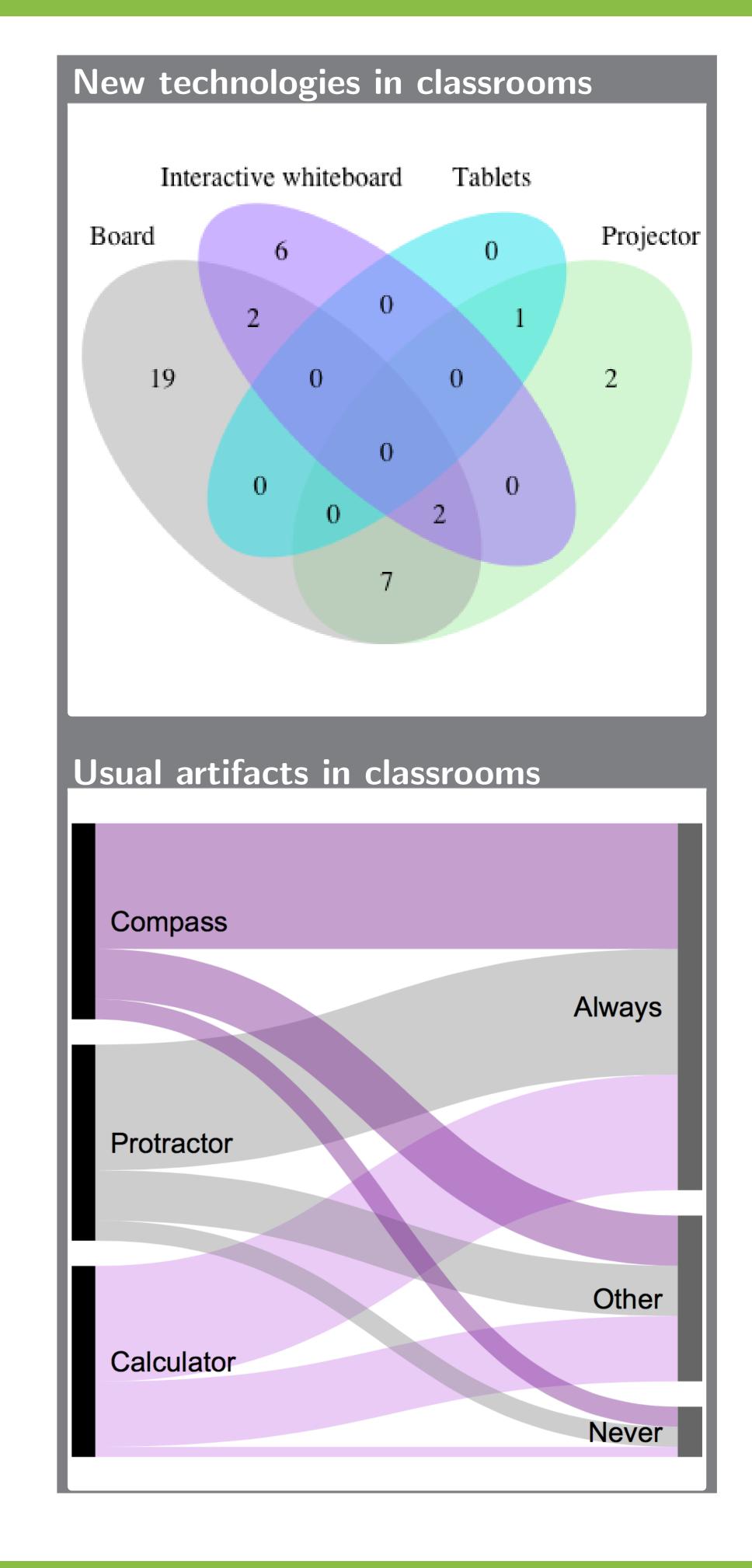
Our aims, at Step 2

- Compare the different knowledges from the didactic transposition of CHEVALLARD [3].
- Building a lesson using dynamic geometry to illustrate the Step 2.
- Following the artifact/instrument theory of RABARDEL [5] and the didactic ingeneering process of ARTIGUE [1] to build this lesson.

Teacher's opinion







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