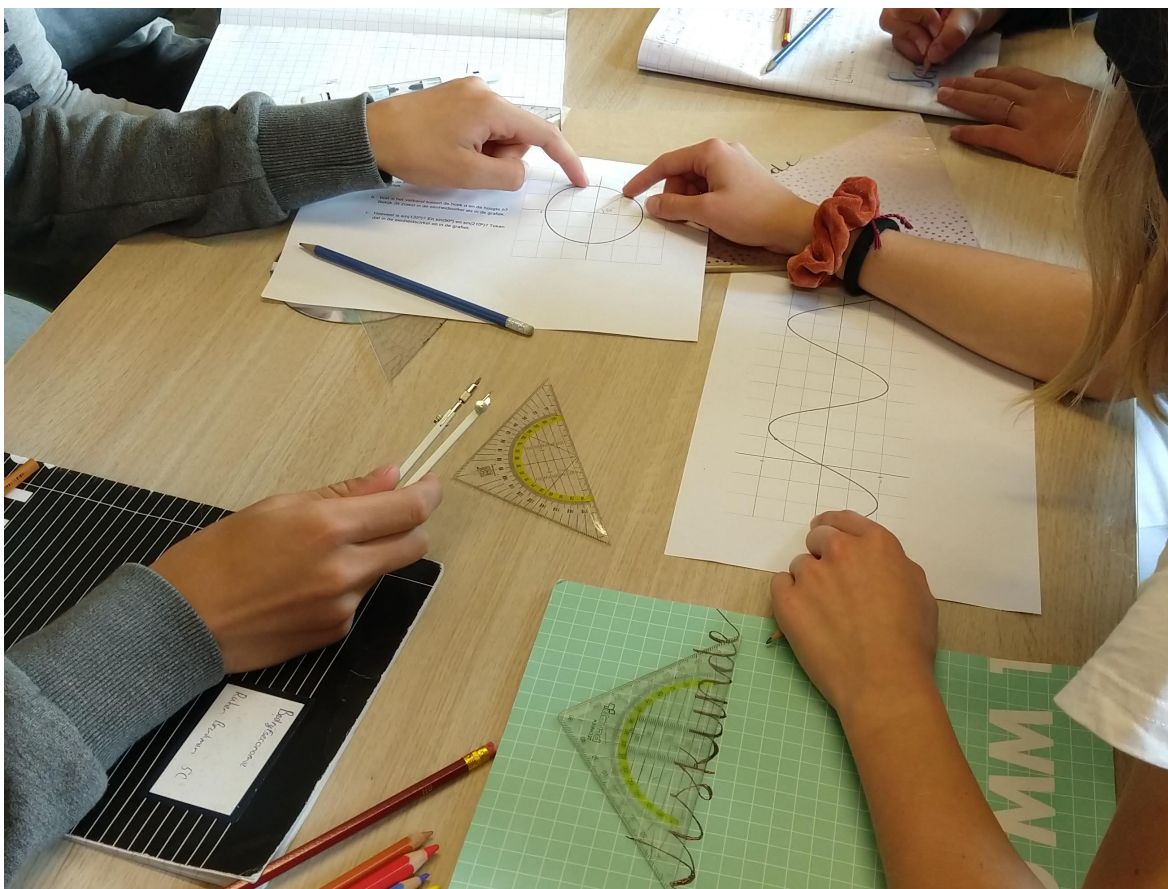


Example of Lesson Study in the Netherlands

In September 2020 the Dutch team ([Utrecht Stedelijk Gymnasium](#) and [Utrecht University](#)) experienced the first Lesson Study cycle for the TIME project. The mathematical topics of the study lesson were [the multiple facets of the sine](#); how it plays a role in a triangle, how it can be defined in a circle, and how the graph has a nice wave structure. The students struggle to unite these views into one coherent picture of the sine, so the challenge of the lesson was to support student developing such integrated picture through inquiry-based tasks.



A central role in the lesson was played by a [disk with a dot on it](#). In the first tasks students were invited to draw the graph of the height of the dot as a function of the angle. Interestingly, students came up with all sorts of shapes: saw teeth, joined parabolas, joined half circles, and some shapes that indeed looked somewhat like a sine graph. After a discussion (validation) of the presented graphs, with the

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Teachers' Inquiry in Mathematics Education

help of the teacher, the students could decide on what the correct shape should look like. After this, students were presented a sheet with both the circle and the graph on it. The next tasks consisted of expressing the height in the circle depending on the angle and, next, computing the sine for several angles that needed to be drawn in both the circle and the graph. Students found this task particularly **challenging**, thus demonstrating how working with all these representations together forms an obstacle in their understanding, and providing the teacher with the opportunity to address many of the learning difficulties.



The lesson was performed on **three consecutive days**. The team very much enjoyed observing how their lesson plan worked out each time. The discussion after each lesson was insightful and allowed the teachers to improve the scenario step by step. A highlight was the second study lesson, where the team were not the only observers. The lesson was live streamed on YouTube for all **international partners** to follow and observe. The discussion afterwards also included many partners from four countries allowing for even more inspiration to improve the lesson. In the end the teachers were very pleased with resulting scenario, that will definitely be planned for next year's classes.

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