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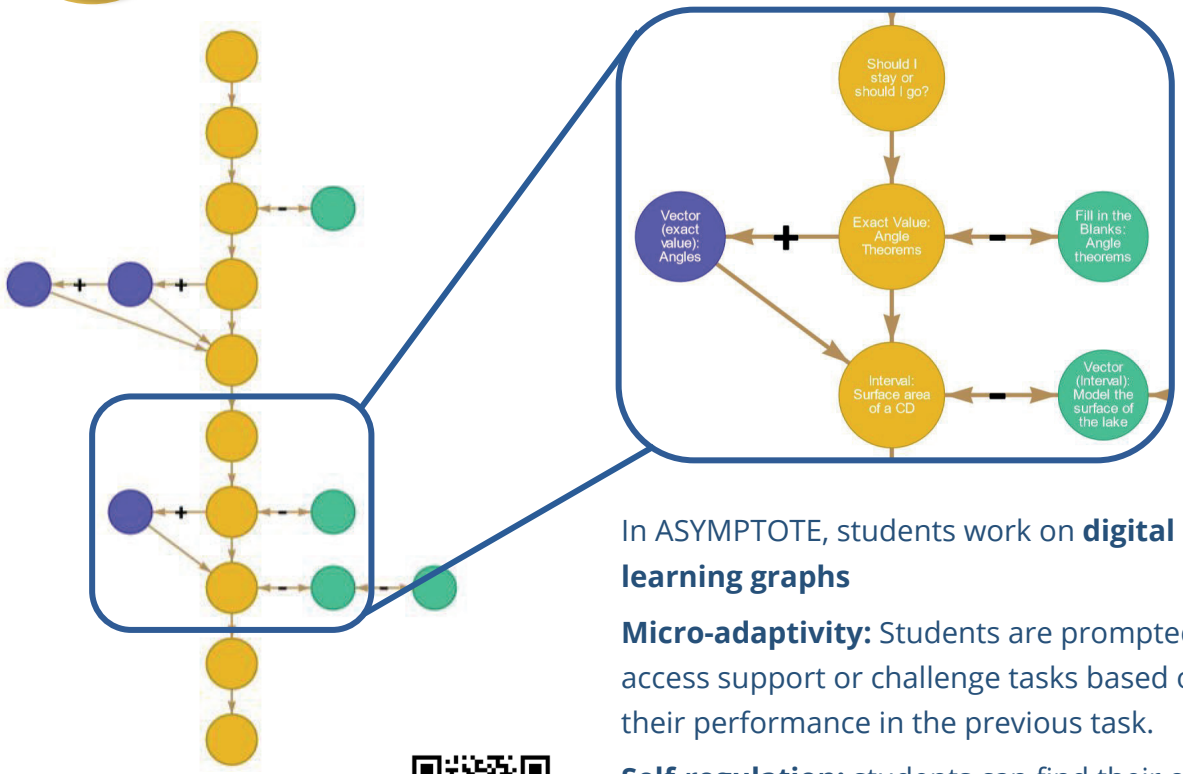
IO1

ASYMPTOTE Web Portal

Technical Output

Learning Graph Concept



The "ASYMPTOTE Tutorial" learning graph (g47109)

In ASYMPTOTE, students work on **digital learning graphs**

Micro-adaptivity: Students are prompted to access support or challenge tasks based on their performance in the previous task.

Self-regulation: students can find their own learning path through the tasks offered, according to their pace, needs and interests.

Main tasks cover the expected learning level of the topic. They are mandatory for all students.

Support tasks offer different, easier approaches to assist the solving process of main tasks.

Challenge tasks pose problems on an advanced level for interested students.

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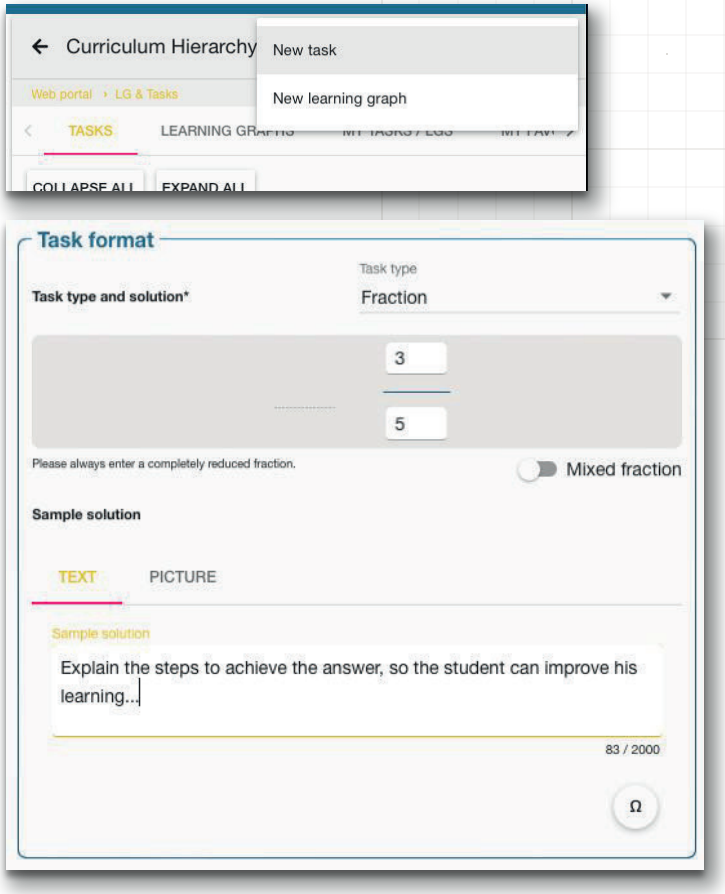
Creation of Learning Contents

Teachers can become **task and learning graph authors** in order to create own learning contents meeting the needs of their class.

To allow the creation of various tasks, ASYMPTOTE offers **9 different answer formats**, e.g., exact values, multiple choice or fill in the blanks.

The manual and tutorial videos offer a **step-by-step guidance** to create learning contents.



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Selection of Learning Contents

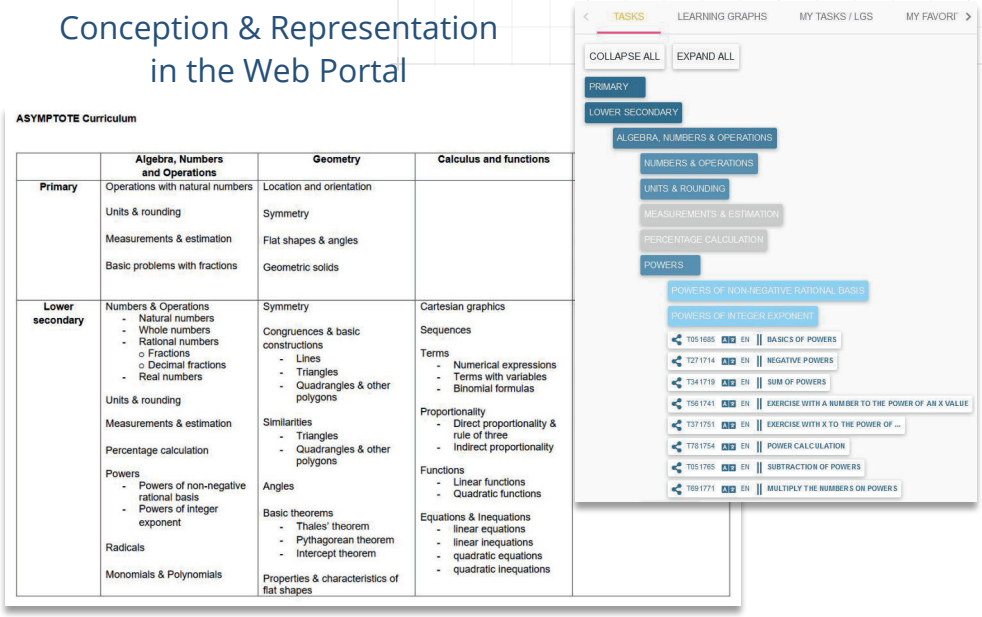
ASYMPTOTE is a community project!

This means that teachers can not only use their own contents but also **public and shared** tasks and learning graph from **anywhere** in the web portal!

Shared contents are accessible for a predefined group of teachers.

Public contents can be accessed by all users after undergoing an expert review by the project team. Public contents can be viewed in the **open database** of ASYMPTOTE.

Conception & Representation in the Web Portal



ASYMPTOTE Curriculum

	Algebra, Numbers and Operations	Geometry	Calculus and functions
Primary	Operations with natural numbers Units & rounding Measurements & estimation Basic problems with fractions	Location and orientation Symmetry Flat shapes & angles Geometric solids	
Lower secondary	Numbers & Operations - Natural numbers - Whole numbers - Rational numbers o Fractions o Decimal fractions - Real numbers Units & rounding Measurements & estimation Percentage calculation Powers - Powers of non-negative rational basis - Powers of integer exponent Radicals Monomials & Polynomials	Symmetry Congruences & basic constructions - Lines - Triangles - Quadrangles & other polygons Similarities - Triangles - Quadrangles & other polygons Angles Basic theorems - Thales' theorem - Pythagorean theorem - Intercept theorem Properties & characteristics of flat shapes	Cartesian graphics Sequences Terms - Numerical expressions - Terms with variables - Binomial formulas Proportionality - Direct proportionality & rule of three - Indirect proportionality Functions - Linear functions - Quadratic functions Equations & Inequations - linear equations - linear inequations - quadratic equations - quadratic inequations

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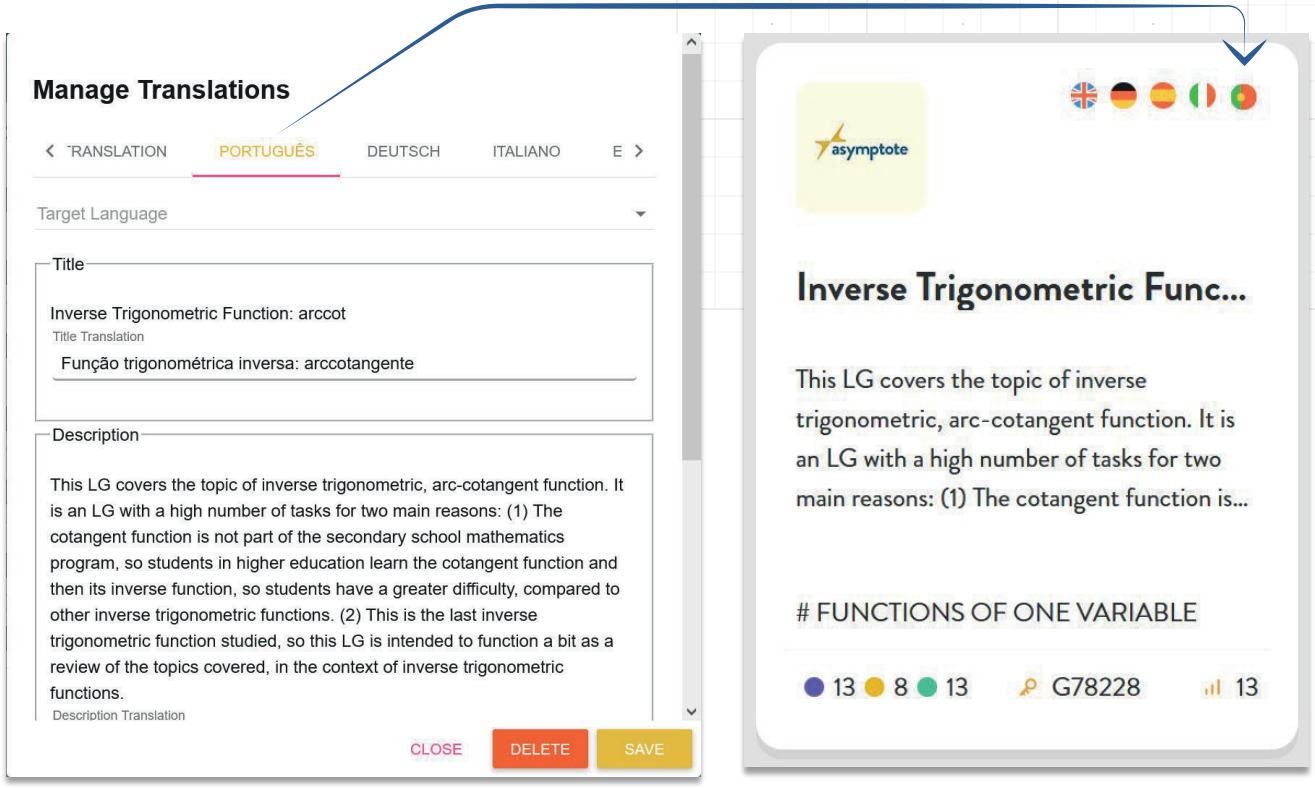
Multilingual Learning Content

Well-designed tasks and learning graphs are valuable for the entire community – **even across countries!**

Thus, ASYMPTOTE learning content is **translatable** and the language **selectable** by your students in the corresponding app.

Our consortium developed a **collection of high quality and multi-lingual learning graphs** which are publicly available.



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Adaption of Learning Contents

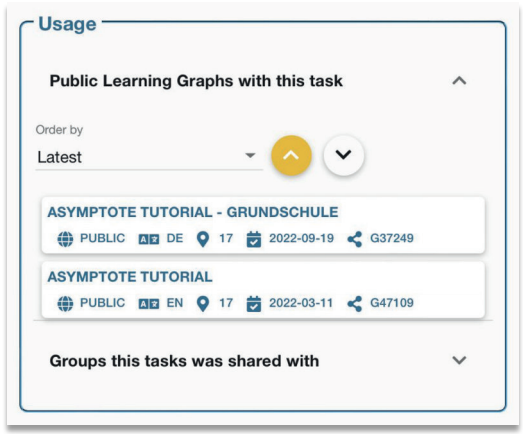
You can **copy tasks** that are your **own, public or shared**.

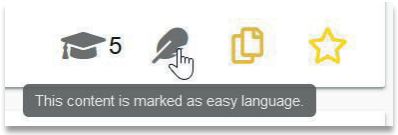
You can **copy learning graphs**, as well. Choose whether you only want to **copy the structure** or **copy every single task** to fit the learning graph to the adapt of your students.

Additional Features

Information about **where & how** tasks have already been used can help using them again quickly and effectively.

You can mark tasks as **easy-language tasks**. This helps you and other teachers to find tasks that are suitable for students for language difficulties.





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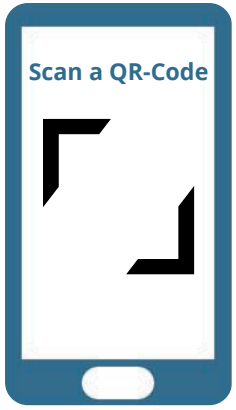
The Digital Classroom: Purpose & Access

The Digital Classroom allows real-time monitoring, synchronous student-teacher interaction and the evaluation of the selected learning graphs.

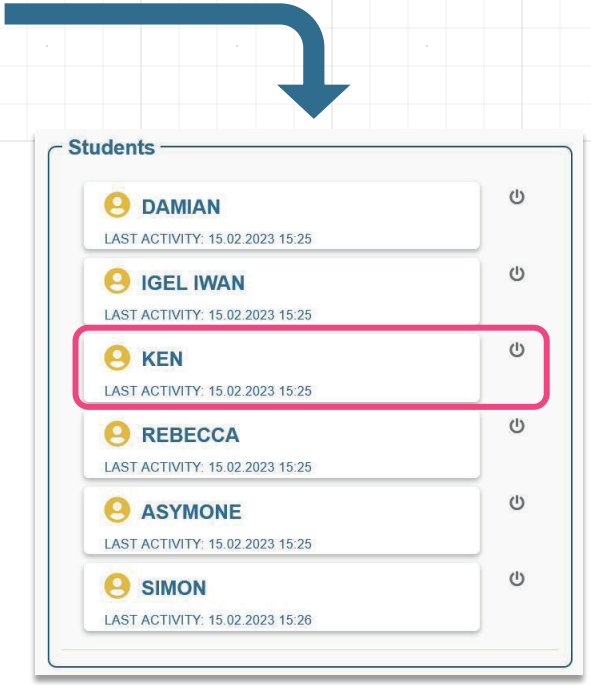
Teachers can monitor the progress of their students across multiple learning graphs over long time periods (e.g., complete school terms) by adding them to an **ASYMPTOTE class**.

To join, students simply need to scan the class-specific **QR code** with their **ASYMPTOTE App**, and they will be automatically linked to all future content provided for this class.

The student's phone (e.g., Ken)



The class-specific QR-code



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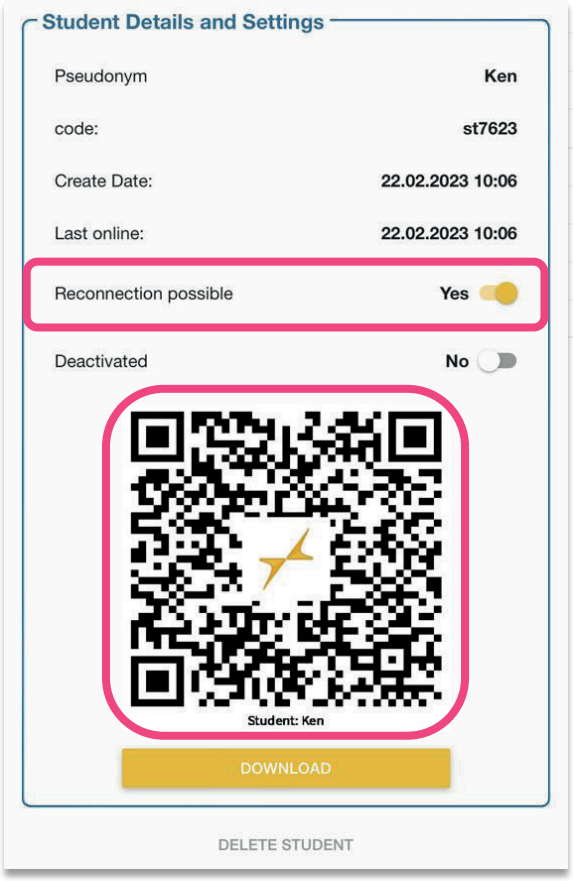
The Digital Classroom: Class Management

Task Allocation:
Via the Digital Classroom, teachers can select learning graphs which are immediately displayed in the app of all class members.

Redirection:
If a student get disconnected from the class and their progress for any reason (e.g., lost or broken smart phone, cleared app data), **don't panic, the student's progress is not lost.**
Students only have to scan an individualized QR-code provided in the web portal – as, if by magic, the previous work progress is restored.



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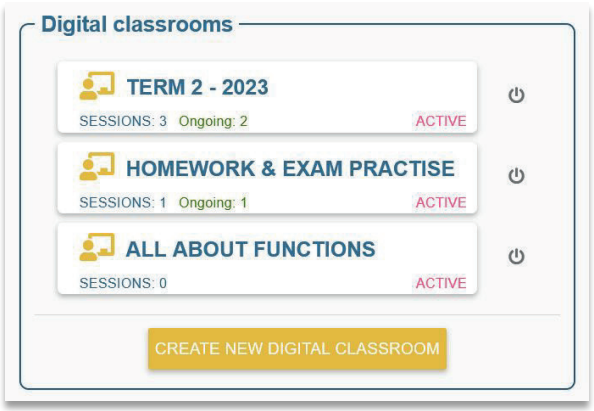
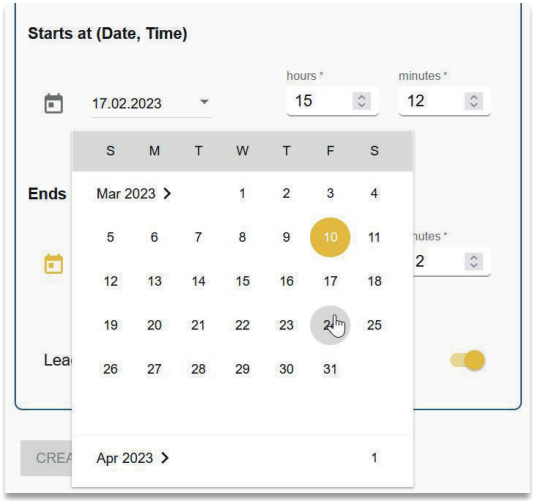
The Digital Classroom: Sessions



After class creation, one or more Digital Classrooms can be established. They allow providing learning graph working session for the students.



Sessions define the time period students can work on a single learning graph. An hour, days, weeks, months, even years – everything is possible!

During this time period, teachers can monitor student's work progress, providing short- and long-term insights into student's learning.

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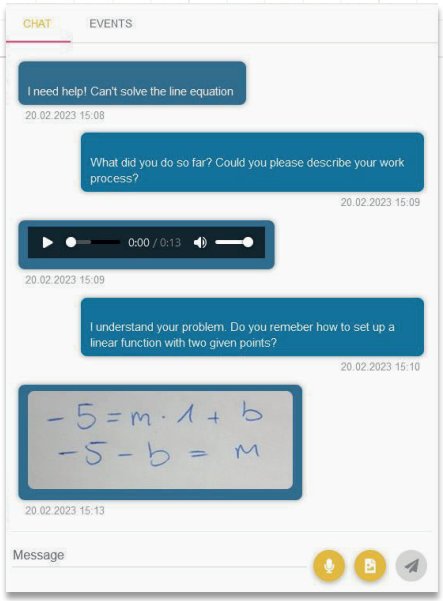
The Digital Classroom: Monitoring Feature

A session is the place where all **working progress** of all students for the corresponding learning graph is collected.

It provides an overview of the entire class to see the student's work process at a glance.

It displayes all interaction events with the ASYMPTOTE App (e.g., answers given, required hints and viewed sample solutions). This allows the teacher to retrace student's work process in detail.

The teacher can also **chat** with the students to support them even in online learning settings via **text or voice messages and images.**



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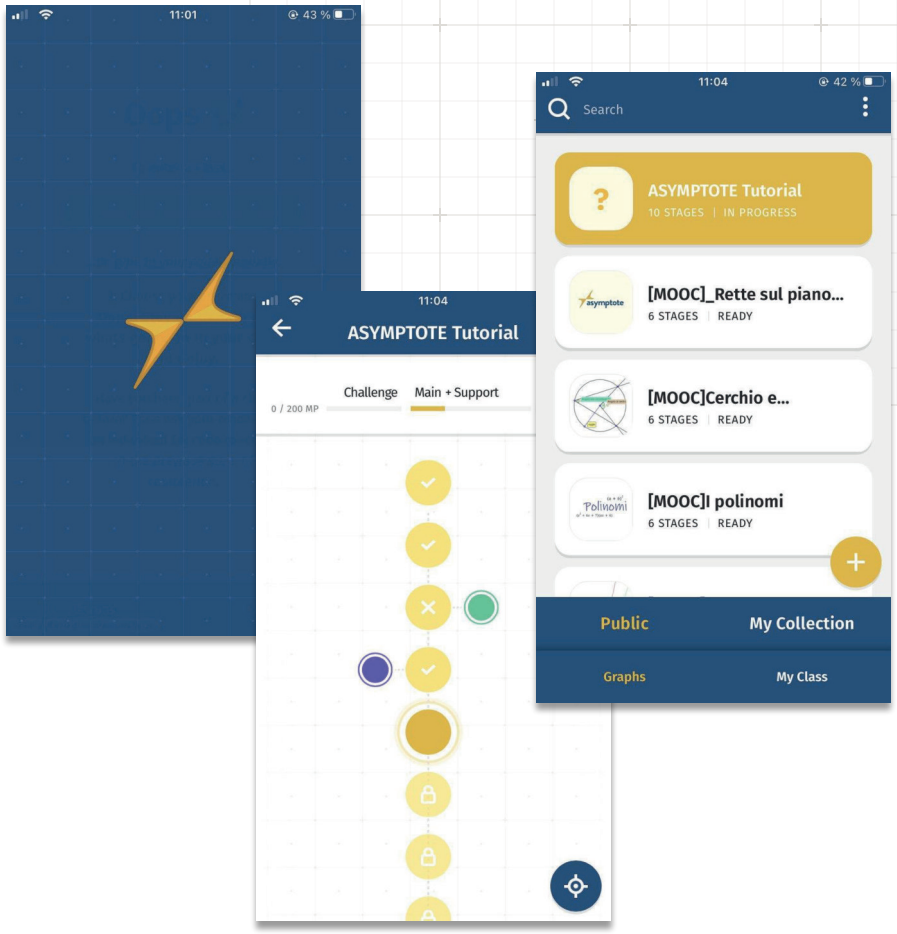
IO2
ASYMPTOTE App
Technical Output

Purpose of the App

ASYMPTOTE opens the new way of online learning:

- The ASYMPTOTE app thereby provides the works pace for the learners to work on Learning Graphs
- Differentiation and feedback are built into the Learning Graphs through hints, answer validation, sample solution & gamification
- Education within a Digital Classroom enables synchronous interaction with the teacher



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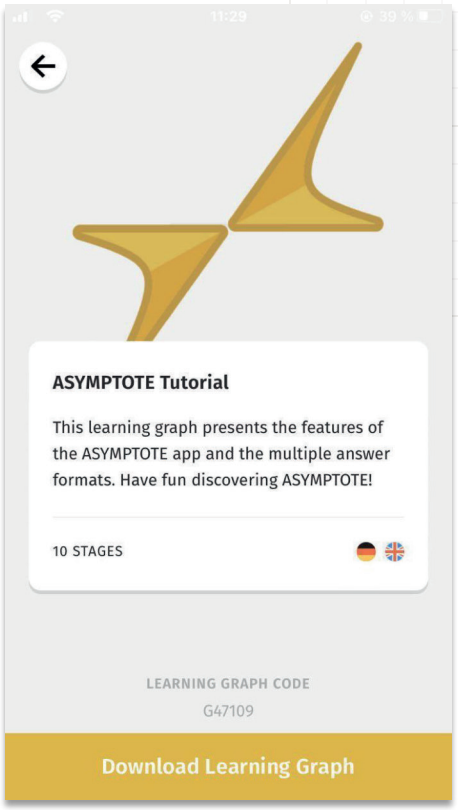
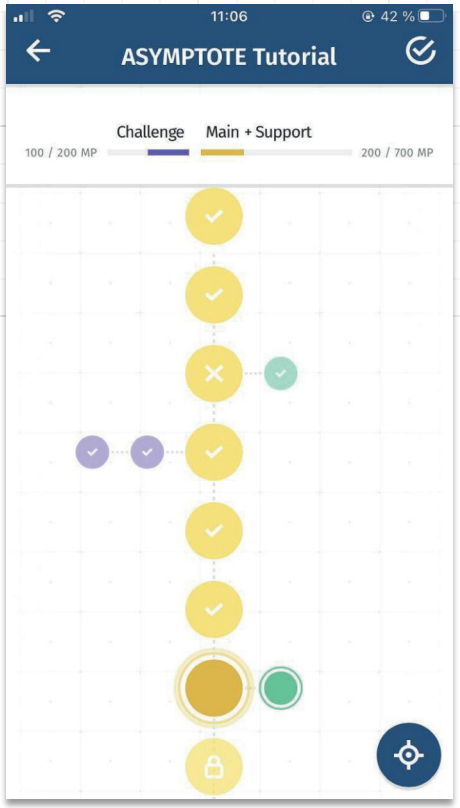
Intuitive Navigation and Tutorials

- Due to its intuitive design, The ASYMPTOTE app is easy to navigate, allowing learners to focus on the most important aspects of finding and working on Learning Graphs.
- To get familiar with the app's use and to experience the app from the learner's perspective, the Learning Graph tutorial introduces both the app's features and the different answer formats.

- **Just enter the code g47109 in the app to discover the world of ASYMPTOTE!**





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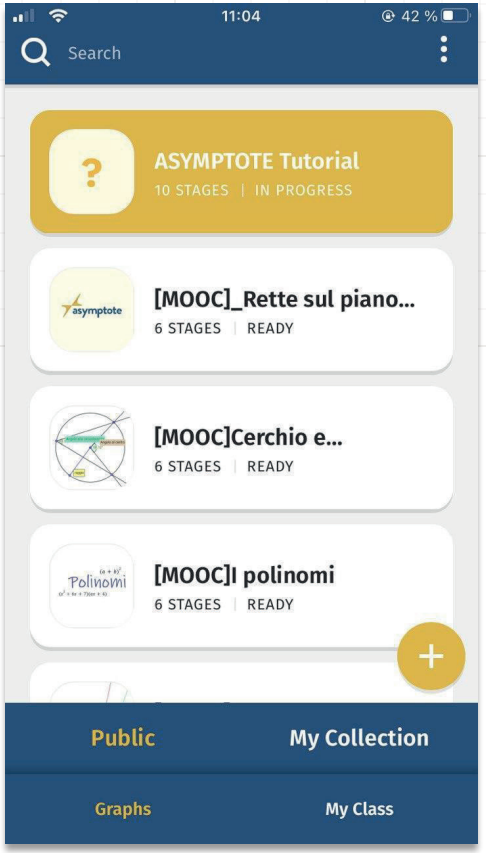
Accessing Learning Graphs

The ASYMPTOTE app provides access to all public Learning Graphs from the **open database of ASYMPTOTE**. Select a Learning Graph from the list of recent publications or retrieve a specific Learning Graph via code by clicking on “+“. Then you can start right away!

Under **“My Collection“** you find a list of all added Learning Graphs. Download a Learning Graph in order to start working on it. The work on a learning graph can be interrupted at any time and continued at a later point in time.

Downloaded Learning Graphs can be edited **offline** as well.



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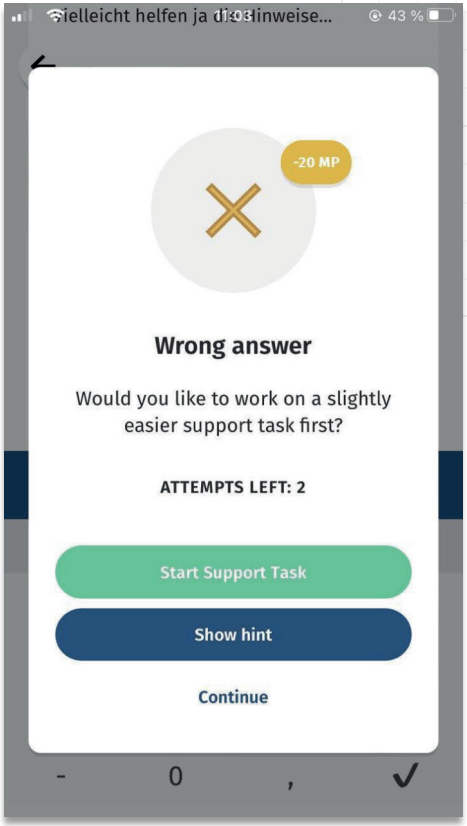
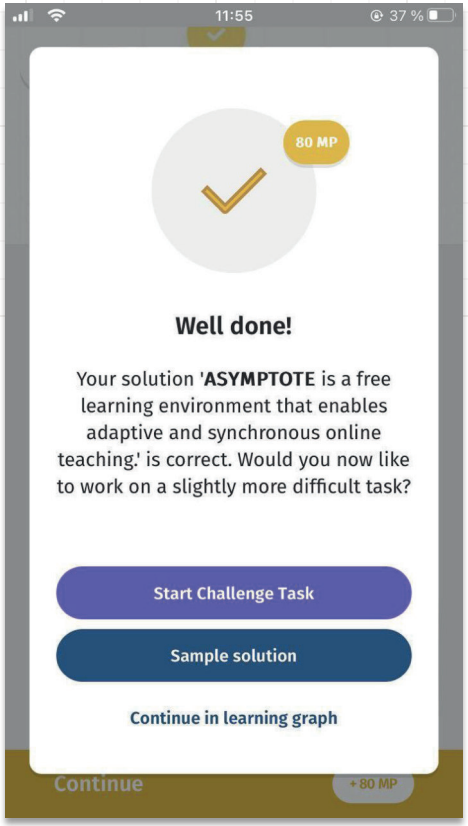
Adaptivity through Task Assignment and Choice

While working on a Learning Graph the built-in **adaptivity** of ASYMPTOTE helps users to select tasks fitting for their learning status:

- Easier support tasks and more challenging tasks are both available along a Learning Graph
- Prompt of the next task through the system is based on the user's performance in the previous task (micro-adaptivity)
- Still, the user decides if he or she wants to take up a challenge which ensures freedom of choice & self-regulation





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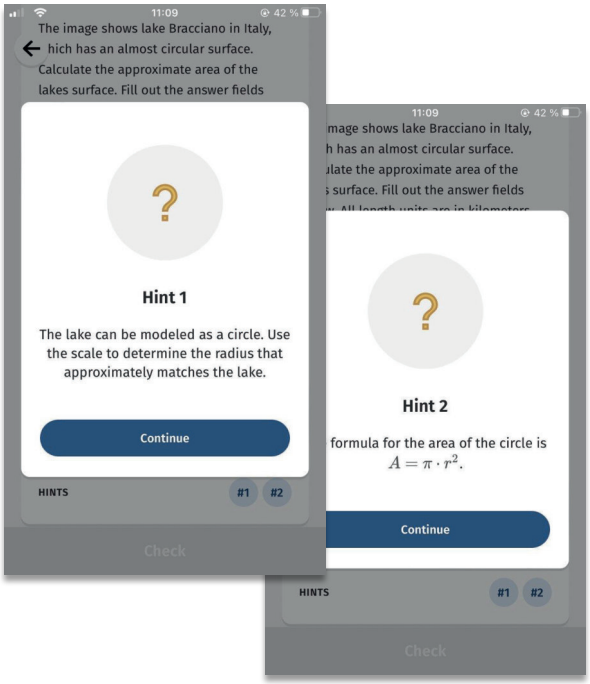
Differentiation and Feedback

Various features of ASYMPTOTE allow for inner differentiation and provide direct feedback on the performance of the user so that different learners can choose their own working speed and level of support while working on the same Learning Graph:

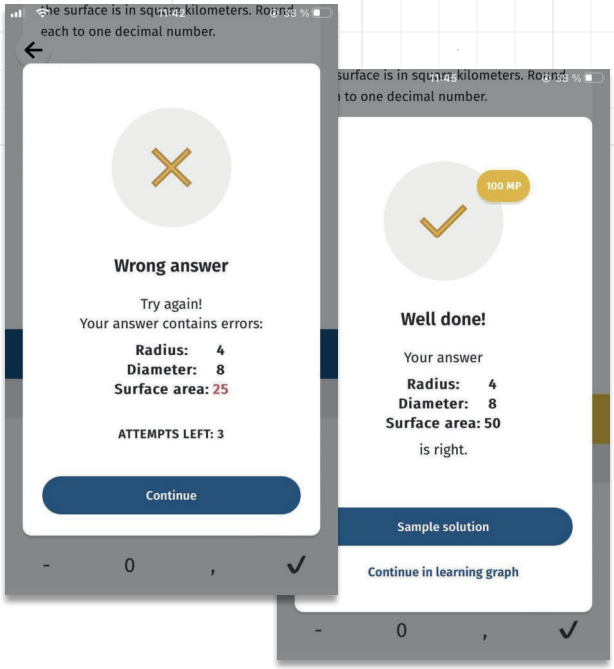
Stepped hints

Up to three hints can be consulted by the user. After giving a wrong answer twice, the system suggests to open a hint.



Answer validation

After entering an answer, the app directly validates it. If it consists of several components those that are wrong are indicated.



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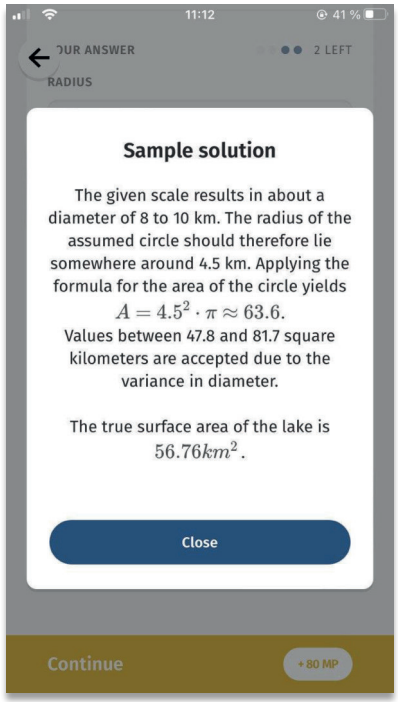
Differentiation and Feedback

Various features of ASYMPTOTE allow for inner differentiation and provide direct feedback on the performance of the user so that different learners can choose their own working speed and level of support while working on the same Learning Graph:

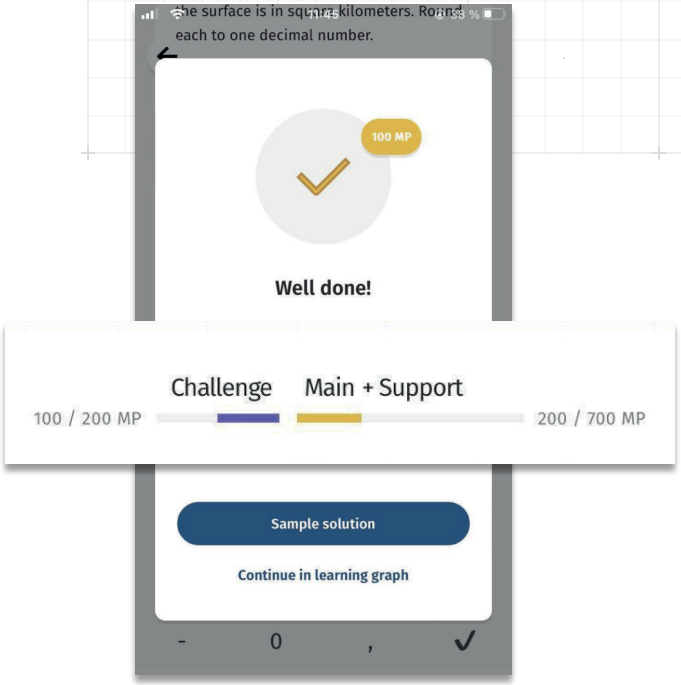
Sample solution

At least one possible solution path is available for comparison after solving a task or after four unsuccessful attempts.



Gamification

Every solved task provides points that are added up in the score bar as a motivation.



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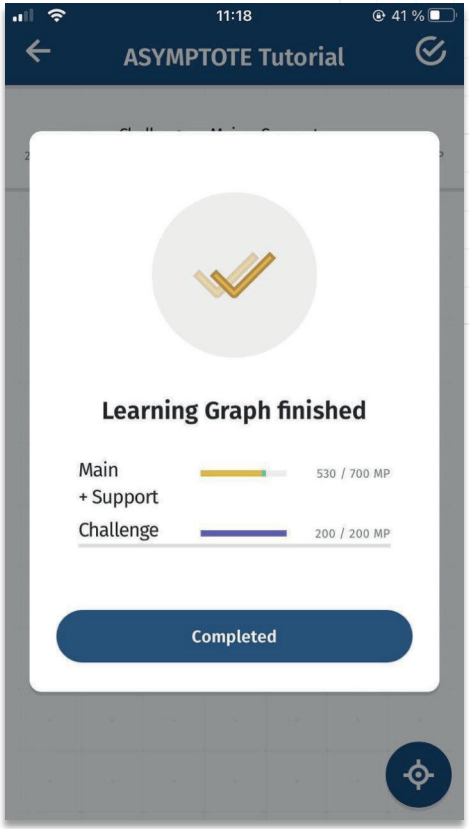
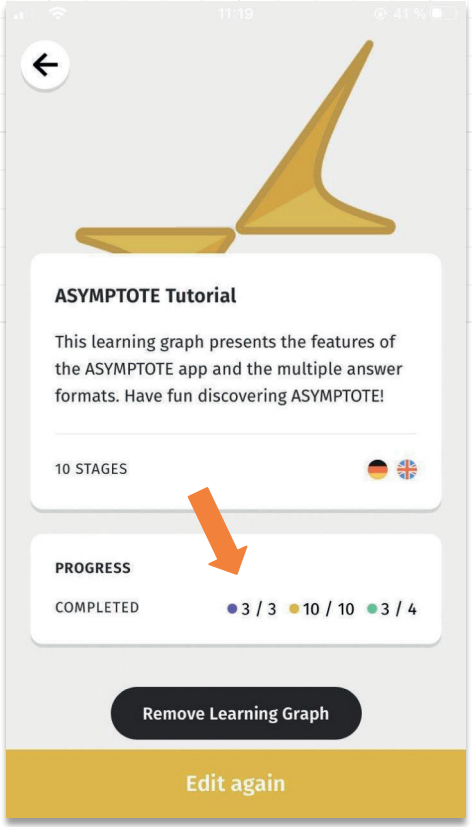
Direkt Access to Evaluation

The ASYMPTOTE app enables users to directly review an **evaluation** of their process:

- After finishing a Learning Graph a summary of a user's performance is provided. There one can see how many points from main and support tasks on the one hand and how many points from challenge tasks on the other hand one achieved
- Furthermore, the **working history** can be retrieved subsequently. Under "Progress" you can see how many tasks of the different levels you have completed.





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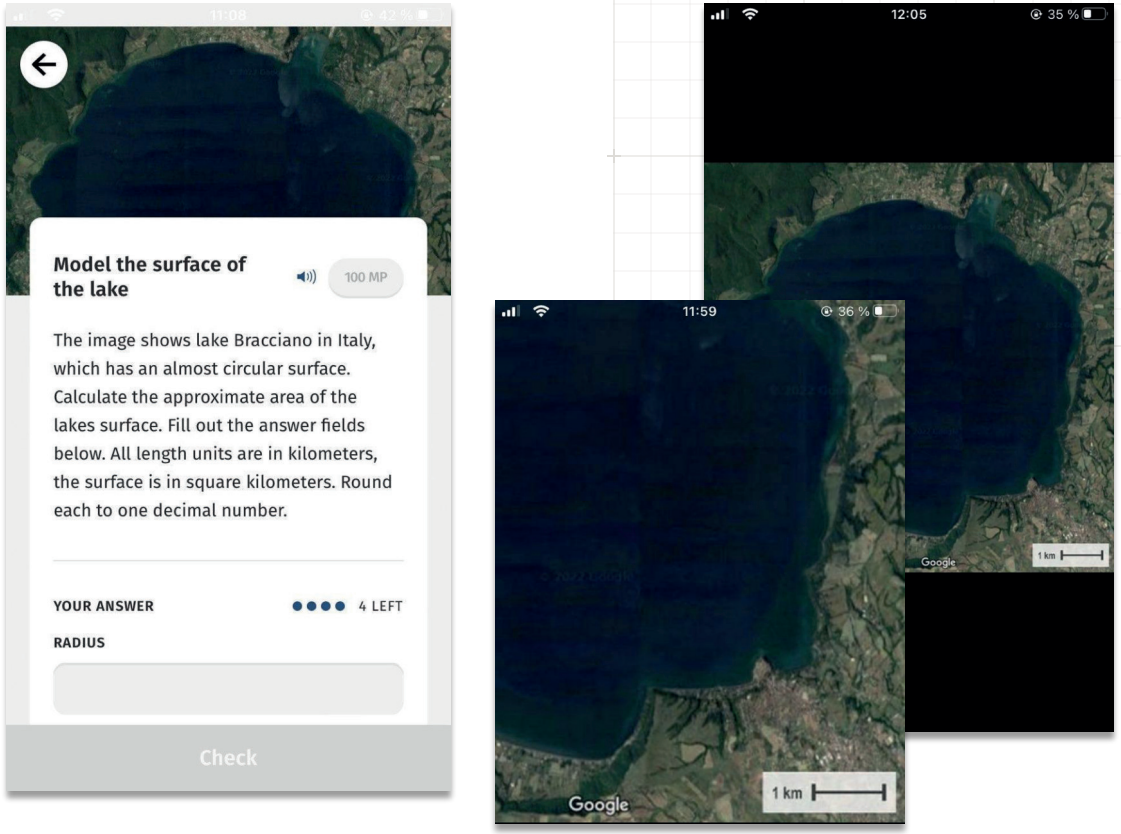
Inclusive Education

Utilizing the possibilities of digital education tools, the ASYMPTOTE app helps to lower learning barriers:

- There is a **read-aloud function** for the task description
- Users can **zoom into pictures** in order to enlarge the displayed text or images



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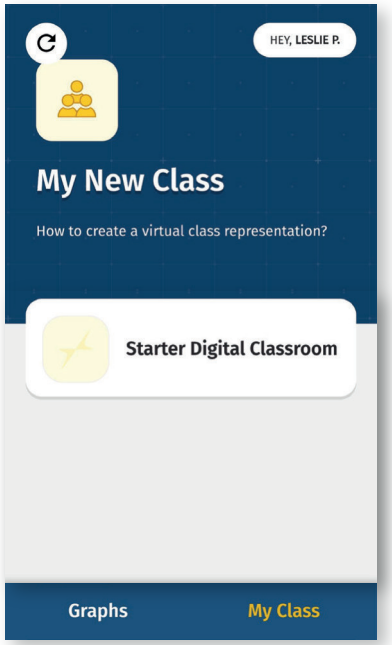
Digital Classroom

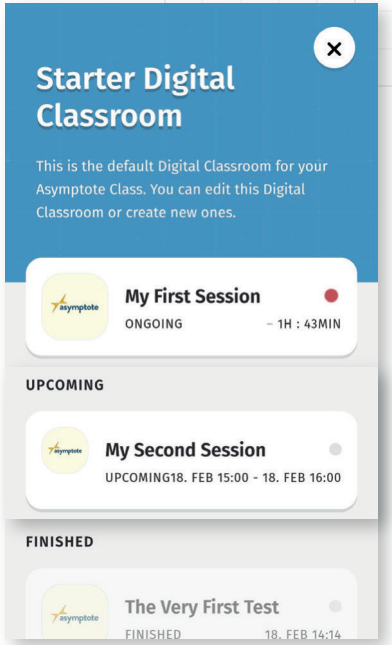
The **Digital Classroom** is a feature for managing a class virtually, monitoring & evaluation of student's work process & their synchronous support via chat.

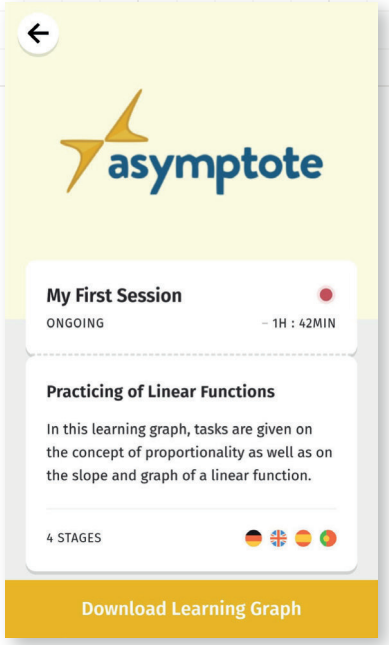
To access the Digital Classroom, students only need to scan a **QR code** & choose a pseudonym.

Class: My First Class

After scanning the QR code, students can access current session and see upcoming or finished sessions







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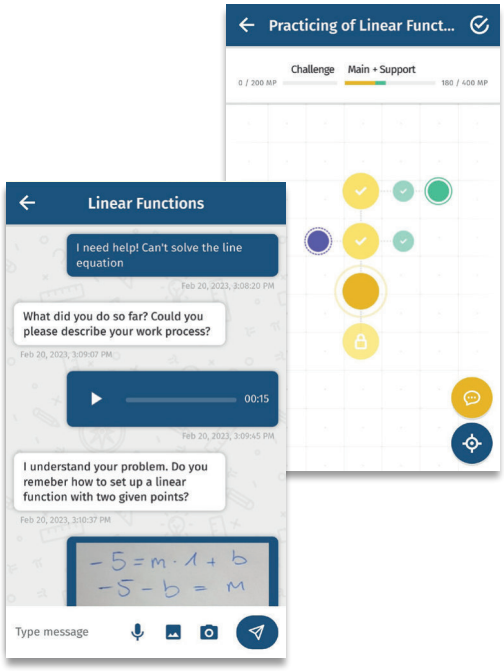
Digital Classroom

Real-time monitoring & evaluation of student's work process

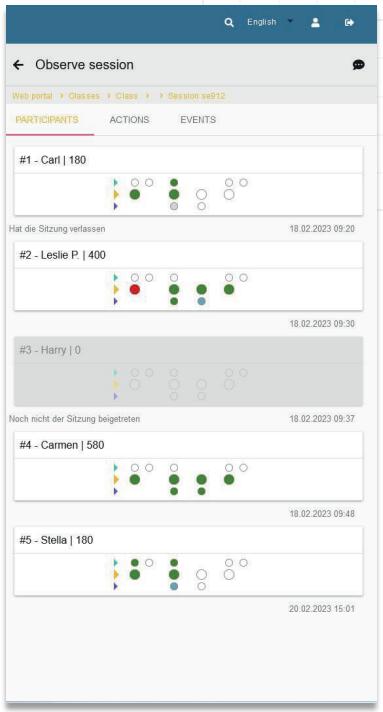


Student (App):

Work process of Stella in the app

Teacher (Web Portal):

The work process of Stella & of the other students becomes visible for the teacher in real-time in the web portal



Class overview & Individual monitoring via event-log

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Digital Classroom

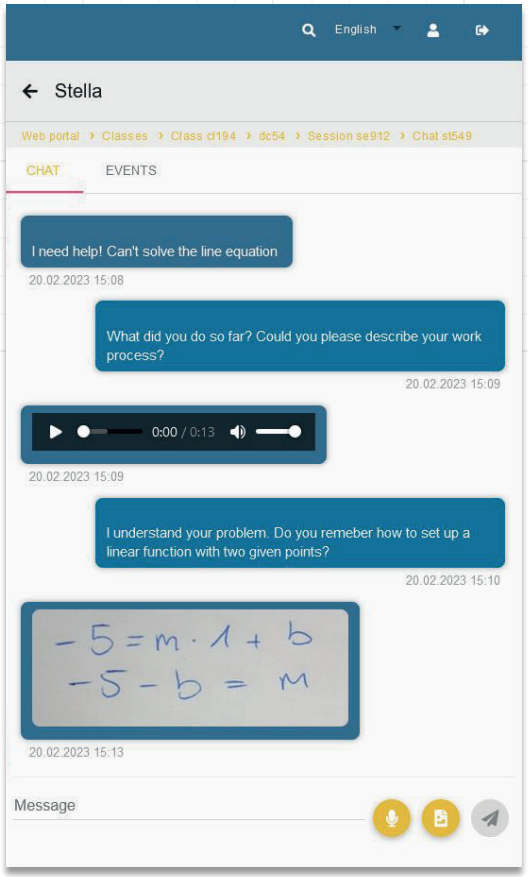
Synchronous communication via the chat

Student (App):

Stella contacted her teacher via chat & sent text and audio messages as well as an image of their solution

Teacher (Web Portal):

The teacher interacts with Stella via the chat tool



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Data Protection & Availability

The ASYMPTOTE System is **easy and safe** for your students to use:

- They don't need to enter their real name
- They don't require any credentials (no mail or password)
- GDPR compliant

The ASYMPTOTE app is available for nearly all mobile devices:

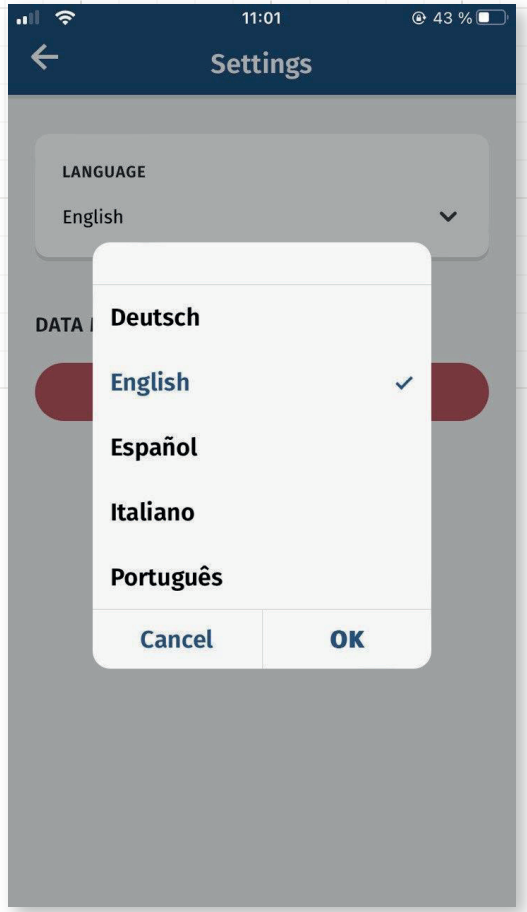
- iOS
- Android
- for Windows or MacOS via Android Emulators, e.g., BlueStacks

The App and Web Portal are translated and available in all partner languages.

Download on the App Store

GET IT ON Google Play

BlueStacks Android Emulator



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