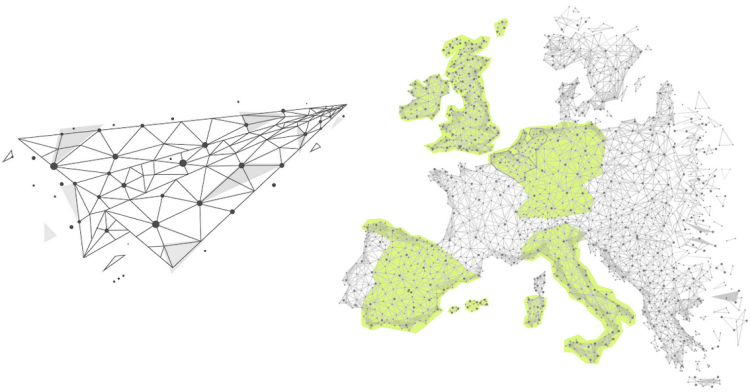
This project has received funding from the European Union's H2020 Research and Innovation Action programme under Grant Agreement No. 856533

Pilot 2:
Geometry App
User Training Guide

ARETE

For an Augmented Reality
Enhanced Teaching
Experience



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Pilot 2 Information. What is Pilot 2 about?

ARETE is a European Commission-funded project that aims to support existing European interactive AR technologies' effort to enhance current technologies and develop new highly usable technologies and contents. To bring together the basic principles of AR in education with the technological concept, ARETE aims to establish a sustainable competitive ecosystem of European technology and solution providers for AR interactive technologies, through a targeted community engagement process within the education field, which will be deployed, demonstrated and evaluated via the pilot studies around Europe.

ARETE Pilot 2 focuses on learning geometry and geography through visualization and interaction. The aim of this pilot is to test the efficiency of Augmented Reality application for STEM education as a tool that helps to improve pupils' test-score by up to 33% and increase retention rate by up to 100% while developing 21st century skills and focusing on personalized learning through kinetic, audio and visual educational approaches. A pre-test post-test control group design will be employed to measure the effectiveness of the pilots' intervention.

CleverBooks is an app that can be launched on a tablet or mobile phone through a collection of markers in the workbok. With the CleverBooks app, students are expected to develop critical thinking, creativity, visualisation skills and improve cognitive development by viewing geometric 2D and 3D shapes from all angles; listening to voiceover for all the shapes and interactions made by kids; seeing sides of 3D shapes unfold into 2D shapes; and more.

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Technical Requirements

Geometry app runs almost on any device with Android 4.1 or iOS 7.
To visualize 3D models, it is recommended to use a mobile device (smartphone or tablet) with a camera pointing outward.

The user experience has been more satisfying on the devices with a larger size screen.

Also, please make sure your phone is running the latest operating system software.

Processor (CPU) Manufacturer	Any
Processor Count	2
Processor (CPU) Speed	1.2 GHz
Recommended Minimum Display Resolution	1280×800
RAM Size	1 GB (2GB recommended)
FREE Memory Storage Capacity (Hard Disk size)	0.5 - 1 GB
Operating System	Android 4.1.x+, iOS 9+
Connectivity Type	Wi-Fi to download app and for multi-user feature
Camera	Any (HD recommended)
Front Webcam Resolution	Not required

Stable internet connection is required for multi-user exercises. The app can also be used offline for Augmented Reality content overview and interaction however multi-user features (content review, game playing with other users/devices) will not be available.

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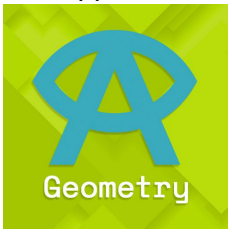
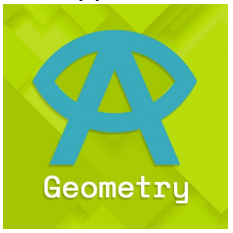
How to Access the mobile app?

For an Android Device	For an Apple Device
https://play.google.com/store/apps/details?id=eu.cleverbooks.arete.geometry	https://apps.apple.com/us/app/arete-geometry/id1571512435
App icon 	App icon 
	

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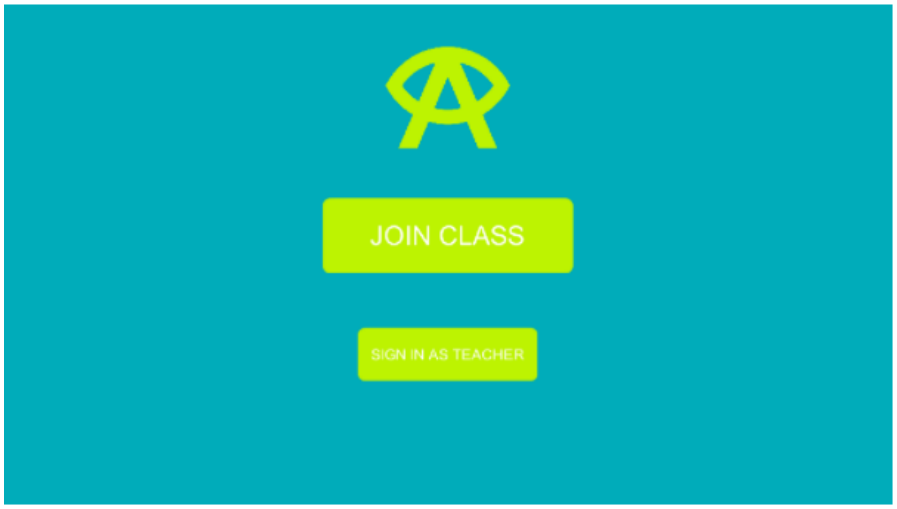
Checklist for Teacher

Action	Completed
Download and install ****ARETE GEOMETRY**** app	
Check internet connection (required for updates of the software and multi-user features)	
Enter code "9AOVH9" to get access to app contents  Select the role: teacher or student: 	
Go through this user training to understand the features and functionality	
Make a plan • Identify a topic. What topic/unit/project will you focus on and what resources you have available?	

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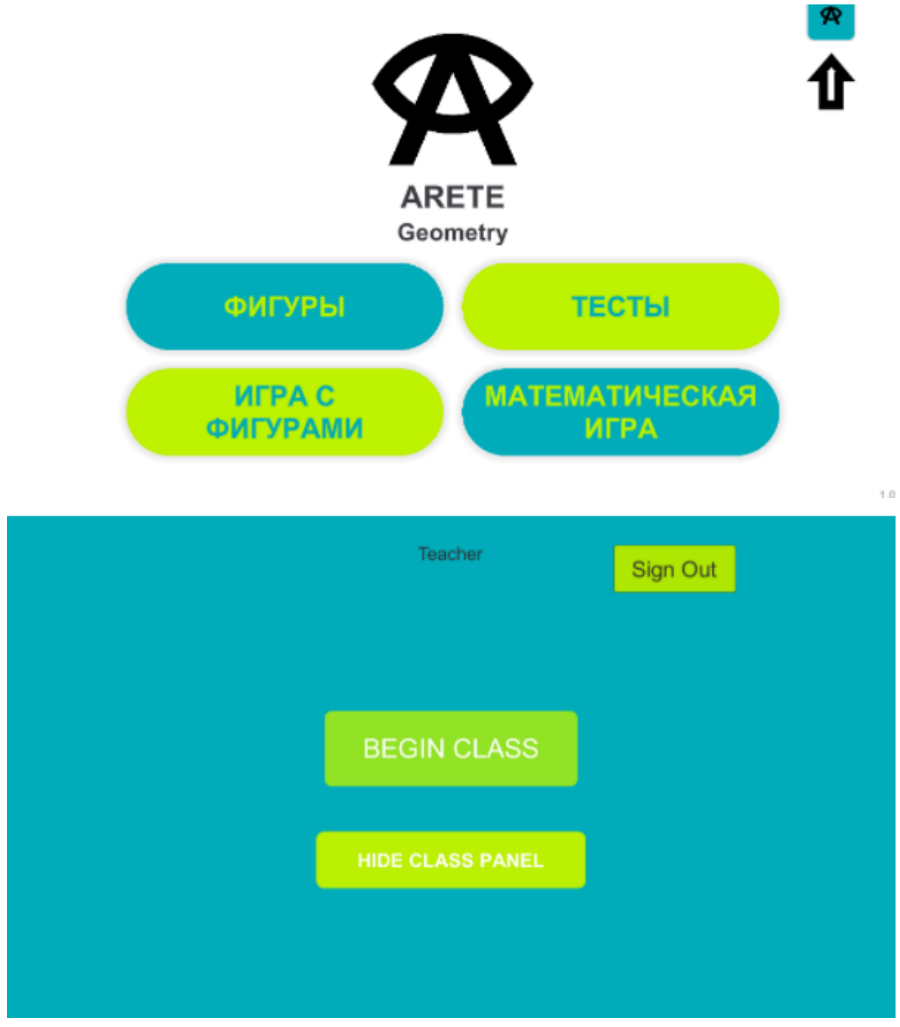
• Identify your practice. How will you have students practice with the information they are learning? • Identify the work. What do you want students to submit to show they're learning your content?	
Select the option: individual work between a user and an app or multi-user work	
For mutiuser please follow the steps. Detailed description of each step is further in this document. 	

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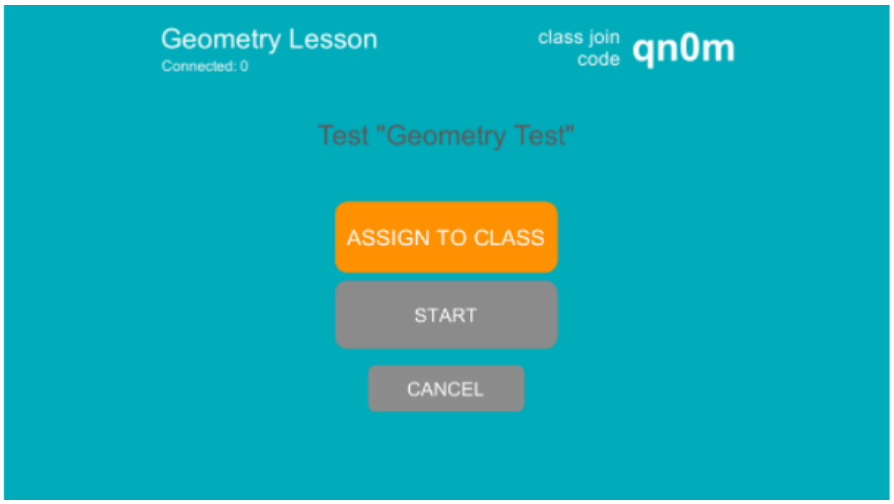

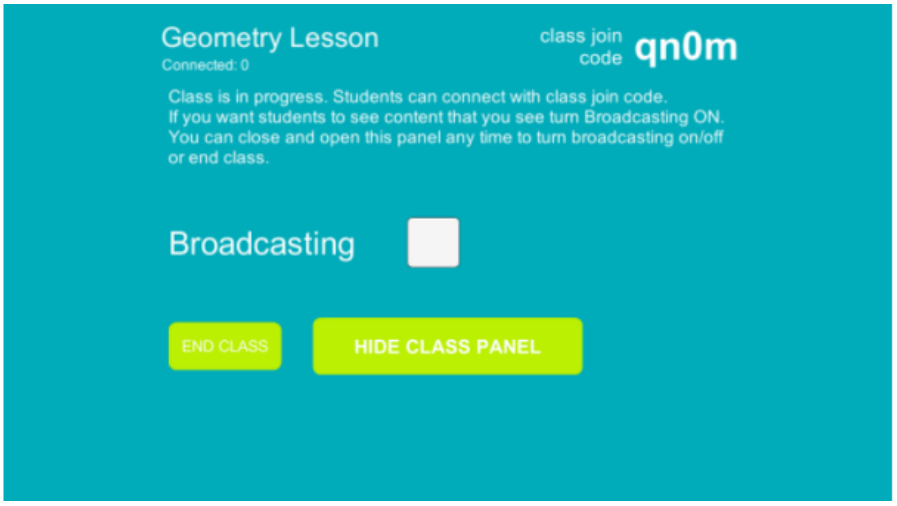

Checklist for Student

Action	Completed

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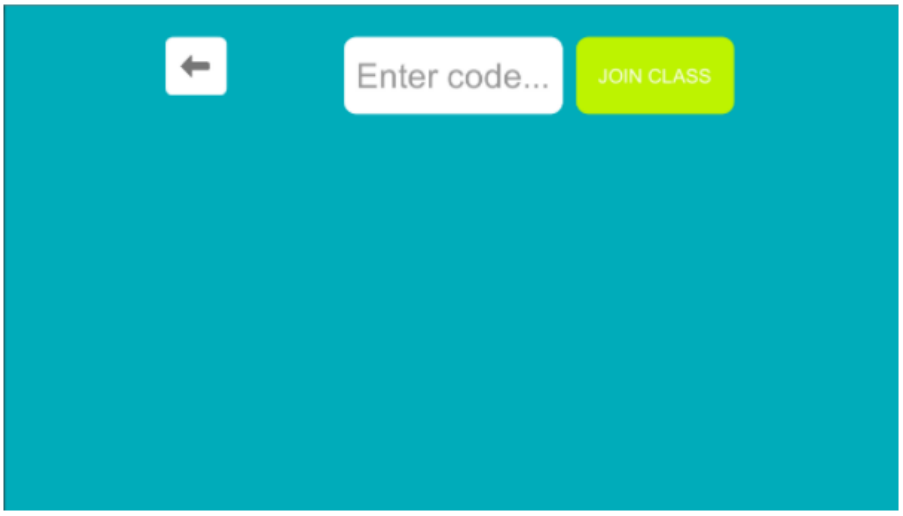
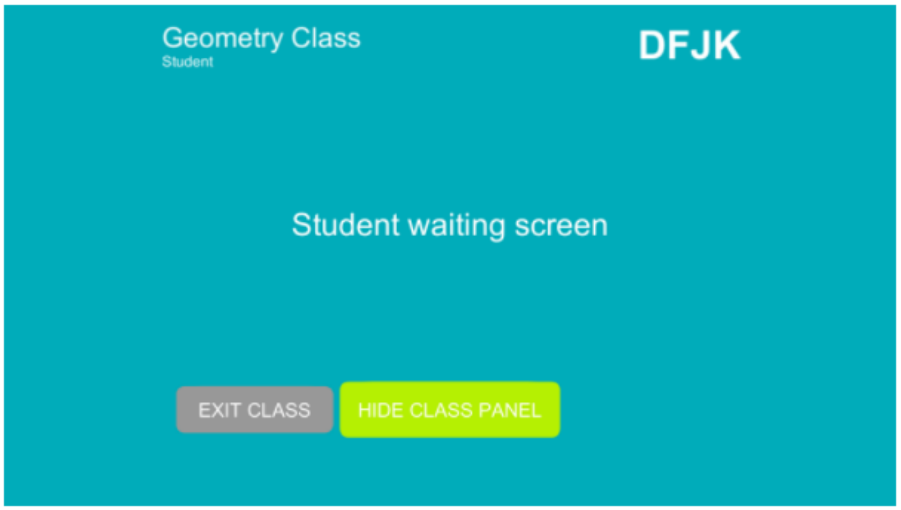
Download and install ****ARETE GEOMETRY**** app	
Enter classroom code provided by your teacher 	
Follow the instructions of your teacher. 	

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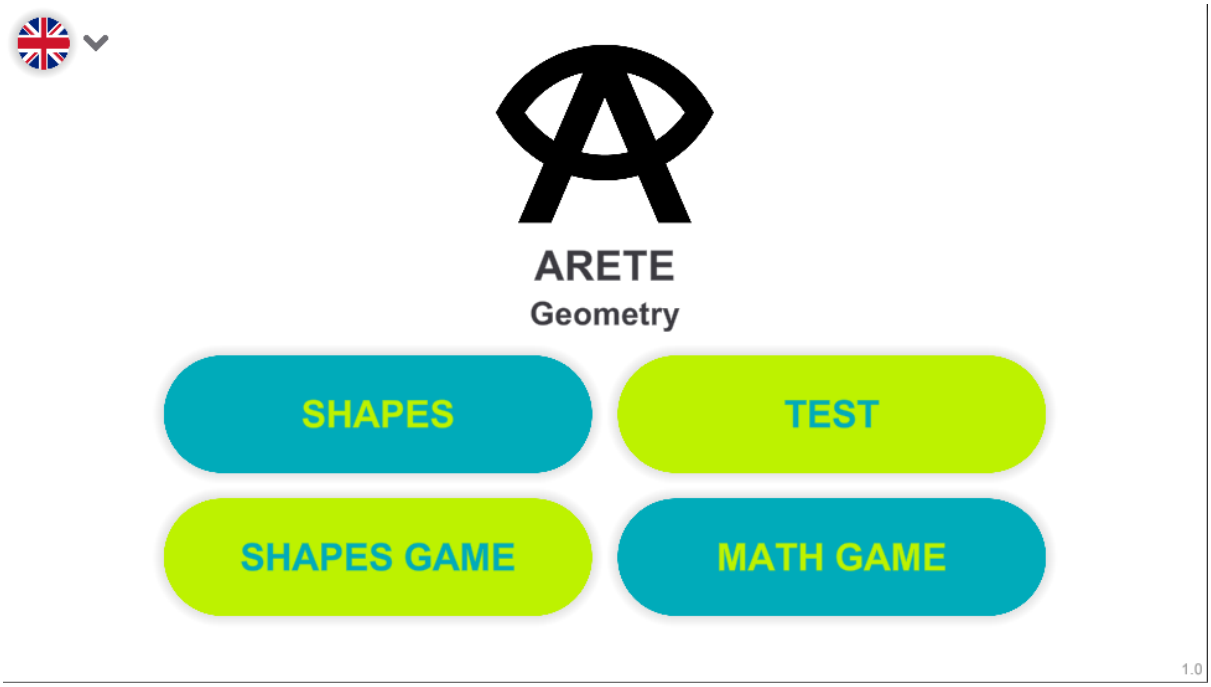
App Menu



	Use drop down to select the language
SHAPES	Use this menu button to select different shapes. The shapes will be automatically shown in Augmented Reality depending on the marker/picture to face your camera on. In the workbook these pages are highlighted as AR. Building Blocks set allows you to create them with building blocks. The markers look like these: 
SHAPES GAME	Use this menu button to launch a simple game of comparing real life objects vs 3D geometrical shapes.

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TEST	Use this menu button to launch an interactive fun multiple choice test.
MATH GAME	This is a multi user game designed for simultaneous players in groups. Please check how to use multi user mode. The game provides 2D and 3D geometrical shapes knowledge tests in combination with arithmetical exercises.

Maths game suggests several levels of arithmetical exercises mix as per menu below:

Extra buttons for internal menu:

SHAPES	Mode shapes with markers		Information about geometric shapes

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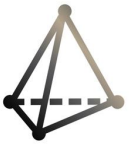
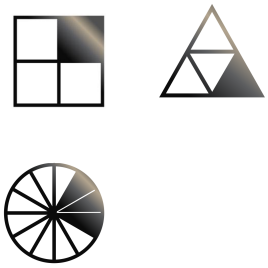
	Testing mode		Switching between 2D and 3D option of the shapes
	Mode game; available after in-app purchase in free app versions		Button home, helps to return to the main menu
	Shapes by names		Mode Vertices
	Mode Fractions		Mode Edges
	Mode Faces		Mode Cross Section
	Mode sphere/hemisphere		

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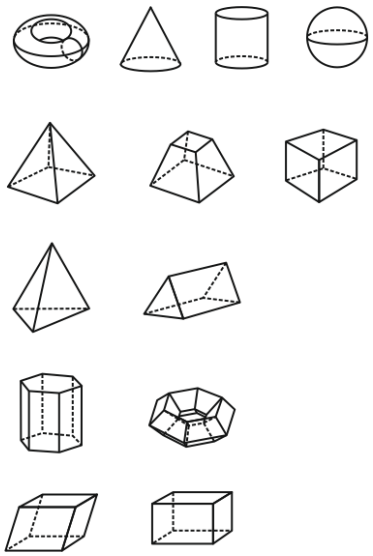	Those buttons launch geometric shapes as seen

Detailed Multi User Functionality Description

For further work of the ARETE app you need to enter a password provided. After you enter the password, it is stored on your mobile device for 30 days from the first login.

After logging in, you will see the next window that prompts you to select your role: student or teacher. Students can connect to a lesson that a teacher creates. Teachers can create lessons and tests.

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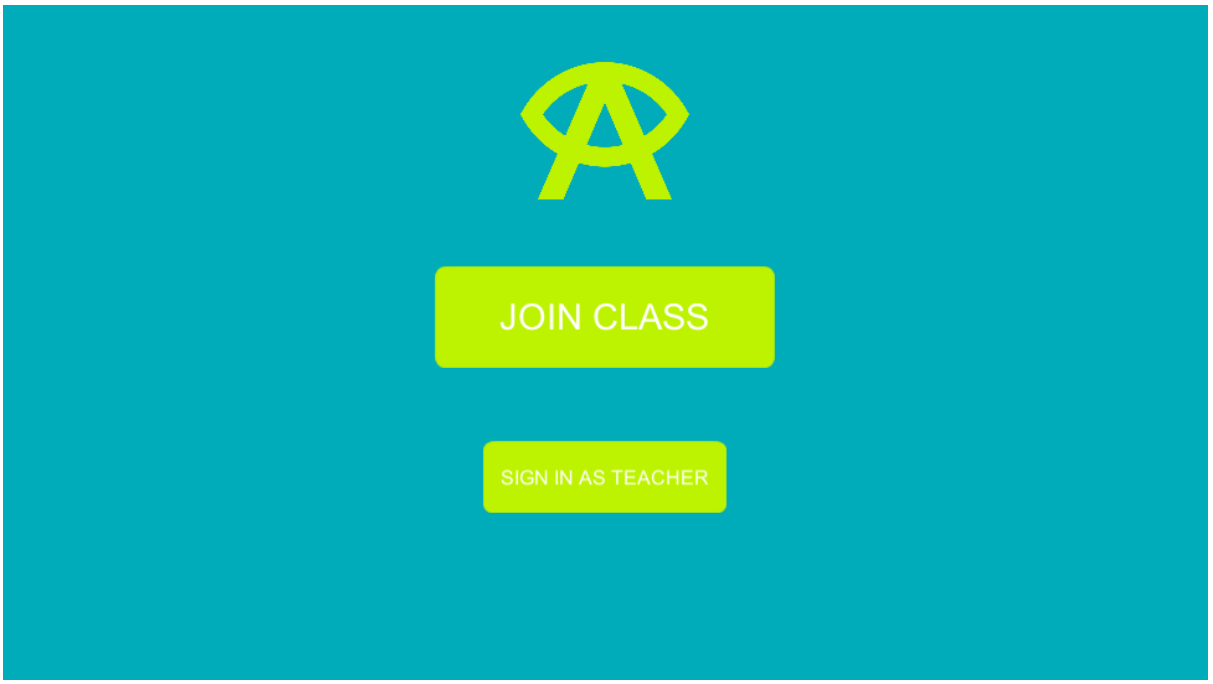
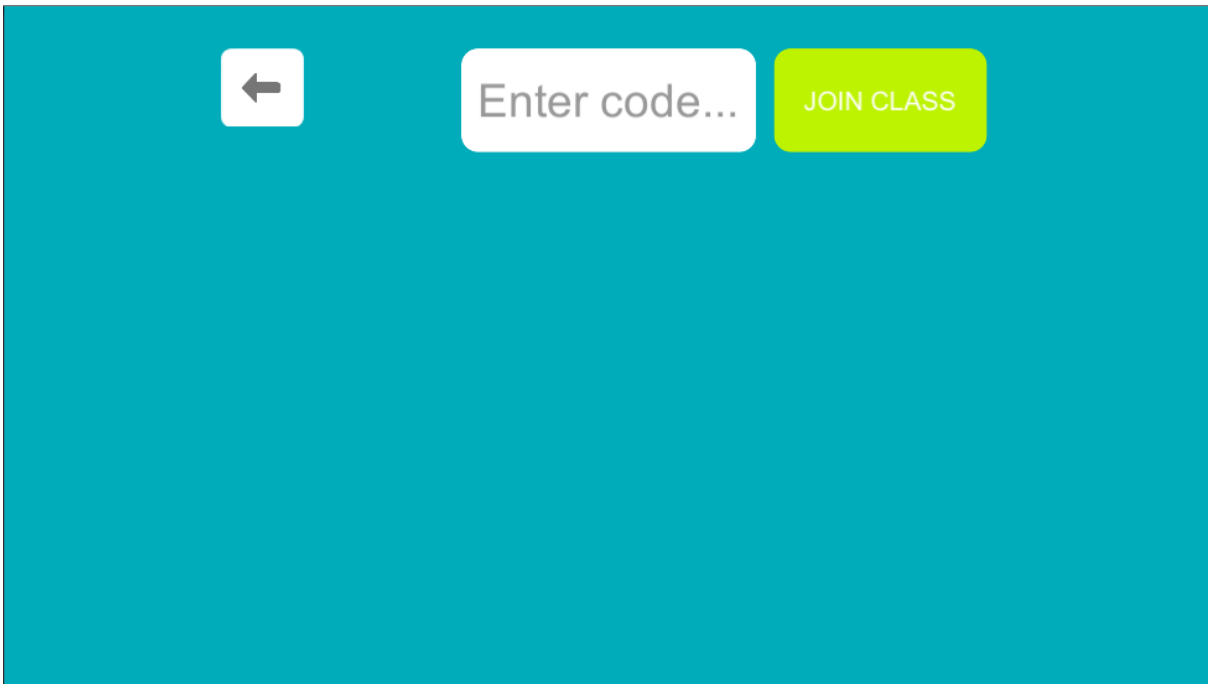


Student's window requests to enter lesson code that a teacher provides and a student needs to click "JOIN CLASS" to enter this lesson. To return to the main screen, you need to use an arrow in the left top corner.



After connecting to the lesson, you enter a waiting screen. Oce teacher starts a broadcast, the student enters the lesson automatically. Students have a n option to "EXIT CLASS". "HIDE CLASS PANEL" button allows to close this info screen if students are already in the

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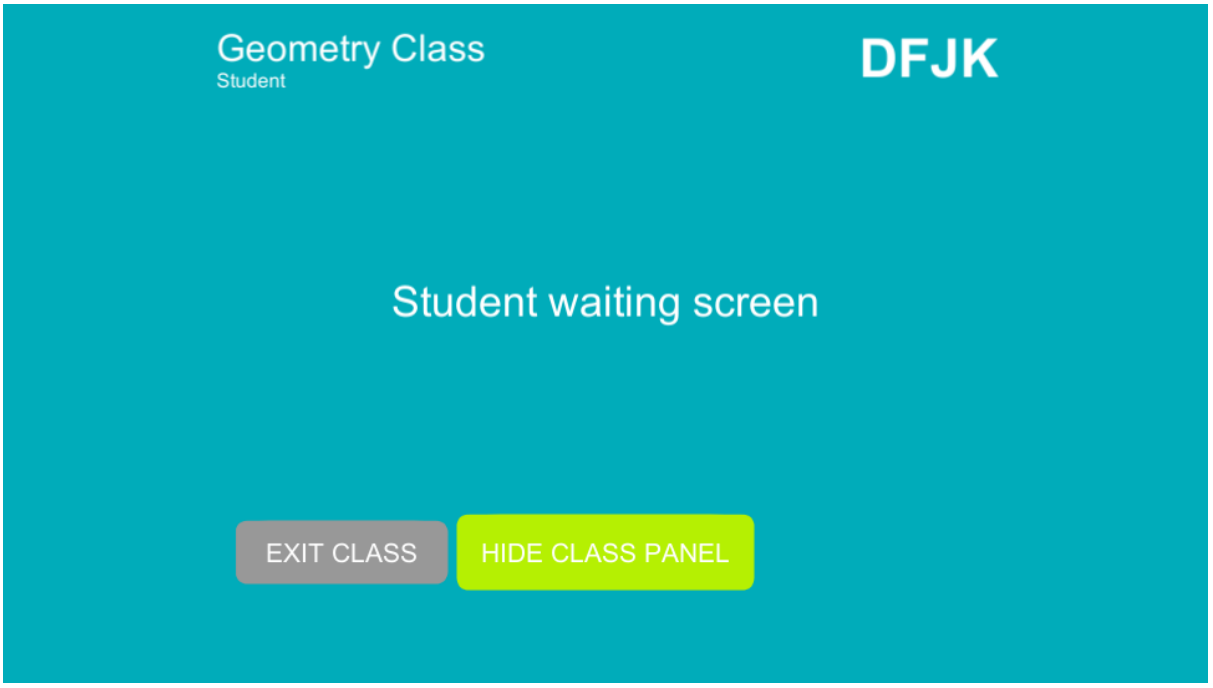
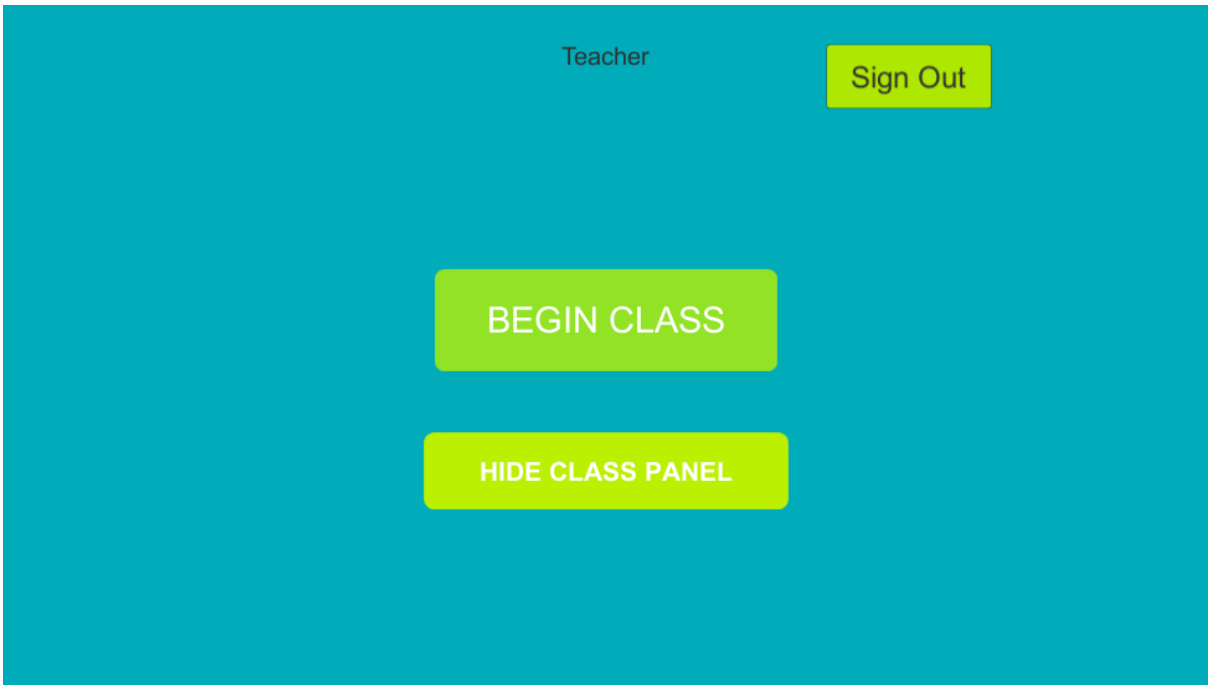
live lesson settings, hide this panel while the teacher is selecting the content for the lesson is not possible.



After connecting as a teacher, you have the following options:
"Sing out" : brings you back to the starting screen
"Begin class" : starts new live lesson session for students
"Hide class panel" : hides the teacher panel and allows to see what students can see.



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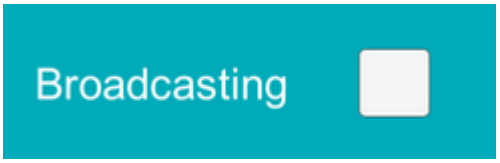
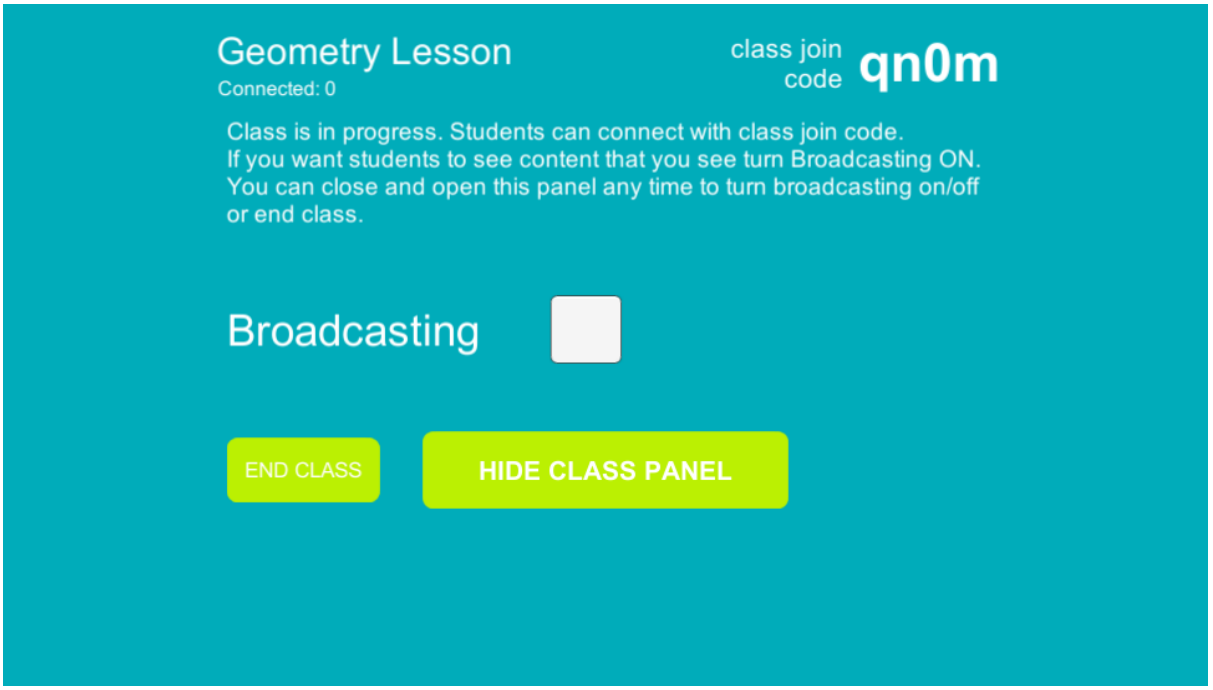
After creating a lesson session, you can see this lesson code in the left top corner. For the students to connect to this lesson, as a teacher, you need to provide this code. Broadcasting supports live session enablement to all students who enters the code. If you do not tick this box:



You can use the teacher interface of the app without broadcasting any lesson.
To create lesson contents, please press "Hide class panel" and you can select contents for your students to see and/or interact.
"End class" button will finish the live session.



After hiding broadcasting panel, you can reopen it by clicking on the ARETE logo

in the top right corner and select the relevant lesson.

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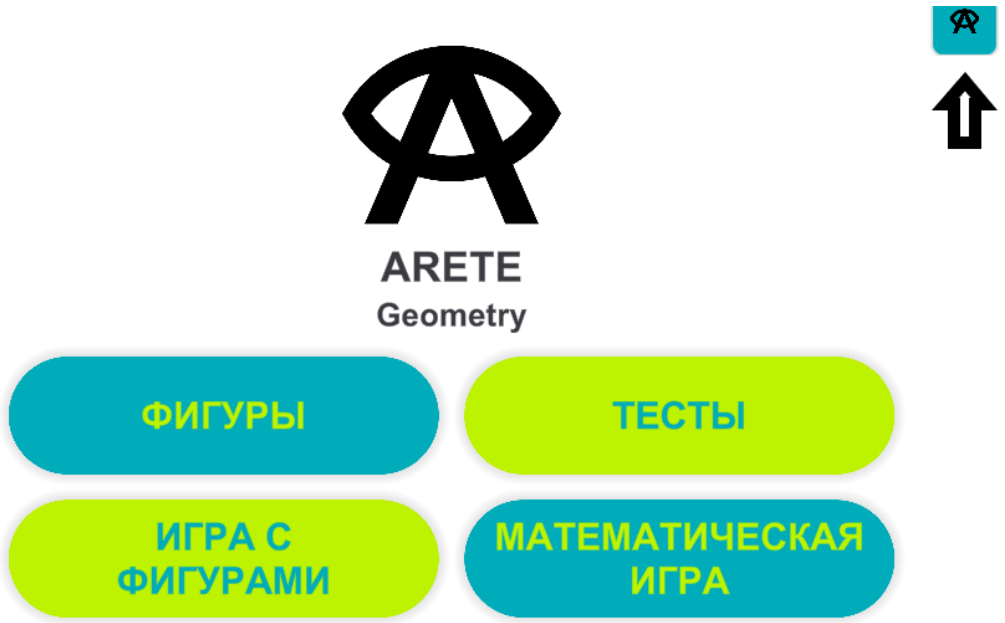
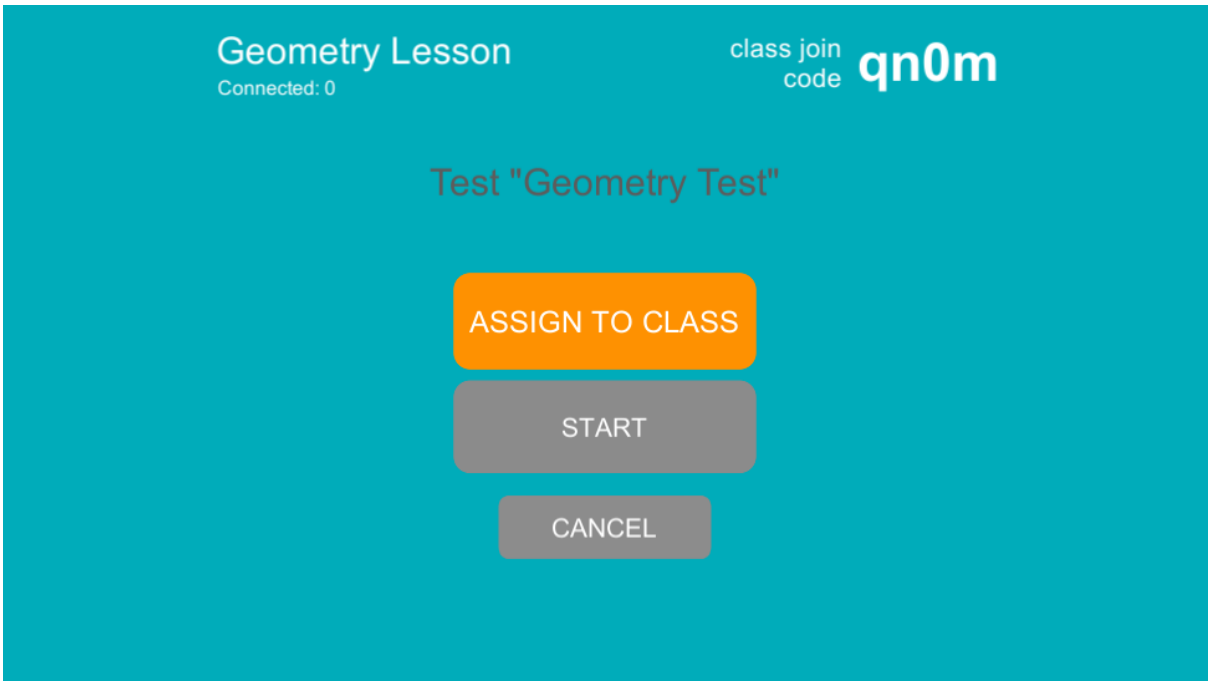


Once you start a lesson, it will automatically open on your device and on the devices of your students once they enter the lesson code.
To assign an activity to your live lesson, please select the type of activity and then click "Assign to class".
"Start" allows a teacher to go through the test on his own.
"Cancel" returns to the previous screen.



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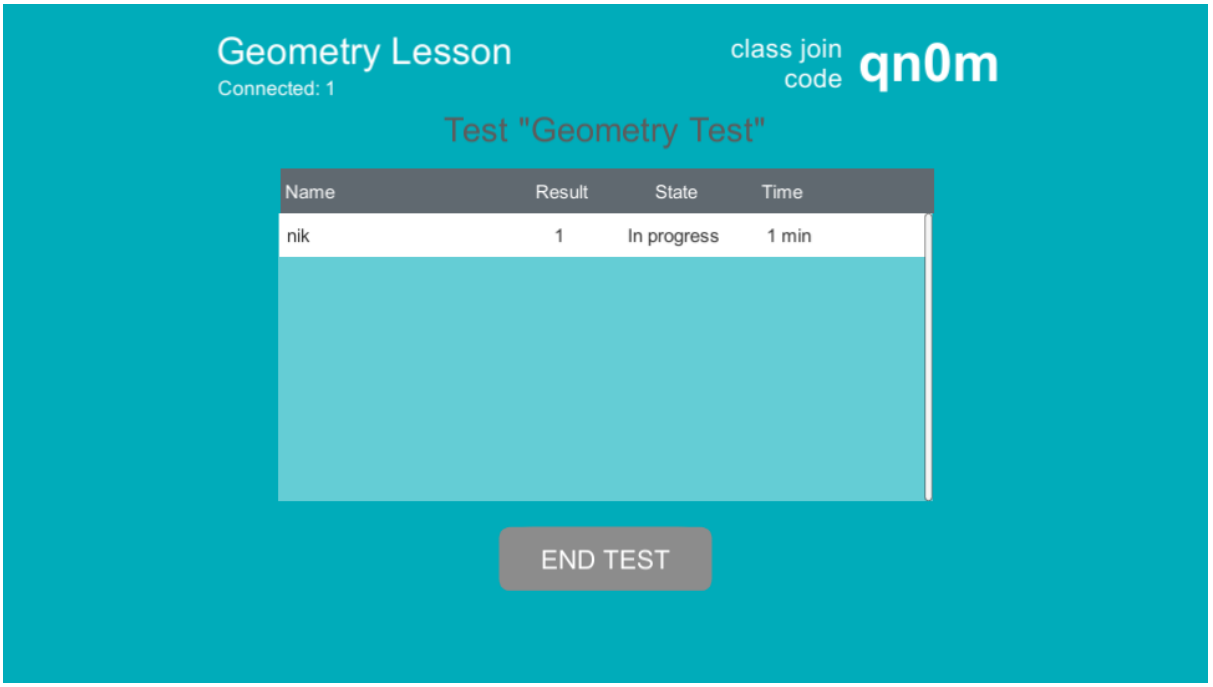
Teacher Dashboard

The progress and the results of the tests can be observed ina special teacher panel. You can see teams, students, progress, time for completion of an activity and results. You can also see who has finished the assigned activity and who is still working on it.



Printable material description

For the ARETE app you have a Geometry kit available. This kit has Geometry Workbooks with extra activities and building blocks sets.

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How to use Building Blocks?

Building Blocks set is delivered as several printed pages of A4 format each. This is a hands-on activity to cut and glue together the building blocks. Then you can facilitate putting building blocks and forming correct 2D shapes, launch ARETE Geometry app and explore Augmented Reality content allocated to each shape.

How to use the Geometry Workbook?

Each page of the workbook marked as AR Marker can be used with the ARETE Geometry app. The exercises associated with 2D shapes outlined in the book will help you with further lesson activities.

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App contents overview

- Basics of geometric 2D & 3D shapes, its properties and decomposition
- Fractions
- Cross section
- Maths (multiplication, division, subtraction, addition) in the single or multiplayer activity
- Compare and identify objects in the environment with geometric shapes using Augmented Reality
- Addition and subtraction
- Multiplication and division

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Additional resources: lesson plans, etc.

Link to suggested lesson activities: https://www.cleverbooks.eu/activityplans/

By CleverBooks

By Badria Husain Taamari,

Teacher, Blended learning, Syria

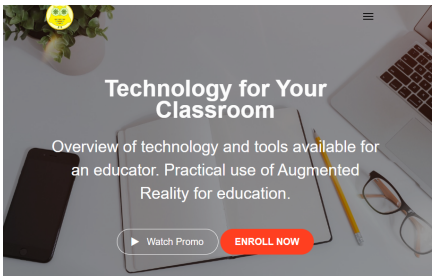
By Christine Danhoff,

Technology Integration Specialist, Genoa Area Local Schools, USA

By Kimberly Mattina & Matthew Tatur,

Kim is a Technology Teacher, and Matthew is a 7th Gr Social Studies Teacher, Galloway Township Middle School, USA

Free resources on Augmented Reality training:

	Technology for Your Classroom Overview of technology and tools available for an educator. Practical use of Augmented Reality for education. Online course on Teachable: https://arcertification.teachable.com/p/technology-in-classroom
	Augmented Reality in Education Basics. Certification Course Augmented Reality Emerging Technologies in Education Certification Course Online course on Teachable: https://arcertification.teachable.com/p/augmented-reality-in-education-basics-certification-course

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FAQ and Support

- **What devices are supported?**

Geometry app runs almost on any device with Android 4.1 or iOS 7.
Geography app is much more complex and additionally requires at least 1.5GB of RAM. It runs on Android 4.1 or above with 1.5GB RAM or iOS 7 or above with 1.5GB RAM
To visualize 3D models, it is recommended to use a mobile device (smartphone or tablet) with a camera pointing outward.
The user experience has been more satisfying on the devices with a larger size screen.
Also, please make sure your phone is running the latest software.

- **What operating systems are supported?**

Android and iOS

- **Is the GDPR compliant to use an app?**

Please, refer to
https://www.areteproject.eu/t4media/Pilot%202%20ARETE%20Privacy%20Policy%20for%20apps%20stores.pdf

- **How is my privacy protected?**

Please, refer to
https://www.areteproject.eu/t4media/Pilot%202%20ARETE%20Privacy%20Policy%20for%20apps%20stores.pdf

- **What languages are supported?**

The application is available in English, Greek, Italian, Polish, Portuguese, Croatian, Serbian, Spanish.

- **CleverBooks Apps work offline? We do not have an internet connection/We have a poor internet connection at school.**

Yes, you need an internet connection only to install applications and then can use it without the network access. Stable internet connection is required for multi-user exercises. The app can also be used offline for Augmented Reality content overview and interaction however multi-user features (content review, game playing with other users/devices) will not be available.

- **What are the tangible materials required?**

To use the Geometry app for Pilot 2 you need to have a Geometry kit at your hand provided by EUN.

Support contacts:
Elisavet Vlachou elisavet.vlachou@eun.org
Maria Delmiche maria.delmiche@eun.org