

Using Augmented Reality (AR) to Support Student Learning Within the PBIS Framework

Sui Lin Goei¹, Jeroen Pronk¹, Wilma Jongejan¹, Crispino Tosto², Luciano Seta², Eleni Mangina³, Giuseppe Chiazzese²

¹ VU Amsterdam, Netherlands, corresponding author s.l.goei@vu.nl

² Consiglio Nazionale delle Ricerche, Istituto per le Tecnologie Didattiche, Italy

³ University College of Dublin, Ireland

ARETE-project (www.areteproject.eu) 2020-2023

Objectives:

1. To develop and evaluate the effectiveness of an interactive AR toolkit
2. To apply human-centred interaction design for ARETE ecosystem
3. To pilot and evaluate the effectiveness of AR interactive technologies
4. To communicate, disseminate and exploit the project results

Workpackage 5 - the PBIS-AR-app of ARETE-project aims at

- Investigating *development, implementation, and evaluation* of embedding **Augmented Reality (AR)** into the **SWPBIS** framework
- To test the effectiveness of **AR-PBIS** implementation compared to regular **PBIS** interventions
- With the aim of **elevating students self-regulating and behavioural management skills**

Research Design 2022-2023

Sample (Italy, Netherlands, United Kingdom)

- 10+ SWPBS-schools using the behavioural lesson intervention
- 10+ SWPBS-schools using AR-PBIS

Study Design

Pre-test/post-test between group design

Instruments and measures

- Administered to students and teachers
- Students: dimensions of psycho-social functioning, perception of classroom and school safety, satisfaction with intervention
- Teachers: learned behaviors, satisfaction with intervention

Steps AR Pilot

Step 1: Identification of AR interactivity requirements & specification for the SWPBIS-system: values, behavioural expectations, behavioural lessons, and reinforcement systems (2020-2022)

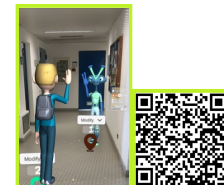
Step 2: Investigation of how the AR technology can be embedded within the PBIS teaching and learning processes by validating both regular PBIS and AR-PBIS behavioural lessons (2022)

The ongoing AR solution

- The main character is an **alien** named **ARPRO**. He/she/it is the coach of the students and models expected behaviour in the classroom, corridor, different schoolsettings....
- The **teacher** is able to compose an AR behavioural learning resource showing how to adapt the modelling of an expected behaviour in a real school setting using the **MirageXR** authoring tool.
- The ARETE **Moodle repository** collects example and non-examples linked to a behavioural expectation created by the teachers
- The **AR-PBIS app** enables **students** to play teacher-created AR behavioural learning resources and supports the process of teaching, practising and reinforcing behaviour.
- The students are able to participate in **multi-user interaction** exercises to practice the learning of behavioural expectations



SCAN ME
I AM ARPRO
THE ARETE PBIS COACH



"GREET OTHERS"
AR BEHAVIOURAL LEARNING
RESOURCE EXAMPLE

Results so far....

Survey values and behavioural expectations in Italy, Netherlands, Lithuania, and Portugal.
Total sample (collapsed) $N = 344$ (135 teachers + 209 students).

Table 3.3. Descriptive statistics and rankings for behavioural expectations gauged in the PBIS-E study.

	Overall			Teachers			Students		
	M	SD	Rank	M	SD	Rank	M	SD	Rank
Walk with a goal	4.12	1.03	14	4.10	0.99	14	4.14	1.05	12
Keep doors open for others	3.97	1.09	15	3.87	1.09	15	4.03	1.08	15
Greet others	4.43	0.89	9	4.40	0.97	9	4.45	0.93	8
Throw trash in the bin	4.68	0.79	1	4.64	0.88	1	4.71	0.73	1
Wash (with soap) and dry your hands	4.50	0.90	5	4.51	0.96	3	4.50	0.87	6
Sit while you eat/ drink	4.47	0.89	6	4.53	0.91	2	4.42	0.86	10
Keep your hands/ feet to yourself	4.37	1.04	11	4.42	1.05	7	4.34	1.04	11
Use stoop/ walk/ talk to solve problems	4.16	1.20	12	4.33	1.04	11	4.05	1.28	14
Keep your working space organized	4.51	0.88	4	4.46	0.95	5	4.54	0.83	4
Store your belongings	4.46	0.92	8	4.32	1.00	12	4.54	0.85	4
Let others be (let others play)	4.16	1.13	12	4.32	1.05	12	4.06	1.17	13
Help others with questions	4.47	0.89	6	4.46	0.85	5	4.47	0.93	7
Stand up for others	4.53	0.93	3	4.49	0.92	4	4.55	0.93	3
Work independently at your desk	4.40	0.83	10	4.35	0.87	10	4.43	0.81	9
Flush the toilet after your visit	4.55	0.93	2	4.42	1.04	7	4.64	0.84	2

Note. Behavioural expectations sharing mean scores in (sub)samples were given the same rank.