



Science Center To Go

Validation Activities

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Validation events – Overview

In general a validation event was conducted as follows:

1. Presentation of the SCeTGo project.
2. Introduction to Inquiry-Based Science Education (IBSE).
3. Introduction to Augmented Reality (AR).
4. Presentation of the SCeTGo suitcase.
5. Demonstration of each miniature (participants could test all miniatures by themselves).
7. Filling out questionnaires.

In phase B miniatures were presented with the corresponding scenarios. Details of the unique events are given in chapter 4.

The projects` implementation comprised three phases:

1. Teachers training seminars: Introduction of the SCeTGo approach to partners of participating institutions.

Partners were trained by consortium members in order to become workshop leaders and to get skilled with the SCeTGo system, the miniatures and all other relevant tools (webcam, markers etc.). The workshop included a demonstration of the 5 miniatures (Boltzmann experiment, Doppler experiment, Mini Wing experiment, Double Cone experiment, Double Slit experiment) and a practical part, where participants had the possibility to make own experiences.

2. Phase A (pilot phase): First cycle of implementation (01.07.2010 – 01.02.2011) conducted at schools/universities

Validation events were offered to pre-service teachers and teachers (1) and students from school (2). During events, participants got information about the project, the Augmented Reality (AR) technology and its application in classrooms. Teachers (1) were given an introduction about technological aspects, including an explanation about the handling of the tool. They got used to the SCeTGo suitcase and its handling, it stores all necessary elements for the existing five exhibits. Also included in the suitcase is a laptop with a touch screen, a webcam and a little stand. A detailed description of the suitcase and the application of the different miniatures is found in the SCeTGo user manual. Additionally participant could interact with all exhibits and AR features that were developed in the framework of the SCeTGo system.

In contrast to teachers` validation, only one miniature was shown to each students` group (2) to get a detailed validation of each miniature.

3. Phase B: Second cycle of implementation (01.02.2011 – 01.12.2011) conducted at schools/universities/ science center

In the second phase, science museum staff and researchers (from universities and schools) (1) of the participating organizations were included as a “provider” group and students from university as a user group (2). In order to enhance quality of the interactive visualization technology of the miniature exhibits, miniatures were revised according the the validation outcomes conducted during phase A. Additionally animations of physical processes in the

classroom were accomplished by pedagogical scenarios, that are tangential to the curriculum. An inquiry-based learning scenario was performed as follows:

Phase 1: Question Eliciting Activities

Phase 2: Active Investigation

Phase 3: Creation/ Formation

Phase 4: Discussion

Phase 5: Reflection

This way the SCeTGo setup assures an innovative inquiry-based learning approach that is tailored to students' needs and implements not only "hands-on", but also 'minds-on' experiments. Moreover, it allows teachers a successful application within school curricula without the need to a time consuming preparation of teaching material. In phase B revised miniatures with the corresponding learning scenarios (further information is given in the Scenarios Adaptation and Development Report D3.1.) were presented to both groups (1&2).

Execution of the validation events

Table 4-1 shows a summary of validation events conducted between 01/07/2010 – 01/02/2011 (phase A) and 01/02/2011 – 01/12/2011 (phase B). A detailed description of each event is provided in Table 4-2.

Table 5.1.1-1: Summarized overview of the validation events conducted in implementation phase A and B.

	Students` questionnaires	Students` interviews	Teachers` questionnaires	Teachers` interviews	Researchers` interviews	Museum staffs` Question- naires
Romania	513	35	27	17		
Finland	-	-	72	29		
Total Phase A	513	35	99	46	-	
Sweden	73	8	9	3	-	-
Spain	-	-	20	2	-	-
Greece	55	5	17	15	14	-
Romania	64	-	19		-	-
Finland	112	-	3	-	-	22
Total Phase B	304	13	68	5	14	22
Total: SCeTGo A&B	817	48	167	51	14	22

Table 5.1.1-2: Conducted validation events in phase A and B

Phase	Partner	Place	Date	Participants
A	Romania	Cluj Napoca (CCD Cluj)	2- 3/11/2010	35 physics teachers
A	Romania	17 schools from the Cluj county	4-11/11/2010	513 students
A	Finland	Heureka	25-26/11/2010	124 students, from the University of Helsinki, department of teacher education 2nd – 3rd class
B	Greece	Project meeting in Athens	1- 3/12/2010	12 project team members
B	Spain	University of Barcelona (UB) – Faculty of Pedagogy	17/5/2011	20 pre-service science teachers (secondary level)
B	Sweden	NO-Biennalen Halmstad	12/04/2011	25 teachers
B	Sweden	Gröndalskolan (school), Värnamo, Sweden	04/2011	73 school students (9 th grade)
B	Sweden	Arabyskolan (school) Växjö, Sweden	31/5/2011	
B	Greece	Pathway Summer school, Crete , Greece	5 - 8/7/2011	app. 35 teachers
B	Greece	EDEN Open Classroom conference in Athens (Pallina)	27-29/10/2011	app. 18 teachers
B	Greece	Greek higher Military academy	18/11/2011	app. 70 university students, 7 th semester (3 courses)
B	Romania		11/2011	64 school students (3 classes)
B	Romania		11/2011	19 teachers
B	Finland	Heureka	11/2011	11 participants, museum staff
B	Finland	Heureka	24-25/11/2011	143 university students