



“CURRICULUM DESIGN RESEARCH” FOCUSING ON GUIDELINES FOR EUROPEAN TEACHER EDUCATION, WHICH WILL FOSTER CREATIVITY-BASED APPROACHES TO SCIENCE AND MATHEMATICS LEARNING IN PRESCHOOL AND THE FIRST YEARS OF PRIMARY EDUCATION.

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The project CREATIVE LITTLE SCIENTISTS has received funding from the European Union Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 289081.



Focus on Teachers

Teachers (incl. student teachers as learners) foster creativity-based approaches to science and mathematics learning in preschool and the first years of primary school.



TEACHER EDUCATION (ITE, CPD)

AIMS, TEACHER EDUCATOR ROLE, LEARNING ACTIVITIES, ASSESSMENT, MATERIALS & RESOURCES, GROUPING, LOCATION, TIME, CONTENT

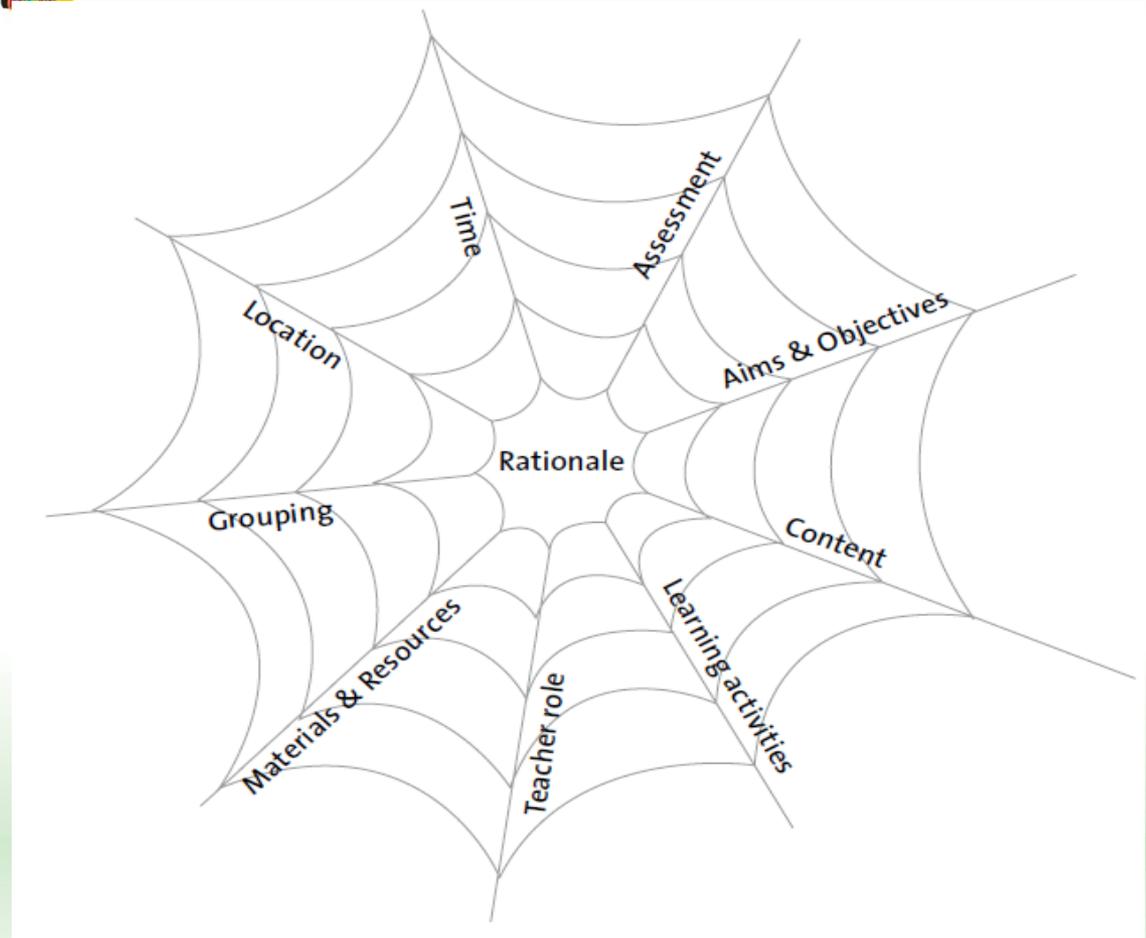


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Curriculum Design

van den Akker, J., 2007
Spider web model with
10 components



Example of design principle

8.3 Teacher education should provide *real-life* learning and teaching opportunities from the viewpoints of where science is experienced on a daily base.



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Learning activities

Example of design principle

3.1 Teacher education in science and mathematics should be *interactive, within a rich learning environment*, including approaches such as: real-world activities and nearby field activities; microteaching; lesson plan discussions; demonstration of good practice; experimental learning; exploration; hands-on activity; play; multimedia; project work.



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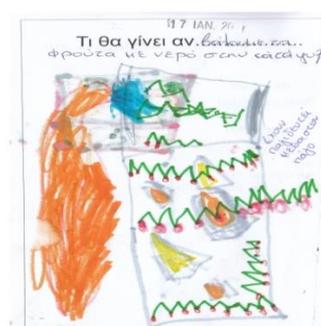
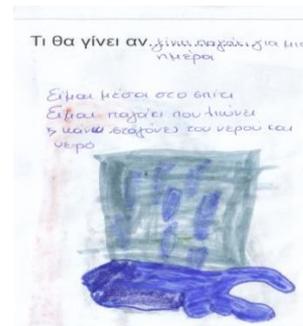
Assessment

Example of design principle

4.2 Teacher education should use *different* assessment strategies as appropriate to the scientific situation.



VAKKEN	Kerst-rapport	Pas-rapport	Eind-rapport	Opmerkingen:	
Gedrag	7	7-	7	Kerstrapport	Handtekening van de ouders:
Uiver	7	6½	7-		
Nulheid	7	7	7		
Godsdienstkennis					
Lezen		7½	8-	Pasrapport	Handtekening van de ouders:
Schrijven		7½	7+		
Rekenen		6½	7		
Nederlandse Taal		7+	7½		
Zingen		7	7½	Eindrapport	Handtekening van de ouders:
Tekenen		8-	8-		
Gymnastiek		7-	7-		
Nuttige Handwerken		6½	6½		
Gaaf score over				Het Hoofd der School: Mieke Alaycia	



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Materials and resources

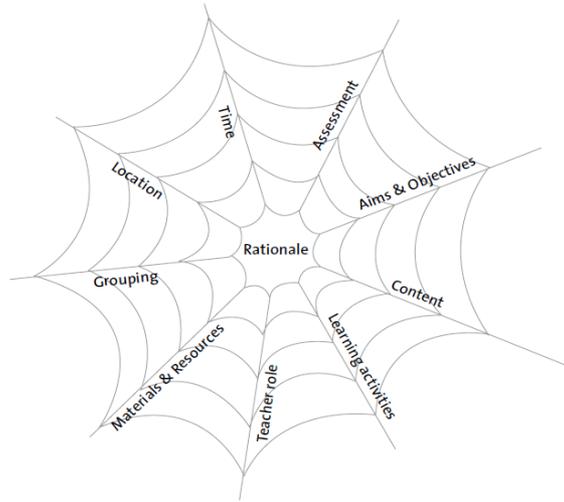
Example of design principle

6.3 Teacher education should provide infrastructure and logistic support to teachers to access diverse learning materials and resources, which include web-based resources, social media, videogames, as well as to digital technologies, such as cameras, tablets, and other digital devices. Resources should also include *picture and story books*, scientific educational journals, and other databases.





Curriculum design
(product) (WHAT)
(van den Akker,
2007)



Methodology

Educational design research
(process) (HOW)
(Plomp, 2009)

- Inspired by a conceptual framework
- Interactivity
- Involvement of different stakeholders
- Iterations



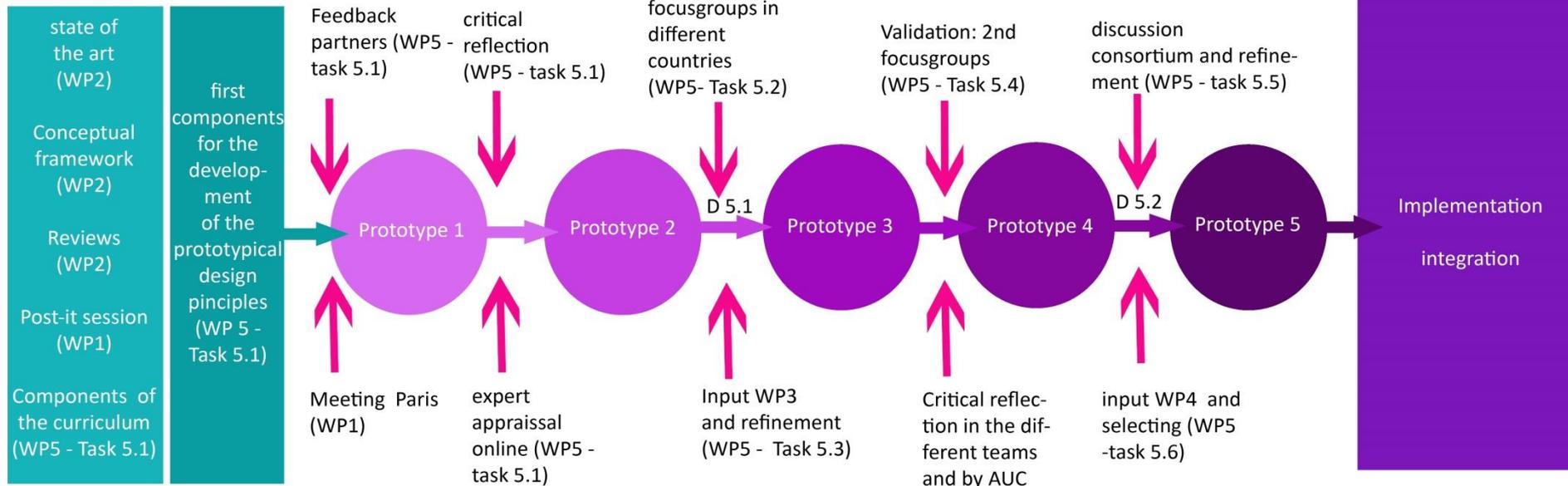
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Analytical phase

Prototypical phase

Assessment phase



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Online focus groups with stakeholders

F2F focus groups with teacher educators

PLOMP, T. (2009)

Analytical phase

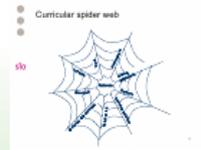
Conceptual framework

Prototypical curriculum design principles

Prototyping Phase

Assessment Phase

State of the art Literature review WP2



Experts appraisal panel (CLS partners)

Feedback rounds Re-design

Input WP3&4

Implications Examples of practice Guidelines

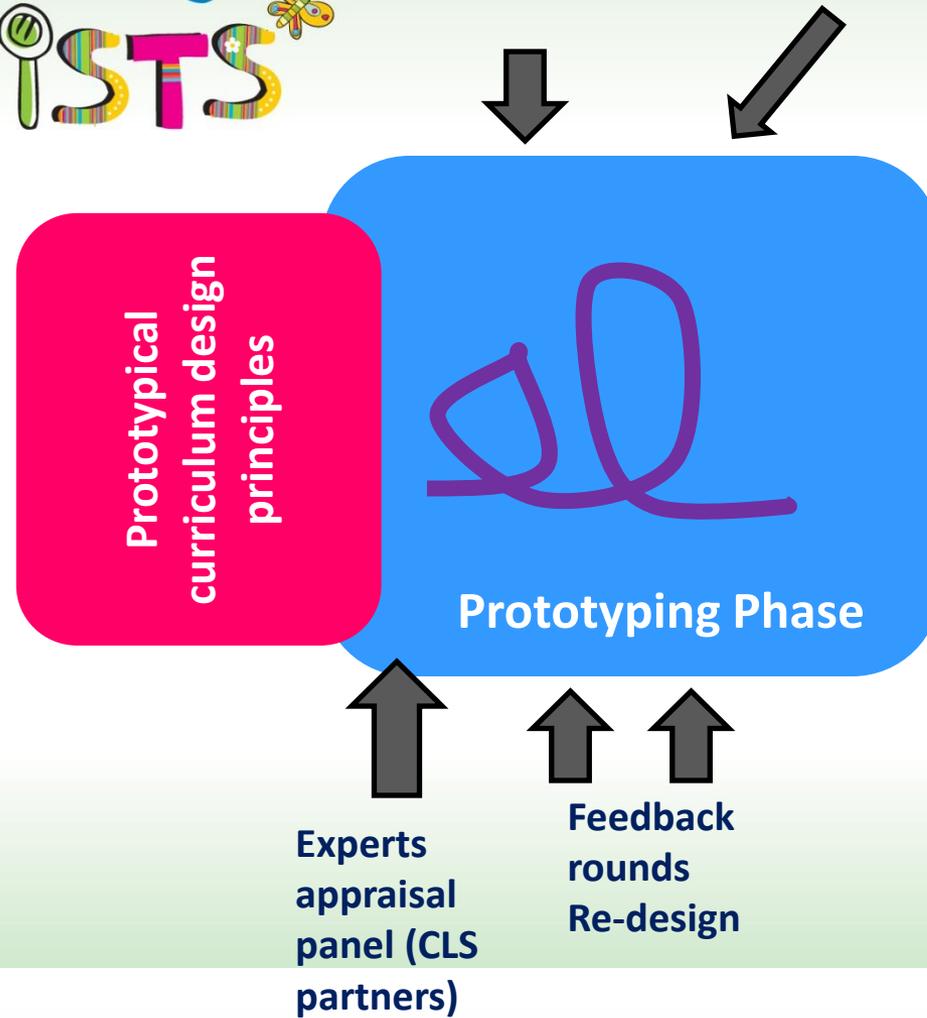


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Online focus groups with stakeholders

F2F focus groups with teacher educators



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Group assignments

An overview

The key expectations for the **focus groups** will be to comment on 10 components of curriculum **design** (and related prototypical design principles).

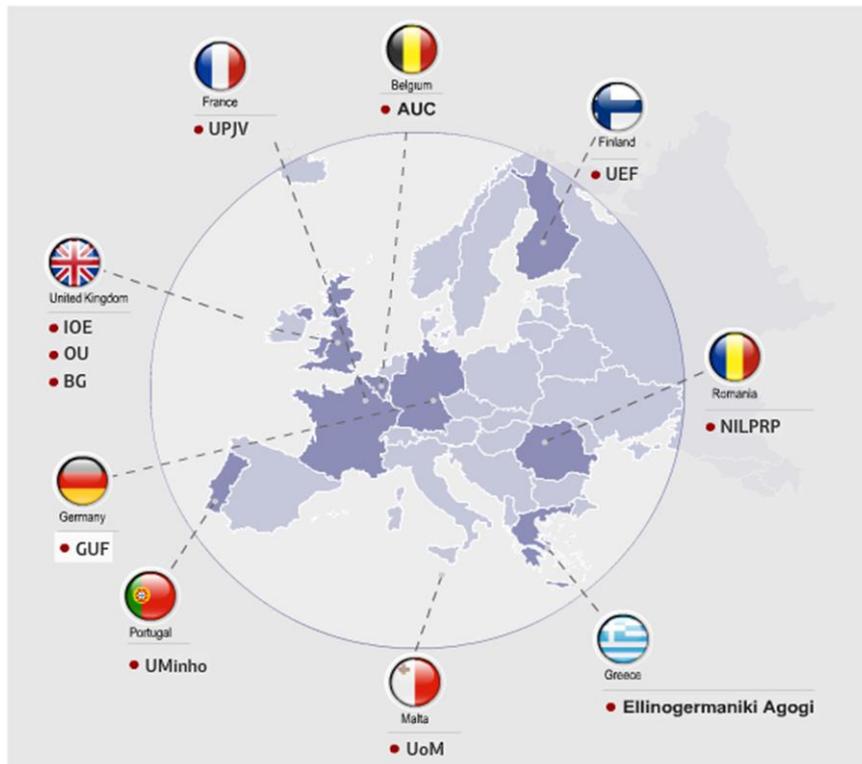
Towards the development of curriculum guidelines and design principles for European initial teacher education (ITE) and continuous professional development (CPD) programs, which foster creativity and inquiry-based approaches to science and mathematics learning in preschool and the first years of primary education.



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Prototyping design principles under supervision of CLS partners



Belgium: AUC
UK: BG/OU/IOE
Greece: EA
France: UPJV
Germany: GUF
Romania: NILPRP
Finland: UEF
Portugal: UMinho
Malta: UoM



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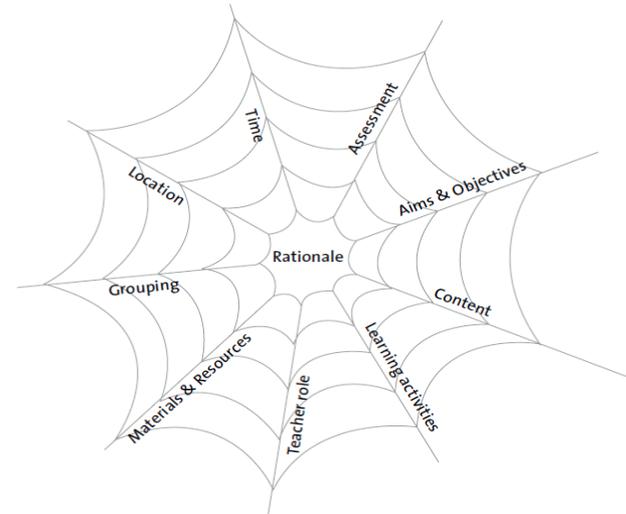
Online focus groups

- Stakeholders
micro/meso/macro (n=77)
- Prototypical design
principles (56 DP; 4
components: aims, teacher
educator, learning activities,
assessment)

Participants

Face-to-face focus groups

- Teacher educators (n=58)
- Prototype 3 (85 DP; 10
components)



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Data collection: Procedure

Online focus groups

- E-moderator = CLS partner
- Three weeks negotiation
- Moodle platform
- Instructions for partners on Dropbox
- Support (AUC) via Skype and e-mail

Face-to-face focus groups

- Moderator = CLS partner
- 2,5 hours dialogue
- Audio recordings
- Instructions for partners on Dropbox
- Support (AUC) via e-mail



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Data collection: Instruments

Online focus groups

- Group assignment
- E-moderator scaffolds
- Prototypical design principles (56 DP)
- Excel template
- Dropbox and Moodle

Face-to-face focus groups

- Group assignment
- Script for the moderator
- Prototype 3 (85 DP)
- Excel template
- Dropbox

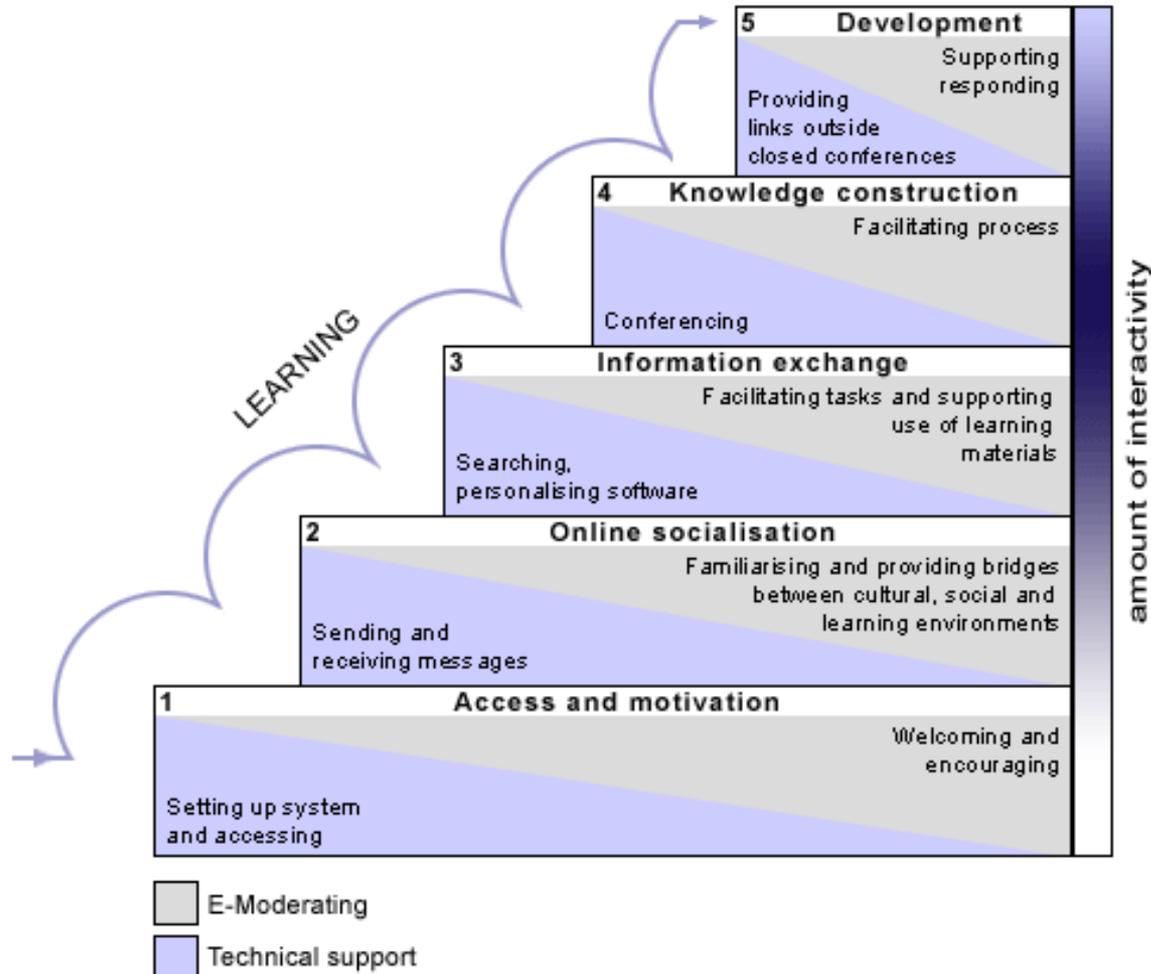


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E-moderating

(Salmon, 2000)





Data representation: Synthesis

Online focus groups

- Quick sheet per CLS partner
 - 5 keywords per component
 - Matrix (A4) on design principles

Accept

Adjust

Abate

Add

- Output: Prototype 3

Face-to-face focus groups

- Output: Set of curriculum design principles
- Deliverable D5.2



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A plea for ...

Stakeholders say ...

- Aims
 - Cooperation
 - Reflection
 - Affective ends
- Teacher educator
 - Role model
- Learning activities
 - Learning by doing
 - New media
- Assessment
 - Ongoing feedback

Teacher educators say ...

- Exploring students' starting profiles
- Profound content/subject knowledge
- Positive attitudes and confidence
- Reflective practitioners
- IB(S)E in 'rich' learning environments
- Hands-on + minds-on + feelings-on activities
- Field observations and experiences
- Networking and teacher collaboration
- Digital technologies and ICT resources
- Teacher scaffolding to support creativity, inquiry, problem solving
- Time is a 'constant conflict'



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The intention of the **final set** of curriculum design principles is to present a document that could be **a stimulus for debate, screening, and a means to promote creativity developments** in science and mathematics education for young children.

As to the many forms teacher education could cover, the document is intended for policy makers and practitioners **to portray, develop and modify** it as needed in order to meet a wide range of purposes and audiences.



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