Quality of Secondary Preservice Mathematics Teacher Education Programs

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A research project

- Characterizing the quality of teacher education programs and courses

  - Supported by the Ministry of Science and Technology

  - Working for three years

  - Three universities working on secondary mathematics pre-service teacher education

   - Almeria, Cantabria and Granada

    - With a common model

The HEES and professional competences

- The need for quality assessment and assurance

    - Given a set of standards or competences for teacher education, how to characterize the quality of teacher education programs?

- Tuning Education Structures in Europe project

    - Generic and specific competences of first and second cycle graduates

    - Model for designing, planning and implementing curricula

- Itermat: competences for secondary mathematics teacher education programs and courses in Spain

Research questions

- How to characterize the quality of a teacher education program or course?

- What instruments might enable us to produce such characterization?

- How does instruments work in practice on specific teacher education programs?

- What implications might the results have for the improvement of those programs?

Quality dimensions
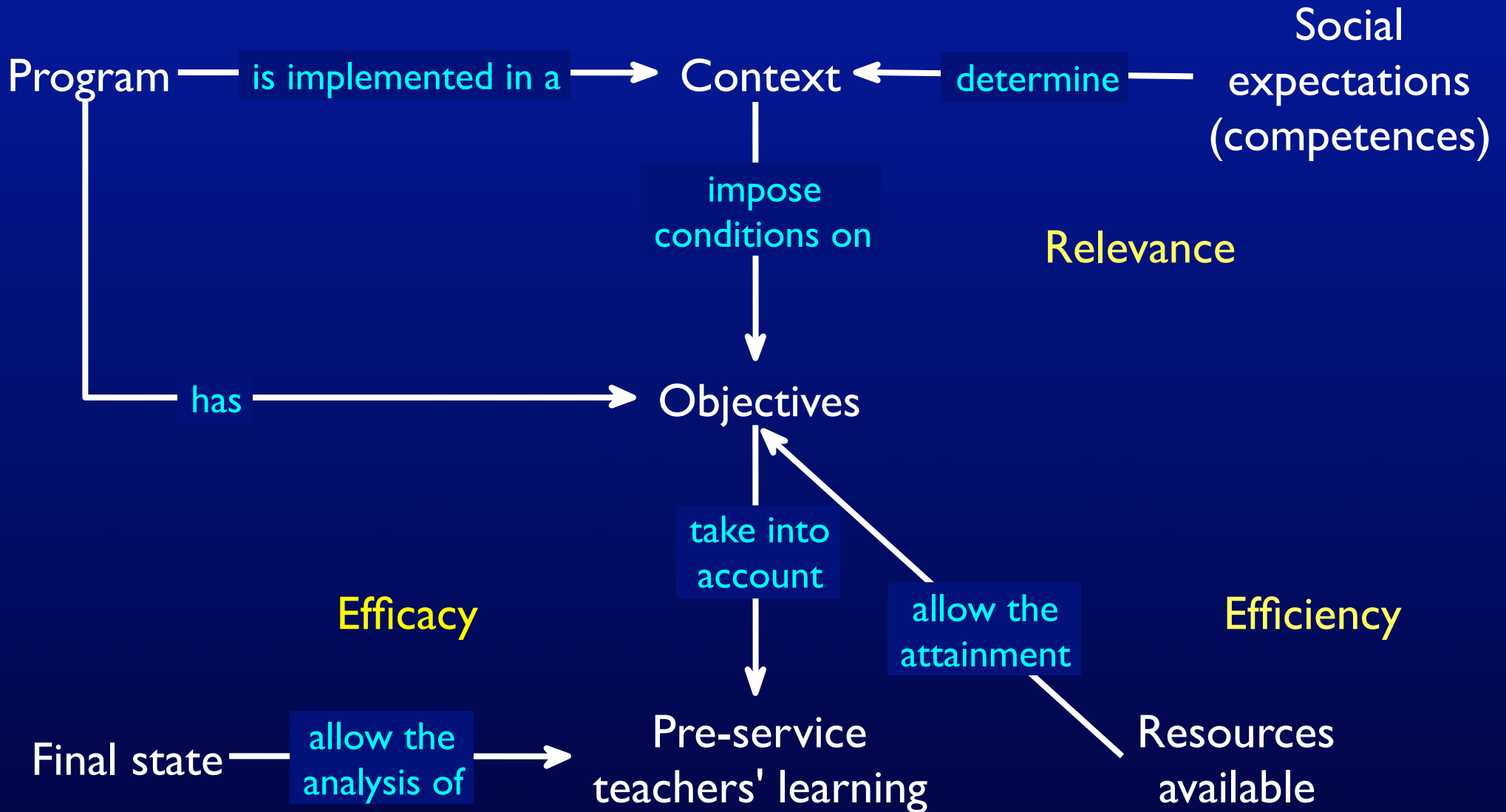
Considering one dimension: relevance

- Focus on relevance

  - A meaning for relevance

    - Conceptual

      - As a function of the fitting of the program's design to a given set of standards

    - Methodological

      - Through dimensions in which one can characterize how a syllabus contributes to the development of a given list of competences

Assumptions for the instrument's design

- a program is composed by a set of courses

- the social expectations for the program are expressed in a list of specific competences for the corresponding professional profile

- the program is designed in such a way that the conjunction of the different courses' competences produces the global achievement of the corresponding program's competences

- the program design identifies the specific competences to which the course is expected to contribute

- a course is described by its syllabus, which is composed by a set of objectives, a content, a planning structure describing when, and how and for how long each content's topic is treated, and an evaluation scheme describing the criteria and instruments for assessment

Instrument: data collection I

- The Competences-Objectives matrix

  - Which objectives contribute to which competences and in which extent

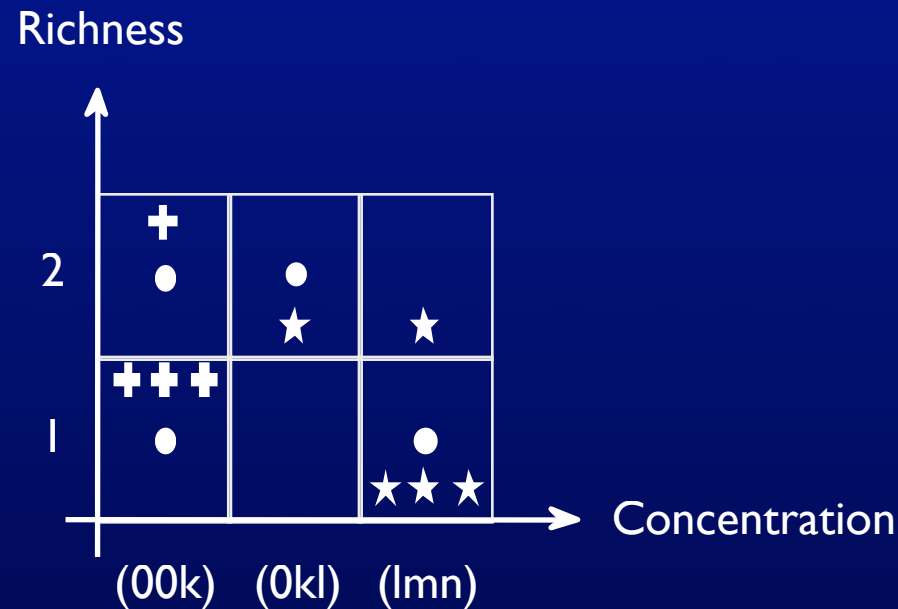|		OBJECTIVES				
		O_1	O_2	O_3	O_4	O_5
Competences	C_1	0	1	0	0	0
	C_2	0	0	3	0	1
	C_3	0	2	0	1	1
	C_4	0	0	0	0	0

Instrument: data collection II

- Time devoted to objectives
    - On the basis of objectives-contents and contents-calendar
- Objectives weight in the assessment scheme
    - On the basis of objectives-contents and contents-assessment instruments or criteria

Characterizing the relevance of a teacher education program I

- Competences for which there are no objectives contributing to them

- Objectives that do not contribute to any competence

- Objectives richness: number of competences an objective contributes to

- Objectives concentration: measure of the strength with which the objective contributes to the competences it is linked to

Characterizing the relevance of a teacher education program II

- Concentration-richness map

- Total time devoted to competences

- Time and assessment indicators

Time and assessment indicators

- Computation

- Design coherence

- Competences ordering

		Objectives				
		O_1	O_2	O_3	O_4	O_5
Competences	C_1	0	1	0	0	0
	C_2	0	0	1	0	1
	C_3	0	1	0	1	1
	C_4	0	0	0	0	0

Competences	Time indicator $tC_i = \dfrac{\sum\limits_{j=1}^{n} t_j CO_{ij}}{\sum\limits_{i=1}^{l}\sum\limits_{j=1}^{n} t_j CO_{ij}}$	Assessment indicator $aC_i = \dfrac{\sum\limits_{j=1}^{n} EO_j CO_{ij}}{\sum\limits_{i=1}^{l}\sum\limits_{j=1}^{n} EO_j CO_{ij}}$
C_1	14.81%	11.76%
C_2	40.74%	41.18%
C_3	44.45%	47.06%
C_4	0.0%	0.0%

Instrument implementation on a course

- The instruments have been implemented on secondary preservice mathematics teacher education courses

- We have developed the computation tools for obtaining the results automatically

In the near future

- A new project supported by the Science and Technology Ministry

- Linking secondary mathematics teachers' competences and students mathematics competences (PISA)

- Proposing teacher education design guidelines for those purposes

- Exploring current teacher education programs adaptation to those guidelines

- Assessing those programs' quality