ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

Dipartimento di Scienze dell'Educazione "G.M. Bertin"

Video analysis and professional development of university teachers: a research on a training course aimed at UNIBO teachers

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14 July 2022

Video analysis and teacher professional development: main underlying assumptions

Because of its *"unique capacity to capture the richness and complexity of classroom activity"* (Gaudin & Chaliès, 2015), video offers the opportunity to "immerse" oneself in authentic teaching situations, to observe one's own or others' practices in real classroom settings, fostering processes of **recursive interaction between theory and practice** (ad es. Blomberg et al., 2013, 2014; Santagata et al., 2007; Santagata & Yeh, 2014; Seidel et al., 2013; Sherin & van Es, 2009)

Compared to direct observation "in real time," video provides a permanent record that allows the situation filmed to be **examined and reexamined with different objectives and from different perspectives**, to "unpack" the complexity of filmed practices through **systematic and focused analysis** (ad es. Brunvand, 2010; Hatch & Grossman, 2009; Stigler et al., 2000)

Video analysis promotes the development of teachers' **professional vision**, i.e., analytical and reflective skills (**noticing** and **reasoning**) important for supporting change in teaching beliefs and practices (ad es. Barnhart & van Es, 2015; Seidel & Stürmer, 2014; Sherin & van Es, 2009; Tripp & Rich, 2012; van Es & Sherin, 2008)

Video Analysis for quality teaching in Higher Education (VAHE)

Objectives of the Project

Promoted by the Department of Education "G.M. Bertin" under the PSSD EDU (Axis 1), the VAHE Project aims to:

1. develop an organic system of methodologies, tools and procedures for video analysis to foster the improvement of teaching skills of university teachers
2. test the system within a pilot training course aimed at UNIBO teachers
3. validate a video-based training model for the professional development of university teachers

EDU Department Research Group:

Andrea Ciani, Maurizio Fabbri, Consuelo Mameli, Licia Masoni, Elena Pacetti, Alessandra Rosa, Alessandro Soriani, Ira Vannini

International partners under the Project:

School of Education - University of South Australia (UniSA)
School of Education - University of California Irvine (UCI)

Technical support:

Media Education Laboratory (MELA) of the EDU Department

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University of South Australia

UCI University of California, Irvine

MELA – Laboratorio di Media Education

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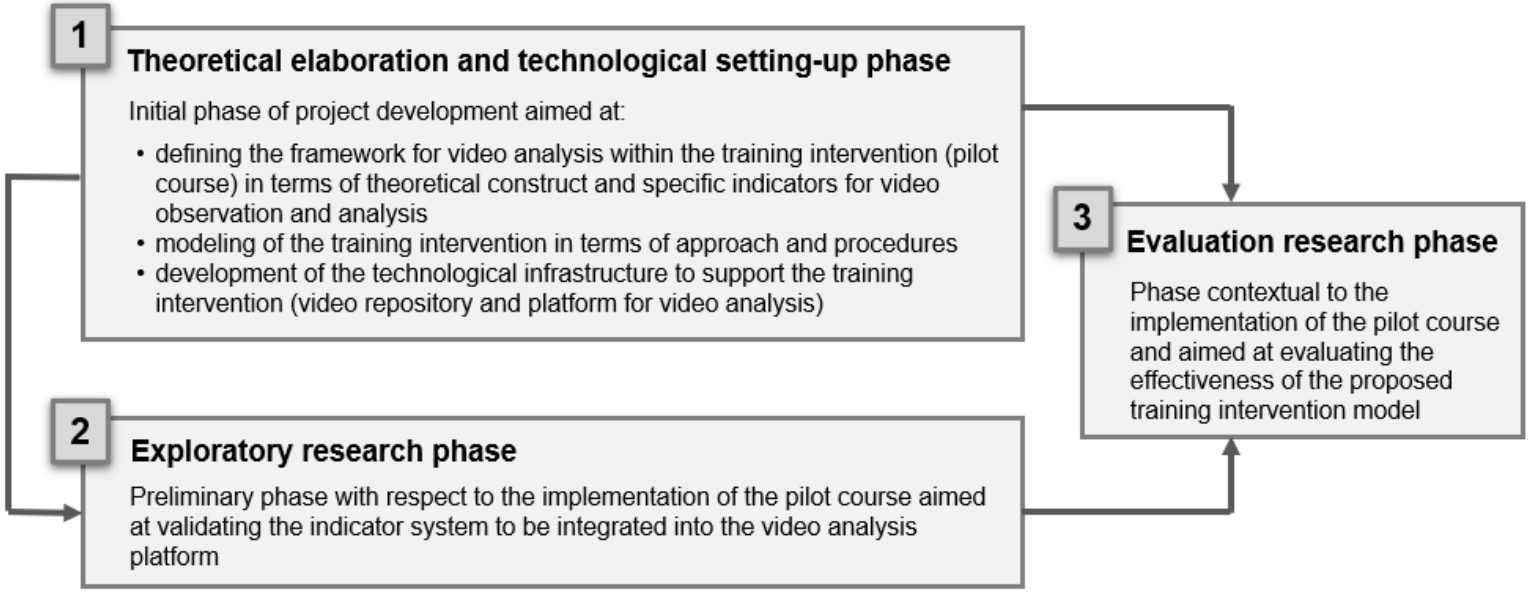
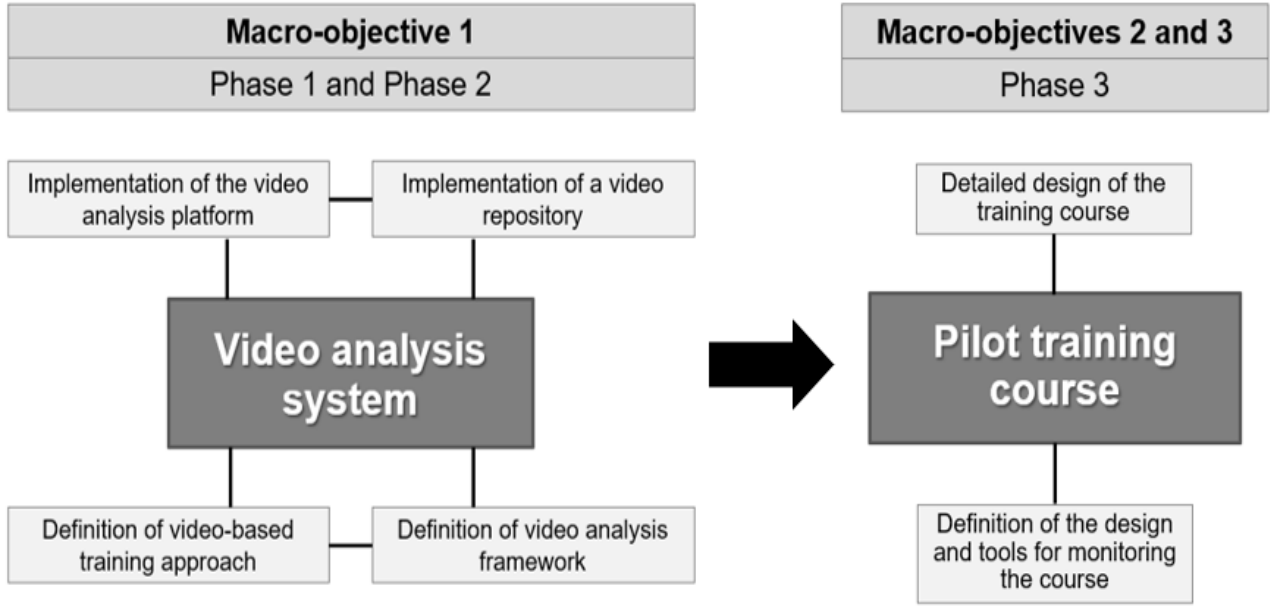
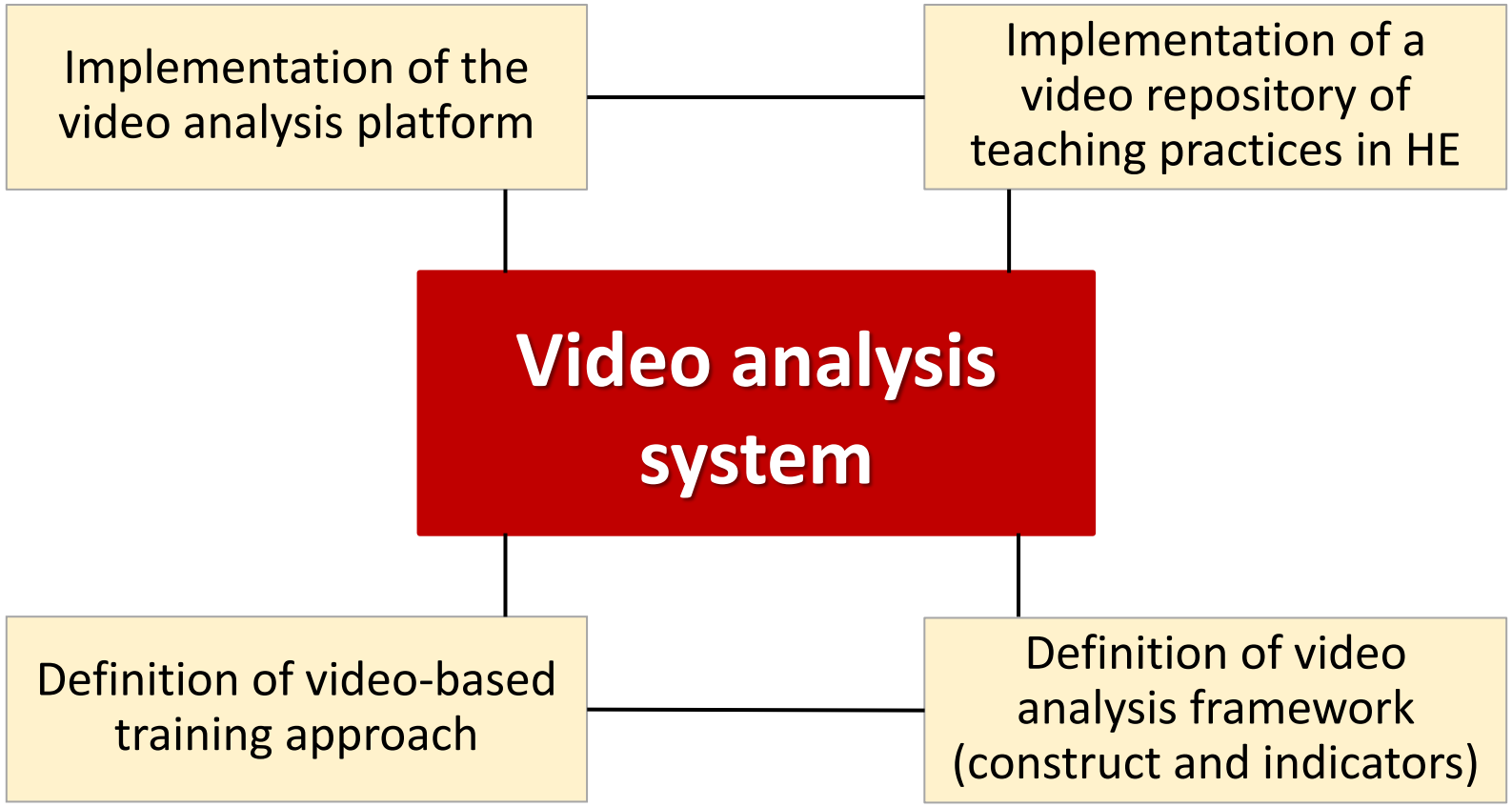
Research phases



Relationship between research objectives and phases



1 Development of a system of methodologies, tools and procedures for video analysis to foster the improvement of teaching skills of university teachers



The video repository

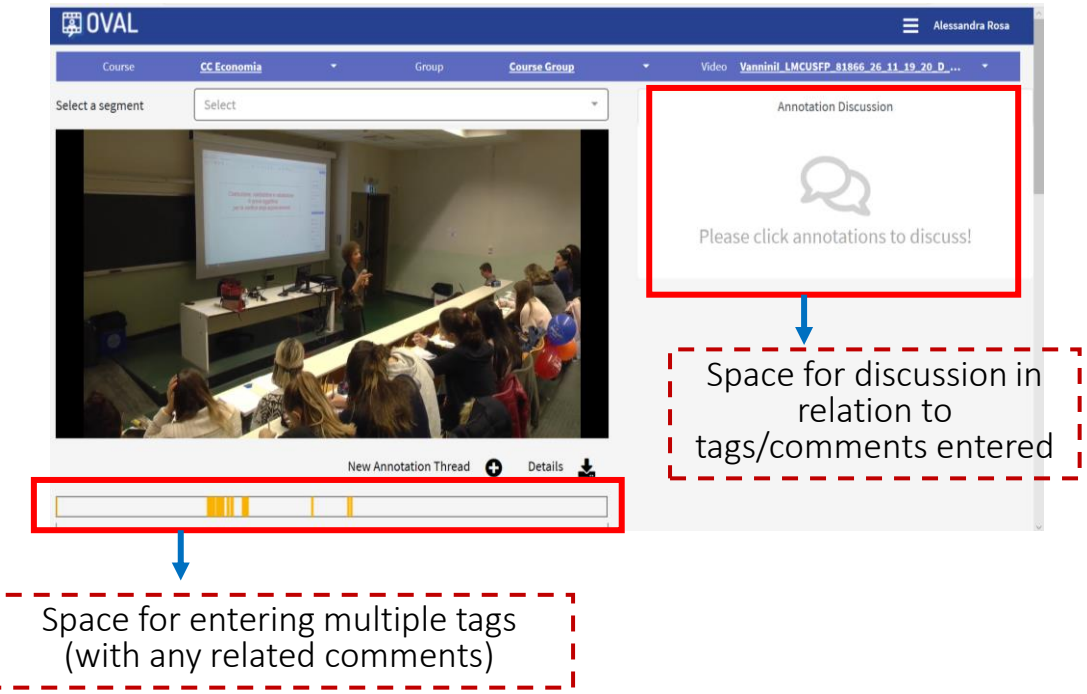
- video-recording of some lectures at UNIBO and UCI
- archiving of the videos on Vimeo (possibility of restricted access)
- cutting of the videos with extrapolation of some short sequences (about 3 to 10 minutes long)
- integration of specific metadata related to the video sequences, functional for the contextualization of the recorded teaching practices

The video analysis platform

Adaptation of the **OVAL** (*Online Video Annotation for Learning*) platform developed at UniSA

Web-based application integrated with the Moodle platform that allows users to insert "tags" and textual comments anchored to specific segments of the videos

- allows the observation and analysis of videos to be guided and structured to focus teachers' attention on specific practices
- enables a collaborative approach in observing and analyzing videos



The video-based training approach

- Adoption of an active and participatory approach that puts the teacher at the center by valuing his/her teaching experience and capacity for analysis and critical reflection for the improvement of his/her teaching practices (ad es. Gaudin et al., 2014; Seidel et al., 2013)
- Promotion of collaboration and discussion among participating teachers (in plenary or small groups) as an opportunity that supports and enriches the processes of analysis and reflection (ad es. Borko et al., 2008)
- Emphasis on the role of the expert/trainer as "facilitators" to support and guide teachers' analytical/reflective thinking (ad es. van Es et al., 2014)
- Use of video as a "springboard" for analysis and reflection on authentic examples of "ordinary" classroom situations, not to show teachers "exemplary" or excellent teaching practices (ad es. Borko et al., 2011)
- Use of videos in which the videoed teachers are external to the group of training participants, a condition that facilitates the appropriation of a method for analyzing professional practices and favors greater involvement in peer discussions and critical reflection (ad es. Gaudin & Chaliès, 2015)
- Centering the processes of noticing and reasoning on specific teaching practices, which is important in delimiting a precise focus of attention on which to orient teachers by providing them with a "guide for vision" (Santagata, 2012)

The focus of video analysis within the Project

INFORMAL FORMATIVE ASSESSMENT (IFA)

assessment *for* learning intended as:

- practice fully integrated into teaching activities and tool for regulating teaching-learning processes
- practice related to a view of teaching-learning processes in line with social-constructivist theories and a student-centred teaching approach
- set of specific behaviors and strategies that the teacher can use to activate/involve students and foster an ongoing exchange of feedback (between teacher and students and among peers)
- dimension of teaching that allows for the identification of theoretical and operational principles that cut across the diversity of possible teaching situations (e.g., in terms of discipline, number of students, classroom setting)

Formative Assessment

"*Formative assessment is a process used by teachers and students during instruction that provides feedback to adjust ongoing teaching and learning to improve students' achievement of intended instructional outcomes*"

Popham (2008)

"*Assessment practice in a classroom is formative to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers, to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would have taken in the absence of the evidence that was elicited*"

Black & Wiliam (2009)

Formative assessment

Incorporated into teaching practice. It allows for monitoring of student progress throughout the learning process in order to identify learning needs and adjust teaching appropriately

Focus on the **process** (*what and how to improve in order to achieve the established learning goals?*)

Ongoing regulatory function with a view to promoting continuous improvement of the teaching and learning processes (*internal relevance*)

- To diagnose strengths and weaknesses of students
- To regulate teaching and learning processes
- To provide feedback to students to improve their learning
- To help students to develop their self assessment skills

Summative assessment

Takes place at the end of the teaching and learning process to verify its effectiveness by assessing and grading students' achievement of intended outcomes

Focus on the **product** (*to what extent the established learning goals have been achieved?*)

Final verification and certification function with a view to formulating a judgment on the results of the teaching and learning processes (*external relevance*)

- To pass or fail students
- To grade or rank students
- To select for future courses
- To predict success in future courses

Formative assessment practices show **high effectiveness** in relevant meta-analyses at both the school level (Hattie 2009, 2011, 2015; Marzano et al. 2001) and **university level** (Schneider & Preckel, 2017)

Schneider, M., & Preckel, F. (2017). Variables Associated With Achievement in Higher Education: A Systematic Review of Meta-Analyses. *Psychological Bulletin*, *143*(6), 565-600.

According to this systematic review, which synthesizes the results of 38 meta-analyses in which more than 100 correlates of academic achievement were analyzed, variables related to formative assessment strategies are found to be significantly associated with student performance at university

FORMAL e INFORMAL Formative Assessment

Bell & Cowie (2001); Bennett (2011); Black (2009); Ruiz-Primo (2011); Ruiz-Primo & Furtak (2007); Shavelson et al. (2008); Torrance (2012)

Formal FA

Pre-planned to collect evidence about students' learning

- Teacher brings together information from students at a planned time (for example by using diagnostic tests)
- Teacher takes time to analyze information collected from students
- Teacher plans an action to help students achieve learning goals

FA as a specific event occurring after a phase of teaching (placed at junctures where an important sub-goal should have been reached) that generally require cycle times suited more to instructional units than to daily lessons

Informal FA

Evidence of students' learning generated during daily activities

- Teacher elicits information in the course of daily classroom (for example by asking questions to students)
- Teacher reacts "on the fly" by interpreting the information from the students
- Teacher immediately makes use of the information to help students achieve learning goals

FA as a continuous and interactive process useful to adapt teaching over short cycles (within or between lessons) and focused on learning goals that tend to be discrete and immediate (what students need to get from that day's lesson or from a particular activity)

IFA can take place within the context of any student-teacher and student-student interaction.
IFA uses everyday learning activities as potential assessments opportunities for collecting evidence of students' learning *in different modes. Information can involve one or more sources of evidence (e.g., students' questions, students' oral responses, students' written responses in a handout, or student-to-student conversations).*

The acquired information must be used to shape the immediate course of events within the given learning context*. Acting in response to this evidence is usually quick, spontaneous, and flexible, because it can take on different forms (e.g., responding with a question, asking other students to express their opinions, or offer an explanation).*

The main purpose of IFA is to make students' thinking evident, or to voice their understanding so that teachers can recognize and act on it to promote learning*.*

Ruiz-Primo (2011)

IFA key strategies

Adopt communication and relational approaches that create a positive and participatory learning climate in which students feel valued and respected as well as comfortable and free to intervene, including expressing doubts and any difficulties

Give students the reference points to orient themselves in the instructional path and monitor/regulate their learning processes, making explicit the learning objectives related to specific lessons or activities and framing them in a coherent and structured learning trajectory

Paying continuous attention to students' learning processes, involving them and encouraging their contributions during teaching activities in order to gather information on their levels of understanding and difficulties

Use the information gathered to modulate subsequent actions and interactions and to promote an exchange of feedback (between teacher and students and among peers) to help students progress in their learning

The reference framework

IFA for quality teaching in HE:
dimensions and sub-dimensions of the construct

Structuring
Clarifying the learning goals and the structure of the instructional path

S1. Opening
At the beginning of the lesson, the teacher clarifies the learning objectives and contents/activities of the lesson and places them within the broader context of the instructional path

S2. Ongoing orientation
During the lesson, the teacher orients students by connecting the contents/activities to the learning objectives of the lesson and the broader context of the instructional path

S3. Closing
At the end of the lesson, the teacher gives a review of the lesson and directs students to the learning objectives and contents/activities of the following lesson(s)

Eliciting
Engaging and activating the students to gather information about their learning and developing understanding

E1. Questioning
The teacher asks questions during the lesson to engage students and elicit information about their learning processes

E2. Proposing tasks
The teacher proposes specific tasks during the lesson to engage students and elicit information about their learning processes. These tasks do not fall in the summative assessment (no grade is given)

Reacting/Using
Acting on the information collected to regulate and improve teaching and learning processes

R1. Responding and building upon students' contributions
The teacher develops on lesson contents/students' ideas and extends the instructional interaction starting from the contributions of students

R2. Providing feedback
The teacher gives feedback to students about their contributions

R3. Promoting self and peer assessment
The teacher creates opportunities for students' individual and collaborative reflection on their learning by promoting self assessment and peer assessment processes

Learning climate
Establishing a positive, safe and participatory learning environment

LC1. Involvement and participation
The teacher uses relational and communicative modes (verbal and non-verbal) suitable to foster students' involvement and active participation

LC2. Recognition and appreciation
The teacher gives value to the students and their contributions

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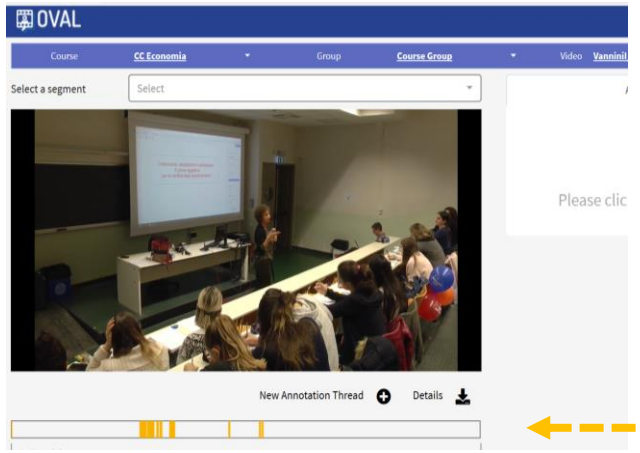
IFA indicator system

IFA indicator system

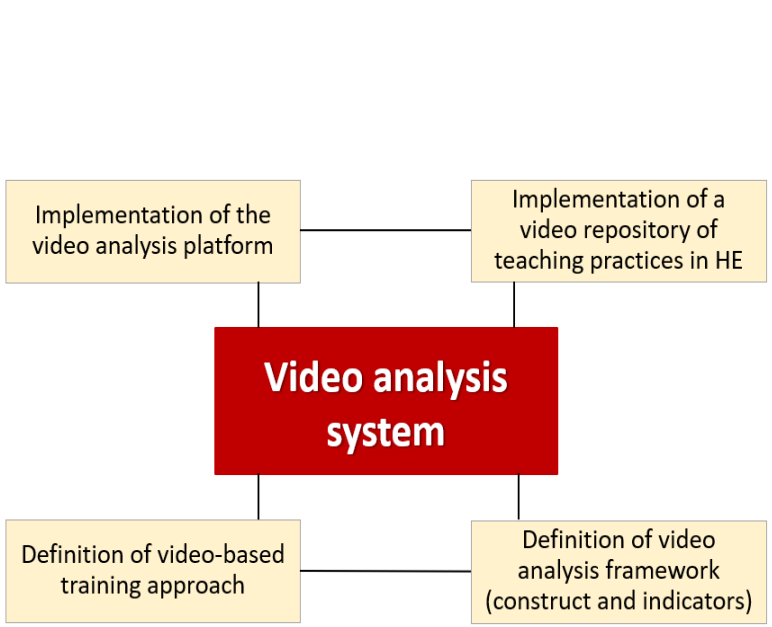
Operationalization of the construct by defining specific observable teacher behaviors and actions related to the various dimensions and sub-dimensions

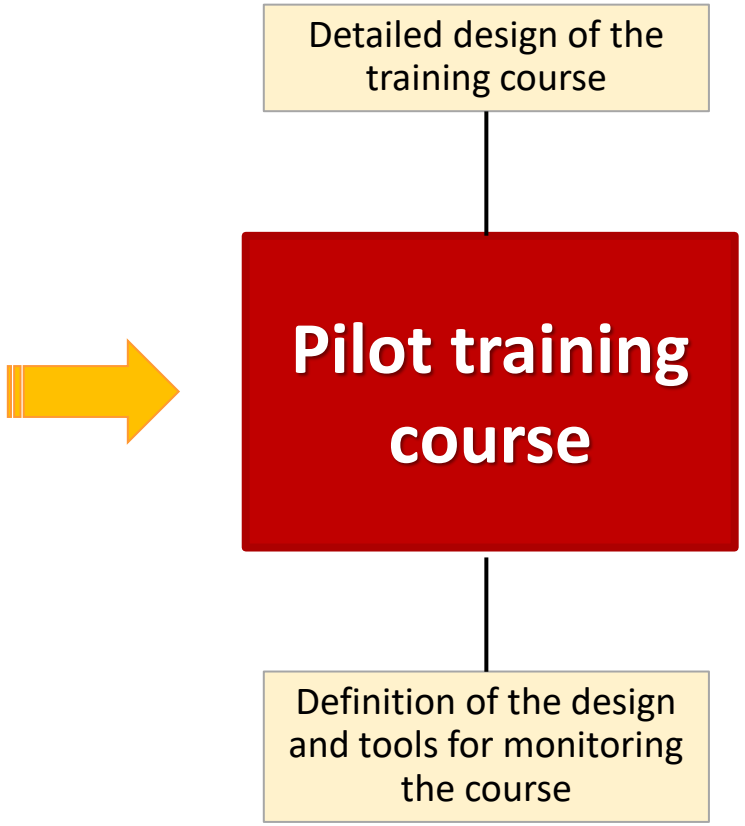
Validation of the indicator system through involvement of a Panel of national and international experts with high scientific expertise on the issues of teaching, assessment, teacher training

Integration of the system within the OVAL platform, thus enabling indicators to be used for observation and analysis of video sequences from the repository



2 Testing the system within a pilot training course aimed at UNIBO teachers





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Validation of a training intervention "model" based on video analysis for the development of university teachers' teaching skills

Testing in other training programs

The pilot course (1)

PURPOSE

Promote the use of effective teaching and assessment strategies to support student learning and foster student activation and engagement in the classroom

TRAINING OBJECTIVES

- Know specific strategies of *informal formative assessment*
- Understand the potential impact of such strategies on the quality and effectiveness of teaching-learning processes
- Recognize and critically analyze *informal formative assessment* strategies in specific classroom situations observed via video, exercising *noticing* and *reasoning* skills
- Reflect on one's teaching-assessment practices and hypothesize possible elements of change related to the use of the strategies examined

The construct dimensions and related indicators were explored in depth through the systematic use of video-analysis procedures, carried out with reference to video sequences previously selected by the research team and associated with specific noticing and reasoning activities – individual and small group – aimed at guiding teachers in analyzing and reflecting on strategies related to the dimensions considered

The pilot course (2)

Running period and duration: three 4-hour meetings in June-July 2021 + one follow-up meeting in October 2021

Location: Department of Education "G.M. Bertin" of the University of Bologna

Participants: 13 faculty members (diversified by age and academic role) from the Department of Civil, Chemical, Environmental and Materials Engineering (DICAM) of the University of Bologna

The monitoring of the pilot course (1)

Aims and design of the evaluation research

Evaluate the effectiveness of the pilot training course through a single-group pretest-posttest design (Campbell & Stanley, 1963)

Collect some initial data useful for reflecting on the validity of the training model developed, also with a view to designing further training courses aimed at university teachers

Hypothesis

Specifically, the evaluation research aimed to test the hypothesis that the video-based training model defined under the project would promote in participating teachers:

- a shift in conceptions of the purpose of assessment in higher education toward a view more focused on improving teaching and learning processes
- an increase in perceived knowledge and skills related to *formative assessment*
- the development of noticing and reasoning skills with reference to IFA practices in university teaching

Dependent variables measured pre and post intervention

A specific focus was also placed on teachers' satisfaction with the course and their motivation/intention to apply the formative assessment strategies examined during the course in their teaching practice

The monitoring of the pilot course (2)

Data collection procedures and tools

Based on the research design and hypotheses, two types of instruments were developed and used for the pre and post intervention collection of data (both quantitative and qualitative):

- two **semi-structured questionnaires** (initial and final) administered online before the start of the course and after its conclusion
- a **video-based task** administered at the beginning of the first meeting of the course and at the end of the last meeting

During the follow-up meeting in October 2021, a **focus group** was also conducted to further discuss the data collected through the final questionnaire on participants' perceptions of the training as well as to explore the dimension of impact on teaching practice

Some findings…

Conceptions of assessment (TCoA): PreTest/PostTest comparison

The differences observed between pre-test and post-test were not statistically significant (paired samples t-test). However, some interesting changes are observed, especially with regard to the *Improvement* subscale.

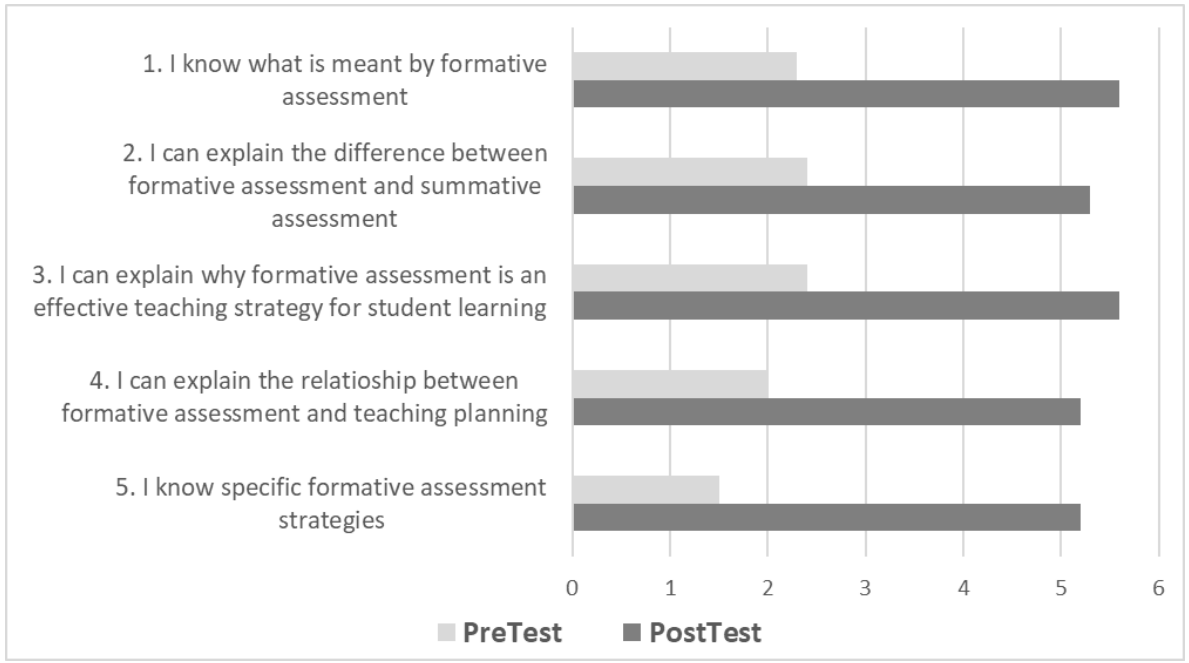
Aggregate values for subscales (scale from 1 to 6 with three levels of disagreement and three levels of agreement)

Subscales	**% Agreement (values 4-6) PreTest**	**% Agreement (values 4-6) PostTest**	**Average PreTest score**	**Average PostTest Score**
Improvement (12 item)	65,1	81,0	3,8	4,3
Irrelevance (9 item)	39,4	50,5	2,9	3,1
Student Accountability (3 item)	57,6	54,5	3,5	3,4
Higher Education Accountability (3 item)	45,5	45,5	3,1	3,3

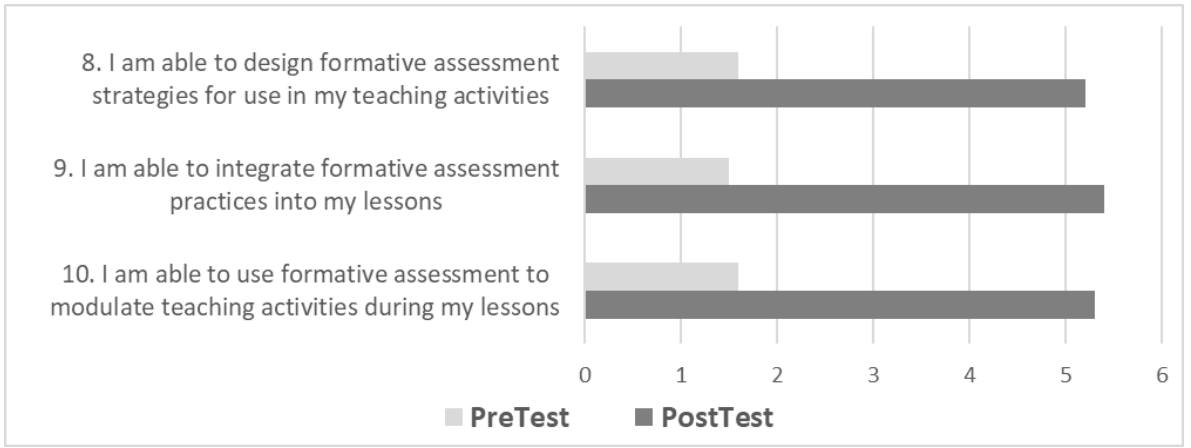
Perception of competence in relation to *formative assessment*: PreTest/PostTest comparison

A noticeable increase in mean scores is observed with respect to all items (scale from 1 to 7).
The observed differences between pre-test and post-test are all significant at the 0.001 level (paired samples t-test).

Perception of knowledge related to FA



Perception of ability to design/implement FA strategies



Satisfaction with the course

Overall, the items related to the evaluation of the training experience highlight high levels of satisfaction and perceived effectiveness.

Content (%)

Item	Not at all agree	Little agree	Quite agree	Very much agree
1. The content covered was interesting	0,0	0,0	0,0	100,0
2. The content covered is relevant and useful for my work	0,0	0,0	8,3	91,7
3. The discussion of the topics was adequate	0,0	0,0	16,7	83,3

Training methods (%)

Item	Not at all agree	Little agree	Quite agree	Very much agree
4. The training approach was motivating	0,0	0,0	0,0	100,0
5. Participation and interaction were well encouraged	0,0	0,0	0,0	100,0
6. The proposed activities fostered understanding of the content	0,0	0,0	8,3	91,7
8. The support and feedback received from the teachers who held the course were helpful	0,0	0,0	0,0	100,0

Organizational aspects (%)

Item	Not at all agree	Little agree	Quite agree	Very much agree
7. The participants' belonging to the same Department fostered the discussion and learning process in the classroom	0,0	0,0	16,7	83,3
12. The equipment and spaces have been adequate	0,0	0,0	16,7	83,3
13. The time available for training was sufficient	0,0	25,0	58,3	16,7

Video analysis (%)

Item	Not at all agree	Little agree	Quite agree	Very much agree
9. The opportunity to observe video-recorded teaching practices added value to the training	0,0	0,0	16,7	83,3
10. Video analysis has been a valid training methodology	0,0	0,0	25,0	75,0
11. The OVAL platform was a useful tool for video analysis	0,0	0,0	8,3	91,7

Learning (%)

Item	Not at all agree	Little agree	Quite agree	Very much agree
14. During the course, I gained new knowledge/skills	0,0	0,0	16,7	83,3
16. The course has helped to broaden my way of thinking about assessment	0,0	0,0	8,3	91,7
17. The course prompted me to reflect on my teaching practices and question some aspects of them	0,0	0,0	16,7	83,3

Usefulness of learning (%)

Item	Not at all agree	Little agree	Quite agree	Very much agree
15. The knowledge/skills learned can be used in my lessons	0,0	0,0	16,7	83,3
20. The application of the knowledge/skills learned may enable me to improve the quality of my teaching	0,0	0,0	16,7	83,3

Intention/motivation to apply/transfer (%)

Item	Not at all agree	Little agree	Quite agree	Very much agree
18. The course motivated me to put into practice what I learned to rethink my teaching and assessment practices	0,0	0,0	25,0	75,0
19. I would like to use formative assessment strategies in my future teaching activities	0,0	0,0	16,7	83,3

Overall satisfaction *(%)*

	Not at all	Slightly	Quite	Very much
Overall, how satisfied are you with the training you participated in?	0,0	0,0	0,0	100,0

	Not at all	Slightly	Quite	Very much
Overall, did the training course meet your expectations?	0,0	0,0	8,3	91,7

	Yes	No
Would you recommend other colleagues to participate in the course?	100,0	0,0

What did you enjoy most about this course?

Main aspects that emerged from the content analysis of the responses:

- multidisciplinary composition of the group of "teacher-trainers"
- informal and participatory classroom climate, opportunity for involvement/interaction/discussion
- usefulness of the proposed content and activities

What aspects of the course would you suggest to modify/improve?

The main critical issue noted by most teachers concerns the duration of the course (need for more training hours)

The FOCUS GROUP

The new semester has begun, and all of you have been starting your teaching activities a few weeks ago. Now that you have returned to the classroom, do you feel that you have drawn from our meetings, particularly the proposed framework, some ideas for the change of your teaching practices? Are you using any IFA strategies with your students? Or do you have any food for thought for the future regarding the design of your lessons?

Main aspects that emerged from the content analysis of the responses:

- greater awareness and intentionality with respect to one's teaching practices
- specific changes in their own teaching practices
- critical elements in the change of one's teaching practices
  - *issues related to student attitudes*
  - *time constraints*
  - *difficulties related to online/mixed teaching*

Future perspectives…

- Collection of additional videos of teaching practices in HE
- Testing of the training intervention model developed (with revisions based on the outcomes of the pilot course) in additional training courses aimed at university teachers
- Possibility of other types of training interventions supported by video analysis (e.g., *self-viewing* or *peer-viewing*) to promote teachers' professional development and support them in changing their teaching practices

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Grazie per l'attenzione!

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