Design, implementation and study of A long-term professional development program for physics teachers and its influence on teachers’ knowledge, views and practice, and students’ learning

The Program

Evidence-based
Teachers examine their teaching and their students’ learning, share their findings and reflections with peers, and summarize the process in “evidence-reports.”

Focusing on knowledge integration (KI)
Through introducing short generic activities and dialogues, the teachers guide the students to connect between their learning experiences.

Each KIR is carried out in five phases:
- Individual work
- Group work
- Whole-class discussion
- Homework
- Individual reflection

Supporting student-centered practice
Integrating face-to-face meetings with on-line interactions
Transforming “The usual once a month meeting workshop to a 9 month workshop.”

The Study

Design and implementation of the program

Q1: How were the Strategies of the Evidence-Based and Blended-Learning Approaches Carried Out in the Program?

Design principles

- The KI and evidence aspects were acquired simultaneously in an integrated manner.
- The guidance of the teachers followed the principles of cognitive apprenticeship both in the evidence and the KI aspects.
- The teachers experienced the KIRs as learners.

Q2a: How did the evidence-based approach influence the teachers’ professional development?

Content analysis of the teachers reflective discourse in the face-to-face meetings

Q2b: How did the blended-learning approach influence the continuity in the teachers’ professional development?

Content analysis of the on-line postings

Q3a: What did Teachers Report about the Initial State of their Students’ knowledge and about the Changes in this Knowledge as a Result of Working with the KIRs?

Content analysis of the teachers’ evidence reports

Q3b: What can be Inferred from the Students’ Work about the Initial State of their Knowledge and about the Changes in this Knowledge as a Result of Working with the KIRs?

Independent analysis of the students’ worksheets

Q3c: What did Teachers Report about the Changes in their Practice and How it was Influenced by Working with the KIRs?

Content analysis of the teachers’ evidence reports and discourse Observations in classes

The influence of the program on the teachers’ views and knowledge

Continuous Learning?

Results

- Progression in the teachers knowledge and views about KI, evidence, and student-centered pedagogies
- Reasoning patterns – mechanisms loading to professional development
- Discussing the same ideas in the face-to-face meetings and on-line postings
- Use of the same reasoning patterns in the face-to-face meetings and on-line postings
- A flow of teachers’ ideas between face-to-face and on-line environments resulting in extension of ideas

The role of the on-line tools in stimulating and maintaining the teachers’ awareness to the “students’ voice”

"Mini Research”

"Smashing Sentences”

The percentage of the posted units relating to “students’ voice” (N=70)

Significant change in their knowledge and practice

Teachers’ evidence reflect reality

Deficiencies in the initial state of their students’ knowledge

Distribution of correct answers while advancing with the KIRs’ phases (N=168)

Shift of practice to more student-centered pedagogies

Recommendations

The influence of the program on the teachers’ practice and their students’ learning