



Deliverable D3.4 Prototype professional development package for teachers: A prototype professional development package to support teachers in their use of the toolkit

Principles for effective professional development

Many efforts have been undertaken in studying the efficiency of professional development (PD) within the last decade. Several literature reviews and meta-analyses summarize evidence of the effectiveness of various projects concerning PD (Lipowsky, 2006 and 2010; Lipowsky & Rzejak, 2012; Timperly et al., 2007; Yoon et al., 2007). The role of digital technology has an increasing impact on PD because of institutional demands and new classroom practices (Clark-Wilson, 2014). The approaches differ considerably as education systems, their goals and organisational structures vary across the globe. Still, certain principles for designing successful units in continuing professional development (CPD) emerge from these analyses and have been summarized by the DZLM (Deutsches Zentrum für Lehrerbildung Mathematik/ German Centre for Mathematics Teacher Education, cf. Kramer et al., 2013; Blömeke, 2013). We refer to this categorization and view the following principles as design criteria for developing a FaSMEd CPD package for teachers (these principles are in line with the findings about effective CPD initiatives summarised in deliverable D1.5):

Transparent competence goals

CPD units are generally designed with the focus on developing certain teacher competencies. Successful CPD units make these goals transparent for all participants. Enabling teachers to see a relation to their own teaching practice clearly can increase their motivation while taking part in the CPD (Timperley et al., 2007; Landry et al., 2009).

Focus on content

Effective CPD often has a focus on content, e.g. the analysis of student learning processes, the diagnosis of student products or reshaping individual teaching practices (Lipowsky & Rzejak, 2012).

Connecting theory and practice

Successful CPD approaches create connections between theoretical knowledge and practical experience by giving participants opportunities to try out new ideas during their daily work in classrooms and to integrate their workplace experience into the CPD meetings. This can be achieved by deploying input, practice and reflection phases (Carpenter et al., 1989; Lipowsky & Rzejak, 2012).

Case orientation

Concrete cases such as student products, student interviews or classroom videos serve as a starting point for and a connection to the praxis during the training. The particular focus on participants' practical experiences is regarded as the core of an effective CPD (Timperley et al., 2007; Lipowsky & Rzejak, 2012).

Collaboration

The collaboration among teachers is a critical aspect for long-term effects of professional training (Bonsen & Hübner, 2012). Many researchers point out the importance of initiating cooperation among colleagues in a more systematically structured and continuous way (Bausmith & Barry, 2011; Kruse et al., 1995; Lomos et al., 2011; Lipowsky & Rzejak 2012; Boyle et al., 2005; Cochran-Smith & Lytle, 1999; Putnam & Borko, 2000). One of the most promising ways to accomplish this is building professional learning communities (PLCs). A PLC is "a group of people sharing and critically interrogating their practice in an on-going, reflective, collaborative, inclusive, learning-oriented, growth-promoting way [...]; operating as a collective enterprise" (Stoll et al., 2006, p.223). Therefore, working in a PLC provides teachers with a safe environment to experiment, examine their experiments, talk openly and get down to established principles about effective student learning, which are the conditions for powerful professional learning (see deliverable D1.5 for further information).

(Self-) reflection

Reflecting on the classroom practice is considered a key to promoting professionalism (Koellner et al., 2011). In the safe environment of a professional community, participants reflect on what and how they are learning particularly in relation to their classroom practice (Lipowsky & Rzejak, 2012; Hargreaves, 2013; Bonsen & Hübner, 2012; Lomos et al., 2011; Boyle et al., 2005; Cochran-Smith & Lytle, 1999; Putnam & Borko, 2000).

Considering teachers' needs

Many CPD projects emphasize that growth in teacher competence is based on the careful observation and consideration of the participants' individual prerequisites, questions and problems (Franke et al., 2001; Timperley et al., 2007; Lipowsky, 2010).

These principles can appear simultaneously but they are neither disjoint nor exhaustive. Nevertheless, it is useful to have recourse to such a comprehensive framework of evidence-based principles when designing a CPD unit. One should, however, keep in mind that principles should be used flexibly as guidelines rather than as rigid prescriptions.

Structure of the FaSMEd professional development package:

The materials for the FaSMEd professional development package are integrated in the toolkit-website (see section 4 of the prototype toolkit in deliverable D3.1). These materials are the contents of the CPD units and can be used by teachers or groups of teachers as self-training courses as well as by teacher trainers.

Depending on the conditions in the partner countries, the organisation of professional development trainings might differ within the FaSMEd project. Nevertheless, we propose the following structure as one possibility to consider the principles for an effective CPD initiative:

The teacher training should consist of at least three sessions. This longer-term commitment enhances cooperation and exchange between teachers (professional learning communities, PLCs) either in local meetings or online. Every CPD session begins with collecting the teachers' preconditions and expectations as well as with revealing the goals of the training explicitly. Every one covers one of the following topics (can be separated into more sessions or extended with other content; session A should be addressed first, B and C can be addressed in any order):

A. What is Formative Assessment?

This CPD unit aims to inform the teachers on formative assessment. It includes materials of the second section of the Toolkit, which gives a theoretical background on formative assessment and stresses the projects' main ideas. Furthermore, some pedagogical challenges associated with using formative assessment in the classroom are addressed.

This part of the CPD uses these modules from the professional development materials of the toolkit (see section 4 of deliverable D3.1):

- 4.1 FA by building on students' prior knowledge
- 4.2 FA by identifying and responding to conceptual difficulties

B. Tools for FA in a group ("Diagnostic teaching")

This CPD unit aims to support the teachers in using formative assessment with groups of students. It provides teaching strategies and addresses further pedagogical challenges associated with using formative assessment in the classroom. In addition, teachers are advised on how to plan their own classroom activities and lessons that include formative assessment.

This part of the CPD uses these modules from the professional development materials of the Toolkit (see section 4 of deliverable D3.1):

- 4.3 FA by improving questioning
- 4.4 FA by increasing student collaboration
- 4.6 Planning lessons that include FA in different phases of teaching

C. Tools for FA with the focus on individual students

This CPD unit aims to inform teachers on how to use formative assessment when focusing more on individual students rather than the whole class. Furthermore, the planning of lessons that include formative assessment is addressed again as it is essential in order to embed formative assessment in the teachers' future practice.

This part of the CPD uses these modules from the professional development materials of the Toolkit (see section 4 of deliverable D3.1):

- 4.5 FA by enhancing students to become assessors
- 4.6 Planning lessons that include FA in different phases of teaching

At the end of every session, teacher trainers and teachers come to an agreement on which materials will be tested in the classrooms and which tasks the teachers work on after the

session. Therefore, the next meeting can start with a reflection on, and discussion of, the participants' experiences with formative assessment in their own classrooms.

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