Indicators for evaluating the impact of initiatives on STEM teachers' competence development

In this document proposed are indicators (and sub-indicators) for evaluating the impact of initiatives on Science, Technology, Engineering and Mathematics (STEM) teachers' competence development, relevant to the national contexts of Greece (GR), the Netherlands (NL), Bulgaria (BG) and Spain (ES). Identified indicators and sub-indicators are based on EC (2013) framework for teachers' competence development (1). The report "*Policy envisions and requirements for STEM teachers' competence development: the case of Greece, Netherlands, Bulgaria and Spain*" (2) provided the information relating the national contexts in which each sub-indicator is relevant to (explicitly as evident in national policy documents and the curricula for STEM teachers' training; implicitly as evident in students STEM curricula).

Outcome Through the participation in initiatives for STEM teachers' competence development, STEM teachers are expected to :	**Outcome Indicators** STEM teachers participating in initiatives for their competence development should demonstrate:	**Sub-indicators** STEM teachers participating in initiatives for their competence development can document the following types of evidence:	**National contexts** in which the sub-indicators are relevant to:	
			Explicitly	Implicitly
Develop **knowledge & understanding** on learning & teaching  **"I have knowledge & understanding on this"**	**Enhanced knowledge and understanding on STEM related & teaching and learning content**	***Demonstration of enhanced STEM knowledge*** *(knowledge in specific content areas)*	NL,BG,ES	GR
		Demonstration of enhanced Pedagogical Content Knowledge (knowledge of tasks, learning contexts & objectives; knowledge of students' prior knowledge & subject specific learning difficulties; strategic knowledge of instructional methods & curricular materials)	NL,BG	GR, ES
		Demonstration of enhanced Curricular Knowledge *(knowledge of STEM curricula- e.g. the planned and guided learning of subject specific contents)*	GR,NL,BG,ES	
		Demonstration of knowledge on issues pertaining to developmental psychology	GR,NL,BG,ES	GR,ES
		Demonstration of knowledge on issues of inclusion and diversity	GR,NL,BG,ES	GR,NL,ES
	Enhanced knowledge and understanding on methodologies and methods relating to STEM learning and teaching	***Demonstration of enhanced Pedagogical knowledge*** *(knowledge of teaching and learning methodologies &* processes; group processes & dynamics; learning theories & motivational issues)	GR,NL,BG,ES	GR,NL
		Demonstration of knowledge on innovative STEM methodologies *(e.g. inquiry based learning and teaching)*	NL,BG	NL
		Demonstration of knowledge on evaluation and assessment *(processes and methods)*	NL,BG,ES	GR
		Demonstration of knowledge on new technologies *(and their affordances as a tool for more effective learning)*	GR,NL,BG,ES	GR,NL,BG,ES
	Enhanced knowledge and understanding on contextual aspects of learning and teaching	***Demonstration of knowledge on educational sciences foundations (****intercultural, historical, philosophical and sociological knowledge****)***	GR, NL, BG, ES	
		Demonstration of knowledge on contextual, institutional & organizational aspects of educational policies	GR, NL, BG, ES	

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			Explicitly	Implicitly
Develop **skills** for learning & teaching  **"I can do this"**	**Enhanced learning skills -relating to the promotion of teachers' own learning**	***Demonstration of ability to using, develop and create research knowledge to inform practices***	GR,NL,BG,ES	NL,ES
		Demonstration of reflective & metacognitive skills during owns learning	GR,BG,ES	NL
		Demonstration of interpersonal skills for learning individually and in professional communities	GR,BG,ES	NL
	Enhanced teaching skills –relating to the promotion of students' learning	***Demonstration of ability to plan, manage and coordinate teaching***	GR,NL,BG,ES	GR,NL,BG
		Demonstration of ability to use teaching materials and technologies	GR,NL,BG,ES	GR,NL,BG
		Demonstration of mastery in managing students and groups	NL,BG,ES	GR,NL,BG
		Demonstration of ability to monitor, adapt and assess teaching/learning objectives and processes	GR,NL,BG,ES	NL
		Demonstration of collecting, analysing, interpreting evidence and data skills for professional decisions and teaching/learning improvement	NL,BG	GR,NL,ES
	Enhanced professional skills- relating to teachers' role as part of educational communities	***Demonstration of collaboration skills (****with colleagues, parents and social services)*	NL, BG	
		Demonstration of negotiation skills *(social and political interactions with multiple educational stakeholders, actors and contexts)*		
		Demonstration of ability to adapt to educational contexts	BG	NL,ES
		Demonstration of Life and Career skills *(Flexibility and adaptability; Initiative and self-direction; Productivity; Leadership and responsibility)*		BG

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			Explicitly	Implicitly
Come to value learning and teaching- **dispositions & attitudes**  **" This is important to me"**	**Positive dispositions and attitudes relating to teachers own learning**	***Demonstration of epistemological awareness***	GR,BG	BG
		Demonstration of positive dispositions to change, flexibility, ongoing learning and professional improvement *(including study and research)*	GR,BG,ES	NL
		Demonstration of critical attitudes to one's own teaching *(examining, discussing, questioning practices)*	GR,NL,BG	NL,
	Positive dispositions and attitudes relating to the promotion students learning	***Teaching skills through content***	NL,BG,ES	GR
		Transferable skills	BG	NL
		Commitment to promoting the learning of all students	GR,NL,BG,ES	GR
		Dispositions to promote students' democratic attitudes and practices, as European citizens *(including appreciation of diversity and multiculturality)*	GR,NL,GR	GR,NL,ES
	Positive dispositions and attitudes relating to their role as part of educational communities	***Dispositions to team-working, collaboration and networking***	GR,NL,BG	NL,ES
		Sense of self-efficacy		

(1) European Commission (2013) Supporting teacher competence development for better learning outcomes, accessible here: http://ec.europa.eu/dgs/education_culture/repository/education/policy/school/doc/teachercomp_en.pdf

(2) Report "*Policy envisions and requirements for STEM teachers' competence development: the case of Greece, Netherlands, Bulgaria and Spain*", accessible here: http://www.learning-in-teaching.eu/images/docs/EN/IO1/IO1.pdf.

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