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Noticing and analysis of pedagogical practices in mathematics

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The purpose of this presentation is to show elements associated to the study and analysis of pedagogical practices used by mathematics teachers, taking into consideration different approaches and conceptions derived from theories related to the role of the math teacher. The project highlights the need to use different strategies to analyze the processes occurring in the activities and tasks organized and implemented by the teacher.

One of the main tasks in teacher training is to promote the capacity to noticing on the pedagogical activity, where noticing is understood as an inherent process to improve the quality of classroom management. In addition, different analysis models should be compared using examples and experiential practices and the different theories and research projects developed in this field related to this type of analysis.

Knowing what happens in the classroom is a task inherent to the math teacher. For

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sure, if the teacher does not understand or is even able to perceive what is happening in the class, improvement actions are very difficult to implement. Consequently, math teachers must develop the capability of analyzing their pedagogical activity and the related elements. It is not about isolating variables and looking for causal relationships, but rather about understanding the teacher's activity as the center of the multiple situations occurring in the classroom, which may be known more in depth, if the attention is focused on the organization, ordering, and execution of the tasks planned by the teacher.

It must also be understood that the competence of analyzing mentioned here is not an isolated activity without an effect. Such analysis must be approached from an active perspective where scenarios are generated to mitigate complex situations or to value an approach different than the one happening in the classroom. Being aware that there are many aspects to analyze (most likely almost everything that happens is analyzable), we must take a stand on which situations are highly related to what happens in our classroom and which could eventually happen.

With such a wide spectrum, some questions that need to be addressed are: What is important in the math education activity and who defines what is important? What elements are of interest to math teachers? How does the analysis conducted relate to the different models of the teacher's knowledge? How does our previous experience influence the assessments we make? How do we distinguish elements of interest to analysis? What is the relationship between reflecting and analyzing? At what stages of the teacher's activity is an analysis required? What is the ultimate purpose of analyzing teaching activities? What competencies or skills are related to the analysis? What types of analysis are appropriate (content, cognitive, media, among others)? How can we balance the actions derived from the analyses we conduct? From all these questions the most important one that can guide the study of this reflection would be: **What should be assessed in pedagogical activities and what is the objective of analyzing such pedagogical activities in math education?**

The following is a systematization of some recommended references from scientific literature that provide the foundations for this communication.

Topics	Authors
Use and study of video-recorded lessons.	Admiraal (2014); Alsawaie & Alghazo (2010); Borko, Koellner, Jacobs & Seago (2011); Coles (2014); Hiebert, Stigler & Manaster (1999); Kaiser, Busse, Hoth, König & Blömeke (2015); Santagata, Zannoni & Stigler (2007); Star & Strickland (2008); and Stockero (2008).
Knowledge and competences of the mathematics teacher	Agarwal (2006); Ball, Hill & Bass (2005); Ball, Thames & Phelps (2008); Clement (2001); Climent (2002); Godino, Giacomone, Batanero & Font (2017); Gómez (2007); Haciomeroglu (2006); Hill, Ball & Schilling (2008); Jansen & Spitzer (2009); Lupiáñez (2009); Morales (2010); Morales (2011); Morales (2014); NCTM (2000); Rodríguez-Flores, Picado-Alfaro, Espinoza-González, Rojas-González & Flores-Martínez (2016); Rojas (2010); Rojas, Carrillo & Flores (2012); Rojas, Flores & Ramos (2013); Shulman (1986); Shulman (1987); Shumway (2003); and Trouche, Drijvers, Gueudet &



Topics	Authors
	Sacristán (2013).
Noticing, Reflection and Research in education	Gellert, Hernández & Chapman (2013); Hayden, Moore-Russo & Marino (2013); Llinares (2013); Mason (2017); Morales-López & Font (2019); Morales-López (2017); Morales-López (2019); Morales-López & Font (2017); Potari & da Ponte (2017); and Rosaen, Lundeborg, Cooper, Fritzen & Terpstra (2008).
Onto-semiotic Approach	Godino, Batanero & Font (2007); and Montiel, Wilhelmi, Vidakovic & Elstak (2009); Font, Morales-López & Alpízar-Vargas (2019)
Lesson Study	Huang & Li (2009); Hummes, Font & Breda (2019); and Yoshida, (2012).

Keywords: Noticing; teaching; mathematics; knowledge; pedagogical activities.

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