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**Professional learning through the collaborative design of problem-solving lessons.**

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Summary: This article analyses lesson study as a mode of professional learning, focused on the development of mathematical problem solving processes, using the lens of cultural-historical activity theory. In particular, we draw attention to two activity systems, the classroom system and the lesson-study system, and the importance of making artefacts instrumental in both. We conceptualise the lesson plan as a boundary object and use this to illustrate how professional learning takes place through the introduction of carefully designed artefacts that draw on teachers' professional knowledge of potential student approaches, and to the nature of progression in problem-solving processes. We identify the roles of instrumentalisation and instrumentation in supporting professional learning as these artefacts are prepared for use before a lesson and as they are again used as catalysts for reflection in post-lesson discussions. These artefacts are seen to effectively facilitate the socially situated learning of all participants. We conclude that the design of artefacts as boundary objects that support teaching and professional learning in their respective activity systems may be fundamental to the success of lesson study as a collaborative venture.

*Classification:* D39 D50 D40 C70

*Keywords:* cultural-historical activity theory; lesson study; problem solving; task design

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