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**Specifying and structuring mathematical topics. A four-level approach for combining formal, semantic, concrete, and empirical levels exemplified for exponential growth.**

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Summary: This article presents our four-level approach for specifying and structuring mathematical learning content developed within the research program of topic-specific design research. We understand this approach as an extension of classic “didactical analysis of subject matters,” following the tradition of *Stoffdidaktik* and extending it by combination with an empirical component. For the exemplarily chosen topic of exponential growth, we illustrate why specifying and structuring along the four-level approach is a constructive and creative work rather than a pure analysis. We discuss the mostly theoretical work of classic didactical analysis of subject matters on the formal, semantic, and concrete levels and analyze the connections between these levels and the empirical level. With the four-level approach, we emphasize the need for including empirical investigations since they can enrich the process of specifying and structuring mathematical topics.

*Classification:* I20 C30 D30

*Keywords:* specifying and structuring content; combining subject matter didactics with empirical investigation; exponential function; students’ conceptions and learning processes; design research

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