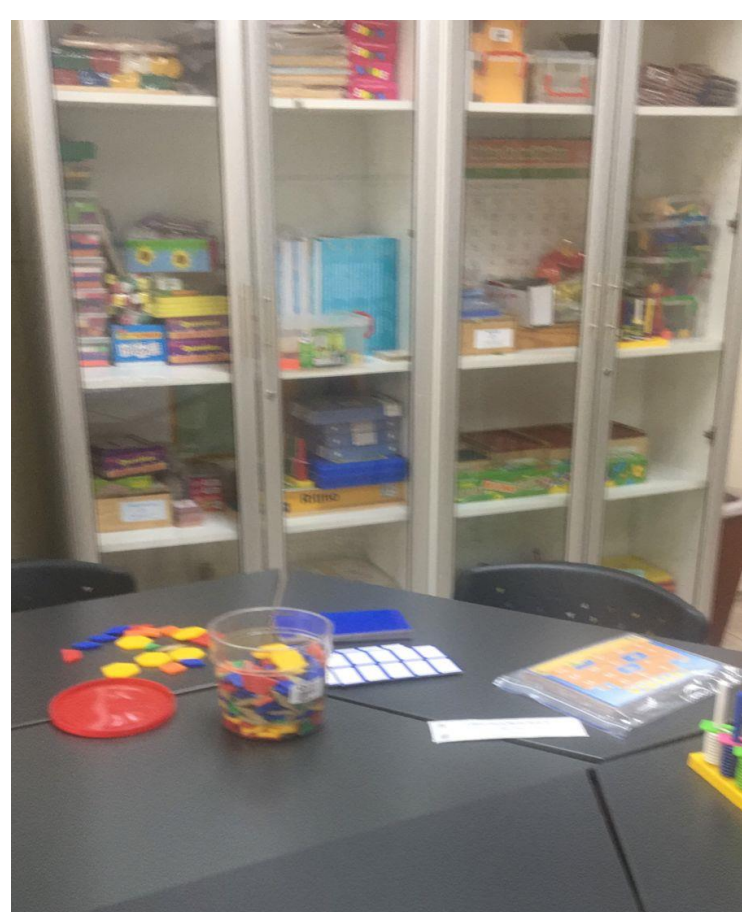


Construction of a laboratory for development of interactions in the learning and teaching of Mathematics

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Background

Brüning (2017) notes that there is little research on the impact of teaching-learning laboratories (LLL). In Chile, the situation is even less favourable, as there are not even rooms in which research can be conducted. Interactions in a laboratory take place between people involved in education, but are also determined in particular by space, time, available materials and the social context (Kihm, 2023). The instructions and explanations that teachers give in their lessons should be learnt in initial training, are important research phenomena for the improvement of the training institution and are interesting for the development of theoretical concepts in mathematics didactics. On the one hand, there is a need for specialised spaces, furniture and equipment for laboratories to bring future teachers closer to pedagogical practice; on the other hand, it is necessary to have an idea of a laboratory that allows research into the development, implementation and modification of effective practices.



PROJECT*

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How, when and where can students in initial teacher education test, simulate, experiment and develop professional skills for high-quality maths teaching?

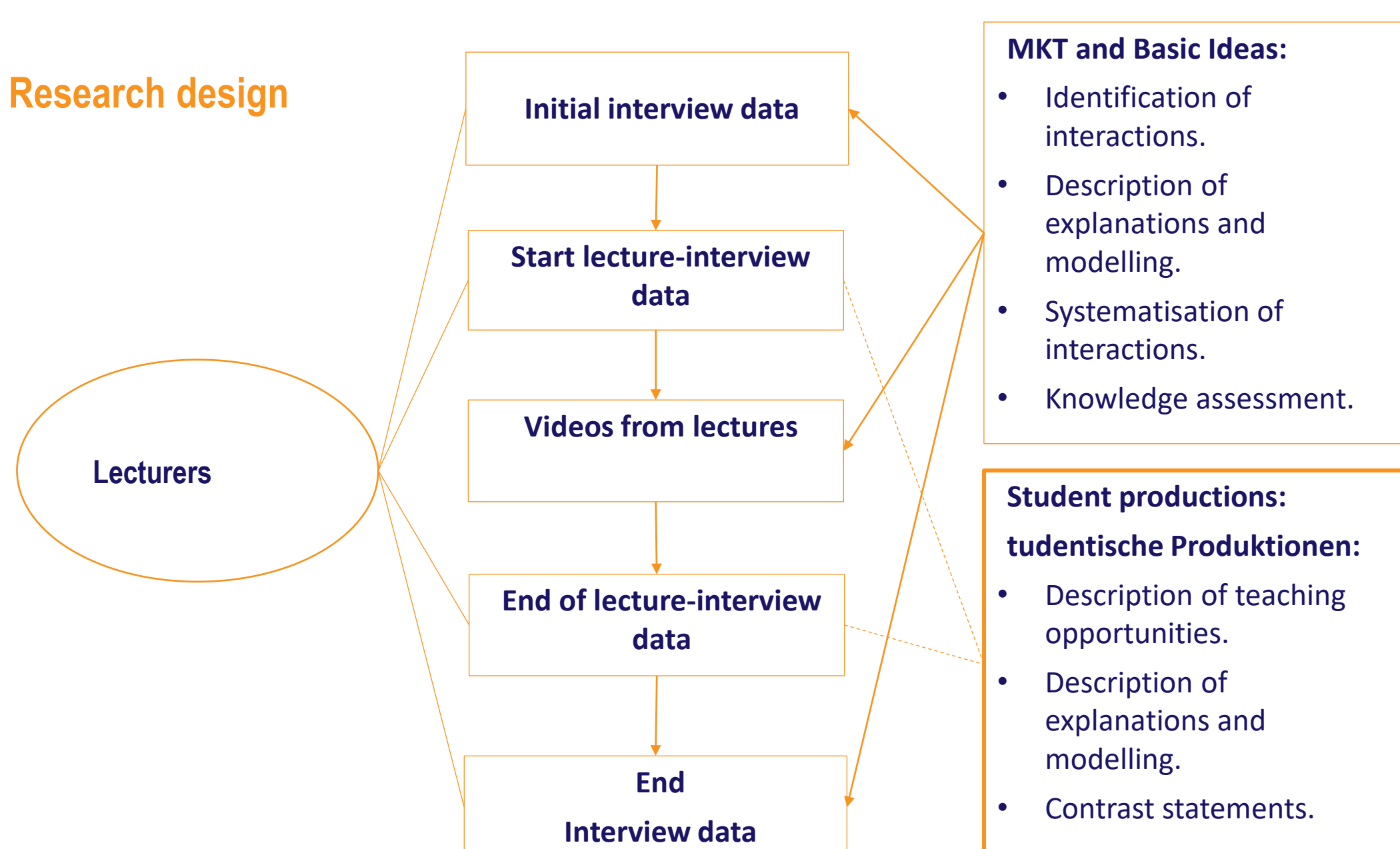


The main objective of this project is therefore the design and implementation of an LLL for lecturers and primary school teacher trainees (GSLs) in mathematics at the university. Here, simulations, experiments and research will be carried out by prospective teachers and lecturers and their observation will be encouraged. By effective practices for mathematics learning, we mean the high-impact practices presented in Grossmann (2018, pp. 164-168). In particular, "leading a group discussion (1, 2)", "explaining and modelling content (1, 2, 3)", "practices and strategies (2, 3, 4, 5)" and "specifying and reinforcing productive student behaviour (3, 4, 5)".

The design of this laboratory is aimed at testing instructions, experimenting with special materials and testing and improving mathematical teaching processes. It therefore provides for five different areas:

1. Plenary work on mathematical representations.
2. Development of arguments.
3. Explanation and modelling of problem solutions.
4. Concrete or digital autonomous work.
5. Development of interactive maths.

Research design



Basic Ideas of mathematical content

Basic conceptions (CBs) play a special role in the effective learning and teaching of mathematics (vom Hofe, 1995; vom Hofe & Blum, 2016; vom Hofe & Reyes-Santander, 2021). GMs enable the construction and explanation of mathematical knowledge because (i) they originate from the subject's experience, (ii) they generate an appropriate visual representation of the concept, and (iii) they have the capacity to be related to reality. Vom Hofe and Reyes-Santander (2021) present some GMs relevant to GSLs (number, fractions, addition, subtraction, multiplication and division). The lab will enable an improvement in the skills of designing, organizing, adapting and structuring learning environments as well as monitoring, observing, analyzing and reflecting on the learning pathway (Wedekind, 2023) of GSLs.

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