



**HAL**  
open science

# Which factors do pre-service teachers consider most important for successful inclusive mathematics classrooms? Results of an interview study

Jennifer Bertram, Petra Scherer

## ► To cite this version:

Jennifer Bertram, Petra Scherer. Which factors do pre-service teachers consider most important for successful inclusive mathematics classrooms? Results of an interview study. Thirteenth Congress of the European Society for Research in Mathematics Education (CERME13), Alfred Rényi Institute of Mathematics; Eötvös Loránd University of Budapest, Jul 2023, Budapest, Hungary. hal-04409073

**HAL Id: hal-04409073**

**<https://hal.science/hal-04409073>**

Submitted on 22 Jan 2024

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# Which factors do pre-service teachers consider most important for successful inclusive mathematics classrooms?

## Results of an interview study

Jennifer Bertram<sup>1</sup> and Petra Scherer<sup>1</sup>

<sup>1</sup>University of Duisburg-Essen, Faculty of Mathematics, Essen, Germany;

[jennifer.bertram@uni-due.de](mailto:jennifer.bertram@uni-due.de)

*Theoretical and empirical literature discuss many factors as being important for teaching in inclusive (mathematics) settings, like teachers' knowledge or beliefs as well as institutional conditions. Teacher education programs intend to provide pre-service teachers with necessary competencies for successful inclusive classrooms. But which factors do German pre-service teachers themselves consider most important for teaching mathematics in an inclusive classroom? After a course on learning mathematics with substantial learning environments (3<sup>rd</sup> year, BA-program for primary mathematics), six pre-service teachers were interviewed to gain insight into this question. Results show that pre-service teachers name quite different factors, which in sum comprise a variety of factors that are discussed in literature as well. In conclusion, some implications for teacher education programs, like reflecting with pre-service teachers about these factors, are presented.*

*Keywords: Pre-service teacher education, inclusive mathematics education, pre-service teachers' perspective, professional development.*

### Professionalization for teaching in inclusive mathematics settings

In research different models for conceptualizing (mathematics) teachers' professional competence exist (for an overview see Schwarz & Kaiser, 2019) which can be used as a starting point for modelling teachers' professional competencies for inclusive (mathematics) teaching (e. g., Bertram et al., 2020; Reis et al., 2020). Thereby, inclusive (mathematics) teaching focuses on coping with heterogeneity and on the teaching and learning of *all* students in an inclusive classroom. Heterogeneity of students might refer to a variety of dimensions like gender, age, language skills, previous knowledge, learning pathways as well as special needs, impairments, or handicaps etc. (e. g. Bishop et al., 2015). Further research on how to prepare pre-service teachers for inclusive mathematics education and therefore, how the required competencies might be developed is still of great importance (e. g. Bock et al., 2019; Troll et al., 2019; Scherer, 2019, 2021). In the following the model by Reis et al. (2020) is used as a starting point to outline important factors for teaching in inclusive mathematics settings, because it already combines the ideas of including different competence aspects like knowledge, beliefs, and self-regulation (Baumert & Kunter, 2013) with the continuum from disposition to performance (Blömeke et al., 2015), and focuses on teacher preparation programs for inclusive teaching. Without going into detail concerning these different competence models or concerning specific teacher education programs discussed in the literature, the model of Reis et al. (2020) and further theoretical and empirical contributions in the field of inclusive mathematics education allow to conclude some factors which seem to be important for successful inclusive mathematics classrooms.

First of all, different dispositions are important, like knowledge, potential for action and orientations (Reis et al., 2020). Knowledge can be specified even more, for example, in content knowledge, pedagogical knowledge, pedagogical content knowledge, organizational knowledge and consulting knowledge (Baumert & Kunter, 2013), with mathematical content knowledge being especially relevant in subject matter specific programs for inclusive mathematics education. The potential for action refers to necessary skills and abilities for teaching in inclusive settings, like the ability to initiate common learning situations or to create differentiating tasks (Reis et al., 2020). Orientations describe the possibilities to reflect upon individual preconditions for action. In addition, knowledge, potential for action, and orientations lead to a specific planning and preparedness for action (Reis et al., 2020). In turn, these ones lead to the concrete action, i. e., the performance in classroom. All those factors are influenced by motivational orientations and self-regulation skills (Reis et al., 2020). For this paper, the understanding of orientations might be expanded: attitudes and beliefs about teaching in inclusive settings are relevant as well (e. g., Avramidis & Norwich, 2002; Ruberg & Porsch, 2017).

As a variety of understandings about inclusion exists, not only in terms of being an ideology or a way of teaching (Roos, 2019), but also from a pre-service teachers' perspective (e. g., Schaumburg et al., 2019), it is important to notice at least one further model for teachers' competencies in inclusive settings that concentrates on a narrower understanding of inclusion: Reis et al. (2020) try to summarize competencies of all teachers, whereas other models focus on competencies especially of special education teachers in inclusive settings. For example, the model by Moser and Kropp (2015) discusses the importance of diagnosis and support, specific disabilities, or teachers' cooperation in the context of special education teachers' competencies in inclusive settings. In addition to teachers' competencies, inclusive education is often discussed in relation to school and lesson development, like organizing support for diversity or mobilizing resources (cf. Booth & Ainscow, 2002).

Research on teacher education programs often focuses on one or more of these factors: Bock et al. (2019) concentrated on situation specific-skills, Troll et al. (2019) considered beliefs, self-efficacy and self-reported pedagogical content knowledge, and Scherer focused on pre-service teachers' experiences (Scherer, 2019) as well as retrospective self-assessment of developed competencies (Scherer, 2021). Although this is just a small overview of the huge amount of literature concentrating on preparation of pre-service teachers for inclusive mathematics classrooms, the perspective of the pre-service teachers themselves is rarely focused on. To analyse whether they are aware of this broad spectrum of relevant factors, the research question of this study is: *Which factors do pre-service teachers mention as important for inclusive mathematics teaching from their point of view?* Especially, this question focuses on mathematics teaching and allows to have a subject specific view on inclusive classrooms. In Germany, students with special needs either visit special schools or regular schools in inclusive settings (Scherer, 2019). On the primary level, the proportion of students with special needs in inclusive settings increases continuously but the different types of schools as well as specific teacher education programs for special education will remain.

## **Methods of the interview study**

After having completed a course on 'Learning Mathematics in Substantial Learning Environments', including practical elements at school (for more details see, for example, Scherer, 2019, 2021) in the

3<sup>rd</sup> year of a BA-program for primary mathematics at the university, interviews were planned with pre-service teachers about teaching in inclusive mathematics settings. Earlier in the BA-program, courses for didactics of mathematics in semester 1 to 4 touch the topic of inclusion casually, whereas the course focused here, goes into more depth (Scherer, 2021). We conducted semi-structured interviews as these allow to ask more open-ended questions and add depth to understand participants' answers (Adams, 2015). The interviews focused on pre-service teachers' beliefs and attitudes about teaching in inclusive mathematics settings as well as their understanding of inclusion and an evaluation of some course-details. For this paper, we selected one part of these interviews, namely answers on the interview question 'Which factors do you consider most important for successful inclusive mathematics classrooms?'. This open-ended question offered the opportunity to answer in a very broad way and additionally, interviewees could explain a factor in detail. At the same time, semi-structured interviews allow to compare different participants' answers to the same question and enable the interviewer to ask for more details.

The whole cohort of pre-service teachers who completed the course was asked to participate in the interview study, and six pre-service teachers agreed voluntarily. The interviews were audio recorded and transcribed afterwards. For data analysis each interview section was read carefully, and suggestions which factors might inductively be identified in the answers were made by the two authors of this paper. For example, the factor *construction of accessible tasks* was generated through answers like "I think, on the one hand, that you really have to make sure that the tasks you select, are really accessible to everyone" (Interview Int1). These suggestions were discussed within a team of (eight other) researchers; all of them are involved in pre-service teacher education programs in primary mathematics. Together, the factors mentioned by the participants were extracted from the transcripts. About forty factors could be identified, which were structured into categories next. Along these categories, the following section reports the results of the study and thereby, the factors, our pre-service teachers see as important factors for successful inclusive mathematics classrooms.

## **Results – Pre-service teachers' perspective on important factors for successful inclusive mathematics classrooms**

The participants named manifold factors in varying depth addressing different fields, and their answers, in general, revealed a positive attitude towards inclusion. The identified factors were structured into the following four main categories: (a) *understanding of inclusion*, (b) *beliefs and attitudes about teaching and learning mathematics*, (c) *connection to special education expertise*, and (d) *mathematics instruction*. This last category consists of the three sub-categories *organizational issues of teaching and learning*, *construction of tasks and arrangement of learning environments*, and *diagnosis and support*.

The first category encompasses factors which show participants' general *understanding of inclusion* (a). They said it was important to accept, that heterogeneity was something "normal", and each child should be honoured for his or her strengths and weaknesses. Teachers should have knowledge about different aspects of heterogeneity (e. g., gender, age, special needs), and it was important not to categorize students as what they "can" or "cannot" do (in a kind of stigmatisation).

The factors in the second category focus on *beliefs and attitudes about teaching and learning mathematics* (b) and often revealed a constructivist interpretation of learning mathematics. For example, the participants emphasized that students should be actively involved in choosing materials or different ways of solutions by themselves. The role of the teacher should be more a moderator by offering different learning opportunities. One participant mentioned that for successful inclusive classrooms teachers' positive attitude towards inclusion was important (Int5).

The third category entails factors which have a *connection to special education expertise* (c). This specific category was generated because in the participants' teacher education program for regular schools, special education expertise is not necessarily in the focus. This specific content is rather dealt with in special education programs. Some participants explained how important it was to have knowledge about special needs of students and about organisational issues in co-teaching. The knowledge about special needs of students should be used for adaptation of learning opportunities and working with another colleague might be used for an exchange of perspectives.

The fourth and last category consists of three sub-categories. All of them focus on *mathematics instruction* (d) itself. One sub-category encompasses factors which describe *organizational issues of teaching and learning*. Following the participants' answers, classrooms with enough space (for example, to arrange group work settings or to separate students), materials for students, personal and institutional resources are important factors for successful inclusion. Sometimes, the participants associated inclusive mathematics teaching with a more time-consuming planning. The factors in the next sub-category refer to *the construction of tasks and the arrangement of learning environments*. Some participants expressed the importance to use tasks with low entrance allowing all students access to learning offers (see also the concrete example Int1 above). Following the participants' answers, it is important to work with problem-oriented and cognitive activating tasks in inclusive mathematics classrooms. In addition, teachers should understand different ways of students' solutions and arrange learning environments in a creative way. The last sub-category focuses on factors which concentrate on *diagnosis and support*. Participants mentioned the importance of individual support for students or specific knowledge about opportunities for supporting students with dyscalculia.

Beyond these categorized factors, participants also mentioned some further interesting factors, which are worth being reported as well. For example, one participant referred to experiences in practice and the education at the university, which both seem to be important for successful inclusive mathematics teaching (Int5). Another participant explicitly reported about her knowledge about school systems in other countries and used this a basis for her argumentation (Int4): some time ago she would have said that smaller class sizes would be important for successful inclusive teaching but now – referring to New Zealand's school system – she focuses more on problem oriented and cognitive activating tasks, which seem to be useful even in classrooms with many students and are important.

## **Discussion of the results**

As the analysis showed, pre-service teachers named many different factors which they find important for inclusive mathematics teaching. In accordance with the literature (e. g., Reis et al., 2020), a broad variety of factors was mentioned, ranging from knowledge (e. g., knowledge about construction of tasks or special needs), and beliefs (e. g., about the role of a teacher), to potential for action and

practical experiences in classroom. Nevertheless, some answers leave room for different interpretations, and it is not always possible to identify what exactly the pre-service teachers associated with the mentioned factor. Three of these open questions are discussed in the following.

Firstly, pre-service teachers mentioned the important role of having (enough) materials and that students might “all work with the same materials” (Int6). Probably, the pre-service teachers had in mind some input from the course they had visited before, because using hands-on materials and working in common learning situations were important topics there (e. g., Scherer, 2019). However, it does not become clear, whether “all work with the same materials” refers to common learning situations or not (e. g., Good & Brophy, 2008, p. 225 ff.; Mitchell, 2014, p. 33 ff.). Secondly, pre-service teachers did not specify, why enough space also for separating children is important (e. g., Int3). Maybe they thought of different opportunities for differentiation in classroom or they thought of situations with individual interactions with children like for a diagnosis or individual support (see for example Good & Brophy, 2008; Krauthausen & Scherer, 2010). In addition, it remains unclear whether the participants are aware of opportunities for balancing individual and common learning situations or the principle of natural differentiation – both ideas were important topics in the course they visited before (e. g., Scherer, 2019). For example, the factor of offering tasks with low entrance for all students fits to the idea of natural differentiation, but some answers concerning separating children might or might not conflict with common learning situations, depending on the concrete implementation. Thirdly, working in teams of teachers might be interpreted as ‘only being in classroom with two teachers of different professions’ or might be interpreted like a ‘real’ cooperative setting. Thus, it remains unclear, which concrete understanding of co-teaching is in mind (see Friend et al., 2010; Mitchell, 2014, p. 71 ff.) and whether co-teaching is understood as, for example, planning common learning situations together and speak about individual support opportunities for individual students or not.

The small number of interviews in this study can be seen as one limitation. Because many factors were mentioned exclusively by single participants, it would be interesting to increase the number of participants and check if further factors would be judged as important from a pre-service teachers’ perspective. Moreover, it would be interesting to investigate similarities and differences in pre-service teachers’ perspectives from different countries, as inclusive mathematics teaching and teacher education programs might have specific national characteristics.

Another limitation is that we just analyzed a small part of the interviews. Future research might combine this analysis with the pre-service teachers’ answers on how they understand inclusive mathematics teaching, or their attitudes and beliefs about inclusion in general. This could help to discuss further questions, like ‘Do beliefs towards inclusion influence the way the pre-service teachers think about ‘special needs’ and about the teaching and learning of mathematics in an inclusive setting?’. Nevertheless, the selected interview sections allowed to identify factors pre-service teachers associate with successful inclusive mathematics classrooms. Finally, it is important to note that the method of inductive qualitative analysis helped to identify similar factors and to arrange them in a reasonable way. Some factors might be related to more than just one category, for example, using problem-oriented and cognitive activating tasks can have a connection to constructivist beliefs on how to learn mathematics, or a positive attitude toward inclusion can have a

connection on how to cooperate with different teachers in an inclusive mathematics setting. Such connections and interdependencies could be analyzed when using the complete interviews as a basis.

### **Implications for (research on) pre-service teacher education programs**

Preparing pre-service teachers for teaching in inclusive settings is a topic of great interest, and the relevance of subject specific aspects could be shown. Pre-service teachers themselves seem to notice many different factors which are important for successful inclusive mathematics classrooms. These findings are relevant for designing and evaluating pre-service teacher education programs.

On the one hand, it offers the opportunity to sensitize all pre-service teachers for later requirements in school, and this might help to get a realistic image of their future job requirements. Teacher educators at the university can encourage pre-service teachers to reflect upon the broad variety of necessary competencies. Moreover, teacher educators should be aware and can point out further important factors that are relevant for inclusion in school. For example, the pre-service teachers in our study did not refer to factors like support by parents or the role of students' attitudes (cf. Mitchell, 2014). This was not surprising as the pre-service teachers did not experience a lot of teaching in practice at school by themselves. Teacher educators should reflect and decide which relevant factors, also considering and referring to theoretical models like Reis et al. (2020) should be integrated in different courses in different phases of teacher education programs to design a coherent program for (pre-service) teachers' professionalization processes.

On the other hand, different pre-service teachers seem to focus on different factors, and it might be helpful to let pre-service teachers discuss among each other which and *why* these factors are important for successful inclusive mathematics classrooms. If some pre-service teachers, for example, focus 'only' on institutional or organisational factors like well-equipped rooms and class size, it could be helpful to have in mind which other factors, like their own pedagogical content knowledge or potential for action in arranging substantial learning environments, are important as well. The latter ones can be influenced by the teachers themselves, and improving these ones may even help pre-service and later in-service teachers to (better) cope with the manifold requirements. Considering a subject specific perspective, concentrating on *the construction of tasks and the arrangement of learning environments* with including ideas of individual and common learning situations or natural differentiation would be especially important (cf. Scherer, 2019).

The results presented in this paper can be used for future research on teachers' professionalization and pre-service teacher education programs. In addition to the afore-mentioned idea of connecting research results on important factors with pre-service teachers' understanding of inclusion, it would be interesting to analyse how pre-service teachers would rank the different factors (e. g. is one factor more important than another in their perspective and why). The setting in this interview study did not focus on possible reasons, why pre-service teachers think of the mentioned factors as being the important ones. It could be interesting to analyse if attending the course on 'Learning Mathematics in Substantial Learning Environments' changes the pre-service teachers' perspective on relevant factors. Furthermore, the pre-service teachers could be asked at different moments as a kind of micro longitudinal study (e. g. at the beginning of their studies shortly after having finished school by themselves, and after having finished all university courses, or after having worked at school as in-

service teachers for some time). Because of the broad variety of necessary competencies also discussed in the literature, it would be interesting to analyze, which of the factors are especially important for mathematics in comparison to other school subjects.

## Acknowledgment

The project is supported by the Federal Ministry of Education and Research (grant FKZ 01 JA 1910) in the program ‘Qualitätsoffensive Lehrerbildung’ (Quality Offensive for Teacher Education).

## References

- Adams, W. C. (2015). Conducting semi-structured interviews. In K. E. Newcomer, H. P. Hatry, & J. S. Wholey (Eds.), *Handbook of practical program evaluation* (4<sup>th</sup> edition, pp. 492–505). Jossey-Bass. <https://dx.doi.org/10.1002/9781119171386.ch19>
- Avramidis, E., & Norwich, B. (2002). Teachers' attitudes towards integration / inclusion: a review of the literature. *European Journal of Special Needs Education*, 17(2), 129–147. <https://dx.doi.org/10.1080/08856250210129056>
- Baumert, J., & Kunter, M. (2013). The COACTIV Model of Teachers' Professional Competence. In M. Kunter, J. Baumert, W. Blum, U. Klusmann, S. Krauss, & M. Neubrand (Eds.), *Cognitive Activation in the Mathematics Classroom and Professional Competence of Teachers. Results from the COACTIV Project* (pp. 25–48). Springer. [https://doi.org/10.1007/978-1-4614-5149-5\\_2](https://doi.org/10.1007/978-1-4614-5149-5_2)
- Bertram, J., Albersmann, N., & Rolka, K. (2020). Ansatz zur Weiterentwicklung des Modells der professionellen Handlungskompetenz von Lehrkräften für inklusiven (Mathematik-)Unterricht. Identifizierte Kompetenzbereiche bei Lehrkräften zu Beginn einer Fortbildung [Approach for the further development of the model of professional competence of teachers for inclusive (maths) teaching. Areas of competence identified for teachers at the start of a training programme]. *QfI – Qualifizierung für Inklusion*, 2(1). <https://doi.org/10.21248/qfi.25>
- Bishop, A., Tan, H., & Barkatsas, T. N. (Eds.). (2015). *Diversity in mathematics education. Towards inclusive practices*. Springer.
- Blömeke, S., Gustafsson, J.-E., & Shavelson, R. J. (2015). Beyond Dichotomies. Competence Viewed as a Continuum. *Zeitschrift für Psychologie*, 223(1), 3–13. <https://doi.org/10.1027/2151-2604/a000194>
- Bock, A.-S., Siegemund, S., Nolte, M., & Ricken, G. (2019). Preparation for Inclusive Teaching: Entangling Prospective Teachers' Perspectives on Inclusive Teaching Using Mathematics Education as an Example. In D. Kolloosche, R. Marcone, M. Knigge, M. Godoy Penteadó, & O. Skovsmose (Eds.), *Inclusive Mathematics Education. State-of-the-Art Research from Brazil and Germany* (pp. 581–605). Springer. [https://doi.org/10.1007/978-3-030-11518-0\\_33](https://doi.org/10.1007/978-3-030-11518-0_33)
- Booth, T., & Ainscow, M. (2002). *Index for Inclusion: Developing Learning and Participation in Schools*. Centre for Studies on Inclusive Education.
- Friend, M., Cook, L., Hurley-Chamberlain, D., & Shamberger, C. (2010). Co-Teaching: An Illustration of the Complexity of Collaboration in Special Education. *Journal of Educational and Psychological Consultation*, 20(1), 9–27. <https://doi.org/10.1080/10474410903535380>
- Good, T. L., & Brophy, J. E. (2008). *Looking in Classrooms*. Pearson/Allyn and Bacon.
- Krauthausen, G., & Scherer, P. (2010). Natural Differentiation in Mathematics (NaDiMa) – Theoretical Backgrounds and Selected Arithmetical Learning Environments. In B. Maj, E.



- Swoboda, & K. Tatsis (Eds.), *Motivation Via Natural Differentiation in Mathematics (Proceedings of CME 2010)* (pp. 11–37). University of Rzeszow.
- Mitchell, D. (2014). *What really works in special and inclusive education. Using evidence-based teaching strategies*. Routledge.
- Moser, V., & Kropp, A. (2015). Kompetenzen in Inklusiven Settings (KIS) – Vorarbeiten zu einem Kompetenzstrukturmodell sonderpädagogischer Lehrkräfte [Competences in inclusive settings (CIS) - preliminary work on a competence structure model for special needs teachers.]. In T. Häcker & M. Walm (Eds.), *Inklusion als Entwicklung. Konsequenzen für Schule und Lehrerbildung* (pp. 185–212). Klinkhardt.
- Reis, O., Seitz, S., & Berisha-Gawłowski, A. (Eds.) (2020). *Inklusionsbezogene Qualifizierung im Lehramtsstudium an der Universität Paderborn. Konzeption* [Inclusion-related qualification in the teacher training programme at Paderborn University. Concept]. Universität Paderborn. <https://plaz.uni-paderborn.de/fileadmin/plaz/Projektgruppen/2020-Konzeption-IP-UPB.pdf>
- Roos, H. (2019). Inclusion in mathematics education: an ideology, a way of teaching, or both? *Educational Studies in Mathematics*, 100(1), 25–41. <https://doi.org/10.1007/s10649-018-9854-z>
- Ruberg, C., & Porsch, R. (2017). Einstellungen von Lehramtsstudierenden und Lehrkräften zur schulischen Inklusion. Ein systematisches Review deutschsprachiger Forschungsarbeiten [Attitudes of student teachers and teachers towards inclusion in schools. A systematic review of German-language research]. *Zeitschrift für Pädagogik*, 63(4), 393–415. <https://doi.org/10.25656/01:18583>
- Schaumburg, M., Walter, S., & Hashagen, U. (2019). Was verstehen Lehramtsstudierende unter Inklusion? Eine Untersuchung subjektiver Definitionen [Was verstehen Lehramtsstudierende unter Inklusion? Eine Untersuchung subjektiver Definitionen]. *QfI – Qualifizierung für Inklusion*, 1(1). <https://doi.org/10.21248/QfI.9>
- Scherer, P. (2019). Professionalisation for inclusive mathematics – Challenges for subject-specific teacher education. In D. Kolloche, R. Marcone, M. Knigge, M. Godoy Penteadó, & O. Skovsmose (Eds.), *Inclusive Mathematics Education. State-of-the-Art Research from Brazil and Germany* (pp. 625–638). Springer. [https://doi.org/10.1007/978-3-030-11518-0\\_35](https://doi.org/10.1007/978-3-030-11518-0_35)
- Scherer, P. (2021). Didactical courses for preparing pre-service teachers for inclusive mathematics classrooms and participants' competence development. In J. Novotná & H. Moraová (Eds.), *SEMT 2021. International Symposium Elementary Maths Teaching* (pp. 377–386). Charles University.
- Schwarz, B., & Kaiser, G. (2019). The Professional Development of Mathematics Teachers. In G. Kaiser G. & N. Presmeg (Eds.), *Compendium for Early Career Researchers in Mathematics Education* (pp. 325–342). Springer. [https://dx.doi.org/10.1007/978-3-030-15636-7\\_15](https://dx.doi.org/10.1007/978-3-030-15636-7_15)
- Troll, B., Besser, M., Abels, S., Ahlers, M., Greve, S., Leiss, D., & Süßenbach, J. (2019). Preparing Pre-service Teachers for Inclusive Education: Analyzing the Status Quo and Comparing the Effect of Different Types of Subject-Specific Learning Opportunities. In D. Kolloche, R. Marcone, M. Knigge, M. Godoy Penteadó, & O. Skovsmose (Eds.), *Inclusive Mathematics Education. State-of-the-Art Research from Brazil and Germany* (pp. 537–559). Springer. [https://doi.org/10.1007/978-3-030-11518-0\\_31](https://doi.org/10.1007/978-3-030-11518-0_31)