



Secondary school mathematics teachers' selection and use of resources

Zeger-Jan Kock, Birgit Pepin

► To cite this version:

Zeger-Jan Kock, Birgit Pepin. Secondary school mathematics teachers' selection and use of resources. Eleventh Congress of the European Society for Research in Mathematics Education, Utrecht University, Feb 2019, Utrecht, Netherlands. hal-02423415

HAL Id: hal-02423415

<https://hal.science/hal-02423415>

Submitted on 24 Dec 2019

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.

Secondary school mathematics teachers' selection and use of resources

Zeger-Jan Kock and Birgit Pepin

Eindhoven University of Technology, Eindhoven School of Education, the Netherlands;

z.d.q.p.kock@tue.nl

Keywords: Teacher resources, Secondary school mathematics, Survey.

Introduction

Secondary school mathematics teachers rely on multiple resources to select materials for classroom use, prepare lessons, and design their curriculum. These include traditional curriculum resources (e.g. textbooks), social resources (e.g. discussions with colleagues) and various digital resources, such as mathematics apps, e-textbooks (Pepin, Choppin, Ruthven, & Sinclair, 2017), and online platforms for sharing digital materials, and constructing lesson series and curricula (Gueudet, 2018). A plethora of digital resources have become available for teachers (Pepin & Gueudet, 2018). Understanding the role of resources in mathematics teachers' work may inform the design of (digital) resources and platforms. To foster this understanding knowledge about the actual use of the various resources is important. In the Netherlands, a survey on the use of learning materials has taken place periodically (Blockhuis, Fisser, Grievink, & Ten Voorde, 2016). However, this general survey does not focus on mathematics teachers and the specific combinations of resources they select.

In this exploratory survey study, we focused on the resources selected and used by secondary school mathematics teachers to prepare their lessons, including resources they use to find materials for classroom use (e.g. student tasks). The research question was: which kinds of resources are selected by secondary school mathematics teachers for lesson preparation, and what do they use them for?

Theoretical framework: the lens of resources

In line with the documentary approach to didactics (Trouche, Gueudet, & Pepin, 2018) we assume that teachers' use of resources has an impact on their teaching. Teachers look for resources, adapt them to their needs and arrange selected resources into learning sequences for their students. This *documentation work* is an essential characteristic of a teacher's work and takes place at the different levels: curriculum, lesson series, and (parts of) individual lessons. The types of resources used by teachers fall into different categories. Pepin and Gueudet (2018) distinguish (1) curriculum resources, (2) social resources, and (3) cognitive resources. Curriculum resources are "developed and used by teachers and students in their interaction with mathematics in/for teaching and learning, inside and outside the classroom". They are further categorized as (a) text resources (e.g. textbooks, syllabi, websites), (b) digital curriculum resources (e.g. e-textbooks, educational platforms), and other material resources (e.g. calculators, digital instructional technology). What distinguished digital curriculum resources from digital instructional technology is the possibility of arranging content and activities in line with the curriculum requirements. Social resources refer to human interactions, for example conversations with colleagues, or feedback from students. Cognitive resources refer, for example, to the mathematical frames and routines used by teachers, and are not considered in this study. By *use of resources*, we denote the selection of resources, their

appropriation, and eventually modification by teachers to fulfill particular educational goals (e.g. determining mathematics content, designing classroom activities or homework tasks). The results of a recent Dutch learning material survey show that textbooks and related materials have still been among the most important resources used by secondary school teachers independent of the subject, although teachers and school managers expect their importance to go down with time (Blockhuis et al., 2016). The most important digital resources for teachers are interactive student exercises. Teachers have indicated that they need guidance, particularly in selecting digital resources.

Method

A survey was administered in June/July 2018 to secondary school mathematics teachers, who were invited to participate by means of a brief text and a link in an electronic newsletter¹. We received 78 complete responses from mathematics teachers. The survey consisted of 14 questions and was partly based on a survey on digital resources for teachers in France (Gueudet, 2018). Items included, among others, teacher background information; (digital) resources selected to prepare lessons; the purpose of the selected resources; and classroom material retrieved or adopted from digital resources.

Results and conclusion

The survey results indicate that the most widely used resources for lesson preparation were national documents (e.g. syllabi), teachers' own notes, interactions with colleagues, mathematics apps, and the website belonging to the textbook. General educational platforms and social media were mentioned least often. Resources were mostly consulted to find materials for classroom activities, although interactions with colleagues covered all aspects of lesson preparation,. In terms of digital resources, Geogebra was mentioned most often, followed by a digital version of the textbook with its associated website, and online video clips. Least often, general educational platforms were used, in which teacher could create and share materials, in spite of efforts to promote these platforms and their transformative potential (Pepin et al., 2017). It appears that the mathematics teachers were mostly led by the school's mathematics textbook and its associated (digital) materials.

References

- Blockhuis, C., Fisser, P., Grievink, B., & Ten Voorde, M. (2016). *Leermiddelenmonitor 15/16: Leermiddelen in het po en vo. [Monitor of teaching materials 15/16: Teaching materials in primary and secondary education.]*. Enschede, the Netherlands: SLO.
- Gueudet, G. (2018). *Online platforms: New connections and new possibilities for teacher documentation work?* Poster presented at the 5th ERME topic conference: Mathematics education in the digital age, Copenhagen, Denmark.
- Pepin, B., Choppin, J., Ruthven, K., & Sinclair, N. (2017). Digital curriculum resources in mathematics education: Foundations for change. *ZDM - The International Journal on Mathematics Education*, 49, 645-661. doi:10.1007/s11858-017-0879-z
- Pepin, B., & Gueudet, G. (2018). Curriculum resources and textbooks in mathematics education. In S. Lerman (Ed.), *Encyclopedia of Mathematics Education*. Cham: Springer.

¹ See <http://www.wiskundebrief.nl/>, newsletter sent to approximately 4800 addresses.

Trouche, L., Gueudet, G., & Pepin, B. (2018). Documentational Approach to Didactics. In S. Lerman (Ed.), *Encyclopedia of Mathematics Education*. Cham: Springer.