



HAL
open science

A survey project on professional journals for mathematics teachers

Yukiko Asami-Johansson, Koji Otaki

► **To cite this version:**

Yukiko Asami-Johansson, Koji Otaki. A survey project on professional journals for mathematics teachers. Twelfth Congress of the European Society for Research in Mathematics Education (CERME12), Feb 2022, Bozen-Bolzano, Italy. ⟨hal-03744133⟩

HAL Id: hal-03744133

<https://hal.science/hal-03744133v1>

Submitted on 2 Aug 2022

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.



HAL Authorization

A survey project on professional journals for mathematics teachers

Yukiko Asami-Johansson¹ and Koji Otaki²

¹University of Gävle, Sweden; yuoasn@hig.se

²Hokkaido University of Education, Japan; otaki.koji@k.hokkyodai.ac.jp

Keywords: Levels of didactic co-determinacy, teaching profession, paradidactic stake.

Journals for disseminating professional scholarship of mathematics teachers

This presentation describes a framework and an analytical method we employ in our project, the aim of which is investigating the characteristics of professional journals for mathematics teachers in different countries. Professional journals for schoolteachers in mathematics function as an important venue to disseminate different kinds of professional knowledge necessary for carrying out teaching. The contents of journals can deal with individual teacher's work for designing lessons in certain area, proposals for different methods for assessment, philosophical articles about mathematics education, columns by mathematicians, presentation of results from research, etc. The selecting and editing from such possible contents depends on the needs of the readers—the roles and responsibilities of schoolteachers that are devolved from a given society to which they belong. What similarities and differences are there between different journals around the world? As a first step for answering this question, we report here a preliminary analysis on a Swedish journal *Nämnnaren* (The Denominator).

Levels of didactic co-determinacy and paradidactic stakes

A sequence of didactic situations in classroom depends upon a family of *conditions* of different kinds and origins. The hierarchy of such conditions is modeled by the anthropological theory of the didactic as a *scale of levels of didactic co-determinacy* (e.g., Chevallard, 2019). We apply the scale to situate foci—or *paradidactic stakes* (Otaki et al., 2020)—of journals, for identifying the properties of the journals. We have categorised the contents of the articles and related them to the different levels of the co-determinacy as the following: *Society*, related to general issues, e.g., Swedish national traits, culture and world trend. *School*, related to school educational issues, e.g., national curriculum, Swedish school and its policies. *Pedagogy*, related to generic teaching principles e.g., methods for promoting students' interaction. *Discipline*, related to mathematics itself as an academic subject or school subject. *Domain*, related to relatively general areas in mathematics such as algebra, geometry, function, etc. *Sector*, related to the general topics of mathematical objects such as equations, similarity, operations. *Theme*, related to contents of teachers' activity such as how to teach the concept of triangles, etc. *Subject*, related to one simple type of task (in a lesson) and a corresponding solving method. From this point of view, our research question in this survey project is formulated as the following: *what levels of paradidactic stakes do professional journals for mathematics teachers include or exclude?*

Pilot analysis on *Nämnnaren*

Nämnnaren has been established in 1974 and publishes four issues a year. The journal is currently directed by the National Center for Mathematics Education, the task of which is to support the development of mathematics education from preschool to secondary school levels. Authors of articles

are mixture between teachers in service in different levels, teacher educators, researchers in mathematics education and mathematicians. In this pilot study, four numbers from the year 2020 are analysed. The total number of published articles in these four numbers is 58, and the main issues of the submitted articles are following: teachers' activities, students' psychology and special pedagogy, history of mathematics, research and survey reports, and use of manipulatives and ICT. Of the 58 articles, 49 of them aim at primary and (mostly lower) secondary levels. The rest aims at pre-school education, adult education, and education in general. *Nämna* has three standard topics in every issue: book reviews on newly published educational books, problem bank and language column. The last two topics often deal with the issues related to lower levels such as theme and subject. Contents of several articles are related to more than one level of the co-determinacy. For example, an article, which describes using double number lines for better understanding for algebra, deals with conceptual description of algebra and equations (sector), but its actual focus was giving suggestions for teaching design (theme) and task examples (subject). Even though two articles present activities on number theory, the focus of one article is on the level of theme, while the other is related strongly to the pedagogy level. In the same way, one article treats a topic of Pascal's triangle for an analysis of a sports context (theme), while the other describes conceptual differences of algorithms using Pascal's triangle in different institutions in several countries (sector). As a summary, two articles are related to the society level, five to the school level, 15 to the pedagogy level, four to the discipline level, three to the domain level, seven to the sector level, 24 to the theme level, and 15 to the subject level.

The tendency that the paradidactic stake of the journal tend to gather in the lower levels *and* the level of pedagogy is not surprising, since the readers of the journal could have a disposition so called *the paradidactic bipolarization* (Otaki et al., 2020). This phenomenon indicates that schoolteachers' interest and their professional knowledge lie exclusively either pinpoint mathematical matters or general-purpose teaching methods. A notable fact is that a professional journal, one of the missions of which is disseminating teachers' professional scholarship, traces the pattern of the bipolarisation of schoolteachers' scholarship. In our view, this illustrates an aspect of the functioning of the *teaching profession*, whereby schoolteachers are reproduced together with the didactic worldview supported by certain *norms* (remember the expression "normal school"). Such institutional structure may hinder forthcoming reforms of mathematics education. Understanding the epistemological economy (and ecology) of the teaching profession—which is often recognised as a *semi-profession*—is crucial, not only for research but also for practice. The information on current states of the teaching profession should be useful for developmental actions for teacher education in the future.

References

- Chevallard, Y. (2019). Introducing the anthropological theory of the didactic: An attempt at a principled approach. *Hiroshima Journal of Mathematics Education*, 12, 71–114.
- Otaki, K., Asami-Johansson, Y., & Bahn, J. (2020). Questioning the paradidactic ecology: internationally shared constraints on lesson study? In U. Jankvist, M. van den Heuvel-Panhuizen, & M. Veldhuis (Eds.), *Proceedings of the 11th congress of the European society for mathematical education (CERME 11)* (pp. 3178–3185). Freudenthal Group & Freudenthal Institute, Utrecht University.