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Teachers as Participants in Textbook Development: *The Integrated Mathematics Wiki-book Project*

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Abstract

The aim of this study is to examine how the conventional relationships between teachers and textbooks may be expanded so that teachers become more genuine participants in the process of textbook development. The study uses the *Integrated Mathematics Wiki-book Project* to examine how this challenge might be addressed. The *Integrated Mathematics Wiki-book Project* invites teachers to edit the textbooks they use in their classes and to produce a revised version of these textbooks – wiki-based revised textbook. Drawing on a variety of data sources from the 1st year activity of nine 7th-grdae teachers, analysis focuses on three aspects: (1) participating teachers' perceptions of their unconventional role as making changes to a textbook designed by expert curriculum developers, (2) the nature of teachers' interactions with the consultants made available for them, and (3) the tension between customizing the textbook for the specific student population they taught and generating a more generic textbook for a broader 7th grade student population.

Keywords: textbook development, teachers as curriculum developers, teachers and textbooks, wikibook, wiki.

Introduction

The relationships between teachers and textbooks are commonly associated with curriculum enactment and teachers' use of curriculum materials. Less widespread is the association of these relationships with curriculum development. The aim of this study is to examine how the conventional relationships between teachers and textbooks may be expanded so that teachers become more genuine participants in the process of textbook development. The study uses the *Integrated Mathematics Wiki-book Project* to examine how this challenge might be addressed. Unlike most wiki-book research that focuses on learners in academic settings (e.g., Ravid, Kalman, & Rafaeli, 2008), our study centers on teachers in a professional situation.

Background

Research on the relationships between teachers and textbooks often centers on the influence of textbooks on classroom instruction, on the discrepancies between the textbook (representing the written curriculum) and the enacted curriculum (i.e., the translation of the written curriculum into classroom reality), and on the ways teachers' use curriculum materials (e.g., Manouchehri & Goodman, 1998; Remillard, 2005; Remillard, Herbel-Eisenmann, & Lloyd, 2009; Stein, Remillard, & Smith, 2007). Such research on the relationships between teachers and textbooks reflects prevalent views and assumptions about the teacher's role, commonly regarding the teacher as curriculum enactor and user of curriculum materials developed by experts (i.e., curriculum developers).

Whereas research in a number of countries suggest that curriculum materials, and especially textbooks, considerably influence classroom instruction (Eisenmann & Even, 2009, 2011; Grouws, Smith & Sztajn, 2004; Haggarty & Pepin, 2002), teachers play a rather insignificant role in the development of textbooks in contrast to their central role in curriculum enactment. Indeed, some textbook authors are teachers, and as part of the process of curriculum development selected teachers are often recruited to teach an experimental version of a new curriculum program (e.g., Clement, 2002; Gravenmeijer, 1998; Hershkowitz et al., 2002). Hershkowitz et al. (2002), for instance, provides a detailed illustration for such teacher involvement in curriculum development. Yet, obviously, only a minute number of selected teachers can take part in the development of textbooks in these ways. The voice of the vast majority of teachers remains unheard and most teachers rarely influence textbook development.

Reflecting the insignificant role teachers play in the development of textbooks and their central role in using them in class, the conventional relationship between curriculum developers and teachers is basically unidirectional – from curriculum developers to teachers. Teachers' aspirations about desired textbooks as well as adjustments that teachers make in textbooks (based on their experiences, on their knowledge and beliefs about mathematics, its teaching and learning, and on their acquaintance with the system in which they teach and with their own students) are often remained unknown to curriculum developers. The *Integrated Mathematics Wiki-book Project* aims to expand the unidirectional connection between curriculum developers and teachers into a bidirectional relationship: also from the teachers to curriculum developers. Thus, it aims to offer teachers a route to become more genuine participants in the process of textbook development.

The Integrated Mathematics Wiki-book Project

In response to the introduction of a new national junior-high school mathematics curriculum by the Ministry of Education, the mathematics group at the Department of Science Teaching in the Weizmann Institute of Science began the development of a new comprehensive junior-high school mathematics curriculum program – the *Integrated Mathematics Project* (*Matematica Meshulevet*). The program emphasizes problem solving, thinking, and reasoning for all students. It approaches the teaching of mathematics in junior-high schools in a spiral way, making connections among mathematical concepts, topics and domains. The curriculum material development team comprises experienced mathematics curriculum developers and mathematics teachers. The experimental edition is currently used in more than 150 schools (more than 35,000 7th and 8th grade students in the 2010/11 academic year), and the team works closely with hundreds of teachers all over the country, who need to adapt to a new curriculum program.

To expand the conventional relationships between teachers and curriculum developers, which is mainly unidirectional – from curriculum developers to teachers – the *Integrated Mathematics Wiki-book Project* invites teachers who use the *Integrated Mathematics Program* to edit the textbooks they use in their classes and to produce a revised version of these textbooks – wiki-based revised textbooks. Additional goals of the *Integrated Mathematics Wiki-book Project* are to improve teachers' understanding of the mathematics and of the curriculum, to acquaint teachers with the use of a technological tool (Wiki) that allows easy collaborative creation and editing of teaching materials, and to support the development of a professional community whose members work collaboratively with colleagues on authentic tasks of teaching.

The *Integrated Mathematics Wiki-book Project* started in the 2010/11 school year and the activity centered that year on the 7th grade textbook. The activity in the 2011/12 school year will center on the 8th grade textbooks (two levels). Participants in the first year of the project

were nine 7th grade teachers from different parts of the country and from different sectors. All the teachers were using in class the 7th grade *Integrated Mathematics* textbook (Buhadanah et al., 2009a, 2009b).

Participation in the *Integrated Mathematics Wiki-book Project* comprised of: (1) 5 hours on-line wiki-based activity that included textbook editing, reacting to other participants' suggestions, and online discussions or chats, and (2) monthly full day whole-group meetings at the Weizmann Institute, in which participants raised, discussed, and worked on mathematical, pedagogical, and technological issues that emerged from the wiki-based activity, and formulated community working norms. Towards each of these whole-group meetings, four of the participants prepared a summary of the changes made and the issues raised by the teachers in selected textbook units. These summaries served as a basis for a focused whole-group discussion.

The study examines the ways in which the first year teachers participated in the unique experience offered to them to edit the textbook they use in their classes and to produce a wiki-based revised version of this textbook. The first author is the head of the *Integrated Mathematics Project* and *the Integrated Mathematics Wiki-book Project*; the second author is a leading team member of the *Integrated Mathematics Wiki-book Project*.

Data Sources

Data sources include: (1) the *Integrated Mathematics Wiki-book Project* website, which contains the wiki-based textbook with all changes made and their corresponding discussion pages, and online forum-like discussions, (2) video-documentation and field-notes of the monthly whole-group meetings, (3) individual semi-structured interviews with the nine first year teachers, at the end of the year, (4) journal kept by the second author in which he documented informal conversations with project participants, ideas and reflections.

Preliminary Findings

Data analysis examines teachers' ways of participation in the editing process and the production of a wiki-based revised version of the 7th grade textbook. The analysis focuses on three aspects: (1) participating teachers' perceptions of their unconventional role as making changes to a textbook designed by expert curriculum developers, (2) the nature of teachers' interactions with the consultants made available for them, and (3) the tension between customizing the textbook for the specific student population they taught and generating a more generic textbook for a broader 7th grade student population. Preliminary findings regarding these three aspects are outlined below.

Making changes to a textbook designed by expert curriculum developers

Initial data analysis suggests that whereas a few of the participating teachers did not hesitate to start editing the book as soon as the project began, making changes to a textbook written by expert curriculum developers was a role that not all teachers easily embraced. As the work progressed, most teachers felt comfortable to introduce changes to the textbook. Still, a few episodes occurred later in the year, indicating that some teachers refrained from making changes to specific aspects of the textbook, due to their respect for the decisions and choices of the textbook's authors. For example, during the third whole-group meeting, one of the teachers suggested to the group to add a label to each "owl" icon ("owl" icons are used in the textbook to signify lesson summaries, definitions, remarks and clarifications), to indicate whether it is

important or not. Another teacher objected labeling some "owls" as unimportant: "I think that if they [the textbook authors] decided to include it in the owl then it is probably important."

Most teachers introduced changes directly in the textbook, inserting new text, changing or omitting existing text. Yet, some teachers tended to suggest changes as ideas, describing them in the discussion pages, or in online forum-like discussions that accompanied the wiki-based textbook. In addition to technical difficulties that were the main source for this behavior at the beginning, sometimes, especially later in the year, this behavior was rooted in the participating teachers' perception of their role in the production of the edited textbook. For example, one teacher continually stated that she only suggests ideas for changing the textbook whereas it is the professional curriculum developers' task to carry them out – if the ideas were good – and execute the actual editing of the book. For instance, in her interview at the end of the year, this teacher explained that it was difficult for her to make changes to changes that other participants introduced to the textbook. Instead, she preferred to write her change suggestions in the discussion pages. Then she added that this was also the case for the changes she wanted to introduce to the original textbook.

Interactions with expert consultants

The project offered teachers the option to consult with three experts: a representative of the textbook authors, a research mathematician, and a researcher in mathematics education. This consultation was restricted to queries related to the following areas only: reasons for specific choices made in the textbook by the textbook authors, the mathematics in the curriculum, research in mathematics education. Seldom did the teachers use this opportunity for consultation. When they did approach these experts, in addition to queries related to the above areas, the teachers also sought the curriculum developer's approval of their suggestions or approached the mathematician as a referee in cases when they strongly disagreed with each other (not necessarily about mathematics). For example, one teacher, who suggested to completely changing the national curriculum so that it would be based on a functional approach, presented her suggestion in one of the whole-group meetings, and later repeatedly pressed for the textbook writers' opinion. The mathematician was approached, for instance, when the group of teachers could not reach a consensus which of two textbook problems is more difficult for students.

Tension between producing personal and generic textbook

The task for the group of teachers was to produce, as a group product, one, and only one, wiki-based revised textbook. Because the group of participants was quite heterogeneous with regard to the teaching context and the student population they taught, decisions about textbook changes needed to take into consideration a variety of teaching contexts as well as different needs and preferences of various teachers and students. Whereas most participating teachers tended to embrace this approach, some of the teachers were inclined to introduce, and insisted on adopting, only changes that suited their unique teaching context. For example, one of the teachers that taught for several years only lower-achieving classes, stated continuously that one of her goals was to make the 7th grade *Integrated Mathematics* textbook more suitable for the population of low-achieving students in her classroom. Throughout the year she suggested and initiated numerous changes in this spirit, the majority of which were rejected by most of the other participants as not suitable for the broader 7th grade student population. Another teacher, whose students were each equipped with a laptop computer, as part of a special school program, stated that her main mission was to find ways to integrate technology into the textbook so that her students could use their computers when learning mathematics. Unlike the initiative described above, this one was embraced by the other participants even though the use of computers in mathematics lessons in Israel is sparse.

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