Association of Mathematics Teacher Educators
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Mathematics Teacher Educator Conceptualization and Rationale[1]

The new journal ***Mathematics Teacher Educator*** is a joint publication of the Association of Mathematics Teacher Educators (AMTE) and the National Council of Teachers of Mathematics (NCTM).

Mission and goals
The new journal will contribute to building a professional knowledge base for mathematics teacher educators that stems from, develops, and strengthens practitioner knowledge. The journal will provide a means for practitioner knowledge related to the preparation and support of teachers of mathematics not only to be public, shared, and stored, but also verified, and improved over time (Hiebert, Gallimore, and Stigler, 2002). The journal will be a tool to build the personal knowledge that mathematics educators gain from their practice into a trustworthy knowledge base that can be shared with the profession. Initially two issues of the journal will be published per year.

Audience
The primary audience of the ***Mathematics Teacher Educator*** will be practitioners in mathematics teacher education, broadly defined as anyone who contributes to the preparation and professional development of Pre-K—12 preservice and inservice teachers of mathematics. Mathematics teacher educators include mathematics educators, mathematicians, teacher leaders, school district mathematics experts, and others. Members of the *Association of Mathematics Teacher Educators* who will receive the journal as a member benefit. NCTM members may choose this journal as one of their secondary options.

Scholarly profile: A peer reviewed journal
The ***Mathematics Teacher Educator*** journal will be a scholarly peer reviewed journal for practitioners using a double blind review process for feature articles. For special issues or departments the review may be done by a panel, but the process will still be blind about the author's identity. A good part of the contributors to the journal will be from university professors and peer review is an important criterion for counting publications in the promotion and tenure process.

The value and importance of practitioner knowledge
Practitioner knowledge of mathematics teacher educators has features that make it valuable and provide the potential of directly impacting and improving the profession. mathematics teaching and learning. Hiebert, Gallimore, and Stigler (2002) discuss three features that make practitioner especially relevant for the profession. The ideas in this section are mainly adapted from that article.

Practitioner knowledge is useful for practice because this knowledge addresses specific problems of practice. The knowledge generated by a mathematics teacher education practitioner is relevant for another mathematics teacher educator addressing the same problem. In mathematics teacher education, practitioner knowledge is linked with practice in two ways. First, its creation originates in problems of practice. Second, the new knowledge is connected to the actual process of preparing teachers of mathematics.

Practitioner knowledge is concrete, specific and detailed. The knowledge generated when solving a specific problem in mathematics teacher education provides someone else facing the same problem with concrete, specific, and detailed knowledge that can be used to solve the problem. Even though practitioner knowledge may not be as generalizable as knowledge generated by research, it is still useful because of these characteristics.

Practitioner knowledge is integrated and organized around complex and multifaceted problems of practice. In contrast to researchers who often try to separate different factors or focus on only certain aspects of a problem, practitioners use all kinds of knowledge that can help them address a problem. For example, when preparing teachers of mathematics to help middle school students understand the concept of function, a mathematics teacher educator would use content knowledge, pedagogical knowledge, and pedagogical content knowledge, as well as their knowledge of the students.

Overcoming limitations of practitioner knowledge

Practitioner knowledge also has some limitations that in the past have prevented this knowledge to become the basis for developing a professional knowledge base. Practitioner knowledge is personal and often not subjected to thorough examination and evaluation. To overcome its limitations so that it becomes the basis of professional knowledge, practitioner knowledge in mathematics teacher education needs to be made public, storable, shareable, verified, and improved over time. The new journal would provide a venue to systematically bring these features to practitioner knowledge in the field of mathematics teacher education.

The Mathematics Teacher Education journal will be a dynamic archive to accumulate, organize, and improve practical knowledge of what works in mathematics teacher education. An example of how a knowledge base can be developed from practice can be found in the special journal issue *Building a Knowledge Base for Educating (Mathematics) Teachers* (Hiebert and Morris, 2009). In the introduction Morris and Hiebert (2009) identify and describe four features of knowledge-building systems: shared goals, tangible products, small tests of small changes, and multiple sources of innovation. Other articles in this special issue illustrate such features in different aspects of mathematics teacher education. The new journal can serve as a catalyst to transform the practice of mathematics teacher education into a knowledge-building system.

In order to have progress it is important to require that the contributions be not just innovations, but provide evidence of improvements, and that innovations prove to be effective beyond the innovators. Articles in the journal should be directed toward the systematic improvement of mathematics teacher education beyond the author's own activities and classroom. There are several ways to increase the likelihood that knowledge in mathematics teacher education is improved over time. One way is building on previous work. Published articles need to show how they build on previous knowledge or efforts. Articles should also be consistent with related research findings when available. Articles should provide a connection to the knowledge base of what we know in mathematics teacher education. The articles can be grounded on theory or on previously published articles, and make explicit the specific new contribution to our knowledge. Articles for the new journal should provide evidence that the discussed approach is indeed an improvement and not merely a change. For example, authors can provide evidence of peer acceptance of their work, such as adoption at other universities or programs for teacher preparation or professional development. Articles should report findings with enough warrants so that recommendations for policy and practice can be constructed or justified.

Another way in which articles can contribute to improvement over time is by allowing others to build on the contribution of the article. For example, an article may describe promising practices that are testable. Hypotheses and rationales will have an important role for such practices to be

tested. Why was that approach tried? In what ways do the results confirm or disconfirm the assumptions?

Publication niche

The *Mathematics Teacher Educator* will occupy its own publication niche. There are no other journals with the same mission, goals, and characteristics.

Difference with practitioner's journals. The journal would be different from other practitioners' journals. The *Mathematics Teacher Educator* would be different from the *Mathematics Teacher* not only because it has a different audience (teacher educators rather than teachers) but also because the *Mathematics Teacher Educator* explicitly seeks to systematically build from practitioner knowledge a professional knowledge base that is not only public, shared, and stored, but also verified and improved over time. This idea is not completely new. There are journals for practitioners in other fields that also publish the kind of articles that can contribute to developing a professional knowledge base from practitioner knowledge (such as *The Reading Teacher*).

Difference with research journals. The *Mathematics Teacher Educator* will also be different from other scholarly journals on mathematics teacher education, because its starting point would be practitioner knowledge rather than research knowledge. There are research journals geared for mathematics teacher educators, such as the *Journal of Mathematics Teacher Education*. Research can inform practice, but the translation is often difficult. Because the nature of the knowledge used by practitioners in teacher education is often of a different kind than the knowledge generated by researchers, there is the need to have a venue that uses practitioner knowledge as the base for developing professional knowledge. Of course, research will have an important role in many articles of the journal, as many ideas for improvement will come from practice informed by research.

A forum for a different kind of article

In addition to providing a space for articles that currently are scattered in many journals, the *Mathematics Teacher Educator* will provide a space for articles that would otherwise not been written or published.

Example of a possible article that at present does not have a proper forum:

> In a mathematics methods course two different approaches to learn to teach proportionality for conceptual understanding are contrasted. In one approach future teachers engage themselves with tasks and hands-on materials, and in the second approach future teachers see and discuss a video of students solving the same problems using the same materials, and analyze students' written work. The activities described are specific; the rationale for and the hypotheses that lead to each of the two approaches are given explicitly; the amount of data is enough to determine how to build on from the experience.

Such an article can contribute to knowledge that is improved over time. The results can inform the practice of other mathematics educators at other institutions who may use the advantages of the two approaches to improve their own course. However, because the focus is very specific and the sample size small, it would not be likely for such an article to be published in a research journal.

The journal will contribute to developing the knowledge mathematics teacher educators need to be effective in preparing teachers. One of the aspects of this knowledge is about ways to develop pre-service and in-service teachers knowledge. An article may thus address the issue of teacher knowledge and provide suggestions to increase the knowledge of mathematics educators about the central issues teachers have in developing their own knowledge and what works to support them.

What counts as evidence?

Especially relevant to establishing the identity of the journal will be to determine what counts as evidence, what are the warrants needed for practice-based knowledge. Because it is not a research journal *Mathematics Teacher Educator* should not just try to use the same criteria the profession uses for research articles. On the other hand, the journal should not be a space to share mere opinions on mathematics teacher education. Evidence for claims should be provided. In a discussion of warranted assertibility Dewey states that,

> The inferred material has to be checked and tested. The means of testing, required to give an inferential element any claim whatsoever to be *knowledge* instead of conjecture, are the data provided by observation—and only by observation. Moreover... it is necessary that data (provided by observation) be *new*, or different from those which first suggested the inferential element, if they are to have any value with respect to attaining knowledge." (Dewey 1991 p. 173)

A useful question could be, "Does the article provide enough information or insight as to guide us as to what the next steps for improvement could be?"

Additional features

The journal will have a web-based repository for scholarly artifacts that supplement articles (video, lesson plans, classroom materials, student work, etc.), providing a way to make these materials public and thus opening the possibility for further improvement by other practitioners.

Types of Articles

The journal will contribute to enhance the communication among mathematicians, mathematics educators, other groups of experts that contribute to the education of teachers of mathematics. Types of articles appropriate for the journal might include

- innovative materials that substantially impact mathematics teacher education
- accounts of development of exemplary educational programs in mathematics teacher education, both pre-service and in-service
    - example: implementation of a masters programs for middle school or high school teachers that better connects to classroom practice and includes mathematics courses that are supportive of teaching 7-12. Not just the description on paper, but data from the actual implementation.
- accounts of innovative uses of video or computer software for mathematics teacher education
- the mathematics taught to teachers, and ways that mathematics is taught to teachers
- reports of effective ways to develop teachers' profound understanding of the mathematics they teach
- developing mathematical knowledge for teaching
- reports of effective ways to develop teachers' understanding and corresponding skills and know-how of pedagogical issues specific to mathematics
    - example: developing teachers' skills in orchestrating discourse in mathematics
- teaching the history of mathematics to teachers
- reports of effective ways to prepare mathematics teachers to deal with issues such as equity, special needs of students, second language acquisition
- lesson study reports including evolution of the lesson and process of improvement
- specific experiences that collect and use small amounts of data that allow educators to build improvements
- replications in different contexts
- revisiting "old" ideas and established practices from a new vantage point or with new insights
- promising practices that can be tested, with clear rationales (why was this tried?) and clear hypotheses
- good practices and models for the preparation of mathematics teacher educators

- professional development for those who teach teachers of mathematics
- discussion of goals for mathematics teacher education with explicit rationales
- effective ways to help teachers implement reform-based curriculum materials
- reports about development projects that contribute to improving mathematics teacher education
- lessons learned from research; applications of research methodology, theoretical frameworks, or results to the practice of mathematics teacher education
- improved methods and instruments for evaluation of mathematics teacher education
- reviews of scholarly books relevant to mathematics teacher education
- reviews of textbooks that are substantially different from and better than previous textbooks and that are especially relevant for mathematics teacher education

Sample Ideas for Articles

Here are two examples of the type of articles that would fit the profile of the new journal that have been published in other mathematics education journals

Focusing on students' mathematical thinking

This article is based on a professional development intervention with an experienced teacher. It provides suggestions to enable teachers take a closer look at students' thinking. The authors provide rationales for some of their suggestions based on research (for example, wait time). The article provides specific examples and detail to allow readers see how this approach works in the classroom (Breyfogle & Herbel-Eisenmann, 2004.).

On blocks, stairs, and beyond: learning about the significance of representations

This article is based on a teacher education course for beginning teachers. It describes how to support teachers' thinking about non-routine problems with a focus on representation. The authors provide a rationale for the two problems chosen (Rubel & Zolkower, 2007).

In both cases, the amount of detail, and the rationales provided allow for verification (for example by replicating in other contexts) and also for building on these experiences (improvement over time).

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