Field Experiences in Mathematics Teacher Education: A Japanese Perspective

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Field Experiences

- One of the most critical component of any teacher education program.
- There seems to be a call for an increased emphasis/quantity in field experiences, e.g., NCATE Blue Ribbon Panel
- Practical concerns
  - Identifying high quality cooperating teachers
  - edTPA
  - Resources for university supervisors
  - etc.
Japanese students have consistently performed at or near the top in various international studies.

TIMSS video–study showed that Japanese mathematics lessons reflected the US “reform” mathematics teaching better than US mathematics lessons.

- Problem solving is emphasized.
- Lessons focused on important mathematics.
- Alternative solutions by students were shared and discussed.
- etc.
The purpose is not evaluative, i.e., we are not trying to answer, “Who does better?”

Making the familiar unfamiliar – help us reflect on our own practices.

“… we should hold Japan up as a mirror, not as a blueprint.” (Mary White in her book, *The Japanese educational challenge: A commitment to children*, 1987)
3 studies

- Examining the mathematics teacher education programs at Japanese national universities
- Survey of cooperating teachers’ perceptions on the roles of student teaching
- Case study of lower secondary school mathematics student teaching (2 student teachers and 1 cooperating teacher)
Japanese Schools

- Compulsory Education
  - Elementary Schools (Grades 1 through 6)
  - Lower Secondary Schools (Grades 7 through 9)

- Non–Compulsory Education
  - Upper Secondary Schools (Grades 10 through 12)
Pathways to teaching

Teacher certification: earned through university programs.
- 3 levels (elementary, lower secondary, and upper secondary)
- Teacher education programs
- Content majors with a set of teacher education courses
Prefectural teacher employment test
- Teachers are hired by local educational agencies, not by a particular school
- Each prefecture administers an employment test.
- Written test: 3 components
  - Educational foundation
  - General knowledge
  - Specialization
- Interview/demonstration lesson
Sample questions

General Knowledge Section

- A and B are distinct numerals. Find A and B that will make the following calculation true.

\[
\begin{array}{c}
A \ A \ A \\
\times \ A \\
3 \ B \ B \ A
\end{array}
\]

- How many digits are needed to number pages 1 through 172 in a book?
Sample questions

Elementary Mathematics Section

- Find the area of the shaded region.

- Identify the grade level of the following standards from the Course of Study. (Standards omitted)
In mathematics education, it is important to help students to experience the joy of problem solving. Discuss how you might try to incorporate this goal in your teaching.

Let \( n \) be a natural number. State the condition for \( n \) so that \( 1^n + 2^n + 3^n + 4^n \) is a multiple of 5.
Suppose $a_n$ and $b_n$ are both rational numbers such that $(1 + \sqrt{2})^n = a_n + b_n\sqrt{2}$ ($n = 1, 2, 3,...$). Find the value of $\lim_{n \to \infty} \frac{a_n}{b_n}$.

Suppose squares ABPQ and ACRS are constructed outside of $\triangle ABC$. Prove that the line that is perpendicular to BC and passes through point A goes through the midpoint of QS.
Field Experiences

- Required: 5 *units* for Elem & Lower SS, 3 *units* for Upper SS
  - Required coursework: 59 *units*
  - 1 of the 5 units may be for pre- and post-field experience instruction (may include on-campus instruction, but also field experiences at other educational settings).

- Field experiences in an “adjacent” level is acceptable. For example, for a lower secondary mathematics teacher candidates, field experiences at elementary schools or upper secondary schools are acceptable.
In some prefectures, a preference is placed on teachers who are certified at multiple levels, typically elementary and lower secondary.

Some national universities offer only combined elementary/lower secondary teacher preparation programs.
53 Japanese National Universities have teacher education programs (including 1 specialized in music education).

Each university operates affiliated schools, called *fuzoku* schools.

All of them operates *fuzoku* schools at the elementary and the lower secondary level. Only 11 university operates *fuzoku* at the upper secondary level – including 3 that operates combined secondary schools (Grades 7 through 12).
Missions of *fuzoku* schools

- Education their students.
- Support the teacher education program at their affiliated university.
- Play the leadership role in professional development of teachers in the region.
  - Hosting yearly research open houses.
  - *Fuzoku* teachers are often invited as the expert commentators for school-based PD at public schools.
  - *Fuzoku* teachers often write articles and books on their specialty areas.
Examining Student Teaching in Japan

- Visited 10 Japanese national universities
  - Met with mathematics teacher educators.
  - Visited attached schools (at some universities) and talked with administrators and teachers.
- Conducted teacher survey.
At 3 of the 10 universities visited, student teaching took place in the 3rd year of their 4-year teacher education programs. At 2 of the 3 universities, there were 2 separate placements during the 3rd year.

At the remaining 7 universities, student teaching took place once in the 3rd year of the programs and once in the 4th year.
At KSU (secondary mathematics education), there are 2 extended field experiences, both in the 4th year of the program, the second of which is the typical “student teaching” (2nd semester senior year).
The duration of a student teaching placement varied from 2 weeks to 5 weeks.

There were 19 student teaching placements at the 10 universities.

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All but one mathematics teacher educators thought the duration of student teaching was “about right.” One MTE thought their 3-week long placement could be extended by a week. All felt that a longer placement will be too much for

- Student teachers
- Cooperating teachers
- School students
Typical day of a student teacher

- 8:00 Arrive at school
- 8:30 – 8:45 Morning meeting in HR
- 8:45 – 3:00 Observing/teaching lessons
- 3:00 – 5:00 Observing extracurricular activities or other teacher duties
- 5:00 – 6:30 Formal meeting with the cooperating teacher
Student teaching: how long

- At KSU (secondary mathematics education), the first extended field placement is during TOSS (first semester senior year), and it lasts 4 weeks (after several weeks of one/two half-day visit to the classrooms).
- The second placement, student teaching, is for the entire semester (second semester senior year).
At all 10 universities, the 3rd year placement is at *fuzoku* schools.

- Only when there are not enough supervising teachers, student teachers are placed at public schools.

At only 2 universities, one placement is intentionally scheduled at public schools.

- Multiple student teachers are assigned to a single supervising teacher at a *fuzoku* school.
- A single student teacher is assigned to a single supervising teacher at a public school.
- There is no university supervisor.
Average # of student teachers

- In the last 5 years
- *Fuzoku* teachers
- *Public School* teachers
At KSU (secondary mathematics education), prospective mathematics teachers are placed in public school classrooms.

One student teacher is assigned to a single supervising teacher, as well as a university supervisor.

One university supervisor typically supervises 2 – 4 student teachers. They must observe the minimum of 4 lessons taught by each student teacher.
Most of the teachers surveyed thought supervising student teachers positively influenced their own mathematics teaching.

- Supervising student teachers gave them opportunities to examine the topic STs were teaching in more depth.
- Observing lessons taught by student teachers gave teachers opportunities to observe their students from a more “objective” perspective.
Student teaching: reflection

- Why do we wait till the senior year for extended field placements?
- Why is our student teaching so much longer?
  - What can student teachers learn in a longer student teaching?
  - What are the learning goals of student teaching?
  - Are we making good use of a longer student teaching?
- How do we make supervising student teachers as professional development opportunities for cooperating teachers?
Thank you!