Teacher Preparation Program Survey Analysis from the Project “Identifying Unique and Promising Practices in Math and Science Teacher Education in APEC Economies”

Submitted by: East China Normal University (ECNU)
Teacher Preparation Program
Survey Analysis

from the project “Identifying Unique and Promising Practices in Math and Science Teacher Education in APEC Economies”

XU Binyan, China

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Brief Overview of the Project

- Project: Identifying Unique and Promising Practices in Math and Science Teacher Education in APEC Economies

- Background:
  - Desire to develop “knowledge societies”
  - Common challenge in developing math and science expertise
  - Need for high quality math and science teachers
  - Opportunity to build on other international research in this area
Key Research Questions

* What characteristics of teacher preparation programs are related to high levels of teacher readiness for secondary math and science teaching?

(1) What are the essential characteristics of secondary teacher preparation programs in each of the economies?

(2) What are the strategies that are most effective in promoting high levels of content knowledge and pedagogical content knowledge for teachers of secondary math and science in particular economies contexts?

Study Instrument

Survey of Curriculum for Upper Secondary High School Mathematics/Science Teacher Preparation Programs
Teacher Preparation Program Survey

* Survey questions mainly include:

1. Type of Institution (e.g., public, private, national level, province level, other local level etc.)
2. Selectivity and entry requirements of students entering the teacher preparation programs
3. Type of program
4. Objectives of the program (math/science)
5. Course information
   - Course name
   - Course code
   - Course choice (Compulsory, Optional)
   - Course credits
   - Format of course (e.g., lecture, workshop ...)
   - Form of assessment (e.g., observation, test, etc.)
Survey questions:
1. Name of District Member Economic Jurisdiction:
2. Name of University Institution:
3. Type of Institution (e.g., public, private, national level, province level, other local level etc.):
4. Characteristics:

<table>
<thead>
<tr>
<th>Student and Faculty Characteristics</th>
<th>Total</th>
<th>Undergraduate</th>
<th>Graduate</th>
<th>International Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of students at institution</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Number of students enrolled in teacher preparation programs</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Number of students enrolled in upper secondary (or secondary) mathematics teacher preparation programs</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Number of students enrolled in upper secondary (or secondary) science teacher preparation programs</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Number of majors offered at institution</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Number of students majoring in mathematics (but not enrolled in a teacher preparation program)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Number of students majoring in science (but not enrolled in a teacher preparation program)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Number of faculty members at institution</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Number of faculty members teaching teacher preparation courses</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

5. Please describe the selectivity and entry requirements of students entering the teacher preparation programs (e.g., percentile on entrance exams, grade-point average, percentage of applicants accepted, etc.). Also, describe any special recruitment activities to ensure high-quality students are entering your teacher preparation program.

6. For mathematics/science courses taken by both students majoring in mathematics/science and students majoring in upper secondary mathematics/science teacher preparation (e.g., Calculus, physics, etc.), please describe any achievement differences between the two groups of students. For example, do mathematics majors have higher or lower grades than teacher mathematics education students when they take the same courses?

7. Mathematics education teacher preparation program:
   a) Please describe objectives of this program.
   b) Type of program: Consecutive or Concurrent?
   c) Number of subjects program graduates are trained to teach (e.g., major in Mathematics and Minor in Physics = 2 subjects): __________
   d) Total number of credits required: _____ (1 credit = _____ hours)
   e) Total number of instructional/practicum hours required: __________

<table>
<thead>
<tr>
<th>Course/Practicum Name</th>
<th>Course code</th>
<th>Course Objectives</th>
<th>Course objectives (optional)</th>
<th>Cccc</th>
<th>Specia lization</th>
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</table>

2/8/2012
Preliminary Analysis

(1) Type of Institution (e.g., public, private, national level, province level, other local level etc.)

- **China**: three levels of universities offering Teacher Preparation Programs for high school teachers: national level, province level and local level (i.e., Teacher College), with all being public
- **New Zealand**: 7 public universities in NZ offering teacher education and two small private institutions.
- **Singapore**: one public university at the national level (i.e., National Institute of Education, NIE)
- ......
Preliminary Analysis

(2) Selectivity and Entry Requirements

New Zealand (e.g. Waikato University—Public-provincial):

- Undergraduate Programmes - Must have University Entrance. This includes specific requirements for numeracy and literacy and requirements to enter the subject specific concurrent degree. All applicants provide hand written a personal statement, two referees reports and are interviewed in person by academic staff and members of teaching profession.

- Graduate Programmes - Must have a degree with a major in the subject they wish to teach and a strong supporting subject. Selection the same as undergraduate. Quality of degree transcript is a consideration.

Preliminary Analysis

(Selectivity and Entry Requirements)

Singapore : National Institute of Education (NIE, national level):

- Postgraduate Diploma in Education for Junior College: All students accepted into the pre-service teacher education programmes at NIE must meet two criteria:
  1) academic qualification requirements for the specific programme, and
  2) successfully complete an employment interview with the Ministry of Education Singapore. All student teachers at the NIE are first employed by the Ministry of Education Singapore before being enrolled in the pre-service teacher education programmes at NIE.
Preliminary Analysis
(Selectivity and Entry Requirements)

P. R. China: East China Normal University (national level):

- **Undergraduate Programmes:** High school students attend the national college entrance exam to get enrolled in this teacher preparation program. Students in the teacher preparation program have full scholarship that covers all tuitions and some living expense. After graduation, students are required to serve the secondary schools in their provinces for several years.

- **Graduate Programmes:** Must have a degree with a major in the subject they wish to teach. They attend the national entrance exam to get enrolled in this graduate program. Most of them are in-service teachers.

Preliminary Analysis

(3) Type of Program / (4) The Objectives of the Program (e.g. concurrent, consecutive, the both integrated.)

Singapore: National Institute of Education (NIE, national level):

- **Consecutive:** study discipline followed by teacher training after students have obtained a Bachelor degree

- The Post-graduate Diploma in Education (PGDE) programme aims to prepare teachers who are well-informed, competent and thinking professionals.
P.R. China: East China Normal University

- **Type of program:** concurrent: study discipline and participate in training at the same time.
- **The objectives of the program:** This program is intended to train students to be outstanding teachers. The program enables students to master the professional theory, knowledge and skills, enhances their problem-solving abilities by using mathematics/science and computer, strengthens their self-study ability and social adapt ability.

New Zealand: Waikato University

- **Type of program:** Consecutive or Concurrent: Both are offered
- **The objectives of the program:** to prepare teachers who master
  - knowledge of NZ curriculum and assessment requirements;
  - Develop curriculum knowledge
  - Lesson and unit planning
  - Selection, development and evaluation of teaching materials and activities
  - Reflect critically on their teaching to improve and respond to student learning
(5) Course Information - The courses can include:

- (D) required math or science courses for all majors in the math or science discipline (e.g. calculus, electromagnetics),
- (MR) additional required math or science courses for upper secondary math or science teacher majors,
- (ME) additional elective math or science courses for upper secondary math or science teacher majors;
- (G) general education course (e.g. liberal arts, foreign language),
- (TE) teacher education course (e.g. how to teach the content such as psychology, pedagogy),
- (P) practicum
- (O) other

P.R.China: East China Normal University

- (D) required math or science courses for all majors in the math or science discipline (e.g. Analytic Geometry, Ordinary Differential Equations, Complex Analysis),
- (MR) additional required math or science courses for upper secondary math or science teacher majors (e.g. Modern Mathematics & Secondary School Mathematics),
- (ME) additional elective math or science courses for upper secondary math or science teacher majors (e.g. Culture & History of Mathematics, Discovery in Mathematics);
- (G) general education course (e.g. foreign language, Social Science, Chinese Modern & Contemporary History),
- (TE) teacher education course (e.g. psychology, pedagogy, Mandarin for Teaching),
- (P) practicum
- (O) other
### Preliminary Analysis

**New Zealand: Waikato University**

- **(D)** required math or science courses for all majors in the math or science discipline (e.g. ---)
- **(MR)** additional required math or science courses for upper secondary math or science teacher majors (-----);
- **(ME)** additional elective math or science courses for upper secondary math or science teacher majors (--------);
- **(G)** general education course (-------);
- **(TE)** teacher education course (e.g. Introduction to teaching and the curriculum, Tirohanga Maori, The Adolescent Within a School Context)
- **(P)** practicum
- **(O)** other (-------)

**Singapore: National Institute of Education**

- **(D)** required math or science courses for all majors in the math or science discipline (---),
- **(MR)** additional required math or science courses for upper secondary math or science teacher majors (------);
- **(ME)** additional elective math or science courses for upper secondary math or science teacher majors (--------);
- **(G)** general education course (-------);
- **(TE)** teacher education course (e.g. The Social Context of Teaching and Learning, Teaching and Managing Learners at the Secondary/Junior College Level, Using e-Portfolio for Learning and Teaching)
- **(P)** practicum
- **(O)** other (e.g. Group Endeavours in Service Learning)
Preliminary Analysis

Course Format

* Lecture
* Workshops
* Tutorial
* Lab session
* Field experience
* Experiential Learning
* etc.

Preliminary Analysis

Form of assessment:

* Paper & Pen Assessment
* Group Presentation, group work, Oral presentation, Class Participation,
* individual Essay, individual Assignment
* e-Portfolio, E-learning Case Analysis, assessment based on microteaching,
* School-based practical assessment, Project work, evidence-based reflective discussions, lesson observations during practicum; Problem-Based Learning (PBL)
* etc.
Preliminary Consideration

To promote future teacher quality, it can be considered as follows:

- How do we combine the subject courses and teacher education courses?
- How do we assess the structure of courses?
- Do we need standard to develop teacher preparation program courses?
- How do teacher preparation programs integrate with in-service teacher program?

Many thanks!