The Italian Didactic Tradition

Specific features of the Italian situation and salient aspects of Mathematics education in the Italian cultural context

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A look at the past

The situation

1970s - 80s in Italy – consolidated tradition of cooperation between universities and schools (mathematicians: e.g. Giovanni Prodi, Lucio Lombardo Radice, Francesco Speranza); (teachers: e.g. Emma Castelnuovo, to whom the International ICMI award for outstanding achievements in the practice of mathematics education is dedicated)

The situation

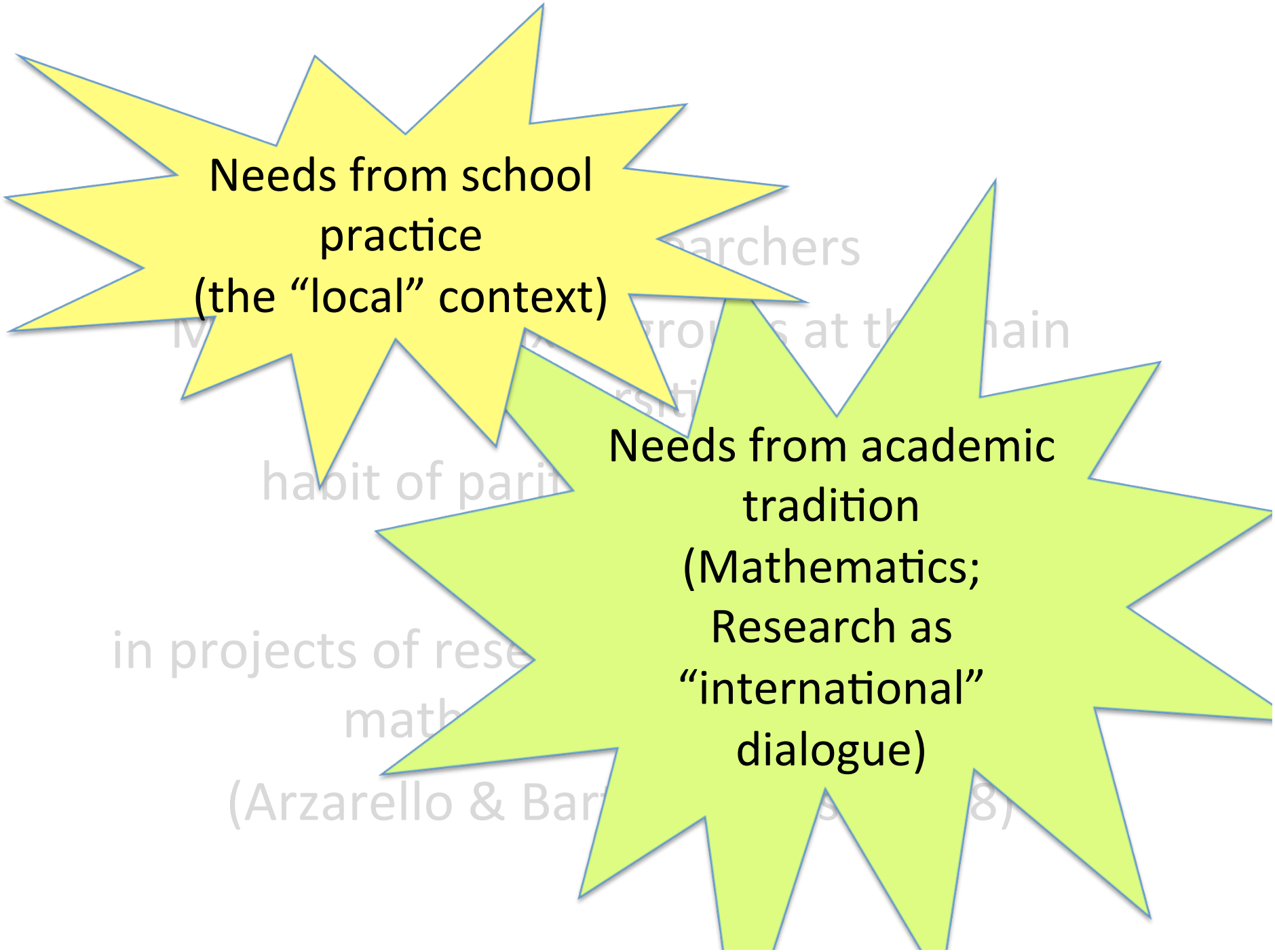
Teacher-researchers

Members of mixed groups at the main Universities,

with habit of parithetic cooperation

with academics

in projects of research for innovation in the mathematics classroom


Needs from school practice (the “local” context)
Needs from academic tradition (Mathematics; Research as “international” dialogue)


There is nothing so practical
as a "good theory"
(Kurt Lewin)

Teacher-researchers' needs 1970s …….

To focus on:

- Whole class interaction (beyond the more popular studies on individual problem solving and small group cooperative learning)
- The teacher's role as a guide (beyond the more popular focus on learner's processes)
- Long term processes (beyond the more popular studies on short term processes)
- Manipulation of concrete artifacts (e.g. abacus, curve drawing devices, tools for perspective drawing) without overlooking the theoretical aspects of mathematical processes

A look at the past

This situation was summarized in the 90s:

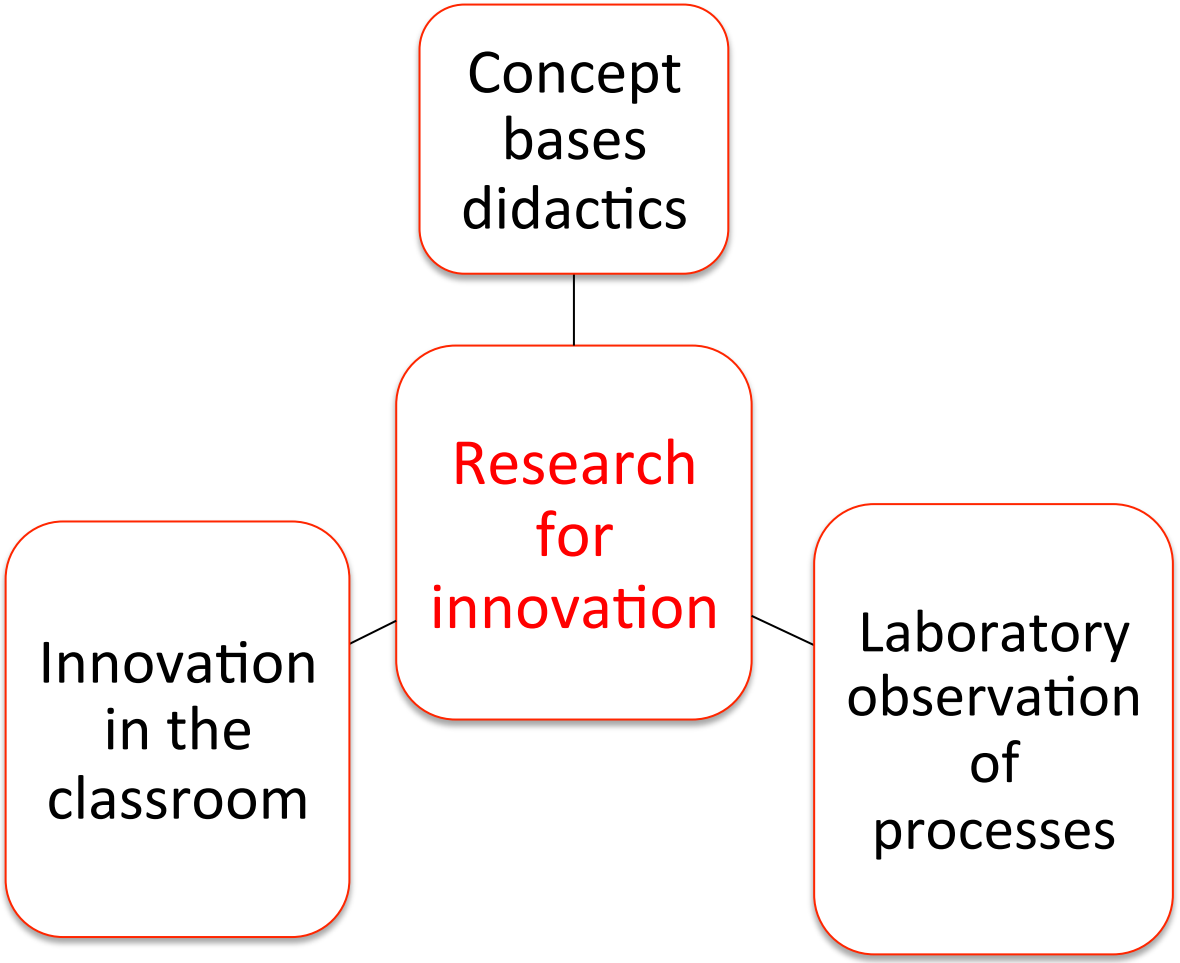
1994-98

F. Arzarello & M. Bartolini Bussi

(ICMI Study n. 8)

Italiand trends in research in mathematical education: a national case study from an international perspective

A systemic view



A dynamic analysis

- Minimality test. In a research study in mathematics education at least two of the three components … are considered. Relevance requires that all three of the conponents ne considered.
- Dynamic interfunctionality test. In a research study in mathematics education …. analysis is focused on the mutual relationships between the components rather then on the components themselves.

  - (FA & MBB, 1998)

Thirty years later

This systemic approach is still fundamental, although

- additional components have strongly emerged (e.g. the study of beliefs and conceptions)
- the landscape is changed (e.g. the impact of technologies; the attention to students with special needs; the major issue of teacher education; the awareness of multicultural aspects)

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In the past

teacher-researchers

in the parithetic collaboration between academics and teachers

research models

(and findings)

with strong links with school needs and constraints

But

the optimistic illusion in the gradual expansion to schools

(teacher education and development)

The recent history of teacher education in Italy

Pre-primary and primary school

University programs (masters)

from 1998 (4 years)

From 2010 (5 years)

with strong balance between

Courses (psyco-peda area + subject matters)

Practicum

Workshops

Secondary school

1999-2009 nine cycles of 2 year specialization after master degrees (e. g. in Mathematics)

2011- today? 1 year specialization after master degrees

Now: reform???

The situation is very different

Pre-primary and primary school

A “quiet and safe” development of good practices and studies without solution of continuity since 1998;

Stronger and stronger links between general education and disciplines (Mathematics, Science, language …)

Secondary school

A continuously interrupted process with tensions and difficult relationships between general educators and specialists of disciplines

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2015: A reform
La buona scuola - The good school was issued.
A comprehensive programme of teacher education and development
is debated

The recent history of teacher development in Italy

La buona scuola has for the first time transformed in service teacher development into a:

- compulsory
- sistematic
- funded

activity

but the details are still unknown and the role of Universities (beside other private agencies, trade unions ad similar) is not yet clear.

A personal example

The two early research projects developed with teachers-researchers (PME 33 – 2009)

Vygotskian approach to social interaction **Mathematical Discussion** orchestrated by the teacher.

Several teaching experiments (grades 1-8) (PME PL -15 - 1991)

Instrumental approach to Mathematical Laboratory **Mathematical Machines (concrete instruments)** Construction and didactical use.

Several teaching experiments (initially, grades 9-13) (PME RR - 17 - 1993)

Implementation in teacher education and development

Larger and larger dissemination of this methodology drawing on

international Lesson Study

(especially in the form of the Chinese open-class approach)-

Strong points

The effects on the institutional processes in Italy

Mathematical Discussion

Mathematical Laboratory with the paradigmatic example of Mathematical Machines next to ICTs

These two theoretical constructs were adopted
in the methodology background
of the Mathematics Curricula
prepared by the Italian Mathematical Union /
Italian Commission on Mathematical Instruction,
on behalf of the Ministry of Education
and had a strong influence on the national standards
issued by MoE (2007 – 2012 - ….)

The effects on the institutional processes in Italy

Mathematics Teacher Education and Development

Books for the Italian teachers
Courses / workshops
for pre-service and in-service teacher education
and so on

The findings for the academic international audience

The development in cooperation
with M. A. Mariotti and with many teacher-researchers
of a comprehensive and developing
theoretical framework on
semiotic mediation in the mathematics classroom
after a Vygotskian approach
that encompassess dozens of
teaching experiments in ALL grades
(from pre-school to university teacher education)
and many different artifacts
(from texts and sources and historical instruments
to contemporary ICTs)

The products for the academic international audience

Dozens of research papers
mainly by Bartolini Bussi, Mariotti and collaborators
on the main journals of the field
(ESM, JMTE, ZDM, FLM…)
on many international volumes and handbooks
Invitations
as keynote speakers in International Conferences
as invited speakers in doctoral schools, summer or winter schools, universities, learned societies
national scientific events in many countries ….
as members of IPCs of International Conferences and ICMI Studies ….

But ….

Weak points

At the national level

Slow dissemination out of the research groups to develop teachers' attitudes and beliefs.

At the international level: theoretical framework

Some of the background choices
(e.g. the focus on

- the epistemology of mathematics
- the teacher's role as a guide

in the mathematical classroom processes)
made and make this theoretical framework
for (Western) researchers less appealing
than other approaches more biased by
non-mathematical issues
(e.g. sociological, psycological)

An example: teacher's actions in the mathematics classroom

Negotiation of meanings, of socio-mathematical norms, development of taken-as-shared meanings

(Voigt, Bauersfeld, Steinbring, Cobb et al. ….)

These positions draw on a more or less radical vision of constructivism, where the focus is on the individual learners, as more or less isolated subjects, with a more or less explicit separation from the historic-cultural context.

An example: teacher's actions in the mathematics classroom

The very formulation of teacher's actions is often more related to general interaction rules (studied in general education) than to the specific mathematical task:

- To invite students
- To establish connections ….

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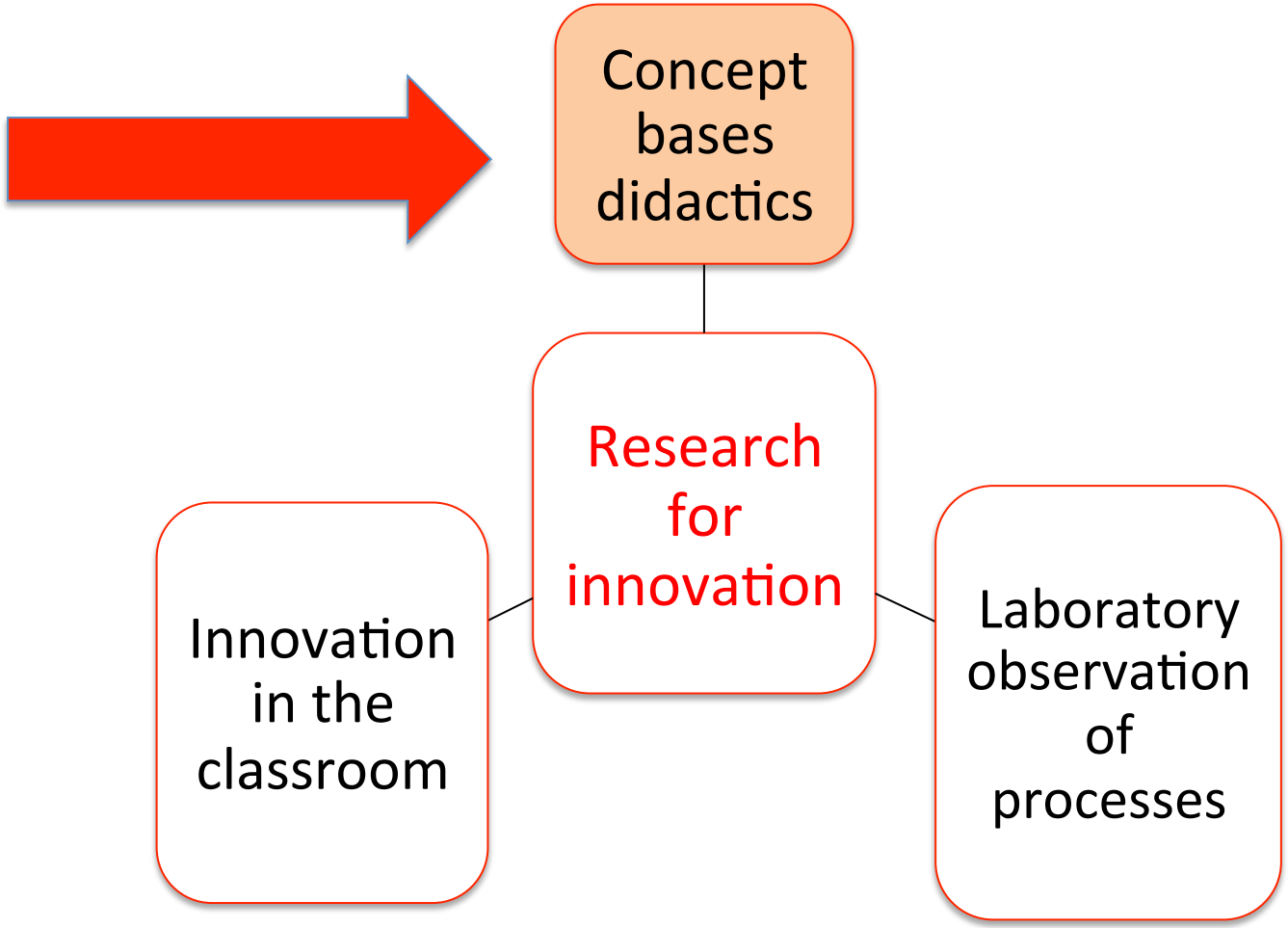
- To invite students
- To establish connections ….

We too draw on this literature, but …

- Where is the specificity of the piece of mathematics knowledge into play? Of the particular task? Of the artifact(s) to be used?
- Are there differences between mathematical discussions and philosophical discussions (e.g. the more and more popular approaches to philosophy for children)?

A systemic view



Hopes

Advantages of this theoretical framework

Some of the background choices,

e.g. the focus on

- the epistemology of mathematics
- the teacher's role as a guide

in the mathematical classroom processes,

are consistent with the systems of values developed in some large regions of the global world,
showing themselves only recently in the forum of mathematics education
(e.g. Far East regions; developing countries)

A finding from a very large international study: the Learner's Study

Whether we look to
the Japanese
"gakushushido" - 学 (Chinese "xuè")
the Dutch
"leren"
or the Russian
"obučenie" - обучение
we find that some communities have acknowledged the interdependence of instruction and learning by encompassing both activities within the one process and, most significantly, within the one word.
In English, we seem compelled to dichotomise classroom practice into Teaching or Learning.

(D. Clarke)

Advantages of this theoretical framework

This theoretical framework
may create the conditions for a fruitful and effective international dialogue not limited to the so-called Western countries

Personal experiences

- Strong connections with Far East communities of mathematics educators (Japan, China, Thailand, Myanmar-Burma and so on)
- A project with Japan (Masami Isoda, Tsukuba Univ. Japan)
- An ongoing joint project with Macau-China (Sun Xuhua, University of Macau)
- A planned project on mathematics teacher education with Burma (NLD – Aung San Suu Kyi party)
- The extraordinary experience of co-chairing the first ICMI study on primary school (ICMI Study 23) with a very strong IPC coming from all the 5 continents.

A personal wish/dream

To educate Italian and European future teachers and future researchers in mathematics education (e. g. doctoral students) to an open minded approach, with the awareness that

- one's own cultural values mould one's own research studies, that are contextually-dependent;
- findings of research studies are themselves contextually-dependent;
- even analytical tools are themselves contextually-dependent.

No finding, no artefact, no analytical tool may be shifted from one context to another without a previous careful analysis, i. e.
a process of "cultural" transposition
from a country to another.

(Bartolini Bussi et al., FLM, 2013 and 2014)

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Thank you!

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