Transforming Teacher Education to Improve Learning Outcomes

29 May-2 June 2017
**E-Seminar Synthesis Report: May 29-June 2, 2017**

*Teachers are considered to be the most important school-level variable affecting student learning outcomes —but how can students learn if teachers are not adequately prepared to teach?*

The IIEP Learning Portal’s e-Seminar on *Transforming teacher education to improve learning outcomes* brought together 1,121 participants from 142 countries to discuss how teacher education systems can be designed to maximize teachers’ abilities, and improve student learning outcomes.

The e-Seminar focused on three themes:

- **Insights**: What can we learn about the strengths and weaknesses of teacher education from large-scale assessments?
- **Reform**: How, and to what extent, can teacher education systems be reformed to solve problems that are detected through learning assessments?
- **Competencies**: What key competencies, necessary for achieving SDG4, are currently not addressed in teacher education programmes?

Four guest presentations guided the discussions:

- **Maria Teresa Tatto**, Principal Investigator for the Teacher Education and Development Study in Mathematics (TEDS-M): Transforming teacher education to improve learning outcomes (Keynote presentation).
- **Michael Ward**, Senior Policy Analyst, Development Co-operation Directorate and Directorate for Education and Skills, Organization for Economic Cooperation and Development (OECD): What can we learn about the strengths and weaknesses of teacher education systems from large-scale assessments?
- **Frank Hardman**, Professor of Education and Development, University of York, United Kingdom: Placing Pedagogy at the Centre of Teacher Education Reform.
- **Helen Abadzi**, retired Senior Education Specialist at the World Bank: Which competencies necessary for achieving SDG4 Remain unaddressed through teacher education programs?

Key takeaway points from the e-Seminar included:

1. Teacher education matters, and can be improved. Participants remarked that they gained new insight into the importance of the influence of teacher education on students’ learning outcomes, suggesting that teacher education is often seen as part of the landscape, not something that can be analyzed and reformed.

2. Countries face similar issues and concerns with teacher education. Participants were struck by the universality of many themes addressed in the e-Seminar.
3. Large-scale assessments and studies can provide information about the strengths and weaknesses of teacher education systems. However, many participants remarked that their own contexts lacked sufficient information for such an analysis.

4. Teachers in many contexts are under-prepared in basic knowledge and skills. Many teachers have significant weaknesses in foundational areas, suggesting that this may require either higher recruitment standards or pre-service and in-service systems that do a better job of assessing and filling these gaps.

5. Teachers need to know more than just subject content. In addition to strengthening teachers’ subject knowledge, participants remarked on the importance of teachers understanding the science of cognition and learning, and developing pedagogical content knowledge.

6. Greater attention should be given to in-service teacher education. Participants noted that in-service education should receive equal or greater attention than pre-service training. In-service training should be more systematic, more school-based, tailored to specific needs and contexts, and offered through multiple modalities.

7. ICT skills should be a crucial element of teacher education systems. Participants remarked that digital literacy is a weak area for teachers, and that improving ICT skills would enable them to update their content and teaching methods, as well as provide them with increased professional development opportunities.

8. Teachers need to build knowledge and attitudes for inclusive education. Participants argued that teachers will be unable to support the Sustainable Development Goals’ agenda unless they gain a greater understanding of social inequities, discrimination, and the special needs of certain groups of students.

9. Teachers need to become more reflexive practitioners. Participants stated that teachers need to take charge of their own professional development. This requires the ability to observe the effects of their teaching, as well as use assessment data to evaluate and identify ways to improve their own practice.

10. Teacher educators need to improve their knowledge and skills. Many weaknesses in teacher education stem from weaknesses in the knowledge and skills of teacher educators. This emerged as an important issue to investigate further.

On the last day, participants discussed their plans for applying what they had learned to their own contexts. These ranged from policy-makers promising to review teacher education within their national education plan, to teacher educators reflecting on how to transform their courses, to teachers pledging to become more engaged in their school’s in-service professional development.
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Introduction
The IIEP Learning Portal supports education policy-makers and other stakeholders around the world to plan for quality education and improved learning outcomes—a crucial issue of our time, with millions of children and youth not yet receiving the education they deserve. The Sustainable Development Goals strive to change that, aiming for a world in which “all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes.” But how can students learn if teachers are not adequately prepared to teach?

As international education efforts renew their focus on quality and learning, rather than just access, education policy-makers and other key stakeholders are asking how the capabilities of their teachers can be improved. Pre-and in-service teacher education systems should be one key focus of attention.

From May 29-June 2, 2017, the IIEP Learning Portal hosted an e-Seminar to help participants explore how their teacher education systems can be designed to maximize teachers’ competencies and to reach goals for student learning outcomes.

The e-Seminar focused on three themes: sharing insights on teacher education from large-scale assessments, discussing teacher education reform, and addressing missing teacher competencies.

The first theme of the e-Seminar drew connections between teacher education and large-scale assessments, asking what we can learn about the strengths and weaknesses of teacher education systems from such assessment programmes, which include citizen-led assessment, national, regional, and international assessment programmes.

The second theme, teacher education reform, posed the question of how, and to what extent, teacher education systems can be reformed to solve problems that are detected in learning assessments.

Finally, our third theme, missing teacher competencies, explored whether our teacher education systems are focusing on what teachers really need to know, be, and do in order to achieve SDG4

Through discussion prompts, guest speakers, and the sharing of policies and research, participants gained new insight into the ways in which teacher education systems could be made more responsive to efforts to improve education quality, and more effectively serve the goal of improved learning outcomes for all students. The e-Seminar concluded with a discussion on engaging in national discussions around teacher education, calling on all participants to reflect on how the ideas they discussed during the e-Seminar related to their own context, and to their personal and professional engagement in helping teachers support the learning of all children.
Outline of this Synthesis Report
This e-Seminar synthesis report contains six major sections. First is an analysis of the registrant demographics and of rates of participation in the different aspects of the e-Seminar. This is followed by four sections summarizing the content of the e-Seminar discussions: highlights from the keynote address, and a summary of the presentations and discussions from each of the three discussion tracks. Finally, this synthesis concludes with a summary of participants’ key takeaways from the event and their plans for taking forward what they had learned during the week.
E-Seminar Registrants
The IIEP Learning Portal e-Seminar on transforming teacher education to improve learning outcomes attracted 1,121 registrants, 475 of whom were active on the e-Seminar platform. A number of people also participated in the e-Seminar via Twitter and the hashtag #teachers4learning.

142 different countries were represented, with very large contingents (over 50 per country) from the Philippines, India, Malta, Kenya, and Nigeria. Some registrants were able to join the discussions despite difficult conditions in their home countries, including Afghanistan (3 registrants), Iraq (2), Somalia (9), Sudan (3), Syria (1), and Yemen (9). Overall, the Asia/Pacific region was the most represented, with 34% of registrants, followed by sub-Saharan Africa at 30%. Slightly over half (53%) of registrants were female.

The highest percentage of registrants came from national Ministries of Education (24%) followed by educational institutions (with universities at 18% and secondary schools at 11%). International organizations and NGOs were well represented (10% and 9% respectively). The average level of education was high, with 52% of registrants possessing Master’s degrees and 20% possessing a PhD. 19% of participants had attained a Bachelor’s degree, while 4% held diplomas from teacher training programmes.

Figure 1: Registrants by geographical region

![Registrants by geographical region](image)

Figure 2: Registrants by institution

![Registrants by institution](image)
Keynote Address

Dr Maria Teresa Tatto, Southwest Borderlands Professor of Comparative Education at the Mary Lou Fulton Teachers College, and Professor in the Division of Educational Leadership and Innovation at Arizona State University offered a keynote address for the e-Seminar. Dr Tatto serves as executive director and principal investigator for the first IEA comparative large-scale study to examine the institutions, processes, and outcomes of teacher education, the Teacher Education and Development Study in Mathematics (TEDS-M), among many other accomplishments.

Highlights from the Keynote Presentation

Dr Tatto argued that “learning to teach is a complex undertaking and needs careful planning and implementation.” She presented findings from the Teacher Education and Development Study in Mathematics (TEDS-M), the first large-scale international comparative study of teacher education. The study involved 15,163 future primary school mathematics teachers, 9,389 future secondary mathematics teachers, and 4,837 teacher educators from 17 countries.

The study’s findings were complex and nuanced, highlighting the key observation that teacher educators benefit greatly from being engaged in research about their own teaching methods and their effectiveness in developing future teachers’ knowledge and skills. Dr Tatto recommended that teacher educators should be involved in “rigorous and comprehensive longitudinal studies of their own programmes in collaboration with their future teachers, and with interdisciplinary research teams.”

Assessing the mathematics and pedagogical knowledge of future teachers, as well as collecting information about their courses of study and about teacher educators, the TEDS-M study found the strongest outcomes from teacher education programmes with the following characteristics:

1. Entry to the programme was dependent on demonstrating prior subject content knowledge
2. Future teachers were prepared as subject specialists in the area they would be teaching
3. The programme provided opportunities to learn the content of the curriculum they would be expected to teach, including key concepts and their applications
4. The programme had specific standards of curriculum mastery
5. The programme had evaluation and accountability systems that provided information about the outcomes of the teacher education programme’s content and approach

Dr Tatto spoke about the importance of seeing teaching as a life-long learning process, requiring pre-service preparation to ensure strong content knowledge and an understanding of how to teach that content (known as pedagogical content knowledge), as well as in-service
education to continue addressing the challenges teachers confront. In conclusion, she argued that improving teacher education is a matter of social justice, since all pupils have the right to be taught by effective teachers.

**Recommended Reading**


**Theme 1: Insights**

**What can we learn about the strengths and weaknesses of teacher education from large-scale assessments?**

**Guest Speaker’s Presentation**

Dr Michael Ward is Senior Policy Analyst in the Development Cooperation Directorate of the OECD. He works on global educational development issues, particularly those related to the SDGs and Education 2030 Agenda, and is the manager of the PISA for Development initiative (the Programme for International Student Assessment for Development, or PISA-D). Dr Ward discussed the different types of assessment and defined large-scale assessments as “system level assessments for monitoring and providing policy-maker and practitioner-relevant information on overall performance levels in the system, changes in those levels, and related or contributing factors.” After reviewing current international large-scale assessments of different types, he discussed what can be learned about teacher education systems from the PISA assessment in particular. Among other findings, Dr Ward highlighted the following:

1. Teaching is not a very attractive career choice among students in PISA participating countries.
2. Countries with higher teacher salaries had a correlated greater interest in the teaching career.
3. Students who are interested in teaching have lower subject scores (e.g. in mathematics) than their peers expecting to work in other professions.
4. Current teachers’ own scores showed similar weaknesses compared to other adult peers’ skills.
5. Countries with higher student performance organize more in-school professional development activities. The relationship between student performance and different forms of pre-service teacher selection criteria is less clear.
6. Teachers’ classroom management strategies matter for student performance, with a clear relationship between more orderly classrooms and higher student performance.

Dr Ward also argued that teachers must be prepared to use a variety of teaching strategies, highlighting data showing that memorisation, control, and cognitive activation strategies all have an important role to play, particularly for developing foundational mathematics skills. However, he noted that a more student-centred approach, together with elaboration
strategies (analyzing problems together with students in the classroom), appear to be necessary for developing students’ abilities to answer more difficult questions. Dr Ward concluded by discussing the plans for expanding the PISA for Development initiative to more low-income countries in 2021 and the further insights that can be gained about teacher education from the Teaching and Learning International Survey (TALIS).

**Recommended Readings**


OECD. 2017. *What do we know about teachers’ selection and professional development in high-performing countries?* PISA in Focus, No. 70, OECD.


**Key Discussion Themes in Track 1**

While participants appreciated the data presented on TEDS-M and PISA, and the overview of other large-scale assessment programmes, many lamented the fact that their own countries—and low-income countries in general—were not included in these studies. A participant from Nigeria wrote, “[There is] so much insight from studies from developed and developing countries, but such studies rarely include Nigeria... The lack of baseline data for Nigeria [is] a major impediment to charting a course for improvement in teacher education.” Another participant argued that large-scale assessments in general cannot provide detail that is fine-grained enough to be meaningful in specific policy contexts: “A uniform approach often fails to accommodate regional differences. Thus, research and evaluation methodologies might fail to measure local peculiarities and features that underpin development realities we see.” Dr Ward wrote about the importance of developing strategies for more detailed country-level analysis of results and for effectively communicating the findings.

Many discussion comments also focused on teachers’ lack of knowledge—including basic and advanced knowledge of the subject itself, of the particular content included in the curriculum, and of pedagogical content knowledge, or the ability to organize and present the content at an age-appropriate level and in a contextually appropriate way. A number of participants concluded that pre-service teacher education programmes need to evaluate the knowledge of teacher candidates, ensure that any gaps in their foundations are filled during the pre-service phase, and also develop practical pedagogical content knowledge—a process that must be continued and deepened through in-service mentoring and professional development opportunities. Nonetheless, as a very high number of participants remarked, the low appeal of the teaching career itself in many countries makes it difficult to attract high-quality candidates who are motivated to engage in a process of lifelong learning.
Another strong current of discussion focused around the issue of whether teachers should be prepared as generalists or as subject specialists, in light of the TEDS-M finding showing the superior subject knowledge of teachers who had been prepared as specialists. While many participants wrote about the difficulties of mastering all subjects as a generalist, others remarked that specialist teachers may not always be appropriate—especially in the younger years where “by creating subject specialists at the primary level, the subject can become more important than the learner.” Dr Tatto recommended increased specialization for teachers of primary grade 3 or beyond, but suggested that small pilot studies should be conducted to determine the most effective approach for each context.

Finally, participants from Pakistan, Tanzania, United Arab Emirates, and elsewhere focused on the importance of teachers knowing how to design formative and summative assessments, as well as analyse the data from their own assessments and from larger-scale studies to inform and improve their own practice. Dr Tatto recommended that “Teacher educators may begin by studying their own practice as a strategy that they can use to teach their future teachers how to do this themselves. These 'mini-studies' of our own practices may be in some cases just as important as large-scale program evaluations, and in fact..., both should be able to co-exist.”

**Theme 2: Reform**

**How, and to what extent, can teacher education systems be reformed to solve problems that are detected in learning assessments?**

**Guest Speaker’s Presentation**

Dr Frank Hardman is Professor of Education and International Development at the University of York, UK. His research into teacher education has played an important role in policy formation and implementation in East Africa, Southeast Asia and the Middle East. In his presentation, Dr Hardman argued that the reform of teacher education systems should focus on “training teachers in an effective pedagogy, informed by observations of how teachers teach and pupils learn in the classroom” and further, that the capacity of teacher educators needs to be developed to “bridge the theory-practice divide.”

Dr Hardman defined pedagogy as “what teachers actually think, do, and say in the classroom, and how the act of teaching links with the social, cultural, and political context in which teachers operate”. He argued that effective pedagogy involves a few key characteristics: clarity about the objectives and processes of the lesson, use of a variety of approaches depending on the need (whole class, group-based, and one-on-one activities), meaningful questioning that probes for students’ ideas and level of understanding, high levels of student engagement, and frequent feedback mechanisms.

He also presented the case for reducing the emphasis on pre-service teacher education in favour of more systematic and contextualized in-service teacher professional development.
Such an approach might involve the creation of decentralized structures “to monitor and support school-based programmes” providing opportunities “for teachers to work together on issues of instructional planning through...study groups, mentoring, peer coaching, and the conducting of action research”. Effective in-service teacher education systems, Dr Hardman explained, have a few key characteristics:

- Alignment with curriculum and assessment reforms.
- Capacity building and incentives for those who deliver in-service teacher education.
- Sufficient time for teachers to engage in in-service programs while still receiving a salary—for approximately 50 hours per year at a minimum.
- A clear demarcation of the roles and responsibilities of actors such as national, regional, and district offices, teacher educators, schools, and head teachers.

Both the pre-service and in-service aspects of the system, he stressed, need to share a coherent vision and be consistent with one another, with the ultimate objective that teachers take responsibility for their in-service professional development “as reflective practitioners”.

Recommended Readings


Key Discussion Themes in Track 2
Participants discussed the balance of pre-service and in-service education, the key skills that both schools and teachers need in order to play a leading role in their own in-service professional development, and additional changes that would be needed to support teacher education reform.

Participants first debated the relative importance that should be given to pre-service versus in-service education reform. Dr Jim Ackers of IIIEP noted that “pre-service is often less amenable to change than in-service. Development partners therefore provide support to governments with in-service training to correct the damage done by poor quality pre-service systems, [but it would be preferable to] engage properly with government and other partners in supporting a more holistic approach to system reform, which links pre- and in-service training.”

There was some agreement that pre-service teacher education programmes need to do a better job of preparing teachers in foundational content knowledge. A participant from Argentina wrote, “When the teacher is already teaching, they improve their pedagogical content knowledge through mentoring, professional courses and readings, but it is rare that they improve their content knowledge—and they usually don’t have time or systematic
training opportunities to do it.” Yet others argued that pre-service teacher education is often too focused on content knowledge, at the expense of practical pedagogical skills. “If teachers are only equipped with content (discipline) knowledge,” wrote a participant from Cambodia, “and they don’t know how to teach, how to act, to talk and to interact with students based on their unique characteristics, students will not be able to learn well. Effective pedagogy significantly improves the quality of student learning.” Participants agreed with Dr Hardman that in-service opportunities need to be systematic and multi-mode, focusing on improving pedagogical skills by incorporating approaches like lesson study and training in dialogic teaching.

A number of participants also discussed the importance of equipping teachers with other skills. ICT in particular is needed, not only for updating teaching approaches, but also for enabling teachers to play a more active role in their own professional development. A participant from Belize wrote, “teacher education institutions and managers of schools need assistance in analyzing learning assessments in order to identify the problems in teaching and teachers’ competencies. Many institutions of learning - at all levels - lack the necessary resident expertise and other resources to do such analyses [and this is] reflected in the insufficient preparation given to future teachers in the areas of developing, conducting and using school-based assessments to identify problems.”

Finally, a number of participants argued that a set of additional reforms is needed in order to improve the outcomes of teacher education. Many discussed the need for higher entry requirements such that teacher candidates begin their training with stronger foundational knowledge. Yet some pointed out that this could cause challenges in contexts where there are already too few candidates interested in the teaching career, arguing that systems need to improve the status of the teaching profession in order to attract a larger number of strong candidates and motivate them towards continuous professional development. A participant from Japan argued that teacher education reform also requires establishing a system that recognizes teachers’ professional development achievements.

Theme 3: Competencies
What key competencies, which are necessary for achieving SDG4, are currently not addressed through teacher education programmes?

Guest Speaker’s Presentation
Dr Helen Abadzi is a Greek psychologist. She spent 27 years as a Senior Education Specialist at the World Bank and is now a researcher at the University of Texas at Arlington. She has drawn on cognitive psychology and neuroscience to improve the outcomes of educational investments around the world. Her work has been credited with raising early-grade reading fluency to the level of an international priority.
In the context of global discussions about the 21st century skills teachers need to develop in order to support the achievement of the Sustainable Development Goals, Dr Abadzi argued that we should not overlook the importance of the more fundamental competencies that will enable teachers to fulfil their complex responsibilities with greater fluency and ease. Reviewing the research on memory and cognition, she emphasized the constraints placed on teaching by the limitations of working memory—the information that the brain can retrieve at any given time.

Dr Abadzi illustrated the high cognitive demands placed on teachers to perform multiple simultaneous tasks—many of which are never explicitly taught to teachers. They include: classroom management, inventing and executing class routines, apportioning curricula and keeping track of progress in comparison to the available instructional time, thinking of questions to ask, and quickly recognizing and responding to mistakes in students’ work. When teachers are slow readers, cannot easily perform mathematical tasks, or have other weak basic skills, they are easily overwhelmed by the more difficult demands of the profession. “Cognitive overload may be a powerful force in teacher motivation,” Dr Abadzi noted, suggesting that this strain causes many teachers to avoid teaching the subjects they do not master as well, or to withdraw from their work more generally.

Having teacher candidates learn higher-level subject knowledge may do little if they have not mastered these fundamentals. She argued that teacher education programmes instead need to give sufficient attention to strengthening teachers’ “lower-level” competencies—reading, basic mathematics, classroom management, keeping track of time and materials, and a basic knowledge of what children can do and understand at different ages. Developing automaticity and fluency in these areas, she explained, will free up their working memory for the more demanding tasks of teaching. Finally, she argued, the guidance given to teacher candidates and serving teachers should take into account their level of mastery and provide sufficient structured guidance to help reduce the number of things teachers are expected to do at once—though “the use of scripted lessons must be evaluated” and should evolve as the capacity of the teaching force grows.

**Recommended Readings**


**Key Discussion Themes in Track 3**
Participants discussed a range of different ideas linked to the guest presentation on cognition, to the reading on education for achieving the sustainable development goals, and to other observations from the participants’ own experience as educators and decision-makers. They agreed with the conclusion that teacher education programmes need to ensure greater fluency in these basic skills. In addition to the focus on reading and basic mathematics, a
number of participants discussed the need to help teachers become more fluent in the language of instruction used in their context—especially in places where the mother tongue is not used or teachers themselves do not master the students’ mother tongue. A participant from Burkina Faso took Dr Abadzi’s presentation a step further, arguing: “not only should teachers be well-equipped in content knowledge, but they should be aware of brain functioning—including automaticity and memory functions—to be able to facilitate learning in students.”

Many participants argued for the fundamental importance of educating teachers in the skills and attitudes of self-reflection, continual learning, and self-improvement. Being able to engage in formal or informal action research, they pointed out—as in both of the other discussion tracks—also depends on developing greater skills in using assessments to analyse and improve teaching and learning. Relatedly, participants argued that teachers need to learn how to orient their teaching more accurately to the age, abilities, and needs of their students. They argued that this requires developing pedagogical content knowledge, as well as an understanding of child development, of how to identify special learning challenges and gifts, and differentiating instruction appropriately.

Participants observed that many teachers lack the necessary knowledge, attitudes, and skills to apply the principles of inclusive education. They argued that teachers need to learn about practical social issues that affect inclusion and equity, including understanding discrimination and prejudice, gender equity, and appreciation of diversity. They also argued that teachers need to be equipped with the appropriate attitudes and skills to understand and serve disadvantaged student populations.

A further core issue mentioned by a number of participants is that of communication and collaboration, including conflict management. A participant from Argentina remarked, “Initial teacher training should promote the ability to build healthy relationships with school members, students and their families, and the community organizations [so that teachers] can understand conflicts, analyze them and take them as instances of learning that open up new opportunities.”

Finally, participants also spoke about the importance of building teachers’ abilities in other specific areas, including digital/ICT and media literacy, reading instruction pedagogy, use of practical teaching materials, ability to use mother tongue-based bilingual instruction methods, and skills in connecting abstract concepts to practical applications and local community needs. As a participant from Zambia remarked, education in all of these aspects should consider issues of cognitive load: “reducing the amount of material presented ... and spending more time on it will likely have better outcomes.”
**Conclusion: Key Takeaways and Ways Forward**

On the concluding day of the e-Seminar, participants were asked to describe their top three takeaways from the experience and to describe their plans for applying this learning to their own contexts. Several possible “ways forward” were shared with participants, including: advocating for research on teacher education systems, sharing perspectives on the issue via blog posts and media contributions, and bringing together other stakeholders who are involved in issues of teacher education.