Supporting Reforms and Developments in Teacher Education
for the Digital Economy

Soledad A. Ulep
University of the Philippines National Institute
for Science and Mathematics Education Development (UP NISMED)

Introduction:

Reforms and developments in teacher education in the Philippines may be viewed in relation to the country's continuous pursuit of teacher quality. In 2017, the Department of Education – Teacher Education Council published the Philippine Professional Standards for Teachers (PPST) which was developed through the Research Center for Teacher Quality. The Standards define teacher quality in the Philippines. They "describe the expectations of teachers' increasing levels of knowledge, practice, and professional engagement." In particular, they play an important role in helping ensure that the K to 12 curriculum reform will achieve its goals. For the reforms and developments relative to the Standards to be effective, support mechanisms should be in place.

This paper will discuss the support initiatives of UP NISMED in addressing specific domains and strands in these domains of the Standards. These domains which are related to each other, are Content Knowledge and Pedagogy, Curriculum and Planning, and Personal Growth and Professional Development. The kind of support that UP NISMED extends through its various programs and projects address these domains and strands simultaneously.

Teacher professional development is a life-long learning process that spans a continuum where teachers move from the level of being a beginning teacher, to being a proficient one, then to being a highly proficient one, and to being a distinguished teacher. The qualities of teachers in these different career stages are given in the Appendix. This paper will focus on the support UP NISMED provides so that teachers will demonstrate the characteristics of highly proficient professionals.

Different Domains in the PPST for which UP NISMED has Support Initiatives for Teachers

Domain: Content Knowledge and Pedagogy (Source: PPST, 2017)

"This domain recognizes the importance of teachers' mastery of content knowledge and its interconnectedness within and across curriculum areas, coupled with a sound and critical understanding of the application of theories and principles of teaching and learning. It encompasses teachers' ability to apply developmentally appropriate and meaningful pedagogy grounded on content knowledge and current research. It takes into account teachers' proficiency in Mother Tongue, Filipino, and

English in the teaching and learning process, as well as needed skills in the use of communication strategies, teaching strategies, and technologies to promote high quality learning outcomes. "

Table 1: Domain - Content Knowledge and Pedagogy (Source: PPST, 2017)

Strands	Highly Proficient Teacher
Content knowledge and its application within and across curriculum areas	Model effective applications of content knowledge within and across curriculum teaching areas
Research-based knowledge and principles of teaching and learning	Collaborate with colleagues in the conduct and application of research to enrich knowledge of content and pedagogy
Positive use of ICT	Promote effective strategies in the positive use of ICT to facilitate the teaching and learning process
Strategies for promoting literacy and numeracy	Evaluate with colleagues the effectiveness of teaching strategies that promote learner achievement in literacy and numeracy
Strategies for developing critical and creative thinking, as well as other higher order thinking skills	Develop and apply effective teaching strategies to promote critical and creative thinking, as well as other higher order thinking skills

Domain: Curriculum and Planning (Source: PPST, 2017)

"This domain addresses teachers' knowledge of and interaction with the national and local curriculum requirements. It encompasses their ability to translate curriculum content into learning activities that are relevant to learners and based on the principles of effective teaching and learning. It expects teachers to apply their professional knowledge to plan and design, individually, and in collaboration with colleagues, well structured and sequenced lessons. These lesson sequences and associated learning programs should be contextually relevant, responsive to learners' needs, and incorporate a range of teaching and learning resources. The Domain expects teachers to communicate learning goals to support learner participation, understanding, and achievement."

Table 2: Domain – Curriculum and Planning (Source: PPST, 2017)

Strand	Highly Proficient Teacher
Planning and management of teaching and learning process	Develop and apply effective strategies in the planning and management of developmentally sequenced teaching and learning process to meet curriculum requirements and varied teaching contexts
Learning outcomes aligned with learning competencies	Model to colleagues the setting of achievable and challenging learning

	outcomes that are aligned with learning competencies to cultivate a culture of excellence for all learners
Professional collaboration to enrich teaching practice	Review with colleagues, teacher and learner feedback to plan, facilitate, and enrich teaching practice
Teaching and learning resources including ICT	Advise and guide colleagues in the selection, organization, development, and use of appropriate teaching and learning resources, including ICT, to address specific learning goals

Domain: Personal Growth and Professional Development (Source: PPST, 2017)
"This domain focuses on teachers' personal growth and professional development. It accentuates teachers' proper and high personal regard for the profession by maintaining qualities that uphold the dignity of teaching such as caring attitude, respect, and dignity. It values personal and professional reflection and learning to improve practice. It recognizes the importance of teachers' assuming responsibility for personal growth and professional development for lifelong learning."

Table 3: Domain – Personal Growth and Development (Source: PPST, 2017)

Strand	Highly Proficient Teacher
Philosophy of teaching	Manifest a learner-centered teaching philosophy in various aspects of practice and support colleagues in enhancing their own learner-centered teaching philosophy
Professional links with colleagues	Contribute actively to professional networks within and between schools to improve knowledge and enhance practice
Professional reflection and learning to improve practice	Initiate professional reflections and promote learning opportunities with colleagues to improve practice

Support Initiatives of UP NISMED

UP NISMED's programs and projects that address the foregoing domains include the Collaborative Lesson Research and Development Program, Lesson Study in the Philippines Website, Go Teacher Go! Radio Program, GeoGebra Institute of MetroManila @UP NISMED Website, Ag*I*Mat Website, and the KaSaMa Teachers Online Community.

Collaborative Lesson Research and Development (CLRD) Program

This program uses lesson study to promote teaching science through inquiry and teaching mathematics through problem solving. "Lesson study is a form of a long-

term teacher-led professional learning, developed in Japan, in which teachers systematically and collaboratively conduct research on teaching and learning in classrooms in order to enrich students' learning experiences and improve their own teaching" (Wang-Iverson and Yoshida, 2002). Teaching science through inquiry and teaching mathematics through problem solving are learner-centered teaching approaches in that they provide plenty of opportunities for students to engage in creative, critical, and other high level thinking as they learn the science and/or mathematics content.

In doing lesson study which is based on the theory of social constructivism, UP NISMED specialists collaborate with school teachers to formulate their research theme (or long-term goal) and yearly sub-goals (or lesson study goals) for the long-term development of their students through the improvement of their teaching. Once the goals are set, they plan the unit of which the research lesson that will help them achieve the goals, is a part. In developing the research lesson whose objectives are aligned with the research theme and the lesson study goal, the lesson study team critically examines the curriculum - its scope and sequence, the learning competencies and standards, textbooks, teacher's guide, research studies on the topic of the research lesson, students' assessment results, and other relevant materials and ideas. They also discuss their own experiences in and learnings from their previous teaching of the topic. They write the research lesson plan and then one of the teachers in the team implements it in his/her own class. The rest of the team members along with other invited observers such as teachers of the same subject but in different grade levels gather data through observation when the lesson is implemented. These data serve as the basis of their discussion in the post-lesson reflection and discussion (PRD) in relation to the research theme, lesson study goal, and the objective of the lesson with focus on student learning and thinking. Then the research lesson is revised based on the results of the (PRD) and implemented by another teacher in the team in his/her own class. This is followed by the PRD, after which the lesson study team writes their report. The diagram below shows the lesson study process that is followed in the CLRD Program.

Lesson Study Process
Lesson study has a research theme or long-term goal.
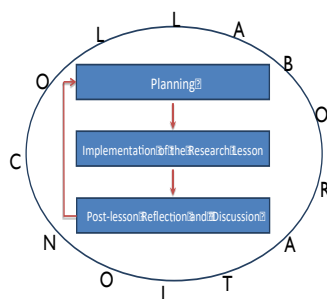
Examples of accounts that show that teachers' knowledge of content was deepened and broadened and their pedagogy gradually shifted to making students more responsible for their own learning are documented in the two lesson study books that UP NISMED published as well as in its dedicated lesson study website. These, and the Lesson Study Guidebook it also published, support teachers as they develop a mindset to collaborate with one another so that they can grow professionally and enrich the learning experiences of their students. These resources are used by education graduate students as they research on lesson study.

UP NISMED's Lesson Study Publications
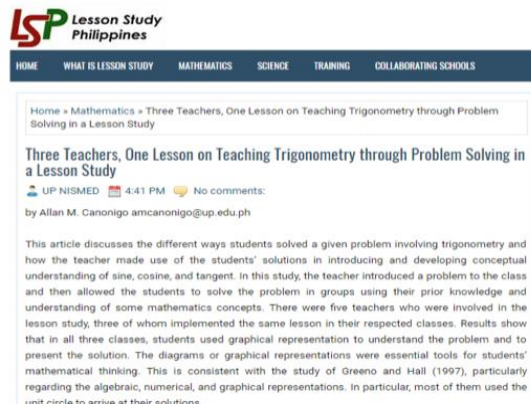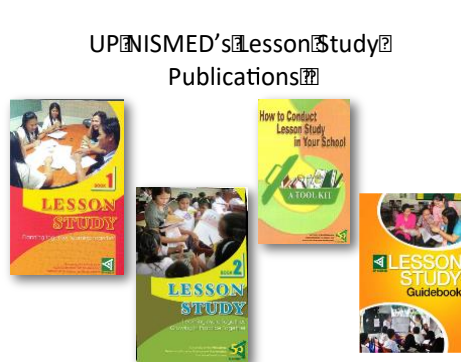
UP NISMED also conducts professional development (PD) programs with two phases which are sponsored by various sectors. These PD programs often include several schools in a district, city, or province. The first phase is a training program which familiarizes the participants consisting of teachers, subject coordinators, principals, supervisors, and teacher educators, with teaching approaches that are inquiry-based in science and problem solving-based in mathematics and with lesson study as a teacher professional learning process. The second phase is a school-based follow-through in which the UP NISMED specialists observe the teacher participants as they implement research lessons in their own classes at school. They had collaboratively developed the lessons based on their research theme and lesson study goal. These PD programs provide opportunities for school teachers and university teacher educators to collaborate. The latter serve as knowledgeable others both in the planning and PRD stages of lesson study.

The Philippine Association of Lesson and Learning Studies (PALS) is an organization initiated by UP NISMED which is aimed at promoting lesson study and creating a network of lesson study practitioners in the Philippines in order to improve the quality of education. So far, PALS had organized seminars and workshops on lesson study and lesson study related topics in different schools in the country. These were conducted by experts from Japan, UP NISMED specialists, and collaborating school teachers.
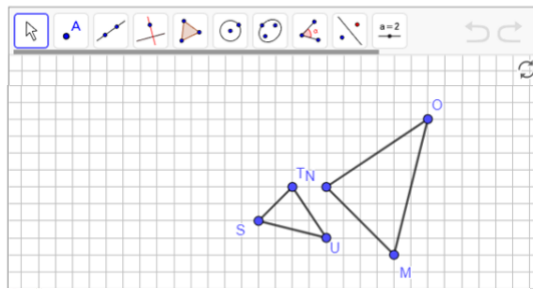
Go Teacher Go! Radio Program

Go Teacher Go! is a radio program produced by UP NISMED in cooperation with DZUP 1602, the official AM radio station of UP. The program provides useful information for elementary and high school teachers on science and mathematics and on strategies in teaching them. Episodes also address common students' misconceptions, difficulties, and errors, as well as numeracy, and scientific literacy. Besides UP NISMED specialists, invited resource persons include school teachers, university professors, and experts in different fields of science and mathematics. By participating in the live streamimg of the program or listening to its podcasts,

teachers can acquire a better understanding of content and pedagogy and appreciation of its applications in their teaching practices.

GeoGebra Institute of Metro Manila @ UP NISMED

GeoGebra is a free downloadable dynamic mathematics software. UP NISMED developed mathematical tasks such as applets in Geogebra which can be used for problem solving or mathematical investigations. These resources which are found in the website https://geogebra.nismed.upd.edu.ph emphasize understanding of concepts and mathematical thinking. Below is an example of an app using GeoGebra.

AgIMat Website

In Ag*I*Mat, Ag stands for Agham (Filipino word for science), *I* stands for Impormasyon (stands for information), and Mat (stands for mathematics). The website contains tried out teaching and learning resources which include among others, lesson plans, activity sheets, and tasks for mathematical investigations. It provides teachers examples of the positive use of ICT and ICT-mediated teaching and learning resources for enhancing their own and their students' learning.

KaSaMa Teachers' Online Community

Teachers from different schools, educators from different teacher education institutions, and UP NISMED specialists who are members of the KaSaMa Teachers Online Community share teaching and learning resources, interact with one another regarding their practices, challenges, and solutions, and collaborate on common professional development activities. Webinars are also conducted mostly by UP NISMED specialists to share critical information, materials, and updates to support

teachers for example, in implementing the new science curriculum or in adapting lesson study in their school.

Concluding Remarks

The support initiatives of UP NISMED concerning reforms and developments in teacher education involve the enhancement of teachers' competence in teaching by strengthening their content, pedagogical content knowledge, resesarch skills, and professional development in collaboration with other colleagues. These are accomplished through face-to-face undertakings such as in training venues and/or in schools. They are achieved as well through the use of technology which is prevalent in a digital economy. With technology, constraints related to time, space, distance, and finances, among others, which often hinder the effectiveness of reforms and developments are addressed. Taken together, the support initiatives of UP NISMED help teachers meet the standards set forth in the PPST.

References:

Research Center for Teacher Quality (2017). *Philippine Professional Standards for Teachers.* Department of Education-Teacher Education Council: Pasig City.

Wang-Iverson, P. and Yoshida, M. (Eds.) *Building our Understanding of Lesson Study*

APPENDIX

Career Stages of Teachers (Source: PPST 2017)

The following are descriptions of the "elements of high-quality teaching for the 21st century" in the different stages of a teacher's career.

Career Stages			
Career Stage 1 or Beginning Teachers	**Career Stage 2 Proficient Teachers**	**Career Stage 3 or Highly Proficient Teachers**	**Career Stage 4 Distinguished Teachers**
They have gained the qualifications recognized from entry into the teaching profession.	They are professionally independent in the application of skills vital to the teaching and learning process.	They consistently display a high level of performance in their teaching practice.	They embody the highest standard for teaching grounded in global best practices.
They have a strong understanding of the subjects/areas in which they are	They provide focused teaching programs that meet curriculum	They manifest an in-depth and sophisticated understanding of	They exhibit exceptional capacity to improve their own

trained in terms of content knowledge and pedagogy.	and assessment requirements.	the teaching and learning process.	teaching practice and that of others.
They possess the requisite knowledge, skills, and values that support the teaching and learning process.	They display skills in planning, implementing, and managing learning programs.	They have high-education focused situation cognition, are more adept in problem solving and optimize opportunities gained from experience.	They are recognized as leaders in education, contributors to the profession, and initiators of collaborations and partnerships.
They manage learning programs and have strategies that promote learning based on the learning needs of their students.	They actively engage in collaborative learning with the professional community and other stakeholders for mutual growth and advancement.	They provide support and mentoring to colleagues in their professional development, as well as work collaboratively with them to enhance the learning and practice potential of their colleagues.	They create lifelong impact in the lives of colleagues, students, and others.
They seek advice from experienced colleagues to consolidate their teaching practice.	They are reflective practitioners who continually consolidate the knowledge, skills, and practices of Career Stage 1 teachers.	They continually seek to develop their professional knowledge and practice by reflecting on their own needs, and those of their colleagues and students.	They consistently seek professional advancement and relevance in pursuit of teaching quality and excellence.
			They exhibit commitment to inspire the education community and stakeholders for the improvement of education provision in the Philippines.