



United Nations
Educational, Scientific and
Cultural Organization



ICT COMPETENCY STANDARDS FOR TEACHERS

Policy Framework

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Foreword

To live, learn, and work successfully in an increasingly complex, information-rich and knowledge-based society, students and teachers must utilize technology effectively. Within a sound educational setting, technology can enable students to become:

- Capable information technology users
- Information seekers, analyzers, and evaluators
- Problem solvers and decision makers
- Creative and effective users of productivity tools
- Communicators, collaborators, publishers, and producers
- Informed, responsible, and contributing citizens

Through the ongoing and effective use of technology in the schooling process, students have the opportunity to acquire important technology capabilities. The key individual in helping students develop those capabilities is the classroom teacher. The teacher is responsible for establishing the classroom environment and preparing the learning opportunities that facilitate students' use of technology to learn, and communicate. Consequently, it is critical that all classroom teachers are prepared to provide their students with these opportunities.

Both professional development programs for teachers currently in the classroom and programs for preparing future teachers should provide technology-rich experiences throughout all aspects of the training. Standards and resources within UNESCO's project "ICT Competency Standards for Teachers" (ICT-CST) provide guidelines for all teachers, specifically for planning teacher education programs and training offerings that will prepare them to play an essential role in producing technology-capable students.

Today's classroom teachers need to be prepared to provide technology-supported learning opportunities for their students. Being prepared to use technology and knowing how that technology can support student learning have become integral skills in every teacher's professional repertoire. Teachers need to be prepared to empower students with the advantages technology can bring. Schools and classrooms, both real and virtual, must have teachers who are equipped with technology resources and skills and who can effectively teach the necessary subject matter content while incorporating technology concepts and skills. Interactive computer simulations, digital and open educational resources, and sophisticated data-gathering and analysis tools are only a few of the resources that enable teachers to provide previously unimaginable opportunities for conceptual understanding.

Traditional educational practices no longer provide prospective teachers with all the necessary skills for teaching students to survive economically in today's workplace.

Foreword cont'd

Through the ICT-CST project, UNESCO is responding to: (a) its function as a standard-setting agency, (b) its mandate within the Education for All (EFA) Programme, (c) its mandate as the lead agency for action lines C4 on “capacity building” (with UNDP) and C7 on “e-learning” as decided by the Geneva Plan of Action adopted by WSIS¹ (2003) and (d) to its overarching objective of building inclusive knowledge societies through communication and information.

The ICT-CST project provides a complete framework for ICT Competency Standards for Teachers by (a) addressing the underlying “Policy Framework” (document 1 of 3), (b) examining the components of educational reform and developing a matrix of skill sets for teachers which correspond to various policy approaches and education reform components² (document 2 of 3), and (c) providing a detailed description of the specific skills to be acquired by teachers within each skill set/module³ (document 3 of 3).

The second phase of the ICT-CST project involves the establishment of a UNESCO mechanism to endorse training programs for compliance with the UNESCO standards. The complete guidelines for submission, evaluation and endorsement will be published on the UNESCO website dedicated to this project: <http://www.unesco.org/en/competency-standards-teachers>.

Furthermore, UNESCO will map existing teacher training standards and training programs to the ICT-CST matrix of skill sets in an attempt to streamline the global efforts in this general area. We do hope that this work will contribute to the development of appropriate training programs for ICT skills of teachers with a global recognition.

Finally, it is important to note that the development of the UNESCO ICT-CST has been a true example of the power of strategic public-private partnerships for development. We are pleased to acknowledge the outstanding support of our numerous partners in both academia and the IT private sector. Most notably, we would like to express our gratitude to Microsoft, Intel, Cisco, the International Society for Technology in Education (ISTE) and the Virginia Polytechnic Institute and State University (Virginia Tech). Their contributions are greatly appreciated.

Abdul Waheed Khan

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UNESCO

1. WSIS stands for the “World Summit on the Information Society” which was held in two phases. The first phase took place in Geneva from 10 to 12 December 2003 and the second phase took place in Tunis, from 16 to 18 November 2005. Check <http://www.itu.int/wsis/basic/about.html> for more details.
2. Such a matrix is referred to as the “Competency Standards Modules”.
3. Such description is included in the “Implementation Guidelines” document. It is important to note that this document is a dynamically evolving set of guidelines which will be continuously updated and posted on the website <http://www.unesco.org/en/competency-standards-teachers> to reflect technology evolution on the teaching/learning processes.

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Introduction

This paper explains the rationale, the structure, and the approach of the ICT Competency Standards for Teachers (ICT-CST) project. It explains how teacher professional development fits into the larger education reform context, as countries review their educational systems in relation to producing 21st century skills in support of social and economic development. It can be used as a guide by those concerned with education decision-making and teacher professional development in preparing their training curriculum and course offering proposals.

More specifically, the objectives of the UNESCO ICT Competency Standards for Teachers project are:

- To constitute a common set of guidelines that professional development providers can use to identify, develop or evaluate learning materials or teacher training programs in the use of ICT in teaching and learning.
- To provide a basic set of qualifications that allows teachers to integrate ICT into their teaching and learning, to advance student learning, and to improve other professional duties.
- To extend teachers' professional development so as to advance their skills in pedagogy, collaboration, leadership and innovative school development using ICT.
- To harmonize different views and vocabulary regarding the uses of ICT in teacher education.

In general, the ICT Competency Standards for Teachers project aims to improve teachers' practice in all areas of their work, combining ICT skills with innovations in pedagogy, curriculum, and school organization. It is also aimed at teachers' use of ICT skills and resources to improve their teaching, to collaborate with colleagues, and perhaps ultimately to become innovation leaders in their institutions. The overall objective of the project is not only to improve teacher practice but also do it in a way that contributes to a higher quality education system which can advance a country's economic and social development.

While the UNESCO ICT-CST project specifies the competencies needed to realize these goals and objectives, it will be up to approved governmental, non-governmental, and private providers to deliver the training for these competencies. The Standards will serve to guide these providers in constructing or revising their learning materials in support of these goals. The Standards will also enable teacher development decision makers to assess how these course offerings map onto required competencies in their country and thereby help drive the development of specific abilities and skills for the teaching workforce that are appropriate to the profession and to national economic and social development goals.

The goal of this paper is to explain the rationale of the ICT-CST project to high-level decision makers and potential professional development partners. It explains how teacher professional development fits into the larger education reform context, as countries tune their educational systems to produce the 21st century skills required for a competitive workforce, for social cohesion and for individual growth. Toward these ends, the paper lays out the broader policy context within which the ICT-CST project was developed and describes the rationale, structure, and approach of the project.

Subsequent sections of the paper provide decision makers and professional development partners with information needed to consider their participation in the project and to prepare their curriculum and course offering proposals. These include a specification of the competency standards modules and guidelines for course developers and training providers.

Policy Context

The UNESCO ICT Competency Standards for Teachers project is situated in a broader policy context of educational reform and of sustainable development. Education is a central function of any nation or community and as such it addresses a diversity of purposes and goals that include:

- Inculcating core values and passing on cultural legacy,
- Supporting the personal development of young people and adults,
- Promoting democracy and increasing participation in society particularly among females and minorities,
- Encouraging cross-cultural understanding and the peaceful resolution of conflict, improving health and well-being, and
- Supporting economic development, reducing poverty and increasing widespread prosperity.

The education programs of the United Nations and UNESCO address these diverse purposes and goals. For example, the Millennium Development Goals (MDG), Education for All (EFA), the UN Literacy Decade (UNLD), and the Decade of Education for Sustainable Development (DESD) all aim to reduce poverty and improve health and the quality of life and view education as an important contribution to these goals¹. All aim to increase the equality of women and men and advance the human rights of all, particularly minorities. All believe that education is a key to development, as a way of enabling people to fulfill their potential and take increasing control over decisions that affect them. All see education as a right of all citizens. In addition, the EFA and DESD place emphasis on the quality of learning, both what students learn and how they learn it. UNLD and EFA both place a focus on literacy as a key part of learning and education. EFA, DESD, and UNLD emphasize the non-formal learning that goes on outside the school system, as well as school itself. Beyond this, the UNESCO International Commission on Education for the 21st Century² contends that learning throughout life and participation in the society of learning are key factors towards meeting the challenges posed by a rapidly changing world. The Commission emphasizes four pillars of learning: learning to live together, learning to know, learning to do, and learning to be.

1. UNESCO (2005). *Links between the global initiatives in education*. Paris: UNESCO.

2. Delors, J., et al. (1999). *Learning: The treasure within*. Paris: UNESCO.

The ICT Competency Standards for Teachers project supports and extends the goals of the education programs described above and supports the full range of educational outcomes. As with all the programs, it emphasizes poverty reduction and improved quality of life. Like the EFA and DESD, the ICT-CST project emphasizes improved quality of education. Like several of the programs, it emphasizes literacy, but like the UNLD, it also argues for a broader definition of literacy. Like the International Commission, it emphasizes life long learning, new learning goals, and participation in a learning society, based on knowledge building and knowledge sharing.

However, the ICT-CST project extends these programs by emphasizing the relationship between ICT use, education reform, and economic growth. The ICT-CST project is based on the assumption that systemic economic growth is the key to poverty reduction and increased prosperity—an assumption that is supported by developments in countries as diverse as Singapore, Finland, Ireland, Korea, and Chile, countries that were all poor 35 years ago. It is also based on the assumptions, articulated in the UNESCO report ‘Education in and for the information Society,’³ that ICTs are engines for growth and tools for empowerment and they have profound implications for education change and improvement.

At the same time, the ICT-CST project concurs with the International Commission that all-out economic growth is at odds with equity, respect for the human condition and respect for the world’s natural assets. Economic growth is not an absolute good. As with the DESD, the Standards project seeks to balance human well-being and sustainable economic development and bring them into alignment through systemic education reform.

Traditional economic models associate growth in economic output with increases in input factors—a nation’s companies purchase more equipment and employ more workers—what economists call capital accumulation. Early in its development, Singapore used this approach by providing inexpensive labor to assemble electronics components for transnational companies. China is currently using this approach. However, as Singapore realized, this approach to growth is not sustainable; eventually additional capital returns smaller and smaller gains in output.

Alternatively, a nation’s economic growth can occur with increases in economic value generated by its citizens. “New Growth” economic models emphasize the importance of new knowledge, innovation, and the development of human capacity as the sources of sustainable economic growth. It is through education and human capacity development that individuals not only add value to the economy but contribute to the cultural legacy, participate in social discourse, improve the health of the family and community, conserve the natural environment, and increase their own agency and ability to continue to develop and contribute, creating a virtuous cycle of personal development and contribution. It is through access to high-quality education by all—regardless of gender, ethnicity, religion, or language—that these personal contributions are multiplied and the benefits of economic growth are equitably distributed and enjoyed. The Standards project provides three ways to connect education improvement to widespread, sustainable economic growth.

3. Guttman, C. (2003). Education in and for the information society. Paris: UNESCO.

Economists identify three factors that lead to growth based on increased human capacity: capital deepening (the ability of the workforce to use equipment that is more productive than earlier versions), higher quality labor (a more knowledgeable workforce that is able to add value to economic output), and technological innovation—the ability of the workforce to create, distribute, share and use of new knowledge. These three productivity factors serve as the basis for three complementary, somewhat overlapping approaches that connect education policy with economic development⁴:

- Increase the technological uptake of students, citizens, and the workforce by incorporating technology skills in the curriculum—or the technology literacy approach.
- Increase the ability of students, citizens, and the workforce to use knowledge to add value to society and the economy by applying it to solve complex, real-world problems—or the knowledge deepening approach.
- Increase the ability of students, citizens, and the workforce to innovate, produce new knowledge, and benefit from this new knowledge—or the knowledge creation approach.

As pointed out in the UNESCO report, *Capacity Building of Teacher Training Institutions in Sub-Saharan Africa*⁵ (TTISSA), UNESCO's aim is to bring teacher education into alignment with national development goals. Consequently, these three approaches correspond to alternative national policy goals and visions for the future of education. Together they provide a developmental trajectory by which education reform supports increasingly sophisticated ways of developing a country's economy and society: from technology uptake, to a high performance workforce, to a knowledge economy and information society. Through these approaches, a country's students and ultimately its citizens and workforce acquire increasingly sophisticated skills needed to support economic, social, cultural, and environmental development, as well as an improved standard of living.

TECHNOLOGY
LITERACY

KNOWLEDGE
DEEPENING

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CREATION

The UNESCO ICT Competency Standards for Teachers project encompasses all three of these approaches to educational change, so as to address different policy goals and visions. But each approach has different implications for education reform and improvement; and each has different implications for changes in the other five components of the education system: pedagogy, teacher practice and professional development, curriculum and assessment, and school organization and administration. ICT plays a different, but complementary role in each of these approaches.

4. Readers interested in exploring general concepts in macroeconomics are referred to Stiglitz, J. & Walsh, C. (2002). *Principals of Macroeconomics* (3rd ed). New York: Norton. For information that is more specific to productivity-based economic growth and development, see OECD (2001). *The New Economy: Beyond the Hype*. Paris: OECD. For a more specific discussion of how economic development is connected to ICT-based education reform, see Kozma, R. (2005). "National policies that connect ICT-based education reform to economic and social development." *Human Technology*, 1(2), 117-156.

5. UNESCO (2005). *Capacity Building of Teacher Training Institutions in Sub-Saharan Africa*. Paris: UNESCO.

The UNESCO ICT Competency Standards for Teachers presented here focus on teachers in primary and secondary schools. However, these approaches apply to all levels of education: primary, secondary, vocational, tertiary, on-the-job training, professional and advanced graduate education, and continuing education. They also have implications for different educational stakeholders: not just teachers but students, principals, ICT coordinators, curriculum leaders, administrators, professional development coaches, and teacher educators.

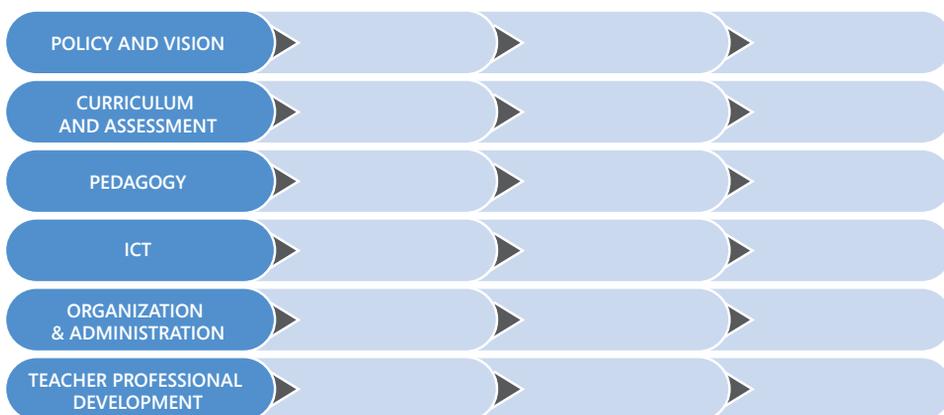
While the UNESCO ICT Competency Standards for Teachers project is focused on primary and secondary teachers and other school-level staff, it was designed within this broader context of economic factors, education reform components, and education stakeholders. Anchoring the project in this broader context allows the standards for primary and secondary teachers to feed into corollary changes targeted at other levels, such as vocational, tertiary, graduate, and job-related training. The framework allows these educational changes in turn to feed into related policies and programs in other ministries and departments that support economic and social development, such as ministries of telecommunication, economic planning, commerce, and labor.

Teacher Professional Development and Education Reform

New technologies require new teacher roles, new pedagogies, and new approaches to teacher training⁶. The successful integration of ICT into the classroom will depend on the ability of teachers to structure the learning environment in non-traditional ways, to merge new technology with new pedagogy, to develop socially active classrooms, encouraging cooperative interaction, collaborative learning, and group work. This requires a different set of classroom management skills to be developed. The key skills of the future will include the ability to develop innovative ways of using technology to enhance the learning environment, and to encourage technology literacy, knowledge deepening and knowledge creation.

Teacher professional development will be a crucial component of this educational improvement. However, teacher professional development has an impact only if it is focused on specific changes in teacher classroom behaviors and particularly if the professional development is on-going and aligned with other changes in the educational system. Consequently, the UNESCO ICT Competency Standards for Teachers plays out the implications that each of the three education improvement approaches have for changes in each of the components of the educational system: policy, curriculum and assessment, pedagogy, the use of technology, school organization and administration, and teacher professional development.

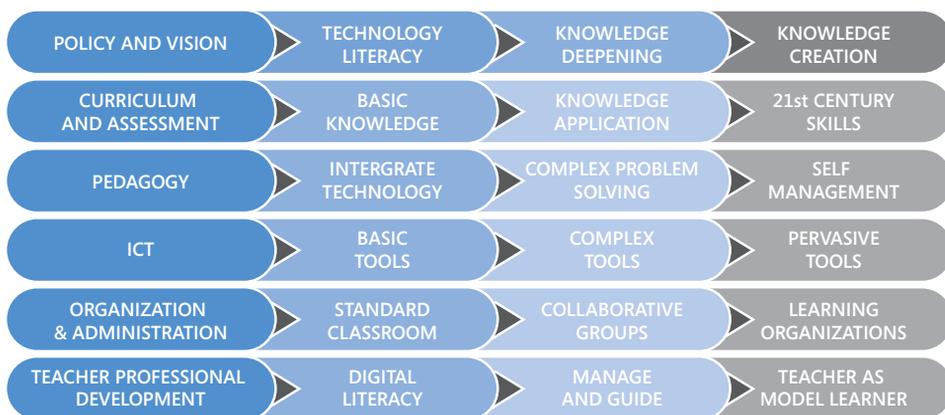
6. Makrakis, V. (2005). Training teachers for new roles in the new era: Experiences from the United Arab Emirates ICT program. Proceedings of the 3rd Pan-Hellenic Conference on Didactics of Informatics, Korinthos, Greece.



The implications for change in teacher professional development and the other components differ as a country moves from traditional education to technology literacy, to knowledge deepening, to knowledge creation. Of the three approaches, the technology literacy approach involves the most basic policy changes. The policy goal of this approach is to prepare students, citizens, and a workforce that is capable of taking up new technologies so as to support social development and improve economic productivity. Related educational policies' goals include making quality educational resources equitably available to all, increasing school enrollments, and improving basic literacy skills, as advocated by the MDG, EFA, and UNLD. This includes a broader definition of literacy, envisioned by UNLD, which involves the newer, innovative technological means of communication—that is technology literacy. Professional development programs that are coordinated with these policies have the goal of developing teachers' technological literacy so as to integrate the use of basic ICT tools into the standard school curriculum, pedagogy, and classroom structures. Teachers would know how, where, and when (as well as when not) to use technology for classroom activities and presentations, for management tasks, and to acquire additional subject matter and pedagogical knowledge in support of their own professional development.

Educational changes related to the knowledge deepening approach are likely to be greater and have more impact on learning. The policy goal of this approach is to increase the ability of learners, citizens, and the workforce to add value to society and the economy by applying the knowledge of school subjects to solve complex problems encountered in real world situations of work and life—problems related to the environment, food security, health, and conflict resolution, as envisioned by DESD. Coordinated teacher professional development would provide teachers with the skills to use more-sophisticated methodologies and technologies with changes in the curriculum that emphasize depth of understanding and application of school knowledge to real world problems and pedagogy in which the teacher serves as a guide and manager of the learning environment and students are engaged in extended, collaborative project-based learning activities that can go beyond the classroom and may involve local or global collaborations.

Finally, the most complex of the three approaches to educational improvement is the knowledge creation approach. The policy goal of this approach is to increase civic participation, cultural creativity, and economic productivity by developing students, citizens, and a workforce that is continually engaged in and benefits from knowledge creation, innovation, and participation in the learning society. The implications of this approach for changes in the curriculum and other components of the educational system are significant. With this approach, the curriculum goes beyond a focus on knowledge of school subjects to explicitly include the 21st century skills that are needed to create new knowledge and engage in life-long learning—the ability to collaborate, communicate, create, innovate, and think critically. Teacher training programs would coordinate the teachers' increasingly sophisticated professional skills with the pervasive use of technology to support students who are creating knowledge products and are engaged in planning and managing their own learning goals and activities. This is accomplished within a school that is, itself, becoming a continuously improving, learning organization. In this context, teachers both model the learning process for students and serve as model learners through their own ongoing professional development—individually and collaboratively. In this regard, schools foster the development of the learning society envisioned by the International Commission.



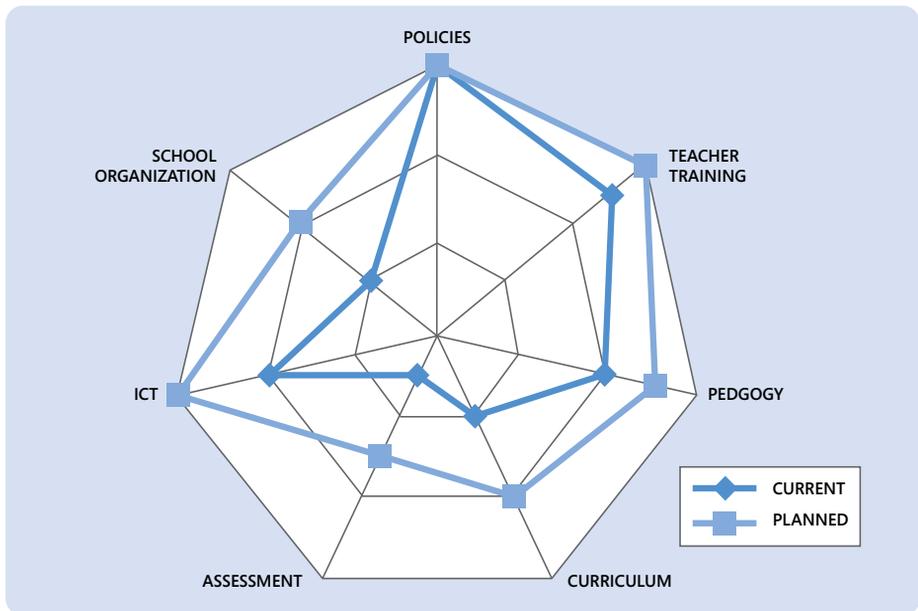
The UNESCO Competency Standards provide a framework that allows teacher professional development providers to connect their course offerings to these broader educational improvement and economic development policy goals.

Development Paths

The TTISSA report points out that teacher training programs are often out of phase with development goals. The intent of the UNESCO ICT Competency Standards for Teachers project is to provide education policymakers tools that they can use to craft ICT-based education reform and teacher professional development to support economic and social development goals. However, there are differences between countries in their economic and social goals and their current economic and social situations. Advanced economies, like Finland and Korea, are in distinctly different positions than middle-income countries, such as Egypt and Chile, and even more so than low-income countries, such as Kenya and Bolivia. Yet the intent of the ICT-CST project is to provide a common education improvement framework that is focused on sustained economic growth and social development while applicable to multiple situations and multiple development paths.

For example, the ICT-CST framework identifies three different productivity-based approaches by which countries may choose to pursue sustained economic growth. It goes on to provide corresponding education change models to match these approaches. Consequently, countries with different growth strategies will find different parts of the framework useful.

Alternatively, countries with dissimilar economic and social conditions may share similar goals but require different paths to achieve these goals. For example, Finland, Singapore, and Egypt all aim to be information societies through economic productivity based on knowledge creation. Yet some countries, such as Egypt, may not have all the economic components in place to implement a program of growth based on knowledge creation. Consequently, a country may need to identify a long-term trajectory by which they move from one approach to another in pursuit of more advanced economic and social goals. The Standards framework provides the foundation for such a strategy. Countries may also differ considerably in terms of their educational infrastructure, the quality of their teachers, the substance of their curriculum, and their assessment approach. The key to moving toward knowledge creation is to leverage current strengths to advance other components of the system. Technological infrastructure may be a strength in one country while in another, there may already be efforts in place to change pedagogical practices. The framework can be used to identify complementary competencies that can build on initial strengths and reform efforts to improve other components in the system so as to maximize the impact that educational change will have on economic and social development. In this way, the framework is be used to localize or tailor a teacher competency program to a particular country, its policies, and its current educational conditions, as illustrated in the diagram right. In this example, a country may leverage current strengths in teacher training and pedagogy to advance curriculum, assessment, and school organization.



Conclusion

By using the policy framework presented here, a ministry can assess its current educational policies, in the context of its current and future economic and social development goals. It can select the appropriate approach for connecting ICT to other education reform efforts. And it can plan a trajectory for connecting these education reform initiatives to the nation's economic and social development goals. Once the approach and trajectory have been selected, a ministry can use the UNESCO ICT Teacher Competency Modules, articulated in the companion document, to plan appropriate training that would give teachers the skills that they need for these goals to be realized.

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