GUIDELINES ON ADAPTATION OF THE UNESCO ICT COMPETENCY FRAMEWORK FOR TEACHERS

KNOWLEDGE CREATION

KNOWLEDGE DEEPENING

TECHNOLOGY LITERACY

UNDERSTANDING ICT IN EDUCATION

CURRICULUM AND ASSESSMENT

PEDAGOGY

ICT

ORGANIZATION AND ADMINISTRATION

TEACHER PROFESSIONAL LEARNING

Policy innovation
Knowledge society skills
Self management
Pervasive tools
Learning organizations
Teacher as model learner
Manage and guide

Policy understanding
Knowledge application
Complex problem solving
Complex tools
Collaborative groups

Policy awareness
Basic knowledge
Integrate technology
Basic tools
Standard classroom
Digital literacy

METHODOLOGICAL APPROACH ON LOCALIZATION OF THE UNESCO ICT-CFT

UNESCO Institute for Information Technologies in Education

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The Guidelines contain the description of the methodological approach to localization of the UNESCO ICT-CFT and are aimed to support the UNESCO Member States in adaptation of this UNESCO framework taking into account specific conditions and requirements of national (regional) education systems; it also promote developing national (regional) standards of teachers' ICT competency as one of the most important policy components in the field of informatization of education and professional development of educators.

 Opinions expressed in this book are those of the authors and do not necessarily reflect the views of the UNESCO Secretariat.

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Foreword

At the 35th session of its General Conference, UNESCO officially presented the UNESCO ICT Competency Framework for Teachers (UNESCO ICT-CFT). Modern society, today more than ever before, is based on information and knowledge. For this reason, it is necessary to create conditions by which all society members are provided with ICT skills that will allow them not only to process information, but also to implement their individual creative potential to the solution of any problem. Teachers and educators should also have the corresponding opportunities for acquisition and development of such skills.

The ICT Competency Framework for Teachers was developed by a cross-sectoral working group and based on consultations with experts in the field from all world regions. Moreover, this Framework is the result of the successful continued collaboration between UNESCO and its partners from private companies in the professional society, such as CISCO, INTEL, Microsoft, and ISTE. In its current version, the Framework has been enriched using feedback from experts and users worldwide, and has been translated into the several languages, including Russian. The Russian version of ICT-CFT was developed by the UNESCO Institute for Information Technologies in Education (IITE) in cooperation with national experts from the Russian Federation and was officially presented in December 2011.

UNESCO and IITE are ready to provide continued support to the UNESCO Member States for the implementation of ICT-CFT, meeting national demands for vocational training of teachers and connecting it with other programmes of general ICT integration, teacher training, and informatization of education. UNESCO and IITE will provide concrete direct assistance to the UNESCO Member States to facilitate the cross-sectoral approach at national or regional levels. One of such actions is the preparation by UNESCO IITE of the Guidelines on adaptation of the UNESCO ICT Competency Framework for Teachers, which we present here for your consideration. These Guidelines were developed by IITE's expert, Professor Vittorio Midoro (Italy) and are based on the methodological approach to the UNESCO ICT-CFT localization.

We want to express our gratitude to the management and staff of the UNESCO HQ sectors "Education" and "Information and communication" for their remarks on the content of this methodological approach to localization. We are also grateful for the feedback of participants in a seminar organized in September 2012 in Ulan Bator, within the implementation of the pilot project on UNESCO ICT-CFT localization in the Mongolian language and the development of the ICT national standards of teacher competency in Mongolia. We would also like to express our gratitude to the representatives of the Ministries of Education who participated in the High-Level Round table, held in November 2012 in Moscow as part of the International IITO-2012 conference, for their remarks and ideas during the discussion of the

methodology of localization of UNESCO ICT-CFT. Finally, we want to thank the international expert Mr. Neil Butcher from South Africa, whose constructive criticism and important recommendations were considered during the preparation of this publication.

I hope that this document, along with the UNESCO ICT-CFT, will be considered an important proposal of UNESCO and its partners, whose objective is to explain how an innovative pedagogical education can increase the overall performance and effectiveness of teachers, especially in developing countries, and therefore can allow pupils to become active and productive members of society.

UNESCO IITE
Director, a.i.
Dendev Badarch

Introduction

The UNESCO ICT Competency Framework for Teachers (ICT-CFT) is aimed at helping countries develop comprehensive national teacher ICT competency policies and standards[1], and should be seen as an important component of an overall ICT in Education Master Plan.[2]

This document proposes a methodological approach for a UNESCO Member State to adapt the ICT-CFT to local conditions and to create ad hoc national standards for teachers in the field of ICTs for education (ICT-ED).[3]

The development of competencies among students has three stages. In the first of them, "technology literacy," the methodology is focused on promoting among the students the opportunity to use ICTs for more effective knowledge acquisition within the learning process. In the second stage, "knowledge deepening," the objective is to have students gain a deeper knowledge of the subject area and to encourage the application of concepts for solving difficult real-world tasks. In the third stage, "knowledge creation," students will be encouraged and trained to create new knowledge as the future workforce of their country in order to create more harmonious working and a prosper society.

The original version of the ICT-CFT is mainly focused on primary- and secondary-level teachers; however, a similar approach can be used at all levels of education – primary, secondary, technical and vocational, as well as the in-service training and life-long learning. Additionally, ICT-CFT is of primary importance not only for teachers, but also for all members involved in the educational process.

Application of new technologies in education assumes a new role of the teacher, new pedagogical techniques, and new approaches to teacher education. The success of ICT integration into real educational classes will depend on the ability of teachers to restructure the educational environment with the purpose of combining of new technologies and new pedagogics. Training for these teachers will focus on their ability to develop innovative ways to apply technology for the improvement of the educational environment, development of technological literacy, and creation of new as well as deepening of available knowledge.

UNESCO ICT-CFT is designed to inform policy-makers of education systems, specialists on teacher training professional development, providers of vocational training, and working practitioner teachers concerning the role of ICTs in education reforming. For this reason, the UNESCO ICT-CFT contains recommendations for a broader application of ICTs within development of national policy in education, After all, the expansion of ICT use in education is crucial for the achievement of the objectives of UNESCO's Education for All programme (EFA), as well as to support of lifelong learning.

UNESCO ICT-CFT contains appendices with specifications and examples of training programmes. These are intended for use by teachers as guides to effective application of ICTs for improvement of educational quality, both in cases where

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[1] According to the UNESCO ICT-CFT Syllabus, curriculum standards are the level and extent of the skills, knowledge, and understanding which the student is expected to achieve, and curriculum is a list of the topics to be learnt in a course of study. The terms 'curriculum' and 'syllabus' are used slightly differently in different countries, but essentially they both refer to a list of what is to be learnt.
[2] UNESCO ICT Competency Framework for Teachers, version 2.0, 2011. Available at http://iite.unesco.org/pics/publications/en/files/3214694.pdf
[3] However there are different models that institutions/Member States may want to use depending on their own needs. As in other areas of education, stress on a single methodology for the 'localization' of an educational process is not relevant, as educational systems and national needs vary.

ICTs is already available at schools and where it is in the planning stages. The appendices can also be a valuable tool for government agencies in policy development in the field of education. They can be a source of reference information for providers of vocational training. They can also be used for teacher professional development programs and ICT competency development courses, as well as they can be a valuable tool for government agencies in policy development in the field of education. The current version of ICT-CFT also includes a detailed glossary of terms to facilitate the general understanding of the terminology on ICTs in education.

Given the generic character of ICT-CFT, in order to put it in practice at the national or regional level, the Framework should be adapted to the specific conditions and demands of the national or regional educational system. The objective of the methodological approach presented in this document is to strengthen the UNESCO Member States' attempts to adapt the UNESCO ICT-CFT to the specific conditions of their national or regional education systems, as well as their attempts to develop standards for teachers' ICT competencies as one of the most important components of education policy.

At the same time, it should be noted that the UNESCO Member States can apply a variety of models to develop strategy and policy in the field of ICTs in education and teacher training, in accordance with their current and perspective requirements. Therefore, it is strongly recommended not to get stuck with this methodology of localization as if it was unique: national education systems and their requirements vary significantly within levels and sectors of education, so the methodology must be adapted accordingly.

The methodological approach proposed in this document explains the most important stages of the UNESCO ICT-CFT adaptation process; suggests guidelines to determine the appropriate strategies and policies for the development of ICTs in education and for the professional development of educators; and identifies the resources needed for the successful implementation of the CFT to the local context.

1 General outline of the UNESCO ICT-CFT adaptation process

Figure 1 shows the main activities involved in the process of adaptation of the UNESCO ICT-CFT in a given national context. Based on the local ICT-CFT, a national policy and standards for ICT-ED can be defined. To localize the UNESCO ICT-CFT, a project should be launched involving five main phases:

1. PLANNING: Establishment of the national expert group with participation of national and regional experts and development of the workplan on the adaptation of the UNESCO ICT-CFT.

2. SURVEY: Investigation and assessment of the ICT competency level at national and regional context. In accordance with the expert group decision this stage can follow the "PLANNING" stage (variant A of the UNESCO ICT-CFT adaptation process) or can be implemented after "LOCALIZATION" stage (variant B of the UNESCO ICT-CFT adaptation process).

3. ANALYSIS: Preparation of the report on local conditions of localization of the UNESCO ICT-CFT.

4. LOCALIZATION: Adaptation of the UNESCO ICT-CFT to the local conditions, specifics and requirements of national and regional educational system.

5. DEVELOPMENT: Identification of the national (regional) strategy and/or policy of informatization of education, implementation of innovations in schools and teachers' professional development. At this stage national (regional) standards of teachers' ICT competency can be developed.

Depending on specific conditions and decisions of the expert working group (EWG) of local experts the UNESCO ICT-CFT adaptation process can contain iterations, and the corresponding tasks can be conducted by turns. So, for example, according to the EWG decision the stage "SURVEY" at which identification of the level of teachers' ICT competence at national or regional level is carried out, can directly be implemented after the stage "PLANNING" (Variant A of the UNESCO ICT-CFT adaptation process) and even in parallel with the stage "ANALYSIS" at which the Report on the analysis of local conditions and features of the UNESCO ICT-CFT localization is formed. In this case the indicators of the level of the teachers' ICT competence of teachers of the concrete country (region) will be included into the abovementioned Report. Besides, EWG by means of consultations with educational policy makers has to develop the solution of what will be a main objective of the final stage of the UNESCO ICT-CFT localization – strategy definition, policy formulation, development of the national (regional) standards of ICT competence for educators, and also to define target priority levels of educational system (primary, secondary, general, all system of school education) at which the UNESCO ICT-CFT localization will be implemented.

Figure 1. Main stages of the UNESCO ICT-CFT adaptation process

It should be noted that the offered methodology of the UNESCO ICT-CFT adaptation can be used as well for adaptation of Framework recommendations to the requirements of other levels and education sectors (the higher, technical and vocational training, education of people with special needs, etc.).

2 Main stages of the UNESCO ICT-CFT adaptation process

This chapter contains the description of stages for localization of the UNESCO ICT-CFT and indicates the products that must be achieved in each stage as well as the main resources needed to accomplish it.

2.1. Planning

The main objective of the first step of the UNESCO ICT-CFT adaptation process is establishment of a group of local experts and development of a project plan. In case EWG decides to implement Variant A of the UNESCO ICT-CFT adaptation process, then at the final phase of the "PLANNING" stage the questionnaire can be developed, that should be used within the "SURVEY" stage for the study and assessment of the level of the teachers' ICT competency (see Fig. 2).

Variant A

Local experts

Guidelines on adaptation of the UNESCO ICT-CFT

Stakeholders

UNESCO ICT-CFT

PLANNING

Project plan

Local expert group

Questionnaire

Figure 2. PLANNING: Establishment of the national expert group and the project plan development (Variant A)

At the beginning of the UNESCO ICT-CFT adaptation process the members of the EWG should be chosen, some analytical studies and a project plan should be implemented. The group of local experts should be composed of innovators with different areas of expertise in the fields of education: pedagogy (ways of learning), curricula (what has be thought), curricular area didactics (how a given subject should be thought and learnt), ICT for education (impact of ICTs on the school system), teacher education (pre-service and in-service), educational technology, and school organization. Moreover, this group should include stakeholders, pioneer teachers, and experts in social surveys.

National stakeholders should appoint an responsible person for implementing the ICT-ED policy. This specialist must have both a thorough knowledge of the UNESCO ICT-CFT and a methodological approach to localize it. She or he identifies what the composition of the expert group should be according to the local conditions, proposes that composition, and writes a draft of a project aimed at localizing the UNESCO ICT-CFT, taking into account the methodological approach proposed in this document. The draft of the project plan should indicate how and when the project objectives are to be achieved, by showing the major products, milestones, activities, and resources required. When the expert group is set up and the draft of the project plan is available, a workshop should be organized with all members of the expert group. The objective of the workshop is to share the key ideas related to the UNESCO framework, the localization methodology, the project tasks, procedures, and the tools to accomplish them. In addition, this workshop should define the communication and cooperation procedures to accomplish the project activities.

By the end of the workshop, the group of experts should have a thorough knowledge of the UNESCO ICT-CFT, as well as of the guidelines for localizing it. An important outcome of the workshop will be the refined project plan. Preparatory documents for this workshop are the UNESCO ICT-CFT, the methodology for localization, and a glossary of all terms used. All these documents must be translated into the local language. In order to gain expected results all procedures and forms of communication, tools and means for the EWG support should be identified during this workshop.

In case EWG made a decision to implement the stage "SURVEY" (carrying out investigation and assessment of the level of the teachers' ICT competence) before preparation of the Report on the analysis of local conditions and specifics for localization (Variant A of the UNESCO ICT-CFT adaptation process) or in parallel with its preparation, then using a template of the questionnaire presented in the Appendix 4, at the final phase of the "PLANNING" stage the local experts have to develop their own questionnaire for investigation and analysis of the level of teachers' ICT competence and to organize the corresponding inspection which results also will be included into the Report. In this case the questionnaire for the data collection will be one more result of the stage "PLANNING". If EWG made the decision for implementing the stage "SURVEY" after stage "LOCALIZATION" (Variant B of the process), such adapted questionnaire will be developed at the stage "LOCALIZATION" (see. Section 3.4), and the main result of this stage will be the established EWG and the project plan as it is presented in the Fig. 3.

Local experts

Guidelines on adaptation
of the UNESCO ICT-CFT

Stakeholders

UNESCO ICT-CFT

PLANNING

Project
plan

Local expert
group

Variant B

Figure 3. PLANNING: Establishment of the national expert group and the project plan development (Variant B)

2.2. Survey

The main objective of this stage is investigation and assessment of the level of teachers' ICT competence at the national or regional contexts, to be implemented with a help of the questionnaires developed earlier.

Countries that are attempting to use the UNESCO ICT-CFT locally should survey the current ICT competency levels of teachers. Doing so would help them decide which of the three ICT-CFT approaches would be the most relevant and would assist them in identifying priorities for providers of teacher education and professional learning.

Based on the questionnaire developed at the previous stage of the project[4], the institution responsible for implementing the study (local or international organization)[5] should improve and finalize development of the analyses and assessment tools; and then it should carry out inspection and assessment of the level of the teachers' ICT competence. The process will include selection of the representative group of teachers; carrying out the interviews with the respondents (it is desirable to use automated tools); and then interpretation of the data obtained from filled questionnaires. The results of the study will be used for elaboration of the corresponding national/regional strategy or policy in the field of informatization of education, introduction of innovations at schools and professional development of educators.

In case EWG accepts Variant A of adaptation process, then the stage "SURVEY" should be implemented before the stage "ANALYSIS", and its results are made out in the form as a separate document or can be joined into the Report on the analysis of local conditions for localization (it could be presented as the section or the appendix). See Fig. 4.

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[4] Depending on the EWG decision the previous stage can be "PLANNING" or "LOCALIZATION".
[5] It may be useful to have the involvement of the UNESCO Institute for Statistics (UIS), as it has developed instruments in this area.

Project plan

Guidelines on adaptation
of the UNESCO ICT-CFT

Questionnaire

Local expert
group

Local
conditions

Teachers

SURVEY

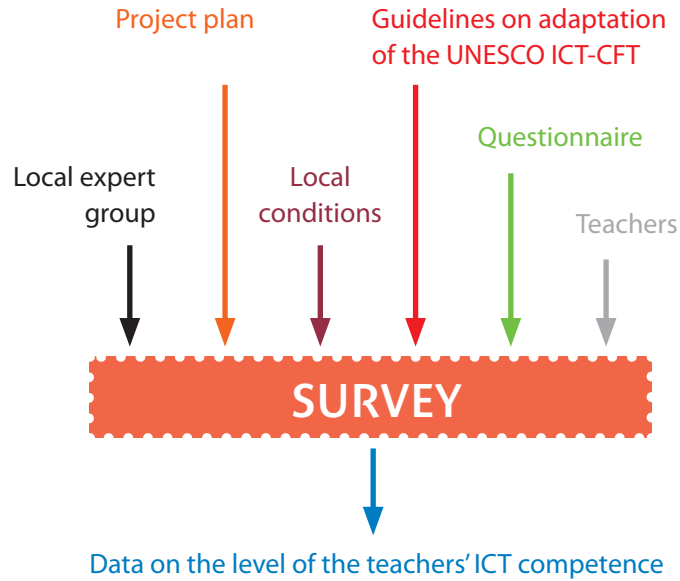Data on the level of the teachers' ICT competence

Figure 4. SURVEY: Investigation and assessment of the level of teachers' ICT competence at national and regional contexts (Variant A)

In other case when EWG decides to follow the Variant B of the process, and to implement this stage after the stage "LOCALIZATION", then the results of the stage "SURVEY" are made out in the form of the separate document, the special report or an analytical note. For example, it could be titled as "Assessment of the Level of the Teachers' ICT Competence at National (Regional) Level" (Fig. 5).

Project plan

Localized UNESCO ICT-CFT

Report on local
conditions

Questionnaire

Institution specialized
on surveys in education

Teachers

SURVEY

Variant B

Survey results

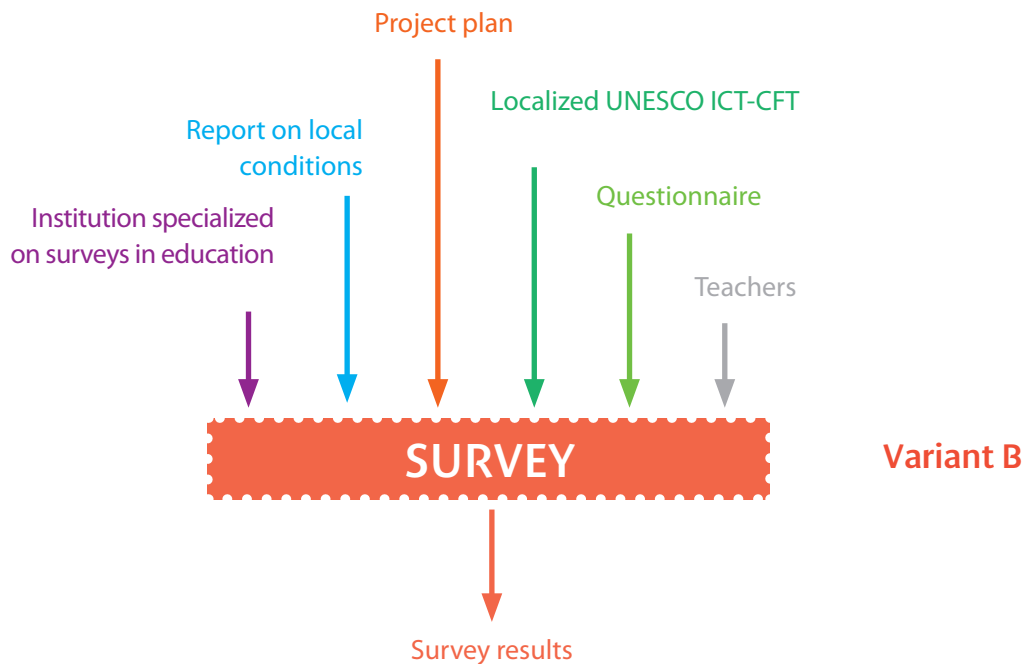*Figure 5. SURVEY: Investigation and assessment of the level of teachers' ICT competence at national and regional contexts (Variant B)*

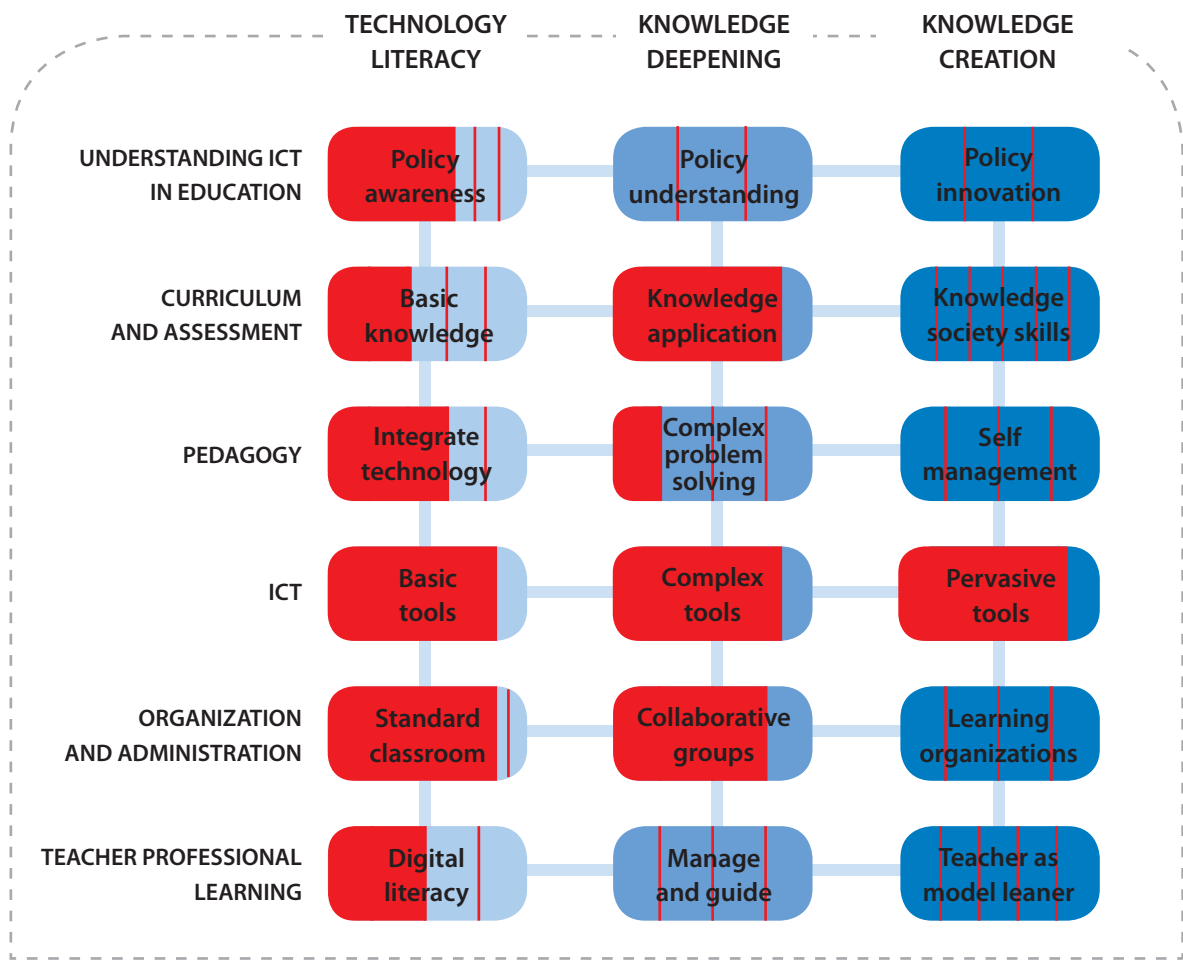|	TECHNOLOGY LITERACY	KNOWLEDGE DEEPENING	KNOWLEDGE CREATION
UNDERSTANDING ICT IN EDUCATION	Policy awareness	Policy understanding	Policy innovation
CURRICULUM AND ASSESSMENT	Basic knowledge	Knowledge application	Knowledge society skills
PEDAGOGY	Integrate technology	Complex problem solving	Self management
ICT	Basic tools	Complex tools	Pervasive tools
ORGANIZATION AND ADMINISTRATION	Standard classroom	Collaborative groups	Learning organizations
TEACHER PROFESSIONAL LEARNING	Digital literacy	Manage and guide	Teacher as model leaner

Figure 6. Graphical representation of the ICT competence level of the particular teacher.

Possible graphic representation of the ICT competence level of the particular teacher, based on the received data with the use of questionnaire, can be arranged as presented in the Fig. 6. The areas covered with red colour, indicate the level of knowledge of the particular teacher corresponding to the concrete module of the UNESCO ICT-CFT (an element of the ICT competence matrix).

The similar graphic representation can also be used for the selected representative group of teachers, based on synthesis of data, collected during the study.

2.3. Analysis

The main objective of this stage is development of the Report on the local conditions for adaptation of the UNESCO ICT-CFT, which results will be used at the stage "LOCALIZATION".

In accordance with the project plan and methodological recommendations for its implementation (described in the Appendix 2) EWG should develop the Report. This document will include detailed analysis of the country/region situation in the field of informatization of education and teachers' professional development. The Report should include evaluation of the available standards in the relevant field and recommendations for its improvement (if necessary).

During the Report preparation it is necessary to pay special attention to the analysis of the system of initial teacher education and continuous professional development of teachers.

The report must address important issues relevant to the localization of the UNESCO ICT-CFT, following the below structure:

1. Context
2. Structure of the school system of education
3. Typology of teachers
4. ICT-ED and initial teacher education (pre-service)
5. ICT-ED and continuing professional development (in-service)
6. Facilities and equipment
7. Actual teachers' use and competencies in ICT-ED
8. Needs expressed by teachers
9. Standards in teacher education related to ICT-ED

If EWG decided to implement the stage "SURVEY" before the stage "ANALYSIS" or in parallel with preparation of the Report on the local conditions (Variant A of adaptation process), then the results of the assessment of the level of the teachers' ICT competence have to be presented in the form of the separate document and should be included into the contents of this Report as the section or the appendix. In this case the results of the stage "SURVEY", i.e. collected data on the level of the teachers' ICT competence at national or regional contexts (Fig. 7) have to become one more result of the stage "ANALYSIS".
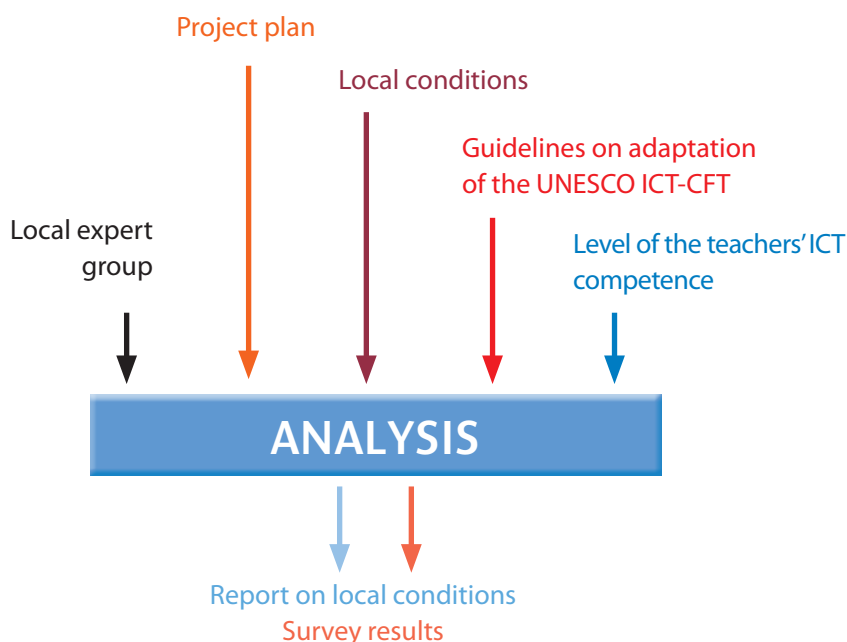
Variant A

Figure 7. ANALYSIS: Preparation of the Report on analysis of the local conditions and specifics on localization of the UNESCO ICT-CFT (Variant A)
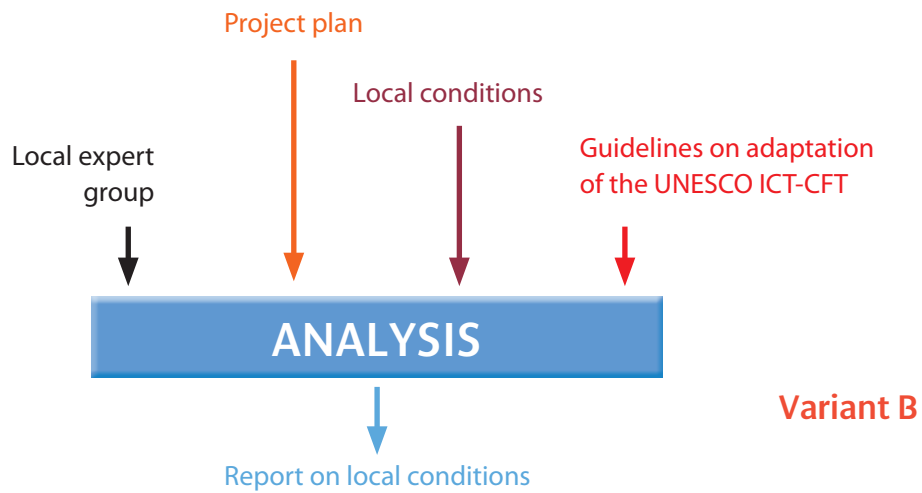
Figure 8. ANALYSIS: Preparation of the Report on analysis of the local conditions and specifics on localization of the UNESCO ICT-CFT (Variant B)

2.4. Localization

The main objective of this essential stage of process is localization of the UNESCO ICT-CFT, its matching to specific conditions and requirements of a corresponding national or regional education system.

On the basis of the original document of the UNESCO ICT-CFT, the Overview of the UNESCO ICT-CFT (Appendix 1) and the Guidelines for localization of the UNESCO ICT-CFT (Appendix 3) the local experts will prepare the document describing and analyzing at what degree and in what specifically structure and contents of the original UNESCO Framework corresponds to the specific local conditions and features and where it does not correspond (Fig. 9).This document should be based on the Report on the local conditions and specifics of localization.
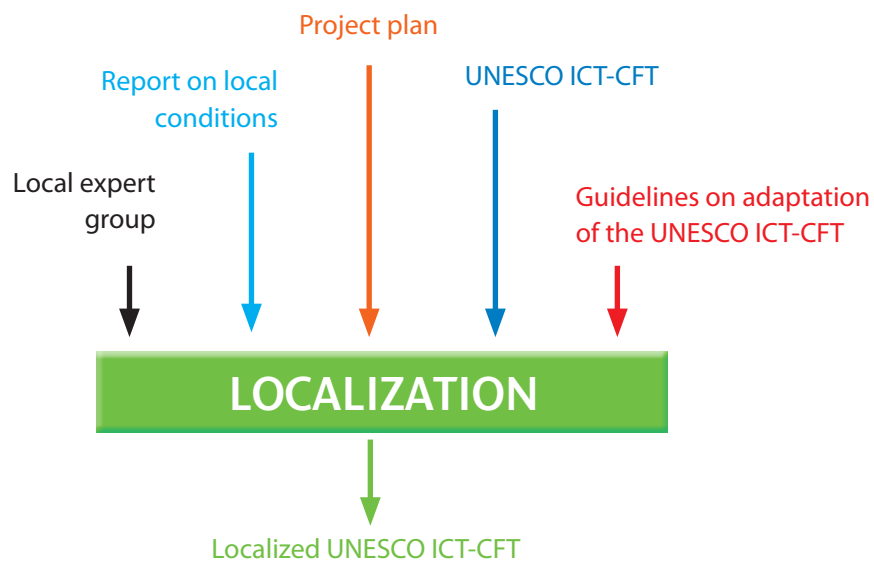

Figure 9. Localization of the UNESCO ICT-CFT (Variant A)

In case of the Variant B of the adaptation process of the UNESCO ICT-CFT (Fig. 10), based on the developed local frame structure and the template of a questionnaire presented in the Appendix 4, local experts should develop adapted questionnaire for study and assessment of the level of the teachers' ICT competence at national or regional contexts and then will pass to the stage "SURVEY" implementation.
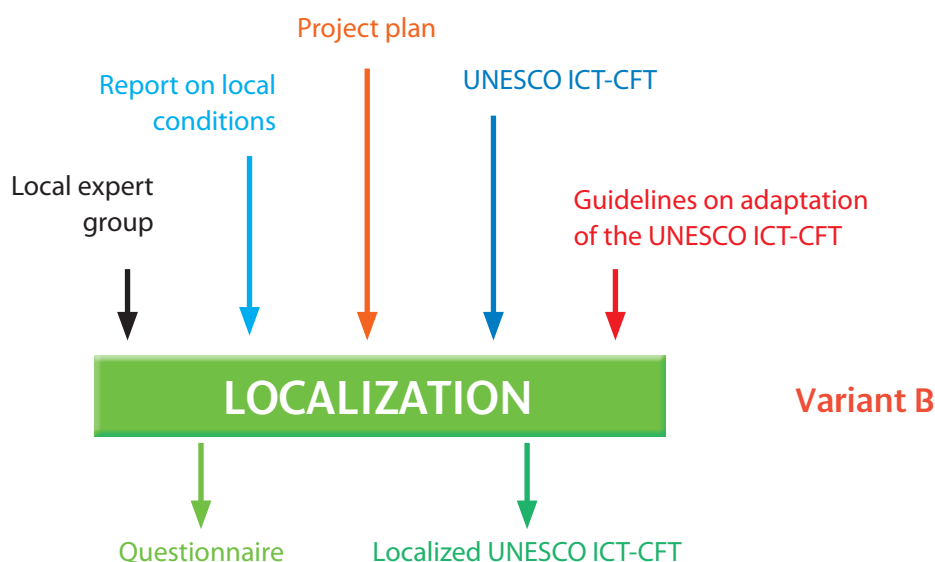
Project plan

Report on local conditions

UNESCO ICT-CFT

Local expert group

Guidelines on adaptation of the UNESCO ICT-CFT

LOCALIZATION

Variant B

Questionnaire

Localized UNESCO ICT-CFT

Figure 10. Localization of the UNESCO ICT-CFT and preparation of the questionnaire (Variant B)

2.5. Development

The objectives of this stage include:

■ Identification of the national (regional) strategy of ICT application in education and teachers professional development.

■ Policy development on informatization of education, introduction of innovations at schools and professional development of educators.

■ Development and implementation of national (regional) standards of teachers' ICT competence.

Any educational system is complex. It involves several interrelated entities and issues, such as educational needs, learners, learning styles, assessment methods, teachers, curriculum, digital content (open educational resources or OER, e-books, etc.), ICTs, and organization. Changes in one element have effects on almost all others. Therefore, a policy of innovation should consider all elements in the system, their mutual relationships, and their relationship with the external environment. To introduce ICTs into the school system, policy makers must consider a holistic approach and use a systemic (ecological) model of school innovation. In order to implement an innovation policy, first we must consider an overall vision of the desired change; then we should understand the present state of the entities involved and how these should change to contribute to innovate the system; and, finally, we must define tasks and actions to be taken.

Guidelines on adaptation
of the UNESCO ICT-CFT

Localized UNESCO ICT-CFT

Report on local conditions

Project plan

Level of teachers' ICT competence

Local expert group

Stakeholders

DEVELOPMENT

Strategy, policy, standards
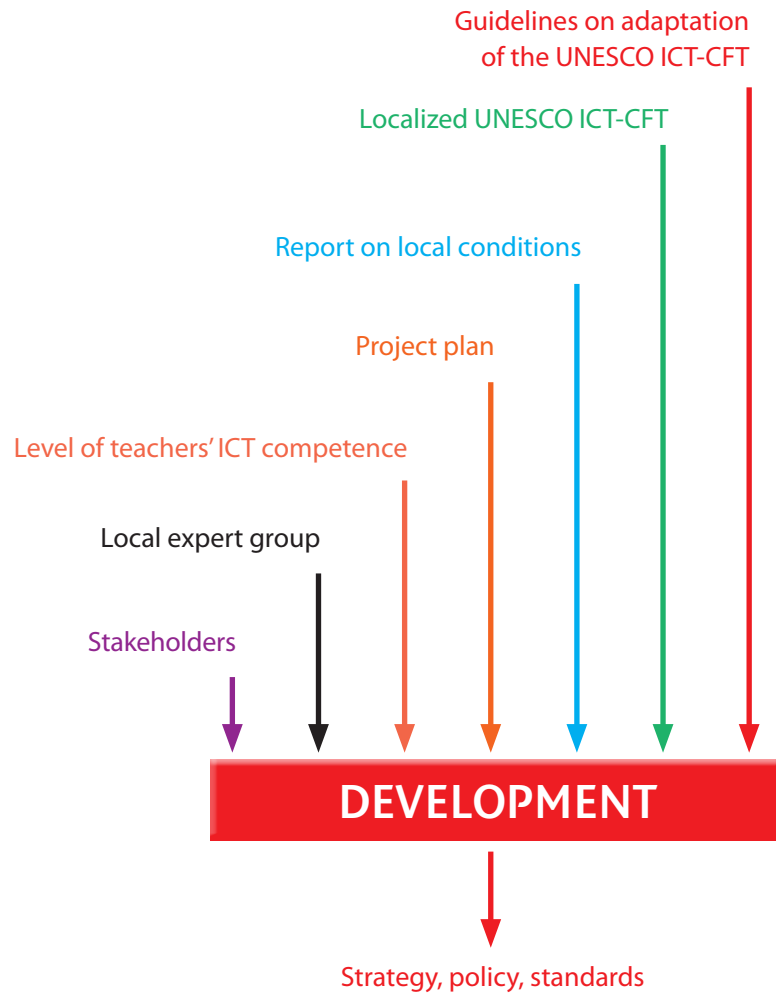
Figure 11. DEVELOPMENT: Identification of the national (regional) strategy, Policy development on informatization of education, preparation of national (regional) standards of teachers' ICT competence.

The Local Framework can provide a good basis to define the national standards for teacher education and the policy goals related to the development of the teachers' competencies and skills. The starting point can be the competencies of the teachers' sample represented in Figure 12 (fields marked with the red colour).

Figure 12. Graphical representation of the ICT competence level of the group of teachers.

The continuing professional development (CPD) strategy could propose a medium term (3-4 years) goal of reaching the situation is represented in Figure 13.

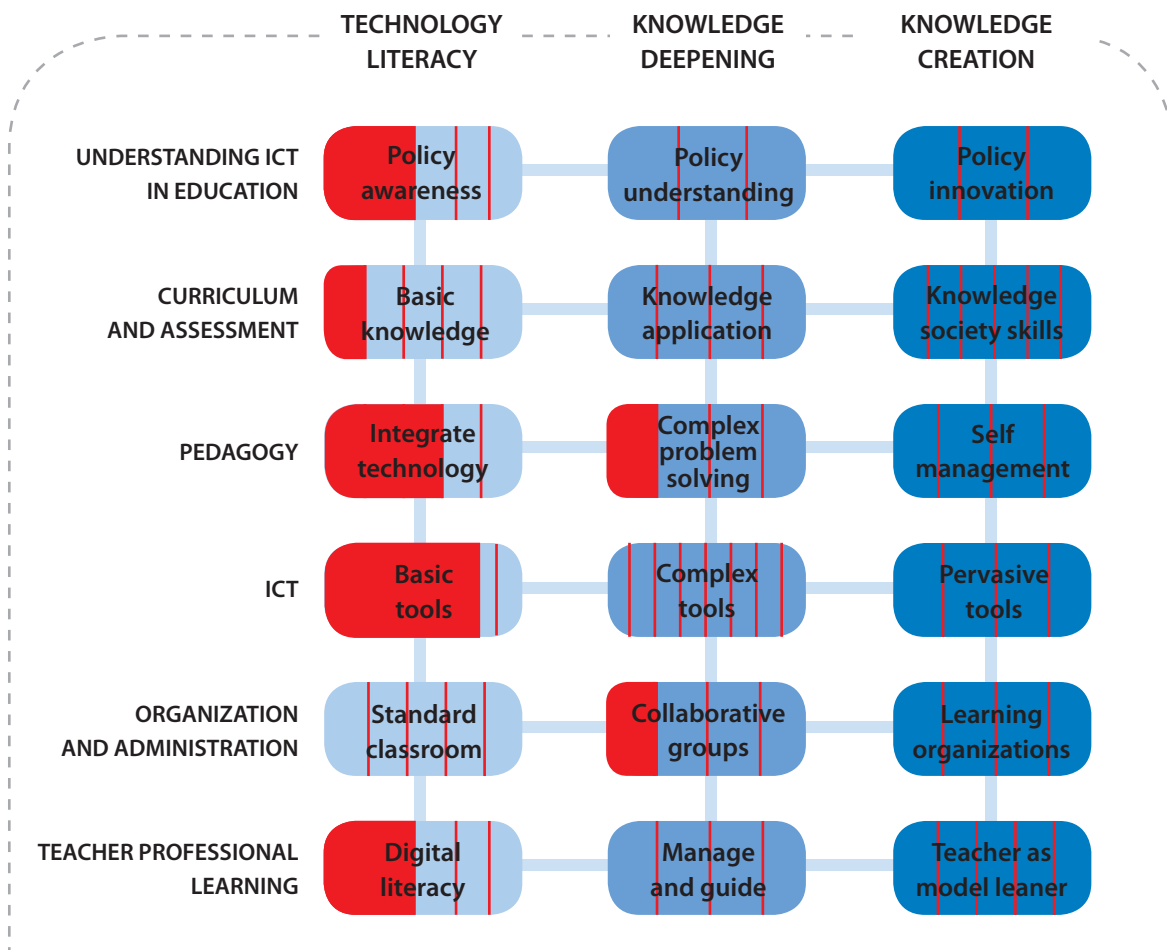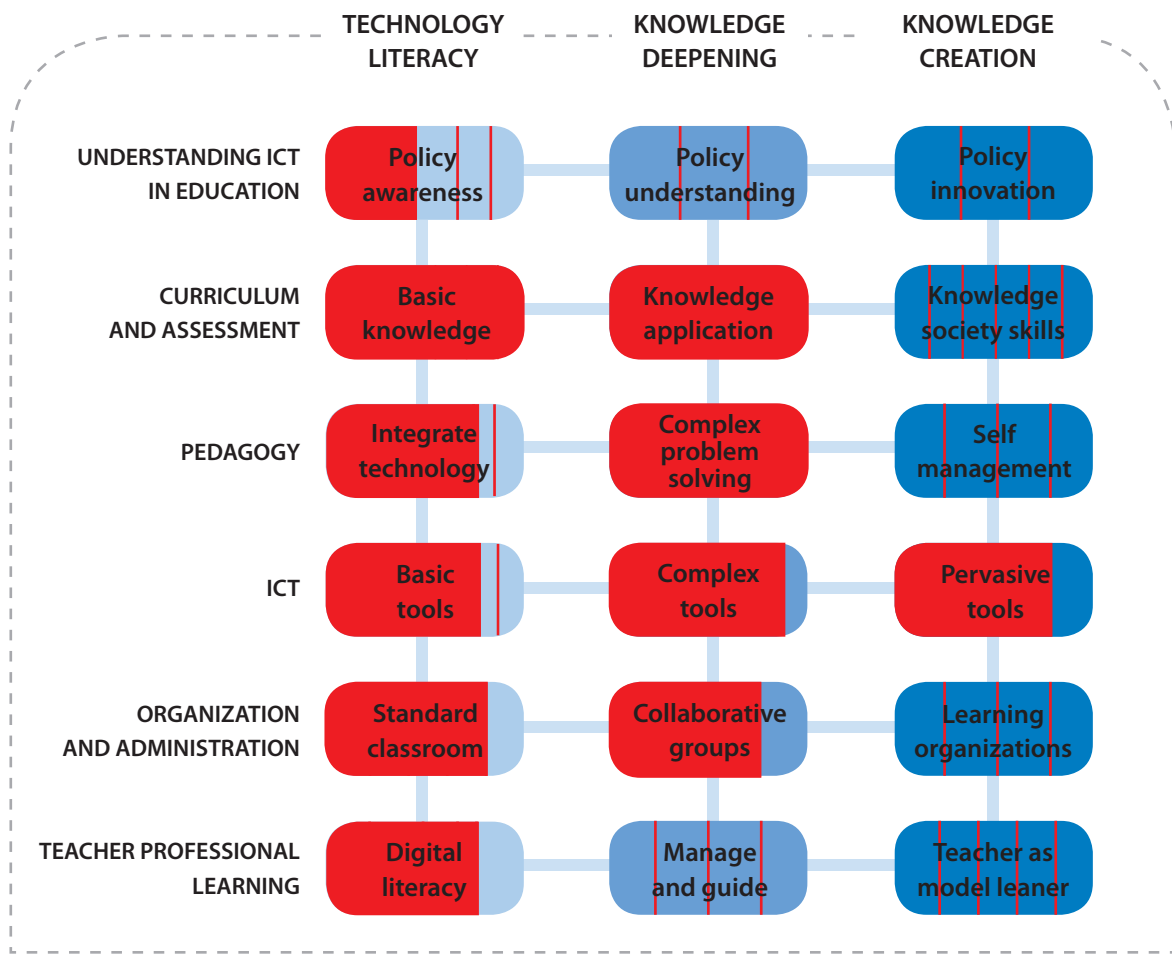|	TECHNOLOGY LITERACY	KNOWLEDGE DEEPENING	KNOWLEDGE CREATION
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ICT	Basic tools	Complex tools	Pervasive tools
ORGANIZATION AND ADMINISTRATION	Standard classroom	Collaborative groups	Learning organizations
TEACHER PROFESSIONAL LEARNING	Digital literacy	Manage and guide	Teacher as model leaner

Figure 13. The continuing professional development strategy of teachers

In order to reach this proposed goal, policy makers should define a suitable roadmap that states resources, time, and tools, along with a description of Standards and Assessment tools based on a subset of the local ICT-CFT. These standards should also be the base to establish an Initial teacher education (ITE) (pre-service) programme. The survey body could monitor the progress of the CPD and ITE plan and the achievement of the plan objectives.

An effective policy for innovating the school system takes in consideration that the teachers' role will inevitably change very deeply and rapidly: they will become managers and facilitators of learning; they will design, adapt, manage, and evaluate learning environments. The policy aimed at adapting teachers' competency to this new reality should take into consideration the local version of the UNESCO ICT-CFT.

Incorporating ICTs into the classroom requires teachers to learn about a very different approach to learning. It therefore requires a shift on the teacher's role from lecturer to designer, since she or he has to design and implement learning environments (involving both digital materials and learning activities) ahead of the start of the course, as well as envision new ways of conducting teaching and learning in the classroom. Teachers must be skilled at locating, reusing, and adapting existing material, as they will have access to a larger array of content through the use of technology. Many of these content resources are freely available as OER. Learning how to design and develop learning environments based on ICTs, before their use in the classroom, requires much more time than that spent in any single course. It is necessary to allow teachers significant time to develop their ideas, skills, and designs. Since it is difficult to involve all

teachers in the innovation process at the same time, a gradual strategy could be adopted, which first involves those who innovate or take up innovation, often called early adopters. These early adopters are willing to take on the trouble and risk required in order to establish an innovative practice. However, it is important to note that this strategy does not exclude that other efforts can made to get as many teachers as possible working to integrate ICTs in their classroom.

According to Rogers' theory of innovation,[6] the adopters of a new innovation can be classified in five categories.

1. **Innovators** are the first individuals to adopt an innovation. They are willing to take risks, and usually are younger in age, very sociable, and have close contact to scientific sources and interaction with other innovators.

2. **Early Adopters** have the highest degree of opinion leadership among the other adopter categories. Early adopters are typically younger in age, have advanced education degrees, and are more socially forward than late adopters, although more discrete in adoption choices than innovators.

3. **Early Majority** includes individuals who adopt an innovation after a varying degree of time. This time of adoption is significantly longer than the innovators and early adopters.

4. **Late Majority** includes individuals who adopt an innovation later than the average member of the society. These individuals approach an innovation with a high degree of skepticism and only adopt it after the majority of society has.

5. **Laggards** are the last to adopt an innovation. These individuals typically have an aversion to change-agents, tend to be the oldest in age of all adopters, and are usually fixated on traditional methods.
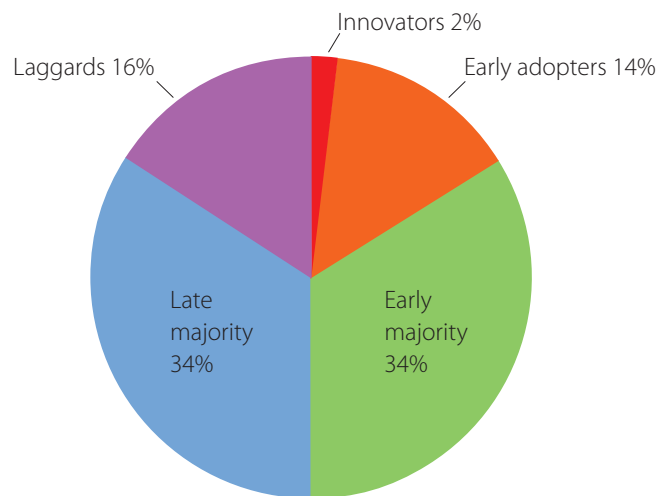

Figure 14. Adopters of any new innovation

[6] In 1962 Everett Rogers in a new way described the concept of information stream and its impact on the individual, having offered the so-called theory of diffusion of innovations which sometimes is called the theory of innovations or adaptations. (Rogers, E. M. (1962) Diffusion of innovations. New York: Free Press). Having analyzed a large number of empirical researches, he came to a conclusion that the process of acceptance by people of new ideas and goods includes six stages: attention, interest, assessment, check, acceptance, confirmation. At origin information on innovation should be available, usually from the mass media, for rather large number of people. Then it is adopted by a very small group of innovators (2,5% of the population) which are more mobile, have various outside contacts, easily perceive abstract ideas and are ready to risk. They are followed by early adopters (13,5%), usually substantial persons, whose opinions are in the lead, and who having counted a novelty useful, convince to try it those who listens to their words. With inclusion of the early majority (34% of the population) the extent of innovation acceptance comes to an average mark. Then the new idea or goods is recognized by the late majority to which is represented by 34% of the population. And, at last, the laggards, or late adopters (16%), conservative people, with suspicion of relating to all new, often with lack of means, change their relation to an innovation. It is agreed that the innovation is recognized by a society if it is accepted from 6 to 16% of the population. More details about the theory of diffusion of innovations is available via the link http://jyrnalistedu.ru/zarubsmi/158-everett-rodzhers-i-teoriya-diffuzii-innovacij-teoriya-podkrepleniya.html

In order to disseminate school innovation, priority in continuing professional development (in-service) should be given to teachers who are innovators and early adopters, but without excluding efforts to get as many teachers as possible working to integrate ICTs in their classroom. Pioneer teachers are key figures in the process of school innovation, since they are keen to use innovative approaches in the classroom with ICTs. The term is inspired on certain plants, known as pioneers, which are the first to colonize a new environment, despite conditions negative to the establishment of life; with their actions, they transform the environment and, as a result, other plants may establish themselves there. According to Rogers' theory, pioneers play a crucial role in an innovation process, since the majority of rest of the teachers could mostly learn about new ideas from them via interpersonal channels. An effective way for developing the pioneer teachers' practice is to create a learning community by means of e-learning courses based on virtual learning communities, focusing and concentrating resources on this class of teachers, though all interested teachers should be allowed to participate. This would reinforce the open and inclusive nature of the Internet, which UNESCO is promoting through its Communication Information programme. It would also allow for teachers that may not be 'detected' as pioneer teachers for administrative and other reasons to participate and make valuable contributions. The process of creating a pioneer teachers' community of practice involves several measures as:

- Defining a legal status of pioneer teachers (e.g., allowing more time for activities such as learning design, support to other teachers, and continuing professional development (in-service); improving their salaries; providing personal advanced ICT devices and free Internet access, etc.);

- Searching and identifying pioneer teachers;

- Creating a system that provides support to this community;

- Designing professional development initiatives to involve pioneer teachers;

- Creating virtual learning communities of pioneer teachers by means of a suitable ICT platform and online tutors;

- Nurturing pioneer teachers' communities.

Pioneer teachers should be supported for extending the early majority of teachers, according to the Rogers' theoretical model of diffusion of innovation.

The pioneer teacher community of practice could be further involved in populating the structure of the ICT-CFT, enriching it with descriptions of classroom experiences. In this way, the CFT could also become a repository of experiences. Moreover, since the ICT-CFT would be a part of the common repertoire of this community, it could be localized taking into account the school levels and the subject matter areas. A social process could be activated, similar to a wiki, for enriching the CFT with the contribution of all members of the teachers' community of practice.

Conclusion

The methodological approach to adaptation of the UNESCO ICT-CFT was presented at the workshop in Ulaanbaatar in September 2012, organized within the pilot project on localization of the UNESCO ICT-CFT for the country needs and development of the standards on ICT competencies for Mongolian teachers, and at the ministerial round table held in Moscow in November 2012 in the framework of the International conference IITE-2012. Several suggestions were proposed to improve this final document. Some of those suggestions are listed below:

- The establishment of a suitable working group of experts is a crucial step, which impacts on the successful project implementation in general.

- A project should be developed for localizing the UNESCO ICT-CFT, clearly stating the objectives to be achieved, the major products, milestones, activities and resources required.

- The expert working group should share a common repertoire involving the cooperation procedures and tools, all the needed documents (CFT and guidelines) translated into the local language, and a glossary that defines the used terms.

- In some situations it could be useful to merge Level 1 (digital literacy) and Level 2 (knowledge deepening) of the UNESCO ICT-CFT.

- Issues related to ethics and ICT application for inclusive education could be added to the six sectors of the UNESCO ICT-CFT.

- In the description of each module (Appendix 1 of UNESCO ICT-CFT), it could be useful to add suggestions for both policy implementation and technical implementation taking into account the local situation.

- In the description of each module (Appendix 1 of UNESCO ICT-CFT), it could be useful to indicate assessment procedures and tools, reflecting the local conditions.

- The UNESCO ICT-CFT could be used for comparative surveys to compare the teachers' competencies in different UNESCO Member States.

- Carrying out the comparative analysis of educational programmes and training courses of teacher professional development (at national or regional level) on compliance to the UNESCO ICT-CFT is advisable.[7]

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[7] The example of such comparative analysis implemented by the UNESCO IITE in 2012-2013 is available at the Institute's website in the Publications section: http://iite.unesco.org/publications/

At the same time according to the decision of national or regional policy makers in education the completion of the UNESCO ICT-CFT localization can become the beginning of the new projects connected with modernization and development of national/regional educational systems on the basis of broad application of modern ICTs and innovative pedagogical techniques. Such initiatives can include:

- Adaptation of the UNESCO framework concerning requirements to structure of the teachers' ICT competence for other levels and sectors of national/regional education systems (the higher, technical and vocational, inclusive), and also subject domains and branches of science (engineering education, ICT education, medical education, education in the field of culture and arts, etc.).

- Development of standards of cyber safety, media and information literacy for education and its integration with the standards for the teachers' ICT competence as the bases for creation of "digital literacy" multilevel system of the population.

- Establishment of the assessment and certification system of teachers.

- Development of educational and methodical resources for the system of training, retraining and professional development of teachers.

- Development (or modernization) of the sustainable national/regional system of teachers' professional development.

- Efficiency assessment of the developed mechanisms and instruments of innovations promotion in education.

APPENDIX 1.
Overview
of the UNESCO ICT-CFT

This appendix summarizes the main features of the UNESCO ICT-CFT. It is a guide to the sections of the original document[8] and should be used in conjunction with it.

[8] UNESCO ICT Competency Framework for Teachers, version 2.0, 2011.
Available at http://iite.unesco.org/pics/publications/en/files/3214694.pdf

AIM OF UNESCO ICT-CFT

The main aim of the UNESCO ICT-CFT is to contribute in re-thinking education in order to help in the development of the economy and build a knowledge society in the countries where it is implemented.

MAIN TARGET AUDIENCE OF UNESCO ICT-CFT

The main targets of UNESCO ICT-CFT are:

Teachers

The module specifications and the examples of syllabi and exam specifications, described in two appendices of the CFT, are intended to guide teachers in how to make the best use of the ICT available in their schools to improve students' learning.

Policy makers

The appendices can guide governments in shaping their education policies.

Teacher educators and teacher education bodies

The appendices can be used to develop full curricula for courses on ICT competencies. They also provide the basis to establish qualifications needed to certify that a teacher has acquired the Framework competencies.

Content providers

It can serve as a reference for providers of professional learning.

STRUCTURE OF UNESCO ICT-CFT

Three approaches to human capacity development

The Framework is based on the hypothesis that education can contribute to the development of a country's economy and society. The country can develop from one that uses ICTs (phase 1), to one that has a high-performance workforce (phase 2), and finally to one with a knowledge economy and information society (phase 3). These three phases serve as basis for three complementary and somewhat overlapping approaches that connect education policy with economic development. The teachers' professional profile in ICTs develops following an analogous path: the professional levels are isomorphic to the national development goals (see Table 1).

Table 1. Matching of the UNESCO ICT-CFT approaches and stages of the socio-economical development of the society

Development stages	Economy	Education	Approach
Capital Deepening: Use of ICTs	The ability of the workforce to use equipment that is more productive than earlier versions	Increase the extent to which new technology is used by students, citizens, and the workforce by incorporating technology skills into the school curriculum.	Technology literacy
Higher Quality Labour: High-performance workforce	A more knowledgeable workforce that is able to add value to economic output	Increase the ability of students, citizens, and the workforce to add value to society and the economy by using knowledge and applying it to solve complex, real-world problems	Knowledge deepening
Technological innovation: Knowledge economy and information society	The ability of the workforce to create, distribute, share, and use new knowledge.	Increase the ability of students, citizens, and the workforce to innovate, produce new knowledge, and benefit from this new knowledge.	Knowledge creation

Six aspects of the teachers' activity/praxis

The ICT-CFT assumes that there are six main aspects in the teacher's activity: understanding the ICT role, curriculum, pedagogy, ICTs, organization, and professional development.

The framework of 18 modules is reflects the interrelation of the three approaches (technology literacy, knowledge deepening, knowledge creation) to teaching based on human capacity development with the six aspects of the teachers' work (understanding the ICT role, curriculum, pedagogy, ICTs, organization, and professional development).

	TECHNOLOGY LITERACY	KNOWLEDGE DEEPENING	KNOWLEDGE CREATION
UNDERSTANDING ICT IN EDUCATION	Policy awareness	Policy understanding	Policy innovation
CURRICULUM AND ASSESSMENT	Basic knowledge	Knowledge application	Knowledge society skills
PEDAGOGY	Integrate technology	Complex problem solving	Self management
ICT	Basic tools	Complex tools	Pervasive tools
ORGANIZATION AND ADMINISTRATION	Standard classroom	Collaborative groups	Learning organizations
TEACHER PROFESSIONAL LEARNING	Digital literacy	Manage and guide	Teacher as model leaner

Figure 15. The structure of the UNESCO ICT-CFT

STRUCTURE OF THE UNESCO ICT-CFT DOCUMENT

The document describing the ICT-CFT included three main sections:

1. ICT-CFT (principles, modules, implementation)

2. Appendix 1: Modules of ICT-CFT

3. Appendix 2: Example syllabi and exam specification.

In the first section, the professional levels of digital literacy, knowledge deepening, and knowledge creation are described by means of four elements:

1. Policy goals

2. Impact on the curriculum

3. Impact on pedagogy and teacher's role

4. Teacher's competencies

Table 2 reports the description of these levels in tabular form, and for each level an example is provided to show what the given approach might look like in practice. For each of the three levels and for each of the six aspects, the activities of an hypothetic teacher are described in tables 3, 4 and 5.

Table 2. Description of the levels of teachers' ICT competency

	Policy goals	Impact on the curriculum	Impact on pedagogy and teacher's role	Teacher competencies
Technology literacy	Enable learners, citizens, and the workforce to use ICTs to support social development and improve economic productivity. Related policy goals include increasing enrolment, making high-quality resources available to all, and improving literacy skills.	Teachers should be aware of these goals and be able to identify the components of education reform programmes that correspond to them. Changes in the curriculum entailed by this approach might include improving basic literacy skills through technology and adding the development of ICT skills into relevant curriculum contexts.	Time must be set aside within the traditional curricula to incorporate a range of relevant productivity tools and technology resources. Changes in pedagogical practice involve the use of various ICT tools and digital content as part of whole-class, group, and individual activities. Changes in teacher practice involve knowing where and when (as well as when not) to use technology for classroom activities and presentations, for management tasks, and for acquisition of additional subject matter and pedagogical knowledge in support of the teacher's own professional learning. Little change in social structure of the class occurs in this approach other than the placement and integration of technology resources in the classroom or in labs to ensure equitable access. Technologies involved may include computers along with productivity software; drill and practice software, tutorials, and web content; and the use of networks for management purposes.	Teacher competencies include basic digital literacy skills and digital citizenship, along with the ability to select and use appropriate off-the-shelf educational tutorials, games, drill-and-practice software, and web content. These competencies should be used in computer laboratories or limited classroom facilities to complement standard curriculum objectives, assessment approaches, unit plans, and didactic teaching methods. Teachers must also be able to use ICTs to manage classroom data and support their own professional learning.

	Policy goals	Impact on the curriculum	Impact on pedagogy and teacher's role	Teacher competencies
Knowledge deepening	Increase the ability of students, citizens, and the workforce to add value to society and to the economy. They will add value by applying the knowledge gained in school subjects to solve complex, high-priority problems encountered in real-world situations in work, society, and life in general. Such problems might relate to the environment, food security, health, and conflict resolution.	This approach often requires changes in the curriculum that emphasize depth of understanding over coverage of content, as well as assessments that emphasize the application of understanding to real-world problems, focus on complex problem-solving, and are incorporated into learning activities.	Pedagogy here includes collaborative problem- and project-based learning in which students explore a subject deeply and bring their knowledge to bear on complex, real-world problems. Teaching is student-centred; the teacher's role is to structure tasks, guide student understanding, and support students as they tackle collaborative projects. Teachers should understand policy goals and social priorities, as well as be able to identify, design, and use specific classroom activities that address these goals and priorities. Teachers help students create, implement, and monitor project plans and solutions. Lessons and classroom structure are dynamic, with students working in groups for extended periods of time. Teachers will employ open-ended ICT tools that are specific to their subject area—such as visualizations in science, data analysis tools in mathematics, and role play simulations in social studies—to guide students' understanding of key concepts.	Ability to manage information, structure problem tasks, and integrate open-ended and subject-specific applications and software tools with student-centred teaching methods and collaborative projects. These competencies should be used in support of students' in-depth understanding of key concepts and their application to complex, real-world problems. To support collaborative projects, teachers should use networked and web-based resources to help students collaborate, access information, and communicate with external experts to analyze and solve their selected problems. Teachers should also be able to use ICTs to create and monitor students' individual and group project plans, as well as to access information, consult with experts, and collaborate with other teachers to support their own professional learning.

	Policy goals	Impact on the curriculum	Impact on pedagogy and teacher's role	Teacher competencies
Knowledge creation	Increase productivity by creating students, citizens, and a workforce that is continually engaged in, and benefits from, knowledge creation, innovation, and life-long learning.	Here the curriculum goes beyond a focus on knowledge of school subjects to explicitly include the skills that are needed to create new knowledge in a knowledge society: problem solving, communication, collaboration, experimentation, critical thinking, and creative expression. These skills become curricular goals in themselves and the objects of new assessment methods. Perhaps the most significant objective is for students to be able to create their own learning goals and plans—to establish what they already know, assess their strengths and weaknesses, design a learning plan, stay on-task, track their own progress, build on successes, and adjust to failures. These skills can be used throughout a lifetime in a learning society.	Teachers should not only be able to design classroom activities that advance these policy goals, but also participate in the development of programmes within their school that advance these goals. The role for teachers is to explicitly model these processes, structure situations in which students apply these skills, and assist students in their skill acquisition. Teachers build a learning community in the classroom in which students are continuously engaged in developing their own and each other's learning skills. Schools are transformed into learning organizations in which all its members are involved in learning.	Teachers are model learners and knowledge producers who are constantly engaged in educational experimentation and innovation. Teachers collaborate with colleagues and outside experts to produce new knowledge about learning and their teaching practice. A variety of networked devices, digital resources, and electronic environments are used to create and support this community in its production of knowledge and its collaborative learning.

Table 3. "Technology literacy" approach in the everyday work of a teacher

Understanding ICTs in education	A mother-tongue teacher understands the basic principles of using ICTs in teaching, so he/she considers how to make the best use of an interactive whiteboard recently installed in his/her classroom. Until now, she has only used it as a projector screen.
Curriculum and assessment	Using the word processing application, the teacher displays on the interactive whiteboard some examples of poor writing. She demonstrates how, with a few changes in the choice of words and the word order, sentences can be made simpler and clearer. Then, by asking questions to students, offering suggestions, and pointing out weaknesses in sentences, she gets them to improve some further examples of writing. She makes the changes on the interactive whiteboard as students suggest them, so the whole class can see the process. Finally, she sits down to one side of the room and asks students to come to the interactive whiteboard and operate it themselves to show how they can improve sentences.
Pedagogy	Initially, the teacher uses a word processing application on the interactive whiteboard while conducting a discussion with the class. In the next lesson, each student uses a laptop computer. Since the laptops and the teacher's computer are networked, the teacher can easily display on the interactive whiteboard interesting examples of re-worded sentences that the students have been able to devise in the five minute test. The whole class can then discuss and evaluate different wordings.
ICTs	The teacher realizes that using word processing on the interactive whiteboard would offer a new approach to one of the basic skills in the curriculum - how to improve the wording of sentences. Word processing allows words to be changed and moved around without having to endlessly re-write whole sentences on paper. Word processing can also be used for formative assessment. She composes a long, badly worded sentence that she will give all students on their computers. Then, she will ask them to improve it and will see how many different versions they can produce within five minutes.
Organization and administration	For the second lesson, the teacher uses the school's trolley of laptop computers so that each student is able to carry out word processing on their own. She devises the two lessons in such a way that students will know exactly what to do in the second lesson, without the need for questions or discussion. This ensures the students make the fullest use of the laptops while available to them. Using the school's computer network, the teacher records her students' grades on a central file that other teachers and the school administration can also access.
Teacher professional learning	The teacher searches various websites for mother-tongue teachers to find resources on writing skills, exercises and writing assignments, stimulus material, and ideas for lessons.

Table 4. "Knowledge deepening" approach in the everyday work of a teacher

Understanding ICTs in education	A PE (physical education) teacher is frustrated that many of his students are not interested in physical exercise and do not understand the importance of physical fitness as part of a healthy lifestyle. He thinks he can use ICTs to change their attitudes and help them become fitter, so he writes a detailed financial bid to the school administration, explaining in detail why the ICTs would improve the PE lessons and help students learn.
Curriculum and assessment	The PE teacher uses ICTs to focus on health issues, which he had not been able to make engaging before. Now he is also able to include in the curriculum information about human physiology. These topics had previously been too abstract and theoretical to explain easily, but using ICTs he is able to show students computer simulations (videos and animations) of physiological processes. The simulations make the topics easy to understand, and thus students achieve a deeper knowledge of PE. He is also able to carry out formative assessment much more efficiently using a digital video camera to record students' performance in the gym. He reviews these video recordings with students to help them understand how to they need to move. Students who previously could not understand what they were doing wrong can now see instantly what they need to do.
Pedagogy	Previously, the teacher had only been able to talk to students about the health benefits of physical exercise, which the students did not find very interesting. Now he is able to show them dramatic clips from films, sporting events, and music and dance videos which feature athletic celebrities explaining the importance of exercise in their lives and careers. He then organizes students into collaborative groups so they can devise their own fitness assessments, such as seeing how quickly their heart rates return to normal after exercise. They analyse their assessments and each student comes up with recommendations for a fitness programme for one of the others in the group. They set up a collaborative spreadsheet to track their progress over the next month. As they go through their fitness programmes, they comment and support each other on a social networking site.
ICTs	The teacher obtains: ■ a laptop computer and a data projector so that everyone in the class can see computer display ■ video clips from the Internet ■ PE and human physiology simulations and animations ■ simple data capture devices such as heart-rate sensors which record data directly to the computer ■ spreadsheet software for students to record their fipread assessments each week ■ a digital video camera to record students' movements and use of the fidigit equipment in the gym. The students also use other computers at school and at home to access the shared spreadsheet and the social networking site. Some students use their mobile phones to post their daily fitness programme achievements on the networking site.
Organization and administration	The PE teacher only has his own laptop and a data projector in the gym for showing video material, but students help record the videos in the gym and play them back on both the camera screen and the computer screen. This way, the teacher arranges PE activities in such a way that all the students are able to see a video clip of themselves in the gym at least once in each lesson or to record the results of their weekly fitness assessment. The teacher uses his laptop to monitor students' entries on their collaborative spreadsheet, and to post encouraging comments and extra information about fitness programmes on the social networking site.
Teacher professional learning	The teacher regularly visits an Internet discussion forum hosted by the professional association for PE teachers. The forum is a useful source of new ideas on how to get students more interested in PE and exercise. He is able to post a question asking for technical advice on an aspect of a new fitness programme the students want to try out.

Table 5. "Knowledge creation" approach in the everyday work of a teacher

Understanding ICTs in education	A geography teacher takes a leading role in organising an ICT-based project for students in collaboration with the history and the math teachers. The project is about the recent arrival in the local community of numerous immigrants from a nearby country that is experiencing political and economic turmoil. The project involves investigating the reasons for the migration, as well as understanding the everyday conditions and issues which the immigrants face.
Curriculum and assessment	The project addresses parts of the curriculum in three subjects: in geography (understanding growth and change in communities), history (the recent history of their own country and its relations with nearby countries) and math (the use of graphs and charts to analyse and display complex statistical information). Students suggest additional aspects that could be considered, such as the impact of the recent migration on their communities. Reflecting on the objectives of the project, students devise assessment rubrics that they will use throughout the project to evaluate their own and each other's work, in collaboration with their teachers. Students create knowledge in at least three ways: ■ They create new historical and geographical knowledge about this local instance of immigration (e.g., facts, quantitative data, interviews, life stories, and other materials and conclusions which could be of value to a local history museum). ■ They discover that immigrants have great difficulty obtaining some of their traditional foods. This commercial knowledge of a new market demand could be passed along to local shopkeepers. ■ They discover that much local prejudice towards immigrants is founded on myths and misinformation (e.g., an immigrant who works as a school concierge, who was assumed to be poorly educated, is in fact a civil engineer. Local knowledge and understanding is thereby increased, and the potential for conflict between both communities is reduced.
Pedagogy	The teachers act as monitors and coaches to students, ensuring that they have the skills and knowledge they need, advising them of methods they could use, and ensuring that they stay focused on their tasks and meet the deadlines they have agreed to.
ICTs	The students use: ■ the Internet to obtain detailed background information about the conditions in the immigrants' country, including email contact with students at local a school there. ■ spreadsheet programs to analyse and display statistics about emigration and immigration flow, as well as relevant economic conditions. ■ graphics applications to create posters, which they put up in local centres asking for volunteers from the immigrant community to be interviewed for the project. ■ digital cameras and audio recorders to make video or audio recordings of interviews with immigrants about their personal stories and experiences in the host country. ■ word-processing software to make notes, write up their reports, and evaluate their work. ■ presentation software to create presentations, including video clips and still images, to show their results to others.
Organization and administration	The teacher creates environments on the school's learning management system (the school's computer network) that allow students to store, share, and develop their work collaboratively. This includes areas for shared files, wikis, and a discussion forum.
Teacher professional learning	The geography teacher regularly shows other teachers how the project uses ICTs to enable students to generate knowledge while studying their school subjects. She also explains to colleagues how the project, and her own role in it, has developed and improved in the light of experience and experimentation. In this way, she acts as a model learner to both her students and her colleagues.

TEACHER'S PROFESSIONAL DEVELOPMENT ACCORDING TO UNESCO ICT-CFT

Based on this framework, the professional development of a teacher can be seen in two different ways:

- Sequential Interpretation: Teacher's professionalism develops sequentially through three successive stages.

- Net Interpretation: During an activity, levels represent archetypes that operate at different grades in the different aspects of teacher's praxis. Teacher's professionalism develops following different paths in the net.

Section 2. Appendix 1: UNESCO teacher ICT competency framework modules

In this section, the 18 modules of the framework are described in a tabular form. The structure of this table involves 18 rows (one for module) and 5 columns, as shown in Table 6.

Table 6. The structure of the ICT-CFT matrix

	Module name	Curricular goals	Teacher competencies	Teacher objectives	Example methods for teacher education or professional learning
Technology literacy	Module 1. Understanding ICTs In education				
	Module 2. Curriculum and Assessment				
	Module 3. Pedagogy				
	Module 4. ICTs				
	Module 5. Organization and Administration				
	Module 6. Teacher Professional Learning				
Knowledge deepeningй	Module 1. Understanding ICTs In education				
	Module 2. Curriculum and Assessment				
	Module 3. Pedagogy				
	Module 4. ICTs				
	Module 5. Organization and Administration				
	Module 6. Teacher Professional Learning				

Knowledge creation	Module 1. Understanding ICTs in education				
	Module 2. Curriculum and Assessment				
	Module 3. Pedagogy				
	Module 4. ICTs				
	Module 5. Organization and Administration				
	Module 6. Teacher Professional Learning				

Each column reports curricular goals, teacher competencies, teacher objectives, and example methods for teacher education or professional learning. An example of cell filling for one module is presented in Table 7.

Table 7. Example of cell filling of the ICT-CFT matrix

	Module name	Curricular goals	Teacher competencies	Teacher objectives	Example methods for teacher education or professional learning
Technology literacy	Module 1. Understanding ICTs in education				
	Module 2. Curriculum and Assessment	Changes in curriculum entailed by this approach often include improving basic literacy skills through technology and adding the development of ICT skills in different contexts. These changes require incorporating a range of relevant ICT resources and productivity tools in other subjects.	Teachers must have an excellent knowledge of the curriculum standards for their subject, as well as knowledge of standard assessment strategies. In addition, teachers must be able to integrate the use of technology into the curriculum.	TL.2.a. Match specific curriculum standards to particular software packages and computer applications, and describe how these standards are supported by these applications.	Select a range of software packages in a specific subject area; have participants identify specific curriculum standards that are associated with these packages and discuss how these are supported by the applications.

Section 3. Appendix 2 of UNESCO ICT-CFT: example syllabi and exam specifications

This section presents an example of syllabus related to technology literacy and knowledge deepening, as well as an example of exam specification related to technology literacy. For each module a list of objectives is defined as in the following.

Table 8. Example of tasks corresponding to a module

Technology literacy

Module 1. Understanding ICTs in education

1.1. Identify the policy goals supported by the ICT-CFT framework
1.2. Identify ICT-CFT framework purpose and approaches
1.3. Identify the target student outcomes that result from implementing an ICT-CFT-supported learning experience
1.4. Understand the relevance of the ICT-CFT framework in a given scenario

Module 2. Curriculum and assessment

2.1. Given a curriculum goal, identify appropriate ICT resources and skills to use these resources
2.2. Given a scenario, evaluate and select an ICT instructional resource
2.3. Given a scenario, evaluate and select an ICT assessment resource
2.4. Select an appropriate computer-based tool to monitor and share student performance data.

Module 3. Pedagogy

3.1. Integrate ICTs into didactic knowledge acquisition and learning theory models
3.2. Create learning activities that use ICT resources to support specific educational outcomes
3.3. Apply ICTs to "just in time" and "spontaneous" learning interactions
3.4. Design presentations that appropriately incorporate ICT resources

Module 4. ICTs

4.1. Given a specific learning activity, identify the required hardware and devices
4.2. Use the Internet and browsers to support learning activities
4.3. Use a search engine to perform a keyword search
4.4. Create and use a web-based e-mail account
4.5. Demonstrate the use of the selected software application to meet an educational need
4.6. Use software to manage student and classroom data
4.7. Use common communication and collaboration technologies

Module 5. Organization and administration

5.1. Integrate learning activities into a computer laboratory environment
5.2. Manage the use of ICT resources with individuals, small groups and whole groups in varied environments
5.3. Identify the appropriate social arrangements to use with various ICT resources

Module 6. Teacher professional learning

6.1. Use ICT resources to enhance teacher productivity
6.2. Use ICT resources to support teacher professional learning
6.3. Manage safety issues in digital environments

Knowledge deepening

Module 1. Understanding ICTs in education

1.1.   Understand ICT policy

Module 2. Curriculum and assessment

2.1.   Identify key concepts and processes in the curriculum that can be best taught by using ICTs

2.2.   Use ICTs to assess students' understanding of key subject matter concepts, skills, and processes

Module 3. Pedagogy

3.1.   Design a project-based learning activity incorporating ICTs

3.2.   Implement the project-based learning activity

3.3.   Critically analyse the effectiveness of the integration of ICTs in the project-based activity

Module 4. ICTs

4.1.   Select or create suitable software and resources

4.2.   Use ICTs to communicate and collaborate

4.3.   Use ICTs to manage and monitor student projects

Module 5. Organization and administration

5.1.   Manage the physical learning environment and resources

5.2.   Manage time and human resources using ICTs

Module 6. Teacher professional learning

6.1.   Manage and use digital resources for personal professional learning

6.2.   Collaborate online to develop professionally

Each objective is described according to several features indicated bellow:

- Scoping statement
- Task components
- Task frequency
- Task trigger
- Out of scope
- Tools used best practice
- Obstacles
- Common mistakes
- Critical mistakes
- Related decisions

Finally, below is an example of task description.

Task 2.1

To identify appropriate ICT resources and the skills required to its use in order to gain curriculum goal

Scoping statement

Find content-specific tools, i.e., subject-specific software packages online (shareware, freeware) and in retail stores, as well as reviews of such software. Find subject-specific websites (e.g., for teachers of the subject, or the History Channel), teaching resources websites, journal websites (e.g., "Teaching History" journal), and relevant non-subject websites (e.g., Discovery Channel, Learning Channel, news reports, etc.). Find appropriate open-ended software (e.g., spreadsheets for teaching math).

Task components

Determine lesson objectives. Determine learning activities. Research what ways exist to teach the objective (e.g., looking at available resources, using the Internet, etc.). Adapt and develop existing resources and approaches. Learn any new software before teaching with it.

Task frequency, importance, difficulty and occurrence

Daily, critical, difficult; this task is scheduled or planned for.

Obstacles

Lack of suitable or desirable tools, connectivity problems, licensing restrictions, software unavailable in language of instruction.

Prerequisite knowledge

Awareness of curriculum standards, expected educational outcomes, syllabuses.

Best practices

Exploiting the potential of digital resources to bring teaching alive. Taking ownership of professional development: learning from colleagues and others how best to use digital resources, upgrading technical skills, and maintaining awareness of pedagogical and software innovations.

Common mistakes

Inappropriate software or resource selection. Mismatch between lesson objectives and software/resources. Copyright violation.

Critical mistakes

Abdicating professional responsibility to devise appropriate teaching/learning activities (e.g., looking for ready-made lessons rather than devising activities). Mismatch between hardware, resources, and available software/data resources.

Task result

Compelling lesson; motivated students who learn.

Guidelines on adaptation of the UNESCO ICT Competency Framework for Teachers

Appendix 2.
Guidelines for preparing a report on local conditions related to teachers' ICT competencies

Drawing on this guidelines, national experts will write a report on the situation of their country. They will address needs, facilities, and standards related to teachers' professional profile in ICTs for Education (ICT-ED), underlying Initial teacher education (pre-service) or ITE, and Continuing professional development (in-service) or CPD.

The report will be structured according to following nine topics:

1. Context

2. Structure of the school system of education

3. Typology of teachers

4. ICT-ED and initial teacher education (pre-service)

5. ICT-ED and continuing professional development (in-service)

6. Facilities and equipment

7. Actual teachers' use and competencies in ICT-ED

8. Needs expressed by teachers

9. Standards in teacher education related to ICT-ED

The context, describing the country's main features that are relevant for the school system; educational, economic, and society pressures that influence educational policy and planning; as well as national policy for introducing ICT-ED into the school system.

The school system structure, describing how the school system is articulated.

Typology of teachers, describing the different categories of teachers operating in the country according to the different school levels.

ICT-ED and initial teacher education (pre-service) or ITE, describing the explicit or implicit curricular framework of teacher training initiatives. It addresses the uses of ICT in the classroom to improve students' learning; in the teachers' community, to improve their cooperation; and in school organization to improve school effectiveness. The report will describe:

- Decision-making bodies and the institutions responsible for ITE

- Admission requirements

- Objectives of the ICT programme

- Content of the ICT programme

- Pedagogy of the ICT programme

- Assessment of the ICT programme

- How ITE is carried out, explaining the ways in which training is accomplished (e.g., using ICT tools or not, working online or not, working collaboratively or not, etc.)

Continuing professional development (in-service) or CPD, describing the explicit or implicit curricular framework of in-service training initiatives related to ICT-ED. The report will describe:

- Policies in the national, regional or local levels aimed at improving teachers' competencies

- General information

- Objectives of CPD programme

- Content of the CPD programme

- Pedagogy of the CPD programme

- How CPD is carried out, explaining the ways in which training is accomplished

Facilities and actual teachers' use and competencies in ICT-ED, reporting studies or statistical surveys that explain teacher uses of ICTs in education, as well as the facilities available to them.

Needs and problems that teachers face when using ICTs in their practice, reporting studies or statistical surveys concerning problems faced by teachers when using ICTs in education (e.g. lack of access to computers and a data projector, lack of educational materials at school, lack of knowledge in using computers, etc.).

Standards in teachers' education related to ICT-ED, listing broad topics related to teachers' competency in ICTs for education. These topics have been drawn from major national CPD initiatives and from initial training courses.

THE CONTEXT

This section describes the main aspects of the country that are relevant for the school system: population, economy, core indicators on ICT infrastructure and Internet penetration, infrastructural issues, number of schools, number of students, number of teachers. Educational, economic, and society pressures that influence educational policy and planning are also described here.

THE SCHOOL SYSTEM STRUCTURE

This section shows a visual representation of the structure of the national school system, grade by grade.

Table 9. Levels of the teachers' ICT competencies

	Grade		Age	Name		Certificate of
Compulsary	1		6–7	Primary education		
	2		7–8			
	3		8–9			
	4		9–**10**			
	5		**10**–11	Basic education		Basic General Education
	6		11–12			
	7		12–13			
	8		13–14			
	9		14–**15**			
Upper secondary	10	10	**15**–16	Secondary	Vocational /Technical Secondary	Complete Secondary Education
	11	11	16–**17**			
	12		17–**18**			Complete Secondary Specialized Education

TYPOLOGY OF TEACHERS

This section describes the different typologies of teachers according to the school level.

- -

Example

Several categories of teachers can be identified:
- *Pre-school teachers*
- *Primary teachers*
- *Lower secondary (upper primary) teachers*
- *Secondary teachers*
- *Vocational teachers*
- *Special education teachers*

The boundaries between these categories are not hard and fast. There are overlaps frequently and these vary according to the school system. For example, in some countries such as Denmark and Norway, pre-school teachers can teach in the first classes of primary school and primary teachers can teach in lower secondary school. In Ireland the vast majority of schools are "all-through" schools, catering for pupils from 4 to 12 years of age.

- -

ICTS IN EDUCATION AND INITIAL TEACHER EDUCATION (PRE-SERVICE), ITE

DECISION-MAKING BODIES IN INITIAL TRAINING and INSTITUTIONS RESPONSIBLE FOR INITIAL EDUCATION

Description of the decision-making bodies and the institutions responsible for initial education.

ADMISSION REQUIREMENTS

Description of the requirements to be admitted to Initial teacher education (pre-service)

- -

Example

In most cases, teacher education is classified as an element of higher education. Applicants to teacher education courses must possess the qualifications required for entry into higher education. For pre-school and primary education, and in some cases lower secondary, this qualification generally consists of a school certificate awarded after successful completion of examinations at the end of upper secondary school. For secondary education the requirement is a university degree in the subject that is to be taught. In some countries it is also possible to enter a primary education teaching programme after successfully completing a degree course at a university. Some countries assess teacher workforce requirements from year to year, and on this basis they set intake levels for the different types of teacher training courses. Where the number of places is limited, an entrance examination may be set.

This section describes objectives, content, pedagogical approach, assessment, and methods related to ICT-ED (pedagogical uses of ICTs in the classroom, the use of ICTs for improving school organization, ICTs in professional development, ICTs for improving personal productivity, etc.).

THE OBJECTIVES OF THE ICT PROGRAMME

- Are programme objectives explicit?

- Is pedagogical change mentioned?

- Is school organizational change mentioned?

- Is curriculum change mentioned?

- Is the role of the teacher mentioned?

- Does the course objective to go beyond technical mastery?

- Does the course promote the idea of a community of practice among teachers?

- Is the programme embedded in a wider socio-cultural environment?

THE CONTENT OF THE ICT PROGRAMME

- Does the programme deal with pedagogical paradigms?

- Does the programme deal with the role of teacher?

- Does the programme deal with collaborative learning?

- Does the programme deal with the concept of a community of practice?

- Does the programme deal with curriculum change?

- Does the programme deal with motivating pupils?

- Does the programme deal with differentiation?

- Does the programme deal with the special needs of learners?

- Does the programme deal with the wider socio-cultural environment?

THE PEDAGOGY OF THE ICT PROGRAMME

- Is the pedagogical stance explicit?

- Is a constructivist stance evident?

- Is a collaborative stance evident?

- Is differentiation employed?

- Is cognitive mastery encouraged?

ASSESSMENT OF THE ICT PROGRAMME

- Who carries out the assessment?

- How frequently is the assessment carried out?

- At what points in the programme is it carried out?

- Is a constructivist approach employed?

- Does the assessment require cognitive mastery?

HOW INITIAL TEACHER TRAINING IS CARRIED OUT

- Traditional face-to-face methods?

- E-learning methods?

- Blended learning?

- Self-instructional packages?

ICTS IN EDUCATION AND CONTINUING PROFESSIONAL DEVELOPMENT (IN-SERVICE), CPD

POLICIES

Is there a national Policy active for teachers' professional development?

Is there a regional Policy active for teachers' professional development?

Is there a local Policy active for teachers' professional development?

In the affirmative, describe the main phases of these policies.

- -

Example

The State, primarily the Ministry of Education, is responsible for controlling and financing CPD education. CPD promotes the practical implementation of the objectives defined in Parliament and Government decisions and in the target outcome negotiations between the Ministry of Education and the National Board of Education. The Ministry of Education drew up a development programme for teacher training in (…). The programme lists current and important topics in continuing teacher education, such as the use of ICTs in education, subject- and field-specific knowledge and skills, special-needs pedagogy, immigrant education cooperation, developing management skills, and schools as work communities. The goal is to ensure that teachers working in different areas of the country and in different institutions get equal and sufficient opportunities for professional development. Continuing teacher education is organised by state-owned training centres, university continuing education units, vocational teacher education colleges, university departments of teacher education, teacher training schools, summer universities, and various private organisations. Continuing education is largely based on the logic of supply and demand: as supply exceeds demand, organisations offering training have to compete on the price and quality of education. In cases when the training is financed or supervised by the National Board of Education, the Board not only defines the objectives and contents of the programme, but it also evaluates the outcome of the objectives. In most cases, however, education providers decide on the topics, duration, and time of education independently. Continuing education may be pedagogical, subject-related, connected to a specialisation area, or it might familiarise teachers with general changes in education policy and society. Recently, the focus has been on themes related to curricular reform, assessment and evaluation, new technologies, multiculturalism, and internationalisation. To date, most continuing teacher education has been short-term training to maintain professional skills. A common characteristic of continuing education for different teacher groups is that all groups favour education that updates their professional knowledge and command of their own subjects or fields.

ASSESSMENT OF POLICIES

- What is the policy on the use of ICTs in the classroom?

- Is the integration of ICTs in the curriculum promoted by the existing policy?

- How much importance is technological literacy given? Media and information literacy?

- What is the importance of ICTs in education policy within the overall educational policy?

GENERAL INFORMATION

- Is the CPD programme centrally determined?

- How long (in years) has this training been in operation?

- What percentage of teachers has been trained?

- What is the target population?

- Is the programme evaluated? How? What instruments are used?

- -

THE OBJECTIVES OF CPD PROGRAMME

- Are programme objectives explicit?

- Is pedagogical change mentioned?

- Is school organizational change mentioned?

- Is curriculum change mentioned?

- Is the role of the teacher mentioned?

- Does the course aim to go beyond technical mastery?

- Does the course promote the idea of a community of practice among teachers?

- Is the programme embedded in a wider socio-cultural environment?

THE CONTENT OF THE CPD PROGRAMME

- Does the programme deal with pedagogical paradigms?

- Does the programme deal with the role of teacher?

- Does the programme deal with collaborative learning?

- Does the programme deal with the concept of a community of practice?

- Does the programme deal with curriculum change and innovation?

- Does the programme deal with motivating pupils?

- Does the programme deal with differentiation?

- Does the programme deal with the special needs of learners?

- Does the programme deal with the wider socio-cultural environment?

THE PEDAGOGY OF THE CPD PROGRAMME

- Is the pedagogical stance explicit?

- Is a constructivist stance evident?

- Is a collaborative stance evident?

- Is differentiation employed?

- Is cognitive mastery encouraged?

HOW CPD IS CARRIED OUT

- Traditional face-to-face methods?

- E-learning methods?

- Blended learning?

- Self-instructional packages?

FACILITIES AND EQUIPMENT

The equipment available in schools is described in this section: computers, labs, internet access, interactive whiteboards, etc.

Table 10. Example of representing in the tabular form data on facilities and equipment

	Primary education, %	Secondary education (post-primary), %	Special education, %
Students/computer ratio			
Internet access			
Interactive whiteboards			
Wireless network in the computer lab			
Software by type			
E-learning tools			
Information and educational resources, including OER			
Educational e-books			
Virtual labs			
Social networks			
………………………			

ACTUAL TEACHERS' USE AND COMPETENCIES IN ICT-ED

This section can be based on studies or statistical surveys concerning teachers' competencies and experience using ICTs in education.

- -

Example

The following table shows information compiled from national surveys.

Table 11. Example of representing in the tabular form data on actual teachers' use and competencies in ICT-ED

	Primary education, %	Secondary education (post-primary), %	Special education, %
Teachers with some computer skills (e.g., would be able to produce a document using a word-processor)			
Teachers with some email and Internet skills			
Teachers with computer at home			
Teachers with Internet access at home			
Teachers who use computers in lesson preparation			
Teachers who use computers in the classroom to improve students' learning			
Teachers who use ICTs to improve their cooperation			
Teachers who use ICTs to improve school effectiveness			
Teachers who use ICTs to extend their learning opportunities			

- -

NEEDS AND PROBLEMS THAT TEACHERS FACE WHEN USING ICTS IN THEIR PRACTICE

This section reports studies or statistical surveys concerning problems faced by teachers in using ICT in education.

- -

Example

It is clear that infrastructure and technical support remain serious difficulties. However, there is also strong reason to belief that even if these were provided, curricular issues would constitute a barrier, especially at post-primary (secondary) level.

Table 12. Example of the table to fill with data on teachers' problems and needs

Percentage of schools giving this issue a high or very high priority	Primary education	Secondary education (post-primary)	Special education
More computers distributed around classroom			
More computers in a central computer room			
More technical support and help with maintenance			
Replacement/renewal of older equipment			
Independent advice on purchase/licenses			
Faster Internet access			
Internet access on more computers			
Development of a school network			
More training for teachers			

This table can be modified and expanded taking into account the current problems and needs of teachers of the country/region connected with use of ICTs in education, corresponding to various levels of school education.

STANDARDS IN TEACHER EDUCATION RELATED TO ICT-ED

This section lists broad topics related to teachers' competency in ICTs for education, including available national/regional standards and recommendations on ICT application in education, and also links to the relevant documents. These topics have been drawn from major national teacher training initiatives from ITE and CPD courses.

- -

Example

- *Theories and Concepts of ICTs*
- *Selection and use of ICTs*
- *Development, design, and production of educational media products*
- *Basics of ICTs in education-processes*
- *Use of ICTs in discipline- and inter-discipline education*
- *Educational Challenges of ICTs*
- *ICT basic education*

- -

Appendix 3.
Recommendations for localizing the UNESCO ICT-CFT

Introduction

The local framework can be produced on the basis of the UNESCO ICT-CFT using the analogy as a mechanism by which a new entity is produced from an original one by detecting their similarities and differences.
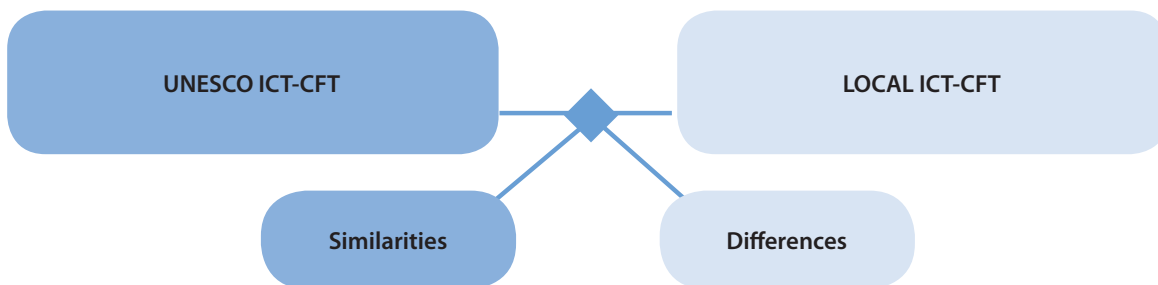

Figure 16. The analogy structure

On the basis of this definition of analogy, the problem becomes defining the similarities and the differences between UNESCO ICT-CFT and the local framework.

According to dictionary definitions a framework can have three convergent meanings:

1. a structure for supporting or enclosing something else, especially a skeletal support used as the basis for something being constructed, a scaffold, a fundamental structure supporting or containing something

2. a set of assumptions, concepts, values, and practices that constitutes a way of viewing reality

3. a structural plan or basis of a project

All these meanings are useful for defining similarities and differences between UNESCO ICT-CFT and the local framework. In the following pages, similarities and differences are examined.
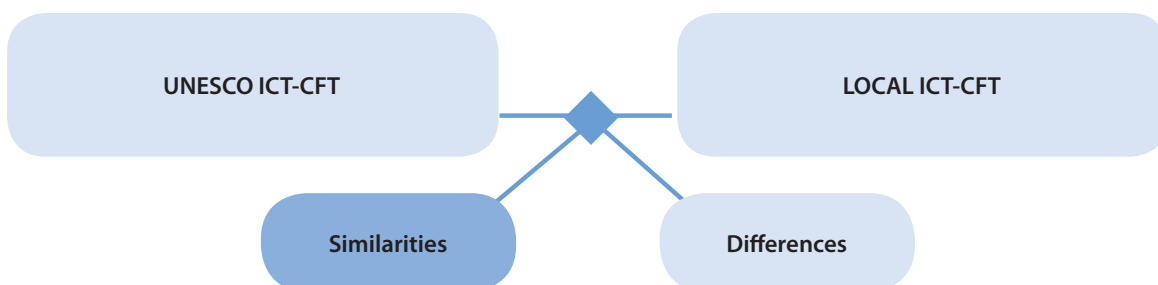

Figure 17. Similarities

Similarities

The two frameworks share the structure used in the UNESCO ICT-CFT. This structure consists of the following elements:

1. The fundamental structure for enclosing teachers' competencies, i.e., the skeletal support used as the basis for constructing teachers' professional profile in ICTs, or the scaffold containing the teachers' skills and competencies. This fundamental structure involves three levels of competence, related to 6 areas of activity (Figure 18).

9 The American Heritage® Dictionary of the English Language, Fourth Edition copyright ©2000 by Houghton Mifflin Company. Updated in 2009.
Collins English Dictionary – Complete and Unabridged © HarperCollins Publishers 1991, 1994, 1998, 2000, 2003.3
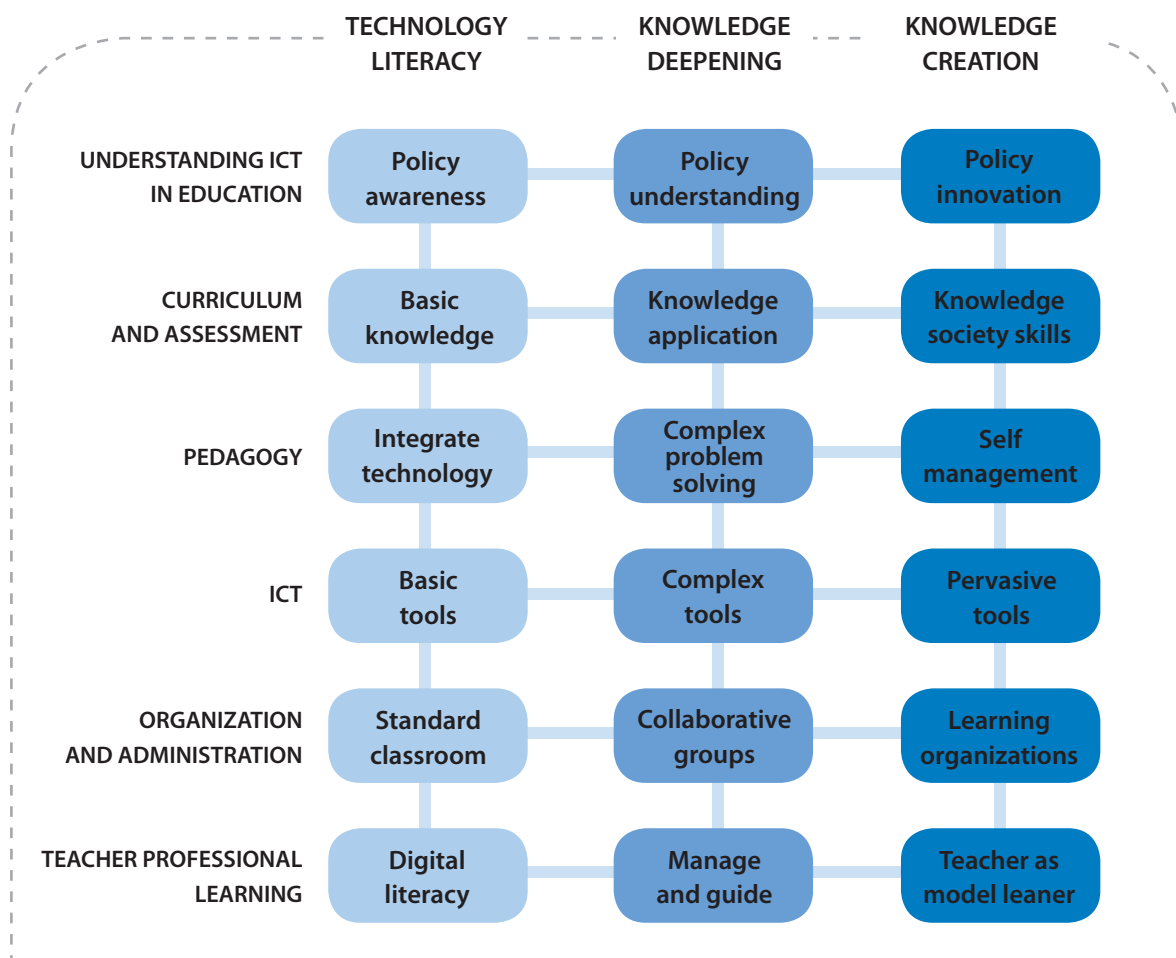
	TECHNOLOGY LITERACY	KNOWLEDGE DEEPENING	KNOWLEDGE CREATION
UNDERSTANDING ICT IN EDUCATION	Policy awareness	Policy understanding	Policy innovation
CURRICULUM AND ASSESSMENT	Basic knowledge	Knowledge application	Knowledge society skills
PEDAGOGY	Integrate technology	Complex problem solving	Self management
ICT	Basic tools	Complex tools	Pervasive tools
ORGANIZATION AND ADMINISTRATION	Standard classroom	Collaborative groups	Learning organizations
TEACHER PROFESSIONAL LEARNING	Digital literacy	Manage and guide	Teacher as model leaner

Figure 18. UNESCO ICT-CFT

2. The structure of the document, describing the framework, articulated in 3 sections:

a. ICT-CFT (principles, modules, implementation)

b. Appendix 1: Modules

c. Appendix 2: Example syllabi and exam specification

3. The description of the levels reported in the Table 2 of Appendix 1 according to the bellow template:

	Policy goals	Impact on the curriculum	Impact on pedagogy and teacher's role	Teacher's competencies
Technology literacy				
Knowledge deepening				
Knowledge creation				

4. The structure of the examples reported in Tables 3, 4 and 5, Appendix 1.

5. The structure of the module descriptions in Section 2, Appendix 1: UNESCO ICT Teacher Competency Framework Modules In this section, the 18 modules of the framework are described in a tabular form as presented in the Tables 6 and 7 of the Appendix 1.

6. The structure of the syllabus as described in "Section 3. Appendix 2: Example Syllabi and Exam Specifications" of the previous Appendix 1 of this document (Table 8).

7. The description of each objective of the syllabus, indicating the following features of the objectives (see Table 8):

- Scoping statement
- Task components
- Task frequency
- Task trigger
- Out of scope
- Tools used best practice
- Obstacles
- Common mistakes
- Critical Mistakes
- Related decisions

8. The previous structures are populated with general contents. The experts' group should analyse this content and decide what aspects are suitable for local conditions, as described in the document previously produced. To this end, the experts' group could start considering each cell of Table 1, Appendix 1 on these guidelines, accepting the content suitable for the local conditions and localizing the content which does not reflect them. The same procedure can be used for the content of the modules on Table 5, Appendix 1, and on Appendix 1 of the UNESCO document, adapting the following descriptions to the local conditions:

a. Curricular goals

b. Teacher competencies goals

c. Objectives teachers should be able to achieve

d. Example methods for teacher education or professional learning

9. Finally, the experts' group should consider the syllabus as described in table 8 and keep the competencies fitting the local conditions.

Differences

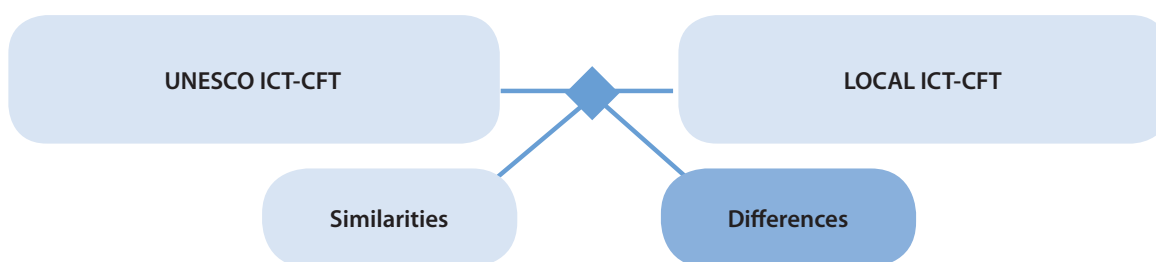The differences mainly concern how the above described structure is populated.

Figure 19. Differences

1. The experts' group could consider each cell on Table 2, Appendix 1 of these guidelines, writing the content suitable for local conditions.

2. The examples on Tables 3, 4 and 5, Appendix 1, should be changed with examples that reflect the local situation.

3. The same procedure can be used for the content of modules on Table 6, Appendix 1, and on Appendix 1 of the UNESCO document, adapting the following descriptions to the local conditions as described in the document previously produced:

   a. Curricular goals

   b. Teacher competencies goals

   c. Objectives teachers should be able to achieve

   d. Example methods for teacher education or professional learning

4. To produce the syllabus, the experts' group should consider the syllabus as described in Table 8, identify the competencies fitting the local conditions and describe them using the structure of the task description presented in the Appendix 1.

5. Using the local framework, the group could define a structural plan withdraw or support existing local policies on teacher education.

Guidelines on adaptation of the UNESCO ICT Competency Framework for Teachers

Appendix 4.
Template questionnaire to survey teachers' ICT competence

INTRODUCTION

Drawing on this template questionnaire, national experts will produce a local questionnaire for estimating the actual teachers' competencies in ICT-ED. The use of this questionnaire on large scale will not produce a picture of the actual teachers' competencies, but a rough image that can be useful as a basis to determine a starting point for a competency policy both in ITE and CPD.

Teachers who are asked to take the questionnaire should be informed of its objective, which is to "provide a rough image that can be useful as a basis to determine a starting point for a competency development policy for teacher training". This is to ensure that individual teachers understand right away that their individual professional practice is not in question. Another way could be to allow for teachers to respond to the questionnaire anonymously.

The questionnaire has two sections: the first is composed of a few preliminary questions to determine if a teacher uses or can use ICTs. If the answer is affirmative, the teacher goes on to complete the second section. The answers to the questions are presented in three types:

– choice of one out of many. For example, Yes. No. I don't know.

– value choice upon scores from 1 to 5. For example, I don't use 1, 2, 3, 4, 5 Use constantly.

– the combined type. For example, a). Negatively 1, 2, 3, 4, 5 Positively; b).I don't know.

SECTION 1. PRELIMINARY QUESTIONS ON THE USE OF ICTS

1.   What is your teaching position?

   a. Kindergarten Teacher

   b. Lower Primary Teacher

   c. Upper Primary Teacher

   d. Primary Teacher Specialist (e.g., Music or Languages)

   e. Lower Secondary Teacher

   f. Secondary Teacher

   g. Special Education Teacher

   h. Other (specify):_____

2.   What is your subject matter?

   a. Language 1

   b. Mathematics

   c. Science

   d. Society and Environment

   e. Physical Education

   f. Arts

   g. Technology

   h. Economics

   i. Language 2

   j. Other (specify)_____

**3.	How many years have you been working in schools?**

a. 0 to 1 year

b. 2 to 3 years

c. 4 to 5 years

d. 6 to 9 years

e. 10 to 19 years

f. 20 years or more

**4.	Is your school in a remote area?**

a. Yes

b. No

**5.	What is your gender?**

a. Male

b. Female

c. Other

**6.	In which age group do you belong?**

a. Less than 24 years

b. 25 to 29 years

c. 30 to 39 years

d. 40 to 49 years

e. 50 to 64 years

f. 65 years and over

**7.	Can you use a computer?**

a. Yes

b. No

**8.	How frequently do you use a computer?**

a. Daily

b. Weekly

c. Monthly

d. At least once a term

e. Never

**9.	Do you have a computer at home?**

a. Yes

b. No

**10.	Do you have an Internet access at home?**

a. Yes

b. No

**11.	Can you use a computer at school?**

a. Yes

b. No

**12.	Do you have an Internet access at school?**

a. Yes

b. No

**13.	Are there other places where you can use a computer and access the Internet (Internet cafes, libraries, etc.)?**

a. Yes

b. No

If the answers to question 7 is "b" or the answer to question 8 is "e", then the test is over. Otherwise, the teacher must complete Section 2 below.

SECTION 2

Section 2 has the same structure as the UNESCO ICT-CFT (see the figure below). The correctness of the answer to each item has to be determined by local experts once the questionnaire is localized, since its validity could depend on local conditions.
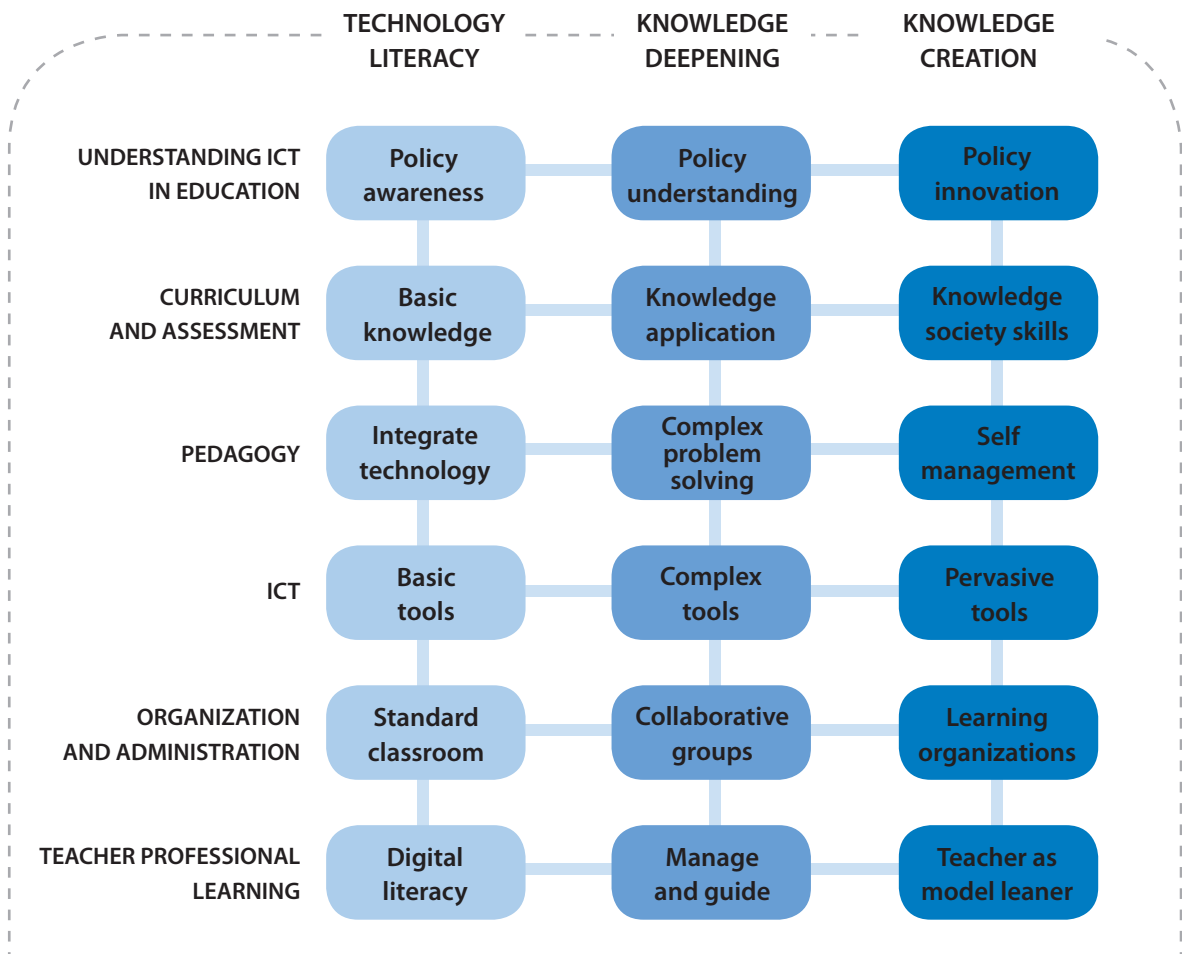
	TECHNOLOGY LITERACY	KNOWLEDGE DEEPENING	KNOWLEDGE CREATION
UNDERSTANDING ICT IN EDUCATION	Policy awareness	Policy understanding	Policy innovation
CURRICULUM AND ASSESSMENT	Basic knowledge	Knowledge application	Knowledge society skills
PEDAGOGY	Integrate technology	Complex problem solving	Self management
ICT	Basic tools	Complex tools	Pervasive tools
ORGANIZATION AND ADMINISTRATION	Standard classroom	Collaborative groups	Learning organizations
TEACHER PROFESSIONAL LEARNING	Digital literacy	Manage and guide	Teacher as model leaner

Figure 20. The modules of the UNESCO ICT-CFT

UNIT 1. "TECHNOLOGY LITERACY"

1.1. UNDERSTANDING ICTS IN EDUCATION: POLICY AWARENESS

1.   Is there a policy for introducing ICT in the school in your country?

    a. Yes

    b. No

    c. I don't know

2.   If answer to question 1 is Yes, this policy is at

    a. National level

    b. Regional level

    c. School level

    d. I don't know

3. **Would you be able to describe how this policy is implemented in your school?**

a. Yes

b. No

c. I don't know

4. **Would you be able to describe the positive aspects and weaknesses?**

a. Yes

b. No

c. I don't know

5. **Indicate the extent to which you agree or disagree with each statement about ICTs:**

a. Students' use of ICTs can support student-centred learning.

strongly agree ☐1 ☐2 ☐3 ☐4 ☐5 strongly disagree

b. ICTs provide valuable resources and tools to support student learning.

strongly agree ☐1 ☐2 ☐3 ☐4 ☐5 strongly disagree

c. ICTs can be mainly used for efficient presentations.

strongly agree ☐1 ☐2 ☐3 ☐4 ☐5 strongly disagree

d. ICTs has limited capacity to provide benefits in the classroom.

strongly agree ☐1 ☐2 ☐3 ☐4 ☐5 strongly disagree

1.2. CURRICULUM AND ASSESSMENT: BASIC KNOWLEDGE

1. **To what extent do you use ICTs with your students in the context of your discipline?**

no ☐1 ☐2 ☐3 ☐4 ☐5 large

2. **Have you ever used educational software related to your subject matter?**

a. Yes

b. No

3. **To what extent do you use educational software related to your subject matter with your students?**

no ☐1 ☐2 ☐3 ☐4 ☐5 large

4. **To what extent do you use digital artifacts from student assignments as evidence of student achievement?**

no ☐1 ☐2 ☐3 ☐4 ☐5 large

5. **To what extent do you use ICT applications to monitor, evaluate, and report on student achievement?**

no ☐1 ☐2 ☐3 ☐4 ☐5 large

1.3. PEDAGOGY: INTEGRATE TECHNOLOGY

1. **To what extent do you use presentation software in your lessons?**

no ☐1 ☐2 ☐3 ☐4 ☐5 large

2. **Do your students use ICTs for mastering skills just taught?**

a. Yes

b. No

3. **To what extent do you use digital resources in you lessons?**

no ☐1 ☐2 ☐3 ☐4 ☐5 large

4. **Do you design lesson plans incorporating digital resources?**

a. Yes

b. No

5. **To what extent do you share your experience of ICT use with other teachers?**

no ☐1 ☐2 ☐3 ☐4 ☐5 large

1.4. ICTS: BASIC TOOLS

1. **To what extent do you use a word processor?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

2. **To what extent do you use presentation software?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

3. **To what extent do you use a web browser?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

4. **To what extent do you use a search engine?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

5. **To what extent do you use an email address?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

6. **To what extent do you use some sort of courseware?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

7. **To what extent do you use open educational resources?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

8. **Do you use the computer to record grades, maintain student records, or to take students' attendance?**
   a. Yes
   b. No

1.5. ORGANISATION AND ADMINISTRATION: STANDARD CLASSROOM

1. **To what extent do you integrate the use of a computer lab in the teaching activities?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

2. **To what extent do you use ICTs in the classroom?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

3. **To what extent do you use ICTs with your students for presentations, without altering the classroom setting?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

4. **To what extent do you use ICTs in the classroom for individual study?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

5. **To what extent do you use ICTs in the classroom for small group activities?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

1.6. TEACHER PROFESSIONAL LEARNING: DIGITAL LITERACY

1. **To what extent do you use digital resources to enhance your school productivity?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

2. **To what extent do you use digital resources to learn about your subject matter?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

3. **Have you ever used ICTs to access online courses?**
   a. Yes
   b. No

4. **Could you list at least three of the main Internet issues related to ethics?**
   a. Yes
   b. No

UNIT 2. "KNOWLEDGE DEEPENING"

2.1. UNDERSTANDING ICT IN EDUCATION: POLICY UNDERSTANDING

1. **To what extent do you think that ICTs could change the school?**
   a. no ☐1 ☐2 ☐3 ☐4 ☐5 l arge
   b. I have no precise idea

2. **To what extent do you credit policy for introducing ICTs in the school in your country?**
   a. no ☐1 ☐2 ☐3 ☐4 ☐5 l arge
   b. I have no precise idea

3. **To what extent has this policy changed your practice in the classroom?**
   a. no ☐1 ☐2 ☐3 ☐4 ☐5 l arge
   b. I have no precise idea

2.2. CURRICULUM AND ASSESSMENT: KNOWLEDGE APPLICATION

1. **To what extent do you use ICTs with your students to understand real-world problems?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

2. **Have you ever used web 2.0 for learning assessment?**
   a. Yes
   b. No
   c. I do not fully understand the question

3. **To what extent do you use innovative ways of assessment using ICTs?**
   a. no ☐1 ☐2 ☐3 ☐4 ☐5 large
   b. I do not fully understand the question

4. **To what extent do you help students apply knowledge obtained in your class in real-world situations?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

2.3. PEDAGOGY: COMPLEX PROBLEM SOLVING

1. **To what extent do you adopt collaborative learning in classroom?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

2. **To what extent do you adopt project-based learning in classroom?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

3. **To what extent do you design online materials for supporting your students?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

4. **To what extent do you deal with real-world problems in project-based learning?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

2.4. ICTS: COMPLEX TOOLS

1. **To what extent do you use authoring environments to produce learning material for your students?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

2. **To what extent do you use authoring environments to produce online material for your students?**
   no ☐1 ☐2 ☐3 ☐4 ☐5 large

3. **Do you use a platform to manage, monitor, or assess the progress of your students?**

a. Yes

b. No

4. **To what extent do you use ICTs to communicate with your students?**

no ☐1 ☐2 ☐3 ☐4 ☐5 large

5. **Do you use a platform to support your students' learning?**

a. Yes

b. No

6. **Do you use social networks to interact with your students and/or colleagues?**

a. Yes

b. No

7. **To what extent do you use open educational resources?**

no ☐1 ☐2 ☐3 ☐4 ☐5 large

8. **Do you use ICTs to collaborate with other schools?**

a. Yes

b. No

2.5. ORGANISATION AND ADMINISTRATION: COLLABORATIVE GROUPS

1. **Do you organise computers and other resources within the classroom to support collaborative activities?**

a. Yes

b. No

2. **Do you create a learning environment to manage project-based activities?**

a. Yes

b. No

3. **Do you organise the classroom to support groups working with different tools?**

a. Yes

b. No

4. **To what extent can you define the requirements of a classroom setting to match the needs of groups working collaboratively?**

no ☐1 ☐2 ☐3 ☐4 ☐5 large

2.6. TEACHER PROFESSIONAL LEARNING: MANAGE AND GUIDE

1. **Do you share digital resources with you colleagues?**

a. Yes

b. No

2. **Do you collaborate with outside experts?**

a. Yes

b. No

3. **Are you a member of a teachers' virtual community of practice?**

a. Yes

b. No

4. **To what extent do you use the Internet for your professional learning?**

no ☐1 ☐2 ☐3 ☐4 ☐5 large

UNIT 3. "KNOWLEDGE CREATION"

3.1. UNDERSTANDING ICTS IN EDUCATION: POLICY INNOVATION

1. **How do you think that you could contribute to implement or modify an ICT policy in the school?**
    a. very little ☐1 ☐2 ☐3 ☐4 ☐5 radically
    b. I have no precise idea

2. **How do you contribute to the discussion of policy for introducing ICTs in the school?**
    a. very little ☐1 ☐2 ☐3 ☐4 ☐5 radically
    b. I have no precise idea

3. **How did this policy to change your practice in the classroom?**
    a. very little ☐1 ☐2 ☐3 ☐4 ☐5 radically
    b. I have no precise idea

3.2. CURRICULUM AND ASSESSMENT: KNOWLEDGE SOCIETY SKILLS

1. **Do you intentionally use ICTs to improve students' communication skills?**
    a. Yes
    b. No

2. **Do you intentionally use ICTs to help students find ideas and information?**
    a. Yes
    b. No

3. **Do you intentionally use ICTs to help students to collaborate?**
    a. Yes
    b. No

4. **Do you intentionally use ICTs to help students share knowledge?**
    a. Yes
    b. No

5. **Do you help students acquire information problem-solving skills?**
    a. Yes
    b. No
    c. The question is not clear to me

6. **Do you use web 2.0 to assess higher order skills (creativity, problem solving, collaboration, etc.)?**
    a. Yes
    b. No
    c. The question is not clear to me

3.3. PEDAGOGY: SELF MANAGEMENT

1. **Do you design online activities that engage students in problem-solving or artistic creation?**
    a. Yes
    b. No

2. **Do you help students in multimedia production?**
    a. very little ☐1 ☐2 ☐3 ☐4 ☐5 very much

3. **How important is the creation of students' new knowledge?**
    very little ☐1 ☐2 ☐3 ☐4 ☐5 very much

4.   Do you reflect with your students on their own learning?

very little ☐1 ☐2 ☐3 ☐4 ☐5 very much

3.4. ICTS: PERVASIVE TECHNOLOGY

1.   Do you design online learning environments to support your students' learning?

a. Yes

b. No

2.   Do you use social networks to support your students' learning?

a. Yes

b. No

3.   Do you use web 2.0 to support students' in creating their own digital products?

a. Yes

b. No

c. The question is not clear to me

4.   Is you classroom involved in learning projects with other schools using online communication?

a. Yes

b. No

3.5. ORGANISATION AND ADMINISTRATION: LEARNING ORGANIZATIONS

1.   Do you organise the classroom as a learning community?

a. Yes

b. No

2.   Do you create a learning environment to support collaborative projects with other schools?

a. Yes

b. No

3.   Do you use the web to collaborate with your colleagues systematically?

a. Yes

b. No

4.   Do you share your materials and/or projects with other teachers?

a. Yes

b. No

3.6. TEACHER PROFESSIONAL LEARNING: TEACHER AS A MODEL LEARNER

1.   Do you play a key role in introducing ICTs into your school?

a. Yes

b. No

2.   Do you are considered a leader in introducing ICTs in Education?

a. Yes

b. No

3. **Do your colleagues consult with you to introduce ICTs in their own teaching?**
    a. Yes
    b. No

4. **Do you teach in teachers' in-service courses?**
    a. Yes
    b. No

5. **Do you participate in virtual professional communities?**
    a. Yes
    b. No

HOW TO USE TEACHER'S ANSWERS

Each module area on Figure 21 is divided by the number of the associated test items.
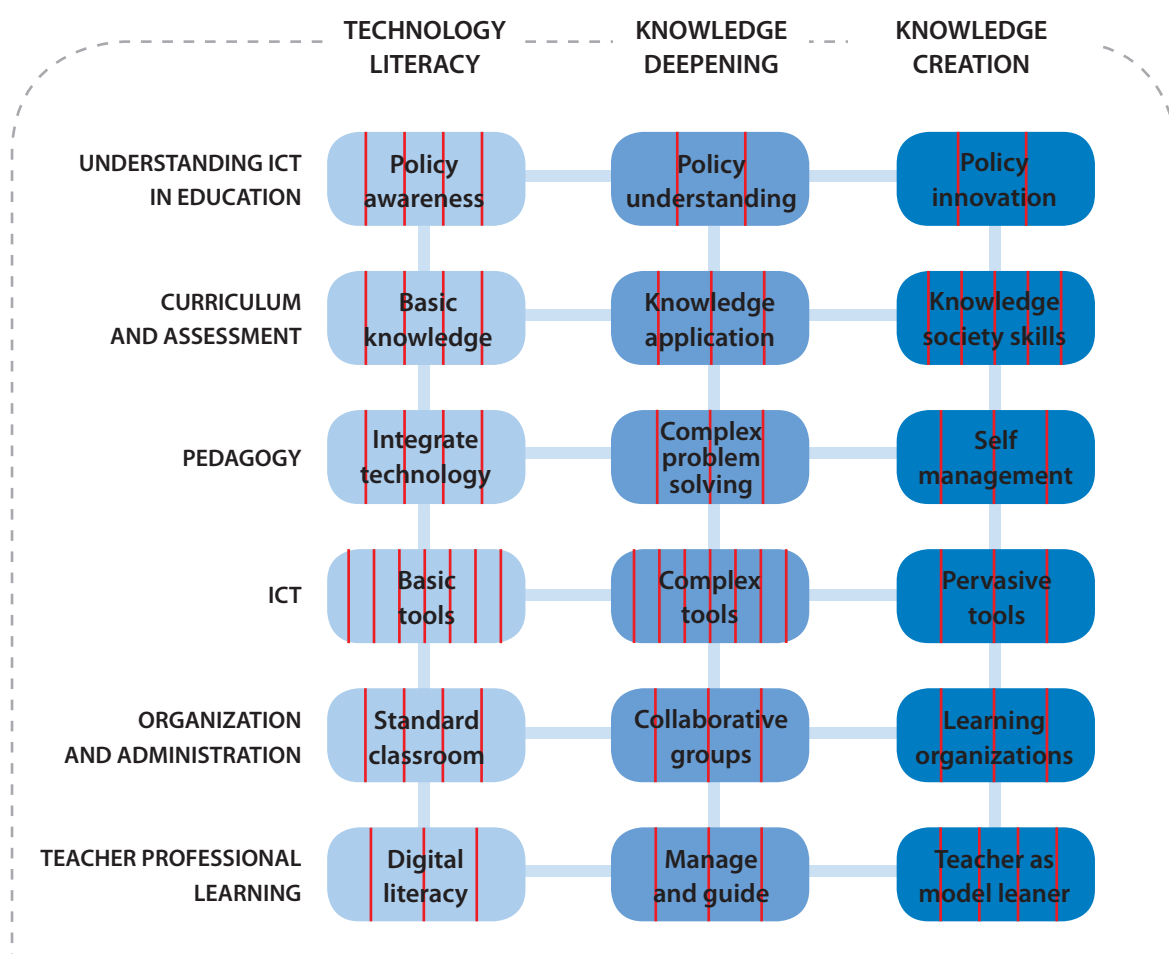

Figure 21. A possible UNESCO ICT-CFT metrics

In these partitioned modules, each area is filled if the answer is "yes" or the number is equal or more than 3. Another visual display option could be a matrix filled with "1" (when the answer is yes or more than 3) and "0" (otherwise).

The result is a rough representation of where a teacher is situated in the framework, and is shown below on Figure 22.

Using this representation for all data collected on a meaningful sample of teachers will give a rough picture of the teachers' competencies in the whole country.
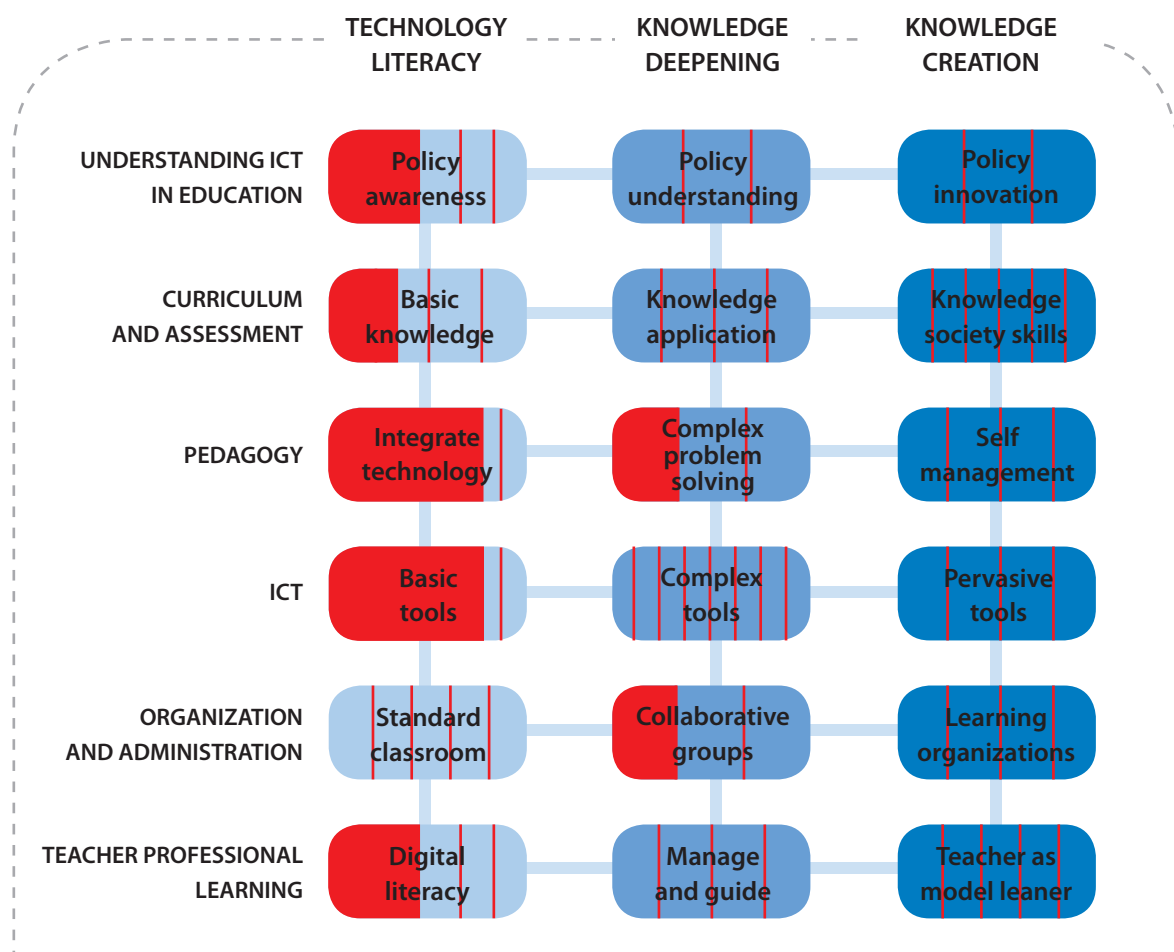

Figure 22. A rough representation of how a particular teacher is situated in the framework