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საქართველოსთვის
The European Union for Georgia

Support to Public Administration Reform in Georgia

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Policy Review on Key Competence Development in Georgia

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The European Union for Georgia

Support to Public Administration Reform in Georgia

Purpose 1: Support to policy development, coordination, monitoring and evaluation

Result 1.7: Strengthened sector policy development and implementation in targeted sectors (namely Education and Health)

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Author of document: **Natia Andguladze**

Senior Non-Key Expert on Assessment of Key Competence Development in Secondary and Vocational Education

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Preface

Georgia has made impressive progress in accommodating key competences in its policy and strategies. However, the majority of children in Georgia still leave school without having acquired the basic competences they need to compete in the 21st century economy. Furthermore, students from rural areas, national minority backgrounds and socio-economically disadvantaged contexts are at greater risk of being left behind compared to their peers. Therefore, education in Georgia needs strategic and targeted reforms so that all children in Georgia can learn and thrive.

This review was undertaken within the framework of Public Administration Reform Support Project in close collaboration with the Ministry of Education, Science, Culture and Sport of Georgia. Focused on the development of key competences in general education and vocational education and training, this review offers suggestions that leverage several of the promising policies that have been enacted by the Government. The proposals are focused on the objective of developing key competences among students. This means that recommendations with respect to standards and frameworks, curriculum implementation, teacher training and development, leader selection and appraisal or quality assurance in educational institutions are directly linked with the education systems' ability to prepare the future generation of the country for the social and economic challenges of the 21st century.

Above all though, we hope that this review will be a useful reference for Georgia as it reforms its education system. This review discusses many of the policy options that the country is considering, from implementing the new curriculum to introducing comprehensive quality assurance mechanisms. We hope that the review's recommendations contribute to the further development of an education system that ensures that all students have the opportunities to develop their potential to their fullest.

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This review was implemented within the framework Support to Public Administration Reform in Georgia (EuropeAid/139255/DH/SER/GE) and in close cooperation with the Ministry of Education, Science, Culture and Sport (MoESCS). In particular, the reviewer would like to thank Olena Bekh, Senior Human Capital Development Expert, European Training Foundation, Timo Kuusela, Country Coordinator for Georgia, ETF, and Nino (Nika) Kochiashvili, Programme Officer, Education, Science, Employment, Health and Institution Building Delegation of the European Union to Georgia. We would further like to thank the leadership of the Ministry of Education, Science, Culture and Sport (MoESCS) for their support and contributions to the review. We are grateful to the officials and education experts from the MoESCS and beyond, who shared their insights and knowledge with us, in particular, the Department of Preschool and General Education and the Department of Professional Education and Training, including Mariam Chikobava, the Head of General Education Unit, Curriculum Experts Nikoloz Silagadze and Ekaterine Slovinsky; Tamar Samkharadze, Deputy Head of Professional Education and Training Department; Gela Lomiashvili, Coordinator of VET Programmes; National Agency for Education Quality Enhancement, Nino Berelidze and Nani Dalakishvili; Manana Ratiani, Teacher Professional Development Centre. The review would like to thank Lali Kalandadze, the head of Preschool and General Education Department, Ekaterine Kvirikashvili, Head of Education Resources Center of Dzveli Tbilisi District and Marika Zakareishvili, Deputy Head of Professional Education and Training Department for organizing interviews and focus group meetings. We are particularly grateful to teachers, school principals, and directors of VET institutions for sharing their insights and recommendations with us.

Abbreviations and Acronyms

CAT	Computer Adaptive Testing
ECA	Europe and Central Asia
EMIS	Education Management Information System
EQE	National Education Quality Enhancement Center
GEL	Georgian Lari
ICT	Information and Communication Technology
ISCED	International Standard Classification of Education
MCC	Millennium Challenge Corporation
MoESCS	Ministry of Education, Science, Culture, and Sports
NAEC	National Examination and Assessment Center
NGO	Non-Governmental Organization
OECD	Organization for Economic Cooperation and Development
PIRLS	Progress in International Reading Literacy Study
PISA	Program for International Student Assessment
SABER	Systems Approach for Better Education Results
STEM	Science, Technology, Engineering, and Mathematics
TALIS	Teaching and Learning International Survey
TEDS-M	Teacher Education and Development Study in Mathematics
TIMSS	Trends in International Mathematics and Science Study
TPDC	Teacher Professional Development Center
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
WB	World Bank

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Executive Summary

Most governments around the world intensify their efforts in enabling their citizens' active participation in social and economic life. To facilitate state and public efforts, the European Parliament and the Council of the European Union has developed the European Reference Framework of Key Competences for Lifelong Learning in 2006 which was updated in 2018. During the last five years, the European institutions have intensified their efforts in developing framework documents on key competences, which are based on a large body of research and extensive consultations and provide helpful guidance for governments and educational institutions in their effort to help their citizens and learning acquire the knowledge, skills, understanding, and values for active participation in social and economic life. The key competences include:

1. Literacy competence;
2. Multilingual competence;
3. Mathematical competence and competences in science, technology and engineering;
4. Digital competence;
5. Personal, social and learning to learn competence;
6. Citizenship competence;
7. Cultural awareness and expression competence;
8. Entrepreneurship competence.

Georgia has pledged to commit to the EU recommendations on LLL which urge governments to make teaching and learning of key competences part of their lifelong learning strategies. The development of a workforce to meet the labor market requirements is among the government's three strategic objectives for 2020. Education holds the key role in these efforts. Therefore, improving the quality of general and vocational education by following the principle of lifelong learning are identified as means for achieving the goals (Government of Georgia, 2016). The Government has made significant reforms in key areas related to skills development and education in general. Examining these changes against the government's commitment to developing key competences, will provide useful insight into potential areas for further cooperation in LLL.

This assessment of key competences in general and vocational education is part of a project aimed at Support to Public Administration Reform in Georgia and financed by the European Commission. The assessment was undertaken in close cooperation with the Ministry of Education, Science, Culture and Sports and with guidance from the European Training Foundation. The aim of the study is to provide an overview of policy and practice concerning the development and implementation of key competences in general education and vocational education and training.

During the last decade, Georgia has made impressive progress in transforming its education and training sectors. The review has identified several notable achievements that has contributed to the development of the sector and can become powerful instruments for the future efforts in the development of key competences among students. Most notable of the improvements are curricula reforms, reintegration of VET with secondary general education, regular participation in International and National Assessments, developing a critical mass of educators, trainers, and leaders who are committed to transforming teaching and learning practices and processes, and consolidation of bilateral and multilateral organizations support around improving education quality and equity.

Notwithstanding the effort put in the improvement of the system, student learning outcomes remain alarmingly low. A large share of Georgian students falls behind in developing their reading, mathematics, and science competences in early years of their schooling which

creates risks for their future educational career. By the end of compulsory schooling around a half of Georgian students fail to demonstrate basic competencies in reading, mathematics, and sciences. There has been some, however, inconsistent indications of improvement in students over the last few years. The trends in the large-scale assessments indicates that the pace of improvement in learning has been either stalled or slowed down. With the current pace, it will take over two decades to ensure that the majority of students finish compulsory schooling with the competences critical for future learning and employment.

To accelerate the pace of improvement, the government should adopt the policies and strategies that will allow the system to move the next stage of its development. The policies and instruments currently used by state and non-state actors have exhausted their potential in facilitating the change. New instruments and measures should be developed. These instruments are aimed at empowering educational institutions and creating incentives for them to respond to the national objectives in education. The interventions including the development of accountability system for educational institutions, supporting schools and colleges in building accountability and collaboration culture, increasing the validity and reliability of selection mechanisms to ensure that most capable candidates are selected to run schools and colleges, creating a critical pool of pedagogic experts and instructional leadership experts to ensure that the development efforts are effective, and strengthen training, research and innovation capacity in pedagogy field.

These interventions, however, are not going to yield immediate impact. They will create foundations for sustained improvement for medium- and long-term impact. Therefore, the review also offers a series of interventions that can compensate for the lack of competences among educators. These interventions propose temporary, transitional solutions that can mitigate the negative implications of low quality of teaching in schools and colleges. Such interventions include improving the quality of teaching and learning resources, engaging students in non-formal and informal education initiatives, and developing incentives and resources to ensure that general VET courses are relevant to the learners.

INTRODUCTION

This assessment of key competences in general and vocational education is part of a project aimed at Supporting Public Administration Reform in Georgia and financed by the European Commission. The assessment was undertaken in close cooperation with the Ministry of Education, Science, Culture and Sports and with guidance from the European Training Foundation.

The aim of the study is to provide an overview of policy and practice concerning the development and implementation of key competences in general education and vocational education and training. In particular, the study assesses the implementation of the eight key competences contained in the European Reference Framework of Key Competences for Lifelong Learning. Georgia has pledged to commit to the EU recommendations on LLL which urge governments to make teaching and learning of key competences part of their lifelong learning strategies. Since then, the Government has made significant reforms in key areas related to skills development. Examining these changes against the government's commitment to developing key competences and their outcomes, will provide useful insight into potential areas for further cooperation in LLL.

Context

At the beginning of the century, when the country started to recover from the civil war and a decade long economic and social crisis, the Georgian Government embarked on a long journey of transforming its education system. Reviewing the objectives of education and reexamining teaching and learning processes, was one of the first steps the Ministry of Education made. The Minister's order of 2002 lays down revised state objectives of schooling and makes clear indication of a shift away from the Soviet education. This marked the beginning of a large-scale education reform. The reform's pace was dramatically accelerated after the Rose Revolution. In 2005, the Ministry introduced the National Curriculum for general education schools. Around the same time, schools became independent legal entities ran by School Boards and elected school principals, financed through per capita allocations. Textbook development moved to publishing companies. Teacher certification and unified and standardized national examinations were introduced. Reforms in the Vocational Education and Training (VET) sector came later. With support from the European Union, the government of Georgia started implementing the VET Strategy (2013-2020).

The reforms in the education sector, some experts claim, were "unprecedented in pace and scope" (World Bank, 2013). However, student learning outcomes have remained low. Around half of 15-year old students in Georgia finish compulsory school without basic reading, mathematics, and sciences skills and the rest are distributed across lower achievement levels (PISA, 2015). Although students' performance has significantly improved during the last few years, the pace of change suggest that it will take around 2 decades to ensure that the prevailing majority of students finish compulsory schooling with basic reading skills and mathematics and science competencies.

After taking stock of the country's development challenges and prospects, the Government of Georgia developed Strategy 2020. The development of a workforce to meet the labor market requirements is among the government's three strategic objectives for 2020. Improving the quality of general and vocational education by following the principle of lifelong learning are identified as means for achieving its goals (Government of Georgia, 2016).

To support the government's efforts, the European Commission approved support for Skills Development and Matching for Labour Market Needs allocating over EURO 50 million for a three-year period. The support programme derives its objectives from the Association Agreement that the EU and Georgia signed in 2014. Specifically, objectives stem from the following sections of the document:

- Employment, Social Policy, and Equal Opportunities ((articles 348-354 and Annex XXX, Chapter 14);
- Education, Training and Youth (Chapter 16, articles 358-361 and Annex XXXII).

The support programme resonates with the Government Strategy goals on the need for better matching of skills with labour market demands and for a coherent and better-quality skills development system. The support programme identifies three priority areas: skills anticipation and mismatch, skills development, and entrepreneurship development. Two of these priority areas are clearly linked with the country's long-standing challenge in developing competences for lifelong learning.

Objectives

The objective of the review is to examine the development of key competences in general and vocational education of Georgia. This report is focused around the following key questions:

1. **How are key competencies integrated and described in the documents guiding the objectives of general education and VET?**
   This question focuses on the analysis of the objectives of the system vis-à-vis key competencies: how does the national framework reflect key competencies as well as principles underpinning competence-oriented education. The latter underpin the introduction of the notion of key competencies and imply moving away from transferring knowledge towards competence development for dealing with real-life issues, from subject-oriented curriculum towards integrated and cross-curricular conceptualization of education. This change also implies increased collaborative and student-driven teaching and learning, and a focus on the skills such as critical thinking, problem solving, team work, communication and negotiation skills, analytical skills, creativity, and intercultural skills which are embedded throughout the key competences.
2. **How has the KC development been addressed in the national strategies, policy instruments, education standard, regulations, including donor-supported interventions? In other words, what has been done at the system level to ensure that learners achieve the competencies?**
   The review maps and describe the interventions of state and non-state actors. Specifically, the review looks at the policy and its implementation, including school governance, initial teacher training and teacher continuous professional development, production of learning materials for students and support materials for teachers, and the assessment system.
3. **How do system level approaches translate to school and classroom level practices?**
   The review looks at the practice level, including: curricula (both compulsory and optional) implementation in schools, the use of relevant teaching and assessment methods by teachers and schools; and leadership practices that help teachers adopt new teaching methods. Where information is available, analysis of extracurricular activities supporting key competence development of students is implemented.
4. **How are the policy objectives and classroom practices reflected in learning outcomes?**
   In particular, how do Georgian students perform on reading, mathematics, science, and financial literacy tests?

5. **What are the main challenges in achieving the objective of key competence development of students?** In other words, what are the main obstacles for the system in achieving this objective?
6. **What are the opportunities and strengths in the education system that can support the development of key competencies of students**?

Methodology

The review was implemented using several methodological approaches. First, content analysis was used to identify, organize, and present the key competencies in the national curriculum, standards, VET programme frameworks and course frameworks. Secondary data analysis of international assessments was also conducted to generate information that was not available from international or national reports or when international reports were not available. Third, the national strategies, policy papers, programmes, legislative documents, national and international assessments, and programmes and projects implemented by non-state actors were reviewed. The study also relies on stakeholder consultations, including representatives of educational institutions and state and non-state actors. The review has greatly contributed to the feedback provided in stakeholder discussion meetings.

Assessment Framework

One of the objectives of the review is to provide a comprehensive assessment of the national policy and practice vis-à-vis key competences. The review is based on the European Reference Framework of Key Competences for Lifelong Learning adopted by the European Parliament and the Council of the European Union first in December 2006 as a result of the work by experts and government representation collaborating within the Open Method of Coordination. In 2018, a revised Recommendation was adopted[1].

This review covers all competencies described in the European Reference Framework of Key Competences for Lifelong Learning. Namely:

1. Literacy competence;
2. Multilingual competence;
3. Mathematical competence and competences in science, technology and engineering;
4. Digital competence;
5. Personal, social and learning to learn competence;
6. Citizenship competence;
7. Cultural awareness and expression competence;
8. Entrepreneurship competence.

The assessment also relies on the interpretations and elaborations made in the following reference documents:

- EU Cultural Awareness and Expression Handbook was developed in 2015 by a working group of EU member states' experts within the framework of the Open Method of Coordination. The handbook provides an analysis of the cultural awareness and expression concepts and terms in the European Reference Framework of Key Competences for Lifelong Learning. The document also provides examples of good practices for cultural awareness and expression from policies and

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018H0604(01)&from=EN

practices in their countries and recommendations for policy makers at national and European level[2].

- EntreComp: The Entrepreneurship Competence Framework was developed by the Joint Research Centre of the European Commission in 2016 to set a de facto reference for any initiative aiming to foster entrepreneurial capacity of European citizens. The framework develops the 15 competences along an 8-level progression model and proposes a comprehensive list of 442 learning outcomes[3].
- DigComp (2017): The Digital Competence Framework is a tool to improve citizens' digital competence. It was first produced by the JRC of the European Commission's Science and Knowledge Service in 2013 and elaborated in 2016 as DigComp 2.0 and in 2017 as 2.1 version. In the current 2.1. version five competency areas are broken down into 21 competences; for each of the 21 competences the framework also provides examples of use of the eight proficiency levels applied to learning and employment scenario[4].
- CDC: Reference Framework of Competences for Democratic Culture was developed by the Council of Europe in 2018. The framework is presented as a model for competences for democracy culture as 20 competences grouped under values, attitudes, skills, and knowledge and critical understanding. The framework also provides descriptors as a series of statements setting out learning targets and outcomes for each competence[5].

Key competences are multidimension models. Each of the key competences in the reference frameworks cover a wide spectrum of areas, domains, dimensions, and descriptors. For example, in the EntreComp, entrepreneurship has 15 sub-competences. Each subcomponent is elaborated by descriptors that explain what is meant, for example, by the ability of "spotting opportunities". Moreover, the concept of competence is also a complex one. All competences include knowledge and understanding, skills, and attitudes dimensions. For example, literacy is a combination of knowledge (e.g. functional grammar and the functions of language), skills (e.g. communicate both orally and in writing in a variety of situations), and attitudes (e.g. an appreciation of aesthetic qualities and an interest in interaction with others). Therefore, the review includes a detailed account of how well the spectrum of dimensions is reflected in the policy framework. In what follows, describes how the competence is conceptualized in the relevant reference framework (e.g. DigComp, CDC, EntreComp), learning objectives, outcomes, or descriptors correspond to the competences, which subjects or courses cover the competence or its dimensions, which dimensions of the competence are missing from the framework.

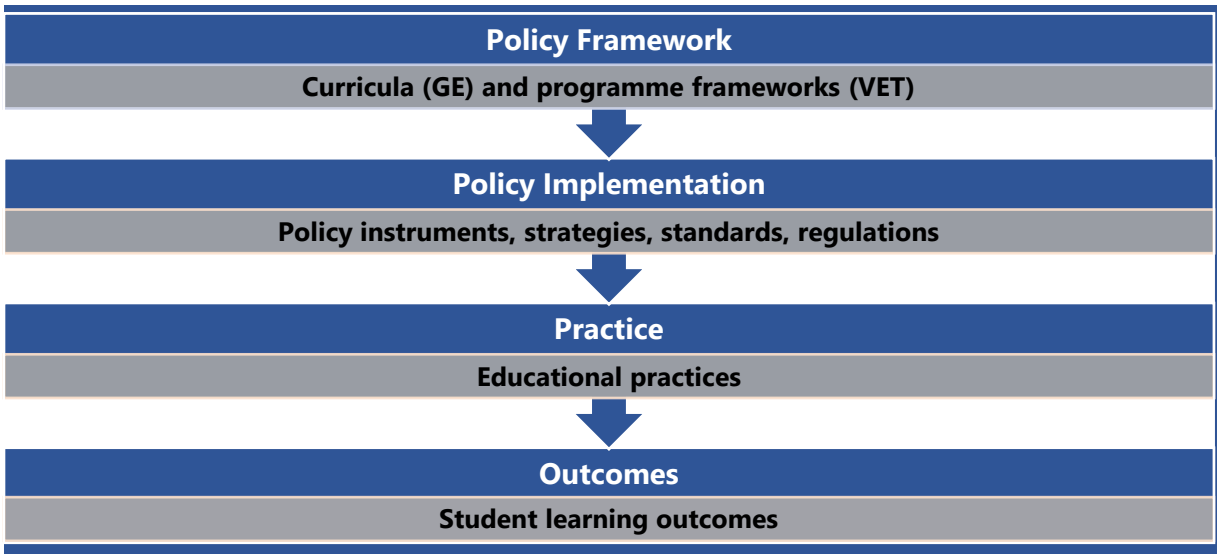
To establish correspondence between the existing national policy framework vis-à-vis Key Competences in the Reference Frameworks (e.g. DigComp, EntreComp), the review presents an in-depth content analysis of the National Curriculum Framework, Subject Standards, Programme Standard Frameworks and Standard Course Frameworks for general courses, integrated courses, and some general occupational and occupation courses. The table below provides a brief summary of ways in which key competences are integrated within general education and vocational education and training programmes[6].

[2] https://ec.europa.eu/culture/library/cultural-awareness-and-expression-handbook_en
[3] https://ec.europa.eu/jrc/entrecomp
[4] https://ec.europa.eu/jrc/en/digcomp
[5] https://www.coe.int/en/web/education/competences-for-democratic-culture
[6] The review considers a competence or its element covered when the wording of a learning outcome can be explicitly linked to a descriptor in the reference framework documents (e.g. EntreComp, CDC, DigComp). For example, a course includes "develop a business plan" as a learning outcome. In theory, developing a business plan can help students develop their own ideas, think creatively. But if a learning outcome or its descriptors do not explicitly make a statement that can be interpreted as "developing creative and purposeful ideas", then the review cannot make an inference that the course is aimed at developing this aspect of a competence.

The summary of the key competences descriptions is provided in the appendix 1.

Analytical approach

The review is aimed at understanding achievements and challenges in developing key competences among students. For this purpose, the review covers policy framework, its implementation mechanisms, practices at school and classroom level, and student learning outcomes.



Policy Framework: The review defines the national policy framework for competencies as a set of legal documents which (1) describes learning outcomes and (2) is mandatory under the law to comply with. There are two separate sets of policy framework documents for general and vocational education levels. Namely:

- For general education,[7] the review covers the *National Goals for General Education* and the *National Curriculum*. The National Goals for General Education and the National Curriculum define what students are expected to learn and achieve in general education. The National Goals for General Education were adopted by the Government of Georgia first in 2002 and then revised in 2004. While NGGE remains the frame of reference for general education goals, National Curriculum provides a detailed and comprehensive guideline for schools, textbook developers, national assessments, examinations, and teacher and school principals' standards. Therefore, the National Curriculum is the main focus for the analysis. It was first developed in 2005 and has since been revised twice. The present curriculum was developed in 2016[8] and is currently being implemented at primary and lower-secondary levels.
- For vocational education and training, learning outcomes are described in *Professional Educational Standards Frameworks and Standard Courses*. The standards are developed and approved by the National Center for Education Quality Enhancement.

[7] General education in Georgia covers grades from 1 through 12. It is divided into three levels: primary education (grades 1 through 6, ISCED 1), lower secondary education (grades 7 through 9, ISCED 2), and upper secondary education (grades 10 through 12, ISCED 3). Primary and lower secondary education are compulsory. After finishing compulsory education, students can continue their studies to upper secondary education or, after taking mandatory exams, move to vocational education. Vocational Education is offered at levels 3, 4, and 5 of the National Qualification Framework.

[8] The review is limited to the curricula for primary and lower-secondary education since the curriculum for upper secondary education is currently under development.

They define learning outcomes, number of credits, and a set of modules required for awarding a qualification at levels 3, 4, and 5. The standards are mandatory for all vocational education and training providers to follow. The analysis presented in the chapter are drawn from in-depth content analysis of Programme Standard Frameworks and Course Standard Frameworks approved in 2019.

Policy implementation: the explicit or implicit policies of state and non-state actors that affect how the national goals vis-à-vis the key competences are translated into strategies and regulations. For example, the review considers school principal standards as regulatory instruments that reflect and communicate curriculum objectives to schools and educators. But how does the government ensure that teachers meet the requirements stipulated in the standards, is indicative of teacher development policy.
The review is mainly concerned with the issues directly related to teacher competences and the capacity of educational institutions. The analysis is concentrated around teacher standards, initial teacher training, appraisal, and professional development, curriculum implementation strategies, resources for teaching and learning, student assessment, school leadership, and school evaluation. Financing of education as well as creating the physical infrastructure conductive for teaching and learning are also related to the implementation of the national policy in education. However, these issues go beyond the scope of the analysis and are therefore are not included in the analysis.

Practices: The next level for the analysis is concerned with teaching and leadership practices. Focus group interviews with teachers and principals as well as interviews with policy makers and implementing parties were used to identify main areas for the analysis. In general education, the review largely relies on the evidence from large scale assessments to get some insight in the changes in teaching (e.g. teaching methods) and leadership (e.g. informal educational opportunities for students). It should be noted however, that there is very little data and information on teaching and learning practices in VET institutions.

Learning outcomes: Ultimately, policies and practices are reflected in students' learning outcomes. Effective policies directly or indirectly affect teaching and learning practices. The latter is then . While there is no data available on student learning outcomes in most key competences, international and national assessment provide valuable data on student learning outcomes in reading comprehension (National Assessment in Georgian as a Second Language, PIRLS, PISA), mathematics and science (TIMSS, PISA, National Assessments).

CHAPTER 1: KEY COMPETENCES IN NATIONAL POLICY FRAMEWORK

This chapter discusses how the national policy in education reflects key competences in learning objectives set for general and vocational education levels. The chapter is focused on examining to what extend the key competences are integrated, interpreted, and communicated in the policy framework for general education and VET. The findings and recommendations presented in the chapter are based on in-depth analysis of the national curriculum and subject standards in general education and programme and course standard frameworks for VET.

Key competences in general education policy

In the general education policy, Georgia embraced the "competence movement" at the very onset of the education reform by accommodating the concepts such as competence, lifelong learning, and civic education in learning objectives. In the National Objectives for Schooling developed in 2002, the Government of Georgia made a clear shift away from rote learning and transmitting "ideologized and excessive information" (Ministry of Education, 2002; p. 1) towards developing independent and free individuals who have the ability to use knowledge in real-life situations and are ready to live in a democratic state and civic society. By accentuating the importance of lifelong learning, cultural awareness, citizenship education, and nurturing capabilities for engaging in social life, the government's commitments reflected the international discourse of the time around competencies (e.g. OECD's DeSeCos, 2003; UNESCO's Four Pillars of Education) and indicated a shift towards a new paradigm of education. The trend was maintained and further elaborated in the National Goals for General Education (NGGE) of 2004 and the National Curriculum developed in the following years.

Since then, the policy framework has maintained the impetus and continued to evolve. The 2005-2011 curriculum covers most of the eight key competences to some degree. For example, the social sciences curriculum covers most of the skills and attitudes described in "competencies for democratic citizenship" and citizenship competence in the European Reference Framework of Key Competences for Lifelong Learning. The arts curriculum is concentrated on cultural awareness and expression, but it also covers some personal, social, and learning to learn skills (e.g. "self-assessment and managing own learning process"). The foreign languages curriculum framework objectives include not only language skills but also cultural awareness and learning to learn competences. Science curriculum includes knowledge and skills as well as attitudes such as "appreciation of the importance of sciences", "interest towards sciences", "interest towards scientific research and innovations", and "care and respect towards the environment". Digital competences were covered in the Information and Communication Technologies curriculum. Teamwork, collaboration, problem solving and creative thinking are mentioned as transversal or generic skills in various subject curricula.

In the current curriculum, the key competences are integrated as either cross-curricula transversal skills and concepts, as subject specific learning outcomes, or both. As illustrated in the Table 2, some competences, such as mathematics and multilingual competences, are assigned to specific subjects; others are integrated as cross-curricula objectives. For example, in the curriculum, digital competence is a cross-curricula transversal skill and is defined as "browsing; sharing information; locating electronic resources and using them in the learning process" (Article 8, page 13). In subjects' standards, "information and data literacy" is included among measurable learning outcomes. For example, the lower-secondary mathematics subject standard stipulates that students should be able to "transform mathematics content into digital format, e.g. record algebraic and geometric symbols; create diagrams, graphs, tables, geometric drawings using a graphical editing tool; using tables for data processing; using dynamic and virtual simulations to solve mathematical problems" (p. 136). Primary level languages curriculum objectives state that students should "browse; create

electronic texts in various formats; process electronic texts, use e-books and audio books" (p. 85, p. 158, p. 230). Lower-secondary history subject standard stipulates that students should locate publications in search engines such as EBSCO and Elsevier; create historical event related online maps in Google Maps etc." (p. 310). In the arts curriculum, students are expected "to create paintings or drawings using computer software." In the citizenship course, students are expected "to create web pages or blogs to post their classwork." Communication and collaboration aspect of the digital competence is integrated in the lower secondary citizenship course as "leading an advocacy campaign using a social network, create petitions, and collection of signatures" (341).

Table 1: Key Competences in the general education curriculum and standards

Key Competences in the European Reference Framework	General Education Curriculum and Subject Standards
Literacy competence	Cross-curricular, Georgian language, Georgian language and literature, Georgian as a second language (Azerbaijani, Armenian, Russian).
Multilingual competence	Foreign languages (English, also Russian, German, and/or French)
Mathematical, science, technology, and engineering	Mathematics, Nature, Biology, Chemistry, Physics, Geography
Digital competence	Cross-curricular, ICT.
Personal, social, and learning to learn competence	Cross-curricular, citizenship education (Me and Society at primary level), sciences
Citizenship competence	Cross-curricular, Citizenship, History, Languages
Entrepreneurship competence	Cross-curricular, Citizenship
Cultural awareness and expression competence	Arts, Music, Georgian language and literature.

Apart from the more traditional competences (e.g. literacy, mathematics, sciences, multilingual), the curriculum covers a broad range of the competences that accentuate the importance of soft skills. In the National Curriculum "problem solving", "critical thinking", "collaboration", "communication", "research", "responsibility", "collaboration", and "learning to learn and autonomy" are integrated as cross-curricula objectives. These competences correspond to some of the descriptors in the personal, social and learning to learn competence in the European Reference Framework. They are also conceptualized as essential building blocks for Competences for Democratic Culture.

The curriculum emphasizes the application aspect of the competences. For example, the mathematics competence, apart from essential knowledge, includes the "application of basic mathematics principles and processes in everyday contexts at home and work" (p. 128). One of nine learning outcomes at the end of compulsory schooling is described as the ability to "relate mathematical models to everyday life objects and processes and use the mathematics models in solving practical problems" (p. 128). In the content framework, the application aspect is stressed, e.g. "numbers and their application in everyday life and in other sciences", "mathematical models of real processes", and "geometrical objects in the environment" (p. 129). The sciences curricula and standards put emphasis on understanding of scientific process. In the biology, physics, and chemistry standards, one of three groups of learning outcomes is concerned with "scientific process" which includes planning and implementing research and recording and analyzing data. The standards also include technological applications of scientific knowledge and procedures stipulating that "science and technology implies the understanding of application aspects of sciences" (p 348).

Attitudes and values are also an important part of the general education curriculum. For example, in the mathematics standard, "respect for truth and willingness to look for reasons and examining the validity of findings" is also conceptualized as essential to the mathematics competence. The sciences curricula accentuate the understanding of the impact of sciences and technology on society and the environment; the importance of scientific innovations; and understanding that scientific knowledge is subject to change in time."

Multilingual competence is high on the education policy priorities. In general education, National Curriculum stipulates that Georgian students have to learn at least two foreign languages. English, which is the first foreign language, is introduced in grade 1. The second foreign language starts in grade 5. Both languages are taught through grade 12. The choice of the second foreign language depends on the resources available to a school and parental choice. Schools also can choose to offer a third language as an elective at the upper-secondary level (p. 209).

Teaching of foreign languages in the curriculum is communicated in terms of European language framework language acquisition levels[9]. By the end of compulsory schooling, students should reach level B1.1 in reading and listening and level A2.3 in speaking and writing. In the second language, levels A2.2 and A2.1 respectively. By the end of grade 12, students should reach B1.4 in listening and reading, and level B1.1 in speaking and writing. For the second language, A2.3 /B1.1 and A2.3, respectively, are expected.

There curriculum sets ambitious achievement objectives in the acquisition of the state language for ethnic minority students. In general education, Georgian as a second language standard stipulates Georgian language acquisition objectives for students who study in so called ethnic minority schools[10]. They are offered Georgian language courses corresponding to A2 and B1 language competence levels. The objective of the A2 level course is to develop the language competence to "communicate orally on everyday topics (A2); read and discuss information; read and discuss basic information; use the language in communicating on occupation related topics" and the objective of the B1 level course is to "communicate orally on everyday topics (B1); read and discuss information; read and discuss basic information; use the language in communicating on occupation related topics".

In the general education, some subjects have more pronounced role in developing some of the non-traditional competences. Entrepreneurship is included in the cross-curricula learning outcomes which indicates the high importance that the curriculum assigns to competence development. Similar to EntreComp, the National Curriculum defines Entrepreneurship as a transversal competence. There are also obvious similarities with EU framework and EntreComp interpretations of the competence. For example, the national curriculum defines entrepreneurship as "readiness for challenge and risk" (Article 7). Moreover, certain skills and attitudes related to entrepreneurship, such as creative thinking (1.2. creativity in EntreComp), collaboration (3.4. working with others in EntreComp), ethics and understanding the implications of one's own actions (1.5. ethical and sustainable thinking in EntreComp) are also included in the list of cross-curricula learning outcomes.

However, some relatively new competences such as entrepreneurship, personal, social, and learning to learn competences, are not described and explained as clearly as others (e.g. literacy, citizenship). The National Curriculum definitions of Entrepreneurship lack clarity and consistency. Entrepreneurship is briefly defined on a few occasions only. Also, unlike EntreComp's interpretation, the National Curriculum interpretation does not make the

[9] See the https://rm.coe.int/cefrcompanionvolumewithnewdescriptors2018/1680787989
[10] Around 10% of Georgian students study in 200 schools or sectors within schools where the language of instruction is Azerbaijani, Armenian, or Russian.

generation of “value for someone other than oneself” explicit. In the National Curriculum, this essential aspect of entrepreneurship can be implied from the article 18 stipulation “[entrepreneurship] automatically makes each individual a contributor to the country’s economic development and also increases his or her civic responsibilities” (Article 18, page 20).

Similarly, financial literacy is described in general terms (e.g. “Demonstrating age specific financial skills (e.g. planning personal finances and using them responsibly)” (p. 336). Financial literacy measurable learning outcomes, concepts, and themes as well as critical questions are elaborated in grade level standards. The review of the descriptors shows that in the curriculum, financial literacy is more concerned with the knowledge and understanding of macro and micro economics concepts and themes and does not adequately cover skills part of the competence. Some skills for personal financing are included (e.g. plan own budget). It should be noted that Entrepreneurship related financial literacy implies “estimating the cost of turning an idea into a value creating activity; planning, putting in place and evaluating financial decisions over time; and managing financing to make value-creating activity that can last over the long term.”

New framework documents (e.g. EntreComp, CDC) can provide helpful guidance in elaborating these competences in the national curriculum and subject standards. In most education systems, including Georgia, competences such as entrepreneurship, social, personal and learning to learn are relatively new to educators and other stakeholders. Moreover, there are some misconceptions about terminology (e.g. entrepreneurship). Often times, curriculum is the only source of communication between policy makers and schools. Therefore, to avoid misconception, these competences should be further elaborated in the existing curriculum framework and subject standards.

Key competences in vocational education and training policy

The key competences are included at all three levels[11] of Vocational Education and Training. The concept of competences and transversal skills started to appear together with the introduction of so called modular programmes in 2009. The Key competences is, however, a relatively new development for the VET sector. It was first initiated in 2014 and is closely associated with the country’s commitment to the EU Association Agreement and supported by EU initiatives.

The key competences in VET programme frameworks are represented in three types of courses.

- **General courses**: The VET Programme Standard Frameworks introduced in 2014 include modules on interpersonal communication, foreign languages, numeracy, foundations of environmental protection, information literacy, citizenship, and entrepreneurship.
- **Integrated in occupational courses**: In 2016, for some programmes (e.g. tourism and hospitality) a new set of Programme Standard Frameworks were approved. The new frameworks allowed the programmes to integrate some of the key competences within field specific courses. For example, entrepreneurship competence was integrated across courses on Marketing and Sales, Finance and Materials Resources Management, and Management of Catering Services.
- **Integrated with secondary education**: In 2019, following the reintegration of secondary education in professional education, MoESCS developed integrated modules. This allows students entering VET programmes without secondary education

[11] VET programmes have three levels and award basic (ISCED 3), secondary (ISCED 4), and higher (ISCED 5) vocational education qualification.

receive secondary education diploma together with a professional qualification. These programmes are referred as *integrated programmes*. Thus, for the purpose of the integration, in 2019, the MoESCS developed integrated modules in Communication in Georgian Language, Mathematical literacy, Citizenship, Entrepreneurship, and Science and Technology.

Table 2: Key Competences in vocational education and training

Key Competences in the European Reference Framework	Vocational Education and Training Courses	
	ISCED 4 level programmes integrated with secondary education	**ISCED 3, 4, and 5 programmes**
Literacy competence	Communication in Georgian language	As a cross-curricular or in Interpersonal communication
	Georgian as a second language	
Multilingual competence	A Foreign Language	
Mathematical, science, technology, and engineering	Numeracy; Science and Technology	Numeracy; Foundations of Environmental Protection
Digital competence	Information Literacy 1	Information Literacy 1 and 2
Personal, social, and learning to learn competence	Entrepreneurship, Civic education	Interpersonal Communication
Citizenship competence	Citizenship; Foundations of Environmental Protection	Citizenship
Entrepreneurship competence	Entrepreneurship	Entrepreneurship 1,2 or 3/ integrated in occupational courses
Cultural awareness and expression competence	Communication in Georgian language	

The courses on key competences are not always included in VET programme frameworks. As summarized in the table below, the analysis of 80 VET programme frameworks approved in 2019 showed that Foreign Language, Entrepreneurship, and Information Literacy courses are included in most programme frameworks. However, Numeracy, Civic Education, and Environmental Protection courses are included in less than a half of the programmes (see Table 3). Some competences (e.g. entrepreneurship) are integrated within occupational courses and others are reformulated as occupational courses (e.g. Communication in Services instead of Interpersonal Communication). For example, nursing programme is a good example of integrating digital, communication, literacy, and multilingual competences in occupational courses. In several programme frameworks, entrepreneurship is integrated with occupational courses. However, there are still some programmes that do not include entrepreneurship and citizenship competences neither as general courses nor as integrated courses.

Some VET programme frameworks offer separate courses on entrepreneurship, while others have integrated some entrepreneurship related competences into occupational courses. Entrepreneurship course was first developed as a general course. Entrepreneurship course is offered as Entrepreneurship 1, Entrepreneurship 2, or Entrepreneurship 3 so that students take only one of the courses depending on which programme they are enrolled in. In some programmes, Entrepreneurship is not offered as a separate course. Instead,

entrepreneurship is integrated with occupational courses. For example, in the Restaurant Service programme, some descriptors related to entrepreneurship can be found in courses on Management of Financial and Material Resources, Event Planning and Management, Marketing and Sales, Problem Management in Restaurants, Catering Business Management. Some of the descriptors can be linked to entrepreneurship competences. For example, in the Marketing and Sales course, students have to 'define a restaurant concept based on various factors on the market', 'implement market research, plan a PR campaign, plan an advertising campaign, use consumer stimulation strategies'.

Table 3: General and integrated courses in VET programme frameworks approved in 2019

Courses	ISCED 3	ISCED 4	ISCED 5	The share of programmes that include the course
Interpersonal Communication	25	18	3	58%
Numeracy	24	13	0	46%
Foreign language	30	25	14	86%
Civic Education	23	1	0	30%
Environmental Protection	9	5	1	18%
Information Literacy 1	28	20	4	90%
Information Literacy 2	0	3	17	
Entrepreneurship 1	26	5	1	81%
Entrepreneurship 2	0	14	1	
Entrepreneurship 3	0	1	17	
Total number of programmes	(32)	(26)	(22)	(80)

VET programme and course frameworks do not adequately communicate the value creation aspect of the entrepreneurship competence. 16 of 18 learning outcomes are related to legal aspects of starting a business (e.g. select legal form for the organization; identify the licenses and permits required for the business) and planning a business (e.g. describe production/service process, identify the resources and materials for the business, identify sales strategy, identify financing sources, list revenue sources, identify state taxes, calculate net profit). These competences can be clearly linked to resource mobilization, planning and management, and financial literacy descriptors of the EntreComp. A few learning outcomes in some integrated courses can also be linked to "ideas and opportunities". According to EntreComp, the "Ideas and Opportunities" is one of the three areas of entrepreneurship competence. It is concerned with using imagination and ability to identify opportunities for creating value, developing creative and purposeful ideas, making the most of ideas and opportunities (EntreComp 2016, pp. 23-26). Although both general and integrated courses have "a business plan development" as a learning outcome, the indicators of achievement as well as suggested teaching and learning methods do not adequately stress that developing a business plan should help students experiment with their ideas and demonstrate creativity, ability to recognize opportunities around them, appreciate the value of creative ideas etc. (see Exhibit 1).

VET frameworks could benefit from re-examining the entrepreneurship competence development objectives and formats from the perspective of the role of the VET in the SME development. One of the challenges for the VET sector is to prepare students for the whole spectrum of working life which includes not only paid employment but also self-employment. A combination of entrepreneurship skills and occupation specific skills could act as a major tool in contributing to the creation of business start-ups, making young people more employable thus mitigating unemployment and opening opportunities for self-employment and SME development. Indeed, developing small and medium size enterprises is a critical element of the country's economic development strategy (Government of Georgia, 2014). Therefore, VET programme framework developers should consider reflecting the competences in the frameworks so that VET students learn not only how to run as business but also have opportunities to boost their ability to come up with value creating ideas and find the courage to put them in action.

Exhibit 1: Ideas and Opportunities according to the EntreComp conceptual model.

Competences	Hints	Descriptors
Spotting opportunities	Use your imagination and abilities to identify opportunities for creating value	- Identify and seize opportunities to create value by exploring the social, cultural and economic landscape - Identify needs and challenges that need to be met - Establish new connections and bring together scattered elements of the landscape to create opportunities to create value
Creativity	Develop creative and purposeful ideas	- Develop several ideas and opportunities to create value, including better solutions to existing and new challenges - Explore and experiment with innovative approaches - Combine knowledge and resources to achieve valuable effects
Vision	Work towards your vision of the future	- Imagine the future - Develop a vision to turn ideas into action - Visualise future scenarios to help guide effort and action
Valuing ideas	Make the most of ideas and opportunities	- Judge what value is in social, cultural and economic terms - Recognise the potential an idea has for creating value and identify suitable ways of making the most out of it
Ethical and sustainable thinking	Assess the consequences and impact of ideas, opportunities and actions	- Assess the consequences of ideas that bring value and the effect of entrepreneurial action on the target community, the market, society and the environment - Reflect on how sustainable long-term social, cultural and economic goals are, and the course of action chosen - Act responsibly

Source: EntreComp 2016

Some essential transversal skills are not fully integrated in the VET programme frameworks. Transversal skills are increasingly acknowledged essential for successful employment and well-being. As illustrated in this chapter, transversal skills are integral to the general education curriculum and standards. Higher education programmes in Georgia also have to demonstrate that they help students develop learning to learn, communication, and problem-solving skills. These requirements and expectations do not seem to adequately applied to VET programmes. Some fragments of the transversal and soft skills can be located in three general courses. Communication skills is included in the Interpersonal Communications course. Also, in some programme frameworks certain courses include career

planning components. For example, agricultural mechanics programme includes Introduction to Agriculture course. One of the learning objective descriptors resonates with career planning ("relate own abilities to occupational tasks… can list employment opportunities in their own professional area"). Within the course, students should learn how a CV or a resume, fill in an application form, write motivation letter are prepared (0911301, EQE, 2011). However, skills such as problem solving, creativity, critical thinking, learning to learn, and collaboration are not adequately reflected in VET programme and course learning outcomes.

The transversal skills however are building blocks and essential components of Personal, Social, and Learning to Learn competence as well as other competences such as citizenship and entrepreneurship. The framework conceptualizes the personal, social, and learning to learn competences as "the ability to reflect upon oneself, effectively manage time and information, work with others in a constructive way, remain resilient and manage one's own learning and career." According to the framework, the competence includes "the ability to cope with uncertainty and complexity, learn to learn, support one's physical and emotional wellbeing, to maintain physical and mental health, and to be able to lead a health-conscious, future-oriented life, empathize and manage conflict in an inclusive and supportive context. The competence is also included in the Reference Framework of Competences for Democratic Culture (Council of Europe, 2018). The framework views the personal, social and learning to learn competence as an integral part of competences for democratic culture and intercultural dialogue (ibid).

The European Framework for the Personal, Social, and Learning to Learn competence is currently being developed. The framework will be based on the European Reference Framework of Key Competences for Lifelong Learning. The LifEComp could provide helpful guidance in reexamining existing programme frameworks and courses.

In general VET courses, target proficiency levels should be linked with students' needs and prior training to accommodate the diversity of VET student population. Learning objectives in most general courses are set at low proficiency levels. If a programme includes the course, then the course is mandatory for all students, irrespective of their prior training. For instance, numeracy course objectives correspond to those of primary education (grade 5-6) learning outcomes. The Information Literacy descriptors include finding relevant information using search engines, saving web addresses in a browser menu using bookmarks, downloading a textual or an image file in a text editor, downloading a file on the web site and the web site as a file, using information organization elements appropriately; and saving files in relevant format and location. These skills correspond to DigComp proficiency level 2. It could be argued that many students already have the skills upon entering the programs.

In light of Georgian students' performance in international assessments, this approach might be well justified for some students. The studies show that a large share of students finish schooling without basic reading, mathematics, and science competences. Therefore, using lower secondary or upper secondary learning objectives and outcomes as the reference for defining baseline competence might not be the best approach. But it should be also considered that student population in VET programmes is diverse and some programmes, especially those serving more mature and academically advanced student populations. Courses on basic mathematics concepts and procedures might be redundant and irrelevant for some students.

There are several ways to improve the relevance of the courses. For example, some colleges use student readiness inventory to assess students' competences and then use the assessment results to prescribe certain courses. The approach has proven to be successful in addressing student retention in community colleges in the US and Canada (see e.g. Beatty-Guenter, 1994; Horn et al, 2009; Marshal, 2008). VET admission examination results could be adapted to serve the purpose. The exam results could be used to assess students baseline competences which would allow for placing students in courses that are more relevant to their

needs. In the case of the numeracy course, based on student baseline performance level, students could be offered different levels of numeracy courses or given a choice to skip the course altogether.

The Ministry is also working on integrating key competences in VET programmes via extracurricular activities. This approach could be effective in addressing the competence gap in some courses such as citizenship, entrepreneurship, and ICT by offering additional opportunities for students to implement engaging projects enriching their learning experience and learning outcomes.

The concept of competence is not adequately integrated in the VET courses. Learning outcomes described in some of the framework course modules disproportionately concentrated on knowledge acquisition. For example, there were seven measurable learning outcomes (evaluation criteria) in the Foundations of Environmental Protection Course. All of the outcomes are formulated as knowledge categories (e.g. student can identify.., can define .., can list..). 13 out of 25 measurable learning outcomes in the interpersonal communication course module also belong to the knowledge domain. 13 out of 14 learning outcomes in the Citizenship course are also knowledge categories.

The development of new integrated programmes has presented an opportunity to revise existing courses. In 2019, the Ministry developed a new set of secondary integrated courses for the integrated programmes. These courses are more rigorous compared to the courses developed earlier. For example, the objectives set for the course on Communication in Georgian Language include the development of "(1) effective oral and written communication skills, (2) the ability to critically analyze various written, oral, and media texts, (3) rich vocabulary, and (4) aesthetic and artistic taste." These objectives are then elaborated into achievement criteria. In programmes offered to students with secondary education diploma or higher, courses are more focused on a narrow range of skills and knowledge.

Similarly, in the integrated course on citizenship, students should be able to "understanding of a citizen's role in a state's social and political life; identify important social issues and take action to address them; identify the ways and means in which they can participate in activities beneficial for the country of the society; understand their country's role and place in a wider political and historical context". Learning outcomes are described as "investigate historical premises of human rights development" or "compare rights and responsibilities of different classes in time". The general course on citizenship is focused on a narrow list of simple elements of the competence such as "identifying government bodies; passive and active election rights; being able to request public information in accordance with relevant procedures."

Another important difference between the courses is how the concept of competence is conceptualized. As explained above, learning outcomes in general courses are described as knowledge categories such as "can correctly define the importance of the principle of power separation", "can describe the roles of branches of government", "can correctly distinguish passive and active election rights" etc. However, the integrated course includes knowledge, understanding, skills, and attitude elements of the citizenship competence. Moreover, the new courses follow the curriculum paradigm that has been recently adopted in the general education so that learning objectives are conceptualized not only as specific set of skills (e.g. "student can compare …) but also as concepts ("minorities and vulnerable groups") and generalizations (e.g. "a democratic society is a civic society that relies of its active citizens").

Reintegrating secondary education back into VET does impose new challenges for the sector. However, the change also presents opportunities for implementing bolder and innovative approaches in conceptualizing teaching and learning objectives (including the new curriculum

paradigm) not only for the VET but also for reconceptualizing general secondary education objectives.

CHAPTER 2: POLICY AND STRATEGY IN PRACTICE

Georgia has implemented impressive and bold reforms both in general education and in VET. These reforms were supported by international, bilateral and local non-state actors. Significant progress has been made in many areas. However, there are still many challenges that need to be addressed. This chapter maps main strategies and policy instruments related to key competence development in students in general education and in VET, and examines achievements and issues in their implementation. It discusses policy areas that are directly related to the development of key competences including curriculum implementation, teacher standards, teacher pre-service training and in-service development, teaching and learning resources, assessment practices, development of teaching and learning resources, recruiting and training school leaders, and quality assurance policy and practices.

Curriculum Implementation

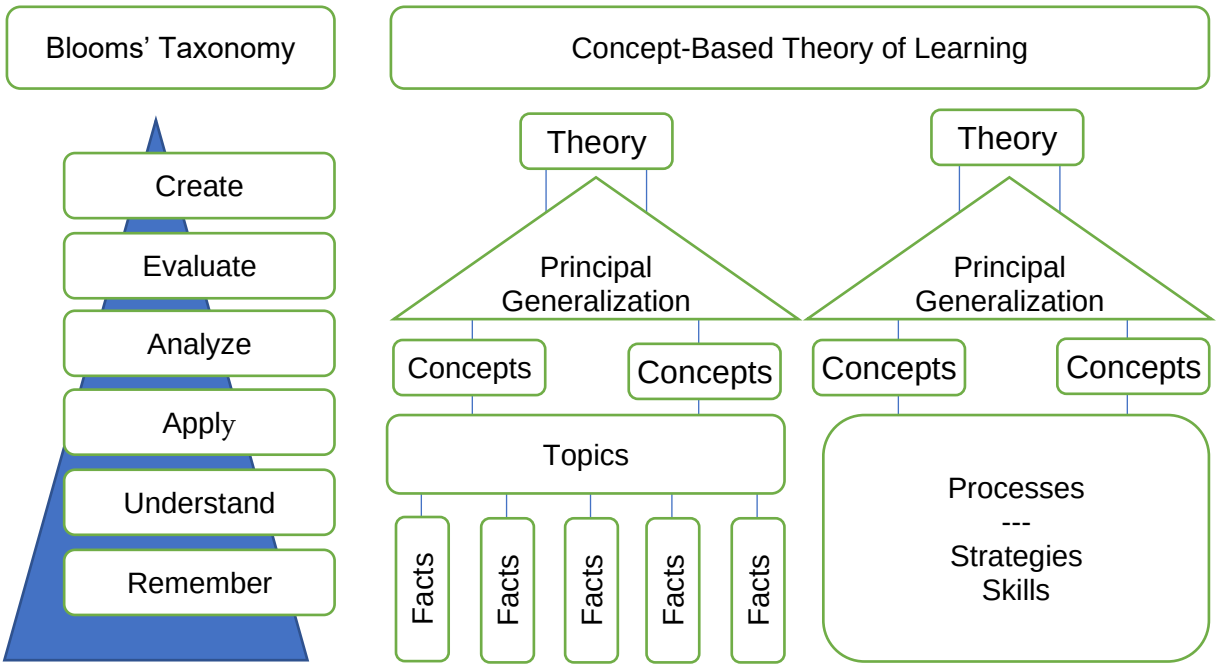
The role of the national curriculum is to ensure alignment and integrity among critical elements of education process - teaching, learning, and assessment. Curricula and standards are the main means for communicating education objectives and, in certain cases, principles of teaching and learning to educators, students, educational institutions, assessment and examination designers, and textbook developers. But curriculum is not simply a statement of learning objectives or learning outcomes. It also communicates education philosophy, beliefs about teaching and learning that serve as the foundation imbedded in curriculum. Therefore, curricula differ not only in what students should learn, but also in the approaches to teaching and learning embedded in them. The way in which the learning objectives and outcomes are formulated is indicative of how we see teaching and learning. Therefore, the effectiveness of the implementation of the national curriculum policy largely depends on how effectively learning objectives are communicated to schools.

The Ministry has introduced a new curriculum framework in general education which offers a dramatic shift in how learning outcomes are conceptualized. The third edition (2016-2024) of the National Curriculum has introduced new principles and concepts in terms of understanding teaching and learning objectives. According to its authors, it is based on concept-based instruction (CBC). Distinctive principles of the approach can be summarized in two main statements:

- We learn inductively - from single observations we gradually make generalizations and create theoretical frames. The frames or lenses of perception then can be applied to explain other events, phenomenon, or processes that we encounter in our lives. Therefore, instruction should allow students to build their own understanding from examples and attributes of a concept or generalization and use this information to construct and articulate the generalization" (Erikson et al., 2017. p. 85). In other words, the structure of knowledge can be represented as the evolution of facts to topics, then concepts, principle generalizations and theories (ibid. p.42).
- Education objectives should go beyond fact and skills acquisition and aim for developing deep understanding among students. In other words, unlike the previous curriculum approach (see Figure 1), the approach used in the new curriculum differentiates understanding from knowledge as places deep understanding at a higher level of the hierarchy in the structure of knowledge. Based on this conception of the structure of knowledge, instruction (hence, the curriculum objectives) should be targeting building students' understanding around essential concepts (e.g. power, system, hero, paradox etc.) "to organize and prioritize information [in order to] to chart

a pathway to students' thinking (ibid. p 12)". For example, instead of aiming at "comparing technological changes in time", educators should instead consider creating an understanding that "advancing technologies change the social and economic patterns of society" (ibid., 2017. p. 8).

Figure 1: Two Paradigms of the Structure of Knowledge



Source: Krathwohl and Anderson, 2009.

Source: Erickson, 2012

The new curriculum introduced the notions of concepts and generalizations, which are new to the education system in Georgia. In the older versions of the National Curriculum as well as in the VET Programme Frameworks and Course Frameworks, the goals and objectives are described based on Bloom taxonomy such as describe, analyze, explain, compare and evaluate. Strong reliance on Bloom taxonomy is particularly evident in subject learning outcomes (see Exhibit 5 in the appendix 2). Bloom's taxonomy however is considered to be contradictory to more recent epistemological and psychological conceptualizations of understanding and comprehension. The proponents of the concept of deep understanding have long argued that the taxonomy proposes a fragmented notion of knowledge disregarding the importance of understanding. More importantly, they argue that the taxonomy is based on "the fold theory of mind" and does not have strong grounds in learning theories (see e.g. Bereiter & Scardamalia, 1996; 1998; Bereiter 2002). In other words, the older and the new versions of the curricula frameworks as well as the new integrated courses in VET vs the older versions are based on two different approaches to learning.

Apart from the paradigm shift, the new curriculum also gives more freedom to teachers. There are two sets of documents of the National Curriculum. A more general framework with statutory subject level standards for primary, upper-primary, lower secondary, and upper secondary general education. Teachers and schools can choose to develop their own curricula for each grade based on statutory education level stipulations. This gives teachers and schools more freedom in planning and organizing their curricula and instruction. But if schools cannot develop their own grade level curricula, they can follow the grade level subject curricula which offers recommendations on themes, topics, concepts, key questions, evaluation indicators,

generalizations that students should be able to make in each grade and subject (see a sample theme from the 7th grade history curriculum in Exhibit 6 in the Appendix #2).

The change in the curriculum paradigm has been extended to vocational education and training. In vocational education and training programs, new integrated courses also follow the CBC approach. For example, one of the three learning objectives in the older version of the Citizenship Course is "identification of branches of government" which is then broken down as "correctly explains the importance of the principle of separation of powers; specifies the purpose of each of them according to the authority; according to the branch of government, explains the way of formation of each branch; establishes the function of the branch of government in accordance with the assignment; creates a hierarchical structure of separation of powers by means of presentation in accordance with the assignment." The course syllabus does not explain how the ability, e.g. explaining the importance of the separation of powers, relates to the learning objective or the outcome. Integrated Citizenship course in the new VET integrated programmes (apart from obvious differences in the scope and content) provide a wider conceptualization of learning objectives as, for example, the "the understanding of historical premises of democracy and its implications on real-life situations". The learning objective is then described in learning outcomes (e.g. identify the causes of the changes in governances structures and political regimes; examine the role of civil society organizations, political parties, and the media in civic society), concepts (e.g. democracy, civic society) and generalizations (e.g. "in democratic governance, society not only shapes government through elections but also participates in governance").

The implementation of the new curriculum started in 2017 within the framework of the New School programme. The program is aimed at integrating curriculum implementation with school-based teacher development by providing teachers with guidance in the curricula planning and implementation process. Four coaches are assigned to each school. A group of teachers in each school work together with their coaches to plan and implement the new curricula. So far, the New School programme has covered 175 schools. The number is expected to grow to around 400 schools by the end of December of 2019. UNICEF, in cooperation with the Estonian government, supported the government in piloting the new school model. From 2014 to 2019, the technical assistance was provided by the Estonian government and UNICEF experts in the revision and piloting of the implementation of the national curriculum in selected schools.

The adoption of the new concepts poses challenges for schools. As focus group interviews with teachers and school principals from the pilot schools suggest, some teachers feel that the new curriculum is closer to their practice and is more coherent; many teachers in pilot schools feel very enthusiastic about the change. They appreciate the freedom and the challenge that comes with it. However, they also express concerns that while the curriculum gives an impression of simplicity, it is quite demanding. As one teacher puts it: "when you look at it, you see there's less than it was in the previous version of the curriculum. The language is also easier to understand. But when you get into planning your instruction, you realize that there's much more work to do". Moreover, teachers and school principals in general and vocational educational institutions show concern that some teachers seem to misunderstand the curriculum changes while others will resist the change as they have before.

There is a lack of consensus on the curriculum reform among the main parties responsible for supporting the curriculum implementation. This can be partially explained by the lack of understanding of what the curriculum change entails. Interviews with policy makers and key staff from the Ministry's agencies show that they either find it challenging to explain how the new curriculum differs from the previous one or claim that the new curriculum is incomprehensible. Some respondents argue the curriculum reform has not being communicated well and "only two persons in the ministry claim to understand what they are

doing". The lack of wider support can create challenges for the curriculum implementation. Some respondents have expressed concerns that the policies and actions of the Ministry's agencies (such as TPDC, NAEC) are contradictory or not supportive to the core principles of the new curriculum. This is particularly challenging considering the lack of long-term planning in the system.

There are concerns that there is a lack of expertise in the support provided to schools in the curriculum implementation. Curriculum implementation requires providing schools with the support in understanding the National Curriculum and developing specific and clear plans for integrating the curriculum change in school policies and practices. Supporting the process requires curriculum implementation experts equipped with the relevant knowledge and skills as well as clear understanding of their mission and objectives. This critical aspect of the current curriculum implementation plan within the framework of the New School Programme has not been adequately addressed and strengthened.

The Ministry has invested around GEL 18 million in the New School Programme; however, very small share of the funding is allocated into teacher training and other actions directly addressing curriculum issues. The majority of the funding was allocated into purchasing computers for schools. While computers can be helpful, in the absence of clear justification or vision how access to computers helps teachers adopt of the new curriculum, the investment is unlikely to contribute to the curriculum implementation objective.

As the experience from the governments' past reform efforts shows, curriculum reform was one of the most challenging reform initiatives. The curriculum reform was initiated in 2005 as a part of the education system reform. The scope and pace of the curriculum reform was not matched with relevant implementation plan. Around 100 schools were selected for the curriculum pilot in 2005. In each pilot school, a team of teachers were trained by curriculum trainers and the national curriculum experts. The objective of the trainings covered the new curriculum framework and standards, lesson planning, and instructional strategies. Each pilot school was offered an eight-day training. Piloting was swiftly followed by expanding the curriculum implementation in all schools. The teachers from the pilot schools then were assigned to nearby schools to train teachers.

Reportedly, however, teachers were far from being enthusiastic about participating in the trainings and as the curriculum trainers claim, attendance was low both in pilot and expansion schools[12]. The change was overwhelming for teachers who tried to adopt the new curriculum. As one teacher puts it – "I couldn't understand what to do. It all .. indicators, objectives .. got mixed-up in my head." Gradually, dissatisfaction towards the curriculum grew into resistance resulting in the government's decision to reverse the curriculum reform.

Understanding previous failures could help avoid them in the future. Retrospectively, teachers, school principals and those involved in the curriculum implementation give four explanations: (1) the reform was unlikely to had succeeded considering the scope and pace of the changes. There were too many changes implemented too fast. As one of the reform leaders explains "the government knew they had little time in power so they decided to implement the changes hoping the next government wouldn't be able to reverse the change (2) the support provided for schools did not match existing limitations in pedagogical competencies and the Soviet tradition of "following the textbook line by line"[13]. Teachers were asking step-by-step instructions. "But the principle of the curriculum was that there were different ways of achieving the objectives"[14]. Therefore, when teachers asked for sample lesson plans, they were refused

[12] Focus group interviews with teachers and school principals; interviews with school principals and former NCAC staff, September-October, 2019.
[13] ibid
[14] Interview with Simon Janashia, October 12, 2019

on the grounds that it would cause imitating the sample lesson plans and hinder deeper investigation and innovation among teachers. (3) There were conceptual limitations in the curriculum, because it offered a reductionist viewpoint of knowledge, learning, and education process; (4) There was lack of coordination among stakeholders within the government agencies in the education sector. Namely, the curriculum authors believed that the examination developers failed to accommodate the principles of the curriculum and imposed a hidden curriculum.

While all these explanations could be reasonable, in the absence of research and credible evidence on the topic, the current review cannot provide a definitive answer to their validity. However, if not investigated, they should be considered and taken into account as possible threats to the implementation of the new curriculum.

The government is planning on putting more resources into the curriculum implementation efforts. The World Bank's I^2Q Project (2019-2026) is planning on supporting the New School Model implementation. One of the four components of the project is "Fostering Quality Teaching and Learning in General Education" with the total cost estimated at around USD 90 million. It is not clear what portion of the funding will be allocated to the curriculum implementation. But considering that the component also covers the construction of "5 to 8 model buildings and the full rehabilitation of up to 60 public schools", we should expect that the most of the funding will be allocated to the infrastructure projects.

Teacher Standards

Increasingly, education systems worldwide use teacher standards to support the improvement of teacher performance, certify teachers who are new to the teaching profession or who have attained a certain status as teachers, to assess teacher performance, and evaluate and accredit teacher training institutions (CEPPE, 2013). Therefore, the review looks at how key competences are integrated teacher standards.

General education teacher standards reflect the main principles of the education reform as well as most aspects of the key competences. The teacher appraisal reform started with the introduction of new teacher standards in 2010 to serve as reference framework for teacher training, professional development and appraisal. Current teacher professional standards (approved in 2014) reflect the principles of student-centered and active teaching methods. The standards cover general professional and subject competences. They also describe teacher's responsibilities in developing knowledge, skills, and attitudes that correspond to some aspects of key competences. For example, primary level teachers are responsible for the development of personal (e.g. "develop self-expression", "develop personal safety and healthy habits, the ability to objectively evaluate on own and others behaviour"), social (e.g. "develop collaboration skills"), and citizenship competences (e.g. caring for the environment) (pp. 17-18, Minister's order #39/n, 2014).

Some competences are described in length, while others lack coherence or clarity. This is particularly the case for entrepreneurship and learning to learn competences. Teachers' ability to provoke or develop creativity is mentioned in some standards (e.g. arts, languages). Social Sciences teachers standard also includes the knowledge of "Budget", "Money and its functions", "main economic systems", and "labour market" (pp 87-89, ibid). The review could not find direct or indirect references to other aspects of the competence. Learning to learn competence is included in the languages standards as "using the summative and formative assessments that help students improve their outcomes independently: engaging students in the development of assessment criteria, self-assessment and peer-assessment; support students to independently identify and solve learning related challenges, evaluate own

strengths and weaknesses, find ways to solve problems etc." (ibid. p. 50). However, the descriptors do not fully reflect the responsibility that the new curriculum assigns to languages teachers in the development of the competence. TPDC is currently revising the teacher standards. Consulting with the European reference frameworks (e.g. EntreComp, CDC) could provide useful options for integrating the key competences in a more systematic and comprehensive manner.

In VET, teacher standards have not yet been enacted, which could explain the diversity in general courses teachers' qualifications. The MESCS has a draft decree that outlines five ranks for VET teachers: novice teacher, practitioner teacher, coordinator teacher, invited teacher, and VET instructor. However, the profession has not been regulated. This could explain the diversity in the background of the teachers who teach courses on key competences. There are around 750 teachers who teach general courses in Georgian as a second language (16), foreign language (118), civic education (61), numeracy (61), Entrepreneurship (281), ICT (118) and Communication (94). The prevailing majority of the teachers have at least an undergraduate degree. Foreign language and Georgian as a second language teachers normally have degrees in the languages or the language pedagogy. But teachers in communication, entrepreneurship, and civic education come from a wide range of disciplines. For example, because entrepreneurship is considered a business subject in the VET Programme Framework Courses, the majority of entrepreneurship course teachers come with qualifications in economics and business and administration. However, there are also entrepreneurship teachers with degrees in engineering and technology (22), education (10), law (9). 40 percent of teachers in Civic Education have law degrees. The rest have degrees in social sciences (e.g. journalism) and education (Table 4).

Table 4: Entrepreneurship and Civic Education teacher qualifications in public VET programmes[15]

Entrepreneurship course teachers' qualifications	Entrepreneurship	Civic Education
Social Sciences (economics, political science, journalism)	143	6
Humanities (history, languages)	0	2
Sciences	0	1
Business and Administration	82	3
Engineering and technology	22	2
Education and pedagogy	10	9
Law	9	25
Services	1	0
Missing	*14*	*13*
Total	281	61

Source: MoESCS VET teacher database, 2019

The World Bank, within the framework of its Strengthening Teacher Quality in VET Project is now developing teacher standards. One of the objectives of the World Bank project is to support the government's efforts in the development of VET teacher standards. The standard should account for the educational needs of VET target groups. This includes

[15] There are multiple cases when teachers have more than one qualification. In this case, most relevant was included in the calculation. For example, if a teacher has two degrees, one in journalism and another in electrical engineering, journalism was selected to include in the Civic Education teacher qualifications.

not only adult education methodology, but also prior educational experience and learning needs of the early school leavers. As experience from KC module implementation has revealed, typical school teachers are not desirable candidates for the module teachers. Judging from their experience, VET college principals claim that school teachers do not show sufficient flexibility to accept new objectives and approaches to teaching. Moreover, students' attitudes towards school teachers are not positive. As one VET principal puts it "these children ran away from the school and the teachers. They expect things to be different here".

Initial Teacher Education

Teacher quality is largely defined by the effectiveness of teacher education programmes. The initial education of teachers should prepare teachers to facilitate the student's acquisition of key competences. Teachers should become competent in developing the competences among students. The programmes should also develop future teachers into lifelong learners, 21st century citizens and knowledge workers. Therefore, teacher education programmes should accommodate the key competences in their objectives. Achieving the objectives will be determined by many factors including but not limited the design of teaching and learning programmes, competences and engagement of the academic staff and students.

A decade ago, prior to the education reform, primary and secondary teacher education was in a dire state. An international study (TEDS-M) conducted in 2008 revealed alarming results pointing towards suboptimal quality of teacher education programmes. TEDS-M examined teacher preparation programs in 16 countries looking at how primary level and middle school level teachers of mathematics were trained. Future teachers near the end of their programs were assessed both in their knowledge of mathematics as well as in their knowledge of how to teach mathematics. Future Georgian mathematics teachers, both primary and secondary, performed significantly below most participating countries on all assessment areas (NAEC, 2010).

Since then there have been significant structural changes in the general education system with positive implications for teacher education programmes. Teacher standards as well as the national curricula and standards provide useful guidance for programme development. Some universities invest in reflecting the new competences in their programmes. For example, at Ilia State University, secondary education consecutive teacher preparation programme[16] learning outcomes (presented as knowledge and understanding, skills, and values) for future secondary teachers of Georgian language and literature, Georgian as a second language, foreign languages (English, German, and Russian), mathematics, sciences, geography, history, and civic education, include the "awareness of the role of the [subject] in developing transversal skills in the curriculum". Similar to the national curriculum and subject standards, some subject teacher preparation programmes, have specific learning outcomes that are different from other subjects. For example, foreign languages teachers learning outcomes accentuates "the ability to select the teaching materials for students' personal, cultural, and intercultural development"; Georgian language and literature programme includes "the ability to facilitate the development of aesthetic appreciation of literature, understanding of universal and national values, and cultural competences". Learning outcomes also includes learning to learn and communication competences.

[16] Retrieved on 10/12/2020 from https://iliauni.edu.ge/ge/ajax/downloadFile/55424/%E1%83%9B%E1%83%9B%E1%83%A1%E1%83%9E_%E1%83%9E%E1%83%A0%E1%83%9D%E1%83%92%E1%83%A0%E1%83%90%E1%83%9B%E1%83%98%E1%83%A1_%E1%83%90%E1%83%A6%E1%83%AC%E1%83%94%E1%83%A0%E1%83%90.pdf

The programme objectives also resonate with the teacher competences described in the Common European Principles for Teacher Competences and Qualification. The latter describes teachers' competences as (1) working with others, (2) working with knowledge, technology, and information, and (3) work in and with society. As Exhibit 7 in the appendix 2 shows, there are many similarities between the three competence descriptors and learning outcomes in Ilia State teacher education programmes. For example, the "ability to create positive learning environment respecting students' individual and cultural diversity and ensure that all students are integrated" resonates with "work[ing] in a profession which should be based on the values of social inclusion and nurturing the potential of every learner" (from working with others); "ability to use evaluation methods to examine the effectiveness of own practice in order to plan own professional development and improve teaching and learning" and the "ability to use information technologies to improve the effectiveness of teaching and learning" correspond with the competence of Working with knowledge, technology, and information. The objectives are also reflected in the courses such as principles of inclusive education, value-based education, media and information literacy in schools, pedagogic approaches in intercultural education. In concurrent, 5-year-long primary teacher programme also includes research courses, including action research.

Recent higher education quality assurance reform has created useful instruments for ensuring that teacher education programmes become more attuned with education reform priorities. Compliance with the standards and curricula is evaluated through the programme accreditation. The quality assurance reform initiated in 2015 is a promising development. Compared to the previous (2011) version, the new framework provides significant improvement in at terms of the validity of evaluation criteria and the rigour of the evaluation process. The goal of the reform is to "improve the quality of higher educational institutions and ensure a student-oriented learning environment in higher educational institutions" as well as to "create preconditions for increasing trust towards the Georgian education system, internalization, and integration in European Area of Higher Education" (EQE, 2018). The new quality assurance framework follows the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG). The new evaluation criteria cover (1) educational Programme objectives and learning outcomes (2) teaching methodology and organization, adequate evaluation of Programme mastering (3) student achievement and supporting students (4) providing teaching resources and (5) teaching quality enhancement opportunity.

There are very few programmes that prepare teachers to teach civic education and ICT. Teacher training programs are offered in 17 public and two private universities offer teacher education programs (MoESCS, 2019). Only 3 universities offer civic education and only 2 offer ICT teacher preparation programmes. Entrepreneurship and learning to learn competence development are not considered in teacher preparation programmes[17]. Entrepreneurship competence is not accommodated in any of the programmes. Ilia State University is now working together with Education Administrations' Association and University of Tartu on integrating entrepreneurship competence in Ilia State University teacher education programmes.

Student readiness in teacher education programmes creates negative implications for the quality of teaching and learning. Each year, about 70 percent of secondary school graduates apply to universities. Because in most university programs entry score in set just above what an applicant would have scored by guessing multiple choice exam item responses randomly, an increasing number of these students find sits in undergraduate academic programmes. As figure 2 below illustrates, in 2017, around 45 percent of the 18-22-year-old youth were enrolled in university programmes. The prevailing majority of the students were

[17] Four university programs were reviewed (two located in Tbilisi and 2 in the regions)

enrolled in research universities (World Bank 2017). A large share of these students, however, are not academically prepared for university programmes. As the figure 1 below illustrates, only around 35 percent of Georgian 15-year-old students perform at or above the baseline level in reading "at which students begin to demonstrate the reading skills that will enable them to participate effectively and productively in life" (OECD, 2016: 164). The rest are either excluded from the education system (22%) or perform below the baseline level 2 and could be considered functionally illiterate (24% below level 1 and 20% at level 1). The figures imply that the prevailing majority of Georgian students are barely ready for university education. This could be particularly true of students in primary education programmes who traditionally are among the lowest performers in Unified National Exams (World Bank, 2015).

Figure 1: 15-year-old population by reading literacy proficiency levels,

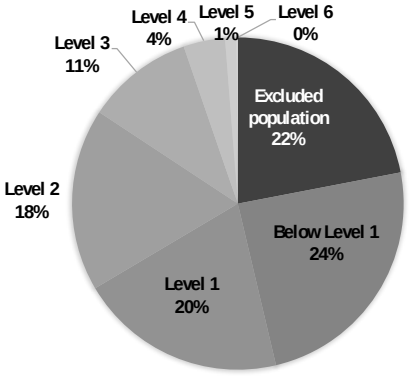
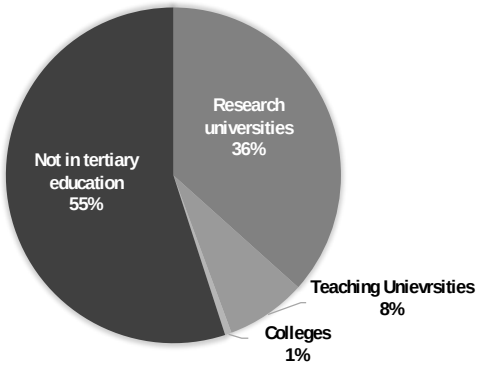


Figure 2: 18-22 age group in tertiary education, 2017



Low research productivity of the faculty creates risks for the development of the quality of teaching in teacher education programmes. Research in higher education institutions is closely associated with the quality of teaching (Middaugh, 2000) and continuous professional development (Livingston, McCall & Morgado, 2009). Therefore, advancing research capability is viewed as a key factor in enhancing the quality of student and teacher learning (Arreman, 2008; Lunenberg, Ponte, & van De Ven, 2007). As in many countries, in Georgia teacher educational institutions traditionally operated as teaching institutions and therefore, research was not a part of their activity. Two decades ago, teacher institutions were transformed into research universities or integrated into research universities. However, research output in education field remains weak. In terms of research output on education topics, Georgia lags behind many other Eastern European countries. In the period between 1998 and 2018, Georgian researchers published 212 citable documents on education topics. Croatia, the country with the around the same population size published 1447 and Estonia - 929 publications in the same period of time (see Table 28 in the appendix #2).

Developing initial teacher training for VET is among the objectives of the Professional Education Reform Strategy for 2013-2020. Actions include (1) the development of professional education teacher initial education and development system and (2) the development of high quality accredited programmes/modules. The experience from some EU countries could provide useful ideas. Most EU countries offer teacher training programmes and recognised teacher qualifications at EQF levels 5 to 8. However, there are different provisions depending on the function of the teachers. General subject teachers are usually trained in general teacher training programmes (Cedefop, 2016). Adopting this practice in Georgia would imply that teachers for general and integrated courses should be trained in university teacher education programmes. The university teacher education programmes could therefore

accommodate the modules or courses addressing VET target population needs which includes not only adult education methodology, but also the educational needs of students in integrated programmes. It should be argued that the target population for integrated VET programmes are early school leavers, the students who do not succeed in and are marginalized by the general education system. Therefore, future teachers for the programmes should be well equipped with classroom and school-wide techniques for addressing the needs of the students.

Teacher In-service Training

During the last 4 years, there has been a significant growth in teacher participation in professional development activities. The percentage of teachers who participated in "at least one professional development activity during the last year" increased from 77 percent in 2014[18] to 94 percent in 2018. The teacher professional development indicator is comparable to that of EU average (93%) and post-soviet countries such as Estonia (98%), Lithuania (99%), and Latvia (98%).

There is also a significant increase in the participation across all major professional development areas. The growth is particularly pronounced in professional development activities that covered teaching cross-curricular skills (25%), teaching students with special needs (26%), and teaching in a multicultural and multilingual setting (20%). The lowest increase is documented in knowledge and understanding of my subject field (7%) and ICT skills for teaching (9%) (OECD, 2019d).

Table 5: Change in the content of professional development undertaken by secondary level teachers from 2013 to 2018.

Topics that were included in professional development activities	Georgia 2018	Change (%) between 2013 and 2018 (TALIS 2018 - TALIS 2013)		
		Georgia	Estonia	Latvia
	%	%	%	%
Knowledge and understanding of my subject field(s)	87.6	7.2	-2.6	4.3
Pedagogical competencies in teaching my subject field(s)	87.0	12.1	2.5	7.2
Knowledge of the curriculum	90.9	11.9	-11.9	21.4
Student assessment practices	89.8	16.5	1.0	17.5
ICT skills for teaching	66.6	9.0	10.9	5.3
Student behaviour and classroom management	84.0	16.3	9.3	20.3
School management and administration	32.5	13.0	1.7	7.4
Approaches to individualised learning	77.6	16.0	5.8	15.6
Teaching students with special needs	51.4	25.7	20.3	19.0
Teaching in a multicultural or multilingual setting	35.3	19.8	3.0	7.0
Teaching cross-curricular skills	74.1	25.2	14.7	20.7

Source: TALIS 2018 Results (Volume I). OECD 2019, Table I.5.27

[18] According to the previous cycle of the study which was implemented in 2014.

Compared to 2014, now teachers participate in a wider range of professional development activities. The increase is particularly pronounced in "Peer and/or self-observation and coaching as part of a formal school arrangement" (from 12% in 2014 to 69% in 2018) and in "participation in a network of teachers formed specifically the professional development of teachers (from 29% to 51%) (see Table 6). On average, Georgian teachers participated in 4 activities during the year, which is slightly lower compared to Estonia (5) and Lithuania (6), but higher than EU average (3.5) (OECD 2018).

Table 6: Types of professional development undertaken by secondary level teachers

	The percentage of teachers				
	Georgia 2014	Georgia 2018	Estonia 2018	Lithuania 2018	EU total-23 2018
Courses/seminars attended in person	50	78.1	89.6	97.0	71.3
Online courses/seminars	n/a	21.6	39.3	46.9	34.3
Education conferences where teachers and/or researchers present their research or discuss educational issues	21	22.7	53.2	60.9	43.1
Formal qualification programme	12	13.8	11.3	19.1	13.9
Observation visits to other schools	18	28.2	40.1	63.2	19.8
Observation visits to business premises, public organisations or non-governmental organisations	6	10.4	22.1	36.1	12.8
Peer and/or self-observation and coaching as part of a formal school arrangement	12	68.9	51.8	69.1	38.1
Participation in a network of teachers formed specifically for the professional development of teachers	29	51.0	58.5	55.5	32.9
Reading professional literature	n/a	83.8	90.0	94.0	58.6
Other types of professional development activities	n/a	51.5	44.0	69.5	31.2

Source: OECD, 2019. Table I. 5.7

Donor agencies have been particularly active in supporting the government's teacher training efforts. Large scale interventions were implemented within the USAID's primary education program (G-PriEd) with primary focus on literacy and mathematics competences in primary education; USAID's Civic Education Programme, with particular focus on civic education and entrepreneurship education; and Millennium Challenge Account – Georgia and Millennium Challenge Corporation' General Education Support project that concentrated its efforts on training mathematics, sciences, ICT, and English language teachers. Around 6700 primary level, 14000 lower and upper secondary level STEM teachers, and 1000 civic education teachers participated in the trainings since 2010.

Although participation rates are impressive, teacher engagement in trainings is rarely high. Multiple sources, including trainers, claim that teachers' participation is usually motivated by accumulating credit hours for the Scheme. In order to increase training participants' engagement, some state and non-state training providers included mandatory assignments. Some of the teacher engagement related efforts were more successful than others. For example, GPriEd and some other USAID projects are frequently praised by teachers and

school principles for introducing rigorous engagement mechanisms: after trainings, teachers were to apply the knowledge in their classroom by demonstrating new knowledge and skills to external expert evaluators; the latter observed the lessons and offered teachers in-depth feedback[19]. Teacher engagement models used in other projects were much less rigorous: after participating in the trainings, the teachers are asked to submit assignments to their trainers. But as some trainers claim[20], teachers' submissions are often inadequate and plagiarism is a common practice.

Despite the large-scale teacher training interventions, there are no consistent improvements in the quality of teaching. The 8th grade students' perceptions of the quality of teaching in mathematics, biology, chemistry, physics, and geography responses in the 2011 cycle and 2015 cycle of TIMSS gives some insight into how the quality of teaching changed in the period of time. As Table 7 shows, students' perceptions of teaching remain largely unchanged between the cycles[21].

Table 7: Changes in the 8th students' perception of teaching mathematics and science from 2011 to 2015, TIMSS 2011 and 2015

The share of students (%) who" agree a lot" or "agree a little" to the statements below

	Mathematics		Biology		Chemistry		Physics		Earth	
	2011	2015	2011	2015	2011	2015	2011	2015	2011	2015
Teacher expects me to do well	87.0	87.8	86.8	88.4	55.7	84.9	80.6	82.6	82.4	87.4
Teacher is easy to understand	88.8	87.2	94.3	94.3	61.1	88.3	87.0	84.3	92.3	91.7
I am interested in what my teacher says	89.0	86.1	89.8	90.7	58.7	85.7	84.6	83.3	87.6	87.7
My teacher gives me interesting things to do	85.0	78.3	88.8	87.0	58.2	82.8	82.0	79.7	85.6	83.4

Source: TIMSS 2011 and TIMSS 2015 databases.

Since the introduction of the current teacher in-service training model, teacher training needs have been defined centrally, by the TPDC. In 2008, TPDC developed a teacher in-service training model. Teacher training was offered through accredited providers in 2009 and 2010. Teachers were given vouchers to choose the training providers but the vouchers covered only the trainings identified by the TPDC"[22]. In 2011, at the backdrop of increased centralization trends in the system, the teacher in-service development policy shifted towards more centralized provision of teacher in-service trainings. TPDC became central provider of teacher trainings. Since then, TPDC develops and delivers teacher training courses nationwide. Although the former model is referred to as a decentralized system, both systems determine in-service development areas and topics.

Recent evidence indicates that teachers and schools should have more power over identifying their training needs. Identifying what areas of their teachers should concentrate

[19] USAID is expanding its primary school intervention to all public schools in Georgia starting from 2019.
[20] Focus groups with teachers and school principals conducted in December, 2019.
[21] An exception is students' perception of chemistry lessons which had a significantly lower baseline indicator in 2011. For example, over 80 percent of students agreed a lot or agreed a little that their mathematics, biology, physics, and earth science teachers were easy to understand. The share of students was 61 percent in chemistry. In 2015 cycle, students' perceptions of chemistry teachers improved significantly matching the indicators on other science subjects.
[22] TPDC, the teacher professional development voucher programme, 2010.

on improving, might not be the most effective policy. Effectiveness of teaching methods is not as straightforward as it could seem. For example, enquiry-based teaching has been an important part of the National Curriculum. The approach has been actively promoted through teacher trainings efforts. There have been some efforts to equip schools with laboratories to support experimentation in teaching and learning sciences. However, using some enquiry-based approaches is not as effective as it was hypothesized. PISA 2015 shows that, as in most PISA participant countries (including Finland, Singapore), the application of enquiry-based approaches in teaching and learning is negatively correlated with students' science performance. For example, in Georgia, one-point increase on the index of enquiry-based instruction is associated with 11 points lower science performance score. Enquiry-based instruction does not have effect on students' epistemic beliefs. Giving students opportunities to explain their ideas, explaining how a science idea can be applied to a number of different phenomena, and explaining the relevance of science concepts to students' lives are positively associated with students' science performance. But activities related to experiments and laboratory work show strongest negative association with science performance (Table 9).

Georgia's case in not an isolated case here. The effect of the enquiry-based instructional practices is similar to that of in Estonia and in OECD countries on average, however, the negative effects are more pronounced in other countries. As illustrated in the table below, this finding also applies to most former Soviet countries (with an exception of Moldova) and other countries in the region.

Table 8: Index of perceived and associated change in science performance and in the index of epistemic beliefs

	Mean index of enquiry-based instructions	After accounting for students' and schools' socio-economic profile (Score dif.)*	After accounting for students' and schools' socio-economic profile Unit dif.*
Estonia	-0.07	-18	-0.03
Latvia	0.13	-10	-0.03
Turkey	0.32	-7	-0.01
OECD average	0.00	-7	0.04
Georgia	0.52	-11	0.00
Jordan	0.62	-9	0.01
Kosovo	0.35	-12	-0.01
Lithuania	0.17	-7	0.02
Moldova	0.51	3	0.07
Russia	0.50	-12	0.00

Source: OECD, 2016. PISA 2015 Results (Volume II): Policies and Practices for Successful Schools

The results do not necessarily imply that using enquiry-based approaches in general or engaging students in experiments is detrimental for learning sciences. But it could indicate that "some of the arguments against using hands-on activities in science class should not be completely disregarded. These include the argument that these activities do not promote deep knowledge, that they are an inefficient use of time, or that they only work when there is good laboratory material and teacher preparation (OECD, 2016).

Table 9: Change in science score when students reported that the following activities happen in "most" or "all" science lessons after accounting for student and school socio-economic profile

Enquiry-based instruction statements	Change in science score when students reported that the enquiry-based activities happen in "most" or "all" science lessons		
	Georgia	**Estonia**	**OECD**
Students are given opportunities to explain their ideas	18	3	3
Students are required to argue about science questions	4	-47	-17
The teacher explains how a <school science> idea can be applied to a number of different phenomena	16	9	14
The teacher clearly explains the relevance of <broad science> concepts to our lives	10	10	3
There is a class debate about investigations	-6	-27	-25
Students are asked to do an investigation to test ideas	-20	-57	-28
Laboratory related enquiry			
Students spend time in the laboratory doing practical experiments	-43	-65	-27
Students are asked to draw conclusions from an experiment they have conducted	-9	-20	-5
Students are allowed to design their own experiments	-27	-66	-45

Source: OECD, 2016. PISA 2015 Results (Volume II): Policies and Practices for Successful Schools

Using teacher-directed approaches, however, is associated with better science performance in some countries. Although these approaches (see Table 29 in the appendix) do imply more passive role of students, can be essential in providing a well-structured, clear and informative lesson on a topic. The use of teacher-directed approaches among Georgian teachers can be explained by teacher's beliefs. It can also be justified by, as teachers explained, a large amount of content information to be covered not leaving sufficient time for approaches oriented towards more student engagement. As illustrated in the table below, accounting for student and school social-economic profile, one unit increase on the index of teacher directed teaching is associated with 14-point increase in science performance and 0.22-unit higher score on epistemic beliefs index.

Table 10: Index of teacher-directed science instruction and associated change in science performance and in the index of epistemic beliefs.

Selected Countries	Index of teacher-directed science instruction	Change in science score per unit increase on the index of teacher-directed science instruction (Score difference)	Change in the index of epistemic beliefs per unit increase on the index of teacher-directed science instruction (Unit difference)
(1)	(2)	(3)	(4)
Estonia	-0.05	4	0.13
Latvia	-0.03	7	0.11

Turkey	-0.04	6	0.16
Albania	-0.02	m	0.19
Georgia	-0.03	14	0.22
Jordan	0.37	14	0.25
Kosovo	-0.28	12	0.10
Lithuania	0.01	4	0.10
Moldova	0.07	21	0.19
Russia	0.31	9	0.15

Source: OECD, 2016. PISA 2015 Results (Volume II): Policies and Practices for Successful Schools

In general education, future in-service development policy and efforts should be built on sound evidence. Teacher in-service development can be effective in addressing the quality of teaching in schools. But not all efforts are successful. In order to ensure that teacher training efforts are effective, first, more rigorous monitoring and evaluation instruments should be put in place. Existing data from most large-scale teacher training interventions in Georgia is limited to the number of participants. Secondly, good practices and evidence from research should be considered. There is growing literature on in-service teacher training, which provide sound directions for building successful teacher training models.

In VET, there are a few, small scale efforts in training teachers in some of the key competences and teaching methods. In 2019, TPDC developed training modules for VET teachers. As illustrated in the table below, the majority of the courses were concerned with teaching (e.g. student individual learning needs in professional education, instructional planning and effective teaching strategies, positive learning environment in professional education, on-the-job training), assessment (competence-based assessment in modular professional programmes), teacher professional development, as well as entrepreneurship (Developing VET teachers' entrepreneurship competences). The length of the trainings ranges from 6 to 30 hours.

In some VET training courses, objectives are not fully alighted with their content. For example, within a 28-hour long training (14 contact+14 independent working hours) on "teacher professional development in VET institutions", teachers should learn 1. how to identify their professional development needs, plan own professional development, and provide feedback for others ("based on self-assessment and student assessment; develop student feedback instruments and analyze their importance for own professional development; develop recommendations on giving and receiving feedback for ensuring the effectiveness of critical friends' institute; based on professional development needs, will be able to develop individual plan for professional development; will learn about principles of portfolio development") and 2. how to conduct research ("define research question, formulate objective, select methods relevant to objectives and become familiar with action research methods; learn about quantitative and qualitative data analysis methods and be able to select interventions based on research results etc."). Action research can be a highly effective teacher professional development instrument. However, it is unlikely that teachers acquire an understanding of the method in a short-term course to a degree that they become marginally competent in using research in their practice.

The objectives of the existing Entrepreneurship course for VET teachers does not reflect the complexity of the competence. There is a growing understanding that "Teachers cannot teach how to be entrepreneurial without themselves being entrepreneurial" (European Commission, 2014. p. 14). However, developing entrepreneurship competence among teachers is a complex task and is unlikely to be achieved in a short-term training. Recent

experience shows that entrepreneurship training initiatives integrated with entrepreneurship education vision and policy planning at institutional level could be a more effective course of action for integrating entrepreneurship in VET programmes (ibid).

VET teacher training capacity is being addressed through donor support initiatives that take a more long-term training approach. The UNDP is working together with the MoESCS to selected teachers for integrated courses for 8 pilot programs (web technologies, railway transportation, forestry, topography, IT, horticulture, hotel service) in 7 VET centers. VET college principals run the selection process using the assessment instruments provided by the MoESCS. The World Bank, in the framework of Strengthening Teacher Quality in VET Project will train about 50 mentor trainers in the delivery of new programs. Training modules and methodology developed for ToT will remain with the Ministry and TPDC to use in the training of teachers across the country. TPDC will include these mentor trainers in their expert database and will resort to their support in the future upscale of the program.

Teacher Appraisal

Teacher appraisal is a mechanism for ensuring teacher quality. It is implemented prior entering teaching profession in the form of teacher certification or licensing as well as throughout teaching career. Teacher appraisal can provide effective instruments for attracting and recruiting qualified candidates, ensuring ongoing teacher professional development, and developing schools as learning organizations (OECD, 2013). Therefore, well-designed and thoroughly implemented teacher appraisal has major implications for the development of students' key competences.

To ensure that teachers meet the standards set by the state, the government developed and implemented a bold centralized appraisal reform in the general education. In 2011, the Ministry introduced mandatory certification exams for all teachers. Teachers had to take two exams in the subject knowledge and general professional skills. According to the initial plan, the results in the certification examinations would determine whether a teacher stayed in the profession or not. Teacher subject examinations have been introduced for teachers in languages (Georgian, Georgian as a second language, English, Russian, French, German), mathematics and sciences (biology, chemistry, physics), social sciences (history, geography, civic education), arts (music, fine and applied arts), ICT, and sports[23]. By the end of 2014, which was initially set as the deadline for passing the exams, only around a third of acting teachers were certified. Each subsequent year, the share of certified teachers was increasing incrementally by around 2 percent.

Growing tension in the system forced policy makers to implement changes in the teacher appraisal policy. There were growing concerns about the examinations' validity of examinations in measuring teacher quality. Teachers argued that the certification was limited to measuring teacher knowledge and overlooked essential aspects of teacher quality. According to a NAEC survey conducted in 2014[24], almost a half of secondary level teachers and principals questioned the validity of teacher certification (NAEC, 2015). To address the growing political tension, in 2015, TPDC developed a new concept for teacher appraisal, the Teacher Professional and Career Development Scheme.

The new teacher appraisal system is a complex mechanism that accommodates a wider spectrum of teacher quality criteria via new instruments. The objective of the Teacher

[23] https://naec.ge/#/ge/post/1958
[24] The survey was administered as a part (national questions) of TALIS 2014.

Professional Development and Appraisal Scheme was to reflect all aspects of the quality of teachers and, at the same time, create incentives for teacher professional growth. According to the scheme, teacher career progression is represented in four ranks: Practitioner teacher, Senior Teacher, Lead Teacher, and Mentor. Based on the performance in teacher certification exam, classroom observation, and participation in various activities, teachers accumulate credits and assigned ranks. The rank is then translated into salary increase and contract term. There are currently 54,000 teachers in public schools. 208 of these teachers are mentors, 5% are lead teachers, 46% are senior teachers, 42% are practitioners, and around 3500 teachers do not have any of the four ranks yet.

The resources invested in the development of the school-based appraisal infrastructure has not matched the ambition of the plan. Many of the responsibilities for teacher appraisal are delegated to school based internal evaluation teams. They are responsible for evaluating teacher performance based on the evidence provided by teachers. The evidence includes a large variety of over 35 different activities (e.g. participation in trainings and conferences, the development of teaching and learning resources, teacher's blogs, leading extracurricular activities, supporting). Each of the activities is assigned a credit (e.g. 0.5 credits for a semester-long extracurricular club and 4 credits for the development of a textbook). The evaluation teams were trained to assess teachers and award credits. However, the guidance provided for the teams has not been adequate to the challenge of the task. They received training on (1) Principles of the Scheme (2) Classroom observation (3) Self-assessment questions and (4) Research. Each of the trainings were 12 hours long. A 2-day-long trainings is not an adequate amount of time for certain topics. For example, conducting an action research is one of the activities included in the requirements for Lead Teacher rank. The teachers should submit their reports to evaluation teams in their schools. Then the evaluation team has to assess the teachers work and make a decision on awarding the credit for the activity. The evaluation teams were offered a two-day training on action research. Considering that teachers are not normally trained in research methods, it is unlikely that evaluators become even marginally knowledgeable on the subject that takes at least a semester of study at graduate schools. Therefore, fair and reliable assessment of the action research projects remains to be a great challenge for schools.

Reliability issues create negative implications for fairness and face validity of the appraisal system. In order for an assessment of a competence to be reliable, there are certain conditions to be met. For example, in order for teachers to move up to lead teacher's rank, they have to successfully pass external classroom observation. The classroom observations are implemented using a standardized observation tool developed by NAEC in 2014[25]. In order for the assessment to be reliable (which is a precondition for its validity), lesson should be independently scored by two external evaluators (scorers) and cross-checked by the third evaluator in the cases when the two evaluators' results diverge. Moreover, reliability requires at least three lessons to be observed. These – three lessons x two scorers - are the minimum preconditions for high-stake standardized assessment. Instead, the current external observations are based on the scoring from one lesson only.

All results from the school-based evaluation teams are uploaded into the centralized online system. Based on information, TPDC then awards a rank. TPDC does not check all cases however. The organization has to monitor school internal evaluation team's performance by randomly cross-checking the evidence provided by teachers against the credits awarded by the schools. 43,000 teachers submitted their applications to TPDC since the introduction of the scheme in 2015. On one hand, if monitoring is implemented based on a representative sample and using rigorous assessment procedure, the amount of information as well as the diversity

[25] The observation instrument was developed based on an existing framework (Danielson's framework for teacher quality). The instrument was validated based on a sample of 200 volunteer teachers' video records (3 lessons per each volunteer teacher).

of evidence materials would create a considerable administrative burden for TPDC. Weak monitoring process, on the other hand, creates major risks with reliability in the evaluation of the evidence and face validity of the entire process.

Introduction of the additional instruments has not increased the validity of the appraisal system. The introduction of multiple measures of teacher quality were to increase the validity of teacher appraisal system. However, some criteria and instruments can be used to compensate credits for subject examinations. Prior to 2015 teachers had to get a passing score on subject examinations. But since 2014, the examination results were broken down into credits so that receiving from 31percent to 41 percent of the total score would count as 1 credit. The rest of the credits can be accumulated to other activities such as participation in trainings, participation in meetings with colleagues, implementing projects, preparing students for various competitions, leading student extracurricular activities, using ICT in teaching[26]. This way, some teachers received not only senior, but also lead teacher ranks. Thus, teachers who had not verified their subject competence were promoted to upper ranks.

TPDC is now working towards simplifying the scheme. According to the plan, teacher appraisal will consist of an examination and classroom observation. The plan also includes revising teacher exams. The appraisal will be implemented by external evaluators. School-based evaluation will be excluded from the appraisal system. The World Bank, within the framework of I^2Q Project is planning on reviewing and improving continuous professional development framework for education professionals.

In the VET, the appraisal scheme is now being development within the framework of the World Bank's Strengthening Teacher Quality in VET Project. Currently, the MESCS has a draft decree that outlines five ranks for VET teachers: novice teacher, practitioner teacher, coordinator teacher, invited teacher, and VET instructor. The objective of the World Bank project is to support the government's efforts in the development of VET teacher standards and VET teacher appraisal system. Teacher appraisal reforms in general education provide important lessons for the design of teacher appraisal policy and system in VET sector. Therefore, the parties involved in the VET development process should closely examine teacher appraisal reforms in general education and use the findings to assess risks and implications of various policy options.

Resources for Teaching and Learning

In general education, textbook development has undergone major transformations. Over the last decade, through several reform initiatives, the ministry has made significant changes in the textbook development. The system first heavily relied on publishing houses. However, the model resulted in creating a big financial burden for families. Therefore, the system was reformed into a licensing model: authors (publishing companies or individual authors) develop content; then the ministry purchases the license for dissemination and prints textbooks. Since 2011, textbooks are free for all students in public schools.

Teachers have frequently raised their concerns about textbooks. Science teacher in 2016 and mathematics teachers in 2015 National Assessment teacher surveys were asked to rate the textbooks according to the relevance to the objectives of the national curriculum, orientation towards strengthening/building on the skills developed during the previous years, opportunities for students to practice their skills, engaging and provoking students interest, providing guidance for teachers, interdisciplinary linkages etc. Around half of teachers in both disciplines

[26] http://tpdc.gov.ge/ptk_files/_ckuploaded/sch19.pdf

disagreed or strongly disagreed with textbook attributes related to interdisciplinary links, relating content and exercises to real life situations, provoking interest among students. Over half of physics and mathematics teachers disagreed or strongly disagreed that the textbooks provided sufficiency amount of exercises for students. In focus group interviews teachers also raise issues of the textbooks being detached from practice and ask for closer cooperation with teacher in textbook development process (NAEC, 2016; NAEC 2017). A study conducted by Civil Integration and Inter-Ethnic Relations revealed strong gender bias in social sciences textbooks.

The existing textbook endorsement model creates negative implications for the improvement of the quality of textbooks. Publishers or individual authors complain that they have to prepare entire book in order to submit it for evaluation. There is no guarantee it will be endorsed. On the other hand, textbook development, as developers claim, is a time-consuming process for individual authors and requires high risk investment for publishers. Publishing companies responded by saving on authors honoraria hiring less qualified authors. The problem is further exacerbated by the evaluation process with its vague evaluation criteria. Evaluators are also widely believed to be not having relevant competencies, especially lacking understanding of recent innovations in pedagogy.

The problem is exacerbated by teachers' extreme dependence on textbooks. Teachers and school principals claim that it is a common practice to follow a textbook rather than school or national curriculum. Teachers completely depend on textbooks. It is also true for other education systems that a large share of teaching is determined by textbooks (source here). But Soviet tradition could be exacerbating the problem since Soviet system expected teachers to fully follow state mandated content which was prescribed in textbooks.

Donor intervention has been substantive in terms of creating a good practice for the development of teaching and learning resources. G-PriEd (USAID) designed and produced supplementary leveled readers for each grade. In addition, G-PriEd provided several types of reading and math materials such as math manipulatives (rainbow fraction tiles, decimal blocks, mathematics games and toys, geometry student kits, math activity cards) and student newspapers for grades 3-6 students, as well as educational equipment (projector, CD/DVD players). All 122 pilot schools received educational equipment and math manipulatives in spring 2013, and in October 2013 and March 2014 all 122 pilot schools received the supplementary leveled readers (Nork, 2016).

The development of online learning resources is high on the government's agenda. The government has invested heavily in equipping students and schools with computers. In 2011, the Ministry of Education and Science, started awarding every first-grade student in public schools with free e-books, computers with very basic capacity. Since then EMIS developed several games for primary level students (mathematics, "out language is Georgian", the nature, music, integrated games for the primary grades). More recently, the ministry developed a platform (el.ge) that provides access to a large number of electronic books and other electronic learning resources. In VET, the Ministry and EQE, with the support provided by the UNDP, developed textbooks for general and integrated courses both for students and teachers. They are available online, also in the form of audio books.

Online teaching and learning resources have a significant potential for addressing the issue of teacher quality and student engagement both in general education and VET. The emergence of new technological solutions, together with growing internet access, can help bypass existing systemic challenges. 80 percent of Georgian students have access to computers and internet (evidence from research large scale assessments such as PISA 2015 and TIMSS 2015). The resources can be used to increase student engagement; they can elevate the burden of content delivery or some part of assessment; can provide teachers with

additional information on student engagement and learning; and can help teachers improve their pedagogical skills. Some online learning platforms can provide information for curriculum planning as well.

The development of online teaching and learning resources requires increased investment in adopting good practices in this new but growing field. The development of online learning and teaching resources can be a worthwhile investment. Effective online learning resources hold a potential for improving teaching and learning. Interactive interface, gamification, application of AI in assessment and adaptive learning provide greater opportunities for more engaging and student-oriented teaching and learning. There are several studies that show that using online learning resources is associated with improvement in learning outcomes (Kong 2014) and increase in motivation (Baepler et al., 2014), particularly for low-performing students, facing difficulties in "traditional', face-to-face educational contexts (Sergis et al, 2018). However, not all online resources are effective. Online learning resources can vary in quality and they can be just as ineffective as traditional teaching and learning modes and resources. Recent studies allow show that the development of online resources requires pedagogic expertise and in-depth investigation of its impact on learning (Hey et al, 2016; Muller, 2018) as their effectives in accommodating teachers needs and competences (Murphey et al., 2014).

Student Assessment

In general education, feedback has been accentuated in the National Curriculum as well as teacher training initiatives. From the very onset of the general education reform, one of the priorities in reforming teaching was strengthening formative assessment. The importance of formative assessment has accentuated in teacher training initiatives and integrated in teacher appraisal.

There are some signs that formative assessment has reached many classrooms and is making impact on student learning. According to students' reports (PISA 2015), the majority of them receive feedback explaining areas of improvement and showing ways to improve. Student responses on statements like "teacher gives me feedback on my strengths in this class", "The teacher tells me in which areas I can still improve", "The teacher advises me on how to reach my learning goals" could indicate that teachers' feedbacks are substantive. The country's average index on the Perceived Feedback scale is significantly higher than in most OECD countries. As illustrated in the table below, students in Georgia receive on average more feedback (0.64) than students in Estonia (-0.08), Latvia (0.25), Lithuania (0.20), Russia (0.43). In Georgia, unlike Russia, Lithuania, and Estonia, more feedback is associated with higher science performance and higher epistemic beliefs (Table 11).

Table 11: Index of perceived feedback and associated change in science performance and in the index of epistemic beliefs.

Selected PISA participant countries	Mean index of perceived feedback	Change in science score * (Score dif.)	Change in the index of epistemic beliefs * (Unit dif.)
Estonia	-0.08	-11	0.01
Latvia	0.25	-7	0.04
Turkey	0.35	-2	0.15
OECD average	-0.01	-9	0.05
Albania	0.69	m	0.16
Georgia	0.64	8	0.22

Jordan	0.46	2	0.20
Kosovo	0.36	10	0.19
Lithuania	0.20	-7	0.03
Moldova	0.54	6	0.14
Russia	0.43	-3	0.11

Source: OECD, 2016. PISA 2015 Results (Volume II): Policies and Practices for Successful Schools . * After accounting for students' and schools' socio-economic profile

Donor interventions have produced good cases for innovative classroom assessment. G-PriEd developed an online innovative classroom diagnostic assessment tool for teachers. Also, G-PriEd created and conducted impact assessments that not only allowed the project to see the results of its school-level interventions, but also allowed the development of an online software – E-Assess – that teachers could customize to analyze and monitor student progress and inform their instruction.

Recent reform in the Unified National Examinations are not supported by evidence. The UNE was widely credited for its effectiveness in addressing long standing issue of corruption in university admission (World Bank, 2012). However, over time, concerns about its validity grew. It was argued that examinations caused dependence on private tutoring and thus – to increasing inequalities. The relevance of the exams to National Curriculum was also often disputed. However, the claims have not been supported by specific examples.

In 2019, NAEC removed general aptitude test and instead included history or mathematics as optional tests so that students can take either mathematics or history test. General aptitude test was removed on the grounds of equity – students in rural areas cannot afford private classes in general aptitude test. However, existing evidence does not support the claim. Research from other countries shows that private tutoring does not contribute to significant improvement in general aptitude test results. One year-long private tutoring in general aptitude skills is associated with only 0.07 standard deviation increase in GAT score in Georgia (NAEC, 2017). Moreover, if equity in access to higher education were a concern, the government should have also considered financial aspect of it which is, unlike GAT, a significant concern considering the high tuition rate (relative to GPD per capita) and extremely week student financial support in the country (see World Bank, 2014; World Bank, 2017).

In the absence of alternative mechanisms, removing GAT from Unified National Examinations, has created a risk of impairing mathematics teaching and learning in schools. In an ideal scenario, the content of external examinations would not have had impact on whether students learn a subject or not. However, Georgian education system is far from that scenario. Alternatively, some balance in student learning could have also be achieved by a strong school accountability system which moves the responsibility for student achievement to schools. However, such system is not in place either. Therefore, there are concerns that this change will affect student engagement in learning mathematics and revert the system back to the scenario when most students concentrated on humanities subjects only.

In general education, the Ministry has set an ambitious objective of redesigning assessment system. The introduction of nation-wide formative assessment is new ambitious plan in student assessment. According to the plan, in order for the assessment to be harmonized with the new curriculum and its constructivist roots, assessment should also be based on the same learning philosophy. The ministry, together with NAEC is currently working on the adoption of SOLO taxonomy. The objective of the assessment will be to use it both as student assessment as well as school evaluation and policy analysis. The World Bank

Innovation, Inclusion and Quality Project 2019-2026 will be supporting NAEC in developing the assessment.

In the VET, there are several ongoing projects aimed at improving assessment practices in VET programmes. The World Bank, within the framework of the project on Strengthening Teacher Quality in VET is currently developing summative assessment guidelines and resources for 10 programmes. A similar initiative is also been undertaken by EQE. New concept for VET enrollment exams is being developed by the Policy and Management Consulting Group financed by the UNDP.

Informal Education

Extracurricular activities can have significant implications for the development of students competences, especially the competences, both cognitive and non-cognitive. Research shows extracurricular activities can develop the competences such as persistence, independence, following instructions, working well within groups, dealing with authority figures and fitting in with peers are needed for students to succeed in school – and beyond (Carneiro and Heckman, 2005; Covay and Carbonaro, 2010; Farb and Matjasko, 2012; Farkas, 2003; Howie et al., 2010). These skills are essential components of entrepreneurship.

According to the National Curriculum, schools are expected to provide extracurricular activities; until recently, there has been little to no support for promoting extracurricular activities. In 2017, the Ministry initiated a program of Free Lessons. It was a small grants program for teachers. To receive the grant (GEL 3000), teachers had to offer a plan for a cycle of free lessons which would be "concentrated on students interests, its content and teaching methodology would be different from typical lesson and does not include homework and student assessment; and would give students and teachers to implement creative ideas". The program had four areas: "sports activities, literacy, culture and arts, intellectual activities". (Ministry of Education and Science, 2017). In 2019, the program's budget dropped from GEL 4 million to GEL 400000 and is now available for remote schools only. Non-governmental organizations (e.g. World Vision, Ph International, British Council, Junior Achievement Georgia) provide non-formal educational opportunities in citizenship and entrepreneurship.

Most schools in Georgia offer extracurricular activities. According to PISA 2015 student survey, among most common activities are hiking to historical monuments or other sights (95%), sports (98%), and arts clubs (81%). Students are also offered to participate in school yearbook or newspaper related activities (69%). Over a half of students are offered to participate in school play or musical. Around a third of students can participate in band/orchestra or choir (32%), science club (39%), chess club (35%). less ICT related extracurricular activities are less common (Table 12).

Table 12: Activities offered to 15-year old students at school. PISA, 2015

Activities offered by schools last year based on school principals' reports.

Activates offered at school	Georgia
Band, orchestra or choir	31.9
School play\musical	58.3
School yearbook, newspaper	68.7
Volunteer and humanitarian activities	81.8

Science club	39.3
Science competitions	78.6
Chess club	34.8
Information and communication technology club	14.4
Art clubs or activities.	81.1
Sport team or activities	98.4
Hiking to historical monuments or other sights	95.0

Source: PISA 2015 database.

Since 2015, the indicator has dropped and remains lower compared to other post-Soviet countries and OECD average. According to school principals' reports, on average, students in Georgia are offered 1.35 extracurricular activities per academic year. This represents a significant drop compared to the same indicator in 2015 (1.65 activities). Georgian students are offered significantly less extracurricular activities that their peers in Estonia (2.04), Latvia (2.35), Lithuania (2.32), Turkey (1.98), Belarus (1.90), Kazakhstan (1.97), Moldova (1.64) and Russia (1.73).

Table 13: Average number of activities offered to 15-year old students at school, PISA 2015 and 2018

Countries	PISA 2015	PISA 2018
Georgia	1.65	1.35
OECD	1.79	1.88
Estonia	2.02	2.04
Latvia	2.35	2.35
Lithuania	2.28	2.32
Turkey	1.42	1.98
Belarus	—	1.90
Kazakhstan	—	1.97
Moldova	1.61	1.64
Russia	1.79	1.73

Source: Retrieved from https://pisadataexplorer.oecd.org/ide/idepisa/report.aspx

The Ministry should consider expanding extracurricular activities for students both in general and vocational education. Extracurricular activities have particular importance in compensating for teacher competences in more non-traditional competences (e.g. entrepreneurship, citizenship, learning to learn). To ensure their effectives, before implementing large-scale interventions, the ministry could consider examining and adopting good practices from other countries and integrating strong evaluation mechanisms in pilot initiatives. Gradually, such initiatives could lead into the development of entrepreneurship and strengthening teacher networks. Regular meetings among the teachers exchanging experiences, know-how and material can assure continuous development of their expertise (European Commission, 2014).

Institutional Leadership

There is a strong consensus among education researchers on the important role of school leaders in teacher professional development (Veenman et al, 1998, Grissom et al, 2013), resolving classroom discipline problems (MacNeil and Prater, 1999). Effective leadership is thought to be particularly critical in systems with less developed teacher workforce. With this

realization, there is an increasing focus on school principal's competences as well (OECD 2013).

In general education, the scale and scope of the reform initiatives were not matched with school principal development initiatives. The curriculum reformed coupled with major transformations in teaching approaches and school decentralization reform set ambitious goals for schools. The role of school principals in the reform was not clearly defined. For example, curriculum implementation initiatives did not include school principles. In the period between 2006 and 2011, school principals were offered only three trainings. The growing need for principal's professional development had remained largely unmet for several years. An OECD study conducted in 2014 showed that, on average, school principals had taken 6 days of training a year (NAEC, 2015).

In recent years, there is a noticeable shift towards conceptualizing school principals as instructional leaders. The standard identifies core professional leadership and management practices in five key areas: (1) School Development: creating a shared vision and strategic plan for the school in collaboration with stakeholders, enacting relevant instruments for monitoring and evaluation of strategic plans of action; effective management of school finances, attracting and mobilizing additional financial, material and human resources and distributing functions and responsibilities in a rational and fare way. (2) Leading instructional processes: monitoring and evaluating the effectiveness of learning outcomes. Introducing modern strategies and methods of teaching and creating shared vision and commitment to improve students learning achievements. (3) Supporting professional development: developing and supporting school-based teacher professional development and self-development, introducing mechanisms of self-evaluation and peer evaluation; (4) Securing Accountability: ensuring transparency and publicity (5) Communicating with parents and the community (Minister' Decree #155, 2010). Principal's qualifications are also defined in the standard as knowledge and skills required for school leadership and include knowledge of contemporary leadership theories, theoretical foundations organizational behavior, principles of strategic planning, learning theories, research methods, principles of inclusive education etc. and skills for developing student centered curricula, evaluating its implementation, analyzing global, social, political,, economic, cultural, and technological changes and linking them to the school curricula etc. (ibid).

Donor interventions have greatly contributed to the increase in the training opportunities for school principals. The MCA/MCC leadership academy was a 160 hour training program covering topics such as 21 century school characteristics, effective principal from theory to practice, financial management, human resources management, time management and legal issues, shared leadership and adult training and coaching, student empowerment through assessment and technology, school community development, 21st century classroom, leadership and group dynamics. Over 2000 principals participated in the trainings. The project also created school principal regional networks as cooperation platforms and 1800 participated in quarterly meetings of school principals to share their experience on applying the new approaches in school leadership. At the same time, G-PriEd trained school principals to be instructional leaders in the schools.

As a result, professional development rates skyrocketed. According to TALIS 2014 74 percent of school principals participated in one training a year. In TALIS 2018, the participation indicator reached 97 percent (OECD, 2018). Moreover, while regional coverage was revealed to be an issue in TALIS 2014, TALIS 2018 shows that participation rates were equally high across rural and urban schools.

Table 14: School principal's participation rates in selected PD activities by the principal's school location

	Courses seminars about leadership seminars about leadership	Participation in a network of principals
A village, hamlet or rural area (up to 3,000 people)	100%	41%
Small town (3,001 to 15,000 people)	95%	30%
Town (15,001 to 100,000 people)	89%	60%
City (100,001 to 1,000,000 people)	81%	33%
Large city (more than 1,000,000 people)	73%	38%
Total	93%	41%

Source: TALIS 2018 database

To ensure that school principals are up to the challenge demanding task of leading instruction change in schools, more rigorous selection mechanisms should be considered. School principal recruitment was first introduced in 2007. Current recruitment process has two consecutive steps - a written exam and an interview. The exams are centralized and are administered electronically. Interviews are conducted by special commissions established by the ministry. A certificate is issued in case both steps are successfully passed and remains valid for seven years. The ministry then nominates candidates to schools (maximum three candidates per vacant position) from the pool of certified persons willing to participate in elections in a given school. It has been argued, however, that existing instruments lack validity and reliability (Bregvadze, 2017).

In VET, the Ministry needs to adopt a transparent, sustainable, valid, and reliable system for the selection and appraisal of VET college directors. Effective leaders are critical for improvement of teaching and learning. Therefore, the ministry should develop a system that will ensure that the best candidates are selected to lead VET colleges. It is already a part of the National Professional Education Reform Strategy 2013-2020. But tangible steps should be made towards its implementation.

Institutional Evaluation

School evaluation refers to the evaluation of individual schools and VET institutions as organisations. It has been increasingly considered as a strong lever of change that could facilitate school improvement. Well-designed evaluation system can help schools concentrate their efforts on improving teaching and learning and developing collaborative culture, provide clear direction for educational institutions. In Georgia, developing effective school evaluation system has important implications for streamlining teacher appraisal and in-service development system. However, building a successful school evaluation system, as experience from many countries shows, is a challenging task. The challenge is concerned not only with the design issues but also essential preconditions need for its sustainable functioning.

In general education, external evaluation framework has been developed in the form of school authorization. Based on the evidence provided by schools, as well as interviews with school community members, authorization experts evaluate schools and award the

authorization for a set period of time. School authorization evaluates schools in four directions[27]:

(1) Educational programmes: compliance with the national curriculum, relevance to the age group needs, equal opportunities for students development (special education needs of students), compliance of the school assessment system with the national curriculum, mechanisms for informing parents/guardians about students' academic performance; mechanisms for using student assessment results for improvement, mechanisms for engaging parents in school life, mechanisms for improvement of school curriculum.
(2) Material resources: material resources for the implementation of the national curriculum (space, equipment, sports facilities, laboratories), library and books, facilities adapted to students with special needs, safety measures met, safety cameras etc.
(3) Human resources: human resources in compliance with the national curriculum, teachers selected in compliance with the law on general education, human resources management system with transparent mechanisms, including human resources development plan, contracts with the staff, respectful and safe environment conductive to well-being of the school community.

Public schools have not yet been subject to external evaluation since the implementation of the authorization is resorted to private schools only. The ministry has been planning to extend the authorization procedure to public schools. However, if the same evaluation criteria remain, many schools will not be able to comply with the authorization requirements. Since the ultimate result of the authorization procedure is awarding the right for operation as an educational institution, many schools would become subject to closure. Recently, the Ministry has extended the authorization implementation deadline to 2026.

In the absence of clear accountability framework and relevant mechanisms, the ministry's oversight authority over schools is exercised through its legal inspection unit with a limited set of criteria. Through its General Inspection Unit, the ministry conducts inspections on irregular basis. The inspections are usually based on complaints submitted to the ministry. The general inspection is a team of lawyers who check schools' compliance with legal regulations. The latter covers issues related to financial and operational issues and does not extend to teaching and learning. There is a growing consensus among school principals as well as education experts that the inspections tend to accentuate legal and financial aspects of school operation and has led to concentrating school's efforts on ensuring that schools follow the legal and financial regulations. Implications of the inspections have high stakes leading to long legal battles and sometimes dismissal of school principals. This aspect of accountability also lacks clarity. As school principals have claimed "the regulations are such that there is not a single school in the country that cannot be charged on something, big or small".

Existing self-evaluation practice needs significant revision in order to better accommodate its intended purpose. In order to facilitate quality improvement in schools, EQE has introduced school internal evaluation practice. Each year, since 2015, schools are required to fill-in a school self-evaluation instrument and submit to EQE. The evaluation form provided by the center requires schools to collect and submit information on school educational programs, school physical resources, and human resources. The indicators in the self-evaluation form derive from school authorization criteria. The intended objective of the self-evaluation instrument is that schools examine their resources and practices against the authorization requirements and works towards filling the gaps. However, this is not normally the outcome.

[27] National Education Quality Enhancement Center. Authorization standard. Retrieved from https://ege.ge/geo/static/495 11/01/2020

which is not normally the good practice in self-evaluations. that all schools have to participate in every 5 years. It was planned to provide schools with feedback from the National Education Quality Enhancement Center. However, schools have not yet received the feedback. As reported by school principals, submitting the evaluation form has become a bureaucratic nuisance usually performed by administrative aids without much consideration from core administrative or teaching staff.

In VET, the National Strategy for Professional Education 2013-2020 has set ambitious quality assurance objectives. The strategy includes a sound plan for "improvement of quality assurance mechanisms in accordance with European approaches which covers (1) adopting a common quality assurance practice based on good practices worldwide, (2) improvement of external (authorization and accreditation) and internal (self-evaluation) mechanisms to accommodate the principles ongoing development; (3) development of quality assurance staff both on system and institutional level; (4) development and dissemination of methodological guidelines on self-evaluation, accreditation, and evaluation. The Ministry has recently revised authorization standards and procedures that accommodate good practices of external quality assurance.

Successful implementation of the new VET accountability framework will largely depend on the development of human resources with the expertise of supporting institutions in the quality improvement process. As already envisaged by the Ministry, the quality assurance mechanisms need relevant resources both in terms of human resources and guidelines. Apart from the resources, the colleges will have to have the opportunity to address internal cultural aspects related to evaluation. As Abelmann and Elmore, in their seminal work "When Accountability Knocks, will anyone answer?" predicted, "external accountability systems will be relatively powerless in the absence of changed conceptions of individual responsibility and collective expectations within schools…A strong normative environment inside the school, based on a belief in the capacity and efficacy of teachers and principals to influence student learning, coupled with the knowledge and skill necessary to act on those beliefs are prior conditions necessary to the success of strong external accountability systems"(Abelmann and Elmore, 1999. p.43). Research shows, in order for external evaluation to have intended impact on organizations, it requires (1) team's readiness to engage in systematic reflection (Schildkamp, 2007; Vanhoof and Petegem, 2011) , (2) and work towards shared objectives (Potter et al., 2002; Vanhoof and Petegem, 2011), (3) use of shared leadership as a means of creating involvement, (4) effective communication among school team members (McBeath, 1999), (5) creating supportive relationships and collaboration, (6) integration of school self-evaluation into existing school policy (Wikeley et al., 2002, Vanhoof and Petegem, 2011), and (7) responsiveness to internal and external expectations concerning the self-evaluation process (Mortimore et al., 1988; Vanhoof and Petegem, 2011).

CHAPTER 3: STUDENT LEARNING OUTCOMES IN KEY COMPETENCES

Notwithstanding the effort put in the improvement of the system, student learning outcomes remain alarmingly low. While there is no data available on student learning outcomes in most key competences, international and national assessment provide valuable data on student learning outcomes in reading comprehension (National Assessment in Georgian as a Second Language, PIRLS, PISA), mathematics and science (TIMSS, PISA, National Assessments).

Literacy Competence

Literacy competence is assessed in three large-scale assessments:

- Progress in International Reading and Literacy Study (PIRLS)[28] was first administered in 2006 and then in 2011 and 2016. The study assesses reading comprehension of students in the 4th grade. ePIRLS, introduced in 2016 cycle, measures students' reading comprehension in a simulated internet environment to measure students' online reading comprehension. PIRLS and ePIRLS have four proficiency levels (Advanced, High, Intermediate, and Low).
- Programme of International Assessment of Students (PISA) measures students reading literacy conceptualizing it as "understanding, using, evaluating, reflecting on and engaging with texts in order to achieve one's goals, to develop one's knowledge and potential and to participate in society" (p. 28, PISA 2019a). The study's target population is 15 year-old-students enrolled in general or vocational institutions. Georgia has participated in three cycles of PISA. It was conducted in 2010 (as PISA 2009+), in 2015, and in 2018. PISA 2018 has eight proficiency levels[29]. PISA 2015 and PISA 2018 cover students in schools where the language of instruction is Azerbaijani and Russian.
- The National Assessment in Georgian as a Second Language (2017): The assessment is developed and administered by the National Assessment and Examination Centre (NAEC). The objective of the study is to assess students' Georgian language competence. The assessment framework was based on the Common European Framework of Reference for Language (CEFR) and includes listening, reading, grammar, writing, and speaking aspects of the language competence. The assessment covered all students in ethnic minority schools and sectors in grade 7 (NAEC, 2019).

A large share of Georgian students falls behind in developing their reading skills in early years of their schooling. 14 percent of students perform below the low international achievement benchmark at which students can "locate and retrieve explicitly stated information, actions, or ideas; make straightforward inferences about events and reasons for actions; Begin to interpret story events and central ideas or, in the case of information texts, begin to make straightforward inferences about explanations, actions, and descriptions". One in every five Georgian fourth graders reach the high achievement benchmark; 60 percent of students, reach the intermediate achievement benchmark and 86 percent of students reach the low achievement benchmark. Only 2 out of 100 Georgian students reach the PIRLS advanced achievement benchmark.

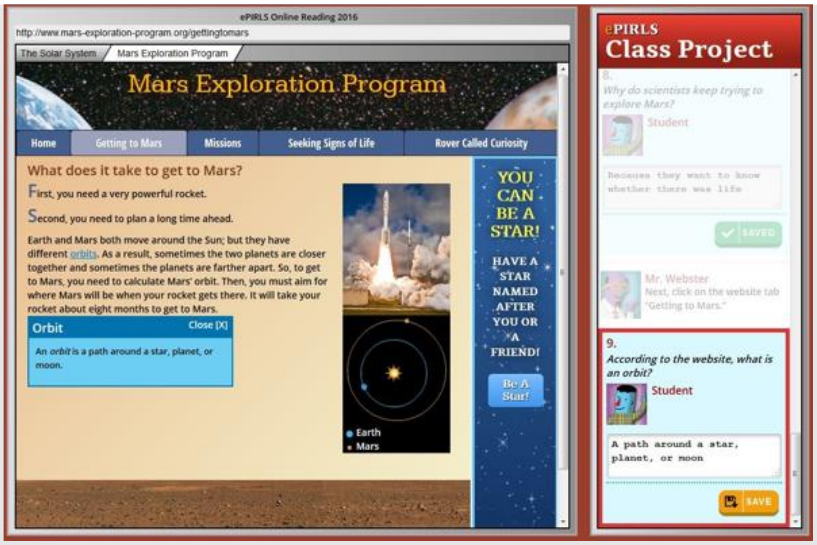
Georgian fourth graders perform significantly below their peers in post-Soviet countries. The share of students at or above the low achievement benchmark is significantly higher in other post-Soviet countries. As Table 15 shows, in Kazakhstan, Lithuania, Latvia, and Poland, less than 4 percent of students perform below the PIRLS low achievement benchmark. This is the case for a half of the PIRLS participant countries. This indicator is particularly high in ethnic minority schools (Table 16). Only 37 percent of students who study in schools where

[28] See Exhibit 1: PIRLS and ePIRLS International Achievement Benchmarks in the appendix.
[29] See Exhibit 2: PISA 2018 reading proficiency levels in the appendix.

the language of instruction is Azerbaijani, perform at below the low achievement level (NAEC, 2019).

The share of the students reaching low achievement level is lower in ePIRLS which measures online reading comprehension. 22 percent of students in Georgia reach high achievement level and 60 percent reach intermediate achievement level in PIRLS. The share among the same students is 16 percent and 54 percent respectively. Mean score on informational reading in PIRLS is 10 points higher compared to ePIRLS. This implies that Georgian students find it more challenging to read online and navigate information online. The Exhibit 2 below shows a sample item from ePIRLS 2015 assessment and students' performance on the item. The item belongs to low benchmark; only 28 percent of students received full credit on the it.

Exhibit 2: Sample ePIRLS 2015 item



Benchmark: Low

Process: Focus on and Retrieve Explicitly Stated Information

Description: Retrieve and reproduce the definition of a term from a pop-up text box

Country	% full credit
Georgia	28
Slovenia	53
Inter. Aver.	57

Source: Mullis et. al, 2016. Retrieved from: http://pirls2016.org/download-center/

Table 15: Performance at International Benchmarks, Reading (PIRLS) and Online Information Reading (ePIRLS), 2016

The share (%)of students across international achievement benchmark levels. Cumulative percentages

	PIRLS Achievement Benchmarks						ePIRLS	
	Georgia	Kazakhstan	Lithuania	Latvia	Poland	International Median	Georgia	International Median
	%	%	%	%	%	%	%	%
Advanced	2	7	12	14	20	10	1	12
High	22	42	52	57	61	47	16	50
Intermediate	60	84	86	90	89	82	54	84
Low	86	94	96	99	98	96	85	97
Below Low Achievement Level	14	6	4	1	2	4	15	3

Source: Mullis et al., 2017

In their period from 2006 to 2011, there was a statistically significant improvement in the students' performance in PIRLS, but the trend has stagnated in the following years. The share of students reaching PIRLS Intermediate Level increased from 50 percent in 2006 to 60 percent in 2011. There was a slight decrease in the share of students below low achievement level. However, there change between the 2011 and 2016 cycles is not significant (Table 16).

Table 16: Trends by international achievement benchmark levels, PIRLS 2006, 2011, and 2016

The share of students across international achievement benchmark levels. Cumulative percentages

	Language of Instruction	Advanced	High	Intermediate	Low	Below Low Achievement Benchmark
2006	Georgian	1	15	50	82	18
2011	Georgian	2	21	60	86	14
2016	Georgian	3	23	61	88	12
	Georgian and Azerbaijani[30]	2	22	60	86	14

Source: NAEC, 2019

The majority of students in Georgia finish their compulsory schooling without having attained basic literacy skills[31]**.** As illustrated in the Table 17, 65 percent of Georgian students at the age of 15 do not attain the baseline level of proficiency in reading (Level 2). The results indicate that. The result also indicates that 33 percent of students perform at level 1a and are over 2.5 years behind in reaching their basic reading proficiency, 24 percent of students perform at level 1b lagging behind by around 5 years. The remaining 7 percent of students perform at lower proficiency levels.

There was a significant improvement in students' PISA reading literacy performance in the period between 2010 and 2015, but the improvement trend has been stagnated since then. As illustrated in the Table 16, the share of students below the baseline literacy proficiency level decreased by 10 percent from 62 percent in 2010 to 52 percent in 2015. There is not improvement in the period between 2015 to 2018. On the contrary: the share of underachievers (students below the baseline level) has increased by 12.7 percent since 2015. However, due to administration related issues (see Exhibit 8) the comparisons between the 2015 and 2018 cycles should be interpreted with caution.

15-year-old students in Georgia perform significantly lower compared to their peers in post-Soviet countries. Only 36% of students in Georgia perform at or above the baseline level in reading. The share of the students is significantly higher in all comparator countries (89% in Estonia, 78% in Russia and in Latvia, 77% in Belarus and in Lithuania, and 74% in Turkey) except for Kazakhstan (36%) (Table 17). Also, results from Kazakhstan, Estonia, Russia, and Lithuania include at least 90% of the countries' target population, while Georgia covers only 83% of 15-year-old students. When compared to all PISA participants countries (69 economies in PISA 2018), Georgia ranks among the lowest 10 performers together with Azerbaijan (only Baku was covered), Kosovo, Kazakhstan, as well as Thailand, Panama, Indonesia, Morocco, Dominican Republic, and Philippines (OECD 2019b).

[30] PIRLS 2016 cycle included ethnic language schools (schools where the language of instruction is Azerbaijani) populations that were excluded in previous cycles.

[31] Since a large share of the students in PISA Georgia population entered school at the age of 5, 74 percent of students are in grade 10 of upper secondary education.

Table 17: Students' Proficiency in PISA Reading Test in Georgia and Selected Countries

	Reading Proficiency Levels										The share of 15-year-olds covered
	Below Level 1c	1c	1b	1a	2	3	4	5	6	Sum Level 2, 3, 4, 5, 6	
	%	%	%	%	%	%	%	%	%	%	%
Estonia	0.0	0.3	2.1	8.7	21.2	29.9	24.0	11.1	2.8	88.9	93
Russia	0.0	1.0	5.6	15.5	28.1	28.0	16.4	4.8	0.6	77.9	94
Latvia	0.0	0.6	5.2	16.6	27.4	28.8	16.6	4.4	0.4	77.6	89
OECD average	0.1	1.4	6.2	15.0	23.7	26.0	18.9	7.4	1.3	77.4	88
Belarus	0.0	0.8	5.8	16.8	28.7	28.0	16.0	3.7	0.3	76.6	88
Lithuania	0.0	1.0	6.3	17.0	26.1	27.7	16.9	4.5	0.4	75.6	90
Turkey	0.0	0.7	6.3	19.1	30.2	26.9	13.5	3.1	0.2	73.9	73
Kazakhstan	0.1	3.5	22.2	38.4	23.9	8.9	2.6	0.4	0.0	35.8	92
Georgia	0.4	7.0	24.2	32.8	22.9	10.1	2.4	0.2	0.0	35.6	83
Georgia in previous PISA cycles											
Georgia in 2015*	9.5		16.4	25.8	25.4	16.1	5.7	1.1	0.1	48.3	78
Georgia in 2009**	13.5		20	28.5	24.1	11.2	2.3	0.3	0	37.9	87

Source: OECD 2019. OECD, PISA 2018 Database, Tables I.B1.1 and I.A2.1. *OECD, 2016**Walker, 2011

The prevailing majority of Georgian students in ethnic minority schools cannot demonstrate basic competences in Georgian language. Around 10 percent of all students in Georgia study Georgian as a second language. These students are enrolled in schools or sectors within schools where the main language of instruction is Azerbaijani, Armenian, and Russian. 80 percent of ethnic minority students studies in the schools. 7th grade students in the 259 schools were included in the National Assessment in Georgian as a Second Language implemented by NAEC in 2016.

Table 18: Students' performance by Georgian as a Second Language Achievement Levels

	High achievement level	Intermediate achievement level	Low Achievement level	Below the low achievement level
	%	%	%	%
Reading	16	11	16	57
Writing	4	4	14	78
Listening	28	11	13	48
Speaking	21	10	9	60

Source: NAEC, 2018

The study shows that student achievement in Georgian as a second language falls behind the requirements of the national curriculum: 64 percent of seventh grade students fail to demonstrate the language competence at the low achievement level. Students performance was higher in listening: over fourth of the students listening skills correspond to high achievement level. Still, around half of students fail to achieve low achievement level. There are high performers on speaking and reading components of the test. 16 percent of students fall under high achievers in reading and 21 percent in high achievers in speaking. Over half of students do not reach minimum curriculum requirements. The most dramatic are students' writing skills. Only four percent of students perform at higher achievement level in writing, another 4 percent and 14 percent perform at intermediate and low achievement levels respectively. 78 percent of students' fail to reach low national benchmark in writing (NAEC, 2018).

There are large disparities by school location: students in urban schools perform significantly higher compared to students in rural areas. Azerbaijani ethnic minority students perform significantly lower compared to their Armenian and Russian peers (ibid).

Mathematics Competence

Mathematics competence is assessed in three large-scale assessments:

- Trends in International Mathematics and Science Study (TIMSS) was first administered in 2007 and then in 2011 and 2015. The study assesses mathematics competence of students in the 4th and 8th grades. The assessment has four proficiency levels[32] (Advanced, High, Intermediate, and Low). (p.24, Mullis et al, 2017).
- Programme of International Assessment of Students (PISA) measures students' mathematics competence conceptualizing it as "the capacity to formulate, use and interpret mathematics in a variety of contexts. These include not only familiar settings related to personal experience, such as when preparing food, shopping or watching sports, but also occupational, societal and scientific contexts, such as costing a project, interpreting national statistics or modelling natural phenomena." (p. 104, PISA 2019b). The study's target population is 15 year-old-students enrolled in general or vocational institutions. Georgia has participated in three cycles of PISA. It was conducted in 2010 (as PISA 2009+), in 2015, and in 2018. PISA 2018 has eight proficiency levels[33].
- The National Assessment in Mathematics in Grade 9: The assessment is developed and administered by the National Assessment and Examination Centre (NAEC). The assessment was conducted twice – in 2015 and in 2018. The objective of the study is to assess students' mathematics performance vis-à-vis the national curriculum objectives.

One in every five 4th graders in Georgia fail to demonstrate basic mathematics competence. There are four achievement levels in TIMSS mathematics assessment: advanced, high, intermedia, and low. According to TIMSS framework students at low achievement level "can add and subtract whole numbers, have some understanding of multiplication by one-digit numbers, and can solve simple word problems. They have some knowledge of simple fractions, geometric shapes, and measurement. Students can read and complete simple bar graphs and tables" (Mullis et al., 2016). 22 percent of Georgian students' mathematics competence is below the low benchmark (see Table 19). The results paint a dramatic picture for the students' future prospects considering that they cannot demonstrate basic mathematics skills. The exhibit below shows a sample low benchmark item. The item measures students' ability to read data from a bar graph. Only 58 percent of Georgian students

[32] See Exhibit 5: PISA 2018 mathematics proficiency levels in the appendix.
[33] See Exhibit 5: PISA 2018 mathematics proficiency levels in the appendix.

could solve the problem. The share of students is 91 percent in Russian Federation, 88 percent in Lithuania, and 79 percent in Turkey.

Georgian fourth graders' mathematics performance is significantly lower compared to the international median as well as compared to their peers in the Russian Federation, Lithuania, and Turkey. As illustrated in Table 19, only 2 percent performs at advanced level. The share of the students is 20 percent in Russian Federation, 16 percent in Kazakhstan, 10 percent in Lithuania, and 5 percent in Turkey. International median is 6 percent, which means that in a half of all participant countries the share of advanced performers is 6 percent or higher. The share of students reaching high achievement level is 15 percent in Georgia. 59 percent of students in Russian Federation, 47 percent in Kazakhstan, 44 percent in Lithuania, and 25 percent in Turkey reach the achievement benchmark. International median is 36 percent. Around a half of Georgian students reach international benchmark. The share is 89 percent in Russian Federation, 81 percent in Lithuania, and 57 percent in Turkey.

Exhibit 3: TIMSS mathematics low achievement benchmark sample item

Benchmark: Low
Content Domain: Data Display
Cognitive Domain: Knowing
Description: Reads data from a bar graph

Country	Percent full credit
Russian Federation	91
Lithuania	88
International Avg.	84
Turkey	79
Kazakhstan	79
Georgia	58

Source: Mullis et. al., 2016

Georgian fourth graders' performance in TIMSS shows a consistent and significant improvement trend. Georgia first participated in TIMSS in 2007. The country's performance then was much more dramatic. Since then the share of underperformers is steadily decreasing. The share of students below the low achievement benchmark dropped from 33 percent in 2007 to 28 percent in 2011 and 22 percent in 2015 TIMSS cycle. There is a significant improvement in the share of the students reaching intermediate achievement benchmark. The share of the students increased from 35 percent in 2007 to 47 percent in 2015.

Table 19: 4th grade students' performance at mathematics international benchmarks in Georgia and selected countries

The share (%) of students across benchmark levels; cumulative percentages.

	Georgia in Previous Cycles		Students by TIMSS Mathematics Achievement Benchmarks in 2015					
	2007	2011	Georgia	Russian Federation	Kazakhstan	Lithuania	Turkey	International Median
	%	%	%	%	%	%	%	%
Advanced	1	2	2	20	16	10	5	6
High	10	12	15	59	47	44	25	36
Intermediate	35	41	47	89	80	81	57	75
Low	67	72	78	98	96	96	81	93
Below low achievement benchmark	33	28	22	2	4	4	9	7

Source: Mullis et al., 2016

Around a fourth of Georgian eighth graders perform below the TIMSS low achievement benchmark level. These students fail to consistently demonstrate "some knowledge of whole numbers and basic graphs" (ibid). The share of the students is 9 percent in Kazakhstan, 5 percent in Russian Federation, 8 percent in Lithuania, and 30 percent in Turkey. International median is 16 percent, which means that in a half of the participant countries the share of students below the low level is 16 percent (Table 20).

Throughout the last two cycles, Georgian 8th graders performance in TIMSS mathematics assessment shows an impressive improvement trend. The share of students below low achievement level dropped by 16 percent, first by 6 percent in the period between 2007 and 2011 and by 10 percent from 2011 to 2015. The change is reflected in the increase in the share of students meeting low and intermediate achievement levels. The share of the students who reach intermediate achievement benchmark level increased by 16 percent and the share of students who reach high achievement benchmark level increased from 7 percent in 2007 to 15 percent in 2015.

The majority of students in Georgia finish their compulsory schooling without having attained basic mathematics skills. PISA identifies six proficiency levels in the mathematics literacy test. Level 2, similar to PISA reading assessment, represents the baseline level at which readers begin to demonstrate the competencies that will enable them to participate effectively and productively in life as continuing students, workers and citizens. At level 2, students can "interpret and recognise situations in contexts that require no more than direct inference; extract relevant information from a single source and make use of a single representational mode; employ basic algorithms, formulae, procedures, or conventions; are capable of direct reasoning and literal interpretations of the results" (ibid, p. 130). The majority of Georgian students (61%) perform below the baseline level. 27 percent of these students perform at level 1. These students are 2 years behind in reaching the baseline level[34]. 34 percent of students below level 1 are even further away from attaining the goal.

[34] The OECD suggest that a difference of 30 PISA points is roughly equivalent to the progress made in one year of schooling.

Table 20: Mathematics performance at the international benchmarks of 8th Grade students in Georgia, and selected countries

The share (%) of students across benchmark levels; cumulative percentages.

	Georgia in Previous Cycles		Students by Achievement Benchmarks in TIMSS 2015					
	2007	2011	Georgia	Kazakhstan	Russian Federation	Lithuania	Turkey	International Median
	%	%	%	%	%	%	%	%
Advanced	1	3	2	15	14	6	6	5
High	7	13	15	41	46	34	20	26
Intermediate	26	36	42	71	78	69	42	62
Low	56	62	72	91	95	92	70	84
Below low achievement benchmark	44	38	28	9	5	8	30	16

Source: Mullis et al., 2016

Georgian 15-year-old students perform the lowest compared to their peers in post-Soviet countries. The share of the students above the baseline achievement level is significantly higher in Estonia (90%), Latvia (83%), Russian Federation (78%), Lithuania (74%), Belarus (71%), Ukraine (64%), Kazakhstan (51%) and Moldova (50%) compared to Georgia (39%). Also, these countries cover a higher share of PISA target population.

Table 21: Summary of student performance in PISA mathematics assessment, Georgia and selected comparator countries

	Mathematics Proficiency Levels (%)								The share of 15-year-olds covered
	Below Level 1	1	2	3	4	5	6	Sum Level 2, 3, 4, 5, 6	
	%	%	%	%	%	%	%	%	%
Estonia	2.1	8.1	20.8	29.0	24.6	11.8	3.7	89.8	93
Latvia	4.4	12.9	25.8	29.4	19.0	7.1	1.4	82.7	89
Russia	6.8	14.9	25.0	27.5	17.8	6.6	1.5	78.4	94
OECD average	9.1	14.8	22.2	24.4	18.5	8.5	2.4	76.0	88
Lithuania	9.3	16.4	24.2	25.2	16.5	6.8	1.7	74.4	90
Belarus	11.4	18.0	24.7	23.4	15.2	6.1	1.2	70.6	88
Ukraine	15.6	20.3	26.2	21.5	11.5	4.0	1.0	64.1	87
Turkey	13.8	22.9	27.3	20.4	10.9	3.9	0.9	63.3	73
Kazakhstan	22.3	26.8	26.6	16.0	6.3	1.6	0.3	50.9	92
Moldova	26.1	24.2	23.5	16.5	7.3	2.0	0.4	49.7	95

Georgia	33.7	27.3	21.6	11.9	4.4	0.9	0.1	38.9	83
Georgia in previous cycles									
Georgia in 2015*	31.2	25.9	22.8	13.4	5.2	1.4	0.2	42.9	78
Georgia in 2009**	40.3	28.4	20.1	8.1	2.4	0.5	0.1	31.2	87

Source: OECD 2019b, Tables I.B1.2 and I.A2.1 *OECD, 2016**Walker, 2011

National curriculum-based assessment in mathematics shows that 2.4 percent of students reach advanced level, 8 percent of students perform at high level, 30 percent at intermediate level, 30 percent of students at low achievement level. 30 percent of students perform below the low national achievement level. Georgian students perform relatively better in content category related to numbers, but most students find geometry and probability related tasks hard to solve. Among cognitive domains, tasks assessing reasoning skills is more challenging for Georgian students than tasks assessing knowing and applying of mathematical knowledge (NAEC, 2016).

Science Competence

Science competence is assessed in three large-scale assessments:

- Trends in International Mathematics and Science Study (TIMSS) was first administered in 2007 and then in 2011 and 2015. The study assesses science competence of students in the 4th and 8th grades. The assessment has four proficiency levels[35] (Advanced, High, Intermediate, and Low). (p.24, Mullis et al, 2017).
- Programme of International Assessment of Students (PISA) measures students' science competence conceptualizing it as "ability to engage with science-related issues and with the ideas of science, as reflective citizens. Engaging in reasoned discourse about science and science-based technology requires a sound knowledge of facts and theories to explain phenomena scientifically. ... knowledge of the standard methodological procedures used in science, and knowledge of the reasons and ideas used by scientists to justify their claims, in order to evaluate (or design) scientific enquiry and to interpret evidence scientifically." (p. 112, PISA 2019b). The study's target population is 15 year-old-students enrolled in general or vocational institutions. Georgia has participated in three cycles of PISA. It was conducted in 2010 (as PISA 2009+), in 2015, and in 2018. PISA 2018 has eight proficiency levels[36].
- The National Assessment in Sciences in Grade 9: The assessment is developed and administered by the National Assessment and Examination Centre (NAEC). The assessment was conducted twice – in 2016. The objective of the study is to assess students' performance in chemistry, biology, and physics against the national curriculum objectives (NAEC, 2017).

Around a fourth of Georgian fourth graders do not reach the low international benchmark at which students cannot demonstrate basic knowledge of life and physical sciences. This includes "show basic knowledge of life and physical sciences; demonstrate some basic knowledge of behavioral and physical characteristics of plants and animals as well

[35] See Exhibit 6: TIMSS grade 4 science international benchmark levels and Exhibit 7: TIMSS grade 8 science international benchmark levels in the appendix.
[36] See Exhibit 8: PISA 2018 science proficiency levels in the appendix.

as of the interaction of living things with their environments, and apply knowledge of some facts related to human health; show basic knowledge of states of matter and physical properties of matter; interpret simple diagrams, complete simple tables, and provide short, fact-based written responses" (Mullis et al., 2016b). Of the remaining 74 percent of students who reach low achievement benchmark, 1 percent reaches advanced level, 12 percent – high level, and 41 percent reaches intermediate level.

Exhibit 4: Sample item from TIMSS science assessment in 2015

Achievement Benchmark: Low

Content Domain: Chemistry

Cognitive Domain: Knowing

Description: Recognizes a material that best conducts both heat and electricity

Which of the following is the best conductor of both heat and electricity?

Ⓐ wood
Ⓑ plastic
● copper
Ⓓ glass

Countries	Percent Correct (%)
Russian Federation	84
Turkey	84
Kazakhstan	81
Lithuania	69
Georgia	54

Source: Mullis et al., 2016

Over the last three cycles, there was a significant improvement in the 4th graders performance in TIMSS science assessment in the period from 2007 to 2011; however, there is no improvement between 2011 and 2015. As

Table 22 shows, the share of students reaching low benchmark dropped from increased from 59 percent in 2007 to 75 percent in 2011. There was a significant 18 percent increase in the share of students reaching intermediate level and the share of students at high achievement level increased from 5 percent to 13 percent. There are no changes in the period between 2011 and 2015.

Georgian fourth graders perform significantly lower compared to students in post-Soviet countries and most TIMSS participant countries. Fifth of students in Russian Federation and Kazakhstan perform at advanced achievement benchmark level; the share of the students is 7 percent in Lithuania as well as in a half of TIMSS participant countries. Turkey is among the countries where the share of advanced achievers is below the international median but still higher than in Georgia (1%). Perhaps more importantly, significantly smaller share of students in the countries fail to demonstrate understanding of science. The share of students below low achievement level is 1 percent in Russian Federation and 4 percent in Kazakhstan and Lithuania. International median is 5 percent, which means that in a half of TIMSS participant countries, only 5 percent of students fail to reach the low achievement level.

Table 22: 4th grade students' performance at science international benchmarks in Georgia and selected countries

The share (%) of students across benchmark levels; cumulative percentages.

	Students by TIMSS Science Achievement Benchmarks in 2015						Georgia in Previous Cycles	
	International median	Russian Federation	Kazakhstan	Lithuania	Turkey	Georgia	2011	2007
	%	%	%	%	%	%	%	%
Advanced	7	20	19	7	4	1	1	1
High	39	62	49	40	24	12	13	5
Intermediate	77	91	81	79	58	41	44	26
Low	95	99	96	96	82	74	75	59
Below low achievement benchmark	5	1	4	4	18	26	25	41

Source: Mullis et al., 2016

At the lower-secondary level, in the eighth grade, students' performance in TIMSS science assessment shows a significant improvement in the last cycle. In the period between 2011 and 2015, the share of students reaching low achievement level increased from 62 percent to 70 percent. The share of students reaching intermediate level increased by 10 percent and the share of students at higher achievement benchmark increase by 4 percent.

Table 23: 8th grade students' performance at science international benchmarks in Georgia and selected countries

The share (%) of students across benchmark levels; cumulative percentages.

	Students by TIMSS Science Achievement Benchmarks in 2015						Georgia in Previous Cycles	
Country	International median	Kazakhstan	Russian Federation	Lithuania	Turkey	Georgia	2011	2007
	%	%	%	%	%	%	%	%
Advanced	7	15	14	8	8	1	0	0
High	29	42	49	37	29	10	6	5
Intermediate	64	74	81	73	59	38	28	27
Low	84	93	96	94	83	70	62	61
Below low International Benchmark	16	7	4	6	17	30	38	39

Source: Mullis et al., 2016

According to the National Assessment in Sciences (2017), 1 out of 2 9th grade students fail to meet the national curriculum objectives at the low achievement level in chemistry. The share of students in the category is also high in physics (35%) and lowest in biology (13%). In physics and biology, the tasks related to reasoning were particularly challenging for students (NAEC, 2018). p.322).

Table 24: Students' performance across the national assessment benchmarks in biology, chemistry, and physics. Grade 9.

Content domains	advanced	high	intermediate	Low	below the low national benchmark
	%	**%**	**%**	**%**	**%**
Biology	0.36	8.5	33.4	44.4	13.2
Chemistry	0.3	2.6	11.1	36.9	49.1
Physics	0	0.2	9.3	55.7	34.8

Source: NAEC 2018. National Assessment in Sciences in Grade 9.

The majority of 15-year-old students in Georgia performs below PISA's science assessment baseline proficiency level at which "students begin to demonstrate the science competencies that will enable them to participate effectively and productively in life situations related to science and technology" (OECD, 2016b. p. 68). As Table 25 shows, the share of students at or above the baseline level is significantly lower compared to other post-Soviet countries like Estonia (91%), Latvia (82%), Russian Federation (79%), Lithuania (78%), and Belarus (76%). Georgian students are roughly on average 5 years behind their peers from Estonia and 3.3 years behind Latvian and Lithuanian students[37].

Table 25: Summary of student performance in PISA science assessment, Georgia and selected comparator countries

	Science Proficiency Levels (%)								
	Below Level 1b	Level 1b	Level 1a	Level 2	Level 3	Level 4	Level 5	Level 6	Sum Level 2, 3, 4, 5, 6
Estonia	0.1	1.1	7.5	21.5	32.1	25.4	10.2	2.0	91.2
Latvia	0.3	3.4	14.8	29.5	31.5	16.8	3.5	0.3	81.5
Russian Federation	0.4	4.1	16.7	31.7	30.0	14.0	2.9	0.2	78.8
OECD average	0.7	5.2	16.0	25.8	27.4	18.1	5.9	0.8	78.0
Lithuania	0.5	4.7	17.0	28.4	28.7	16.3	4.0	0.5	77.8
Belarus	0.5	5.0	18.7	31.3	28.8	13.1	2.5	0.1	75.8
Kazakhstan	2.2	17.8	40.3	26.9	9.9	2.5	0.4	0.0	39.7
Georgia	5.8	22.9	35.7	24.3	9.5	1.7	0.1	0.0	35.6
Georgia in previous cycles									
Georgia in 2015*	4.2	16.0	30.5	28.2	15.2	4.9	0.8	0.1	49.2
Georgia in 2009**	33.5	32.1		23.6	8.8	1.7	0.2	0	34.3

Source: OECD 2019b, Tables I.B1.2 and I.A2.1 *OECD, 2016**Walker, 2011

[37] Mean score in PISA Science literacy is 383 for Georgia, 530 in Estonia, 487 and 482 in Latvia and Lithuania respectively. 30 PISA points is roughly equivalent to the progress made in one year of schooling.

Similar to reading and mathematics competences, there was a significant and impressive improvement in science performance between 2009+ (administered in 2010) and 2015 cycles. In five years, the share of students at or above the baseline level increased by 15 percent. 2018 cycle does not show improvement. On the contrary, Georgian students mean score dropped by 28 points (OECD, 2019b, Table I. 1). However, due to the change in PISA administration mode in Georgia, the difference between the cycles should be interpreted with caution.

The majority of 15-year-old students in Georgia reports having at least some knowledge and understanding of environmental issues, which is an integral part of science competence. As Table 26Students report having more knowledge about air pollution (85%), extinction of plants and animals (82%), water shortage (75%), and deforestation (67%) and nuclear waste (59%). However, a large share of Georgian students report that they have no knowledge of some very critical 21st century environmental issues. For example, only third of students claim to know about the increase of greenhouse gases in the atmosphere to a degree that they could explain the general issue, less than half of students have some understanding of the use of genetically modified organisms (44%).

Table 26: Students' knowledge about environmental issues. PISA 2015.

How informed are you about this environmental issue?	I am familiar with this and I would be able to explain this well	I know something about this and could explain the general issue	I have heard about this but I would not be able to explain what it is really about	I have never heard of this
The increase of greenhouse gases in the atmosphere	8	25	44	23
The use of genetically modified organisms (<GMO>)	12	32	40	17
Nuclear waste	17	42	32	10
The consequences of clearing forests\other land use	27	40	24	9
Air pollution	47	38	11	4
Extinction of plants and animals	42	40	13	5
Water shortage	34	41	19	7

Source: PISA 2015 database

In another important aspect of science competence, understanding of scientific process, Georgian students score above the OECD average. PISA 2015 science literacy covered epistemic beliefs by measuring students' knowledge of how scientific knowledge is produced and an understanding of the goal of scientific enquiry and of the nature of scientific claims (OECD, 2016). The results show that, unlike other components of PISA science literacy, Georgian students show higher than OECD average agreement with current views about the nature of science can be said to value scientific approaches to enquiry (see Table 27). The study also shows that there is a strong relationship between science performance and epistemic beliefs: among Georgian students, one-point difference on the epistemic beliefs scale is associated with 42 (s.e.=1.7) points difference on the science performance scale.

Table 27: Students' epistemic believes about science from PISA 2015

The epistemic statements:

1. A good way to know if something is true is to do an experiment
2. Ideas in <broad science> sometimes change
3. Good answers are based on evidence from many different experiments
4. It is good to try experiments more than once to make sure of your findings
5. Sometimes <broad science> scientists change their minds about what is true in science
6. The ideas in <broad science> science books sometimes change

Selected countries	Percentage of students who "agreed" or "strongly agree" with the statements					
	1	2	3	4	5	6
	%	%	%	%	%	%
Estonia	88	85	89	89	83	85
Latvia	81	79	81	77	79	78
Turkey	73	72	76	76	72	71
Georgia	86	86	86	86	82	78
OECD	84	81	86	85	80	79
Lithuania	81	79	81	79	77	77
Russia	79	79	83	82	81	78

Source: OECD, 2016. Volume I. Figure I 2.32

CHAPTER 4: KEY FINDNINGS AND RECOMMENDATIONS

The chapter provides a summary of the review's findings and recommendations. It first lays out key findings vis-à-vis the key competences development as (1) achievements and strengths and (2) challenges and areas for improvement; and proposes (3) recommendations for addressing these challenges. The recommendations describe strategies and interventions for (a) mitigating the challenges for short-term impact and b) for building the system's capacity and infrastructure for ensuring sustained medium to long-term impact.

Achievements and Strengths

Georgia has made impressive progress in transforming its education and training sectors. Over a decade ago, the country started its bold journey of transforming its education system. The transformation process has contributed to building greater consensus on the importance of change among the education community, emerging collaboration and cooperation practices between state and non-state actors, and accumulating experience. The review has identified several notable developments that has contributed to the development of the sector and can be used as powerful instruments for the development of key competences in the future efforts.

- In the general education policy, Georgia embraced the "competence movement" at the very onset of the education reform in 2002 by accommodating the concepts such as competence, lifelong learning, and civic education in learning objectives. Since then, the policy framework has maintained the impetus and continued to evolve. In the current curriculum, the key competences are integrated as either cross-curricula transversal skills and concepts, as subject specific learning outcomes, or both. The new curriculum approach in general education and in integrated VET programmes, with its concept-based pedagogy is a critical development towards upgrading and advancing pedagogical foundations of teaching and learning.
- Georgia has removed the dead-end in the system by reintegrating VET with secondary general education. This is perhaps one of the most notable positive developments towards the development of key competences, ensuring equity and increasing participation in VET. The Ministry is working actively on creating new courses and resources to ensure effective integration of secondary education in VET.
- In general education, Georgian education system has made a significant progress in reconceptualizing the teaching profession. The notions of active teaching and student-centered education have been actively promoted during the last decade. These principles as well as the key competences are reflected in general education teacher standards. The national curriculum, teacher standards, and programme accreditation have made a significant impact of the content and structure of the teacher education programmes. There are indications that some new approaches to teaching and learning are implemented in practice. For example, formative assessment, which has been accentuated in the National Curriculum as well as teacher training initiatives, has reached many classrooms and making impact on student learning.
- In VET, the Ministry is gradually building the capacity and structure together with multilateral partners. The Education Quality Enhancement Centre has swiftly accommodated the national commitment in EU integration in VET curriculum through mandated Programme Standard Frameworks and Standard Courses. The key competences have been integrated as separate general courses, as learning outcomes integrated with occupational courses, or learning outcomes integrated with secondary education objectives. The UNDP is working together with the MoESCS to select and train teachers for integrated courses for eight pilot programmes in seven VET centers.

VET college principals run the selection process using the assessment instruments provided by the MoESCS. One of the promising developments include the development of quality assurance framework which is based on good practices from other education systems and, judging from the impact of such mechanisms in other countries, could potentially provide a strong stimulus for improvement in VET system.

- Georgia's participation in International and National Assessments provide valuable data on students' performance in some of the key competences and their progress over time. Georgia joined international assessments in 2006 by first participating in PIRLS, followed by TIMSS in 2007 and PISA in 2009. Since then Georgia regularly participated in the international assessments. At the same time, the country developed national assessments. These assessments provide valuable information for tracking the system's progress towards its objectives in education.
- Both in general and vocational education, the government has developed and maintained a critical mass of educators, trainers, and leaders who are committed to transforming teaching and learning practices and processes. They are critical force for the further improvement of the education and training system.
- The government has mobilized and maintained sustained support of bilateral and multilateral organizations supporting education reforms in the country. USAID, European Delegation in Georgia, UNICEF, UNDP, Millennium Challenge Account in Georgia and Millennium Challenge Corporation, the World Bank etc. In general education, USAID's primary education project (G-pried) made an immense contribution to the adoption of good school and teacher support models aimed at building school communities' capacity in developing young learner's literacy and numeracy skills. The model is currently being expanded to all schools in Georgia.
- Non-state actors have been actively supporting the implementation of national goals in education. Teacher Prize project implemented by the Education for All Coalition in Georgia in collaboration with the MoESCS and private foundations is an example of a good practice in terms of public-private partnership. It has consolidated the state, non-state grass roots, and private philanthropy resources to popularize teaching profession in the country.

Challenges and Areas that Need Improvement

Student learning outcomes

Notwithstanding the effort put in the improvement of the system, student learning outcomes remain alarmingly low. While there is no data available on student learning outcomes in most key competences, international and national assessment provide valuable data on student learning outcomes in reading comprehension (National Assessment in Georgian as a Second Language, PIRLS, PISA), mathematics and science (TIMSS, PISA, National Assessments). Main findings from the studies implemented since 2006 can be summarized as follows:

- A large share of Georgian students falls behind in developing their reading, mathematics, and science competences in early years of their schooling which creates risks for their future educational career. 14 percent of the fourth graders in PIRLS reading comprehension assessment, 22 percent of the students in online reading comprehension, 22 percent in TIMSS mathematics assessment, and 26 percent in TIMSS science assessment perform below low achievement level[38]. The majority of ethnic minority students finish primary education without reaching basic communication skills in the state language.

[38] There are four achievement levels in the studies: Advanced, High, Intermediate, and Low.

- By the end of compulsory schooling around a half of Georgian students fail to demonstrate basic competencies in reading, mathematics, and sciences. Georgian students' performance in PISA shows that the majority of Georgian students perform below baseline achievement level in reading, mathematics, and science assessment at which "students begin to demonstrate the reading, mathematics, and science competencies that will enable them to participate effectively and productively in life situations related to science and technology".
- There has been some, however, inconsistent indications of improvement in students over the last few years. The trends in the large-scale assessments indicates that the pace of improvement in learning has been either stalled or slowed down. With the current pace, it will take over two decades to ensure that the majority of students finish compulsory schooling with the competences critical for future learning and employment.

Policy framework

The National Curriculum for General Education (2018-2024) and VET programme standard frameworks describe national objectives in relevant field of education. The review identifies several areas for improvement.

- In the national curriculum and standards some new competences such as entrepreneurship and learning to learn are not described and explained as clearly as more traditional competences such as literacy. In most education systems, including Georgia, competences such as entrepreneurship, social, personal and learning to learn are relatively new to educators and other stakeholders. Moreover, there are some misconceptions about terminology (e.g. entrepreneurship). The lack of clarity could lead to misinterpretations of the curricula objectives among teachers, schools, and other users of the curriculum (e.g. training providers).
- In VET programme frameworks, the concept of competence is not adequately integrated in the VET course frameworks. Learning outcomes described in some of the framework course modules disproportionately concentrated on knowledge acquisition. For example, 13 out of 25 measurable learning outcomes in the interpersonal communication course module belong to the knowledge domain. 13 out of 14 learning outcomes in the Citizenship course are also knowledge categories.
- VET Entrepreneurship courses are disproportionally concentrated on developing planning and management competences and do not adequately address the competence areas for using imagination and ability to identify opportunities for creating value, developing creative and purposeful ideas, making the most of ideas and opportunities. VET programme framework developers should consider reflecting these aspects of entrepreneurship competence in the frameworks so that VET students learn not only how to run as business but also have opportunities to boost their ability to come up with value creating ideas and find the courage to put them in action.
- Learning objectives in most VET general courses are set at low proficiency levels. For instance, numeracy course objectives correspond to those of primary education (grade 5-6) learning outcomes. The Information Literacy descriptors correspond to DigComp proficiency level 2. The low performance targets can be justified by the lack of basic competences among Georgian students. Indeed, around a half of Georgian 15-year-old students perform below proficiency levels in reading, mathematics, and sciences. However, VET centers serve a diverse student population. Therefore, it could be argued that many students already have the skills upon entering the programs. When achievement objectives are set too low or too high, this could lead to student disengagement from learning and even student drop-out.

Policy and strategy in action

The development of key competences revolves around the adoption of the national curriculum by schools and programme frameworks and course frameworks by colleges and VET programmes. Therefore, ultimate purpose of education reforms, implicit or explicit policies, and programmes is to support educational institutions and education community in general in adopting objectives stipulated by the curriculum and standard frameworks. The review covered all major aspects of state and non-state interventions and policies related to the implementation of curriculum and standard in practice.

Coordination: The general education curriculum implementation can be impaired by the lack of the expertise schools need in adopting the curriculum. The biggest challenge to the curriculum implementation is the lack of expert teachers who can support schools in understanding the new concepts and ideas and translating them into teaching and assessment. There are several highly qualified expert teachers who are currently working with schools within the framework of the New School programme. However, the expertise comes from a combination of strong theoretical knowledge of pedagogic approaches, their application in practice and regular and in-depth reflection. Since there no sustained mechanisms in the system that support the development of such expertise and excellence, the review argues, that there not enough expertise to support schools in the curriculum implementation and colleges in effectively adopting integrated courses.

The curriculum implementation is further jeopardized by the lack of understanding of underlying philosophy and principles of the new curriculum. There is lack of consensus on how the new curriculum should be reflected in various aspects of the system governance (e.g. teacher training or assessment and examination) among the main parties responsible for supporting its implementation.

Teacher appraisal: Frequent changes in the general education teacher appraisal system have had dramatic implications for general trust in reform initiatives across the school community and effectiveness of appraisal efforts. Since its introduction in 2011, teacher appraisal system was modified several times. In 2011, it had only an examination component. To accommodate other aspects of teacher quality, the government started to introduce new instruments. New teacher appraisal scheme was developed in 2015. It covered a wide range of teacher quality criteria. Over the next year, the teacher appraisal system grew into an overly complex mechanism with a variety of sources of information on teacher activities and instruments. Many of the responsibilities for teacher appraisal were delegated to school-based internal evaluation teams. However, the ambitious decentralization plan was not matched with relevant training efforts. Moreover, since the appraisal results for each and every teacher is validated by TPDC, implementing the scheme has put increasing administrative demand in terms of recruiting and training evaluators and overseeing the process. As a result, negative implications for fairness and face validity have emerged. TPDC is currently working on a new plan that will link teacher status to teacher responsibilities in school and delegate some of the appraisal responsibilities to schools. This plan needs to be elaborated and optimized to ensure that appraisal instruments are valid and reliable; the system's ambitions should be aligned with the system's capacity (e.g. time and effort to train evaluators, financially sustain evaluation process).

Teacher Professional Development: Existing centralized teacher professional development practices are exhausting their potential. In general education resources have been invested in short-term teacher and school leaders' trainings. In VET, there are a few, small scale efforts in training teachers in some of the key competences and teaching methods. Although participation rates are impressive, teacher engagement in trainings is rarely high and is believed to be motivated by accumulating credits. In the teacher professional development policy and practice there are three main limitations that need to be addressed:

- The relevance of training topics: To plan trainings TPDC conducts surveys to learn what topics teachers are interested in. However, such questionnaires are often not valid measures of teacher training needs. Identifying actual development needs comes from active engagement in the search for pedagogical solutions. There are teachers and schools who are looking for new ways of improving teaching and learning. However, there is no evidence indicating that teachers in Georgia are engaged in such practices on mass scale. Therefore, it is unlikely that the questionnaires generate carefully considered responses on professional development needs.
- The format of trainings: Trainings can be a combination of presentations, discussion, demonstration, simulations, and seminars. As growing evidence from research on the effectiveness of various professional development activities shows, "training is the most efficient and cost-effective professional development model for sharing ideas and information with large groups of educators. It provides all participants with a shared knowledge base and a common vocabulary. Large-scale training also helps dispel the rumors that typically abound when complete knowledge of an innovation is held by only a few individuals". However, for successful implementation of ideas… "training sessions also must be extended, appropriately spaced, or supplemented with additional follow-up activities to provide the feedback and coaching" (Gusky, 2000; p.23). State and non-state actors should re-examine their teacher professional development strategies in light of growing evidence on teacher professional development methods and link teacher development objectives with relevant PD tools.
- Quality of trainings: Based on the analysis of around 20 different training syllabi, the review found that training objectives are not fully alighted with their content and duration. For example, it is unlikely that within two-hour long session, a teacher gets some basic understanding on a topic that requires two semesters of teaching and active learning at graduate programmes. Also, it is important to consider that trainers should have relevant practical or research experience in the training area. Perhaps a more effective alternative to such trainings is translating and disseminating professional development materials.

Leadership: School principal and college director recruitment policies and practices are unlikely to help select the candidates that have the competences to lead change at the institutional level. In recent years, there is a noticeable shift towards conceptualizing school principals as instructional leaders. In general education, while teacher appraisal system has become increasingly ambitious and complex, the selection of school principals is based only on examination and an interview. Compensation scheme of school principals has been reformed, but many school principals in rural schools are paid less than some teachers in their schools. Similar to general education, in VET, the MoESCS and the World Bank are actively working on the development of teacher standard and appraisal scheme; but there are no plans for improving the college director selection procedures.

To ensure continuous and uninterrupted development of schools and colleges, they should be led by highly dedicated and capable leaders who have the capacity to translate the national policy in organizational vision and development actions, consolidate organizational resources and work strategically towards transforming the schools and colleges. The MoESCS should therefore consider developing clear policy and relevant mechanisms for selecting and developing school and college directors. There are growing number of successful examples in other countries. For example, in Israel school director candidates are selected among experienced teachers. The selection process is rigorous using a myriad of valid and reliable instruments; selected candidates who successfully finish training program, they will qualify for the job.

Teaching and Learning Resources: The quality of teaching and learning materials remains to be a challenge. In general education, textbook development has undergone major transformations. However, the existing textbook endorsement model creates negative implications for the improvement of the quality of textbooks. Teachers have frequently raised their concerns about textbooks. The problem is exacerbated by teachers' extreme dependence on textbooks.

The development of online learning resources is high on the government's agenda; however, the lack of clear policy and understanding of pedagogical value of technological aids, the resources invested ICT (e.g. computers for primary level students) are not effective. As evidence from a recent ePIRLS study (PIRLS, 2016) suggests, despite availability of computers, Georgian fourth grades performance in simulated online environment is significantly lower compared to the same students' performance in reading test on paper.

Teacher Training: Student readiness in teacher education programmes creates negative implications for the quality of teaching and learning and the future of the teaching profession. As international and national studies suggest, the prevailing majority of Georgian students are barely ready for university education. This could be particularly true for students in primary education programmes who traditionally are among the lowest performers in Unified National Exams. The quality of teaching and learning is largely defined by the quality of students and their ability to succeed in learning. Thus, the future of the profession is being jeopardized by the system's capacity to attract qualified candidates in teacher training programmes.

Knowledge base: Low research productivity of the university faculty in education fields creates risks for the development of the quality of teaching in teacher education programmes as well as the university's capacity to bring expertise and knowledge to education sector and thus support its development. Research in higher education institutions is closely associated with the quality of teaching and continuous professional development. Therefore, advancing research capability is viewed as a key factor in enhancing the quality of student and teacher learning. As in many countries, in Georgia teacher educational institutions traditionally operated as teaching institutions and therefore, research was not been a part of their academic activity. Two decades ago, teacher institutions were transformed into research universities or integrated into research universities. However, research output in education field remains low lagging behind many other Eastern European countries.

Recommendations

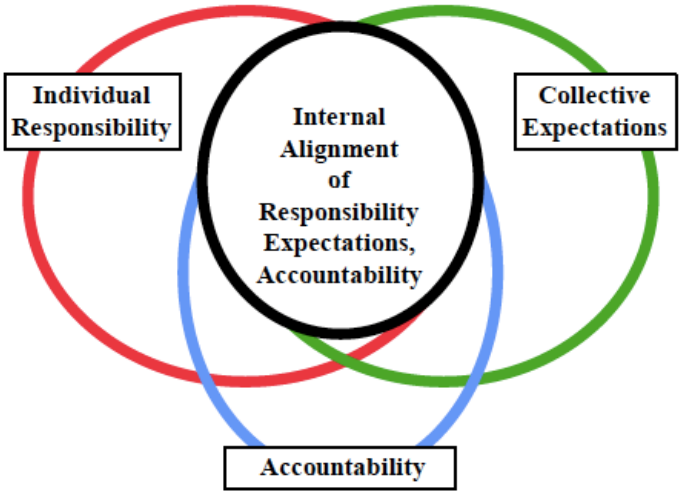
Conceptual Framework

To be able to effectively transform curriculum and standards into teaching practices, a school or a college should have three characteristics:

A. **Internal accountability culture** aligned with external accountability framework. Internal accountability culture is an institutional characteristic and describes alignment between individual responsibilities, collective expectations, and accountability practices (Abelmann et al., 1999; Elmore, 2004). Studies on the US experience from introducing school assessments within the No Child Left Behind federal programme shows, that for an external accountability mechanism (e.g. National Curriculum or VET programme framework in Georgia's case) to be effectively implemented, schools should have readiness to accept the demands of the accountability system. A school community should have shared vision of expectations towards their collective actions (e.g. what students should achieve by the end of the 4th grade) that largely overlap with teachers' personal perception of their own responsibilities (what is my responsibility in terms of an individual students' learning and who am I responsible to),

and these two should also be largely overlapping with the expectations set forward by the accountability mechanism. If this is not the case, then schools and teachers tend to play around the system or reject it altogether (ibid).

Figure 1: Accountability culture and internal alignment of responsibility, expectations, and accountability in schools



Source: Abelmann et al, 1999

B. **Social cohesion** is the characteristic of internal networks in a school community. If relations between members in the network are close and frequent, then the community develops shared expectations and responsibilities, information channels, norms and sanctions, and trust that are critical for the members of the network individually and collectively (Burt, 1997; Coleman, 1988; Leana & Pil, 2006; Oh, Labianca, Chung, 2006). In practical terms, this means that teachers in a typical school should trust each other and feel safe to openly reflect on their practice without the fear of hostile critique or ridicule. (Hargreaves and Fullan, 2013; Leana, 1999; Phil and Leana, 2006). The development of the social cohesion and collaboration practices in schools and educational institutions largely depends on the leadership expertise of school principals and college directions. Without relevant expertise, efforts to facilitate collaboration among teachers may suffer from creating burdensome structures devoid of purpose (Levine, 2002) or promoting the practice of “pseudo-collaboration” (Carrie, 1995).

C. **Pedagogical expertise** means that at least some teachers in a school or a college have the expertise to support school-based collaborative efforts with expert knowledge about pedagogical solutions that teachers need to improve their teaching. Research on the effectiveness of school collaboration shows that school effectiveness is a function of pedagogical expertise and social cohesion. Collaboration among teachers is effective only when pedagogical expertise is strong. In other words, collaboration on a shared objective or task among teachers is effective only if one or more teachers can offer their colleagues relevant, actionable and effective pedagogical solutions; collaboration among teachers with inadequate expertise, will lead to reinforcement of ineffective practices (Leana, 1999; Phil and Leana, 2006; Fullan and Hargreaves, 2013). For a typical college in Georgia this would mean that if none of the teachers working together on solving, for example, student engagement issue in entrepreneurship courses or on improving students’ presentation skills, then the collaboration is fruitless and cannot be conductive to improving teaching practices.

Such college will require an external support from a teacher who has the expertise on the pedagogical problems.

The review claims that these preconditions are not present in the prevailing majority of Georgian schools and colleges. In order for the system to gradually move to the condition at which a critical part of schools and colleges are able to transform policy framework provided by the state (e.g. programme frameworks and curricula), these prerequisites should be developed. Traditional instruments will not be effective in the developing these building blocks of the system. Therefore, the review suggests that the MoESCS and other stakeholders should concentrate their efforts on building the capacity among schools and then expect from them to respond to the challenges posed by a new curriculum.

The policies and instruments currently used by state and non-state actors (e.g. trainings, teacher appraisal, standardized examinations) have exhausted their potential in facilitating the change. New instruments and measures should be developed in order to move to the next stage of the system's development. These instruments are aimed at empowering educational institutions and creating incentives for them to respond to the national objectives in education. The interventions, however, are not going to yield immediate impact. They will create foundations for sustained improvement for medium- and long-term impact. Therefore, the review also offers a series of interventions that can compensate for the lack of competences among educators. These interventions propose temporary, transitional solutions that can mitigate the negative implications of low quality of teaching in schools and colleges.

Intervention Options

Based on the conceptual framework, the report has identified a list of priority interventions grouped under two main objectives:

Objective 1: Strengthening the system's capacity for sustained change. Interventions 1 to 6 describe the measures aimed at setting in place the mechanisms for regular examination of the national framework in general education and VET and supporting the development of school and college's capacity in translating the objectives and principles of the national framework into teaching and leadership practices. These interventions however are not going to yield immediate effect.

Objective 2: Consolidated efforts to improve teaching and assessment instruments and programmes. Building the system capacity will take time. To compensate for the lack of institutional capacity in the short-run, we propose providing immediate and direct support through teaching and assessment resources and extracurricular programmes.

Intervention 1: Strengthen mechanisms for wider discussion around student competences

Objectives of education and training are a matter of ongoing discourse and agreement in every society. No single educator, education expert, or an agency can dictate what Georgian students should know and be able to do in a way that it becomes accepted and shared by all educators and institutions. Moreover, the objectives change over time and need to be adjusted to new challenges and opportunities or development goals. In an ideal system, loosely defined objectives are effectively translated and adopted to institutional mission by highly capable educators and leaders. However, when most educational institutions are lacking in the capacity, alternative measures should be considered to ensure that there is adequate understanding around education objectives and this understanding is shared by most stakeholders. This is particularly true of some competences that are new to most education

systems in the world (e.g. entrepreneurship, citizenship, personal, social, and learning to learn). The agencies responsible for translating these competences into the curricula and standards could benefit from more discussion on the competences with the engagement of relevant parties. For example, the Ministry is currently working together with the International Foundation for Electoral Systems (IFES) on the development on a new framework course on citizenship. Such practices can be further reinforced by engaging other relevant parties in the discussion who can help elaborate the objectives. These stakeholders can potentially become collaborators and partners in advocating new curriculum or standard objectives among education community and wider society.

In practical terms, the recommendation can be operationalized through identifying key partners and stakeholders (e.g. teachers, professional associations, principals, local and international experts) and setting in place platforms (e.g. conferences, working groups, etc.) for ongoing discussion around learning outcomes (e.g. entrepreneurship) in order to regularly revise and elaborate national curriculum or programme standard objectives, generate consensus and greater understanding. The discussion should be supported by relevant expertise. New framework documents (e.g. EntreComp, CDC) can provide helpful starting point for the discussions. Committees on specific areas (e.g. entrepreneurship) would gather representatives of teacher associations, administrators' associations, education experts, relevant civic and private organizations around specific objectives (e.g. developing guidelines for educational institutions on entrepreneurship competences). Experts from other education systems can also provide helpful suggestions. The results of the collaborative discussions should produce relevant communication resources in various formats, which should be effectively disseminated among wider community of stakeholders.

Intervention 2: Develop effective external evaluation system to facilitate the adoption of the national policy framework by schools and colleges[39].

Policy frameworks require effective mechanisms that help facilitative their adoption by educational institutions. In many education systems, external evaluation of education institutions is one of the most commonly used instruments. External evaluation is a set of expectations translated into assessment criteria, evaluation mechanisms, and response policies and practices. Educational institutions are evaluated on regular basis and the information from the evaluation is used to inform decisions at national, local and institutional level. As growing evidence shows, effective external evaluation helps educational institutions concentrate and unite their efforts towards achieving objectives set at national level (e.g. national goals in education and the national curriculum). However, external accountability has proven to have both positive and negative implications for institutions and systems (e.g. Elmore, 2004; Kane & Staiger, 2002; Elmore, 2004; Figlio and Liob, 2011). Therefore, to ensure that external evaluation is effective, experience from other education systems need to be carefully examined and adapted to general education and VET sector in Georgian. Special consideration should be given to some of the critical aspects of accountability system.

i. Are the evaluation criteria valid measures of quality? For example, some accountability systems have been criticized for concentrating on a small number of the dimensions (e.g. students' learning) out of a wide range of outcomes that stakeholders value (e.g. citizenship, work ethics, critical thinking) (Rothstein, et al., 2008). Therefore, many accountability systems accommodate several criteria (e.g. quality of teaching and learning, school climate, school development mechanisms and practices etc.). The evaluate criteria then should be translated into valid indicators of educational institutions' performance. For example, if student learning

[39] For more on the topic, consult with the OECD review on assessment and evaluation in Georgia. https://www.oecd.org/countries/georgia/oecd-reviews-of-evaluation-and-assessment-in-education-georgia-94dc370e-en.htm

is an evaluation criterion, what kind of indicators could be the valid measures of student learning? There are several indicators for consideration including but not limited to graduation rates, participation in national or international Olympiads, student performance in national assessments, student employment rates etc. These indicators should be carefully considered and discussed to ensure that they are valid indicators of student learning.

ii. Are the instruments used in measuring the indicators valid and reliable? For example, in some countries, school inspectorates conduct classroom observations. They randomly sample lessons and usually observe a short period of the lessons, and score the lessons using standardized instruments. While the theoretical frameworks of effective instruction have become increasingly standardized since the turn of the millennium (e.g. Danielson, 2013; Marzano, 2007; Helmke 2006; Meyer 2004) and a basic general understanding of "good" teaching seems is a methodological challenge. Thus, when using classroom observation for measuring the quality of instruction (or standardized tests to assess student learning), validity and reliability of the instruments should be carefully scrutinized through relevant procedures.

iii. Are there sufficient resources (financial, human) for ensuring that evaluation is reliable? It is essential that the external evaluation system is optimal and is gradually evolving together with the system's capacity. On paper, an appraisal system can be valid and comprehensive. However, the success of any evaluation system depends on the reliability of appraisal which ultimately places increasing importance on the competences of the evaluators and the rigour of the appraisal process. Where evaluation system has consequences for the educational institutions, evaluators should be trained in standards-based methods for assessing evidence of school performance in order to ensure validity and reliability of the evaluation.

Reforming existing accountability system would require relevant parties to consider specific set of actions. For example:

(1) Developing conceptual framework for external evaluation system which includes (a) developing a working model (principles, criteria, indicators, instruments, actors, implications) through integration of in-depth understanding of strengths and limitations of various accountability models in other countries and examination of their implications for Georgian education system (b) engaging wider education community in discussing the working model and adjusting the model based on the feedback from stakeholders;
(2) Setting in place evaluation mechanisms including (a) the development and piloting of external evaluation instruments (b) recruiting and training external evaluators (c) piloting the external evaluation administration process and adjusting the mechanisms based on the results from the pilot. Wider education community should be well informed about ongoing developments and plans so that they have time to digest and prepare for the change;
(3) Introducing external evaluation gradually starting with volunteer schools and colleges and engaging them in examining and addressing the limitations and promoting the external evaluation among other educational institutions;
(4) Setting in place mechanisms for continuous examination and improvement of the external evaluation system which includes (a) conducting studies and evaluations and (b) engaging schools as partners in generating ideas for improving the external evaluation procedures.

Reforming the system will take time. Therefore, it is essential that the reform component has a realistic schedule and clear intermediate benchmarks. The criteria for evaluating the

implementation of the reform could include educational institutions' perception of validity, reliability, and fairness the accountability system and the capacity of the accountability system to provide policy makers with the information for supporting school improvement vis-a-vis the national policy in general education and VET.

Intervention 3: Ensure that schools and colleges engage in institutional self-evaluation to support the development of accountability culture in educational institutions and strengthen collaboration practices.

Effectiveness of any external accountability system depends on the readiness of educational institutions to accept it. The readiness depends on the degree to which the internal accountability culture creates the conditions for accepting the external control and expectations. Therefore, prior to introducing external evaluation, at least a critical share of schools and colleges should have internal accountability culture that allows them to accept the objectives set by the external evaluation and have the capacity to respond to results from external evaluation. In other words, there should be a certain degree of congruence of values and objectives within an institution and between an institution and policy framework. Educators within an institution should have a certain degree of consensus on learning objectives, individual and collective responsibilities, and principles of teaching and collaboration. These objectives, responsibilities and principles should also be consistent with the national policy framework translated into external evaluation.

Evidence based collaborative reflection practices help organizations in gradually building a shared understanding of organizational goals, expertise in evaluating and examining own practices against the shared goals. In education field and beyond institutional self-evaluation has been widely used to strengthen institutions' capacity in collaborative reflection. The purpose of institutional self-evaluation goes beyond the development of internal accountability culture and setting the stage for external evaluation. It is also a strong instrument for organizational improvement and effective tool for professional development since it concentrates teacher learning on existing, authentic needs identified in their practice and encourages collective learning (Vanhhoof et al., 2011; Staessens, 1993; Schildkamp, 2007).

During self-evaluation exercise, administrators and educators in an educational institution work collaboratively on small-scale change initiatives. They identify a problem that needs to be addressed (e.g. students' engagement in learning drops at lower secondary level). Once the problem is identified by the evaluation team composed of teachers and administrators, they set target objectives (e.g. 80% of students regularly do homework, 40% of students participate in extracurricular activities etc.). Then they investigate reasons that cause the problem and develop and implement a solution or a set of solutions (e.g. introduce learncouching for lower secondary level students). If evaluation results show that they have reached the target, they institutionalize the practice (e.g. learncouching) as a school-wide practice or the keep looking for alternative solutions if the they fail to address the problem.

Strengthening educational institutions self-evaluation capacity implies that schools and colleges gradually develop their internal improvement capacity vis-à-vis national objectives in education. Activities towards the objective would involve (1) starting on a smaller scale by engaging volunteer schools in self-evaluation process; (2) Preparing a pool of local school improvement experts which involves and (3) Scaling-up the school self-evaluation.

Intervention 4: Develop valid and reliable mechanisms for recruiting capable leaders for educational institutions and strengthening their professional development.

Effective instructional leaders are agents for implementing national policy framework in schools and colleges. The MoESCS has developed the school principal's standard that accommodates

the concept of instructional leadership. However, the standard has not been operationalized through relevant selection procedures. In many education systems, assessment center (a combination of several standardized instruments such as interviews, group discussions, “mailbox”, etc.) are used to scrupulously select the most relevant candidates. The candidates are usually required to have extensive teaching experience.

Enhancing school leadership development mechanisms should lead to gradual transformation of institutional leaders corps into capable and dedicated leaders are drivers of change in schools. These leaders should have the expertise to unite schools around shared objectives and provide their community with guidance in their journey of improvement. Proposed actions include the development of:

(1) Valid and reliable concept for recruiting capable leaders for schools and colleges which entails (a) designing a working model (principles, criteria, indicators, instruments, actors, implications) through integration of in-depth understanding of strengths and limitations of various selection models in other countries and examination of their implications for Georgian education system (b) engaging wider education community in discussing the working model and adjusting the model based on feedback from stakeholders; (c) setting in place mechanisms for ongoing examination (e.g. monitoring and evaluation) and adjustment of the model;
(2) Instruments for school principal/college director selection model which include the development and piloting of selection instruments (b) recruiting and training evaluators (c) piloting the procedure and adjusting the mechanisms based on the results from the pilot and (4) development of mechanisms for evaluating school principal candidates' training needs;
(3) School leadership training programmes: (a) In collaboration with HEIs, develop a concept and curriculum for training selected candidates (e.g. blended learning programmes) (b) Pilot the training programmes c) set in place mechanisms for ongoing evaluation of school principal training programmes;
(4) Integrate school leadership professional development with school accountability, school support, and initial training efforts. (a) set in place valid and reliable assessment instruments to evaluate school principal's professional development needs (b) develop the concept and plan for integrating school principal professional development into accountability and support activities (e.g. see objective 2 and 3). (c) pilot the plan and set in place mechanisms for ongoing monitoring and evaluation of the model.

Intervention 5: Create a critical pool of pedagogic and instructional leadership experts.

The role of the pedagogical experts in the system is to support schools and teacher communities in the adoption of new objectives and institutional level development efforts. They help schools, colleges, and educators in adopting innovative teaching practices and solving the challenges that educators and leaders face in their improvement efforts. For example, when a school sets an objective to improve learning to learn skills among their students or design extracurricular activities to foster the development of entrepreneurship skills, pedagogic experts are the ones who provide guidance through training, sharing their knowledge through online webinars, developing effective teaching resources, consulting schools and colleges etc. In other words, they provide fuel for change and improvement, they are enablers and, also, agents of change.

Traditional teacher development practices are not the relevant instruments in this case. Instead, programmes and projects that help uncover and develop potential expert educators should be carefully planned and implemented. Interventions may include teacher research conferences, grants for outstanding research or teaching projects for individual teachers or

teacher associations, teacher and school principal exchange programs, joint school projects with successful schools in other education systems etc. Local non-governmental organizations have made some progress on this front (e.g. civic education teachers' association, chemistry teachers association) indicating that there is a potential to build on. New School project has also been successful in gradually building a pool of curriculum development experts.

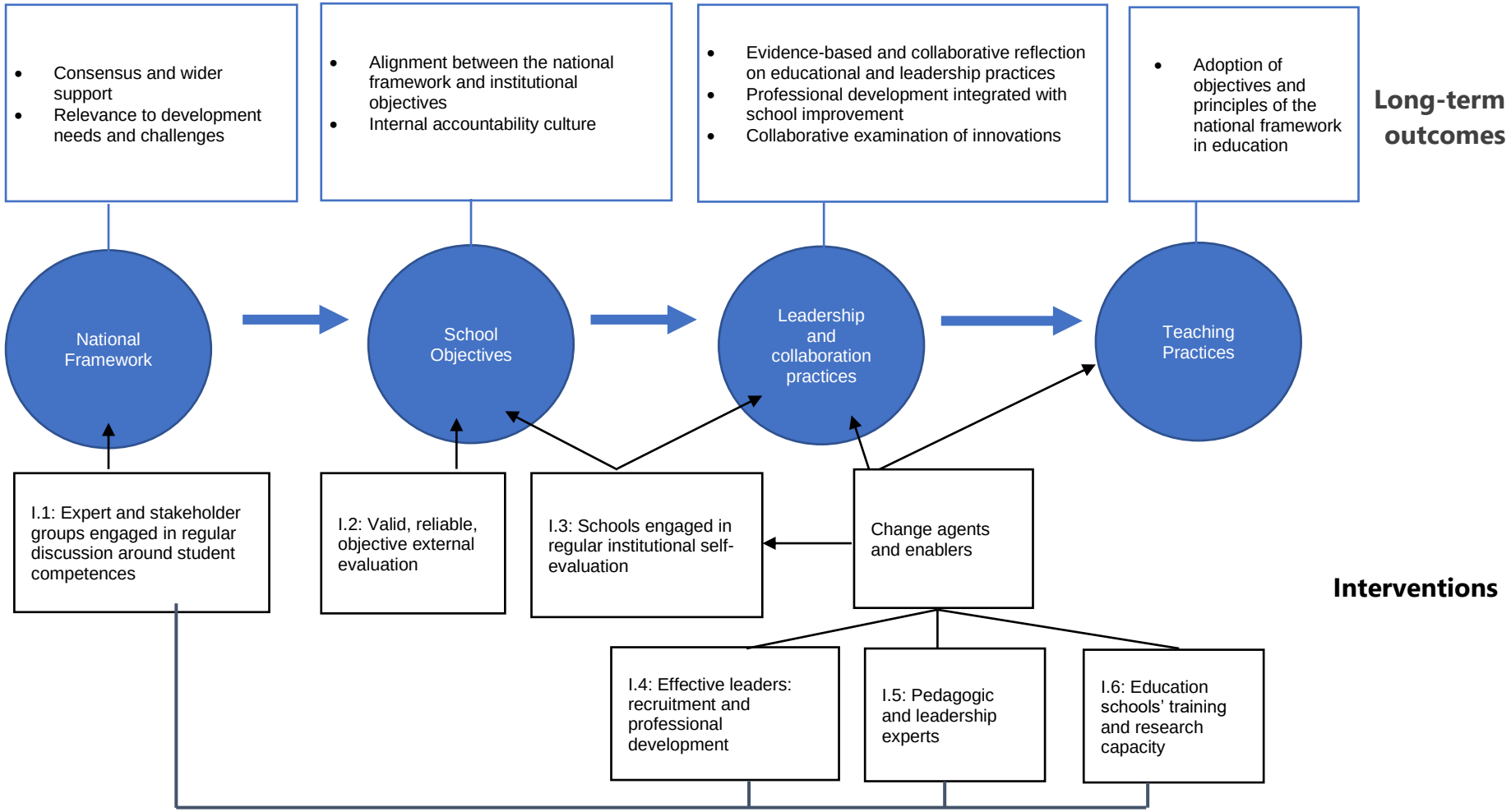
It is essential that these activities are designed so that they help develop the pool of experts in a gradual manner starting with less challenging tasks (e.g. evaluating teaching resources) and progressing to more advanced tasks (e.g. development of teaching resources). Also, the programmes should have built-in training, consultancy, and feedback components so that their participants have the opportunities to learn good practices and receive the support they need to develop their expertise.

Intervention 5: Increase education schools' training and research capacity

In most systems, universities play pivotal role in infusing education systems with knowledge and expertise. However, the capacity of Georgian universities in this regard has been weakened by the limitations in higher education financing policy that forces universities to increase enrollment beyond their capacity and disregard student readiness for university level learning (see e.g. World Bank 2017). This scenario has particularly dramatic implications for the fields of education that have traditionally suffered from low prestige because they end up with the least capable candidates. In the long run, this problem can be addressed by reforming higher education financing.

To mitigate the harm imposed by the higher education policy, the MoESCS should consider introducing targeted programmes that strengthen research capacity in pedagogy thought financial assistance for joint research projects and joint doctoral programs in pedagogy and education psychology with leading education research institutions abroad. The financial assistance programmes should be designed so that they focus HEIs efforts on solving teaching and learning issues that Georgian schools and colleges are facing and bringing innovations in teaching and learning to areas that particularly novel to the Georgian education system (e.g. using technology to enhance learning, development of entrepreneurship skills etc.).

Figure 2. Conceptual map for policy framework elaboration and implementation



Apart from more systematic and holistic development interventions proposed above, recommended actions also include interventions that would alleviate the negative impact imposed by the lack the educational institutions' pedagogic and leadership capacity in the short-run. Instead addressing institutional capacity, these interventions are aimed at developing teaching and assessment resources and programmes.

Intervention 6: Provide schools with high quality teaching and learning resources.
Online resources have a potential for addressing the issue of teacher quality and student engagement both in general education and VET general and integrated courses. The MoESCS has already made significant steps towards examining the potential of technology aided education. To respond to the school closure in the wake of Covid-19, the MoESCS has successfully managed to mobilize the efforts of both state and non-state actors to exploit the potential that technology aided education can offer. The MoESCS is also planning examining the existing capacity for online teaching and learning (availability of online teaching and assessment resources, access to interment and computers, and ICT skills among teachers and students).

The development of online learning and teaching resources can be a worthwhile investment. Effective online learning resources hold a potential for improving teaching and learning. Interactive interface, gamification, application of AI in assessment and adaptive learning provide greater opportunities for more engaging and student-oriented learning. There are several studies that show that using online learning resources is associated with improvement in learning outcomes (Kong 2014) and increase in motivation (Baepler et al., 2014), particularly for low-performing students, facing difficulties in "traditional', face-to-face educational contexts (Sergis et al, 2018). However, not all online resources are effective. Online learning resources can vary in quality and they can be just as ineffective as traditional teaching and learning modes and resources. Recent studies allow show that the development of online resources requires pedagogic expertise and in-depth investigation of its impact on learning (Hey et al, 2016; Muller, 2018) as their effectives in accommodating teachers needs and competences (Murphey et al., 2014).

Intervention 7: Expand non-formal and informal education initiatives
Extracurricular activities have particular importance in compensating for teacher competences, particularly in more non-traditional teaching areas. Entrepreneurship, citizenship, learning to learn competences are new to the Georgian education system and not all schools and classes have the teachers who can successfully accommodate the learning objectives in their teaching. Summer and winter schools, clubs, competitions etc. could provide such students opportunities engage in activities that are aimed at developing the competences. The MoESCS is currently running a programme that supports school project ideas. The programme could be expanded to accommodate school-level and intraschool cooperative projects that are aimed at developing students' competences. For example, a team of teachers in a from different schools can initiative a project aimed at personal, social, and learning to learn competences. In VET, MoESCS is already planning on using clubs and projects as a means of strengthening the development of key competences. Such initiatives provide immediate solution, but they could also lead towards building capacity among teachers, schools, and colleges. Regular meetings among the teachers exchanging experiences, know-how and material can assure continuous development of their expertise (European Commission, 2014). To ensure their effectives, before implementing large-scale interventions, the ministry could consider examining and adopting good practices from other countries and integrating strong evaluation mechanisms in pilot initiatives.

Intervention 8: Develop incentives and resources to differentiate general courses according to VET students' prerequisite competences in the areas.

General VET courses should be relevant to the learners. Not all students need courses in basics of communication skills or information literacy. Therefore, VET providers need flexibility, resources, and incentives to accommodate the general courses to the diversity of student population in general VET programmes. This is a challenging task considering the diversity of student population in terms of their prior experience and training. There are several ways to improve the relevance of the courses. For example, some colleges use student readiness inventory to assess students' competences and then use the assessment results to prescribe certain courses. The approach has proven to be successful in addressing student retention in community colleges in the US and Canada (see e.g. Beatty-Guenter, 1994; Horn et al, 2009; Marshal, 2008). VET admission examination results could be adapted to serve the purpose. The exam results could be used to assess students baseline competences which would allow for placing students in courses that are more relevant to their needs. In the case of the numeracy course, based on student baseline performance level, students could be offered different levels of numeracy courses or given a choice to skip the course altogether.

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APPENDICES

#1: Key Competences in the European Reference Frameworks

KC#1: Literacy

In the European Reference Framework of Key Competences for Lifelong Learning, literacy is defined as "the ability to identify, understand, express, create, and interpret concepts, feelings, facts and opinions in both oral and written forms, using visual, sound/audio and digital materials across disciplines and contexts. It implies the ability to communicate and connect effectively with others, in an appropriate and creative way" (European Parliament and the Council, 2018). Literacy is concerned with the language(s) of schooling, mother tongue, and/or the official language of the country. Literacy includes:

- Knowledge: knowledge of vocabulary, functional grammar and the functions of language, main types of verbal interaction, features of different styles and registers of language;
- Skills: the ability to communicate orally and in writing and motoring and adapt their own communication to the requirements of the situation; abilities to distinguish and use different types of sources, to search for, collect and process information, to use aids, and to formulate and express one's oral and written arguments in a convincing way appropriate to the context; critical thinking and ability to assess and work with information.
- Values: disposition to critical and constructive dialogue, an appreciation of aesthetic qualities and an interest in interaction with others (ibid).

CK#2: Multilingual competence

The European Reference Framework of Key Competences for Lifelong Learning defines the multilingual competence as more than the ability to use different languages appropriately and effectively. The competence also integrates "a historical dimension and intercultural competences; the appreciation of cultural diversity, an interest and curiosity about different languages and intercultural communication; respect for each person's individual linguistic profile, including both respect for the mother tongue of persons belonging to minorities and/or with a migrant background and appreciation for a country's official language(s) as a common framework for interaction" (p. 8). The competence is also considered integral to competences for democratic citizenship (Council of Europe, 2018).

CK#3: Mathematical competence and competence in science, technology, engineering

European Reference Framework of Key Competences for Lifelong Learning defines mathematics competence as "the ability to develop and apply mathematical thinking and insight in order to solve a range of problems in everyday situations." This includes knowledge (numbers, measures, structures, basic operations, mathematical presentations); understanding (terms and concepts); skills (e.g. apply mathematical principles and processes in everyday contexts, follow and assess chains of arguments, reason mathematically, use statistical data and graphs, understand mathematics proof), and attitude (respect for truth and willingness to look for reasons and assess their validity).

Competence in science, technology, engineering includes knowledge (e.g. methods, concepts, principles, theories, technology and technological processes), understanding (impact of

science, technology, engineering, advances, limitations and risks of scientific theories, applications), skills (understanding of scientific process, the ability to use logical and rational thought to verify a hypothesis, ability to use and handle scientific data to reach evidence-based decision, technological tools) and attitudes (critical appreciation and curiosity, concern for ethical issues, support for safety and environmental sustainability)".

KC #4: Digital Competence

Digital Competence was first elaborated in the European Reference Framework of Key Competences for Lifelong Learning. Later, in 2013, the European Digital Competence Framework for Citizens, also known as DigComp was developed as a tool to help improve citizens' digital competences. The DigComp framework was updated in 2017 as DigComp 2.1.

The DigComp 2.1 identifies five competence areas:

1. Information and data literacy: 1.1 Browsing, searching and filtering data, information and digital content; 1.2 Evaluating data, information and digital content; 1.3 Managing data, information and digital content;
2. Communication and collaboration: 2.1 Interacting through digital technologies; 2.2 Sharing through digital technologies; 2.3 Engaging in citizenship through digital technologies; 2.4; Collaborating through digital technologies; 2.5 Netiquette; 2.6 Managing digital identity;
3. Digital content creation: 3.1 Developing digital content; 3.2 Integrating and re-elaborating digital content; 3.3 Copyright and licenses); 3.4 Programming;
4. Safety: 4.1 Protecting devices; 4.2 Protecting personal data and privacy; 4.3 Protecting health and wellbeing; 4.4 Protecting the environment;
5. Problem solving: 5.1 Solving technical problems; 5.2 Identifying needs and technological responses; 5.3 Creatively using digital technologies; 5.4 Identifying digital competence gaps (DigComp 2.1, p.11).
6. The DigComp 2.1 also describes proficiency levels. The levels are defined according to task complexity, autonomy, and cognitive domain.

KC# 5: Personal, social, and learning to learn competence

The European Reference Framework of Key Competences for Lifelong Learning conceptualizes the personal, social, and learning to learn competences as "the ability to reflect upon oneself, effectively manage time and information, work with others in a constructive way, remain resilient and manage one's own learning and career." According to the framework, the competence includes "the ability to cope with uncertainty and complexity, learn to learn, support one's physical and emotional wellbeing, to maintain physical and mental health, and to be able to lead a health-conscious, future-oriented life, empathize and manage conflict in an inclusive and supportive context" (p.10). The competence is broken down into knowledge, skills and attitudes related to the competence. In the framework, personal, learning to learn and social competences are considered to be strongly intertwined concepts.

The competence is also included in the Reference Framework of Competences for Democratic Culture (Council of Europe, 2018). The framework views the personal, social and learning to learn competence as an integral part of competences for democratic culture and intercultural dialogue. For example, the framework includes knowledge and critical understanding of the self, skills of listening and observing, empathy, flexibility and adaptability, cooperation skills, conflict-resolution skills, and attitudes such as respect, responsibility, self-efficacy, and tolerance of ambiguity (ibid).

KC# 6: Citizenship competence

The Council of European Union Recommendation on Key Competencies for Lifelong Learning defines the citizenship competence as “the ability to act as responsible citizens and to fully participate in civic and social life, based on understanding of social, economic, legal and political concepts and structures, as well as global developments and sustainability” (p.10). The competence is also integrated in the Reference Framework of Competences for Democratic Culture (Council of Europe, 2018). The framework extends the notion of competences for democratic culture and intercultural dialogue to competences in citizenship, literacy, multilingual competence, and personal, social, and learning to learn competence (ibid). The framework includes values such as valuing human dignity and human rights; cultural diversity; democracy, justice, fairness, equality and the rule of law. It also covers attitudes such as openness to cultural otherness and to other beliefs, world views and practices, respect, civicmindedness, responsibility, conflict-resolution skills, and knowledge and a critical understanding of the world (politics, law, human rights, culture, cultures, religions, history, media, economies, environment, sustainability) (ibid).

KC# 7: Entrepreneurship competence

Entrepreneurship in the Council of European Union Recommendation on Key Competencies for Lifelong Learning is defined as a competence that “refers to the capacity to act upon opportunities and ideas, and to transform them into values for others.” Later, in 2016, based on EU framework stipulations, the Entrepreneurship Competence Framework, also known as EntreComp, developed a tool to improve the entrepreneurial capacity of European citizens and organizations. In EntreComp entrepreneurship competence is conceptualized as three, intertwined competence areas and 15 competences.

1 Ideas and opportunities
   - 1.1 Spotting opportunities: Use your imagination and abilities to identify opportunities for creating value;
   - 1.2 Creativity: Develop creative and purposeful ideas;
   - 1.3 Vision: Work towards your vision of the future;
   - 1.4 Valuing ideas: Make the most of ideas and opportunities;
   - 1.5 Ethical and sustainable thinking: Assess the consequences and impact of ideas, opportunities and actions.

2 Resources
   - 2.1 Self-awareness and self-efficacy: Believe in yourself and keep developing;
   - 2.2 Motivation and perseverance: Stay focused and don't give up;
   - 2.3 Mobilizing resources: Gather and manage the resources you need;
   - 2.4 Financial and economic literacy;
   - 2.5 Mobilizing others: Inspire, enthuse and get others on board.

3. Into Action
   - 3.1. Taking the initiative: Go for it;
   - 3.2. Planning and management;
   - 3.3. Coping with uncertainty, ambiguity and risk;
   - 3.4. Working with others: Team up, collaborate and network;
   - 3.5. Learning through experience: Learn by doing.

KC# 8: Cultural awareness and expression

Competence in cultural awareness and expression, according to the Council of European Union Recommendation on Key Competencies for Lifelong Learning involves “having an understanding of and respect for how ideas and meaning are creatively expressed and communicated in different cultures and through a range of arts and other cultural forms” (2006, p.11). The Cultural Awareness and Expression Handbook published in 2015 provides interpretations of the competence. The handbook, in short, defines the competence as “appreciation of the importance of the creative expression of ideas, experiences and emotions in a range of media, including music, performing arts, literature, and the visual arts” (OMC, European Union, p. 15).

The handbook proposes that cultural awareness should be understood as “knowing about the importance of culture and arts and developing the capacity to enjoy or be interested in them.” Cultural expression is defined as “communicating feelings or ideas through artistic media and oneself.” According to the handbook, appreciation of the importance of creative expression of ideas, experiences and emotions in a range of media falls under the category of values. Appreciation and enjoyment of works of art and performance and the ability to relate one’s own creative and expressive point of view to the opinions of others should be considered skills essential to self-expression according to the handbook. Skills also include self-expression through a variety of media and the ability to understand social and economic opportunities in cultural activity. An awareness of local, national, and European cultural heritage and their place in the world is also a part of the competence. According to the framework, a solid understanding of one’s own culture and a sense of identity; understanding of the cultural and linguistic diversity in Europe and other regions of the world; the need to preserve it; and the importance of aesthetic factors in daily life are integral to the competence (pp 1618).

#2: Additional Tables and Exhibits

Exhibit 5: Bloom taxonomy as the foundation for conceptualizing learning objectives and outcomes in the 1st edition of the lower-secondary social studies curriculum

Lower secondary education objectives "Teaching the subject should enable students to **see** the diversity of human experience from ancient to current time and also own country's accomplishments on the background of the accomplishments of the humankind. Students should receive the information on the political, social, cultural, religious, and ethnic diversity of both the World and Georgia. Based on the information, students should be able to **analyze** critical historical or geographic events and differences and similarities in the development of different eras and societies. Students should start developing historical thinking: ability to independently **explain** historical events and **analyze** their results; **see** historical processes from different angles (political, social, economic, cultural, religious); **explain** the reasons for different historical interpretations of an event or figures in history; **compare and evaluate** the interpretations. **Locate** historical sources and **analyze** them critically; **compare and analyze** historical materials (written historical sources, archaeological or ethnographic materials, literary works on a historical topic, photo material etc.); **write** an essay on a history topic; **participate** in a debate on a history topic. "

Source: The 1st edition of the National Curriculum, NCAC, 2007. Reviewers verbatim translation from the original.

Exhibit 6: Leaning outcomes in the 2nd and the 3rd editions of the National Curricula

2nd edition of the curriculum	3rd edition of the curriculum
Student can link events and facts with the relevant historical era. The learning is evident if student can: • Describe historical events in a chronological manner, link historical facts to old and new dating systems; • Show dates and time periods on a timeline During group work or in individual assignments; • Identify the century and the millennium of a date in time; • Develop a table, based on the topics discussed in the textbook, that puts important dates in chronological order and assigns to the relevant era (e.g. pre-agrarian, agrarian, industrial, post-industrial)." Mandatory content topics: What is history? 1. How can I learn about our past/time and space? 2. The genesis of humankind	Theme: Prehistoric period/The Stone Age Topics: 1. Dmanisi excavations 2. Paleolithic caves in Georgian and Europe 3. Georgia – one of the oldest agricultural and winery traditions Concepts: Time – chronology, dating system, century, millennium, era Space: continent (Europe, Asia), region (Mediterranean, Middle East, Caucasus, Near East, Central Asia); Georgia's historical and geographic unit. Society: social class, economy, culture, religions, worldview; ethnic group/nation; "culturally different". Historical event/process: political history, social history. Governance: state, democracy Source, historical research: source (primary, secondary), fact/interpretation, stereotype, historiography, disciplines of history. Key questions: - How have we learnt about the Stone Age? - How did people live in the Stone Age? What did their society look like? - How did the ancient humans perceive the world? Why did it practice religious rituals? - How does the Stone Age differ from contemporary time? - Why do scientists refer to agriculture and domestication of animals as a "revolution"? Evaluation Indicators

2nd edition of the curriculum	3rd edition of the curriculum
3. Prehistoric world: modes of substance – hunting and gathering; agriculture (the oldest agricultural society in Georgia), husbandry, crafts, prehistoric religions, tools, prehistoric human settlements. National Curriculum, 2nd edition, 2011, p. 1038.	1. Identify characteristics of the Stone Age/prehistoric period 2. Examine and interpret archaeological and ethnological data 3. Compare Stone Age societies (hierarchy, worldview) to those of contemporary or another historical era 4. Compare the Neolithic revolution to other familiar historical events. Generalizations 1. Prehistoric era is the period from Homo Sapiens to the first states and writing systems. 2. Archaeological and ethnographic data tell us about stone age. 3. In the Stone Age, people mostly used tools made of stones. 4. In the Stone Age, people lived in tribes. 5. Religious rituals were the main form of perception and worldview among prehistoric people. It implies invisible connections between subjects/human beings 6. In the Stone Age, people were hunter-gatherers. Later on, they learnt agriculture and domestication of animals. 7. Oldest human fossils in Eurasia were found in Georgia. 8. Georgia is one of the countries were agriculture was developed. National Curriculum, Third edition, 2016, pp 78-79

Exhibit 7: Common European Principles for Teacher Competences and Qualification in the learning outcomes of Ilia State University teacher preparation programmes.

Common European Principles for Teacher Competences and Qualification	Ilia State University teacher preparation programme learning outcomes
Working with others: They work in a profession which should be based on the values of social inclusion and nurturing the potential of every learner. They need to have knowledge of human growth and development and demonstrate self-confidence when engaging with others. They need to be able to work with learners as individuals and support them to develop into fully participating and active members of society. They should also be able to work in ways which increase the collective intelligence of learners and cooperate and collaborate with colleagues to enhance their own learning and teaching.	Understanding of the importance of inclusion in creating positive learning environment; knowledge of principles of differentiated teaching; knowledge of development and learning theories and understanding of their importance in teaching process; ability to apply teaching and learning theories in practice; knowledge of factors affecting collaborative culture in schools and the awareness of the importance of collaboration in own professional development and improvement of teaching and learning.
Working with knowledge, technology, and information: They need to be able to work with a variety of types of knowledge. Their education and professional development should equip them to access, analyse, validate, reflect on and transmit knowledge, making effective use of technology where this is appropriate. Their pedagogic skills should allow them to build and manage learning environments and retain the intellectual freedom to make choices over the delivery of education. Their confidence in the use of ICT should allow them to integrate it effectively into learning and teaching. They should be able to guide and support learners in the networks in which information can be found and built. They should have a good understanding of subject knowledge and view learning as a lifelong journey. Their practical and theoretical skills should always allow them to learn from their own experiences and match a wide range of teaching and learning strategies to the needs of learners.	Ability to use main methods of evaluation to examine the effectiveness of own practice in order to plan own professional development and improve teaching and learning; Ability to identify problems, analyze them and come up with effective solutions; Ability to use information technologies to improve the effectiveness of teaching and learning; Ability to adopt innovations for professional development; Appreciation of the principle of lifelong learning in teaching profession; Ability to use information technology in communicating with others.
Work with and in society: They contribute to preparing learners to be globally responsible in their role as EU citizens. Teachers should be able to promote mobility and cooperation in Europe and encourage intercultural respect and understanding. They should have an understanding of the balance between respecting and being aware of the diversity of learners' cultures and identifying common values. They should also need to understand the factors that create social cohesion and exclusion in society and be aware of the ethical dimensions of the knowledge society. They should be able to work effectively with the local community and with partners and stakeholders in education– parents, teachers, education institutions, and representative groups. Their	Ability to effectively communicate with students, parents and colleagues; Ability to comply with academic standards in communication.

experience and expertise should also enable them to contribute to systems of quality assurance.	

Table 28: Publications on education topics on in Georgia and Eastern European Countries from 1998 to 2018

Rank	Country	Documents	Citable documents	Citations per document	H index
1	Poland	2725	2530	4.23	39
2	Hungary	999	961	6.69	38
3	Croatia	1493	1447	3.46	32
4	Russian Federation	8169	8077	1.4	31
5	Czech Republic	2124	2075	2.84	30
6	Slovenia	1737	1672	4.02	30
7	Romania	1632	1590	3.37	28
8	Slovakia	1402	1371	3.1	28
9	Estonia	947	929	4.71	27
10	Serbia	1365	1331	3.35	27
11	Georgia	222	212	10.13	24
12	Lithuania	1031	1012	2.34	21
13	Latvia	342	332	3.29	15
14	Ukraine	434	421	2.4	15
15	Bulgaria	1004	930	1.83	14
16	Bosnia and Herzegovina	337	335	1.84	10
17	Armenia	62	61	5.02	9
18	Macedonia	331	311	1.71	9
19	Azerbaijan	48	48	3.6	7
20	Belarus	94	92	1.64	7
21	Albania	56	55	3.02	5
22	Moldova	40	34	2.93	5
23	Montenegro	50	49	1.48	4

Source: Scimago Journal & Country Rank. Retrieved on 02/10/2019

Table 29. Teacher-directed science instruction, PISA 2015

(Percentage of students who reported that the following things happen in their science lessons)

	Never or almost never	Some lessons	Many lessons	Every lesson or almost every lesson
The teacher explains scientific ideas	15.6	45.1	23.4	15.9
A whole class discussion takes place with the teacher	12.1	46.5	29.1	12.3
The teacher discusses our questions	7.9	25.5	36.2	30.4

The teacher demonstrates an idea	19.4	44.0	23.3	13.3

Source: OECD, 2016. PISA 2015 Results (Volume II): Policies and Practices for Successful Schools

Table 30: General courses teachers in public 32 VET programmes

Courses	Total	Female (%)	Age			
			Mean	St. Dev.	Min	Max
Georgian	16	100	48	13	25	68
Foreign language	118	99	41	12	24	73
Civic Education	61	75	41	11	24	69
Numeracy	61	64	53	11	25	76
Entrepreneurship (1, 2, 3)	282	81	45	12	23	76
ICT (1 and 2)	118	69	43	12	23	73
Communication	94	83	45	13	24	72
Total	750	73	44	12	23	76

Table 31: TPDC training modules for VET teachers and administration members (in numbers), January-September, 2019

Training modules	Contact hours	Participation
Students' individual learning needs in professional education	20	540 Teachers
Positive learning environment in professional education	10	493 Teachers
Instructional planning and effective teaching strategies	30	464 Teachers
Competence based assessment in modular professional programs	15	274 Teachers
Teacher professional development in VET institutions	14	483 Teachers
Individual consultations in competence-based assessment	6	98 Teachers
Modular teaching for novel teachers	10	144 Teachers
Developing VET teachers' entrepreneurship competences	24	161 Teachers
Entrepreneurship	m	40 Teachers and Administrators
Strategic Planning	m	32 Administrators

Source: TPDC, 2019 and World Bank, 2020

Table 32: Perceived Feedback in Sciences Classes, PISA 2015

Percentage of students who reported that the following things happen in their science lessons

	Never or almost never	Some lessons	Many lessons	Every lesson or almost every lesson
The teacher tells me how I am performing in this course	8.4	41.0	32.0	18.5
The teacher gives me feedback on my strengths in this class	14.0	43.0	28.8	14.1
The teacher tells me in which areas I can still improve	10.9	38.5	32.9	17.7
The teacher tells me how I can improve my performance	9.2	36.2	34.1	20.5
The teacher advises me on how to reach my learning goals	12.0	32.6	33.0	22.4

Source: OECD, 2016. PISA 2015 Results (Volume II): Policies and Practices for Successful Schools

#3: Methodological considerations for interpreting international assessments

Exhibit 8: Methodological notes on the international and national assessments used in the analysis in Chapter 2

There are certain administration related issues that should be considered in interpreting the results from the international and national assessments discussed in the chapter.

Population Coverage: The international and national assessments usually cover representative samples of student populations. However, in some studies and in some cycles of certain studies, some populations are excluded. The following issues related to population coverage should be considered in interpreting the results from the studies:

- PIRLS: 2016 cycle covers students in schools where the language of instruction is Georgian and Azerbaijani. Adding the Azerbaijani instruction schools and sectors was necessitated by the increase in the relative share of students in Azerbaijani instruction schools in the entire PIRLS target population. PIRLS 2006 and PIRLS 2011 cover only the students who study in Georgian. However, all three cycles are based on a representative sample of the fourth grade population in Georgia.
- TIMSS: The study covers only those students who study in Georgian. Students who study in schools where the language of instruction is Russian, Azerbaijani, or Armenian, are excluded from the assessment. Therefore, the results do not fully reflect Georgian students' performance in TIMSS. As other studies show, the students in the schools where the language of instruction is Azerbaijani or Russian on average perform lower compared to their peers in the schools where the language of instruction is Georgian. Therefore, it could be argued that TIMSS results would have been lower if the populations were included in the study.
- PISA: PISA 2015 and 2018 cover schools with the language of instruction in Georgian, Azerbaijani, Russian, and English. However, in PISA 2015 cycle only 78 percent and in PISA 2018 – 87 percent of the population was covered. The excluded populations include students who left school after completing compulsory schooling and are not enrolled in any educational institution at the age of 15 and also Azerbaijani ethnic minority school students who are enrolled in school but do not actually attend school.
  The majority of other PISA participant countries cover over 90 percent of their target populations. It could be argued that the populations excluded from PISA surveys are among the most disadvantaged and therefore, the results would have been more dramatic if they were included in the study.
  PISA 2018 covers a higher share (83%) of the target population compared to PISA 2015 (78%). Therefore, covering a higher share of the target population could have affected the validity of comparability between the cycles.
- National Assessments in Mathematics and Sciences cover only students in schools where the language of instruction is Georgian. The studies do not cover students in schools where the language of instruction is Azerbaijani, Russian, or Armenian.

Assessment administration mode: Traditionally, the international assessment discussed in the chapter have relied on paper-based assessment. However, during the last years assessments are gradually moving to computer-based administration. The change in the mode of assessment administration has created certain limitations with negative implications for the validity of comparisons between study cycles.

In 2018, Georgia switch from paper- to computer-based assessment in PISA. Evidence from previous studies indicate that administration issues that could partially explain the decline:

- As demonstrated in PIRLS and ePIRLS administered in 2015 (see above), there is a significant difference between student performance in the paper-based PIRLS and computer-based ePIRLS. In should be noted that PIRLS and ePIRLS assessment frameworks do not fully overlap because the objective of ePIRLS is to assess students' ability to navigate and locate information in the internet.
- Most countries of the 32 countries that switched from paper to computer-based assessment in 2012 experienced a significant drop in student performance. Mathematics scores dropped in 15 out of the 32 countries (Jerrim, 2016). Reading scores in several East Asian countries had plummeted (Hong Kong —18 points, South Korea —19 points, Japan —22 points, Taiwan —26 points, Vietnam – 18 points) (Komatsu and Rappleye, 2017). It has been suggested that differences can be explained by the differences in the cognitive processes needed for reading on paper and computer (Jabr, 2013; Mangen, Walgermo, & Brønnick, 2013); screen size and resolution (McKee & Levinson, 1990) and internet use during their reading classes (Komatsu and Rappleye, 2017).

Exhibit 9: PIRLS and ePIRLS International Achievement Benchmarks

PIRLS and ePIRLS study four broad-based processes of comprehension typically used by fourth grade readers: focus on and retrieve explicitly stated information; make straightforward inferences; interpret and integrate ideas and information; and evaluate and critique content and textual elements. There's underlying hierarchy among the processes: while less proficient readers are expected to focus on and retrieve explicitly stated information, more advanced readers can make inferences and explain relationships. Based on the skills demonstrated across these comprehension processes, PIRLS and ePIRLS estimate students' performance levels – Advanced, high, intermediate or low.

Advanced: Interpret story events and character actions to describe reasons, motivations, feelings, and character development with full text-based support; Begin to evaluate the effect on the reader of the author's language and style choices.

High: locate and distinguish significant actions and details embedded across the text, make inferences to explain relationships between intentions, actions, events, and feelings, and give text-based support, Interpret and integrate story events and character actions, traits, and feelings as they develop across the text, recognize the use of some language features (e.g., metaphor, tone, imagery).

Intermediate: Independently locate, recognize, and reproduce explicitly stated actions, events, and feelings, make straightforward inferences about the attributes, feelings, and motivations of main characters, interpret obvious reasons and causes, recognize evidence, and give examples, begin to recognize language choices.

Low: Locate and retrieve explicitly stated information, actions, or ideas; Make straightforward inferences about events and reasons for actions; Begin to interpret story events and central ideas or, in the case of information texts, begin to make straightforward inferences about explanations, actions, and descriptions.

Source: Mullis et al., 2016

Exhibit 10: PISA 2018 reading literacy proficiency levels

Level 6: comprehend lengthy and abstract texts in which the information of interest is deeply embedded and only indirectly related to the task; compare, contrast and integrate information representing multiple and potentially conflicting perspectives, using multiple criteria and generating inferences across distant pieces of information to determine how the information may be used; reflect deeply on the text's source in relation to its content, using criteria external to the text; compare and contrast information across texts, identifying and resolving inter-textual discrepancies and conflicts through inferences about the sources of information, their explicit or vested interests, and other cues as to the validity of the information.

Level 5: comprehend lengthy texts, inferring which information in the text is relevant even though the information of interest may be easily overlooked; perform causal or other forms of reasoning based on a deep understanding of extended pieces of text; answer indirect questions by inferring the relationship between the question and one or several pieces of information distributed within or across multiple texts and sources; produce or critically evaluated of hypotheses, drawing on specific information; establish distinctions between content and purpose, and between fact and opinion as applied to complex or abstract statements; assess neutrality and bias based on explicit or implicit cues pertaining to both the content and/or source of the information; draw conclusions regarding the reliability of the claims or conclusions offered in a piece of text; deal with concepts that are abstract or counterintuitive, and going through several steps until the goal is reached; handle several long texts, switching back and forth across texts in order to compare and contrast information.

Level 4: comprehend extended passages in single or multiple-text settings; interpret the meaning of nuances of language; demonstrate understanding and application of ad hoc categories; compare perspectives and draw inferences based on multiple sources; search, locate and integrate several pieces of embedded information in the presence of plausible distractors; generate inferences based on the task statement in order to assess the relevance of target information; handle tasks that require them to memorise prior task context; evaluate the relationship between specific statements and a person's overall stance or conclusion about a topic; reflect on the strategies that authors use to convey their points, based on salient features of texts; compare and contrast claims explicitly made in several texts and assess the reliability of a source based on salient criteria.

Level 3: represent the literal meaning of single or multiple texts in the absence of explicit content or organisational clues; integrate content and generate both basic and more advanced inferences; integrate several parts of a piece of text in order to identify the main idea, understand a relationship or construe the meaning of a word or phrase when the required information is featured on a single page; search for information based on indirect prompts, and locate target information that is not in a prominent position and/or is in the presence of distractors. In some cases, recognise the relationship between several pieces of information based on multiple criteria; reflect on a piece of text or a small set of texts, and compare and contrast several authors' viewpoints based on explicit information; perform comparisons, generate explanations or evaluate a feature of the text; demonstrate a detailed understanding of a piece of text dealing with a familiar topic, demonstrate basic understanding of less-familiar content; take many features into account when comparing, contrasting or categorising information.

Level 2: identify the main idea in a piece of text of moderate length; understand relationships or construe meaning within a limited part of the text when the information is not prominent by producing basic inferences, and/or when the text(s) include some distracting information; select and access a page in a set based on explicit though sometimes complex prompts, and locate one or more pieces of information based on multiple, partly implicit criteria; can, when explicitly cued, reflect on the overall purpose, or on the purpose of specific details, in texts of moderate length, reflect on simple visual or typographical features; compare claims

and evaluate the reasons supporting them based on short, explicit statements, compare or contrasts based on a single feature in the text; make a comparison or several connections between the text and outside knowledge by drawing on personal experience and attitudes.
Level 1a: understand the literal meaning of sentences or short passages; recognise the main theme or the author's purpose in a piece of text about a familiar topic, and make a simple connection between several adjacent pieces of information, or between the given information and their own prior knowledge; select a relevant page from a small set based on simple prompts, and locate one or more independent pieces of information within short texts; reflect on the overall purpose and on the relative importance of information (e.g. the main idea vs. non-essential detail) in simple texts containing explicit cues.
Level 1b: evaluate the literal meaning of simple sentences; interpret the literal meaning of texts by making simple connections between adjacent pieces of information in the question and/or the text; scan for and locate a single piece of prominently placed, explicitly stated information in a single sentence, a short text or a simple list; access a relevant page from a small set based on simple prompts when explicit cues are present.
Level 1c: understand and affirm the meaning of short, syntactically simple sentences on a literal level, and read for a clear and simple purpose within a limited amount of time. Tasks at this level involve simple vocabulary and syntactic structures.

Source: PISA 2019b. Table I 5.1

Exhibit 11: TIMSS Grade 4 mathematics international benchmark levels

Advanced: Students can apply their understanding and knowledge in a variety of relatively complex situations and explain their reasoning. They can solve a variety of multi-step word problems involving whole numbers. Students at this level show an increasing understanding of fractions and decimals. They can apply knowledge of a range of two- and three-dimensional shapes in a variety of situations. They can interpret and represent data to solve multi-step problems.

High: Students can apply their knowledge and understanding to solve problems. They can solve word problems involving operations with whole numbers, simple fractions, and two-place decimals. Students demonstrate understanding of geometric properties of shapes and of angles that are less than or greater than a right angle. Students can interpret and use data in tables and a variety of graphs to solve problems.

Intermediate: Students can apply basic mathematical knowledge in simple situations. They demonstrate an understanding of whole numbers and some understanding of fractions and decimals. Students can relate two- and three-dimensional shapes and identify and draw shapes with simple properties. They can read and interpret bar graphs and tables.

Low: Students have some basic mathematical knowledge. They can add and subtract whole numbers, have some understanding of multiplication by one-digit numbers, and can solve simple word problems. They have some knowledge of simple fractions, geometric shapes, and measurement. Students can read and complete simple bar graphs and tables.

Source: Mullis et al., 2016

Exhibit 12: TIMSS grade 8 mathematics international benchmark levels

Advanced: Students can apply and reason in a variety of problem situations, solve linear equations, and make generalizations. They can solve a variety of fraction, proportion, and percent problems and justify their conclusions. Students can use their knowledge of geometric figures to solve a wide range of problems about area. They demonstrate understanding of the meaning of averages and can solve problems involving expected values.

High: Students can apply their understanding and knowledge in a variety of relatively complex situations. They can use information to solve problems involving different types of numbers and operations. They can relate fractions, decimals, and percentages to each other. Students at this level show basic procedural knowledge related to algebraic expressions. They can solve a variety of problems with angles including those involving triangles, parallel lines, rectangles, and similar figures. Students can interpret data in a variety of graphs and solve simple problems involving outcomes and probabilities.

Intermediate: Students can apply basic mathematical knowledge in a variety of situations. They can solve problems involving negative numbers, decimals, percentages, and proportions. Students have some knowledge of linear expressions and two- and three-dimensional shapes. They can read and interpret data in graphs and tables. They have some basic knowledge of chance.

Low: Students have some knowledge of whole numbers and basic graphs.

Source: Mullis et al., 2016

Exhibit 13: PISA 2018 mathematics proficiency levels

Level 6: conceptualise, generalise and utilise information based on their investigations and modelling of complex problem situations, use their knowledge in relatively non-standard contexts; link different information sources and representations together and flexibly translate amongst them; apply this insight and understanding, along with a mastery of symbolic and formal mathematical operations and relationships, to develop new approaches and strategies for attacking novel situations; reflect on their actions, and formulate and precisely communicate their actions and reflections regarding their findings, interpretations, arguments and the appropriateness of these to the original situation.
Level 5: develop and work with models for complex situations, identifying constraints and specifying assumptions; select, compare and evaluate appropriate problem-solving strategies for dealing with complex problems related to these models; work strategically using broad, well-developed thinking and reasoning skills, appropriate linked representations, symbolic and formal characterisations, and insight pertaining to these situations; begin to develop the ability to reflect on their work and to communicate conclusions and interpretations in written form.
Level 4: work effectively with explicit models for complex, concrete situations that may involve constraints or call for making assumptions; select and integrate different representations, including symbolic representations, linking them directly to aspects of real-world situations; utilise their limited range of skills and can reason with some insight in straightforward contexts; construct and communicate explanations and arguments based on their interpretations, arguments and actions.
Level 3: execute clearly described procedures, including those that require sequential decisions; can interpret and use representations based on different information sources and reason directly from them; typically show some ability to handle percentages, fractions and decimal numbers, and to work with proportional relationships; reflect that they have engaged in basic interpretation and reasoning. Their interpretations are sufficiently sound to be a base for building a simple model or for selecting and applying simple problem-solving strategies
Level 2: interpret and recognise situations in contexts that require no more than direct inference. They can extract relevant information from a single source and make use of a single representational mode; employ basic algorithms, formulae, procedures or solve problems involving whole numbers. They are capable of making literal interpretations of results.
Level 1: answer questions involving familiar contexts where all relevant information is present and the questions are clearly defined; identify information and carry out routine procedures according to direct instructions in explicit situations; perform actions that are almost always obvious and follow immediately from the given stimuli.

Source: PISA 2019b. Table I 6.1

Exhibit 14: TIMSS grade 4 science international benchmark levels

Advanced: Students communicate understanding of life, physical, and Earth sciences and demonstrate some knowledge of the process of scientific inquiry. Students demonstrate knowledge of characteristics and life processes of a variety of organisms, communicate understanding of relationships in ecosystems and interactions between organisms and their environment, and communicate and apply knowledge of factors related to human health. They communicate understanding of properties and states of matter and physical and chemical changes, apply some knowledge of forms of energy and energy transfer, and show some knowledge of forces and an understanding of their effect on motion. Students communicate understanding of Earth's structure, physical characteristics, processes, and history and show knowledge of Earth's revolution and rotation. Students demonstrate basic knowledge and skills related to scientific inquiry, recognizing how a simple experiment should be set up, interpreting the results of an investigation, reasoning and drawing conclusions from descriptions and diagrams, and evaluating and supporting an argument.

High: Students communicate and apply knowledge of the life, physical, and Earth sciences in everyday and abstract contexts. Students communicate knowledge of characteristics of plants, animals, and their life cycles, and apply knowledge of ecosystems and of humans' and organisms' interactions with their environment. Students communicate and apply knowledge of states and properties of matter, and of energy transfer in practical contexts, as well as showing some understanding of forces and motion. Students apply knowledge of Earth's structure, physical characteristics, processes, and history and show basic understanding of the Earth-Moon-Sun system. Students compare, contrast, and make simple inferences using models, diagrams, and descriptions of investigations, and provide brief descriptive responses using science concepts, both in everyday and abstract contexts.

Intermediate: Students show basic knowledge and understanding of life, physical, and Earth sciences. The can: demonstrate some knowledge of life processes of plants and humans, communicate and apply knowledge of the interaction of living things with their environments as well as impacts humans can have on their environment, and communicate knowledge of basic facts related to human health; apply knowledge about some properties of matter and about some facts related to electricity and to energy transfer, and apply elementary knowledge of forces and motion; show some understanding of Earth's physical characteristics and demonstrate some basic knowledge of Earth in the solar system; interpret information in diagrams, apply factual knowledge to everyday situations, and provide simple explanations for biological and physical phenomena.

Low: Students show basic knowledge of life and physical sciences. The can: demonstrate some basic knowledge of behavioral and physical characteristics of plants and animals as well as of the interaction of living things with their environments, and apply knowledge of some facts related to human health; show basic knowledge of states of matter and physical properties of matter; interpret simple diagrams, complete simple tables, and provide short, fact-based written responses.

Source: Mullis et al., 2016b

Exhibit 15: TIMSS grade 8 science international benchmark levels

Advanced: Students communicate understanding of complex concepts related to biology, chemistry, physics and Earth science in practical, abstract, and experimental contexts. Students apply knowledge of cells and their functions as well as characteristics and life processes of organisms. They demonstrate understanding of diversity, adaptation, and natural selection among organisms, and of ecosystems and the interaction of organisms with their environment. Students apply knowledge of life cycles, and heredity in plants and animals. Students demonstrate knowledge of the composition and physical properties of matter and apply knowledge of chemical and physical change in practical and experimental contexts. Students communicate understanding of physical states and changes in matter in practical and experimental contexts, apply knowledge of energy transfer, and demonstrate knowledge of electricity and magnetism. Students communicate understanding of forces and pressure and demonstrate knowledge of light and sound in practical and abstract situations. Students communicate understanding of Earth's structure, physical features, and resources as well as of Earth in the solar system. Students show understanding of basic aspects of scientific investigation. They identify which variables to control in an experimental situation, compare information from several sources, combine information to predict and draw conclusions, and interpret information in diagrams, maps, graphs, and tables to solve problems. They provide written explanations to communicate scientific knowledge.

High: Students apply and communicate understanding of concepts from biology, chemistry, physics, and Earth science in everyday and abstract situations. Students apply knowledge of cells and their functions and of the characteristics and life processes of organisms. They communicate understanding of ecosystems and the interaction of organisms with their environment and apply some knowledge of human health related to nutrition and infectious disease. Students show some knowledge and understanding of the composition and properties of matter and chemical change. They apply basic knowledge of energy transformation and transfer and of light and sound in practical situations, and demonstrate understanding of simple electrical circuits and properties of magnets. Students apply their knowledge of forces and motion to everyday and abstract situations. They apply knowledge of Earth's physical features, processes, cycles, and history, and show some understanding of Earth's resources, their use, and conservation as well as some knowledge of the interaction between the Earth and the Moon. Students demonstrate some scientific inquiry skills, including selecting and justifying an appropriate experimental method. They combine and interpret information from various types of diagrams, graphs, and tables; select relevant information to analyze and draw conclusions; and provide short explanations conveying scientific knowledge.

Intermediate: Students demonstrate and apply their knowledge of biology, chemistry, physics, and Earth science in various contexts. Students demonstrate some knowledge of characteristics and life processes of animals and human health. They apply knowledge of ecosystems, the interaction of living things, and the adaptation of animals to their environments. Students apply some knowledge of the properties of matter. They also show knowledge of some aspects of force, motion, and energy. Students apply knowledge of Earth's processes, resources, and physical features. They interpret information from tables, graphs, and pictorial diagrams to draw conclusions, apply knowledge to practical situations, and communicate their understanding through brief descriptive responses.

Low: Students show some basic knowledge of biology, chemistry, physics, and Earth science. Students apply basic knowledge of ecosystems and adaptation of animals to their environment, show knowledge of basic facts related to thermal and electrical conductivity and electromagnetism, and show knowledge of some basic Earth science facts. Students interpret simple pictorial diagrams and apply basic knowledge to practical situations.

Source: Mullis et.al., 2016

Exhibit 16: PISA 2018 science proficiency levels

Level 6: draw on a range of interrelated scientific ideas and concepts from the physical, life, and earth and space sciences and use content, procedural and epistemic knowledge in order to offer explanatory hypotheses of novel scientific phenomena, events and processes or to make predictions; discriminate between relevant and irrelevant information in interpreting data and evidence; draw on knowledge external to the normal school curriculum; distinguish between arguments that are based on scientific evidence and theory and those based on other considerations; evaluate competing designs of complex experiments, field studies or simulations and justify their choices
Level 5: use abstract scientific ideas or concepts to explain unfamiliar and more complex phenomena, events and processes involving multiple causal links. They are able to apply more sophisticated epistemic knowledge to evaluate alternative experimental designs and justify their choices, and use theoretical knowledge to interpret information or make predictions. Level 5 students can evaluate ways of exploring a given question scientifically and identify limitations in interpretations of data sets, including sources and the effects of uncertainty in scientific data.
Level 4: use more complex or more abstract content knowledge, which is either provided or recalled, to construct explanations of more complex or less familiar events and processes; conduct experiments involving two or more independent variables in a constrained context; justify an experimental design by drawing on elements of procedural and epistemic knowledge; interpret data drawn from a moderately complex data set or less familiar context, draw appropriate conclusions that go beyond the data and provide justifications for their choices.
Level 3: draw upon moderately complex content knowledge to identify or construct explanations of familiar phenomena. In less familiar or more complex situations; construct explanations with relevant cueing or support; draw on elements of procedural or epistemic knowledge to carry out a simple experiment in a constrained context; distinguish between scientific and non-scientific issues and identify the evidence supporting a scientific claim.
Level 2: draw on everyday content knowledge and basic procedural knowledge to identify an appropriate scientific explanation, interpret data and identify the question being addressed in a simple experimental design; use basic or everyday scientific knowledge to identify a valid conclusion from a simple data set; demonstrate basic epistemic knowledge by being able to identify questions that can be investigated scientifically.
Level 1a: use basic or everyday content and procedural knowledge to recognise or identify explanations of simple scientific phenomena; with support, undertake structured scientific enquiries with no more than two variables; identify simple causal or correlational relationships and interpret graphical and visual data that require a low level of cognitive demand; select the best scientific explanation for given data in familiar personal, local and global contexts.
Level 1b: use basic or everyday scientific knowledge to recognise aspects of familiar or simple phenomena; identify simple patterns in data, recognise basic scientific terms and follow explicit instructions to carry out a scientific procedure.

Source: PISA 2019b Table I.7.1