UNIVERSITY OF CENTRAL ASIA

Education Improvement Programme

Teaching and learning in Schools in Tajikistan:
Current Realities, Future Possibilities
Research report

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Executive Summary

The University of Central Asia initiated its Education Improvement Programme to respond to an urgent need to enhance students' academic achievement and prepare a quality workforce in the mountainous regions of Central Asia to meet the challenges of the 21st century. To achieve the goal of improving students' academic performance it developed a strategic plan. The plan consists of stages of situational analysis, recommendations for policy and practice improvements, implementation of programmes to improve student learning in secondary schools and evaluation of their impact. This report is the completion of the first stage - a comprehensive situational analysis on the current state of secondary education in Tajikistan. A sample of 21 secondary schools from across Khatlon region, the Districts of Republican Subordination (DRS) and Dushanbe participated in the study. Ten schools are in villages, ten in small towns and one in the capital city. 513 students of grades 6-11, 115 teachers, 21 school directors, and 193 parents from the schools were surveyed or interviewed, and 90 lessons taught by the participating teachers were observed for this study. This situational analysis specifically focuses on the teaching and learning of the 21st century skills in the sciences, mathematics, ICT and English.

Increase public spending on education and spend it equitably and efficiently

The schools offer education from grades 1-11. The average number of students in the schools is 1,394. The largest school has 3,222 and the smallest 353 students. A third of schools are housed in dilapidated buildings and half do not have adequate heating and cooling systems. There is also a chronic shortage of infrastructure, equipment and materials for teaching and learning. Schools in disrepair, overcrowded classrooms, 75% of students without textbooks, no experience in conducting scientific investigations, and few, if any, opportunities to develop their ICT skills put Tajik students at risk of not developing the competences needed for success in the 21st century. *It is critical that the government increase public spending on education and spends it equitably and efficiently. It must upgrade school infrastructure and provide schools with essential material resources to achieve the goals for education set out in the state standards for secondary education.*

Build new schools and repair existing schools

A third of the schools are housed in dilapidated buildings. Half of the schools have inadequate cooling and heating systems. There are not enough classrooms for the number of students, so most schools must operate in two-shifts and even in three-shifts. Moreover, classrooms are small and overcrowded with practically no place to move. *It is imperative that the government provide capital investments for new schools and renovations of existing schools and classrooms to ensure conducive conditions for teaching and learning. New schools must have sufficient classrooms to accommodate students in no more than two shifts and their size should enable thirty-five to forty students to study comfortably in them. The need for new schools is urgent given the upward demographic trend.*

Provide sufficient and up to-date resources to facilitate high-quality science teaching and learning

There is a serious inadequacy of infrastructure, equipment and resources for science. Only half the schools have laboratories for physics and chemistry and only a third for biology. Only 19.6% of the teachers report adequate laboratory equipment and 10.2% adequate materials. Teachers and school directors believe the lack of adequate infrastructure, equipment and materials hinders the teaching and learning of science. *It is essential to provide capital investments and a recurring budget for science laboratories with sufficient and up to-date equipment and materials for scientific investigations*.

Provide schools with computers and high-speed internet

There are on average 25 computers in a school, but many are outdated or not in working order. Only four of the schools have internet access. Given the ubiquitous use of ICTs in every aspect of life it is crucial that computers with high-speed internet access are sufficient and easily available to develop students' ICT competence through ICT-embedded teaching and learning in the schools. *It is recommended that the state programme for the introduction of ICT in educational institutions be given priority and fully implemented by providing all schools with sufficient computers with high-speed internet service. Computers with high-speed internet will facilitate students in developing their ICT competence by allowing teachers to embed ICT into teaching and learning and personalize learning for diverse students. It will also enable schools to establish digital libraries, providing access to e-textbooks and a range of digital resources for teaching and learning of STEM, ICT and English. Further, science teachers will be able to conduct simulations and real-time experiments in online laboratories.*

Ensure girls complete general secondary education

There are on average 672 girls and 721 boys in the schools. Girls drop out in lower secondary school mainly because of poverty and conservative social norms concerning gender roles in Tajik society where boys are expected to be bread winners and girls to stay home to take care of the family. In this study 28% of students report working for pay. This is most likely because they must contribute to family income. *It is important to raise awareness on the importance of girls' education and put tangible measures in place to ensure gender equality in education to ensure a better future not just for girls but also for the country.*

Undertake a fundamental reform of teacher remuneration to attract and retain teachers

92.9% of teachers have a higher education diploma (equivalent to a bachelor's degree), the qualification required to teach in schools in Tajikistan. But 7.1% do not have the required qualification. This indicates a shortage of qualified teachers. Moreover, the 27.4% of teachers currently at retirement or post retirement age presages a severe shortage in the future. Furthermore, the school directors reporting great difficulty in hiring qualified teachers to fill vacant posts in physics (70.6%), mathematics (66.7%), informatics (57.1%), chemistry (53.1%), English language (35.7%), and biology (23.1%) is yet further evidence. The main reasons for

this are poor teacher remuneration and a promotion system based on seniority. With teacher pay inadequate for living a decent life and the lack of a systemic and transparent performance evaluation system, competent young people are not attracted to the teaching profession and conditions are not conducive to retaining high-quality teachers. *It is imperative that the government undertake a fundamental reform of teacher remuneration and put in place a systemic and transparent performance evaluation mechanism to attract and retain competent young people to the profession.*

Use innovative ways to address teacher shortages

In addition to the general shortage of teachers, there is also a shortage of qualified and experienced teachers especially in physics, chemistry, mathematics and informatics. This shortage will undoubtedly be exacerbated as teachers at retirement and post-retirement age leave the system and demographic developments put additional pressure on the system. *It is recommended that initial teacher education programmes be developed to allow prospective teachers to specialize in at least two disciplines by offering double degrees or by obtaining a major in one discipline and a minor in a related discipline. It is also recommended to recertify existing teachers to teach another discipline related to the one they are currently certified in. Moreover, professionals in the field could be required to take certain teacher education courses and be certified to teach.*

Set a minimum number of days for students and teachers to attend school and ensure there are no interruptions during lessons

The school climate is amicable. There is a friendly and supportive relationship among students, a respectful relationship between teachers and students and a cooperative relationship among teachers. The relationship between all school groups is respectful and cooperative. A factor negatively impacting school climate is the absenteeism and late arrivals for class by teachers and students and the number of class cancellations and interruptions. A quarter of students missing an entire school day, skipping some lessons and arriving late for others and being late for school at least once a week is a high percentage and detrimental for learning. When combined with teacher absenteeism, class cancellations and interruptions it only exacerbates the harm to student learning. *The government should set the minimum number of days teachers and students must attend school. Moreover, school leaders must address the issue of class cancellations and interruptions by better scheduling of meeting and encouraging active and authentic learning which are known to reduce student absenteeism. Furthermore, school leaders must educate parents about the importance of regular attendance and punctuality for learning.*

Give schools more autonomy and build school leaders capacity to use their autonomy effectively

The Ministry of Education and Science, its departments and the local education authorities have control over school budgets, the curriculum, student assessment, teacher salaries and teacher professional development. Schools only have autonomy with respect to the everyday functioning. *It is recommended that school directors be given greater autonomy in determining*

and using budget allocations to address human and physical resource shortages. They should also be given more autonomy with respect to curriculum and instruction to improve student academic achievement. At the same time, the capacity of school directors should be built to use their autonomy to make their schools more effective.

Develop all subject curricula based on the state standards for secondary education, set benchmarks for primary, lower and upper secondary levels, identify clear learning outcomes for each subject grade-wise and assessments as per SSSE guidelines

The State Standards for Secondary Education (SSSE) approved in 2015 are clearly aimed at developing students' curricula and 21st century skills. They are very ambitious and rightly so. However, with only a few subject curricula developed on the competence-based framework to-date and textbooks yet to be developed it is highly unlikely the goals of the SSSE will be met in the near future. Key limitations of the curricula thus far developed are the lack of benchmarks at each developmental level (primary, lower secondary and upper secondary), clear statements of student learning outcomes grade-wise, a major focus on subject knowledge, and paper-based summative assessments even for the assessment of ICT skills! Other limitations are, the absence of exemplars of general and subject pedagogies, ICT embedded teaching and learning and formative and summative assessments. *It is imperative the curricula for all subjects based on the SSSE 2015 are developed immediately. Moreover, the new and existing subject curricula be developed to address the limitations identified above. Furthermore, as a competence-based education system differs greatly from a knowledge-based system it is essential that each subject curriculum include exemplars of general and subject-based pedagogies, technology-embedded teaching and learning and formative and summative assessments. This will facilitate realization of the student learning outcomes and the goals of the SSSE.*

Develop professional standards for teachers

There are no professional standards for teachers specifying what they should know, be able to do and the qualities of character they should have. Teacher professional standards delineating the competences teachers must have to play new roles and enact new teaching practices is a first step to ensuring effective implementation of the new competence-based curricula and realization of the goals of the new SSSE. Teacher professional standards are essential as they serve as a framework for decisions regarding selection of teachers, guide their professional development and determine career advancement. *It is recommended that teacher professional standards be developed immediately specifying what teachers should know, be able to do and the character qualities they should have to provide education for the 21st century.*

Redesign initial teacher preparation programmes and use the redesign process to further the professional development of the teacher educators

The teachers hold traditional educational beliefs and subscribe to contemporary ones when presented with statements about them. They rate their knowledge and teaching skills very highly but in practice use the Banking method of education - teacher transmission of subject knowledge and student rote memorization (Freire, 1970). They transmit subject content through lectures

(dictate notes) and ask lower order questions to get students to regurgitate it. Assessment is a mark on a four-point scale given at the end of each lesson and term tests require regurgitation of factual knowledge. While this data is from in-service teachers, it is evidence of poor-quality initial teacher education programmes. *It is recommended that new initial teacher education programmes be designed to ensure the development of teachers as per the professional standards and to enable them to play new roles and enact new practices according to the requirements of a competence-based education system. Initial teacher education programmes must include a well-designed and implemented practicum to ready prospective teachers to engage in effective classroom practice. It is also recommended that experts in teacher education be invited to develop and offer a continuing professional development programme for existing teacher educators in universities and pedagogical institutes to prepare them to design and offer the new programmes.*

Prepare science teachers to facilitate students conduct of science investigations, interpret data and discuss evidence scientifically

Science teachers express a high level of preparedness to teach the science curriculum, but not all aspects of it. They feel best prepared to teach subject knowledge. They are less confident in their abilities to design and conduct scientific investigations and enquiry, interpret data and discuss evidence scientifically. They are least confident in embedding ICT in the teaching and learning of science. They express conflicting views about the best ways for learning science, thinking it is important for students to learn and memorize facts and procedures as well as ask many questions about phenomena scientifically. The self-reports of their practice and lesson observations reveal traditional teaching practices: teacher transmission and student memorization of subject knowledge. *It is recommended that both initial and continuing teacher education prepare science teachers to facilitate students' explanation of phenomena scientifically, design and conduct scientific investigations and enquiry, and interpret data and evidence scientifically. They must also prepare them to use ICT to facilitate teaching and student learning of science. They must be taught not only to demonstrate but to teach students how to design and conduct experiments using easily available materials and through online simulations when specialist equipment and materials are unavailable. It is vital they be provided with school-based support to effectively implement their new learning in their lessons.*

Prepare mathematics teachers to develop students' problem solving and higher order thinking skills and use them to solve real-world problems with the support of digital technologies

The mathematics teachers' confidence in their preparedness to teach the mathematics curriculum is varied with only 25% feeling very well prepared to teach subject knowledge, use pedagogies such as cooperative learning, discussion and enquiry, and conduct summative assessments. More teachers feel unprepared to teach students to think abstractly, use ICT to learn mathematics and use formative assessment to facilitate student learning. Similar to the science teachers they hold traditional beliefs but see value in statements of contemporary practice such as students learn mathematics best by solving real-world problems. In mathematics lessons, they act on their

traditional beliefs, demonstrating how to solve textbook problems on the board and having students solve similar problems using the same method. Teaching students to reason logically, think abstractly and apply mathematics knowledge to real-world situations is not exercised. *It is recommended that initial and continuing teacher education programmes prepare mathematics teachers to use instructional strategies that encourage students to solve problems (textbook and real-world) justifying the method used and explaining how they arrived at the solution, and to use both general and subject specific digital technologies for teaching and student learning of mathematics. Moreover, they be taught to use formative assessment to improve student learning and develop authentic tasks for assessment of learning. Teachers be coached to effectively implement their new learning and work collaboratively to further improve it.*

Prepare informatics teachers to use project-based learning to develop ICT skills for life and work

The informatics teachers convey confidence in their preparedness to teach their subject. They express contemporary beliefs about the teaching and learning of informatics indicating the most effective ways to learn it is by making connections to real life and having students do team projects. However, teacher demonstration is the most common instructional strategy used in lessons. Teachers seldom have students work on extended projects or facilitate development of ICT skills used in everyday life, such as, browse the internet for information, communicate via email, edit digital photos, or create file folders on the computer. One could argue, common ICT skills are not developed because of a lack of ICT infrastructure and resources, but this argument does not hold entirely as even common skills that can be developed without internet access are not developed. Moreover, students access to computers and mobile phones at home is not taken into consideration. *It is recommended to improve ICT infrastructure and resources in schools and provide initial and continuing teacher professional development in pedagogies that encourage learning by doing such as project-based learning. Moreover, teachers should be encouraged to innovate to address resource limitations.*

Support existing English teachers to attain proficiency to B2 level on the CEFR and appoint new English teachers with a minimum B2 level

Of all the teachers, the English language teachers indicate the least preparedness to teach the curriculum. Teachers believe the grammar-translation method is effective, with students memorizing as much vocabulary and grammar rules as possible. Observations of English lessons indicate this is the predominant method with most of the lesson delivered in Tajik rather than in English. Vocabulary is translated, texts are read and translated, questions are translated. When students speak in English it is generally to share memorized content. Teaching in most English language lessons is poor because most of the teachers own language skills and professional knowledge are weak. *It is recommended that as part of the state programme for the improvement of teaching and learning of English, the English language skills of all in-service teachers be assessed, and they be provided professional development to attain proficiency at B2 level on the CEFR. It is also recommended to make B2 the requirement for English teachers and ensure*

teachers attain this level by the end of their initial teacher education programme. In three years, the required level be raised to C. At the same time provide in-service teachers with scripted lesson plans to facilitate teaching that develops students grade-level proficiency in English language.

Develop a comprehensive continuing teacher professional development programme

All the teachers participate in in-school professional development activities, observing each other's lesson and engaging in dialogue with colleagues which has a positive impact on their teaching. These activities are important but if teachers are to stay up to-date in their profession, they must have access to professional development external-to-the-school. Only 39.3% of the teachers attended professional development programmes external-to-the school. Nearly all teachers want more professional development but because of the lack of financial resources and relevant offerings they do not obtain it. The areas of highest need identified by the teachers are subject knowledge and understanding and ICT skills. Other areas of high need are understanding the new competence-based curriculum, developing cross curricula skills and learning new instructional strategies and assessment practices. *It is recommended that the continuing professional development programme include a well-structured and delivered induction and mentoring programme for new teachers and in-house and external-to-the-school professional development activities for all teachers to be delivered in phases. In the first phase, teachers be facilitated in understanding the competence-based curriculum for their subject and enhancing their subject knowledge and skills and ICT skills. In the second phase, teachers be provided with scripted lessons or unit plans (series of lessons) with all supporting teaching and learning resources. The scripted lesson will not only facilitate teachers in effectively developing students' knowledge, skills and attitudes but also further the teachers' own teaching competences. The third phase focus on teachers across the school learning and implementing an instructional strategy to develop a cross curricula skill in the subject they teach. The fourth phase introduce another instructional strategy with a focus on using formative assessments to diagnose and address learning gaps, use of rubrics for performance assessment and summative assessment to assess achievement of the learning outcomes. The continuing professional development programme be delivered over time (3-5 years) with school-based coaching to facilitate teachers in effectively implementing their new learnings in their lessons and methodology days structured for teachers to come together to discuss what worked, what did not work, identify ways to improve, implement the improved ways and return to discuss how it worked. At the same time a certification programme be developed and offered to methodologists in schools, in district education departments and in institutes for pedagogical development (IPDs) to prepare them to offer the new programme. The university certification courses must develop the knowledge and skills methodologists need, include in-school application of learning and lead to professional qualifications such as a post-graduate certificate in education (PGCE) and further to a master's degree.*

Provide budgetary support for schools to implement the comprehensive continuing teacher professional development programme

Nearly all teachers want and as this study shows all teachers need more professional development but only 10% of schools have a budget for it. Because of the lack of financial resources, teachers participate in professional development programmes offered for free, rather than on need or pay to attend offerings they see as relevant to them. *The government should include allocations for continuing teacher professional development in budgetary support to schools. This support be based on the professional development activities planned for the year and future support on the outcomes of the previous year.*

Ensure all stakeholders understand that all children can learn and prepare teachers to teach a class of diverse students

Science (44.7%), mathematics (41.7%), and English (76.1%) teachers believe only academically competent students should study their subjects. Moreover, this belief is reflected in their teaching practice where teachers consistently call on a few 'good' students, ignoring the rest. This is very concerning as research shows teacher expectations of students can influence students' academic achievement (de Boer, et al., 2018; Rosenthal & Jacobson, 1968*).* This means that around half of the students may not achieve academically because their teacher believed they could not and acted in ways that fulfilled the belief! *It is recommended that initial and continuing teacher professional development programmes help teachers understand that all children can learn and that while having a talent is great, what makes children successful is the effort they make to learn and how teachers respond to their efforts. Moreover, the programmes must provide teachers with the knowledge, skills and attitudes to design learning tasks for a class of diverse students, ways to assist and encourage them to complete tasks and praise them for the effort made to successfully complete them.*

Address the gender bias of mathematics and science teachers

Although many mathematics and science teachers are female, and assessments of learning including tests in mathematics and the sciences conducted by EIP in Tajik schools, show no significant difference in the academic performance of boys and girls, nearly half of the mathematics (41.7%) and science (40.4%) teachers believe boys are better than girls at learning their subjects. This finding is troubling as research shows it has a negative impact on girls studying these subjects and making careers in them. *It is recommended that initial and continuing teacher professional development programmes help teachers understand there is no evidence of gender influencing student performance, rather it is gender-based stereotypical thinking and actions that results in gender differences in academic achievement. It is also recommended to teach teachers the strategies to use in their lessons that ensure both girls and boys attain the learning outcomes in the mathematics and science curricula.*

Conduct national assessments of learning at each developmental level and use the findings to set improvement levels and support schools to realize them

In terms of student learning, the test of application of knowledge to real-world situations conducted by UCA-EIP on a sample of 909 students of grades 7, 9 and 11 in the sciences, mathematics, and English. The test measured student performance in grade 7 at three levels and grades 9 and 11 at six levels. The results reveal the following: In science, in grade 7 only 41.48% of students attained test levels 1-3. 58.52% could not attain level 1. In grade 9, only 34.78% of students attained test levels 1-5. Not a single student was able to answer any question at level 6 and 65.22% could not attain level 1. In grade 11, only 39.99% of students attained levels 1-3. Not a single student answered any questions at levels 4-6 and 60.01% could not attain level 1. In mathematics, the results are similar to science but with more students not reaching level one. In grade 7, only 31.92% of students attained test levels 1-3. 68.08% could not even attain level 1. In grade 9, only 34.12% of students attained test levels 1-3. Not a single student could answer questions at levels 4-6 and 65.88% could not attain level 1. In grade 11, only 35.16% of attained test levels 1-4. No student answered questions at levels 5-6 and 64.84% could not attain level 1. In English the results were similar but with students in grade 7 and 9 only able to answer questions upto level two and grade 11 students answering questions only upto level three. Also, more students were unable to reach even level 1. In grade 7, only 39.60% attained test levels 1-2. Not a single student could attain level 3 and 60.40% could not attain level 1. In grade 9, only 33.24% of students attained test levels 1-2. No one answered questions at level 3-6 and 66.76% could not attain level 1. In grade 11, only 29.86% of students attained test levels 1-3. No student answered any question at levels 4-6 and a high 70.14% could not even attain level 1. Over 60% of students not able to reach the basic level in mathematics, science and English is very concerning. Moreover, in English students were unable to write even a single sentence at all three grade levels. Furthermore, results show that of the two variables, location and gender tested for, only location influenced student performance with students in villages performing better than those in small towns. There was no significant difference between the performance of boys and girls in all three subjects. The poor performance on the tests is probably influenced by the way students learn. Data from this study shows that rote memorization is the dominant learning strategy both in and out-of-the-classroom. Other contributing factors could be student and teacher absenteeism and tardiness, teachers being ill-prepared for lessons and having low expectations of students and a severe lack of teaching and learning resources. *It is recommended that national assessments of learning be conducted at grade 4 (end of primary school) and 9 (end of compulsory schooling) on a random sample of students every three years. The assessment be aimed at identifying how well students attain the learning outcomes in Tajik, mathematics and the sciences. It is further recommended that from each national assessment, the goals for all students to reach by the next assessment be determined, communicated to all schools and the government provide the necessary support to schools to achieve them.*

Provide all students up-to-date textbooks for all subjects

There is a severe shortage of textbooks for students! On average only 25% of students have a textbook most of which are old and outdated (from Soviet times). As such, the textbooks would not facilitate students in achieving the competences identified in the curricula and state standard. *It is imperative that each student be provided an up-to-date textbook to acquire the 21st century competences delineated in the curricula and state standard. Developing quality textbooks requires expertise and time. It is recommended that quality textbooks already available in the market be reviewed, contextualized, translated and approved for use in schools.*

Bring the assessment system in schools and for university entrance in line with the requirements of a competence-based education system.

Data from this study reveals that students engage in lower order thinking activities much more frequently than higher order thinking ones in their lessons, memorization is still the dominant student learning strategy and they make little use of ICT for learning. *The assessment system both in schools and for university entrance must be brought in line with the requirements of a competence-based education system. This will facilitate the teachers to translate their constructivist educational views into everyday practice by using pedagogies such as cooperative learning, enquiry, project-based learning, giving challenging and ICT embedded home assignments, and using formative and authentic summative assessments to develop students' curricula and cross curricula skills.*

Direct students' high motivation, education and career aspirations into STEM and IT professions

Students hold positive attitudes and are highly motivated to learn, have high educational and career expectations which is promising. The data shows that 40% of students want careers in health care, others are mainly interested in being teachers, lawyers and government servants, a few want to be entrepreneurs, and none are interested in IT or other science and engineering professions. The students career expectations may not bode well for them attaining their dream job nor for addressing the country's future workforce needs. *It is recommended that a career counselling programme be set up for students to make them aware of the range of professions currently available, the knowledge, skills and attitudes required by professionals in specific fields and the future job opportunities both at home and abroad. Moreover, students be encouraged into the IT, science and engineering professions.*

Use students' positive perceptions of school and the supportive learning environment at home to challenge them intellectually and enable them to improve their performance

In terms of well-being, most of the students report their parents own the home they live in, provide a comfortable home and supportive learning environment and also spend time before and after school talking with them, enquiring about their school day and encouraging them to do well at school. They have very positive perceptions about their school lives and their relationships with their teachers and peers. They are motivated to learn and have high educational and career expectations which they anticipate meeting. They also regularly spend time talking

and playing with their friends. Most students feel a sense of well-being in all its dimensions with 51.5% reporting they are very satisfied and 35.6% satisfied with their current lives. There are about 12% of students who do not have high education and career expectations and indicate some dissatisfaction with their current lives. *It is recommended that teachers use students' positive perceptions of their lives at school and the supportive learning environment at home to challenge them intellectually and enable them to improve their performance. They must also find the reasons for some student's low education and career expectations and dissatisfaction with their current lives and provide relevant assistance where needed. They must also educate parents on how to facilitate their adolescent children's learning to enable improved performance.*

Develop professional standards for school directors and use them to design programmes to prepare them to enter and continue working effectively in the position

Most school directors come through the ranks of teachers with many having also served as deputy directors. There is, however, no criteria nor a systematic process for their appointment. Appointments are made by their colleagues all the way up to the President of the country. They are also changed frequently. They average 3.9 years in the role with 63% of them having been in this position for less than two years! They are expected to be visionary leaders, skilled administrators, instructional leaders, effective human resource managers, good public relations officers, and adept fund raisers. There are, however, provided no formal education prior to assuming the position of school director and few opportunities for continuing their professional development, limiting the effectiveness with which they could play their roles and fulfill their responsibilities. *It is recommended to develop professional standards for school directors and use them to appoint school directors to the position and develop formal programmes to prepare them to enter the profession. Existing school directors be offered a continuing professional development programme (CPDP) focusing on identifying educational goals for the school, facilitating teaching and learning to achieve the goals and systematically monitoring and evaluating achievement of the goals. The CPDP must be structured, practical and regular to enable them to achieve the set goals.*

The teacher appraisal system in schools clearly distinguish between appraisal for development and appraisal for performance evaluation. Appraisal for development result in need-based professional development and appraisal for performance evaluation in reward or censure

All the teachers are frequently appraised through observations of teaching and generally receive feedback following lesson observations from multiple sources both internal and external-to-the-school. There is no mechanism to record observations, feedback is general and provided orally. Most importance in feedback is given to class management, student discipline and subject knowledge. The least importance is given to achievement of student learning outcomes, test scores and pass rates. This is concerning as the purpose of teacher appraisal and feedback is to enhance student achievement through improved teaching. The most important outcome of the appraisal is an increase in confidence as teachers and the least likely outcomes are more

opportunities for professional development or rewards, such as an increase in salary. Most teachers claim the appraisal system is fair and helpful but find it ineffective as it has little impact on their teaching and teachers who show sustained poor performance are not dismissed. Moreover, 58% perceive the appraisal and feedback process is undertaken simply to fulfill administrative requirements rather than improving teaching quality and students' learning outcomes. *It is recommended that the teacher appraisal system clearly distinguish between appraisal for development and appraisal for performance evaluation. Teacher appraisal for development must be clearly linked to provision of professional development aimed at improving teacher performance and thereby student learning outcomes. Teacher appraisal for performance evaluation be clearly linked to rewards for good performance and dismissal for sustained poor performance. The government should also put in place a career ladder for teachers and use it to reward sustained high performers.*

Parental involvement be furthered to assist schools to achieve higher academic standards and by schools educating parents on ways to further their children's academic socialization.

Parents actively engage with and support their children in their lives at home and at school. They have high expectations for their children and consequently of their children's schools. Parents expect their children to obtain good grades, complete secondary education and obtain higher education. While most parents do not have a choice in school selection there being only one school in the neighbourhood, where options exist, 40% report choosing the school based on the quality of education. School directors claim most parents put pressure on the school to achieve higher academic standards. Parents feel the schools meet their expectations of preparing their children for university (81%), for work (58%) and for responsible citizenship (67.8%). Parents play an active role in the schools providing monetary and non-monetary support. *It is recommended that the positive parental involvement in their children's education be further developed by educating parents on how best to support schools to achieve higher academic standards and on ways to further their children's academic socialization through providing informal, experiential and work-based learning opportunities.*

List of Abbreviations and Acronyms

AOE	Academy of Education
BoT	Board of Trustees
DED	District Education Department
DRS	Districts of Republican Subordination
FGD	Focus Group Discussion
GDP	Gross Domestic Product
HBoT	Head, Board of Trustees
HoM	Methodological Head
HoPC	Head, Parents Committee
KII	Key Informants Interviews
ICT	Information Communication Technology
IPD	Institute of Professional Development
MoES	Ministry of Education and Science
NDS	National Development Strategy
NTC	National Testing Center
NSED	National Strategy for Education Development
OECD	Organization for Economic Cooperation and Development
PC	Parents Committee
PDW	Professional Development Workshop
RIITT	Republican Institute for In-Service Teacher Training
PISA	Programme for International Students Assessment
PVET	Primary Vocational Education and Training
SES	Socio-Economic Status
SIP	School Improvement Plans

SPC	School Parent Committee
SSSE	State Standards for Secondary Education
SD	Standard Deviation
STEM	Science Technology Engineering and Mathematics
TALIS	Teaching and Learning International Survey
UCA-EIP	University of Central Asia's Education Improvement Programme

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Section I: OVERVIEW OF THE STUDY

The Country Context

Tajikistan is a land-locked country in Central Asia. It is bordered by Afghanistan to the south, Uzbekistan to the west, Kyrgyzstan to the north, and China to the east. It covers an area of 143,100 km^2 with over 90% of it being mountainous. The capital is Dushanbe. The four provinces are: Khatlon with its capital city Kulyab, Sughd with its capital city Khujand, Gorno-Badakhshan Autonomous Oblast with its capital city Khorog, and 13 Districts of Republican Subordination (DRS).

As of 2020, Tajikistan's population is estimated to be over 9 million, with a growth rate of 2.4%, the highest in Central Asia. Over 80 nationalities and ethnic groups reside in Tajikistan. Most are Persian-speaking Tajiks (79.9%) with a significant Uzbek population (15.3%). Russians, Tatars, Kyrgyz and other ethnic groups make up the rest of the population. Only 26.69% of the population is urbanized (World Bank, 2014). The official language is Tajik, but Russian is also frequently used.

The economy of Tajikistan was severely affected by the collapse of the Soviet Union and independence in 1991 and the five-year civil war that followed. As a result of the civil war, the country's GDP fell by more than 60%, while labor productivity fell to 35% from 1991 levels. After gaining peace and consolidating resources in the 2000s, key reforms have been implemented resulting in the growth of the economy and financing of social sectors needs including education. Despite a significant increase in GDP not enough jobs were created for the growing workforce, with official employment increasing by only 2.1% in 2018 compared to 2010. It is estimated that at least an eight of the population is working abroad and remittance from labour migrants are estimated at 50% of GDP (CIA, 2016). Thus, making Tajikistan the most remittance-dependent country in the world (World Bank, 2018).

To ensure continued economic growth and create jobs for a growing workforce a strong link needs to be established between the national education system and the domestic labor market. Education in both vocational-technical specialities and academic disciplines must be in keeping with needs of the economy.

The Educational Context

At independence, Tajikistan had a very high literacy rate of 99.8%. Currently, however, the system faces issues of access and quality of education for all. The key challenges to education are the high population growth rate, "brain drain" from the education sector due to migration, insufficient funding, poor learning conditions and outdated management and planning (ADB, 2015). The government of Tajikistan has been making considerable efforts through its legal framework and policies to improve access to quality education for all.

The legal and policy framework for education

Legal framework

Education is a national priority in Tajikistan and is enshrined in article 41 of the Constitution. According to Article 41 of the Constitution (1994) and Article 12 of the law "On Education" (1993)

all children must complete nine years of education (grades 1-9). It also guarantees free education in state educational institutions for higher secondary education (grades 10-11), secondary professional and vocational education, secondary special education, and higher education on a competitive basis.

Since independence, the Government has adopted several laws and regulations that determine state policy in the field of education. There are ten basic laws governing activities in the field of education (see table 1). Some of them have been revised several times, including over the past few years. In general, all laws and regulations are aimed at modernizing the education system, achieving equal access to education, improving the quality of education, addressing gender issues, and eliminating poverty by raising the level of education among the population.

Date of adoption/latest revision	Full name of the regulatory legal act
May 17, 2004	Law of RT "On Education"
May 21, 1998	Law of RT "On scientific activity and state scientific and technical policy "
May 10, 2002	Law of RT "On the Academy of Sciences"
April 22, 2003	Law of RT "On primary vocational education"
December 8, 2003	Law of RT "On higher and postgraduate education"
August 2, 2011	Law of RT "On the responsibility of parents for the education and upbringing of children"
April 16, 2012	Law of RT "On Continuing Education"
December 31, 2013	Law of RT "On Preschool Education and Upbringing"
August 8, 2015	Law of RT "On secondary vocational education"
February 24, 2017	Law of RT "On adult education"

Table 1: The main regulatory framework of the education sector of the Republic of Tajikistan (RT) Adapted from Mirzoev (2016). Tajikistan Joint Sector Review Education Sector Synthesis Report. Dushanbe, Tajikistan.

Policy Framework

Education sector development is governed and regulated by the National Development Strategy (NDS), the National Strategy for Education Development (NSED), and several medium-term implementation plans and state programmes consistent with the NDS and NSED. At the time of this study education development was governed by the NDS 2016-2030 and the NSED 2012-2020. The achievement evaluation and preparation of the new NSED 2021-2030 was underway.

Over the past twenty years (2000-2019), twenty-nine state programmes were adopted and implemented by the Government of Tajikistan. Twenty-three have ended, some have been extended under the same title or renamed and six are still being implemented. The programmes impacting secondary education are listed below.

- State Education Development Program of the RT for 2010-2015
- State Program on Construction, Repairs and Renovations of Schools for 2008-2015 – for schools located in private houses, carriages, administrative buildings
- State Program on Development and Publication of Books for 2007-2010
- State programme to improve the teaching and learning of Russian and English in the RT for the period until 2030 (No 438 dated August 30, 2019) (extension of programme 2001-2014)

- State programme for the education of patriotism and strengthening the national mentality of youth of the RT for 2018-22 (No 79 on March 1, 2018).
- State programme for the introduction of ICT in educational institutions of the RT for 2018-2022 (No.328 of June 21, 2018) (extension of programme for computerization of basic secondary education 2008-2010 and computerization program for general education institutions 2011-2015)
- State programme for the development of private education of pre-school and general secondary education in the RT for 2014-2020 (No. 295 dated May 3, 2014).

The management of education

The administration of education in Tajikistan is shared across various levels of government. At the Republican level, the Ministry of Education and Science (MoES) is responsible for overall planning for educational development and manages all levels of the education system except for PVET (managed by Ministry of Labor, Migration and Employment). It is responsible for setting, implementing, and monitoring state policies and standards, and the development of curricula. Provincial government authorities implement state policies concerning education and develop regional educational programmes. District level education departments supervise schools. Schools are managed by directors supported by deputy directors.

The Academy of Education (AOE) of the MoES is an independent scientific state organization, whose activities include development and implementation of theoretical and practical education and coordination of scientific research activities in the education sector. The Republican Institute for In-Service Teacher Training (RIITT), a division of the AOE, is responsible for the retraining of in-service education sector employees. RIITT operates through a central office and a regional office in Dushanbe and regional offices in each provincial capital.

The National Testing Center (NTC) is run under the aegis of the President of Tajikistan and operates in close cooperation with the MoES. It organizes and conducts the centralized entrance examination (NCT) for admission to higher education institutions. It also conducts assessment of the students' knowledge and organizes subject Olympiads.

As of 2019 there are over 3,884 schools (315 only primary) with 124,593 teachers educating nearly 2 million children. There are also over 66 secondary vocational institutions and 40 higher professional educational institutions in Tajikistan.

Provincial and district budgets mainly fund preschool and general secondary education, while the national budget funds most of the vocational and higher education, as well as the administration of the education sector.

The structure of the education system

The education system of Tajikistan comprises of preschool education, eleven years of general secondary education [primary (grades 1–4), lower secondary (grades 5–9), and higher secondary or PVET (grades 10–11)], and four or more years of higher education in secondary vocational education and training or universities and institutes. In Tajikistan, pre-primary education is not compulsory, and access is extremely limited, particularly in rural areas. After completion of compulsory education at grade 9 children can choose to leave school or attend an academic track

at a higher secondary school or obtain vocational training, at a specialized school. The structure of the education system is provided in table 2:

<table>
<tr><th>Students age</th><th>Years of study/ grades</th><th colspan="3">Stages of study</th></tr>
<tr><td>1-3</td><td>3 years</td><td colspan="3" rowspan="2">Preschool education (nursery and preschool) (not compulsory)</td></tr>
<tr><td>4-6</td><td>3 years</td></tr>
<tr><td>7-10</td><td>Grades 1-4</td><td colspan="3">Primary education - 1st level of general secondary education (compulsory)</td></tr>
<tr><td>11-15</td><td>Grades 5-9</td><td colspan="3">Basic education - 2nd level of general secondary education (compulsory)</td></tr>
<tr><td>16-17</td><td>Grades 10-11</td><td>General secondary education (optional)</td><td>Primary vocational Education</td><td>General vocational Education</td></tr>
<tr><td>18-21</td><td>4 years</td><td>Undergraduate studies</td><td colspan="2" rowspan="3">Secondary vocational training and development.
Aadditional or continuing education in grade schools, institutes of professional education and other educational institutions.
Short-term learning: formal, non-formal and self-learning.</td></tr>
<tr><td>22-23 (22-24)</td><td>2 (3) years</td><td>Master’s programme</td></tr>
<tr><td>24-26</td><td>3 or more years</td><td>Doctoral programme (PhD)</td></tr>
</table>

Table 2: Structure of Education system in Tajikistan

The purpose of education

According to the law "On Education", the purpose of education is the all-around development of citizens to enable them to realize their abilities to improve their quality of life and work, thereby improving the economic, cultural, and spiritual legacy and promoting the social and economic development of Republic of Tajikistan.

To achieve its goals, the government is working to improve access to quality education for all Tajik children. It is implementing reforms to increase preschool enrollment, constructing schools to increase their capacity and has developed new state standards and a competence-based curriculum for some subjects corresponding to the state standards. It is prioritizing science and education for socio-economic development. This is reflected in the address of the President of Tajikistan to the parliament on December 26, 2019. He said, “At the current stage of Tajikistan’s development, we prioritize science and education as they play a key role in strengthening the foundations of a democratic, law-based and secular state”. Further he proclaimed 2020-2040 as

the “Period of 20 years of learning and development of natural and hard sciences in the Republic of Tajikistan”.

The Research Methodology

Research design

This situation analysis utilized mixed methods research design. Quantitative data was collected and used to understand trends, patterns, and magnitude of the phenomenon under study, as well as ensure the results are generalizable to a larger population. Qualitative data was collected to obtain detailed insights pertaining to the behaviors or opinions of the participants (Denzin & Lincoln, 2005), as well as to reflect multiple realities representing the different stakeholders’ perspectives. Additionally, curricula and textbooks used in the schools were analyzed, and teaching and learning processes in classrooms were observed. The qualitative data provided the context critical to understanding the phenomenon being investigated (McMillan, 2008).

The data for this research was collected from all the key school stakeholders interested in improving teaching and learning in secondary schools: students, teachers, school directors and parents in the 21 EIP schools. 14 schools from Khatlon region and 6 schools from three DRS (two schools in each district, one in a village and one in a district center), and one school in Dushanbe. The school in Dushanbe varied considerably from the rest of the schools in terms of quality of infrastructure and human resources, however, the analyzed data with and without this school did not show huge differences and is included in this report.

The qualitative data for this study was obtained through interviews with school personnel, observations of teaching and learning in the classroom, the analysis of curricula and textbooks, and the analysis of 5 open-ended questions in the student questionnaires. The quantitative data was collected through student, teacher, school director and parent questionnaires.

Prior to the field data collection, a thorough review of available literature on the education system in Tajikistan (e.g., government documents, reports from previous education projects, research results) was undertaken to identify the divergence between the current and desired situation and to identify challenges, opportunities and new directions. A review of the literature on 21st century education was also undertaken to delineate the motivations for educational change, the competences required by high school graduates for success in work, life, and citizenship, the pedagogies and assessment practices required to develop these competences and the role of digital technologies in facilitating the development of the competences. The literature review provided a good understanding of the broad education context.

The objectives of the research

The primary objectives of the research were to:

- Identify the gaps between the current state of teaching and learning in secondary schools in Tajikistan and the desired goal of developing students’ curricula and cross curricula skills;
- Identify what needs to be done to close the gap;
- Identify best practices in teaching and learning that can be shared with other schools;
- Facilitate the development of an education improvement plan for each school; and

- Have a baseline from which to assess the impact of the program at various end-lines.

Key questions that guided the research included:

- What are the current teaching and learning practices in the sciences, mathematics, English, and informatics?
- What are the 21st century competences delineated in the science, mathematics, English, and informatics curricula and how well does teaching and learning support their realization?
- How do students perceive teaching and learning and what do they think would facilitate improvement?
- What is the nature of the administrative support provided for teaching and learning in the schools?
- What roles do the Parents committees (PC) play in supporting school improvement?
- What needs to be done to improve teaching and learning for student success in the 21st century?

The population surveyed

The list of twenty schools to participate in the EIP was provided by the MoES in April 2019. It included fourteen schools from seven districts of Khatlon and three districts of the DRS. Since a school in Dushanbe wanted to participate in EIP, it was included in the study. Thus, ten of the schools are in villages, ten in small towns and one in the capital city.

A total of 115 teachers (Dushanbe 4, Rudaki 12, Sharinav 12, Tursunzoda 12, Baljuvon 12, Khovaling 10, Muminbod 12, Vose 11, Hamadoni 11, A jomy 10, and Shaartuz 9) completed the teacher general and subject specific questionnaires and 90 lessons taught by them were observed. 513 students (5 grade 6, 11 grade 7, 126 grade 8, 134 grade 9, 119 grade 10 and 116 grade 11 students) of which 234 were male and 275 female (4 students did not indicate their sex) completed the student questionnaire. However, the responses to all questions do not always total 513, as some students missed several questions. Therefore, the response rate is not given as 513 for all questions, but for each question separately.

In each school, the school director or deputy director filled in the school questionnaire and 9-10 parents completed the parent questionnaire. A total of 193 parents completed them. Key informant interviews (KIIs) were conducted with the school director, a methodological head, and the head of the School Parent Committee (SPC).

Developing the tools and collecting the data

Based on the above-mentioned objectives and questions, the programme team developed research instruments. The data from the literature review on education in the Republic of Tajikistan and standardized tools such as the TALIS (OECD, 2014 sections of the teacher questionnaire) and PISA (2015) (sections of the school and student questionnaires) were used to develop the research instruments for this study. The research instruments were sent to several academics and education specialists within the country and abroad for validation.

The instruments include a school questionnaire, questionnaires for students and teachers (including a general questionnaire and a subject specific questionnaire for teachers of the sciences, informatics, mathematics and English language), a questionnaire for parents and semi-structured interview questions to conduct KIIs. All the instruments were initially developed in the English language and translated into Tajik language. To ensure quality of the translation a back-translation technique was used.

Prior to data collection, the tools were pilot tested. Pilot testing was conducted in 2 schools: a city school and a village school. Pilot testing helped identify if the desired level of data would be collected from the questions asked, if the questions were clear to the targeted audiences and if not, what changes had to be made to clarify the questions and/or what follow up questions had to be asked.

The data collection instruments were also shared with the MoES where they were reviewed, and minor changes made. Based on the pilot testing results, as well as the feedback, suggestions, and recommendations from all the academics, education specialists, and the teachers who were involved in the pilot test, the team made the necessary modifications and finalized the data collection tools.

Validity (measure what the instrument is designed to measure) of the instruments were endorsed by the academics and education specialists. A variety of the research tools were used for triangulation of the data which in turn contributed to checking validity of the data. The reliability coefficients (consistency of the instruments) of the student questionnaire, teacher questionnaire, and school questionnaire using Cronbach's alpha were .830, .833, and .600, respectively. The internal consistency reliability was slightly lower for the school questionnaire.

To select student participants, a multistage, random sampling technique was used in most of the participating schools. In each participating school about 22-25 students were randomly selected from grades 6-11. A random sampling technique was used to identify every n^{th} (10^{th} in most cases) student from each grade based on the total number of students. For the schools that had smaller numbers of students, a purposive sampling technique was used.

Self-administered questionnaires were given to the participants for the quantitative part of this situational analysis. However, research staff were available to assist the participants when needed to understand the questions and their logic and sequence.

The KIIs were recorded and later transcribed in the programme office.

After the data was collected, a data cleaning process was conducted. The data clean-up was conducted in two phases. First, every completed questionnaire was examined, problems identified and resolved, and some missed questions discarded. Second, the data was entered in google forms, then transferred to excel sheets and cleaned. In this phase the data was entered and prepared for analyses in SPSS. All the output tables of the data analyses were produced by the SPSS.

Limitations of the Study

The MoES provided EIP the list of schools just two months before the close of the academic year. Since EIP wanted to start its programmatic activities in the new academic year, it was critical to collect the baseline data before the end of the current academic year. The timing of data collection created two main issues which are the primary shortcomings of this study. The first, affected the

lessons observations. Being near the end of the academic year, some teachers had completed the curriculum requirements and were conducting revision lessons. The second, was data collection coincided with the month of Ramadan when many Muslims fast. Therefore, some findings need to be interpreted with this context in mind. For instance, 14% and 18% of the students reported not having breakfast and lunch respectively, because they were fasting.

Collection of the students' socio-economic status (SES) data was included in this survey as research shows SES might have a direct or indirect impact on student learning outcomes. However, due to the age of the students, the findings from some of the questions should be interpreted with some caution as the students may not have had the necessary information to answer these questions accurately.

Many of the results are based on self-reports from students, teachers and school leaders and therefore represent their perceptions, beliefs, practices, and attitudes. While this is very useful information in and of itself because it provides insight into how students, teachers and school leaders perceive the environments in which they work, what motivates them and how their work is affected by policies, this information is subjective. To address this limitation and obtain more objective information and get a better understanding of how teaching and learning occurred in the subjects, observation of teaching was carried out.

The Organization of the Report

This report presents the analysis, results and policy and practice recommendations that have emerged from the situational analysis of 21 secondary schools in Tajikistan.

Section I: Overview of the study. This section presented a brief context and education background of Tajikistan. It also presented the research methodology.

Section II: Profile and context of the school. A description of the schools and the characteristics of the teachers, students and school directors is provided. In doing so, it provides the context for the sections that follow.

Section III: The state standards and curriculum. It describes the goals and objectives of education and key competences for secondary education delineated in the state standards. It reviews the curricula of Sciences, mathematic, informatics and English relevant to this study.

Section IV: Teaching. It discusses teacher's self-reports of their knowledge, beliefs, practices and attitudes and how these are reflected in teaching and learning in their lessons. It also discusses the factors that support and hinder teaching, teacher self-efficacy and job satisfaction.

Section V: Student learning: This section presents an analysis of student knowledge based on a test and self-reports, students' engagement in the classroom, their learning behaviours and motivation to learn, and their educational and careers expectations. The factors that support and hinder students learning are also discussed.

Section VI: Student well-being. It assesses student well-being through looking at how they live their lives at home and at school and their relationships with peers, teachers and family.

Section VII: The school leadership. The profile of the school directors and the work they do to determine school goals and plan programmes to realize them is the focus of this section.

Section VIII: Improving teaching and learning using appraisal and feedback. An examination of the process and impact of teacher appraisal and feedback is discussed in this section.

Section IX: Developing and supporting teachers. This section examines the school's support for teacher professional development, teachers need for professional development, and how best these needs are being met.

Section X: Parental Involvement in School. Parent support for teaching and learning and their contribution to the functioning of the school is discussed in this section.

Section XI: Conclusion. This section delineates the strengths, challenges, opportunities and threats schools face in providing quality education and encourages policy makers and practitioners to take the actions recommended throughout this report.

Section II: PROFILE AND CONTEXT OF THE SCHOOLS

Introduction

This section is divided into two parts. The first part provides a profile of the schools. It presents background information on the schools, including information about the schools' resources, climate and autonomy. The second part proffers some demographic characteristics of the teachers and students in the schools thereby providing a picture of the personnel who work and the students who study in them. Section VII presents information about the school directors; readers are referred to it. In providing a picture of the schools and the people who work and study within them, this section sets the scene for the rest of the report.

Profile of the Schools

This part presents background information on the schools, more specifically on the school type and composition, the resources available, the quality of the school environment and level of autonomy.

School type and composition

Of the twenty-one schools in this study, ten are in villages, ten are in small towns and one is in the capital city, Dushanbe. All are state schools. There are some specialized state schools in Tajikistan. They include the very prestigious Presidential Schools in regional centers and large cities. There are also several lyceums for gifted students. A presidential school and a lyceum are included in this study.

All the schools have students studying in grades 5 to 11 (the primary grades are excluded as they are not the focus of this study). In each school, grades 5 to 9, have on average four sections per grade, whereas grades 10 to 11 have three sections. The number of sections decrease at the higher secondary level because some students go into PVET whereas other students leave school, this being the end of compulsory schooling.

94.7% of the schools operate in two shifts. Only one school operates in three shifts[1]. Each shift is of about five and a half hours duration. In addition to offering lessons during regular school hours, extra lessons and extra-curricular activities (e.g., sports, chess and music) are offered after school. Students are encouraged to participate in after school activities of their choice. Schools are open six days a week. The medium of instruction in all the schools is Tajik, except for one where the medium of instruction is English.

The student population varies across the schools. The average number of students in the schools is 1,394 (SD 169.1) with 721 (SD 381.2) boys and 672 (SD 361.5) girls. The difference in numbers of boys and girls suggests girls drop out before and/or after compulsory schooling. The largest number of students in a school is 3,222 and the smallest is only 353! The school with the largest number of students operates in three shifts, but even then, there are not enough classrooms for the students. Observations show that some teachers must conduct classes in the school yard, which is alright on warm days, but quite difficult on cold days.

[1] Due to the lack of space schools must operate in shifts. Students in higher grades study in the morning and students in lower grades in the afternoon.

The average class size is 28 students, with an average of 30 students in small town and 27 students in village classrooms. 55.5% of schools compete with other schools for students. 33.3% of schools have two or more schools in their neighbourhood and 22.2% of schools have one other school in their neighborhood competing with them for students. 44.5% of the schools are the only school in the neighborhood. Students move from one grade to the next, almost without repeating any grades.

School resources

School resources in this study refer to both material and human resources. In this part, only the availability and condition of material resources are discussed. The availability and quality of human resources are examined in a sub-section below entitled 'the people who work in the school'.

All the surveyed schools are housed in purpose-built buildings, but about a third (31.6%) of the building are dilapidated. Nearly all the directors report their schools have adequate lighting (94.7%), but only half adequate heating (57.9%), and only a third adequate cooling (38.9%) systems. The disrepair in which schools are and the lack of adequate cooling systems were evident during the data gathering process. In two schools, the windows could not be opened making the classrooms very hot and unbearable for even a few moments in the Tajik summer with temperature of 24 - 29°C. It is not surprising then that 35.2% of the school directors' think the inadequate heating and cooling systems in the schools affect teaching and learning '*to some extent*' or even '*a lot*'.

Only half of the directors (52.6%) think the number and size of the classrooms are appropriate for the number of students in their schools. The fact that all schools must operate in two shifts and even three shifts indicate a lack of classrooms. Moreover, lesson observations indicate most classrooms are far too small for the number of students.

Only half the schools have science laboratories. 57.9% have chemistry and physics laboratories and only 36.8% biology laboratories. The laboratories are poorly resourced with science teachers' reporting, adequate equipment and materials only in 19.6% and 10.2% of science laboratories, respectively. Laboratory equipment and materials are *not available* (52.9% & 67.3%), are *outdated* (11.8% & 4.1%) or are *insufficient* (15.7% & 18.4%). Hence, it is not unexpected for the directors to believe (*58.8% a lot & to some extent*) the shortage of equipment and materials in the science laboratories negatively impact teaching and learning.

All the schools have libraries, but observation of most school libraries reveal, they are filled with outdated textbooks, support books, newspapers, and journals. Only 42% of science teachers, 37.5% of mathematics teachers and a mere 30.4% of English teachers report teaching guides are available to them. Even fewer audio-visual resources are available with only 18.2% of English teachers, 12.2% of science teachers and no mathematics teachers reporting availability. There are no computers in the libraries. 5.6% of directors consider the shortage of print materials and 47.1% of them inadequate audio-video resources affect teaching and learning *a lot* in their respective schools.

Regarding availability of textbooks, only 20.8% of mathematics teachers, 21.6% of science teachers and 22.7% of English teachers confirm there is a textbook *available* for every student in their classrooms! Lesson observations reveal this to be the case. Moreover, the textbooks are outdated both in terms of content and strategies they encourage teachers to use to teach them.

All the schools have computers. On average there are 25 computers for the entire student body (generally located in the informatics classroom) and 3 computers for all teaching and administrative staff. 84.2% of the schools' lack internet access. With respect to the teaching of informatics, only 12.5% of informatics teachers report sufficient computers for students in their classrooms and only 11.8% report having internet connectivity. The directors hold (*a lot* & *to some extent*) the shortage or inadequacy of computers (52.9%), software for instruction (47%) and internet access (61.2%) hinders teaching and learning.

Insufficient teaching and learning resources are a real concern as they will leave Tajik students behind their counterparts in the rest of the world. 75% of students not having textbooks, few if any opportunities to access books in the library or online, no experience with designing and conducting experiments and limited ICT because of the severe shortage of computers with internet access put them at risk of not developing the knowledge and skills needed for success in the 21st century.

School climate

School climate or quality of school life includes factors such as safety and well-being (e.g. bullying, violence, verbal or physical abuse by teachers or students); punctuality and regularity of teachers and students; cheating; criminal behavior (e.g. vandalism or drug and alcohol possession or use); and discrimination. It also includes the overall culture of the school in terms of the quality of the relationships among and between teachers and students and the levels of co-operation, respect and sharing that are present.

Research shows that school climate influences many aspects of the learning environment, affecting both students and teachers. A positive school atmosphere has been shown to be related to student academic achievement at all levels of schooling (MacNeil, Prater and Busch, 2009; Sherblom, Marshall and Sherblom, 2006; Stewart, 2008). Cooperative and respectful teacher-student relationships not only have a positive effect on teaching and learning but are also known to prevent bullying or violence in a school (Eliot et al., 2010) and motivates students to learn (Eccles et al., 1993). A positive school environment has also been shown to be related to teachers' confidence that they can influence student learning (Hoy and Woolfolk, 1993) and to assist in teacher retention (Weiss, 1999).

The data shows there is for the most part a relationship of respect and cooperation among and between all school groups: the students, teachers, school directors and parents.

Students were asked to report about the attitude and behavior of their peers towards them over the last year. The students' responses indicate there is a safe and supportive relationship among them. Students report '*never and almost never*' being bullied by their peers. 95.1% report other students never took away or destroyed their belongings, 94.5% report they never got hit or pushed by other students at school, 94.3% report they were never threatened by other students at school, 90.5% other students never spread nasty rumors about them, and 86.5% report other students never made fun of them at school. Moreover, 91.3% of students *agree and strongly agree* with the statement that 'other students at the school like me'.

Most of the students have very positive perceptions of their relationships with their teachers and their school. 96.5% report they get along well with most of their teachers and 96.1% claim their teachers like them. Moreover, when asked to name three things they like most about their school, about 30% listed their teachers. This may be because some teachers do more than what is required

of them. In school 'R' a retired chemistry teacher, recognized as one of the best teachers in the region was seen voluntarily conducting an additional lesson for students after school. School directors, however, report teachers being too strict with students and in lesson observations the researchers found some teachers were strict. More generally, they felt the respect between teachers and students was based on the cultural norm of respect for elders rather than out of respect for teachers helping them do and be their best.

The school directors report a good level of collaboration between teachers at the schools. Almost all directors (94.4%) state teachers share teaching materials and discuss teaching issues with each other. Teachers agree, reporting they develop and share teaching materials with colleagues e*very week* (27.1%) or at least *once a month* (32.7%).

When school directors were asked to describe their relationship with teachers, eight directors reported it is '*good*', four '*cooperative'* three '*mutually respectful'* and two as *'strict'*. A director who described the relationship as good said, "It is good, I am very young in comparison to many teachers, I am the same age as their children, but still, we work together, we have a good relationship" (Director, School P, June 4, 2019). A director who characterized the relationship as '*strict*', explained, "With teachers I am also very strict, because if you are not, there is no progress. I am caring for them, I am honest with them, but, at the same time, I am strict with them" (Director, School E, May 31, 2019).

While in the school director's office in 'School O', a researcher witnessed the director and Head of the Parent Committee discussing plans for the schools' renovation that would be paid for by the parents. When the researcher asked the Head of the Parent Committee why parents were contributing to school repairs, he said, "The school does not have enough money in their budget and as parents we should support the school as it is providing education for our children. The government does not provide enough funding and if we do not do it ourselves who else will helps us…".

One factor in the school climate likely to negatively affect student learning is lesson cancellations and interruptions, and absenteeism, missing lessons or late arrivals by teachers and students. Students report that school is highly unlikely to be called off (98.4%). However, cancellations of one or more lessons are frequent. 33.3% of the students report lesson cancellations and 27% a teacher missed a lesson in the two weeks prior to data collection. With respect to lesson interruptions during the same period, 28% of students report their teacher came late for a lesson, 29.5% their teacher was called for a meeting and left during a lesson, and 12.5% their teacher did personal work during the lesson.

Students were also asked to report the frequency with which they skipped school, missed lessons, or arrived late for school over the two weeks preceding data collection. 28.4% report skipping one to two days of school, 5.1% missing three to four school days and 2.7% a whole week. Many students come to school but do not attend some lessons. 20.7% report they did not attend some lessons once or twice and 5.9% report not attending some lessons three or more times. These figures of students' absenteeism and missing lessons should be of concern to the school directors and parents. Research shows students skip school and miss lessons because lessons are boring, content too difficult to understand, have issues with teachers or are working for pay. School directors would do well to find out and address the reasons. A high percentage of students (25.2%) also report being late for school once or twice in the last two weeks. This might be the result of

factors such as adolescents need for sleep, distance between home and school and shortage of regular transportation. Some school directors and teachers report the schools are located far from students' homes and 3.6% of the students report it takes them 60 minutes or more to reach the school.

School autonomy

School autonomy is the decision-making power that the school has as opposed to that of national, provincial, and district education authorities. The research shows that different kinds and levels of autonomy can have an impact on student achievement. Some studies emphasize autonomy in curriculum and assessment decisions (OECD, 2010 cited in OECD 2014) while others stress the decision-making role of the school leader especially if their decisions are supported (Pont, Nusche & Moorman, 2008).

Tajikistan has a centralized education system with centralized planning and control. The MoES prepares the standard, curricula, and syllabi. Departments and committees of the MoES develop textbooks and approve them for use in schools, provide in-service professional development for teachers and school directors, and assess the attainment of student learning outcomes. Decisions regarding formulating the school budget and deciding on budget allocations is made on instructions from the MoES and compiled by the school director (57.9% & 55.6% respectively). For schools directly under the MoES and district education authorities they make all budgetary decisions.

The school directors are largely responsible for hiring (65%), firing (65%) and assigning duties (84%) to teachers. They do not, however, have any autonomy in determining their starting salary or salary increases which are determined by the MoES.

School policies are made by the school director, the teachers and the school's parent committee, in the following percentages: discipline policy (SD 52.6%, TR 21.1%, SPC 5.3%), grading policy (SD 38.9%, TR 33.3%, SPC 5.6%), and homework policy (TR 77.8%, SD 16.7%, SPC 5.3%).

The above clearly indicates that schools only have autonomy with respect to its everyday functioning. They have no autonomy with respect to curriculum and assessment and teacher salaries and professional development. Moreover, outsiders (researchers, university recruiters) need an official letter from the MoES to visit schools. This further shows the limited autonomy schools have.

The People Who Work in the Schools

The teachers

According to the school directors, almost all the teachers in the school are employed full-time.

Age and gender

55.3% of the teachers are male and 44.7% are female. The percentage of teachers that fall into various age groups are as follows: 12.4% are under 25 years, 23% are between 25-29 years, 23.9% are between 30-39 years, 13.3% are between 40-49 years, 15.9% are between 50-59 years and 11.5% are over 60 years. The figures above show that 35.4% of teacher are considerably young below 30 years of age and 27.4% are over 50 years of age.

Qualifications and experience

88.5% of the teachers in the schools have a higher education diploma[2] (common in the ex-Soviet Republics and equivalent to a bachelor's degree), the required teaching qualification in Tajikistan. 4.4% have a master's degree. There are also 7.1% of teachers who do not have the required teaching qualification. These are graduates of pedagogic vocational schools that provide only three years of training after grade 9.

With respect to teaching experience, 26.3% of teachers have been teaching for 1-5 years, 22.8% for 6-10 years, 13.2% for 11-15 years, 7.0% for 16-20 years and 30.7% have been teaching for more than 20 years. The average teaching experience is thus 15 years[3].

If there are more than three teachers teaching a subject in a school, one of the teachers from among them is appointed as the methodological head[4]. Methodological heads are usually appointed based on the years of teaching experience they have. On average each school has six full-time and one part-time methodological head. The main responsibility of the methodological head is to work with teachers to improve the quality of teaching. Many of the methodical heads, however, when asked about their responsibilities, had only a vague understanding of it.

The Students

There are on average 1,394 students studying in each school (3,322 in the largest school and only 353 in the smallest school). The average number of boys is 721 and girls is 672. There are on average 776 students studying in the secondary section (grades 5-11) in each school (with a maximum of 1951 and minimum of 186 students). The students studying in secondary school are between 11-18 years of age.

The directors' estimate that on average there are about 1.5% students with special needs, 3.9% from disadvantaged socio-economic backgrounds and 0.4% from marginalized communities. In addition, there are a few orphans and children from single parent families studying in the school.

Summary

There is a severe shortage of infrastructure and teaching and learning resources in Tajik schools. Schools are overcrowded and only about 20% of students have a textbook! There are more boys than girls in the schools. The school climate is generally positive, but teacher and student absenteeism and missing lessons negatively impact it. The MoES wields immense authority over schools leaving school directors to only ensure school functioning.

[2] It is a five-year university education programme. It includes both acquisition of subject matter knowledge and pedagogy and practical experience necessary to qualify to teach in school. Since the collapse of the Soviet Union in 1991, the theoretical component continues but the practical component has largely been curtailed

[3] Since the average years of work experience was calculated from a group data, the 15 years is slightly inaccurate, as it would have been if it was calculated from the exact years

[4] Teachers with additional responsibility for improving the quality of teaching.

Key Findings and Recommendation for Policy and Practice

Key findings

- A third of the schools are in disrepair and half have inadequate heating and cooling systems and inadequate number and size of classrooms.
- Only 20% of students have a textbook for each subject! The science laboratories suffer from a severe shortage of science equipment and materials. There is also a severe shortage of computers and internet access in only four schools. The lack of instructional resources greatly impedes teaching and learning in their schools.
- There is a positive school climate with respectful and cooperative relationship among and between all school groups: students, teachers, school directors and parents. School climate is, however, negatively impacted by many lesson cancellations and interruptions and by absenteeism and late arrivals for lessons by teachers and students.
- The MoES, its departments and committees have immense control over schools. Schools have only administrative autonomy.
- The student body comprises 3,222 students in the largest school and 353 in the smallest. On average, there are more boys (721) than girls (672) in the schools.
- Except for 7.1%, all the teachers have the initial qualification required to teach in schools. There are more male (55.3%) than female (44.7) teachers in the school.

Recommendations for policy and practice

Build new schools and repair existing schools

It is imperative that dilapidated school buildings are repaired, and new schools built to ensure conditions are conducive for teaching and learning. New schools must have enough classrooms to accommodate students in no more than two shifts and their size should enable between thirty and thirty-five students to sit comfortably in them. The need for new schools is urgent given the growing population.

Provide sufficient and up to-date resources to facilitate high-quality teaching and learning

It is imperative to provide sufficient and up to-date resources such as a textbook for each subject to each student, additional teaching and learning resources, equipment and materials for scientific investigations and computers with internet access to enable high-quality teaching and learning.

Provide schools with computers connected to high-speed internet

Provide schools with sufficient computers with high-speed internet service immediately as the use of digital technology is integral to teaching and learning in schools. It will enable schools to establish digital libraries, providing access to e-textbooks and a range of digital resources for teaching and learning of STEM, ICT and English. It will enable science teachers to conduct simulations and real-time experiments in online laboratories. It will facilitate students in becoming skilled users of ICT and use it for learning and life.

Ensure girls complete general secondary education

There are on average 672 girls and 721 boys in the schools. Research shows that girls begin to drop out after primary school and many more do so after compulsory schooling mainly because of poverty and conservative social norms concerning gender roles in Tajik society where boys are expected to be bread winners and girls to stay home to take care of the family. In this study 28% of students report working for pay indicating they are contributing to family income. It is important to raise awareness and put tangible measures in place to ensure gender equality in education to ensure a better future not just for girls but also for the country.

Prevent the interruption of learning

Ensure that learning is not interrupted. The school management must ensure teachers and students come regularly to school. Attendance should be added to assessment of teacher performance and parents must be educated about the importance of ensuring their children are in school every day. School directors should schedule teacher meetings and assign teachers duties in such a manner to avoid lesson interruptions and a negative impact on student learning. Class prefects should be given the additional responsibility of ensuring students in school attend all their lessons.

Provide greater autonomy and support to schools and build capacity of school staff

Provide greater autonomy to schools in areas that will increase student achievement such as in curriculum and assessment. This will require capacity building of school staff in these areas.

Section III: THE STATE STANDARD AND SUBJECT CURRICULA

Introduction

Educational standards identify what students should know and be able to do by the end of their schooling. They also inform the development of curriculum and textbooks, the professional development of teachers, teaching and learning in schools and national assessments of student learning. National standards are important because they identify what all students should learn at each grade and in each subject. They hold schools and teachers responsible for what goes on in classrooms by ensuring that the level of learning identified in the standard is attained. They, thus, ensure all students meet the specified learning outcomes and help a country raise the standard of student achievement to international levels. However, critics point to the need to be cautious as the 'one size fits all' standards may limit students' creativity and innovation.

The development of national standards and curriculum has been a priority of the MoES as it is seen as a means of improving the quality of education and the effectiveness of its outcomes. A new State Standard for Secondary Education (SSSE) was developed by MoES and approved in August 2015. The SSSE 2015 differs from the SSSE 2009 in seeking to change from a knowledge-based to a competence-based education system. The SSSE 2015 differs from the SSSE 2009 in identifying the competences to be achieved and how the elements of the competences are to be assessed. To-date only the curriculum for some subjects including mathematics and biology (subjects of interest in this study) have been developed based on the SSSE 2015.

This section describes the main components of the SSSE 2015, and analyses how its goals are interpreted (or not) in the curriculum for mathematics, the sciences, English and informatics. It seeks to identify what students are required to learn and how this learning would prepare them for college, career and citizenship in the 21st century.

The State Standard

The SSSE 2015 (and SSSE 2009) was developed to ensure a unified state policy for school education. It is based on the Constitution, the law "On Education", the National Concept of Education and other normative legal acts. The SSSE identifies the principles on which the standards are developed, the objectives, provisions and purposes of the standards. Its focuses on delineating the goals and objectives for the three levels (primary, lower secondary and higher secondary) of general secondary education. It also describes for each level the subjects to be studied, the teaching and learning load and graduate expectations in terms knowledge, skills and attitudes as well as the competences to be acquired as the result of study. It further describes how the elements of the competences are to be assessed.

Goals and objectives of education

The main goal of general secondary education is to prepare citizens who are intellectually developed, have high moral values and are lifelong learners. More specifically, citizens who master the basics of subjects useful for further study and life, make independent life choices, adapt to society, and participate actively and creatively in family life, society and the state; citizens who know, appreciate and respect national and universal values and cultures; a patriotic and active citizen who has national pride, respects human rights and freedoms, cares about life and feels responsible for the development of society, culture and the environment.

The objectives of general secondary education are to create the necessary conditions for the holistic development of students as citizens of Tajikistan. This includes creating the conditions for students to learn the basics of science, the state and a foreign language, develop working, thinking, creative and communication skills and form an outlook of intercultural cooperation; maintain and strengthen the physical health of students, by teaching them how to care for their own and others' health, engage in safe behaviour and adopt a healthy lifestyle; prepare the youth for a better life, by engaging in lifelong learning and constructive activities for the benefit of family and community and the social and economic development of the country (SSSE p. 8).

Goals and objectives for lower and higher secondary education

The goals and objectives for each stage, primary (grades 1-4), lower secondary (grades 5-9) and higher secondary (grades 10 -11) are delineated in the SSSE. Only the goals and objectives for lower and higher secondary education are described below (as these are the levels of interest in this study).

The goals of lower secondary are the formation of a scientific worldview; development of moral, ethical and cultural norms and values; acquisition of a range of cognitive and work skills; adopting an active and healthy lifestyle; and a readiness to continue their education and determine a profession of choice.

The goals of higher secondary are formation of universal and humanistic value orientations, ideological positions, civil responsibility and legal self-awareness; formation of a systematic view of the world, society and man, scientific and technological progress and innovation; readiness for continuing education, productive work, and creative and responsible participation in the life of the family, society and the state; laying the basis for self-development and self-improvement; and development of individuality and creativity, based on students professional intentions, interests and educational needs.

The objectives are to create the necessary conditions for the acquisition of the goals outlined above.

The goals for general secondary education in Tajikistan are ambitious and rightly so. It is important to create suitable conditions in the schools to realize the goals. As this study shows there is still much to be done to facilitate schools in realizing the goals set.

Graduate expectations in terms of knowledge, skills and attitudes at developmental levels

Graduates completing lower secondary education should: know the culture and ethical norms of communication with peers; have an expanded worldview and assert themselves in their peer group; show interest in social and cultural life, be active and patriotic; master the bases of legal and economic knowledge, to be ready to comply with legal norms; take care of material and cultural values; be able to live in harmony in their community, state and nature; master the state and foreign languages to gain knowledge and as a means of communication; gain skills that facilitate the choice of a profession and involvement in work; have scientific ideas about the material world and the basic laws of its development, the ability to perceive and explain, on the basis of acquired knowledge and experience, the phenomena and events of the surrounding reality; know the basics, have experience of safe living and a healthy lifestyle; be able to consciously navigate the flows of diverse information, to perceive and interpret it for educational and general cultural purposes; be

familiar with the fundamentals of modern information and communication technologies; and have the ability to perceive the surrounding reality, life and art aesthetically.

Graduates of higher secondary education must: know and respect national and universal values; preserve and increase the national historical and cultural heritage; show respect for the culture, customs and traditions of other nations; know and observe laws and legal norms of the Republic of Tajikistan and generally accepted norms of the society; perceive and give a scientifically grounded assessment of the phenomena and events of the surrounding reality; defend their civil position, their own views and beliefs, the interests of the family, society and the state, and counter negative facts and manifestations in public life; realize their professional choice and continue their education throughout life; seek to improve their knowledge of the state and foreign languages as a means of communication and knowledge of the world; possess knowledge and skills in modern information and communication technologies; know the methods of analysis, synthesis, generalization, systematization and comparison; have the ability to express themselves, manifest their emotions, empathy and compassion; and be able to use the acquired knowledge and skills in everyday life and extraordinary situations.

The above is a long and ambitious list of outcomes in terms of knowledge, skills and values for students graduating from lower and higher secondary schools. This study will look at how well these outcomes are being met currently and make policy and practice recommendations for improvement.

Subjects to be studied at each level of education

At all levels of general secondary education, students must study subjects from seven educational areas: philology, social studies, mathematics, natural science, art, physical education, and technology. The native language, literature, state language, Russian, foreign languages and Arabic graphics fall under philology. The history of the Tajik people, general history, fundamentals of state and law, human rights, history of religion, family culture and fundamentals of economics are part of the social studies. Mathematics consists of arithmetic, algebra and geometry. Natural history, physics, chemistry, biology, ecology and geography are included in natural science. Visual arts, drawing, singing, and music are part of the arts. Physical education includes physical and basic military training. Technology consists of labor training and information technology.

At the lower secondary level, the following subjects are compulsory: the native, state, Russian and a foreign language, literature, Arabic graphics, history of the Tajik people, general history, human law, arithmetic, algebra, geometry, visual arts, physics, chemistry, biology, ecology, geography, singing and music, drawing, ICT, art and craft and physical education.

At higher secondary, native, state, Russian and a foreign language, literature, family education, history of the Tajik people, general history, history of religion, arithmetic, algebra, geometry, visual arts, physics, chemistry, biology, geography, basics of economics, ICT, physical education, labour and basic military training are compulsory disciplines.

Higher secondary education is focused on preparing students for a profession. Students can choose a stream: social-humanities, natural sciences, mathematical, technical and technological, agro-technical, music and sport. While they must study all twenty-two compulsory subjects, they study subjects within the stream in greater depth.

The SSSE emphasizes the need for connections between and consistency across the subjects. It specifies the maximum weekly learning load for each grade and the approximate distribution of study time between state (subjects compulsory for all students), school (subjects identified by the school and offered with consent of students and parents) and electives (subjects chosen by the school and supported by the Republican budget) within the weekly learning load.

The standard lists seven educational fields and from them identifies twenty-three subjects for study at lower secondary and twenty-two subjects for study at higher secondary school. These are far too many subjects for study. Given that the standard aims to develop a few competences and emphasises the need for connections between subjects, it would have done well to keep to the seven educational fields identifying key competences to be developed within and across them.

Key competences to be acquired through the education process

The content of general secondary education is aimed at developing three competences: problem solving and self-management competence, information competence and communicative competence.

The problem solving and self-management competence will be demonstrated in students' ability to identify problems, come up with various solutions, identify the most effective one, identify the process and appropriate technology to solve it; set a goal, identify how to achieve it, plan the content, result and consequences of the activity; and identify ways to evaluate the result of their solution, their actions and behavior.

The information competence will be reflected in students' ability to take rational decisions based on critical information; set goals, plan, present and justify solutions to a problem; independently gather information, analyze it to identify the main and significant ideas, and draw conclusions, using ICT throughout the process; and use effectively the outcomes of the information in their real life.

To demonstrate communicative competence students must demonstrate use of various means of oral and written communication in Tajik and other languages to solve tasks in specific social situations. In communication follow the required genre and style to express thoughts and opinions using language appropriate to context and culture. In conversations with speakers of other languages and cultures be restrained and patient, think over and express oneself clearly and politely to achieve the goal.

A competence is a dynamic combination of knowledge, skills and attitudes whose mastery would enable the attainment of the competence. For example, 'the ability to communicate effectively is a competence that may draw on an individual's knowledge of language, practical IT skills and attitudes towards those with whom he or she is communicating' (OECD, 2003, p. 4). In the SSSE there are graduate expectations given both in terms of knowledge, skills and attitudes and three competences. In this, as in other parts of the SSSE there appears to be remnants of the old knowledge-based education approach. The three competences described indicate the incorporation of other 21st century skills such as critical thinking in information gathering and processing, creativity in problem solving, and cultural intelligence in communicating with others. It will be important to see how these competences are reflected in the subject curriculums and across them.

Assessment

Student achievement is to be assessed based on three aspects, including personal results, systematic activity results and subject results.

Personal results are reflected in showing respect for the Constitution, law and order, active citizenship and knowledge of the state and native languages. More specifically, showing high patriotic feelings, readiness to serve and protect the interests of the homeland, respecting the history, culture, traditions and values of the Tajik people and residents in Tajikistan, protecting and enhancing the nature of Tajikistan, maintaining a healthy lifestyle, ensuring one's own and others safety; ability to communicate effectively and ethically; being aware of one's self and one's abilities for continued learning and creative work; respecting elders and caring for youngsters and being kind to others; understanding the social context and refraining from antisocial behaviour.

The systematic activity results are reflected in possessing: basic scientific knowledge and applying it for progress of humankind; the ability to analyze, process, synthesize and use scientific information; the knowledge and methods of research design and creative application; ICT knowledge and skills and using them; and the ability to communicate in a multilingual culture.

Subject results are reflected in the knowledge and application of the main content of each subject of study.

This section delineates the kinds of achievement students must demonstrate but does not describe how the achievements are to be assessed. In a competence-based education system it is important that both process and product of learning are assessed using various types of assessment that form part of the assessment system. Without a clearly defined assessment system, it is expected that the use of tests and exams for subject-results will continue and will remain the sole determinant of opportunities for further study.

Preparation of teachers for new roles

The SSSE only provides a general statement about having teachers skilled in using innovative teaching methods. It, however, neither identifies these methods nor how teachers will acquire them.

The curricula

The curricula of only those subjects of interest to this study are analysed and key findings shared.

Information communication technology (ICT)

Goals and objectives

There are three main goals for teaching and learning ICT. One, the user-centered aspect that focuses on building students' understanding and use of ICTs for study, work and life. Two, algorithmic aspect which centers on developing students' logical thinking and competence in programming languages. Three, international aspect that involves the development of a systematic and informative approach to the analysis of environmental events, understanding the role of information in management processes, the nature of self-management systems and the general patterns of information processes in global systems.

Learning outcomes

The learning outcomes are not clearly delineated in the curriculum. They are merely a repetition of the section on content, discussed below.

Content

ICT content is provided for primary level grades 1-4 and for grades 5-6, 7-9 and 10-11 at the secondary level with the number of hours for its study during the academic year. For grades 5-6 the content comprises of computer programs, simple text editors, drawing applications, user-friendly calculators, operating systems and their functions and word processing. The content for grades 7-9 includes the theory of information technology, information tools, ICTs, MS office, internet, websites, HTML and computer networks. For grades 5-9 it is to be taught once a week for a total of 34 hours per year. The content for grades 10-11 covers the basics of algorithmic development, basics of programing, visual basic, C++, computational systems and logical principles of computing, form and design, technology and information systems, technology research, search and information, basics of social communication systems, obligations and legal rights of people using ICT. For these grades it is to be taught twice a week for a total of 68 hours in a year.

The general list of competences is provided as is the content, but it does not specify the learning outcomes for the topics or competences. It would be quite helpful for the teacher if the topics, learning outcomes and competences would be provided in a form of a table corresponding to each other.

Assessment

There is no assessment section in the curriculum, a sample test is provided for each grade. All the sample tests include several multiple-choice questions that assess knowledge, not the competent use of ICT. It would be quite helpful to provide guidance on how to assess the gained ICT competences.

The natural sciences

There is a separate curriculum for each of the science subjects. To-date only the biology curriculum has been developed based on the SSSE 2015. The physics curriculum was approved in 2004 and the chemistry curriculum in 2012 (based on SSSE 2009). The biology curriculum identifies the competences and learning outcomes aligned with each topic. A list of demonstrations and experiments for each grade is also provided.

Goals and objectives

The curriculum emphasises the importance of the sciences in facilitating understanding of the natural world. The goals are to equip students with knowledge and skills to enable them to explore the physical world around them, develop practical skills through demonstration of experiments, conduct of laboratory work and authentic practical exercises, and foster critical thinking, creativity and reflection. The main objective is to develop students' science process skills including observing, measuring, sorting/classifying, inferring, predicting, experimenting and communicating.

Learning outcomes

Only in the biology curriculum is there a list of learning outcomes as per the topics within the five areas to be studied.

Content

The content for each of the sciences is provided in five main areas. For physics they are mechanics, thermodynamics, electrodynamics, optics and atomic physics. Since 2004 astronomy has been integrated into physics, but the curriculum has not been updated to reflect this. In chemistry the five topics are, elements and compounds, structure of substances and types of bonds, properties of substances, consumption and production and types of chemical reactions. The five topics for biology are external and environmental conditions; internal structure and life activity (anatomy and physiology); growth and development; classification, importance and origin; the environment and the natural community.

In the content section, the curriculum of each science subject (except physics) has a teacher's guide that explains how to plan a lesson with SMART learning outcomes and deliver it effectively by providing samples for each grade. It also explains how to connect learning to real-life by giving specific examples.

Assessment

The biology and chemistry curriculum include an assessment section which briefly explains formative and summative assessment (there is no such section in the physics curriculum). It also describes how the assessment is to be conducted, what needs to be assessed and suggests various types and methods of assessment, especially formative assessment. Some examples are provided for each grade.

Mathematics

The mathematics standard and curriculum were developed by the MoES to provide methodological assistance to teachers of mathematics under the framework of the State Programme for Accelerated Development. It was developed in 2018, based on the SSSE 2015.

Goals and objectives

The main goal of mathematics is to develop students' logical thinking and mathematical reasoning skills by developing their intrinsic mathematical compatibility. More specifically, the goals are to enrich students' spatial perceptions, develop students critical thinking, reasoning and imagination; develop the character qualities of persistence, determination, creativity, independence, responsibility, hard work and discipline; and develop an understanding of the nature of mathematics, the essence and origin of mathematical abstractions, the relationship between reality and fantasy, the description of events and processes through mathematics to improve students' scientific worldview.

The following four objectives are identified for teaching mathematics in secondary schools: acquiring specific mathematical knowledge required for practical use and in studying other subjects; developing reasoning skills; developing mathematical concepts and methods, forms of expression and methods that can be applied in real life; and developing an understanding of mathematics as part of a universal culture and its importance for the future of modern society.

Learning outcomes under competences

The curriculum describes the general competences (social, cognitive, communicative) along with the subject competences (knowledge, skills and attitudes) to be developed in the learning process for all grades. Below are two examples of subject competences provided for grade 9.

Topic: Equations and inequalities

Algebraic competence: Students will be able to solve and explain linear equation through various ways.

Topic: Triangles

Geometrical competence**:** Students will be able to use formulas of the length of the circle, the area of the circle and the concept of sphere to solve various real-life problems.

The learning outcomes are provided for each topic, but not aligned with the subject competences described above. It would greatly assist teachers if the learning outcomes were provided with each subject competence.

In this section of the curriculum a list of abilities teachers need to plan, teach and reflect on teaching mathematics is provided. For example, understand the purpose of learning and identify new learning objectives, plan the process for achieving the learning objective, independently monitor and manage the time allocated for learning activities, independently evaluate the correctness of the implementation of plan and identify correction at the end of the lesson. Moreover, a general list of required resources to support teaching and learning is provided.

Content

The content for mathematics is given under five topics. They are numbers and expressions (grades 5-9); algebraic expressions and functions; equations and inequalities; data processing (grade 10-11); and geometric shapes and forms (grades 5-11).

Cross disciplinary connections are emphasized but these focus mainly on the contribution of mathematics for learning the other subjects and not vice versa.

Pedagogy

This is the only curriculum in which there is a section on pedagogy. It provides some pedagogical principles to guide teaching. They encourage teachers to put students at the center of the learning process and to meet the needs of all students; provide students opportunities to acquire new knowledge and skills based on prior knowledge and skills; use interactive methods to make math lessons more interesting, effective and achieve the educational goals; collaborate with students in solving issues and improving their skills; and adapt the content of a lesson to the student's ability to learn.

Assessment

The assessment section of this curriculum differs from that provided in the sciences as it explains the purpose, key principles and types of assessment: diagnostic, formative and summative. Most attention is given to summative assessment with oral and written examinations described in great detail and a five-dimensional evaluation system for assessing them using the given assessment criteria explained. However, when and how to use formative assessment is not explained at all.

Also, no clear guidance is given on assessing the specific general or subject competences identified.

Foreign Languages (English)

Goals and objectives

The main goal of teaching a foreign language is its practical use in life. The objective is to acquire the required competence in the target language to be able to understand and communicate in it. It is important to note the curriculum is provided in Tajik not English.

The learning outcomes

The learning outcomes are provided for just two of the four language skills, reading and speaking. For grade 10 there are only two learning outcomes for reading. One, 'to be able to read previously learned text without the help of a dictionary and understand sentence types and grammatical material that contain 3-4% of unfamiliar words based on knowledge. The reading speed should be 300-350 letters per minute'. Two, 'to be able to understand literary, journalistic, scientific, and popular texts with the help of a dictionary'. With respect to speaking, there are three learning outcomes. One, 'to understand the content of a speech lasting 1-1.5 minutes and 7 words'. Two, is focused on students engaging in monologues and three, on dialogue doing so 'logically consistently and independently' within the scope of the programme.

Content

The content is provided in a single paragraph with an exemplary list of topics for reading and speaking provided. At the higher secondary level, this list differs for the different streams. For grade 10 in the mathematics and science stream the list includes: 1) Means of communication: post office, phone, radio, TV; 2) The animals and plants of Tajikistan and English-speaking countries; and 3) Weather and climate in Tajikistan and English-speaking countries. In the same grade for the socio-humanities stream the list consists of: 1) Shopping; 2) Helping others; and 3) Culture and traditions.

There is little relationship between the content and the learning outcomes. While the learning outcomes refer to reading and understanding political, social and cultural information in newspapers and understanding scientific texts, the content focuses on means of communication, animals and plants, and shopping.

Assessment

The curriculum provides no information on assessment of learning. This is especially concerning because the curriculum wants students to apply their foreign language competence in the real-world. Assessment tasks would have to be quite different from the current paper-pencil tasks that require students to simply regurgitate information. It would have been very helpful to provide exemplars of assessment tools and tasks to guide teachers in developing their own assessments to assess the language competences of students in the grade(s) they teach.

Summary

The SSSE 2015 outlines the goals, objectives, and results of general school education both in terms of knowledge, skills and attitudes and competences. It also identifies the list of subjects to be studied and how learning is to be assessed. The curricula for three subjects of interest to this study

- mathematics, biology and ICT have been developed. These curricula provide the list of social, cognitive and communicative competences for each grade and provide some guidance for assessing them. The curricula of the other subjects of interest to this study - physics, chemistry and English are yet to be developed as per the SSSE 2015 and simply provides a list of topics to be studied. Unfortunately, the curricula of all subjects do not provide the learning outcomes at each grade level, and do not provide exemplars of 21st century pedagogies or assessment tools. There is still much work to be done to develop all the subject curricula as per the SSSE 2015. There is also a need to develop textbooks and make them available to all students before the curricula can be implemented in schools and the goals of the SSSE realized.

Key Findings and Policy and Practice Recommendations

Key findings

- The SSSE 2015 outlines the goals, objectives, and results of general school education. It also identifies the list of subjects to be studied and how learning is to be assessed.
- The SSSE describes seven broad curricula areas but rather than focusing on these curricula areas, delineates several subjects within each area requiring students to study 23 subjects at the lower secondary and 22 subjects at higher secondary level.
- The SSSE provides a general statement about having teachers skilled in using innovative teaching methods. It, however, neither identifies these methods nor how teachers will be facilitated in acquiring them.
- The SSSE delineates the different assessment formats to be used to assess the competences but provides no examples to assist teachers in using them.
- The curricula for all subjects have not yet been developed based on the SSSE 2015. With respect to the subjects of interest to this study, the curricula of mathematics, biology and ICT are consistent with the SSSE 2015, whereas the curricula of physics, chemistry and English are not.
- None of the curricula identify the learning outcomes for each grade level, provide exemplars of learning activities and 21st century pedagogies, the integration of ICT in the teaching and learning of each subject and the assessment techniques and tools that could best assess achievement of the learning outcomes.
- The updated mathematics and science curricula include a list of resources to ensure attainment of the learning outcomes, this must be part of all the subject curricula.
- Observations suggest that majority of DEDs, schools and teachers do not have access to the SSSE 2015 nor to the updated curricula.

Policy and practice recommendations

Finalize the development of the curricula for all subjects based on the SSSE 2015 and make them accessible to all teachers

The SSSE 2015 sets out competence-based standards aimed at developing students 21st century skills through the subject curricula. Without subject curricula showing teachers what and how to

teach to the standards, this important change aimed at bringing education in Tajikistan into the 21st century will be jeopardized.

Reduce the number of subjects to be studied at the lower secondary and upper secondary levels

Students are expected to study far too many subjects at both the lower and upper secondary levels. The new standards and curricula, however, are focused on the development of competences that involve the interplay of knowledge, skills and attitudes and cross-disciplinary application of transferable skills. This means students could achieve the same learning outcomes by 'deeper learning' of a few core subjects.

Develop learning outcomes grade wise for all subject curricula

Because competence-based standards are an innovation in education, it is imperative that all the subject curricula clearly provide the student learning outcomes to be achieved at each grade level. It is only in the systematic achievement of grade level outcomes can the graduate outcomes identified in the state standards be achieved.

Provide exemplars of 21st century pedagogies, assessments and integration of ICT, in all subject-curricula

To support teaching, learning and assessment of the competences identified in the SSSE it is important to provide exemplars of 21st century pedagogies, such as, 'inquiry', 'project-based learning', and 'cooperative learning', ways to embed ICT into teaching and learning of all subjects and assessment tools clearly linked to assessing the competences.

Adapt and/or develop textbooks and make them available to all teachers and students

Textbooks are an important teaching and learning resource. Developing high-quality textbooks requires expertise in areas such as subject knowledge, pedagogy and assessment and cognitive and psychomotor abilities of students at the developmental level. While this expertise is being developed in-country, it is suggested to identify high-quality science, mathematics and English textbooks available in the international market and adapt them to the curricula outcomes, context and culture of Tajikistan. The textbooks be made available to all teachers and students to facilitate attainment of the competences to be developed through that subject.

Section IV: TEACHING IN SCHOOLS

Introduction

It is a widely accepted that schools are only as good as their teachers. It is also widely accepted that of all school related factors, teachers have the most influence on student learning (Darling-Hammond, 2000; Hattie, 2003; Konstantopoulos, 2006; RAND Cooperation, 2012). Improving the quality of teachers and teaching at school will improve student achievement and consequently impact the socio-economic development of a country and the well-being of its people. It is, therefore, crucial to understand the current teaching practices at schools and based on the findings develop appropriate, specific, and realistic strategies to improve them.

To find out about the teachers' themselves, their knowledge, beliefs, and teaching practices a general and subject specific survey was completed by 115 mathematics, science (biology, chemistry, physics), informatics and English teachers and 93 of their lessons observed. Students, school directors and parents were asked about the teachers' teaching practices. School directors were also asked to identify the factors that support and hinder teaching in the schools. The data from these sources has been triangulated to provide a more complete picture of teaching in Tajik schools. Teachers' demographics: age, gender ratio, education qualifications and years of teaching experience have already been discussed. Teacher's knowledge and skills, beliefs about teaching and learning, teaching practices (general and subject-specific), self-efficacy and job satisfaction as well as the factors supporting and hindering teaching is the focus of this section. This section provides an in-depth understanding of the current state of teaching in Tajik schools.

Teacher Self-reports of Their Knowledge and Skills

Most teachers rate their knowledge and skills very highly (*a lot & quite a bit*). With respect to their knowledge, 80% of teachers report they can provide alternative explanations when students are confused and 75.6%, they can help students use subject knowledge to solve real-world problems. Teachers' assessment of their instructional skills is also very positive. 79.2% of them report they can use a variety of instructional strategies. Questioning appears to be a particular strength with an overwhelming 89.9% reporting they can craft different types and levels of questions. Project-Based Learning is more challenging with only 68.6% claiming they can prepare, conduct, and assess students' projects. In relation to developing students 21st century skills, over three-fourths of teachers hold they can help students communicate effectively both orally and in writing (81.9%), develop students' collaboration skills (78.4%), and encourage students to engage in creative thinking (75.2%), but less than two-thirds can help students think critically (64.6%). 75.6% of teachers state they can get students to believe they can do well in school. One area in which less than half of the teachers (46.3%) assess themselves to be skillful is in using ICT to facilitate teaching and learning.

Teacher Beliefs about Teaching and Learning

Teachers' self-reports (*strongly agree & agree*) reveal they hold both contemporary and traditional educational beliefs which are often diametrically opposite to each other. With respect to the role of teachers and students in the teaching and learning process most teachers think effective teachers demonstrate the most appropriate ways to solve problems (96%) and should provide students the answers rather than allow them to develop answers that may be incorrect (57%), while also

believing students should be allowed to find solutions to problems on their own (98%). Similarly, while believing the teachers' role is to facilitate students' own inquiry (96%) they also believe, students' learning depends on their background knowledge so teaching facts is necessary (97.2%). They subscribe to a traditional view regarding students' voice indicating they should decide lesson activities (93%) and give students homework as it is important for learning (99.1%). They also hold traditional beliefs about the classroom environment believing a quiet classroom is needed for effective learning (96%). In relation to curriculum coverage, teachers simultaneously hold they should follow the curriculum strictly; teaching every topic within the set time (95%) and teaching thinking and reasoning are more important than teaching specific curriculum content (79%). Teachers may hold these contradictory views for several reasons. One, the education system in Tajikistan is in transition, moving from the Soviet system in which the teacher was the 'sage on the stage' to a competence-based system in which the teacher is a 'guide on the side'. Two, teachers being professionally developed to deliver a competence-based curriculum may have been introduced to contemporary views about teaching and learning but they have yet to come to believe them. Three, the teachers may have indicated their agreement with statements regarding contemporary practice presented in the survey because they seem reasonable to them rather than because they believe them.

Resources to support teaching

A dominant problem for all teachers in all schools is the lack of teaching and learning infrastructure and resources. The textbook, the key teaching and learning resource is insufficient for all students in all subjects. A mere 20% of mathematics, science and English teachers report they are sufficient for their students (see figure 1). Moreover, data from the school questionnaires reveal nearly a third of school buildings (31.6%) are dilapidated and the heating (42.1%) and cooling systems are inadequate (61.1%) in many more. Classrooms are insufficient in number and size (57.4%). There are no laboratories for biology (63.2%), chemistry (42.1%), and physics (42.1%) in the schools and the schools with science laboratories have little or no equipment and materials to facilitate scientific experiments.

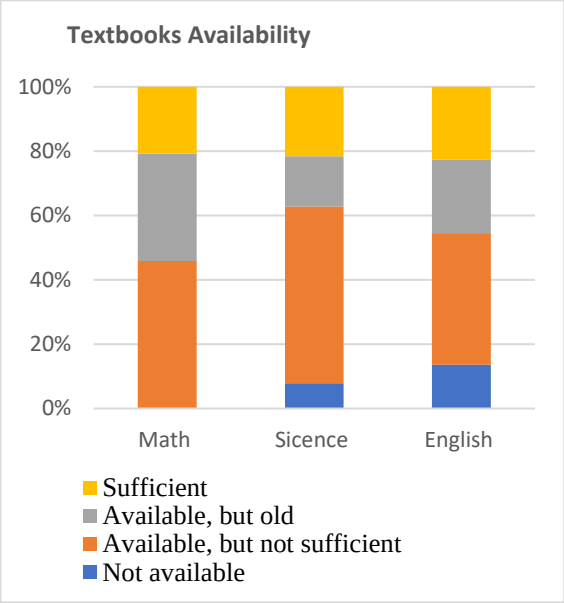


Figure 1: Availability of textbooks for each subject

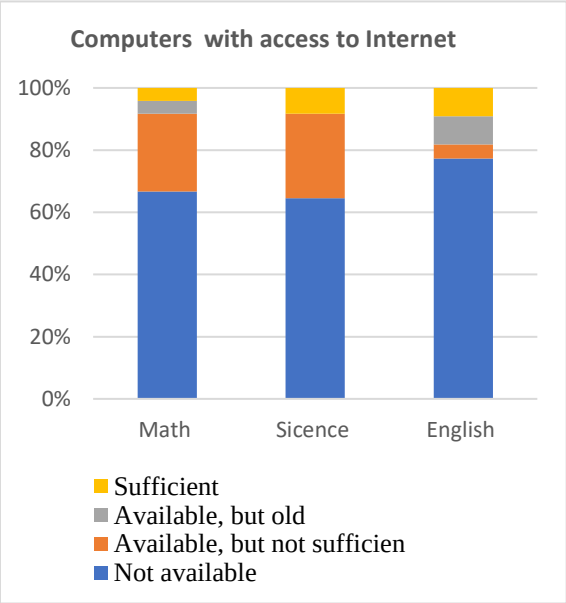


Figure 2: Availability of computers for each subject

According to the school directors, all schools, except for one have computers. However, only four schools have internet access! On average each school has twenty-five computers for students and three computers for teachers. The averages are misleading as some schools have more computers than others. The computers for students are in the school's computer lab and are used mainly for teaching and learning informatics. Over 60% of the teachers' report computers with internet access are not available to them for teaching (see figure 2).

Lesson observations reveal the most used educational resource is the chalkboard (89.2%) followed by textbooks (30.1%). Teacher made charts (11.8%), pictures (9.7%) and worksheets (2.2%) are used far less frequently as are computers (2.2%).

Without sufficient and up-to-date equipment and teachers skilled in the effective use of education technology, all the teaching will remain at a theoretical level or information dissemination, with no chance for actual application of knowledge and skills acquired.

Teaching Practice (general)

The findings on teaching practice in the schools draws on three data sources, the teachers' self-reports (TR) on the frequency (*always & often*) with which they use various instructional practices in their lessons, the students' reports (SR) on the regularity (*in all & most lessons*) with which teachers use various instructional activities in their mathematics, science, informatics and English lessons and the qualitative data from 93 lesson observations (LO) quantified to identify the frequency (*yes/no* and *in all & most lessons*) of teachers use of various instructional practices in their lessons. The findings from all three data sources have been triangulated and are presented below.

Only two-thirds of teachers start their lessons on time (LO 66.3%). Instruction starts almost immediately (LO 75%) as students quickly settle down (SR 91.8%) and are ready to start learning (SR 83.8%). Teachers generally begin lessons by checking students' homework (LO 86%), to review what was learnt in the previous lesson (LO 51.6%, SR 86.4%) or to demonstrate preparation for the day's lesson. They ask questions to elicit the information memorized overnight. They also

encourage students to direct questions to the presenting students, calling on a few volunteers to do so. Students' questions, like that of their teachers simply require the recall of the same or additional facts. While one student is answering the teacher's questions, other students memorize the content from their notebooks or textbooks in anticipation of being the next one to be called on. Often teachers keep calling on students to answer the same questions, sometimes even unimportant or irrelevant ones. The question-answer session to review homework can consume a lot of time, on occasion even the entire 40-minute lesson. The above strategy is well known for getting students to memorize subject knowledge which appears to be what the teachers want for their students.

Having checked students' homework, the teachers turn their attention to the focus of the day's lesson by sharing its topic with the students. Teachers do not share the student learning outcomes either verbally or in writing (LO 97.8%) although they sometimes have learning aims and/or objectives written in their lesson plans. Teachers and students, however, indicate learning outcomes are not shared only about a quarter of the time (TR 25.4%, SR 27.3%). Furthermore, in most cases teachers do not present an overview of the lesson (LO 95.7%).

The most common instructional strategy used is the lecture (LOs 78.5%, SR 67.4%, TR 45.1%) or more correctly dictating notes which students must diligently record in their notebooks. In about half of the lessons, the content of the lecture/notes is accurate (LO 60.3%), relevant (LO 46.3%), related to the learning objectives (LO 35.2%) and appropriate to the level of the students (LO 57%). While dictating notes, the teachers sometimes explain unfamiliar terms and concepts (LO 47.3%), write formulas or draw diagrams on the chalkboard and provide examples to clarify points (LO 49.5%). In a few cases teachers ask students for their input when writing formulas or drawing diagrams on the board. The teachers present new ideas (LO 40.7%) but much less frequently (LO 28.3%) restate important ideas when it would be appropriate to do so. The delivery of the lecture is appropriate in only half of the lessons with teachers speaking clearly and maintaining eye contact with students (LO 50.6 %). Immediately after the lecture, the teacher asks questions requiring students to recall and restate the content of the lecture.

Before, during and after the lecture, the teachers ask students questions (TR 85%). Most questions are lower-order knowledge questions, requiring simple regurgitation of facts (LO 81.7%). Because the questions require a factually correct answer, no wait time is provided (LO 75.2%). The students, however, claim the questions require them to think (SR 74.3%) and teachers provide wait time for them to do so (SR 78.2%). Students respond correctly to teachers' questions about a third of the time (LO 30.2%) and teachers provide feedback only a third of the time (LO 38.7%). Teachers encourage students to ask them (LO 33.4%) and their peers questions. When students take up the offer (LO 5.4%), they ask factual questions to which their teachers provide correct answers (LO 46.2%, SR 90.1%). In response to survey statements, students report teachers conduct whole class discussions on lesson topics (SR 72.1%) and teachers claim they hold debates (TR 49.1%) so students can argue for a point of view which may not be their own. No discussions or debates were observed in any of the 93 lessons. It is possible teachers and students view the question-answer sessions in their lessons as discussions and debates.

The teachers have students' complete textbook tasks that are focused mainly on subject knowledge acquisition (SR 86.6%, TR 87.8%). Teachers generally have students complete these tasks individually (LO 86%, SR 67.5%, TR 78.3%). Occasionally, they have students pair up or work in groups (LO 14%, SR 56.8, TR 76.6%) on similar tasks. As the tasks are not challenging,

they do not require the contribution of all group members (LO 1.1%) so students do not interact with each other, completing these seemingly group tasks individually as well. Collaboration is not fostered as there are no instructions provided on how to work collaboratively (LO 0%) nor are students required to process how well they worked together (LO 0%). Tasks that require students to apply their knowledge and skills (LO 30.1%), inquire before making decisions (LO 10.8%), generate their own explanations and justifications (LO 7.5%) and use a wide range of idea creation techniques (LO 20.4%) were rarely observed. Moreover, while teachers claim they give different tasks to students of different abilities, observations reveal all students working on the same tasks in all lessons (LO 0%, TR 74.8%). The use of ICT could facilitate differentiation of learning. However, with ICT being used only for teaching informatics in all except one school this is highly unlikely.

Lesson observations indicate teachers generally conclude lessons by engaging in three activities. One, they review the subject matter taught. They generally ask a few questions on the lesson content to 3-4 students. They occasionally summarize lessons by identifying the main learning points (LO 24.7%, SR 65.2%). Two, they give students homework. Homework involves doing tasks related to the day's lesson (SR 91.8%) or preparing for the next lesson. Three, they assess students' participation in the lesson using a four-point scale (5-2). Teachers give a few students a mark, usually without telling them what they did to receive the mark nor what they could do to improve on it.

With respect to assessment, teachers check student's homework (LO 86%). They observe students working on tasks (LO 60.2%) but they seldom provide feedback that would facilitate students' attainment of the learning outcomes (LO 9.7%). Students and teachers, however, claim (SR 76.3%, TR 68.8%) feedback for improvement is regularly provided. As indicated above teachers also assess students' participation in the lesson using a four-point scale. Assessment is teacher led, with teachers providing very little opportunity for student self-assessment (LO 2.2%) or peer assessment (LO 5.4%).

Lesson observations suggest the learning environment is not conducive to learning (LO 74.2%). Teachers *never and rarely* use pre-established classroom procedures to prevent misbehavior (LO 93.5%), encourage all students to learn by providing pathways to knowledge and skill acquisition (LO 75.8%) and use meaningful verbal praise to encourage participation and keep students engaged (LO 63.5%). They do, however, *always and often*, show respect and sensitivity to students during lessons (LO 90.3%)

Bringing Teachers' Beliefs and Practices Together (general)

Although teachers' responses to the survey statements indicate they hold both contemporary and traditional educational beliefs, lesson observations clearly show their traditional views influence their teaching practice. The teachers' self-reports of their practice and classroom observation indicate that in most lessons' teachers give lectures/dictate notes followed by questions that require students to recall lecture content. Students also spend considerable time completing textbook exercises individually. It is also clear that practices based on a constructivist philosophy such as students working collaboratively, undertaking week-long projects, debating ideas, and using ICT for teaching and learning are *never* or only *seldom* used by teachers. What is needed is to help teachers recognize the contradictions in their views and provide them the necessary knowledge, skills and support to transition from teacher-centered to student-centered instructional practice.

The Teaching of Mathematics

Teacher confidence in their preparedness to teach mathematics

The self-reports of mathematics teachers indicate most are confident (*very well & well prepared*) of their ability to teach the mathematics curriculum (29.2% & 66.7%). Their confidence, however, varies with respect to teaching different aspects of it with not a single teacher feeling *very well prepared* to use ICT to teach mathematics (0% & 30.4%). Most teachers express confidence in their abilities to develop students' mathematics knowledge and problem-solving skills. They are confident to use students' prior knowledge and experience to build new knowledge (26.1% & 56.5%), develop students' mathematical concepts and skills through problem solving (26.1% & 52.2%), get students to investigate and solve mathematical problems (12.5% & 62.5%), encourage students to explain both how they found their solutions and why they chose a particular method of solution (21.7% & 65.2%) and ask probing questions to get students to justify their responses (26.1 % & 69.6%). Fewer teachers, however, feel confident about encouraging students to think abstractly (13% & 52%) and using mathematical tools to find solutions to problems (8.7% & 65.2%).

Most mathematics teachers are also confident of their abilities to use contemporary pedagogies in their lessons. They report being able to organise cooperative learning groups (31.8% & 50%), conduct discussions on mathematical ideas (25% & 58.3%) and engage students in mathematical enquiry (26.1% & 47.8%). With respect to assessment of student learning, more teachers express confidence in conducting summative assessment (13.6% & 59.1%) than in formative assessment (10% & 60%). They also feel well prepared to differentiate instruction to meet the learning needs of all their students (12.5% & 58.3%), make connections between mathematics and other subjects (13% & 65.2%), and encourage students' interest in mathematics (34.8% & 56.5%).

Teacher beliefs

The mathematics teachers hold both contemporary and traditional educational beliefs. They believe (*strongly agree & agree*) students learn mathematics best by solving real-life problems (100%) and by asking a lot of questions (100%) while at the same time believing students learn best by memorizing mathematics rules and formulas (95.8%) and by watching the teacher demonstrate how to solve problems on the board (91.3%). All the teachers hold that working individually and in small groups on mathematics exercises, problems or investigations are equally effective for learning mathematics. They also believe that students need extra time out of class to understand most mathematics topics. This is probably because the mathematics curriculums overloaded, and the teachers believe they should cover every aspect of it.

The mathematics teachers have stereotypical beliefs about student ability and gender. 41.7% believe only academically competent students should study mathematics and 41.7% of them hold that boys are better at learning mathematics than girls. That nearly half of mathematics teachers hold these beliefs is an issue because it is possible that students whom teachers perceive as not academically competent and girls are likely to get less attention and support during the teaching and learning process.

Teaching resources

There is a severe dearth of teaching and learning resources for mathematics in all schools. Only 20.8% of teachers report that a mathematics textbook is available for every student! 45.8% report textbooks are available but insufficient and 33.3% the available textbooks are outdated. Teachers state additional mathematics textbooks (37.5%), instruments (37.5%) and models (41.7%) are unavailable at their schools. Only 37.5% of teachers report enough teaching guides whereas 12.5% report teaching guides are unavailable and 50% that the ones available are outdated. Audio-visual resources are unavailable to 75% of teachers and computers with internet access to 67%. Such a dearth of resources for teaching and learning mathematics is bound to negatively affect teaching and thereby student learning and achievement in the subject.

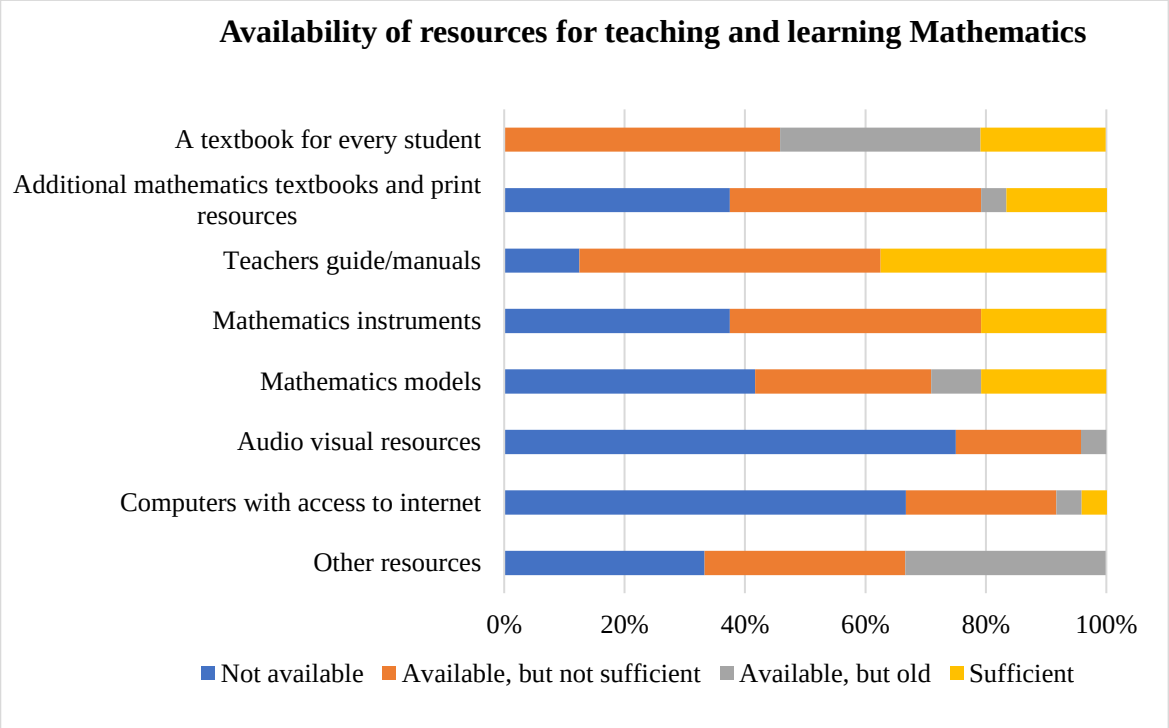


Figure 3: Conditions and availability of resources for teaching Mathematics

Teaching practice – self-reports

According to the self-reports of mathematics teachers (*every & most lesson*), the most frequent teaching activity in their lessons is the teacher (95.5%) and students (95.6%) demonstrating how to solve textbook problems (88.2%) on the board with students explaining their reasoning orally or in writing (87%). Less frequently they have students create word problems using real-life situations (70.8%) and apply mathematics concepts to real-world problems (73.9%). Having students work on problems for which there is no immediately obvious method of solution is least exercised (34.7%). Nearly as frequently, students solve problems individually (91.7%) or in small groups (82.6%). Most teachers claim they have students use multiple representations to communicate mathematical ideas (78.3%) and represent and analyze relationships using tables, charts, or graphs (73.9%) but less frequently they have students collect, analyse and draw conclusions from data (52.1%). Using computers, calculators or other technology to do

mathematics is infrequently practiced (33.4%) as is having students take a test at the end of each topic (45.8%). (see figure 4 below).

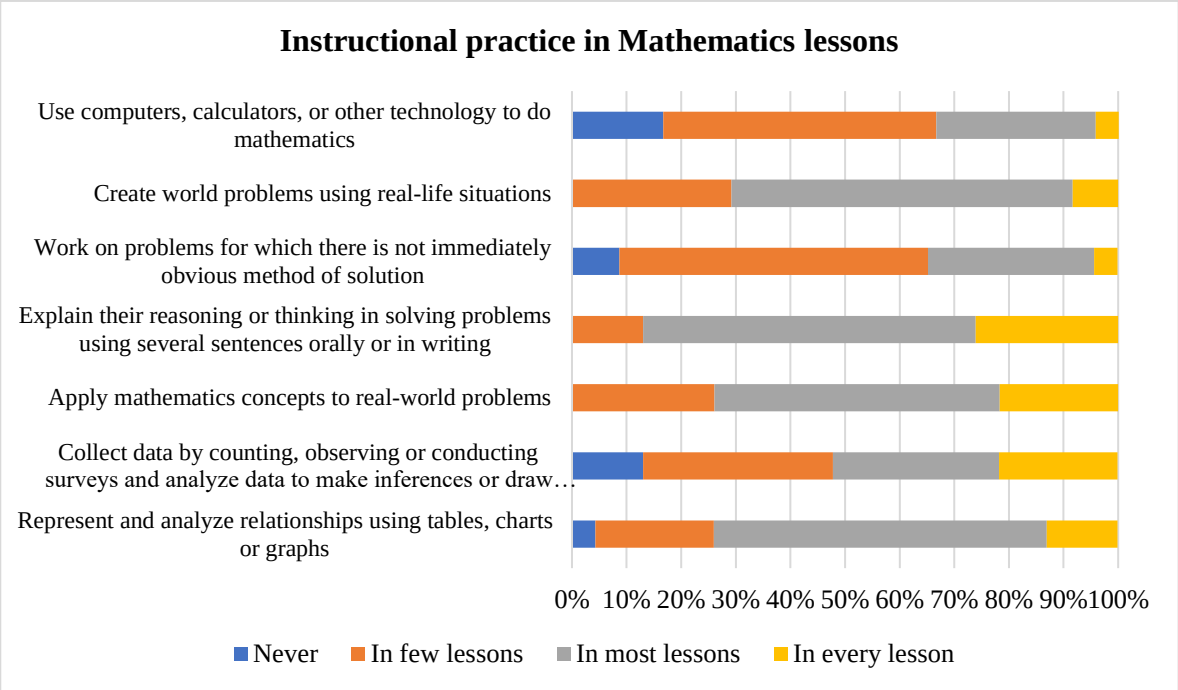


Figure 4: Instructional practices in Mathematics lessons

Teaching practice – lesson observations

Mathematics lesson observation 1

Grade 10

Topic: Finding the biggest and smallest values of a function

Number of students: 33. Present: 33. Absent 0.

Legend: Teacher (T), Student (S), Students doing something together (Ss), actions (), observer's comments []

T &Ss: Greetings.

T: What was your homework?

S: Our homework was, what is a function?

T: Looks at the class register and calls a student to come to the front of the class to answer.

S1: Function is a special relationship where each input has a single output. It is often written as f(x) where x is the input value.

T: Any questions for him?

S2: (to S1) What is quadratic equation?

S1: (no response)

T: Who else is ready?

S2: (raises hand, is called on and goes to the front of the class and repeats the definition of function).

S: What is variable?

S2: x & y are variables in function.

S: What is square equation?

S2: Square equation is when you have a variable with exponent 2 [responds correctly].

T: Who else can come to the board?

Ss: (silence).

T: Write today's topic: Identifying maximum and minimum values of a function.

T: (starts lecturing/dictating and Ss start writing) The maximum value of a function is the place where a function reaches its highest point, or vertex, on a graph. If your quadratic equation has a negative term, it will also have a maximum value… " (the teacher writes the formula on the board) f (x)=x^2 (continues lecturing. After a while the teacher draws the graph of f(x)=x^2 on the board which students copy in their notebooks). [The teacher does not explain the graph].

S: (raises her hand) Why the graph of the function is going up?

T: [does not explain] Draw the graph as soon as possible. (when the students complete drawing, she continues dictating). Maximum, in mathematics, is a point at which a function's value is greatest. If the value is greater than or equal to all other function values, it is an absolute maximum. If it is merely greater than any nearby point, it is a relative, or local, maximum (writes on board) f(x)=x^2-1 (and continues lecturing).

T: [writes the problem below and its solution step by step copying from her notebook].

Example 1: Identify the maximum and minimum values of the function y=x^4 -2x^2+5 at $[-2; 3]$

Solve:

Find f '(x) =0 $4x^3-4x=0$; $4x(x^2-1)=0$; $4x(x-1)(x+1)$; $x_1=0$, $x_2=1$, $x_3=-1$

2. Find f(-2), f(-1), f(1) and f (3)

f(-2)=13, f(-1)=4, f(0)=5,

3. Compare the numbers it is evident that the maximum value is f(3)=68; min value

f(+-1)=4

Ss: (copying into their notebooks).

T: (invites one male student to the board, shows him a problem from the textbook which he copies onto the board).

S2: Is it homework?

T: First we will solve it here and then do it for homework.

S: [The student at the board is copying the solution of the problem from the textbook onto the board].

T: [says something to the students, which is inaudible]. Your homework is to do exercise no…problem no… (to the students who answered questions and solved problems) Bring your diaries to put your marks (writes marks in the diaries).

LO School N, 25/05/2019

Mathematics lesson observation 2

Grade 11b

Topic: Solving problems with Derivative

Number of students: 38. Present: 30. Absent: 8.

T&Ss: Greetings.

T: As we have covered all Math units, today we will have revision lesson. For revision, I would like you to solve problems with "Derivative" (revised the formulas writing them on the board).

$$\frac{d}{dx}x^n = nx^{n-1}$$

$$\frac{d}{dx}(\sigma \pm \vartheta) = \frac{d\sigma}{dx} \pm \frac{d\vartheta}{dx}$$

$$\frac{d}{dx}(c\sigma) = c\frac{d\sigma}{dx}$$

$$\frac{d}{dx}(\sigma\,\vartheta) = \sigma\frac{d\vartheta}{dx} \pm \vartheta\frac{d\sigma}{dx}$$

$$\frac{d}{dx}\left(\frac{\sigma}{\vartheta}\right) = \frac{\vartheta\frac{\partial\sigma}{\partial x}}{\vartheta^2} - \frac{\frac{\partial\vartheta}{\partial x}}{\vartheta^2}$$

T: What is the formula of trigonometric function?

Ss: (silence)

T: [asked other formulas of derivatives and on getting no response from students answered herself and wrote the formulas on the board].

Ss: (adding a word or phrase as teacher writes the formulas on the board) [some other students were misbehaving; talking and laughing loudly].

$$\frac{d}{dx}(\sin(u)) = \cos(u)\frac{du}{dx}$$

$$\frac{d}{dx}(\cos(u)) = -\sin(u)\frac{du}{dx}$$

T: (to the students laughing) Are you a human beings or animals?

Ss: [quieten down].

T: Now I will explain to you by solving problems about derivatives as you have forgotten all (solves a problem on the board, explaining what she is doing)

$y=x(3x-5)=3x^2-5x$

$y'=3(x^2)'-5(x)'=3\times2x-5\times1=6x-5$

Ss: [Students observe the teacher passively]

T: Now copy it.

Ss: (copying it off the board).

T: Now we will solve the second problem. I will show you and then you will solve yourself (writes and solves the second problem on the board as well).

$y=(2x+1)^2$

$y'=((2x+1)^2)'=2(2x+1)\times(2x+1)'=4(2x+1)$

S: (the students copy it off the board).

T: (writes another problem on the board and calls a male student to come to the board and solve it)

$f(x) = (2-3x^2)^7$

S: [student at board, solves it with the help of the teacher].

Ss: (copy it off the board).

T: Now you will solve more difficult problems. [But writes the problem on the board and starts solving it, explaining each step herself].

$f(x) = (1+2x^2)^3\,,\, x_0 = 4;\; f(x) = 2e^{-x} + \ln(x+1)\,,\, x_0 = 0;$

Ss: [observing passively]

T: (completes solving the problem and students copy it off the board).

T: Write homework. Solve one problem of each of the three types.

Ss: [misbehaving by talking and laughing loudly].

T: (calls up a few students and puts marks in their diaries).

LO School J, 20/05/2019

Box 1: Mathematic lessons observation

Similar to the teacher's self-reports, the observations of mathematics lessons (see box 1) reveal the most frequent teaching activity is teachers and students demonstrating how to solve textbook problems on the board. While demonstrating, teachers' pay little attention to ensuring all students understand what they are doing, rather they place more emphasis on ensuring all students copy the solved problem into their notebooks. As a result, many students are unable to solve similar problems. The strategy of calling the 'best' students to the board to solve problems does not facilitate peer understanding as the students are neither required to explain what they are doing nor why. Rather the 'best' students when solving problems at the board, often receive support from the teacher to successfully solve the problem, with the result that good students get better and struggling students fall further behind. These 'good' students are further advantaged as they are given high marks (5s and 4s) for their participation, while the rest are given lower marks affecting end-of-the-term results.

Except for teachers demonstrating 'how to' and students applying the algorithm to solve textbook problems, in none of the mathematics lessons observed did students explain how they solved the problems, represented and analyzed relationships using tables, charts, or graphs and applied mathematics concepts to solve real-world problems.

Bringing mathematics teachers beliefs and practices together

None of the contemporary beliefs about teaching and learning, the self-reports on using modern teaching practices and the high confidence teachers indicate in their abilities to use 21st century pedagogies to develop students' mathematics competences were evident in the mathematics lessons observed. Observations indicate teachers use 'transmission' pedagogies that require students to memorize mathematics terms, rules and formulas and use algorithms to solve textbook problems. Students are generally not encouraged to apply learning to solve real-world problems, use different methods to solve problems and to justify their choice of method and solution, nor to do so in small groups to learn with and from each other. Moreover, there is no use of formative assessment to identify where students are at and suggest ways to improve. The marks (2-5) given at the end of each lesson, by teachers to students who 'actively' participate in the lesson (often teacher selected not voluntary) which could be used formatively is used as a summative assessment.

All the mathematics teachers believe that students need more than the allotted time to understand most curriculum topics but as they are required to complete the curriculum on time, they emphasize curriculum coverage rather than student learning. Student learning is further affected by the mathematics teachers' stereotypical beliefs about student ability and gender and the reflection of

these beliefs in practice. Teachers regularly call on a few 'competent' students to answer questions and solve problems on the board most of whom are boys.

The Teaching of Science

Teacher confidence in their preparedness for teaching science

Most science teachers (76.5%) express a high level of confidence (*very well & well prepared*) in their preparedness for teaching the science curriculum to their classes. Like the mathematics teachers, the science teachers feel least prepared for using ICT to teach science with only 28% of teachers expressing confidence to do so.

The science teachers are most confident in their ability to develop students' knowledge and understanding of facts, concepts, and theories of the natural world (94%), their connection to other subjects (86%) and to real-life (89.4%). They are also confident in developing students content knowledge by asking questions that get students to think deeply about science (80%) and helping them use scientific ways of thinking and writing (82%).

Fewer science teachers express confidence in their abilities to develop students 'competences' to 'explain phenomena scientifically, evaluate and design scientific enquiry, and interpret data and evidence scientifically' (OECD, 2019, p. 103). Only two-thirds of them feel confident to demonstrate scientific experiments (66%), use simple equipment and easily available materials to conduct them (57.1%), manage and support a class of students engaged in experimentation (69.4%), develop students science process skills (65.3%) and discuss the results of science ideas and investigations (70.9%). Engaging students in scientific enquiry is a challenge for nearly half the science teachers (53%).

With respect to assessment of learning, most teachers express confidence in conducting summative assessments to identify how well students have attained the learning outcomes (83.3%) but much fewer are confident in using formative assessment strategies to track the progress of individual students and design activities to facilitate learning (47.9%). Despite expressing less confidence in designing scientific investigations and enquiry and interpreting data and evidence scientifically, most teachers feel confident they can encourage all students to participate fully in science learning (87.5%) and encourage students' interest in the sciences (87.5%).

Teacher beliefs

Similar to the mathematics teachers, the science teachers also hold conflicting beliefs (both contemporary and traditional) about the most effective ways of teaching and learning science. With respect to student learning, most science teachers believe (*strongly agree & agree*) students learn best by first learning facts and procedure and then conducting scientific experiments (97.8%), memorizing science facts and procedures (84.8%) and by the teacher explaining orally (80.9%). At the same time, they believe students learn science best by asking a lot of questions (93.6%), connecting the principles of science to real life (88.5%), and sharing science ideas with peers (87.2%). Nearly all the science teachers believe that students need extra time out of class to understand most science topics (92%). This belief might not only be driven by an overloaded curriculum that teachers feel must be covered in the given time but also by their belief that science is a difficult subject.

The science teachers, like the mathematics teachers also hold stereotypical beliefs about academic competence and gender. Nearly half of them (44.7%) believe science is a difficult subject, so only academically competent students can study it and 40.4% of them believe that boys are better than girls at learning science. These beliefs being held by nearly half the science teachers is concerning as they are likely to negatively affect the learning of students perceived as less competent, particularly girls.

Teaching resources

The problem with the availability of resources is almost the same as for all subjects. Textbooks are a big problem with only 22% of science teachers reporting there is a textbook for every student in their class. 7.8% report textbooks are unavailable and 60.6% report they are available but are insufficient (54.9%) or outdated (15.7%). The situation with science equipment and materials for experiments is even worse! 52.9% of teachers state there is no scientific equipment and 11.8% the equipment is too old to use. 67.3% of teachers report there are no materials available and 4% they are too old to use to conduct scientific experiments at their school. The lack of and outdated scientific equipment and materials was a concern raised by science teachers during data collection visits. They stated the lack of scientific apparatus hindered teaching and learning and they did not use the outdated equipment and materials as it endangered both students and their own safety.

Sufficient resources for teachers are available only in a third of schools. 42% of teachers report sufficient teacher guides/manuals, 37.3% additional science books and print resources and 12.2% audio-visual resources. Computers with internet access could addressing resource related issues by facilitating students access to textbooks, teachers access to additional print and e-teaching resources and simulations of scientific experiments online but with their being only enough computers in 8.3% of schools and internet access available in only four schools, even this is not possible! (see figure 5 below).

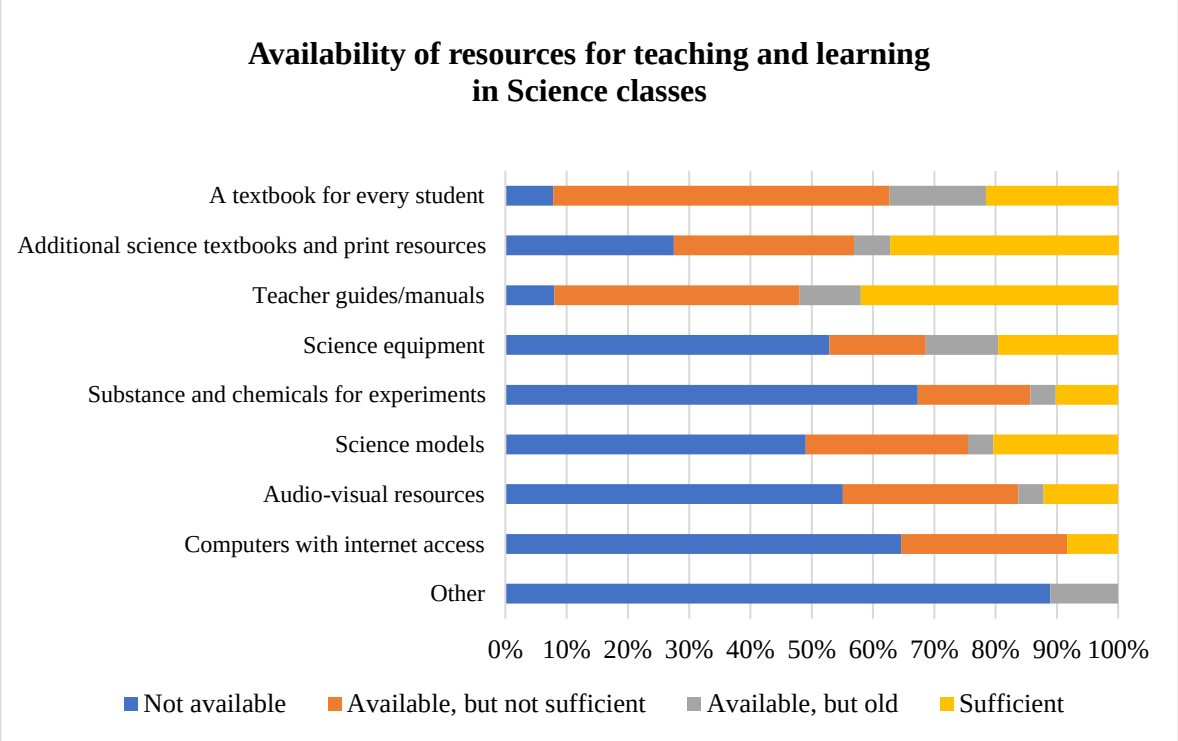


Figure 5: Conditions and availability of resources for teaching Sciences subjects

Teaching practice – self-reports

The data from the science teachers' self-reports about their teaching practices clearly show that most of them adhere to traditional teaching practices focused on the transmission of knowledge. Most teachers report that in *every and most lessons* they have their students read from science textbooks (79%), listen to lectures on a science topic (86%), take notes from the lectures or textbooks (89%), complete exercises from the textbook (84%) and use science concepts to understand the real-world (77%). It is also normal practice for most teachers (80%) to take a quiz or test at the end of each topic.

The activities that develop students 'competences' to design scientific investigations and gather, interpret and report findings scientifically are conducted by fewer teachers. For example, about two-thirds of teachers state they *never and just in few lessons* have their students work on extended science investigations (71%) and engage in science inquiry (64%). Moreover, around half of the science teachers report they *never and just in a few lessons* encourage their students to conduct scientific experiments based on given instruction (47%) and design and conduct their own scientific experiments (53%). Despite between two-thirds and half of the teachers reporting they *never and just in a few lessons* engage students in scientific enquiry and investigations, yet over two-thirds (69%) state they have students communicate orally or in writing their observations and explanations of findings of investigations in *every and most lessons* (see figure 6 below).

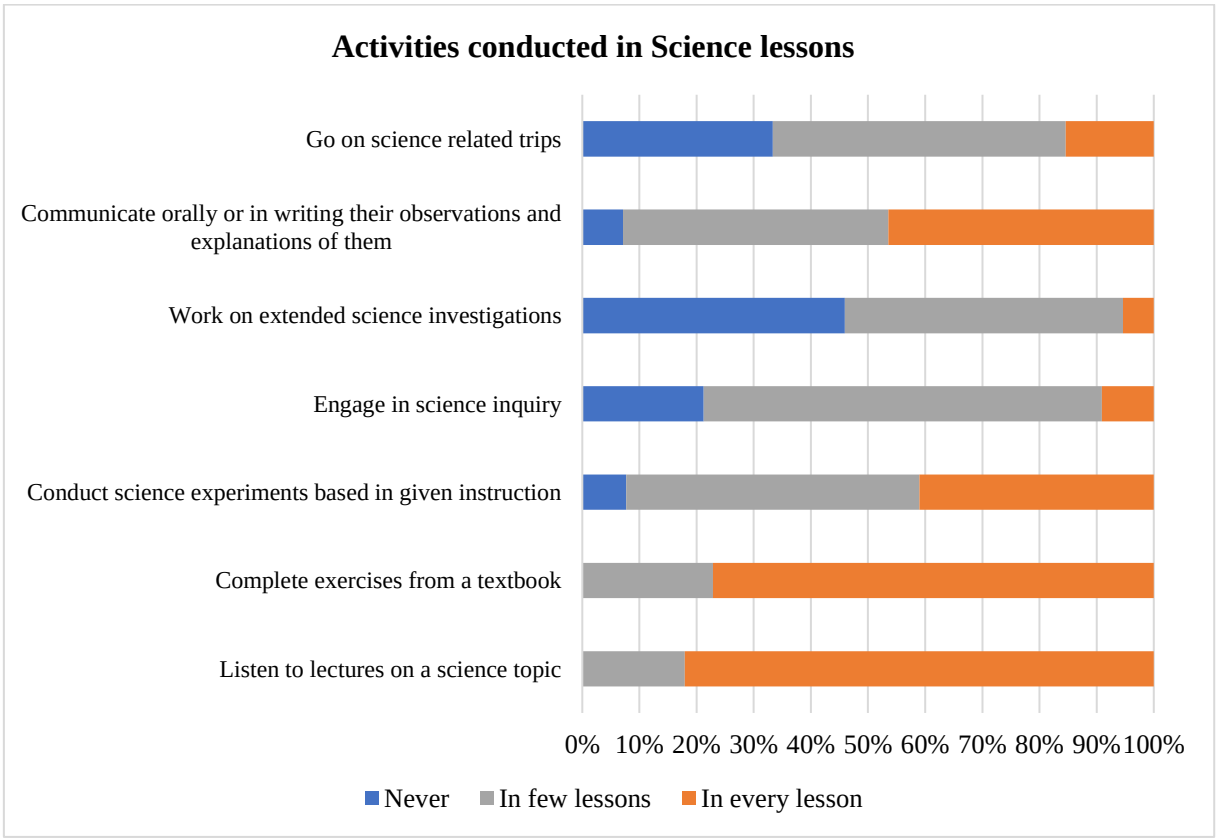


Figure 6: Activities conducted in Science lessons

Teaching practice – lesson observations

Lesson Observation: Chemistry

Grade 9

Topic: Ways of Production of Steel

Number of students: 37. Present: 32 Absent: 5.

Legend: Teacher (T), Student (S), Students doing something together (Ss), actions (), observer's comments []

T & Ss: Greetings.

T: What was your homework? [without waiting for a response] Now I will give cards to students who do not have marks. [This is the teacher's way of getting students who do not participate in the lessons, to do so].

S: Our homework was, what is cell?

T: Who is ready?

S1: (A few students raise their hands; the teacher asks a girl to come up front and answer). Cells are the basic building blocks of all living things. Most living things are made up of many cells. Cells have many parts. The nucleus is in the center.

S2: (repeats the same and adds) Cells have many parts. Each part has a different function. The nucleus controls all the activities of the cell. Around the nucleus is a jelly like substance called cytoplasm.

T: Ask questions from them.

Ss: What is a cell? What does the nucleus do? Name main parts of a cell. [Information is repeated]

T: Karim come to the board and write a chemical reaction of any metal.

S: Fe+H [student could not write a chemical reaction]

T: Who can help?

S3: (Student adds) Fe+HCl [Student could not complete the reaction]

T: Who can write the symbol of any metal? (called another student to the board)

S: Cu

T: [The 6 students with cards are called in turn up front to write a formula or respond to questions such as] Write the formula of water?

S: H_2O=H+ OH

T: How many isotopes has carbon?

S: Three.

T: Correct. What kinds of metallurgy we have?

S: Coloured metallurgy and black metallurgy [It is non-ferrous and ferrous metallurgy, sometime referred to as coloured and black metallurgy].

T: Can you tell about colored metallurgy.

S: Includes metals other than iron.

T: Who can tell about black metallurgy?

S: Includes iron.

T: Which metallurgy is more developed?

S: Black metallurgy.

T: Now we will have group work. You should prepare a response to the following question: What are the characteristics of nitrogen and describe it? You have 5 minutes to answer the question!

Ss: [Worked independently, without even a single interaction among them]

T: (Comes to some students and puts her hands on their shoulders and says to one) Good for you. [Started explaining something to them which is inaudible].

T: [After three and a half minutes] Who is ready? Time is up [Many students were not ready and there was still time to complete their work as per teacher instruction].

T: Student from group 1.

S: Nitrogen symbol is N. It is colourless, odorless and tasteless.

T: Student from group 2.

S: Nitrogen symbol is N. Atomic number is 7. It is colourless, odorless and tasteless. It makes up 78% of the earth's atmosphere.

T: Student from group 3.

S: Nitrogen symbol is N. Atomic number is 7. It is colourless, odorless and tasteless.

T: The second group gave better and more complete answer and are the winners. Write todays topic: Production of steel [Wrote it clearly on the board]. Now write about the process of production of steel [dictates information from her notebook]. According to their chemical properties, steel is divided into carbon steel and stainless steel. Steel is made from iron by removing impurities and by adding various substances such as, manganese, chromium, nickel, tungsten, etc. The added substances give it special properties. (While dictating, writes the symbols of elements 'Mg' 'Cr', 'Ni', 'W' on the board, asking students what is the element). [She moves around the class checking that students are writing down what she is dictating].

T: [After 4 minutes] (invites a student) Write the formula of Phosphorus Oxide.

S: P+O= P_4O_{10} [Student writes, with prompts from peers]

T: Good for you, well done!

T: (continues lecture) Characteristics of steel. One characteristic of steel is its strength. Steel is very strong. It does not corrode or rust like iron. It is malleable. Steel can be hammered, sheeted, molded, and even stretched into wire. Steel equipment is highly durable. Depending on the field of application, different kinds of steel is used. (to a student) Write the formula of Carbonic Acid.

S: CO [student corrects with prompts from peers] H_2CO_3

T: (continues lecture) Protection of environment from production of iron and steel. Processing cast iron into steel is a complex process. As a consequence, the environment is exposed to dust, gases, slags, and the water will be polluted. Therefore, for steel production various methods are considered. One of the methods is using natural gas and hydrogen instead of coke. Strip iron is obtained from an ore that is very clean (explaining it means does not contain carbon and other impurities) and the ore is used to produce rolled and stainless-steel and martensite in electric furnaces.

T: Now put your pen aside and listen to me, I will ask you some questions. How many types of metal we have?

S: Five.

T: Who can you write the formula that we have just discussed? [the only student who raised his hand was called on].

S: H_2CO_3

T: How many elements are there in the table of chemical elements?

S: 118.

T: Which elements are in column 2 of the table of chemical elements?

S: (No response)

T: Did you understand today's topic?

Ss: Yes.

T: Do you have any questions? [without giving students the opportunity to ask questions] Who is absent? [Checks attendance by reading the names of the students] 32 students were in the lesson, 5 are absent. Those who had cards please raise your hands [Puts marks for them without explanation]

(Bell rings, teacher says goodbye and leaves the class)

LO School J, 20/05/2019

Lesson Observation Physics

Grade: 7

Topic: Inclined Plane

Number of students: 21. Present: 17. Absent: 4.

T & Ss: Greeting.

T: What was the homework?

Ss: Lever.

T: Define lever.

S1: A simple machine that allows you to gain a mechanical advantage in moving an object.

T: (to another student) Define lever.

S2: [Repeats the same].

T: How is it made?

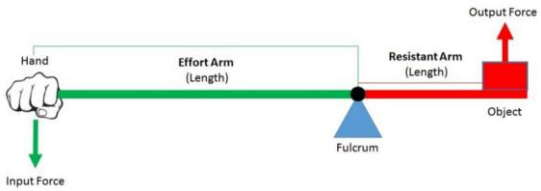
S2: It is made of a rigid beam and a fulcrum. The effort and load are applied to either end of the beam. When an effort is applied to one end of the lever, the load on the other end moves.

T: Draw the scheme.

S2: [Drew a straight line and stopped].

T: [Same questions asked of a third student]

S3: (Student draws the scheme below with help from the teacher)



T: (to same student) For lifting the weight which formula is used?

S3: [writes the formula correctly with teacher's help]

$$\text{Mechanical Advantage} = \frac{\text{Output Force}}{\text{Input Force}}$$

T: Define lever and give an example.

S4: [started to say something, got confused and stopped].

T: You (pointing to another student).

S5: A lever is a simple machine made of a rigid beam and a fulcrum. The effort and load are applied to either end of the beam. The fulcrum is the point on which the beam turns. When an effort is applied to one end, it moves the load at the other end.

T: What variables does lever depend on?

S6: The input and output forces and the place of the fulcrum.

T: (to same student) How many kinds of levers are there?

S6: Three.

T: (to same student) Which machines belong to each kind of lever?

S6: (No response).

T: Who can write the formula of kinetic energy?

S: (comes to the board and writes) $E.K = 1/2\ m\ v^2$

T: How can we explain the formula?

S: (no response from student at the board)

T: (to another student) Can you help?

S: Kinetic Energy is equal to half mass and velocity squared.

T: Kinetic energy is directly proportional to the mass of the object and to the square of its velocity. Who can write the formula of potential energy?

S: E. P= mgH

T: Can you explain the formula?

S: (no response from student at the board).

T: Potential energy is equal to mgh, m is mass, g is acceleration due to gravity and h is height.

T: Does anyone have a question?

S: Sir, what is acceleration due to gravity?

T: Acceleration due to gravity, is the acceleration of a body caused by the force of the earth's gravitational field acting on it.

T: Write todays topic, The golden rule of mechanics. What section of mechanics is it a part of?

Ss: (no response).

T: What is regular and irregular motion?

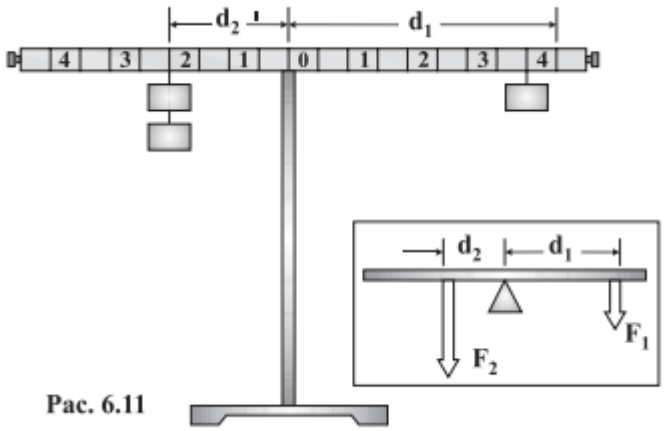
Ss: (no response).

T: How many types of motion are there based of trajectory?

Ss: (no response).

T: (lecturing) The law of the lever, proven by Archimedes shows that if the distance a from the fulcrum to where the input force is applied (point A) is greater than the distance b from fulcrum to where the output force is applied (point B), then the lever amplifies the input force. You can use a ruler graded with centimeter as a lever [While lecturing, the teacher took out a small piece of paper with a diagram on it. Pointing to a

student] Come up and draw the diagram on the board (the teacher describes the diagram being drawn).



Pac. 6.11

T: (concludes) The lever is balanced when F2 = 2F1 and d1 = 2d2. This means that the force F1 is equal to half F2, but the distance from the point of the force F1, that is d1 is twice more in comparison to the distance of the force F2. The multiplication product of F1d1 and F2d2 is equal to each other: F1 d1=F2 d2

T: (Continues lecturing) This is the condition of a balanced lever. Archimedes came up with this formula. This ratio includes two important physical concepts: one is the distance between the point of reference "0" to the point of force d, which has a special name - it is called the shoulder of force. The product of multiplying this magnitude and the force, i.e. F · d, as we have said in §6.5, is called the rotation of the force (moment of force) and is usually denoted by M. M = Fd.

T: Homework page 259-260. Read the text about Inclined plane for the next class and answer the following questions:

1. What is an inclined plane and what is it used for?

2. What is the (degree) sharpness of the inclined plane? and what does it mean?

3. What are the advantages of using an inclined plane?

T: (Called the names of a few students to bring their diaries up to him so he could give them a mark). [These were the students who had answered questions and copied the diagram on the board].

T: (bell rings while teacher is giving marks and when he completes it, leaves the class).

LO School F, 27/05/2019

Lesson observations Biology

Grade: 8b

Topic: The environment

Number of students: 26. Present: 20. Absent: 6.

T & Ss: Greetings.

T: Who is on duty? Give me your report (started writing the lesson topic on the board).

S: Today is 22nd May 2019. 20 students are present, 6 students are absent. Which celebration is coming up soon?

Ss: (In chorus) Youth Day.

T: What was your homework?

Ss: Environment.

T: (Called on a student) Define environment?

S: The part of the nature where organisms live, are exposed to, and also affect it, is called the environment.

T: What are the factors affecting the environment?

S: [looked in her notebook and then by heart] Conditions that affect the environment are called environmental factors. They are divided into three groups: non-living factor, living factor, and factor related to human activities.

T: (Drew on the board a chart of evolution)

T: Ask questions [students asked questions that mainly focused on chronology such as who came after birds]

Ss: (no response).

T: [wrote 'Environment' on the board, drew a circle around it and asked one student at a time to come up and write something related to it. Three students go to the board and each writes a word only birds, nature, animals.

T: Who has done the questionnaire?

Ss: (no response).

T: Why birds are not getting wet?

Ss: (no response).

T: What is artificial choice?

Ss: (no response).

T: Why do people keep animals?

Ss: For food, as pets.

T: Can human beings affect the environment?

Ss: Yes, human beings affect the environment. They cause pollution by burning coal and cutting down trees.

T: Tell me about embryology.

Ss: (no response).

T: Have you your notebooks? (wrote the topic on the board) 'Seasonal changes in animal life' (starts lecturing) There are changes in animal life due to changes in the season. During the spring and summer, the hot weather and plentiful food causes animals to reproduce and grow. During the fall and winter, the cold weather and scarcity of food causes some animals to collect and store food for the winter months.

T: Can we impact nonliving things?

Ss: (no response)

T: Can we impact living things?

Ss: Human beings can increase and decrease the living things.

T: I am going to explain how animals adapt to the changes in the environment. [Instead of explaining asks] Why bears hibernate in winter?

S: Bears hibernate in winter because it is cold and there is little food.

T: (lecturing) Different animals store food differently. Some animals like seals and walruses eat as much as they can and put-on layers of fat under their skins. Squirrels bury nuts and acorns to store for winter. In winter, bears go underground and go into a deep sleep. This is called hibernation. Some birds migrate to warmer climates for food.

T: What is hibernation?

Ss: Hibernation is going underground and going to sleep in winter.

T: (continues lecturing) The Colour and Patterns on animal's bodies help them to hide from both their predators and prey. This is called camouflage. The colour and pattern on an animal's body usually reflects the animal's habitat. [Explaining] For example, the polar bear lives in the arctic. The arctic is cold and covered in snow throughout the year. The polar bear is white which is the same colour as the snow in the habitat in which it lives making it difficult to see by predators and prey.

T: [Hands out cards with questions on them, which students read and answer. All the questions are factual and require students to repeat information just provided or information from previous lessons].

T: (Calls a few students by name) Bring your diary. (Puts a mark on each student's diary) [No reason given for the).

LO School I, 22/05/2019

Box 2: Science lessons observation

All the science teachers' lessons follow the same pattern. Teachers begin their lessons by asking students questions related to their homework, which might be either to review the topic of the previous lesson or to prepare for the day's lesson. In addition, to they themselves asking students questions, they also have students ask questions of their peers. This is followed by a lecture which students are required to record in their notebooks. During the lecture, the teachers draw diagrams, write formulas on the board sometimes with the contribution of students. The lecture is generally followed by another question-and-answer session, which is aimed at reinforcing the content of the lecture. Teachers attempt to make their lessons more interactive through the question-and-answer sessions, seeking students' contributions during the lecture and a few attempting group work. Group work is generally not successful as the groups are too large, the tasks not challenging, and team-work skills undeveloped. Lessons generally end with teachers giving students homework and giving those students who participated in the lesson a mark ranging from 2-5.

The science teachers' self-reports of their practice and the observations of their science lessons show their practice is largely focused on the transmission and memorization of subject knowledge. Teachers devote a significant amount of lesson time to lecturing or dictating subject content for students to note down which is due to the severe lack of science textbooks. Both teachers and students ask questions, a practice generally encouraged, however, their questions simply require regurgitation of science facts. The absence of having students explain phenomena scientifically, design and conduct scientific investigations and enquiry, and interpret data and evidence scientifically will do little to prepare students with the scientific competences delineated in the state standards and the science curricula.

Bringing science teachers beliefs and practices together

The data from both lesson observations and teachers self-report suggest that teachers teaching practice is in keeping with their traditional beliefs. Lesson observations reveal teachers mainly provide students content knowledge by having them listen to lectures on science topics, take notes from lectures and complete textbook exercises. A significant portion of lesson time is spent asking students factual questions to check how well they have memorized the content. While most of the teachers strongly believe that connecting science topics to the real world, having students conduct science experiments and engaging students in enquiry-based learning are effective methods for teaching science, in their self-reports on their practice only a third of them state they engage in

these practices in most lessons. However, in none of the lesson observations were these practices evident.

Nearly all the science teachers believe they must cover the curriculum in the given time and hold the allotted time is not sufficient for students to understand curriculum content. Rather than finding innovative ways to deal with the lack of time, they act on their beliefs covering the curriculum in time and at the expense of student learning. Student learning is also compromised by teachers acting on their belief that only competent students should study science. Lesson observations show that teachers call on a few 'competent' students to answer questions. Teachers also hold the stereotypical belief that boys are better than girls at learning science. The gender of the competent students was not consistently recorded so we cannot make any claim regarding the effect of the teachers' gender bias on student learning. This area requires further study.

The Teaching of Informatics

Teacher confidence in their preparedness for teaching Informatics

Most teachers (82.4%) report they are very confident (*very well & well prepared*) of their ability to teach informatics to their assigned class, but only two-thirds feel (68.8%) the same level of confidence in teaching students of diverse abilities. Most teachers are very confident in teaching students how to behave safely (81.3%) and ethically (75%) online, connecting content of informatics lessons to real-life (75%) and encouraging students' interest in informatics (76%), but only half in connecting informatics to other subjects (56.3%). With respect to pedagogy, more teachers are confident in facilitating cooperative learning (73.4%) than in conducting projects (62.6%). In terms of assessment, 70.6% of teachers are confident of engaging in summative assessment but only 58.9% of them express the same confidence in conducting formative assessment. Fewer teachers are confident in preparing materials to use with a Smartboard (60%) and downloading or uploading curriculum resources from websites and learning platforms for students to use (56.3%).

Teacher beliefs

All informatics teachers express contemporary beliefs about the teaching and learning of informatics. They *strongly agree and agree* that students learn informatics best by connecting it to real-life (100%) and the most effective way of learning informatics is by having students do projects in teams (100%). Most teachers also believe the integration of ICT in lessons improves the class climate (94%), facilitates collaborative work (93%), increases students' engagement (88%) and autonomy in learning (84%).

Teaching resources

The data suggest that similar to mathematics and science there is a severe shortage of resources for teaching and learning informatics. Computers for students are available in all except one school but only 12.5% of teachers indicate they are sufficient. The majority report the available computers are insufficient (25%) or old (62.5%). Most of the computers are available to students only in the computer labs for their ICT lessons. There is an even greater dearth of computers for teachers. 35% of teachers report there are no computers available for them and only 17.6% indicate the computers are sufficient for them. The rest report computers are available but old or insufficient (23.5% each). Most teachers (65%) report they do not have access to the internet. Only 11.8% of teachers report internet connectivity. Only 31% of the teachers report sufficient content material and room and furniture for teaching and only 12.5% indicate sufficient technical support (see figure 7 above).

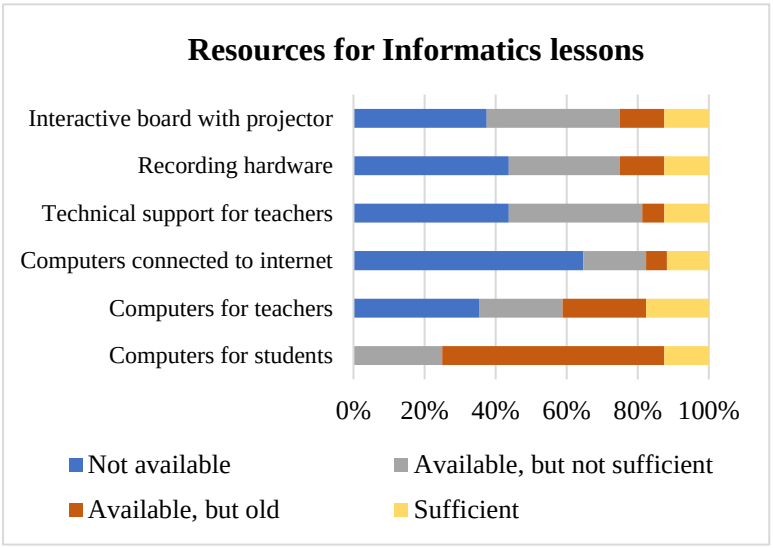


Figure 7: Availability of resources for teaching and learning informatics

Teaching practice – self reports

According to the teachers' self-reports they have students engage in the following activities in *every and most* informatics lessons: produce a text using a word processing program (75.1%), watch the teacher demonstrate how to do programming or how a software/hardware works (58.8%), use a spread sheet (58.8%) but less often to plot a graph on it (41.2%), and create a presentation with simple animation functions (50%). They report students work more frequently (*every & most lessons*) on these tasks collaboratively (82.3%) than individually (68.8%). Half of the teachers' report assessing student learning by taking a test or quiz on completion of each topic (50%)

Most teachers report commonly used ICT skills are rarely (*never* & *in a few lessons*) developed in their lessons. They hardly ever have students edit text online containing internet links and images (94.1%), use emails to communicate with others (88.2%), create a presentation with videos or audio clips (87.6%), create and maintain blogs or web sites (85.7%), capture and edit digital photos, movies or other graphics (82.3%), participate in online discussion forums (81.2%), create data bases (76.5%), participate in social networks (75%), download and install software in computer (68.8%), and organize computer files in folders and subfolders (66.5%). They also have students rarely work on extended projects (76.5%) (see figure 8 below).

Limited internet access does hinder teachers from developing some commonly used ICT skills. However, there are several skills such as creating presentations with audio and video clips, editing digital photos, creating data bases and organizing computer files in folders that can be developed

without internet access. This study shows that students have access to android phones and as such could develop many other skills through home assignments and working on extended projects that require these skills. It is important that attention be paid to developing student digital literacy skills given the ubiquitous use of digital technology in all areas of work and life.

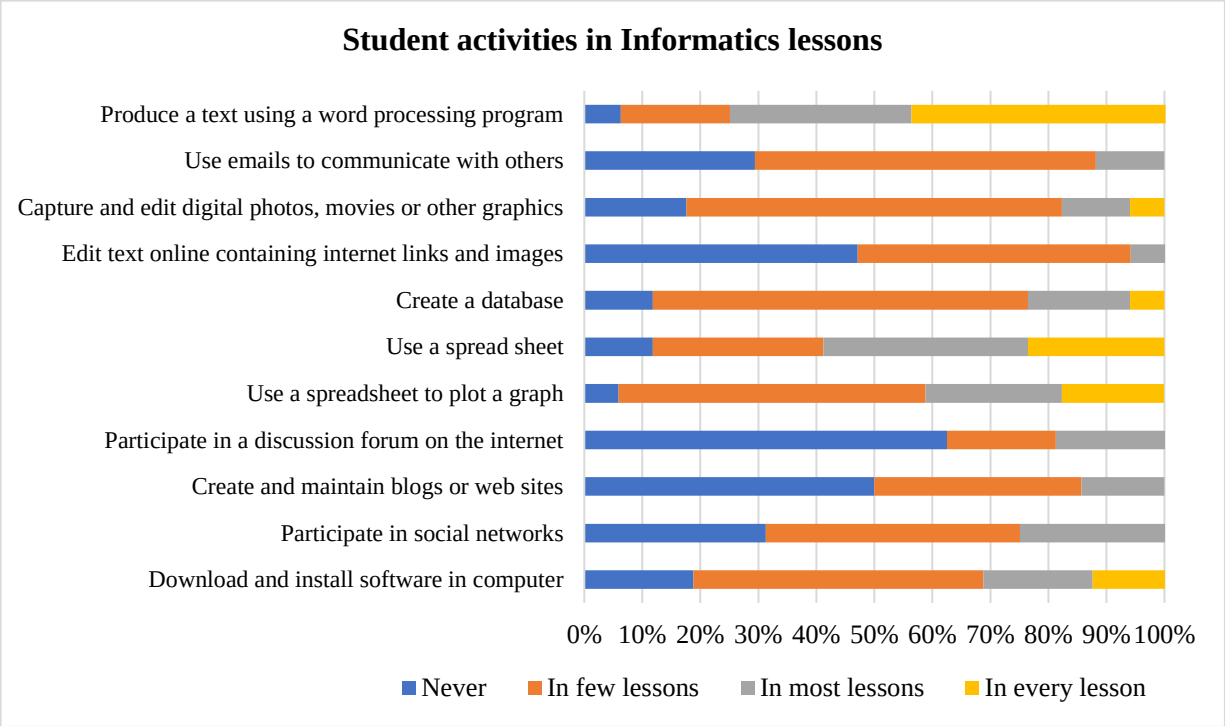


Figure 8: Key student activities in informatics lessons

Teaching practice - lesson observations

Informatics Lesson observation 1

Grade: 8

Topic: Revision

Number of students: 38. Present: … Absent: …[Data not available]

Legend: Teacher (T), Student (S), Students doing something together (Ss), actions (), observer's comments []

T: Today we have revision lesson.

T: When was the first computer invented?

Ss: 1822

T: What is microprocessor?

S: A microprocessor is the most important part of the computer. It takes the input, processes it and produces the desired output.

T: What is software?

S: The programmes used by a computer.

T: What is hardware?

S: The physical parts of a computer. Example, monitor.

T: What is internal and external memory?

S: Internal memory is random access memory or main memory in the computer. External memory, or secondary memory, comes from outside the computer.

T: What is flash disk?

Ss: A storage device.

T: What are the types of disks?

Ss: Disks, floppy disks, flash disks…

T: If you buy a TV of 43 inches how many cms would it be?

Ss: (no response).

T: How much is 1 inch.

Ss: 2.54cms

T: (on the board) Multiplied 43 by 2.54. This way we can convert into cms.

T: What kinds of printers are there?

Ss: [shout out names of printers].

T: What kind of printer do we have in our class?

S: Laser printer.

T: What are the essential and additional parts of computers?

Ss: [shouting out the names of the parts of the computer]

T: (called a student up to the computer at the front of the class) Open documents on the computer and draw a table. [Students standing up trying to see what the student was doing but the teacher did not ask them to come up to get a closer look].

T: We can put pictures, diagram, tables, and other objects.

T: If I want to print 10 pages how can I print 10 pages? [did not wait for the student but explained herself and students repeated after her]

T: If I want to print pages 1, 3, 5, 7, what should I do? [answered the question herself]

T: (to a student) Come and insert a diagram.

S: (went up to the computer and did it).

T: Sahlo, good Job! (to another student) Come and insert an object [student hesitated so teacher guided him, giving the instructions out loud]. Thank you.

T: The homework was presentation. (to a student) How to prepare presentations?

Ss: [respond giving the steps but as they are speaking together it is difficult to follow]

T: In order to create new PPT which command should we use?

Ss: [call out together F5]

T: Tell me about forms.

Ss: [response inaudible]

T: Who has questions?

S: What is F4?

S: Command to repeat last action.

S: What is F5?

S: Command to create new presentation.

S: (Then another student asked a question)

S: (in response the student stood and shared some theory)

T: Who can continue?

S: (continued)

T: When was DOS version 3 created?

S:1984

T: Who has questions? You can ask from previous topics as well.

S: How many types of monitors exist?

S: Two types of monitors CRT and LCD.

T: What kind of monitor are we using now?

Ss: (in front row) LCD.

[Around 6 students ask factual questions, and only the front row students answer. The teacher also puts questions to students in the front row. The students in the back rows were ignored and remained silent. Seemed as if they were not in the class].

T: What is pixel?

Ss: [no response]

T: Who knows math? We just converted 43 inches into centimeters, if we want to check if it is right, what should we do?

S: [to same student who has answered some questions and drew the table]. We have to divide (teacher called her to the board) [When the student started to solve it on the board, she had some difficulties dividing and the teacher helped her]. (The teacher then explains how to divide to the class)

T: Your homework is to revise, and I will take a test. [The teacher realizes that there is still time and says] You will ask questions of each group. (to a student) Ask group A, a question.

S: Who is the scientist [inventor] of computer?

S: Charles Babbage.

T: Who are scholars of computer science from Central Asia? (the teacher shows a photo) What is the name of this person?

Ss: [no response]

T: [shows 4-5 photos with students guessing the names and the teacher filling in when they do not know the name of the person in the photo].

T: Fotima ask a question (while Fotima is thinking the teacher asks) What does computer mean?

S: A computer is an electronic device for storing and processing data, in binary form, according to instructions given.

T: What is informatics?

S: Informatics is the study of gathering, storing and retrieving recorded information.

T: What are 21st century skills?

Ss: ICT skills.

T: Is improving ICT skills beneficial or harmful? [the teacher answers the question herself]

LO School O, 21/05/2019

Informatics Lesson Observation 2

Grade: 11B

Topic:

Number of students: 32. Present: 22. Absent: 10

T: [Enters the class, teacher and students greet each other, then the teacher leaves the class to go and get his journal and returns after 4 minutes]

T: Who is ready? Who is going to ask questions?

S: What are information resources?

S: TV, Computer.

S: What is algorithm?

S: Algorithm is instructions (unable to complete the answer).

T: Who can add?

S: Algorithm is the instruction and rules that a computer needs to do to complete a task.

S: What is information systems?

S: Information systems are combinations of hardware, software, and telecommunication networks involved in the collection, processing, storage, and sharing of information.

[The teacher was not listening to the students' questions or answers but was talking to nearby students about something else].

S: When was the first computer invented?

S: 1837.

S: What are the key parts of a computer?

S: CPU, monitor and keyboard.

S: (asks a question asked earlier) What is algorithm?

S: Algorithm is the instruction and rules that a computer needs to do to complete a task.

T: Is there anyone else who wants to ask a question?

Ss: (no response)

T: Give me your book [the teacher reaches out to get the textbook from his seated position in the chair. He has been sitting on the chair from the time he entered the class]. Write please store the main information, information products [Starts reading from the textbook and students write. He reads softly so now and again students ask him to repeat what he read. The teacher continues reading sitting at his desk and students copy the information into their notebooks for 23 minutes].

T: [suddenly to a student] Stand up (and to another student) Ask her a question.

S: What is ICT?

S: Information and Communications Technology.

T: (to a student) Stand up (and to another student) Ask her a question.

S: (asks the same question) What is ICT?

S: Information and Communications Technology.

T: (to another student) Stand up. Do you know any topic?

S: (no response).

T: (to the same student) Where was the first computer produced?

S: (no response).

T: Who can help? (to a student who raised his hand) Yes, you.

S: 1946 in USA.

(the bell rings and the teacher leaves the class).

LO School H, 15/05/2019

Box 3: Informatics lesson observation

The teaching in informatics lessons, like other subject lessons is focused on students' acquisition of subject knowledge about the history of computers, the parts of the computer and their functions, and how to perform various tasks theoretically. Teachers dictate notes for students to copy and ask many factual questions to ensure the information provided has been memorized. Students are provided little opportunity to develop their ICT skills. Common tasks are performing various functions in Word and making Power Point Presentations. Most other tasks are learnt theoretically rather than practically. There is no doubt that practical application is constrained by the lack of computers and even more by limited internet access. It is also constrained by inadequate teacher preparation to teach the new competence-based curriculum and in their inability to creatively use the scarce school resources and the more accessible resources available to students at home.

Brining informatics teachers' beliefs and practices together

The data reveals teachers of informatics have very contemporary beliefs about the teaching and learning of their subject but their classroom practice does not reflect their beliefs. While all teachers believe informatics is learned best by connecting it to real-life and most state they are well prepared to do this, their actual teaching is largely theoretical with only a limited amount of time spent in having students develop skills used to perform real-life tasks. All the teachers hold informatics is best learned by having students engage in team projects but less than two-thirds express confidence in their preparedness to conduct project work. Moreover, no project work was observed in any informatics lesson.

There is no doubt that teachers practice in informatics lessons is constrained by their own preparedness to teach the subject and by the unavailability or insufficiency of the required

resources both for themselves and their students. This has resulted in teachers teaching a subject that requires hands-on-learning theoretically. Given the ubiquitous use of ICT and its integration into every aspect of life, it is imperative that teachers creative skills are developed so that they can imaginatively address the limitations their encounter in their teaching and learning environments.

The Teaching of English

Teacher confidence in their preparedness for teaching English

The English teachers are much less confident than their other subject colleagues in their preparedness to teach their subject. Only 43.3% of teachers feel confident (*very well & well prepared*) to teach the English language curriculum to their students but oddly more teachers (59.1%) report confidence to do so with students of diverse abilities. The teachers feeling of preparedness varies for different aspects of the curriculum. With respect to teaching the four language skills, most teachers (73.9%) express confidence in designing and conducting activities to develop students speaking skills but their confidence declines when it comes to doing the same to develop students reading, writing, and listening skills (43.3%, 43.5%, and 36.4% respectively). It declines even further when using a whole language approach to develop the skills (23.8%). Only a third (31.8%) feel confident in their ability to design and conduct activities to teach grammar and vocabulary. Less than half of the teachers express confidence in having students work in cooperative learning groups (47.8%). With respect to using ICT for teaching and learning, although fewer teachers (36.4%) express confidence in using it to teach, surprisingly more teachers (43.4%) feel confident in using it to facilitate students learning. With respect to assessment, only a third of teachers (34.8%) feel confident in summative assessment, whereas nearly half (45.4%) report confidence in formative assessment. Most teachers (85.7%) feel confident they can encourage students' interest in English language and connect English language lessons to real-life (81.8%).

The fact that only half of the teachers feel well prepared to teach the English language curriculum and even less than half important aspects of the curriculum is concerning. English language teachers it appears need professional development with respect to planning, teaching using a variety of activities to develop grammar, vocabulary and the four language skills as well as in assessing student learning. Without this professional development student competences as delineated in the curriculum will not be realized.

Teacher beliefs

The English teachers like their mathematics and science colleagues hold both contemporary and traditional views on teaching and learning English. All the teachers *strongly agree and agree* that students best learn the English language through reading many kinds of books, playing a variety of educational games, and working together in pairs. Most teachers believe that students learn English language best by listening and speaking to natives, through oral communication with others and by engaging in a variety of writing tasks (90.5%, 80.9% and 80.9% respectively). While most of the teachers believe the communicative approach is best for learning English, 81% of them also hold that the grammar-translation method of language learning is effective, with students memorizing as much vocabulary (90.5%) and grammar rules (81%) as possible.

Three fourths (76.1%) of the teachers believe that only those students who have a talent for languages can master the English language. This is concerning, as it indicates teachers believe

that students must have an inherent capacity to learn the language rather than the belief that students who try can master the language.

Teaching resources

Similar to the other subjects, there is a severe shortage of teaching and learning resources for English language. Only 22.7% of teachers indicate there is a textbook for every student! 13.6% report they are unavailable, 40.9% outdated and 22.7% insufficient. Print resources such as additional textbooks, stories/novels/poetry books and dictionaries/thesaurus are sufficiently available only for 17.4%, 17.4% and 27.3% respectively. Audio visual resources and computers with internet access are only available to 18.2% and 9.1% respectively. Teacher guides are sufficient only for 30.4% of teachers. The rest indicate these resources are unavailable and if available are outdated or insufficient.

Teaching practice – self-reports

The English teachers' responses to the statements about their teaching practice reveal the following. In almost all (*every & most*) English language lesson teachers focus on developing students' vocabulary and grammar. They have students learn new words and their meanings (95.4%) and learn how to pronounce them properly (68.2%), watch the teacher explain grammar rules on the board (73.9%) and do grammar exercises (91.3%) to apply the learned rules. In most lessons, teachers have students do textbook-based exercises: speaking (69.5%), writing (65.2%), reading comprehension (60.8%) and listening comprehension (27.3%) to develop students English language skills. Teachers have students work on these tasks more frequently individually (60.9%) than collaboratively (54.6%). Much less exercised are students communicating their ideas through presentations (47.8%) and engaging in free writing tasks (30.4%).

The data reveals the textbook is the only teaching and learning resource in English language lessons with all language skills being developed based on the activities given in the textbook. It also shows teachers largely use the grammar-translation method and teaching is largely teacher-centered (see figure 9 below).

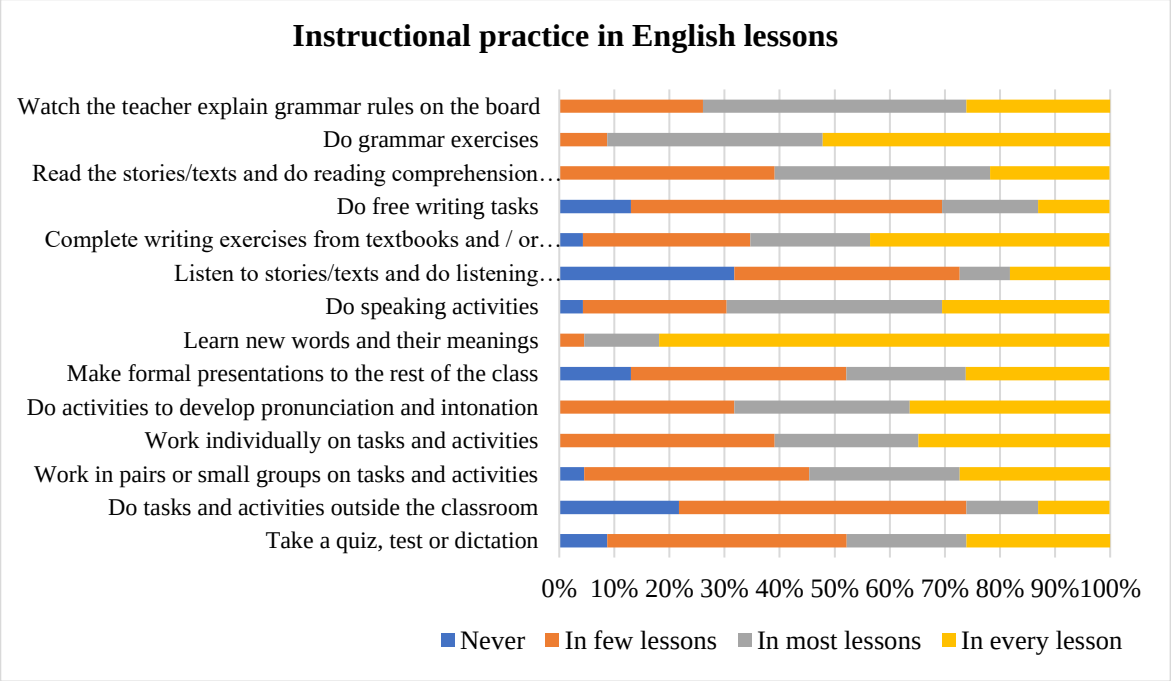


Figure 9: Instructional practice in English lessons

Teaching practice – lesson observations

English Lesson 1

Grade 9

Topic: Canada

Number of Students: 31. Present 25. Absent 6.

Legend: Teacher (T), Student (S), Students doing something together (Ss), actions (), observer's comments []

T: [Enters the classroom and greets the students who all stand up for him]: Good morning, students.

Ss: Good morning, teacher.

T: Are you ready for the lesson?

Ss: Yes.

T: Is everything OK?

Ss: (No response).
T: What is the date today?
Ss: 20th of May.
T: Shams write.
S: (writes the date on the board)
T: Homework?
Ss: Make up sentences about friend [teacher checks homework later]
T: What is the name of our country?
Ss: Tajikistan.
T: Capital?
Ss: Dushanbe.
T: What countries Tajikistan borders with?
Ss: Afghanistan, Uzbekistan, Kyrgyzstan.
T: Capital of Uzbekistan?
S: Tashkent.
T: Do you like geography?
Ss: Yes. No.

T: What other countries are there in America?
Ss: USA, Austria, England, Europe, France [teacher does not correct students].
T: Do you know Mexico?
Ss: (No response).
T: What other countries?
S: Canada
T: I want you to come and write some sentences in board. (Teacher wrote R, T, BUP – SUAN. He called two students to the chalkboard) [Not clear what the teacher wrote]. S1: (writes) Romain, Suriyan, Amerkian. S2: [writes] Paris – capital of France. [teacher provides no feedback]
T: Open your book on p. 97. Read the text on Canada. [There are only 8 books among the 22 students in the class] (while some students are reading the teacher writes the following sentences on the board)

a. We live in Tajikistan
b. Uzbek is country in Asia
c. Paris is in France
d. Moscow is very good
e. Canadian flag has two color [later comes up and adds 's' to color]
f. Nigeria is in Africa

T: (checking student reading) What information did you gain? Maybe you knew something before about Canada?
Ss: [4 students repeat or read sentences from the textbook. One student starts to speak in Tajik]
T: In English. [The teacher's phone rings, and he puts it off].
T: What is the capital?
Ss: Ottawa
T: What kind of sport do you like best of all? Can you answer.
Ss: (No response). [Some students are looking in the textbook to find the answer].
T: Anything about flags?
T: How many colors in Tajik flag?
Ss: Red, white and green.
T: What colors in Canada flag?
Ss: (No response).
T: What else?
Ss: Chocolate.
T: What else do you see in the middle (pointing to the maple leaf on the flag of Canada)?
Ss: No response.
T: You read the text and tell me.
Ss: (No response).
T: Maple leaf. We will come back to it.
T: There are six sentences on the board [see sentences above]. [Points to different students to come and translate them. Students translate the first three and the last correctly but needed the teacher's help to translate sentences 'd' and 'e'].
T: Now, I am going to write some vocabularies, without translation you must read the text. You have to read the text and give the meaning (wrote) relax, skyscraper, maple.
T: (to a student) Read.
S: (read) Relax.
T: Can you tell me what do you mean?
S: [translates in Tajik correctly].
T: Do not translate, show something. If you show, then I know you know. [A student put his head down on the desk to show 'relax']
T: Next, singular. [Picks up two pieces of chalk. Lifts one up but does not explain his action].
Ss: (No response).
T: (repeats) How can you show singular? [Teacher picks up two books].
Ss: (No response).
T: (without explaining singular, moves on) Maple. It is the sign of Canadian flag.
T: Your sentences about your friend from homework.
Ss: (No response).
T: (pointing to three different students asks) Who is your friend in class?
Ss: [each student gives the name of one friend] Saida. Nasima. Shahnoza.
T: Do you know who is my best friend?
Ss: (No response).

T: (to another student) Who is your friend?
S: Shabnam.
T: Is she here?
S: No
[9:30am, a student walks into class]

T: (to the late arrival) You are very late.

T: Do you need a friend?

Ss: (No response).
T: I need a pen to write. Do you need? [It seemed the teacher wanted to teach something about the verb 'need' but then just moved on]
T: Tell the sentences you wrote for homework.
S: My best friend wants to go to cinema.
S: My best friend wants to wear new jeans and t-shirt [other students shout out the sentences they have written about their best friend].
T: Who is your best friend? (points to a girl)
S: [student named a lot of girls]
T: Good, you have lots of friends.
T: Where is Canada situated?
Ss: (No response).
T: What is the capital of Canada?
Ss: (No response).
T: How many colors on flag?
Ss: Two: red and white.
[9:34am another girl and boy enters the class. The teacher ignores their entry and continues asking questions]
T: Do you know any Canadian Football Club? [Teacher in Tajik talks about a Tajik football club]
T: Do you know anything more about Canada?
S: (calls out): Yes, yes, I want to go there.
T: Why?
S: Because it is very beautiful, rich and excellent.
T: Now, boys and girls we divide with two groups [but no groups made]. Read the words girls. [The girls read the words 'relax, skyscraper and maple' and translate them].
T: What is maple?
Ss: (No response). [Teacher opens the book and shows the maple leaf on the flag].
T: What is relax?
Ss: [start to answer in Tajik].
T: Show me, show me.
Ss: [all students lay their heads on the desk].
T: At home, I want you to read the text, get more information. Retell the text to each other in English.
If you can, tell in English. If not, tell in Tajik. Another part of your homework is to repeat the vocabulary: skyscraper, maple, relax. Write about another country the questions that we answered. Where is it? What is the capital? You can write about Tajikistan. Where it is located? The capital? Sport people play here. We can compare our country with Canada. How many colors? What sport played?
T: Some students were active. She came late, but she was active. Shirin and Sadi were active, so I give them good marks. [Pointing to a student] I give you good mark. I want others to be active.
T: Give me the names of students who are absent.

Bell rings.

LO School J, 20/05/2019

English Lesson 2

Grade 9A

Topic: Hero from the city of heroes

Number of Students: 25. Present: 25. Absent: 0.

T: [Enters the classroom and greets the students who all stand up for her]: A salom!

Ss: A slalom dear teacher!

T: Who is on duty today?

S: I am on duty today. Today is May 22 (wrote date on board). All students are present.

T: What season is now?

S: It Spring.

T: What is the capital of Tajikistan?

S: Dushanbe.

T: What is the area of Tajikistan?

S: 143 000 km2.

T: Which country Tajikistan border with?

S: Afghanistan, Kyrgyzstan, Uzbekistan, and China.

T: How many populations is in Tajikistan?

S: Population of Tajikistan is more than 9 million.

T: What is the nature of Tajikistan?

S: (No response).

T: Who wants to say some words?

S: Tajikistan the nature is beautiful [teacher does not correct the student].

T: As you know this year the year of world development and tourism. Who can tell what places we have in Tajikistan?

S: We have Varzob, Dushanbe and many nice place. It Tajikistan is big mountains and lake [teacher does not correct the student].

T: Now we will answer home task, what was it?

S: We need to read the text and translated [teacher ignores the mistakes]

T: (The teacher called on a student) You read and translate.

S1: (Reads the title and first sentence from the textbook) 'Hero from a city of heroes. From, The youth of Heroic Leningrad by V. Ivanov. In the third month of the Great Patriotic War, Leningrad was surrounded by the German Fascists' [The student mispronounces hero, heroic, German and cannot read patriotic, surrounded, and fascists but the teacher only corrects German]. [The student translates the text into Tajik correctly].

Ss 2&3: 'The people of Leningrad decided to defend their city'. 'There are lots of stories about brave men and heroic deeds of the Leningrad people'. [Each student reads a sentence and translates it correctly].

Ss 4,5&6: 'Here is one story of heroism'. 'One unit of Soviet soldiers perished. 'Only Lazarev, a youth Soviet soldier of that unit was alive'. 'He was taken prisoner by a group of German soldiers'. [Students read a sentence each, they mispronounce heroism and prisoner and cannot read perished and youth but translate correctly].

T: (Walks around handing out cards to students).

S7: 'On the way they came to a place that Lazarev recognized' [The student reads came as come and cannot read recognized. Translates the sentence with help from peers]

Ss 8&9: 'The place was mined. He did not think of his own life'. 'He decided to lead the German fascists to their death'. [The students misread all the words of more than three letters and is only able to translate with the help of the teacher].

S10: Lazarev thought, "I shall be killed, but I'll die for my country and at least fifteen fascists will pay for my death with their lives". [The student cannot read, the teacher calls on S2 (Iskandar) to read and translate the sentence which he did correctly except for the word fascists. The teacher then asked him to read and translate the rest of the text which he did faltering at, 'terrible explosion' and 'crawled'].

T: Thank you, children, for translating and now I want you to retell the text. Iskandar retell the text.

S2: Hiro from…. city. Leningrad surrounded by the German. The people defend it. There were many hiro. Only one Soviet soljer was alive. He was given prisoner from German soljer. He lead the German fascist to kill [Stops unable to continue].

T: Thank you Iskandar. You did very well. [To S4] You retell.

S4: Hiro from a city of hiroes. In the third month… Leningrad surrounded by the German. The people of Leningrad fight with them. Lazarev, was aleeve. He was kept by German solders. ……. There was mines. He was not afraid. He killed the German. There was a, there was a, [he could not complete the sentence so the teacher added], "terrible explosion and several fascists fell at once". He came back to his people. [The student tells the story with difficulty even though he keeps referring to his notebook]

T: Thank you very much. 9th of May is Day of victory and celebrated and we must remember it. In this day Soviet Union defeated German… [The teacher spoke with difficulty, mispronounced words and used incorrect grammar]. I have already give you a cud task [pronounced 'cards' as 'cud']

[Then she asked students one by one to read the sentences written on their card and explain it in English. Most students found it difficult to read and explain what they read in English, but the teacher rarely corrected their mistakes. When one student was reading the sentence she suddenly asked]

T: What is the translation of Spend?

S: [answers correctly in Tajik]

T: Very good

T: Who else?

S: (Student stands up and reads the last card) Yesterday I bought food from the shop.

T: Write the homework for today (and wrote on the board) Home reading.

T: Now let us learn new words that we have learned last time (she says the words in Tajik and students translate to English). [She writes some words with their tense forms: speak- spoken-spoken, do -did on the board. Then she calls two students to the board to write sentence with the words while she dictates other words that the rest of the students copy in their notebooks] child-childhood; dictate -dictation; translate -translation; Friend-friendship; nice-nicely. [After the students have written the words, she asks them to translate the words. But rather than waiting for them, she translates the words with the students joining in chorus]

T: (to students at the board) Read your sentence.

S: I will talk with English teacher during English lesson and sometimes after the lesson.

S: Last week my mother did a cake. [The teacher does not correct the mistakes]

T: I am very glad for answering the question and doing your home task. For homework complete exercise 1 on page 71. [The task requires students to complete the sentences with the given words. Some of the given words are in English whereas the others are in Russian]

T: I give you mark now. [The teacher calls students by name, the students go to her desk with their diaries and she gives each a mark without explanation: 5, 5, 5, 5, 4, 5, 4, 3, 4, 4, 4, 3]

[bell rings]

T: Goodbye dear students [standing]

Ss: Goodbye dear teacher [standing]

LO School I, 22/05/2019

Box 4: Observation of English lessons

Similar to the other subject teachers, English language teachers also begin their lessons by asking students questions. The questions are factual requiring students to provide one word or a short sentence in English as answer. The questions are generally asked to lead students to the topic of

the day's lesson or as a warm-up activity. The practice of asking questions is good as it requires students to speak in English but since in nearly every lesson the same questions are asked, the purpose is defeated. Questioning is generally followed by teachers having students read the given vocabulary and translate it into Tajik. Teachers then have student read one or two sentences of the text and translate them into Tajik. While reading students are often unable to do so correctly, but there is no attempt by the teacher to help students read the words correctly either before, during or after the reading. This is undoubtedly because the teacher's own English language is at an elementary level. Reading and translating the text, is usually followed by teachers asking students to retell the story and answer questions based on the text. While some students attempt to do these tasks in English, it is more often done in a combination of English and Tajik or entirely in Tajik. Teachers usually call on the 'good' students to retell the story and answer the questions. Often, while students are reading and translating, the teachers get ready with the next activity which includes handing out cards with words for students to make sentences or with sentences on cards or the board for students to read. This is a good strategy for making use of limited time and would be more effective if related to the topic at hand.

Lessons mostly end with the teacher giving students homework and a mark for their participation in the lesson. Homework often requires students to read textual material in a new chapter from the textbook, retell the story to someone at home in English or Tajik or complete textbook exercises. Given that only a few students have textbooks, the homework tasks should not rely on the textbook but require students to engage in activities all of them can do at home. The giving of a mark at the end of the lesson would serve formative assessment if teachers would tell students what they can do to improve.

Bringing English language teachers' beliefs and practices together

Less than half of the English language teachers feel confident in their preparedness to teach the English language curriculum. Of the four language skills, grammar and vocabulary, the only one most of the teachers feel confident in, is developing students' speaking skills. English language teachers hold both contemporary and traditional beliefs about teaching English. They believe as strongly in the communicative approach as in grammar translation approach to teaching English but their teaching mainly follows the grammar-translation approach as this is most probably how they learnt English and how they were prepared to teach it. There is a lot of literature support for drawing on the native language in teaching a foreign language but lesson observations reveal that far too much of the lesson is conducted in Tajik, providing students little opportunity to develop their English language skills. Most teachers believe that only students with a talent for learning languages should learn English, this is reflected in lessons, with teachers calling on those who have some facility with the language to answer questions, read and respond to most learning tasks.

Factors Supporting and Hindering Teaching

The school directors report the capacity of their schools to provide quality teaching is hindered (*a lot & to some extent)* by a lack of resources. Most directors believe the lack of internet connectivity (61.2%), the shortage of computers (52.9%) and computer software for instruction (47%) hinders teaching. They also believe teaching is severely hindered by the inadequacy of science laboratory equipment and materials (58.8%). The shortage of additional teaching resources such as audio-visual aids (47%), teaching guides (33.4%) and reference materials (44%) also hinder teaching and learning. The school directors would be able to purchase some resources

but lack a budget (50%) to procure them. Moreover, during the interviews the school directors (44%) and methodological heads (37%) indicated the lack of resources is the key challenge to improving teaching in their schools.

School directors indicate the quality of teaching is hindered (*a lot & to some extent*) by the lack of qualified teaching staff. 29.4% report a shortage of qualified teaching staff. With respect to the subjects of interest to this study, they report poorly qualified science (29%), mathematics (17.6%), informatics (27.8%) and English (27.8%) teachers. With respect to other subjects, they report 35.4% of teachers are inadequately qualified. They also report finding it difficult to hire well-qualified teachers for vacant posts in physics (70.6%), mathematics (66.7%), informatics (57.1%), chemistry (53.1%), English language (35.7%), and biology (23.1%). Moreover, during the interviews, 50% confirmed that the key challenge to improving student performance is the lack of qualified teachers.

Apart from the hindering factors, there are factors supporting the improvement of teaching in the schools. All school directors' report teachers cooperating to address teaching issues. According to them, their schools have an official policy to promote collaboration among teachers and all the teachers are encouraged to share and discuss teaching ideas and materials. This is confirmed by the teachers 96% of whom report they share teaching materials with colleagues with 60% doing so as often as *once a week* (27%). 74% report discussing ideas on teaching and learning with colleagues frequently (*once a week and once a month*). Moreover, over 96% of them observed lessons and provided feedback to their colleagues with 74% doing so often (*once a week and once a month*). Furthermore, 77% of teachers confirmed it had a *large to moderate* impact on their teaching.

Another key factor that supports improved teaching is teachers' satisfaction with their job and their status in the community. Teachers' self-reports reveal they are satisfied with their job (28%

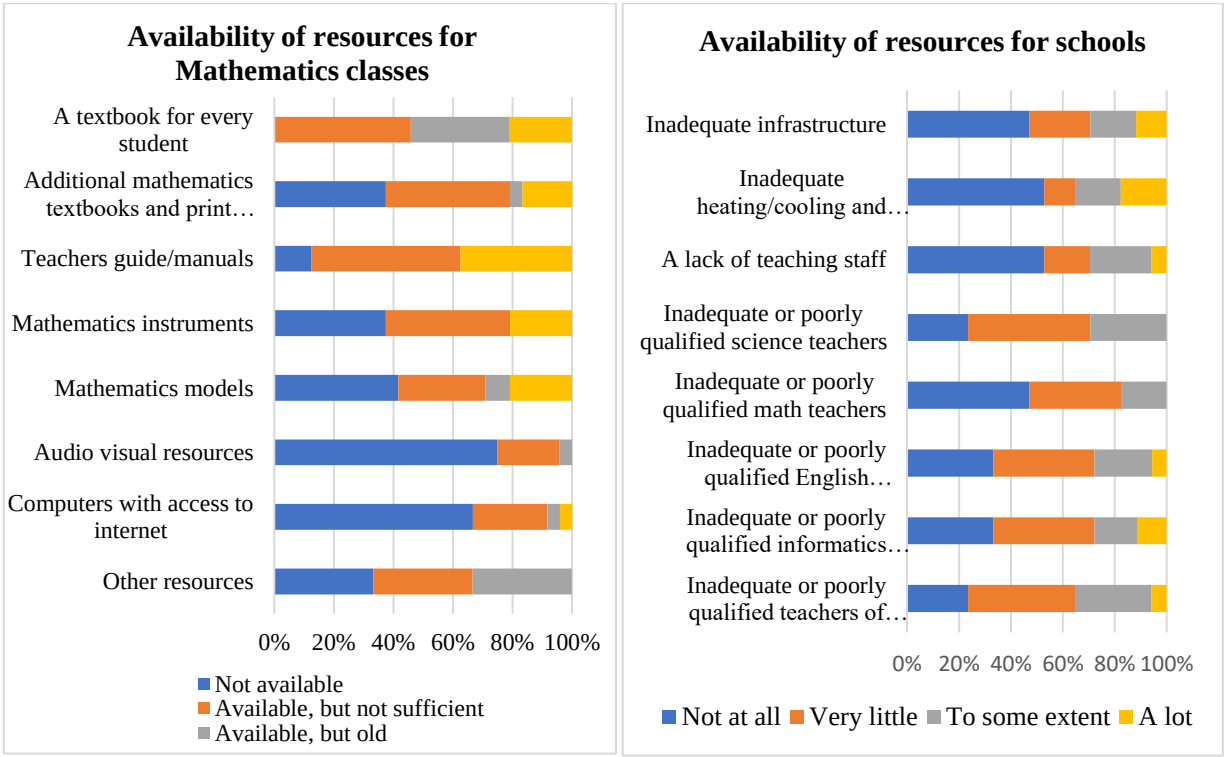


Figure 10: Factors impacting teaching in schools

strongly agree, 70% agree) and an overwhelming 99% of them perceive they are well respected in their local community (41% strongly agree, 58% agree). Research by Kadtong, et al, (2017) and Nyamubi (2017) show job satisfaction and respect in the community are important contributors to improved teaching (see figure 10 above).

Summary

The teachers in this study hold both contemporary and traditional beliefs about teaching but their teaching practice is traditional. Teaching is teacher-centered. Lecturing and lower order questioning are the main instructional strategies and assigning students a grade for each lesson and paper-pencil tests are the assessment strategies. While most teachers report they are well prepared to teach the curriculum to their assigned classes, they indicate not being well prepared to teach various aspect of it especially the use of modern pedagogies such as project-based learning, the integration of ICT in their lessons and engagement in formative assessment. School directors report teaching in their schools is hindered by inadequately trained teachers and difficulty in hiring well-qualified teachers in the sciences, mathematics, and informatics. All school staff report a severe lack of resources such as textbooks, teacher guides, outdated equipment and inadequate materials in science laboratories and insufficient computers with only four schools being connected to the internet. It is imperative that teachers be provided quality professional development and schools be adequately resourced to enable teachers to deliver the outcomes and goals identified in the state curricula and standards.

Key Findings and Policy and Practice Implications

Key findings

- Most teachers rate their subject knowledge and teaching skills highly. Only half accept they are unable to integrate ICT into their teaching and a third acknowledge they cannot engage students in Project-Based Learning nor teach critical thinking.
- Most teachers do not have proper lesson plans. Lesson plans generally include aims that are too broad or too vague and subject content to be delivered through lectures.
- There is a severe lack of adequate infrastructure, equipment and resources for teaching. In over half the schools, classrooms are insufficient in number and size. In over a third there are no science laboratories, and most science equipment and materials are outdated and insufficient. Only 20% of students in each class have a textbook! There are a limited number of computers with internet access in only four schools.
- Most teachers express confidence in their preparedness to teach the curriculum to their assigned class, but lesson observations reveal they are not prepared to teach the competence-based curriculum. Science teachers are not prepared to explain phenomenon scientifically, evaluate and design science inquiry and interpret data and evidence scientifically. Mathematics teachers are not confident to have students explain and justify their solutions and interpret and apply mathematics to real-world situations. Informatics teachers are not prepared to facilitate real-world application of ICT skills. English language teachers are unable to develop students' English language skills. The expressed lack of confidence in using student-centered pedagogies such as Project-Based Learning,

using ICT to facilitate teaching and student assessment for learning was evident in their teaching.

- When presented with statements on contemporary and traditional instructional practice, teachers agreed with both, even though they are diametrically opposed.
- Most mathematics, science and English teachers believe their subjects are difficult so only academically competent students should study them.
- Over 40% of mathematics and science teachers believe that boys are better than girls at learning their subjects.
- Most mathematics and science teachers think students need more than the allotted time to study their subjects.
- Teaching of all subjects is focused on transmission of knowledge and student learning on rote memorization.
- Teachers ask a lot of factual questions, they do not ask questions that facilitate higher order thinking and 'deep learning'.
- Group work is ineffective as the groups are too big, time insufficient, tasks not challenging enough to foster collaboration and no opportunity provided for reflection on how to become more effective.
- Teachers always give students homework. The homework is not challenging, does not deepen learning nor encourages application of learning to real-world situations.

Policy and practice recommendations

Provide adequate infrastructure, facilities, and resources for teaching

This study shows inadequate infrastructure, facilities, and teaching and learning resources is a dominant issue in all schools and all subjects. Dilapidated school buildings, inadequate number and size of classrooms and lack of up to-date teaching and learning resources hinders effective teaching. Only 20% of students with a textbook, severe lack of science equipment and materials, insufficient computers and no internet access in most schools results in the 'banking system of education' rather than a competence-based education system.

Provide adequate ICT infrastructure and equipment in schools

Improving ICT infrastructure and equipment should be a top priority for the government as it will greatly improve the teaching of 'informatics' and facilitate the teachers of all subjects in integrating ICT into their teaching practice and student learning activities. The government must provide enough computers with internet access to support the teachers as well as facilitate hands-on learning for students. Providing all schools with computers and high-speed internet can address many of the challenges related to the lack of resources. Textbooks can be made available online for students and teachers. Teachers and students will benefit from the large number of internet resources facilitating both improved teaching and learning. Students can engage in simulations or conduct science experiments online as well as engage in science inquiry. With ICT a part of every profession and everyday life, young people skilled in ICT will be well equipped for college, career and citizenship.

Create an educational technology instruction and IT maintenance team at district level

Keeping current with ICT knowledge and skills is a challenge as technology is changing rapidly. It is recommended that an educational technology instruction team be created and in charge of evaluating the latest instructional technology, determining the most effective utilization of them, and providing professional development to bring teachers up to date. As the findings show in most schools' computers are not in working order. It is recommended that each district team have an IT specialist whose job would be to ensure computers are maintained, only approved software uploaded, and teachers and students trained in IT maintenance.

Develop professional standards for teachers

Professional standards for teachers must be developed specifying what teachers should know, be able to do and the qualities of character they should have. The standards should be informed by the SSSE. The professional standards should serve as a framework for decisions regarding selection of teachers, guide their professional development and determine career advancement.

Develop a comprehensive continuing teacher professional development programme

Schools must put in place a comprehensive programme for continuing teacher professional development. This should include an induction and mentoring programmes for teachers new to the profession to support and coach them as they learn to navigate the teaching and learning process, facilitate their success in the classroom and their development as teaching professionals. It must also include a need-based continuing professional development for all teachers with support and coaching to assist teachers to successfully implement their new learnings. For teachers with years of experience support and coaching must help them adapt to the changing demands of the profession.

The continuing teacher professional development programme should be based on the assessment of teachers needs as per the professional standards. This research shows teacher professional development should focus on: a) what is a competence-based curriculum, understanding the key competences in the Tajik curriculum and identifying how best to implement them; b)lesson planning including identifying learning outcomes, designing activities to realize the outcomes and ways to assess achievement of the outcomes; c) Pedagogies that develop student competences: improve questioning skills to construct questions at all levels of Bloom's Taxonomy and effectively respond to students' correct, partially correct and incorrect answers; facilitate cooperative learning by designing challenging group tasks so students learn with and from each other; use project-based learning and enquiry to facilitate learning by doing; and discussion to learn to effectively communicate ideas; d) facilitate ICT embedded teaching and learning; e) convert simply assigning students marks (5,4,3) into formative assessment by telling them what they did well and what they can do to get better and design summative tasks that require students to apply their learning to real-world situations; f) assist teachers to overcome stereotypes regarding student ability and gender and come to the belief that all children can learn and that given similar opportunities both boys and girls can be successful in mathematics and science; and g) encourage innovation and creativity in providing high-quality learning in resource poor environments. Methodological heads would require additional professional development to become skilled in methods of observations, monitoring and mentoring.

The need-based programme should be practical, delivered over time and be credit bearing. Credit could lead to advanced certification such as a Postgraduate Certificate of Education (PGCE). With ICT infrastructure in place the all or part of the programme could be delivered online and teachers be required to provide evidence of successful implementation through sharing for example, lesson plans, videos of teaching, and/or students' work.

Set-up and link a database of teacher professional development to EMIS

A database on teachers' professional development should be developed and linked to EMIS so as to keep track of teachers obtaining professional development to ensure equity and regularity of professional development for all teachers.

Section V: STUDENT LEARNING

Introduction

This section presents findings from a test of 909 students of grades 7, 9 and 11 and a survey of 510 students which includes their self-assessment of their abilities to apply learning to real-world situations. The survey also examines their learning of mathematics, the sciences, English, and informatics both in and out of the classroom. Their motivation to learn and educational and career expectations are also examined. Moreover, factors that facilitate and hinder student learning are identified and discussed. The findings are used to provide a picture of students' learning in as many aspects as possible to understand Tajik students' current learning status and to suggest ways to facilitate improvement.

Student Knowledge and Skills

The NTC is responsible for conducting assessments of students' knowledge. Being unable to access any reports in print or online, the research team requested the NTC for the same but its request was declined. EIP thus developed and conducted a test of students' ability to apply their knowledge and skills to real-world situations, the findings of which are discussed below. In addition to the tests of students' self-reports of their ability to apply their knowledge and skills to real-world tasks are presented and collated to elucidate students' current knowledge and skills.

Student test results

The test of students' ability to apply their knowledge and skills to real-world situations is based on a PISA like test conducted by EIP in 2020. 909 students of grades 7, 9 and 11 from twelve schools (seven villages and five small towns) in six districts of Khatlon and DRS took part in the test. A test of 45 minutes each was conducted in the sciences (physics, chemistry and biology), mathematics, and English. The science and mathematics tests were designed to test students' abilities at the 6 levels customarily used in the PISA tests. Since English is taught as a foreign language in Tajik schools the English test was designed to test students' abilities at 3 levels. The results are as follows:

Science: In grade 7, only 41.48% of students attained test levels 1-3. 58.52% of students could not attain level 1. In grade 9, only 34.78% of students attained test levels 1-5. 65.22% of students could not attain level 1. In grade 11, only 39.99% of students attained levels 1-3. 60.01% of students could not attain level 1.

The most difficult areas in science were physics and chemistry, where about 85% of students did not reach level 1. Moreover, most of correct answers were based on content and procedural knowledge with respect to explaining phenomena scientifically. This is not surprising given that the main method of learning is listening to teacher's lecturing and reading textbooks and retelling or rewriting information from them. The students' knowledge and competence development in the sciences was slightly better than in the other two educational areas tested as evident in the lower percentage of students not reaching level 1. Although student performance is slightly better, the test results reveal science teaching at schools does not equip students with the knowledge and skills required by the state standards and curricula.

Mathematics: In grade 7, only 31.92% of students attained test levels 1-3. 68.08% of students could not attain level 1. In grade 9, 34.12% of students attained test levels 1-3. 65.88% of students could not attain level 1. In grade 11, 35.16% of students attained test levels 1-4. 64.84% of students

could not attain level 1. The results are similar to science but with more students not reaching level one.

The test results show that only one-third of students acquired basic conceptual understanding and procedural skills to solve problems. The 7th grade students showed the lowest results in the sections equation and area. The 9th grade students found the topics percent and area difficult and were unable to read the information presented in tables. The 11th grade students' knowledge in function and in developing and applying formulas were least developed.

English: In grade 7, only 39.60% of students attained test levels 1-2. 60.40% of students could not attain level 1. In grade 9, only 33.24% of students attained test levels 1-2. 66.76% of students could not attain level 1; and only 29.86% of grade 11 students attained test levels 1-3. 70.14% of students could not attain level 1. In English the results were similar to science and mathematics but with more students not even reaching level 1.

The analysis reveals that students at all the three grades experience difficulty in basic reading skills like identifying the main idea of the text, drawing conclusions from the reading, interpreting and generalizing what was read. Regarding grammar it can be noted that 7th grade students had difficulty in identifying the correct article and preposition for the given sentences. The 9th grade students were unable to distinguish between gerunds and present continuous tense. The 11th grade students found it very difficult to use properly passive voice and perfect tense. The test reveals that students writing skills are least developed as most students from all three grades were unable to write a simple paragraph in English even when key words were provided.

Results showing about 60% of students not reaching even the basic level in all three disciplinary areas indicate some underlying problems in the education system that are discussed in this situational analysis report. There is a need for ensuring students attain a sufficient level of subject knowledge and skills in all three areas – mathematics, the sciences and English. Though the sample of students from only six districts in two provinces is not enough to generalize conclusively, an effort in ensuring sufficient subject knowledge and skills of students throughout Tajikistan may be warranted.

Influences on students' academic performance

A few variables that may influence the results of student performance were also examined and are reported as follows.

Location

The schools surveyed are categorized into two types of schools, rural schools and urban schools. In science rural schools performed better than urban schools across all three grades. In mathematics 7th and 9th grade students in rural schools fared better than their urban counterpars. However in 11th grade students in urban schools fared better. In English rural school students in grade 7 and 11 fared better than urban school students but in grade 9 urban school students outperformed their rural counterparts. The results show that rural schools across all the three grades did better than urban schools. The only exception was the 9th and 11th grade urban students who scored higher than their rural counterparts in English and mathematics respectively. Since this finding challenges the mainstream research literature, further research is warranted to validate it.

Gender

The girls' test results in mathematics were slightly lower than the boys across all grades and districts. Nevertheless, these differences were not statistically significant.

Their results in science were quite interesting. The average test scores of girls in the 11th grade were significantly higher across all schools and districts. However, in the 7th and 9th grades the average test scores of girls and boys were almost the same.

Boys and girls did not show any significant differences in their English test results across all three grades and districts. Boys in the 7th and 9th grade did slightly better than girls, whereas girls in the 11th grade outperformed boys. The differences in all cases were not statistically significant.

Thus the test results show girls performance in mathematics, science and English is not significantly different from the performance of boys in these subjects. This is contradictory to what 40% of mathematics and science teachers in this study think. They believe boys are better than girls at learning mathematics and science, which the results of this study show are not based on their performance in these subjects.

Furthermore, results show that of the two variables, location and gender tested for, only location influenced student performance. Students in rural schools performed better than their counterparts in urban schools. The test results also show that there was no significant difference in the results of boys and girls.

Students reports on their ability to apply knowledge and skills to real-world tasks

In this study, students were asked to rate their own abilities in applying knowledge and skills to real-world tasks in science, mathematics, informatics, and English. Students assessed their abilities positively with over half responding they could do what was stated '*easily and with a bit of effort'*.

Students assessed their abilities more favourably in science compared to the other subjects. Over two-thirds of students report they can '*easily and with a bit of effort'* recognize science questions underlying a report on a health issue (87.4%). Around two-thirds can explain why earthquakes occur more frequently in some areas than in others (65.4%) and predict how changes in the environment affect the survival of certain species (62.3%). There are however, two tasks slightly more difficult for them, identifying the better of two explanations about the formation of acid rain (57.2%) and independently discussing how new evidence can lead to a change in understanding about the possibility of life on Mars (52.7%). It appears students are better able to recognize science questions and explain science phenomena than evaluate and interpret scientific evidence.

Students' assessment of their English language knowledge and skills is higher than in mathematics and informatics. Two-thirds of them indicate they can read, write, and speak in English '*easily and with a bit of effort*'. 72.8% of them claim they can read a non-textbook story in English; 66% they can converse in English on an everyday topic and 62.5% they can write an essay in English. It appears that students are assessing their skills more positively than they actually are.

Students are less confident of their application of ICT skills to everyday tasks such as editing digital images, creating multimedia presentations, and using MS Word for homework assignments. A little over half of the students report they can do the following tasks '*easily and with a bit of effort'*. 61.5% can edit a digital photo or other graphic images, 58.1% can use MS Word to do homework assignments, and 57.3% can create multimedia presentations. The percentage of

students indicating confidence in their ICT abilities is high given the lack of computers at school and at home and the fact that most teachers do not integrate ICT in teaching or student learning. However, it could be that the students with access to computers and digital phones are developing these skills through experimenting on the devises and self-learning.

Students are least confident of their abilities to apply knowledge and skills in mathematics to real-world tasks. Only 56.9% of students feel they would '*easily and with a bit of effort'* be able to interpret graphs in the business section of a newspaper and only 56.3% would be able to write a simple algebraic equation for the ingredients of a product such as juice.

Comparing the self-reports with the tests of subject knowledge and skills indicate the students overestimate their own academic competence, which is not a complete surprise. However, helping students to have a more accurate self-estimate of their own competence is warranted as over-estimating self-competence may cause over-confidence in the subject or topics that they may actually need to strengthen.

Student Learning in the Classroom

Students rating on the frequency of the learning activities they engage in, in their mathematics, science, informatics and English lessons show they much more frequently engage in lower-order thinking activities than in higher-order ones. In mathematics, they observe teachers demonstrating how to solve textbook problems on the board more often than they learn to apply mathematical concepts to the real-world problems. In science lessons, students ask and answer factual questions and listen to lectures more frequently than conduct experiments and work on extended projects. They name computer parts and their function and observe teachers demonstrate 'how to' perform various tasks rather than learning and using their ICT skills for learning and everyday living. They learn new vocabulary and grammar more frequently than speak or write in more than a sentence. In all subjects, students report they seldom use computers or make presentations.

Mathematics

Students and teachers report the most common learning tasks in '*all and most*' mathematics lessons are students observing teachers demonstrate problem solving procedures on the board (SR 91.7%, TR 95.5%) using textbook problems (TR 88.2%). They then solve similar problems on the board (TR 95.6%), explaining both how they solved the problem and their choice of problem-solving method (SR 86.4%, TR 95.6%). They also frequently listen to teachers explain math concepts (SR 90.5%) use multiple representations to communicate concepts (SR 71.7%, TR 78.3%), but less frequently apply mathematical concepts to real-life (SR 66.1%, TR 73.9%) and make connections between concepts in mathematics and other subjects (SR 59%). The reports also indicate students spend considerably more time working individually (SR 85.7%, TR 91.7%) than in small groups (SR 65.2%, TR 82.6%) to solve mathematical problems. They spend the least time working on problems for which there is no immediately obvious solution (TR 34.7%), making presentations (SR 42.3%) and using computers (SR 19.1%, TR 33.4%). It is clear from the reports that students would know some mathematical concepts and develop some problem-solving skills, but lesson observations reveal there would be less likely to engage in logical reasoning and represent mathematical concepts in multiple ways. Furthermore, as the tests indicate it would be difficult for them to apply their conceptual understanding and problem-solving skills to real-world situations.

Science

Students and teachers report the most frequent activities they engage in during science lessons (*all & most lessons*) are reading from the science textbook (SR 88.5%, TR 77.5%), answering textbook questions (SR 88.5%, TR 84%) and listening to lectures on science topics (SR 72.1%, TR 86%) and noting them down (TR 88%). They also regularly argue about science questions and investigations (SR 72.1%) and communicate their ideas on science topics orally or in writing (SR 63.5%, TR 69.4%). Less frequently do they conduct given experiments, write observations, and draw conclusions (SR 56.9%, TR 53.1%) or design and conduct their own experiments (SR 53.1%, TR 46.8%). '*Never and in a few lessons'* do students watch science related videos (SR 79.4%), use computers (SR 78%), go on field trips (TR 67.4%), engage in science inquiry (TR 63.8%), make presentations (SR 54.2%) and work on extended investigations/projects (SR 49.7%, TR 71.4%). The reports of students and teachers and lesson observations indicate learning in science lessons is focused on subject knowledge acquisition. The findings from teachers report of their preparedness to teach science, observations of their science lessons and the severe shortage of science equipment and materials indicate it would be practically impossible for students to develop the skills of scientific investigation and interpreting data scientifically.

Informatics

According to the students and teachers, only 42.7% of students get the opportunity to use computers in '*all*' informatics lessons whereas 17.2% of them '*never*' get the opportunity to do so. In *all and most* informatics lessons, observing the teacher demonstrating 'how to' (SR 67.8%, TR 58.8%) and doing the same (SR 61.1%, TR 68.8%) are the most common learning tasks students engage in. They learn how to produce a text using Word (TR 75.1%), learn programming languages (SR 62.3%, TR 58.8%) and coding (SR 54.8%). Considerably less time is spent on real-world applications such as using power point to create presentations (SR 46.6%) with simple animations (TR 50%) or with video and audio clips (TR 12.6%), using spreadsheets to plot graphs (SR 38.8%, TR 41.1%), organising files and folders on the computer (TR 33.3%), developing databases (SR 32.4%, TR 23.5%) and capturing and edit digital photos (TR 17.7%). Seldom do students engage in tasks that require the internet such as browsing the internet for information (SR 43.7%), participating in discussion forums (TR 18.8%), creating and maintaining websites (TR 14.3%), using email (TR 11.8%) and editing texts online (TR 5.9%). It is also uncommon for them to work on extended projects (TR 23.5%). Like the other subjects, students in informatics lessons work more often individually (SR 64.6%, TR 82.3%) than in small groups (SR 55.6%, TR 68.8%). Though it is important to demonstrate the procedures for students to perform tasks effectively and provide ample amounts of practice to develop various skills, opportunities for real-world application are the key to students' successful development of their ICT competences, which is lacking considerably in the learning experiences of students in their informatics lessons.

English

Most students and teachers report the main learning tasks in '*all and most'* English lessons are learning new words (SR 89.2%, TR 95.4%) and memorizing them (TR 90.5%); doing reading comprehension exercises from the textbook both orally and in writing (SR 84.7%, TR 60.8%), retelling the stories read (SR 81%, TR 69.5%) and expressing their opinion on them (SR 75%); watching the teacher explain grammar rules on the board (TR 73.9%) and doing grammar exercises (SR 73.2%, TR 91.3%); and listening to stories and doing listening comprehension exercises (SR

72.1%, TR 27.3%). Students do these learning tasks more frequently individually (SR 68.2%, TR 60.9%) than in small groups (SR 57.2%, TR 54.6%). Making presentations (SR 46.6%, TR 47.8%) and writing creatively (SR 41.9%, TR 30.4%) are learning tasks students engage in far less frequently. Students practically '*never'* use computers in their English lessons (SR 79%). The report indicates students spend most of their time in English lessons memorizing new vocabulary and grammar rules. With respect to developing the four language skills, students spend more time learning the receptive skills of reading and listening than the productive skills of speaking and writing. Findings in this study indicate that without competent English language teachers and adequate resources to support its teaching and learning, students are unlikely to acquire proficiency.

Student Learning Out-of-the-Classroom

Important to student learning is not just what and how they learn in the classroom, but also what and how they learn outside the classroom. This part reviews students' learning outside the classroom.

Hours spent studying

Students spend twenty-five hours each week attending the lessons scheduled for them at school. In addition to these lessons, more than a third of the students report spending an additional 1-5 hours learning mathematics (44.9%), science (38.7%), informatics (37%) and English (38.8%) in school, outside of scheduled classes. About a third of them spend 1-5 hours in other educational centers to learn mathematics (31.4%), science (26.3%), informatics (24.5%) and English (29.8%). The data also shows about a third do not spend any additional time studying mathematics (31%), science (29.2%), Informatics (48.7%) or English (32.2%).

Generally, most of the studying done after school hours is spent completing the assigned homework. Students report being given homework in all subjects, mathematics (92.6%), science (93.7%), English (93.6%) and informatics (87.5%). Homework usually requires students to complete tasks to reinforce what was learnt during the day's lessons or prepare for the next day's lessons. Parents confirm their children are given homework regularly (99%) and that the homework is mostly given to repeat and strengthen what was learned at school (85.6%). Whereas two thirds (63.2%) of parents think a suitable amount of homework is given, a third (33.2%) find the homework given is too much. The homework also seems to be too difficult for students to do independently, as parents report that most of their children require support to complete their homework with 43.2% noting this support must be provided '*always*' and 46.4% '*sometimes*'. Some of this support is provided at paid tuition centers which assist students in successfully completing their homework and preparing them for tests and examinations. It is therefore, questionable if the hours spent learning outside of school will further students conceptual and contextual learning.

How students learn

The students' reports of their learning behavior show they use both passive and active learning strategies *(always & often)*. Most students memorize as many details as possible (90%) as well as the most important points (72.1%). Most students also seek to figure out what they need to learn (86.1%) by identifying what they understand and what they have yet to understand (80.8%) and then looking for the information that will further their understanding (82.3%). Less frequently do

students try to make sense of new information by relating it to what they already know (73.4%) or relating it to real-world situations (67.4%).

The students focus on memorizing not just the most important points but as many details as possible has a direct relationship with how the teachers model learning behaviors. It is also reflective of the nature of the assignments teachers give students and both school-based and external assessment practices. The more active learning strategies the students use need to be further developed to ensure students studying behavior are more directed to 'deep learning'. These will require changes in the nature of classroom and homework assignments and in the school-based and external assessments of student learning.

Use of the school library for learning

All the schools have libraries. Students were asked how often and for what purpose they use the library. About a third of the students use the library *at least once a week,* another third *at least once a month* and yet another third *hardly ever* or *never*. The students who do frequent the library, mostly use it to complete their homework (75.3%) and class work (70.6%). They also use it to borrow books to read for pleasure (74.1%) and to read newspapers and magazines (70.2%). They use it far less frequently to learn about sports, music or famous people (48.4%) or use the internet to gather information (38%).

The use of the school library by students to do their class work and homework is understandable given that most of them do not even have their own textbook for the subjects they study. While students do indicate they have some materials to support learning at home, books to read for pleasure are not available at home so students frequent the school library for them. Most school libraries are not equipped with computers and few have internet access; the few students reporting use are possibly from the schools where these resources are available.

Use of computers for learning (school and home)

Students were asked to indicate what ICT devices are available for them at school and if they use them. 83.4% of students report there are desktop computers and 62.9% use them. 28.8% indicate there are portable devices and 14.2% use them. 35.4% state the internet is available but only 13.6% use it. Students also have access to printers (72.1%) and USBs (64.1%) with 37.5% and 32.5% respectively using them. The reported high level of access to and use of ICT equipment is probably because informatics is a compulsory subject with two lessons a week.

The students were also asked to report the frequency with which they use school computers for various tasks. They report infrequent use of the computers. They use it for homework (8.6% *daily*, 27.1% *weekly*), for drill and practicing mathematics and languages (10.4% *daily*, 21.6% *weekly*), to browse the internet (5.1% *daily*, 13.7% *weekly*) and for group work and communication with other students (7% *daily*, 16% *weekly*). Most students '*never'* use their school computers to chat online (73.8%) or send emails (69%). The infrequent use of school computers indicates limited access and most students never going online or sending emails is evidence of extremely scarce internet access.

The students' use home computers more frequently than school computers for learning and recreation. They use it to do homework (24.1% *daily*, 24.1% *weekly*) and browse the internet for schoolwork and enjoyment (11% *daily*, 17.9% *weekly*). They also use home computers to play

video games (7.6% *daily*, 12.5% *weekly*) and to download music, films or games from the internet (10.7% *daily*, 14.1% *weekly*). Most students '*never*' use their home computers to participate in online forums (71.6%), chat online (67.7%), publish or maintain a personal website, weblog or blog (67%), communicate via email (65%) or check or download material from the school website (64.2%).

Teachers and school directors were also asked about students use of computers for learning. 20.4% of teachers report students *always and often* use computers for classwork. This percentage is higher than students' reports. The directors are quite realistic about computer-based student assignments, noting that *once a month* most students would operate a computer (94.7%), use educational software to complete various tasks (77.8%) and browse the internet for information (50%). Similar to the students, they report much less use of computer-related activities to communicate via email and learn by simulation (22.2% & 23.5% respectively). The school directors also report computers are used '*only a little'* or '*not at all*' to develop students' skills of independent learning (52.9% or 11.8% respectively) or to differentiate learning for students with special needs (58.8% or 17.6% respectively). However, they report it is used '*a lot*' to personalize learning by allowing students to learn at their own pace (60%). However, none of the above was evident in the nighty-three lessons observed.

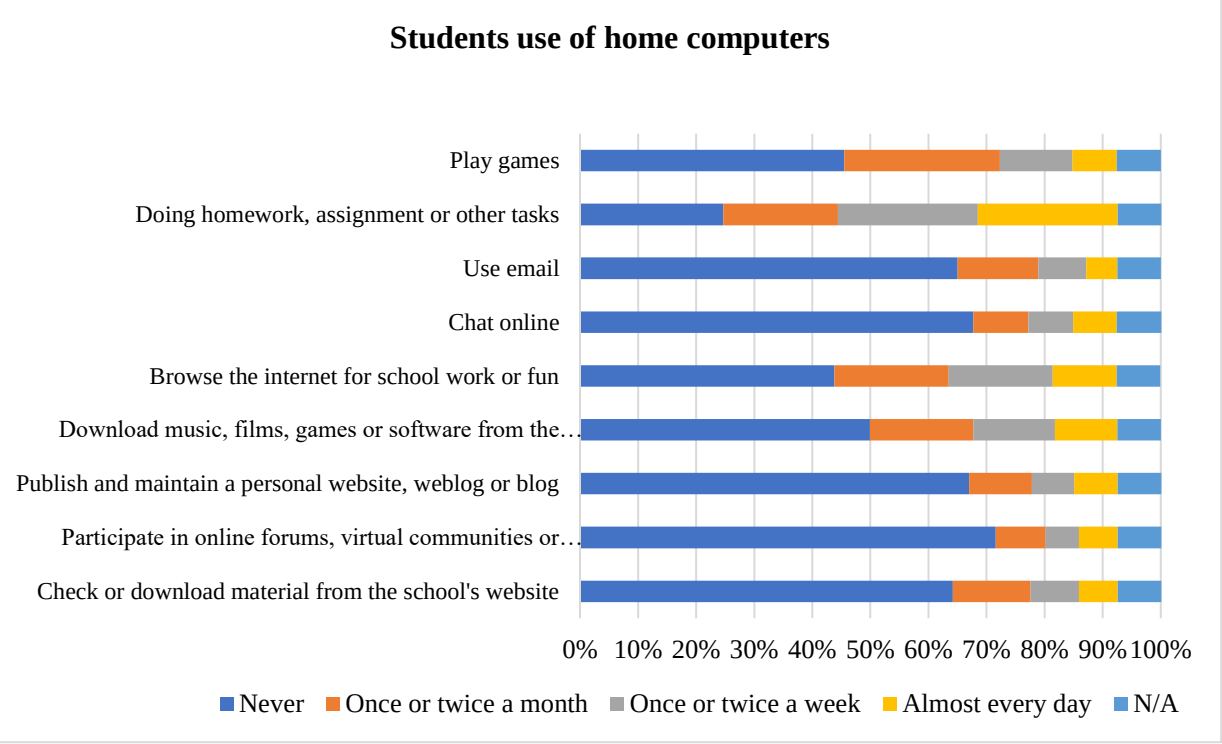


Figure 11: Students use of home computers

Motivation to Learn

Research shows that motivation to learn is central to students' success. Therefore, students were asked to agree or disagree with statements about their motivation to learn both intrinsically (learn because it is self-satisfying) and instrumentally (learn for a practical reason such as to get a job or enter university). The findings show that students have both high intrinsic and instrumental motivation. However, their instrumental motivation is slightly higher than their intrinsic motivation.

Enjoyment of learning

Students '*strongly agree and agree*' with the following statements regarding the pleasure they experience in acquiring new knowledge and skills in their science, English, mathematics, and informatics lessons. They report:

I generally have fun when I learn new topics in science lessons (33.6% & 60.2%), I like to work on new topics in science lessons (39.3% & 55.2%), I enjoy acquiring new knowledge in science lessons (47.4% & 48.6%), and I am interested in learning new skills in science lessons (41.3% & 53.8%).

I generally have fun when I learn new topics in English lessons (40% & 53.5%) I like to work on new topics in English lessons (44.2% & 48.4%), I enjoy acquiring new knowledge in English lessons (51.6% & 44.7%), and I am interested in learning new skills in English lessons (45.6% & 49%).

I generally have fun when I learn new topics in mathematics lessons (35.7% & 58.3%), I like to work on new topic in mathematics lessons (41.1% & 53.1%), I enjoy acquiring new knowledge in mathematics lessons (44.6% & 50.5%), and I am interested in learning new skills in mathematics lessons (41.2% & 53.8%).

I generally have fun when I learn new topics in informatics (31.2% & 60.2%) I like to work on new topic in Informatics (40% & 51.2%), I enjoy acquiring new knowledge in Informatics (43.5% & 51%), and I am interested in learning new skills in informatics (39.7% & 54.5%).

Learning for success

Students '*strongly agree and agree'* with the statements regarding making efforts to learn in their subject lessons because these efforts would facilitate their success in higher education and their careers. They state:

Making efforts in science lessons is worth it because it will help me in my further studies (55.7% & 41.4%) and in the work I want to do in future (49.9% & 47.1%).

Making efforts in English lessons is worth it because it will help me in my further studies (60.3% & 36.2%) and in the work I want to do in future (52.4% & 44.7%).

Making efforts in mathematics lessons is worth it because it will help me in my further studies (55.1% & 42.7%) and in the work I want to do in future (49.8% & 46.4%).

Making efforts in informatics lessons is worth it because it will help me in my further studies (54.5% & 40.7%) and in the work I want to do in future (47.4% & 47.6%).

The data reveals students have strong intrinsic and instrumental motivation to learn all the subjects. However, their intrinsic and instrumental motivation for informatics is slightly lower than the other subjects. This is concerning as today computers are ubiquitous in every part of life. Could it be that the curriculum, and thereby, what and how students learn in their informatics lessons is quite different to how computers are used in and for real-life activities?

The findings also indicate that students intrinsic and instrumental motivation for English is higher than for all subjects. The reason is probably because young people who have good English language skills secure well paid jobs in international organisations at home. Moreover, with a large

Tajik population working abroad, a foreign language like English opens up possibilities to secure a comparatively better job than most Tajiks migrant workers currently have.

The data further reveals that students' instrumental motivation is slightly higher than their intrinsic motivation to learn all subjects. This might be because students are aware of the difficulty of securing a place in a faculty of their choice in higher education institutions and in securing a good job in a small and competitive job market. Learning for them is therefore less about learning for learnings sake and more about learning to secure a better future for themselves and their families.

Teachers would do well to direct this motivation for learning by encouraging students to persevere in acquiring new knowledge and skills, maintaining their involvement in learning, encouraging confidence in their abilities to perform a specific task and recognizing and praising their success (Malone & Smith, cited in Meyer et al., 2008). It is also important for teachers to connect what students are learning to real-world issues that matter to them as research shows that when this is done students 'motivation soars, and so does their learning' (P21, 2007).

Educational and Career Expectations

Students have high expectations and a very positive outlook for their future education and career. All students expect to complete general secondary education. An overwhelming 89.1% of them expect to go to university and obtain a bachelor's degree (55.3%), master's degree (7%), and doctoral degree (26.8%). More than 90% of students '*strongly agree and agree'* they want the best in their future education and job opportunities. 93.8% want high grades in all subjects, 95.7% want to be one of the best students in the class, 96.8% want to get into the best university, and 95.8% want to be best in whatever they do. This high self-expectation could be used to motivate them to develop the necessary competences to achieve their educational goals.

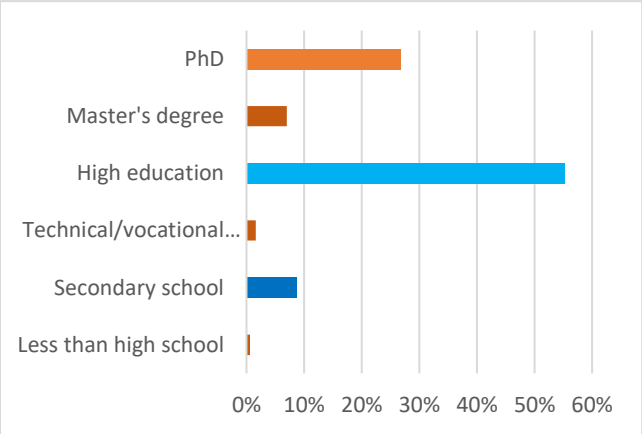


Figure 12: Level of education students expect to complete

In terms of their career outlook, most students (99.8%) identified the job they want to have at age 30. The career of choice for an overwhelming 40.3% of students is that of a health care professional. About 10% each of students see themselves as teachers, translators and lawyers. This was followed by about 6-7% each of students working as entrepreneurs, in government service as police/military/customs officers and in the banking sector. Making a career in the fields of science and engineering and IT were the choice of very few students.

It is concerning that only a few students want to become science and engineering and IT professionals especially as research indicates these are the 21st century professions and because there is a growing need for them in the country. Teachers and policy makers would do well to look at how they can make professions in these fields attractive to students, as they will contribute to the social and economic development of the country.

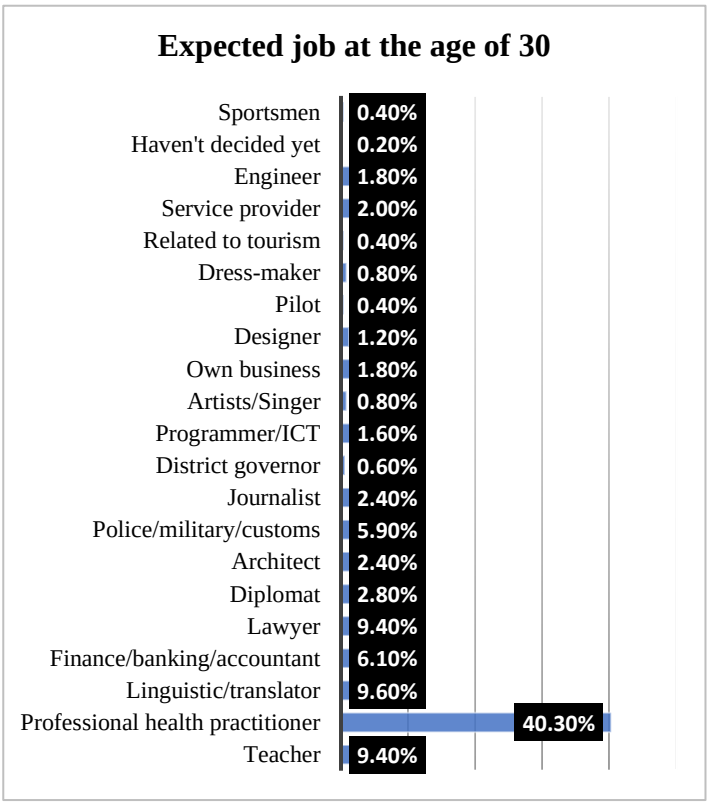


Figure 13: Expected job at the age of 30

Nurturing future scientists and entrepreneurs: The role of skills and motivations

The students' high intrinsic and instrumental motivation to learn and the high expectations of their future education and careers show a promising outlook for themselves. The schools should encourage students to work towards their goals. At the same time, the students' interests in science as indicated by the large number who want to become healthcare professionals must be broadened to encompass other science and engineering professions. More students need to be encouraged to become job creators rather than job seekers to grow the job market in Tajikistan. Most jobs today require IT skills, so greater emphasis must be placed on developing students' ICT skills which could further their ambitions. STEM, ICT, and English and the 21st century skills would be the most essential for students to enter the related majors in higher education settings, and eventually become part of 21st century workforce and contribute to the social and economic development of the country.

Factors supporting and hindering learning

The school directors were asked to identify the extent to which student learning is hindered by teacher and student factors. According to them (*a lot* & *to some extent*), the main teacher factor hindering student learning is teachers being too strict (38.9%). Other teacher factors are low expectations of students (17.6%), not being well prepared for lessons (11.1%), not meeting individual students' needs and resisting change (11.8% each). All school directors do not see teacher absenteeism as a factor that hinders student learning.

The school directors report the student factors that hinder student learning '*to some extent'* are student absenteeism (16.7%), student disruption of lessons (11.8%) and student missing some lessons (5.6%). It is surprising the school directors' do not view student absenteeism and truancy as factors hindering student learning, when about a third of students indicate that in two weeks prior to taking the survey they missed a whole day or more at school (36.2%), missed some classes (32.5%), and were late for school (30.8%).

The data from the students, reveal other teacher and school factors such as high-class cancellations and lesson interruptions hinder their learning. They report some lessons were cancelled (33.3%), teachers missed lessons (27%), teachers were called to meetings during lessons (29.5%), teachers

came late for lessons (28%), and teachers did personal work during lessons (12.5%). The school directors not believing a third of students missing school, missing lessons and coming late to school and a third of classes being cancelled and lesson interruptions will have a negative impact on students' learning is concerning as they would probably take no action to reduce it.

The severe shortage of infrastructure and resources also negatively impacts student learning. Only 20% of students having a textbook for each subject and with little recourse to additional resources in school or online severely hinders their learning.

There are also teacher, student and school related factors that support student learning. The cordial teacher-student relationship in which teachers encourage student learning is one factor. Positive student-student relationships based on respect and willingness to help each other is another. Yet another factor is the students' high intrinsic and instrumental motivation to achieve their educational and career goals. High motivation is not just individual but collective with students reporting their peers care about learning and getting a good education (77.5%). The schools use of assessment data to improve student learning is also a supporting factor. School directors claim student assessment is used to guide student learning (88.9%), to identify where the curriculum and teaching can be improved (88.9%) and adapt teaching to students' needs (88.9%).

To improve student learning it is important for the supporting factors to be further developed and steps taken to reduce the hindering factors. Ensuring regularity of teachers and students, teachers are well prepared for their lessons and have the resources to support quality teaching and learning will go a long way to facilitate student achievement of their educational and career goals.

Summary

Student learning in all the subjects is knowledge-based rather than competence-based. In most lessons students either listen to lectures and answer questions or observe teachers demonstrate 'how to' and then do the same. They spend hours rote memorizing information for tests and examinations. It is, therefore, not unexpected that nearly 60% of grade 7, 9 and 11 students failed to reach the basic level in a test of application of subject knowledge and skills to real-world tasks.

Teachers need to develop students' competences through having them conduct science experiments and investigations, apply concepts to solve real-world problems and use ICT skills for learning and life. They must use their high levels of motivation and educational and career aspirations to enhance their performance and achievement. Teachers also need to attend school regularly, be well-prepared for every lesson and offer high-quality instruction throughout the lesson if students are to meet and even exceed the set learning outcomes.

Key Findings and Policy and Practice Recommendations

Key findings

- Over 60% of students of grade 7, 9 and 11, were unable to reach level 1 in mathematics, the sciences and English in a PISA like test conducted by EIP in twelve schools across six districts of Khatlon and DRS.
- The students' performance was the best in science with fewer students not reaching level 1. Students had greater difficulty responding to items in physics and chemistry than biology. The results show that only one-third of students acquired basic conceptual

understanding and procedural skills to solve problems. The 7th grade students showed the lowest results in the sections equation and area. The 9th grade students found it difficult the section realted to percent and area difficult. The 11th grade students' knowledge in function and in developing and applying formulas were underdeveloped.

- In English the results were similar to science and mathematics but with more students not even reaching level 1. The results show that students at all the three grades experience difficulty in basic reading skills like identifying the main idea of the text, drawing conclusions from the reading, interpreting and generalizing what was read. The test also reveals students writing skills are least developed as most students from all three grades were unable to write a simple paragraph in English.
- Students' performance was affected by location with schools in rural areas performing better than schools in urban areas.
- There was no significant difference between the performance of girls and boys in any of the three educational areas tested.
- Learning in classrooms is largely focused on knowledge acquisition. Students mostly engage in lower order thinking activities. Learning is more individual than collaborative. Students hardly work on investigations or projects, apply concepts to solve real-world problems and use ICT skills for learning and life.
- Two-thirds of students spend additional time learning outside schools' hours. Most of this time is spent getting additional help with understanding subject matter and doing homework. About a third get the assistance they need in tuition centers. About a third of students do not spend any time learning outside of normal school hours. Students' main learning strategy is rote memorization.
- Most students use computers only in their informatics lessons. Students with home computers use them for learning and recreational purposes.
- Students are highly motivated to learn with instrumental motivation slightly higher than intrinsic motivation. They have high education and career aspirations.
- There are student, teacher and school factors that support student learning. Respectful and helpful student-student relationships, students' positive attitude toward learning and their high education and career expectations are supportive of learning. Teachers encouraging students to do their best also facilitates learning as is the schools use of assessment data to improve teaching and learning.
- There are student, teacher and school factors that hinder student learning. Student and teacher absenteeism and tardiness, class cancellations and interruptions, teachers not being well prepared for lessons and lessons focused largely on knowledge acquisition all hinder students' learning. The severe lack of infrastructure and resources is yet another factor that hinders learning.

Policy and practice recommendations

Assess students, set realistic goals for student achievement, and facilitate their realization

It is important for Tajikistan to put in place national assessments of students at the end of primary school (grade 4), end of compulsory school (grade 9) and end of school (grade 11) in the core subjects. Assessment results must be shared with all stakeholders, realistic goals set for students' achievement in each subject and teachers and schools facilitated to realize the goals.

Make learning active, conceptual and contextual

The teachers need to encourage students to use more active, conceptual, and contextual learning strategies through designing in-class and home assignments that require students to engage in higher order thinking and real-world tasks like those they will encounter in further education, the workplace and real-life. Higher order thinking and real-world tasks will move students away from using passive learning strategies such as memorization to going through a deep conceptualization process and relating what they learn to real-life situations.

Facilitate real-world application and project-based learning in informatics lessons

Findings from this study indicate informatics lessons predominantly consist of students watching the teachers' demonstrations of computer applications and then practicing the procedures themselves. As a result, students see informatics as just another school subject, rather than a learning tool and a path to a future career. Teaching in informatics lessons should assist students in learning through real-world applications of the ICT and tools and engage students in projects that encourage creativity and innovation.

Change the assessment system

Research shows that 'whatever is measured matters' (Binkley, et al., 2012). If tests and examinations require regurgitation of facts, and results of these determine entrance to university and thereby to potential jobs, teachers will focus on transmission of knowledge and students on rote memorization. The assessment system both in school and at the national level must be brought in line with a competence-based education system. Moreover, the SSSE delineates a more constructivist approach to teaching and learning focusing on project-based learning, inquiry learning and collaboration. These pedagogical approaches require students to work collaboratively, apply their learning to real-world tasks and share their learning with authentic audiences. Assessment of these competences would best be accomplished by broadening the range of knowledge and skills to be assessed and using a variety of metrics.

Use students' positive attitude and high motivation to guide them to higher achievement and to careers in STEM, ICT and English

Students have very positive attitudes toward learning and high expectations for their future education and career. These attitudes and expectations present a great opportunity for guiding them toward studying STEM, ICT and English. It is recommended to use real-life tasks to trigger students' interests to study the subjects, and to link what and how the knowledge in STEM, English, and ICT and the 21st century skills are used and required in their desired professions. This

will make learning more relevant and meaningful and motivate them to develop the knowledge and skills required for higher education achievement and entry into their professions of choice.

Encourage students to be regular

Students report a high absenteeism, skipping classes and tardiness. It is essential that school leaders share these findings with parents, indicate the detrimental effects on student learning and encourage them to ensure their children come regularly and on time to school.

Reduce class cancellations and interruptions

Students report a third of classes being cancelled, teachers missing lessons and lesson interruptions. School leaders must address this issue with better scheduling of meetings and coordination of teachers' administrative duties.

Improve school infrastructure and resources

The severe lack of appropriate school infrastructure and resources has a detrimental effect on student learning and academic achievement. It is imperative to provide each student with a textbook for each subject, easily available and low-cost equipment and materials for practical investigation of scientific phenomena and computers with internet access.

Section VI: STUDENTS WELL-BEING

Introduction

Well-being is defined as the physical, social, cognitive and psychological capabilities students need to live happy and fulfilling lives not just in the future but 'here and now' (PISA 2017, p. 60). Physical well-being is adopting a healthy lifestyle and overall health. Social well-being is the quality of relationships with family, peers and teachers as well as feelings about one's social life. Cognitive well-being is proficiency to apply one's knowledge and skills to solve problems and psychological well-being includes a sense of purpose, self-awareness and life satisfaction (see figure 12). Research shows that students well-being facilitates academic achievement. Positive relationships have been shown between students' psychological well-being and academic achievement (Grable, 2017).

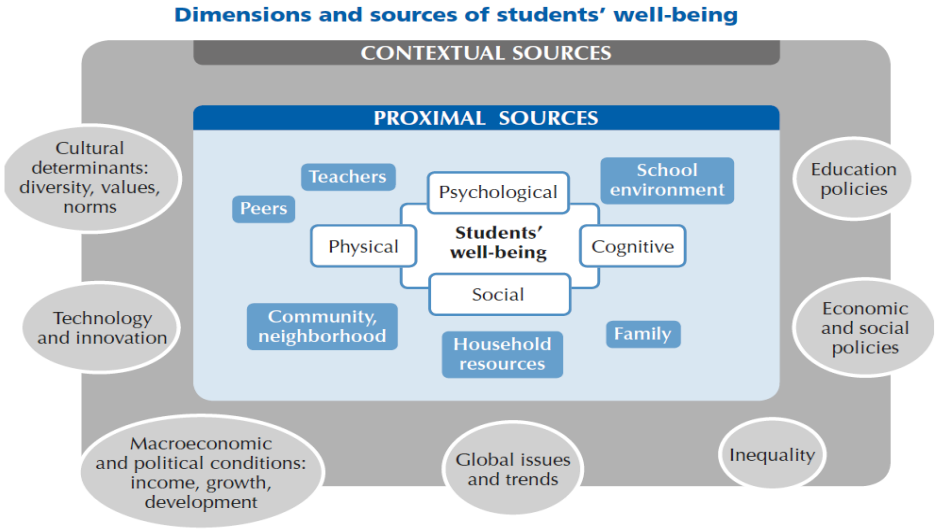


Figure 14: Dimensions and sources of students' well-being (PISA 2017, p. 60)

The students participating in this study were asked questions about the various dimensions of their life, as well as their perception about their lives in general and in schools specifically. Below we present the data on the proximal sources of home, school and immediate community and discuss how they contribute to students' well-being and subsequently their academic achievement.

Students' Physical Well-being

Students were asked several questions to determine their socio-economic status as socio-economic status is known to impact well-being and academic achievement. They were asked about their parents' current employment status, how well their households were resourced and how well their needs were met.

The students report over two-thirds (83.3%) of their fathers are gainfully employed (62.3% full-time & 21% part-time) whereas less than one-third (31.6%) of their mothers (19.7% full-time & 11.8% part-time) are. In Tajik society, men are expected to work, while women are expected to stay home and care for the children. These expectations are gradually changing due to the worsening economic conditions of the country and because more women are receiving a higher education. Most fathers and mothers work in the service industry in both the government (26.2% & 26.4% respectively) and private sectors (22% &2.8% respectively). In the government sector a few work as teachers (5.8% & 9% respectively), as health care workers (2.4% & 4.4% respectively) and in management (3.6% & 5.6% respectively). In the private sector they work as service providers (21.2% & 2.8% respectively) and managers (.8% & 0% respectively). Many more fathers than mothers run their own business (19.6% &1.8% respectively), work as farmers (7% & 0% respectively) and are migrant workers (7.4% & .4% respectively). Not a single mother and only1.6% of fathers work in engineering and not a single parent in the IT sector. This is important as it may influence the career choices of the students with respect to professions in STEM and IT and thus their potential wealth and social status.

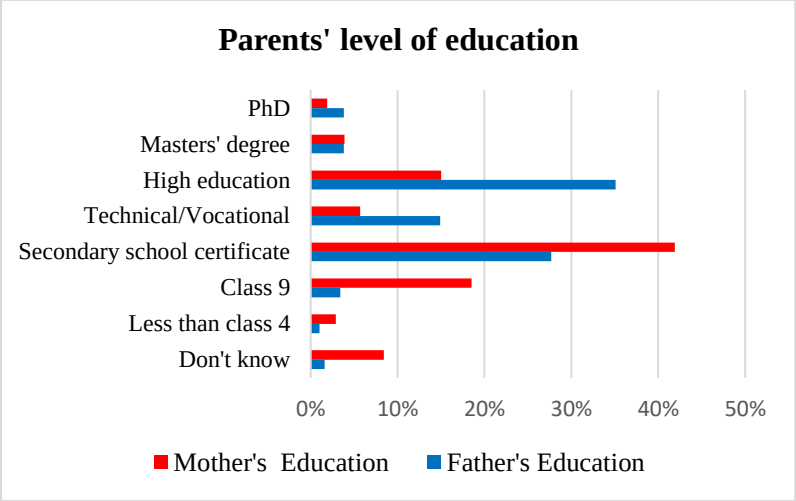


Figure 15: Parents' level of education as reported by the students

About 28% of students report they work for pay before or after school. Students usually work for pay because their income is necessary for the family's subsistence.

Most students (92.7%) report their families own their homes. 82.1% of which are detached houses and 13.3% apartments. 63.4% families own some additional land. Some families also own a small number of animals (less than 10). 10.4% own less than 10 horses, 43.9% less than 10 cows and 18.8% less than 10 sheep and goats. In 64.3% of families, not a single family member has a bank account.

Most students report their homes have the necessities needed for living a comfortable life. Nearly all homes have a toilet (99.6%) and a guest room (95.3%) and in two thirds of the homes students even have a room of their own (69.4%). Nearly all students' homes have the necessary appliances such as a stove (97.1%), a refrigerator (78.1%), and a television (99%). Fewer students report their homes are equipped with luxury appliances like washing machines (61.2%), air conditioners (48.9%) and dishwashers (46%). Only half of their families own motor vehicles (50.7%) with 11% having two vehicles. Motor vehicles may be a necessity as well as a luxury depending on the kind and use of the vehicle.

Most students report they have regular meals. 85.3% eat breakfast and 81.4% eat lunch every day. They exercise and engage in sports at home (75% before and 67.5% after school) and at school.

The high number of students reporting home ownership, ownership of additional land and some livestock, as well as homes equipped with all the necessities of life and where they eat regular meals indicate most students experience a good level of safety and security that is promotive of their physical well-being and contributes to their overall well-being. 28% of students who work for pay are currently contributing to their own and their family's well-being. If the nature of the work facilitates student learning, then it will positively impact the students' future education and job prospects. If on the other hand, the nature of the work hinders student learning then it will negatively impact the students future educational and career prospects and consequently their own and their family's well-being.

Students Social Life at Home and at School

Students report an active social life at home and at school. They spend time eating meals as a family, talking with family members, caring for older and younger members of the family, and having fun engaging in recreational activities. They spend time learning, talking, and playing sports with their peers at home and at school. They like going to school because of the positive relationship they have with their teachers and peers.

Familial relationships

Most students live with both their parents (98.4% mother and 90.6% father) and siblings. 28.6% also have their grandparents and 14.7% other relatives such as uncles, aunts and cousins living at home with them. The average number of family members that live in a student's home is 6.63.

Parents actively engage in their children's lives at home. An overwhelming majority of students report their parents have meals with them (95.8%) and talk to them every day (93.7%). Spending time talking appears to be important to both parents and students as it is the only activity engaged in as frequently before (96.7%) as after school (97.2%). Most students report their parents inquire about their school day and encourage them to do well at school. In addition to inquiring about their academic performance they also attend to areas that impact their social and emotional well-being. About two-thirds of students report their parents inquire about their relationship with their peers (66.7%) and discuss problems they might have had at school that day (72.4%).

In Tajik society the joint family system is quite common. A fourth (26.8%) of students' grandparents live with them and 14.7% have uncles, aunts and cousins live with them. Grandparents and other relatives who live in a family are likely to care for other family members or require some form of care from them. Moreover, in households where the mother is working or where there are many children, it is expected that older siblings especially girls will be responsible for household chores and the care of younger siblings (75.1% before school and 82.8% after school). In some cases, this responsibility may require girls to leave school prior to completing compulsory schooling or to leave school on completion of compulsory schooling (grade 9). This is evident from the data on parent's education levels; 21.8% of mothers have grade 9 or less education while only 4.4% of fathers have similar education levels.

The students also spend considerable time with their friends. They spend time before and after school talking to their friends in person or on the phone (before 53.5% & after 67%) and playing with them before (75%) and after (67.5%) school. They also make time for entertainment, watching TV before (47.3%) and after (72.9%) school. As the internet is expensive only few

students have access to it (18% computers and 73.7 mobile phones) at home and therefore spend considerably less time playing video games (before 20.2% & after 29.4%) and chatting on social networks before (22.6%) and after (25.4%) school.

Relationships at school

Relationship with peers

The students report (*strongly agree & agree)* they make friends easily at school (88.1%) and their peers like them (91.3%). They also report very positive relationships with their peers at school. 88.2% of them state they '*always*' treat each other with respect and 87.3% they '*always*' help each other even if they are not friends. An extraordinary 86.5% of students report that over the last year other students '*never*' made fun of them, 94.3% '*never*' threatened them, 95.1% '*never*' took away or destroyed their belongings, 94.5% '*never*' hit or pushed them around, and 90.5% '*never*' spread nasty rumors about them.

The students also get the opportunity to develop collaborative relationships with peers at school. All schools provide students opportunities to play group sports, engage in community service activities and organise and participate in celebrations of special days.

Relationship with teachers

Most students report (*strongly agree & agree*) a very good relationship with their teachers. An overwhelming 96.5% report they get along with most of their teachers. They also report most of their teachers' have a positive attitude towards them. The teachers show an interest in their well-being (92.2%), listen to what they have to say (39.7% & 54.2%), give them the opportunity to express their opinion (45.9% & 49%) and treat them fairly (49.6% & 46.5%). The students are also very positive about their teachers' responsiveness to their needs in the classroom. They assert that most teachers show an interest in their learning (40.8% & 51.6%), continue teaching until they understand (34.3% & 49%), provide them extra help when needed (45.2% & 49.8%), and encourage them to do their best (49.8% & 45.9%).

Teachers' responses about their attitude and behaviour with students are similar, albeit in higher percentages than the students, except for their interest in what students say which is lower. Teachers report (*strongly agree & agree*) there is mutual respect and trust between them and their students (37.5% & 59.8%). Moreover, they motivate students to learn (41.3% & 55%), provide extra assistance to students who require it (34.2% & 64%) and are interested in what students have to say (22.9% & 58.7%).

When asked specifically about their teachers' treatment of them over the last year, the students report, my teachers '*never*' insulted me in front of other students (91.9%) and my teachers '*never*' gave me the impression they think I am less smart than I am (75.2%). With respect to comparisons with classmates they report, my teachers '*never*' graded me harder than other students (72.1%), '*never*' disciplined me more harshly than my colleagues (75.9%) and '*never*' called on me less than my classmates (13.9%).

The data shows one area in which most students (86.1%) feel their teachers' treatment of them is not fair, is their teachers calling on them less often than their classmates. The lesson observations clearly reveal teachers call on a few students most of the time, ignoring the other students even when they raise their hands to answer. The fact they are called on less than their classmates may

be responsible for some students believing their teachers think they are less smart than they are and they do not grade them as fairly as other students. This teacher behaviour could have a negative effect on students' socio-emotional well-being and academic performance and achievement.

Students' attachment and sense of belonging to their school

The students express positive emotions about their school. 97.3% of them report they like to go to school. This liking for school is possibly influenced by the perception that their teachers (96.1%) and their peers (91.3%) like them. The positive feeling about school is also reflected in the responses of the students to the open-ended question, "What things do you like most about your school? The top three responses are the opportunity for them to learn, their teachers, and their peers. They also feel a sense of belonging because the school involves them in making decisions about things that affect them in school (83.6%) such as choosing the elective subjects the school will offer.

This study shows that most students have strong relationships with family members at home and with teachers and peers at school. They like going to school as they believe both their teachers and peers like them. These findings are important as research shows that students who feel part of the school community perform better academically, are more motivated to learn and are less likely to engage in risky or antisocial behavior.

Cognitive Well-being

Parents do not only care about their children's physical and social well-being; they also care about their learning and academic performance. They provide their children the necessary conditions for learning at home and discuss with them what they are learning and how they are performing at school. They also get involved in their children's school to improve the learning conditions in them.

Parents provide facilities at home that are supportive of learning. Most students have a quiet place to study (92.8%), books to help with schoolwork (91.5%) such as dictionaries (84.3%), and a desk for study (76.2%). Students use these facilities to do their schoolwork, both before (92.6%) and after school (95.9%). A third of students' families (39.8%) have a computer at home but only 18% are connected to the internet. Most families (97.8%) have mobile phones with 73.7% of them connected to the internet. The cost and unreliability of the internet means students cannot use these resources regularly for learning.

Parents do not only provide resources to facilitate their children's learning; most parents also take a very active interest in what they are learning and how they are performing at school. Students' report show most parents inquire about what they did at school that day (85.1%), what they are learning at school (87.3%) and encourage them to get good grades (94.3%). About two thirds of parents also discuss their performance at school (64.8%) and encourage them to obtain further education (66.6%). Many parents help their children with their schoolwork at home. They also send their children for additional classes before (69.6%) and after (72%) school to enhance academic achievement. A third of them send their children to paid tuition centers where they not only get help with schoolwork but are also prepared for tests and examinations.

In addition to regular lessons, schools offer enrichment (61.1%) and remedial (77.8%) programmes to facilitate student learning. They also prepare students for various competitions

especially subject Olympiads (94.7%), organise academic clubs (58.8%), conduct special projects (88.9%) and organize lectures and seminars by guest speakers (78.9%).

There is a lot of pressure on students to do well at school which can be a source of anxiety and stress. High levels of school related anxiety can have a negative effect on student achievement. The students in this survey show schoolwork related anxiety that ranges from no anxiety to a moderate level of anxiety. More than half of them worry taking tests may be too difficult for them (16.9% strongly agree, 41.3% agree). About a third of them worry they will be unable to solve the given problems (7.4% strongly agree, 26.3% agree) and obtain poor grades (10.5% strongly agree, 26% agree).

Parents and schools both want students to excel academically. Schools provide learning opportunities for all, and enrichment and remediation to those that need it. Parents help their children with their schoolwork or send them to paid tuition centers for expert assistance. The pressure to excel makes many students anxious but schoolwork anxiety is not high and is likely to be sufficient for students to prepare well for tests and get good grades.

A Sense of Purpose and Life Satisfaction Providing Psychological Well-being

Research shows that motivated students do better at school. They are highly satisfied, show greater resilience and are more tenacious in the face of academic challenges (PISA, 2017).

Student motivation to achieve

The students in this study demonstrate a high (*strongly agree & agree*) motivation to achieve. They want to be among the best students in class (95.7%), want high grades in most or all subjects (93.8%), want to be able to select the best university or job (96.8%), and be the best in whatever they do (95.8%).

Most students also have high expectations of their future education and career. 89.1% of them expect to go to university and receive a degree (55.3% a bachelor's degree, 7% a master's degree and 26.8% a doctoral degree). They also envision themselves in a job of their choice by age 30.

Student satisfaction with life

Students were asked to state how satisfied they were with life. 51.5% report they are very satisfied, 35.6% satisfied, 7.6% somewhat satisfied and only 5.3% not satisfied. Most students reporting a strong sense of purpose and high level of life satisfaction is evidence of their psychological well-being. It is important to find out the reasons for and assist the roughly 12% of students who do not have high education and career expectation and indicate a low-level of life satisfaction.

Summary

Most students perceive themselves to be living comfortably and fulfilling lives in all dimensions of well-being and express an overall satisfaction with life. Their parents provide all the comforts of life for them, make time for them at home and take an interest in their school lives. They have very positive relationships with their peers and teachers and a keen sense of belonging at school. They are provided opportunities both at school and at home to learn and excel academically. They express some anxiety about tests being too difficult and getting poor grades. Their moderate levels of anxiety about their academic performance and their high achievement motivation bode well for them meeting their educational and career expectations.

Key Findings and Policy and Practice Recommendations

Key findings

- Most students live with their parents and nearly half live in extended families. They live in homes owned by their families. Most parents have completed high school and 63.8% have a university degree. Two-thirds of fathers and a fifth of mothers are in full-time employment. A quarter of students are also in gainful employment. These factors contribute to student well-being.
- Most students' homes are equipped with all the necessities of life. Students regularly have meals with their parents and play in-doors and out-doors with their friends.
- Parents have a strong presence, take an interest and actively engage in their children's home and school lives. Most students have very positive perceptions of their school lives; they have positive relationships with their peers and teachers and feel a sense of belonging at school. These factors contribute to their social well-being.
- Students' homes are supportive of learning with most students having a quiet place to study and books to help them with their studies. Students' families have computers and mobile phones with some connected to the internet which are only occasionally used for learning because of cost constraints.
- In addition to studying at school, about two thirds of students spend additional time studying after school, about a third of them in paid tuition centers.
- The students have high educational and career expectations with most expecting to obtain a university degree and securing their job of choice. They know that to achieve their education and career goals they must perform well academically. This puts some pressure on them making about half of them anxious about taking tests.
- 51.3% of the students are very satisfied and 35.5% satisfied with their current lives.

Policy and practice recommendations

Encourage and educate parents about the nature of their involvement in their adolescent children's academic life

Research shows that parental involvement in their children's school life has an impact on students' achievement. Parents have a strong presence and are actively engaged in their children's school lives. However, too much support for adolescents such as helping with homework or getting things they need for schoolwork can have a negative impact on student achievement (PISA 2017). Parents must be educated about the ways to facilitate their adolescent children's academic achievement.

Develop students' collaborative skills

Good peer relationships and student-teacher relationship are an important component in student academic success. Teachers could take advantage of the students' positive attitude toward their peers with collaborative learning. Collaborative learning would not only help students develop their team-work skills, which are important in today's workplace and society, but also benefit their learning. When working in small, purposeful groups, the more competent students could help the

less competent students with their learning (Vygotsky's zone of proximal development), refining their understanding of the subject in the process. Thus, collaborative learning is an effective instructional strategy that benefits both advanced and struggling students.

Convert student anxiety and stress to achievement motivation

Anxiety is not necessarily a negative psychological state. A manageable level of anxiety can serve as a driver or motivator for students to study harder and smarter which would lead to higher grades facilitating them to realize their educational and career expectations. This will require teachers to teach students how to learn and develop their skills of problem solving, critical thinking, effective communication, and collaboration through participating in authentic learning. These 21st century skills are fundamentally critical for the effectiveness of student learning and success in higher education, work and life.

Use students' positive perceptions and satisfaction with life to challenge them intellectually and ensure their future well-being

Most students have very positive perceptions about their school lives and their relationships with their teachers and peers. Also, most of the students are satisfied with their current lives. This very positive attitude toward school and life in general should be used to challenge students to develop their curricula and 21st century skills to ensure their future well-being.

Section VII: THE SCHOOL LEADERSHIP

Introduction

School leadership is important for improving student achievement (Pont, Nusche and Moorman, 2008; Robinson, Hohepa and Lloyd, 2009) and improving underperforming or failing schools (Branch, Hanushek and Rivkin, 2013). Although, there is no empirical evidence showing a direct relationship between school leadership and student achievement (Hallinger & Heck, 1996 cited in OECD 2014, p. 56), there are studies showing school leaders contributing to student achievement. The studies show school leaders can contribute to student achievement by clearly identifying the school's mission and goals, creating a positive school climate, ensuring effective organization of curriculum and instruction (ibid, p. 56, Karadag, 2020), and fostering professional development and shared ownership (Barth, 1989). Research also shows that students in better managed schools have better test scores (World Bank, 2018). Thus, it is important to understand how schools are managed and how school leaders contribute to student achievement.

This section provides a profile of the school directors and the work they do especially with respect to identifying and ensuring the realization of the school goals and providing instructional leadership.

The School Directors

Age and gender

Half of the school directors are in their fifties, 22% in their forties and 28% in their thirties. The average age of the schools' directors in this study is 46.2 years (SD 2.3), with the oldest being 59 years and the youngest being 30 years. The fact that a quarter of the school directors are in their thirties may be a possibility or a challenge. A young school director might bring new ideas and dynamism to the position, positively affecting student achievement. Whereas, becoming a school director at a young age without any preparation and little experience might have a negative effect on school performance and thereby student achievement.

57.9% of directors are male and 42.1% are female. The percentage of male and female directors is very similar to the percentage of male (55.3%) and female (44.7%) teachers in the schools. This indicates male and female teachers have about the same chance of being appointed school directors, indicating gender equality in their appointment.

Formal education

Except for one school director all the directors have a higher education diploma which is equivalent to a bachelor's degree. This is the qualification required to teach in Tajik schools. In addition, to asking directors about their formal educational qualifications, they were asked if they were required to obtain any additional qualification or to participate in any professional development programme prior to their appointment. They report that in Tajikistan no additional qualification nor any additional professional development is required for appointment to the position of school director. However, 21% of them report having attended a short professional development workshop on 'school management' including 'financial management' before their appointment.

The fact that none of the directors hold a masters' or higher degree indicates that once teachers get into the profession, they stop pursuing higher degrees in education which is very unfortunate. A study to identify why teachers, even those who become directors do not pursue higher qualifications might inform us of the reasons for the same.

Work experience

It is a fact that in any profession, formal education regardless of the level or type cannot fully prepare one for many of the situations one will encounter on the job. It is only in dealing with on-the-job situations that one learns the appropriate behaviors and actions. Thus, the work experience directors have prior to and in their current role informs their work.

All the school directors have worked in the education sphere. Most start out as teachers, are subsequently appointed as deputy directors and finally as school directors. Of the school directors, in this study, six worked as school directors in other schools, before being transferred to their current school. Seven were promoted from deputy directors, six in their current school and one transferred from another school and four were appointed from teacher to director, three in same school and one from another school. Two directors worked in a District Education Department (DED) prior to being posted as directors in their current school. A study of the effects of school directors being promoted within or across schools on school management and student achievement is warranted.

The school directors have an average of 3.9 years of experience in this role, but the data is highly negatively skewed, because twelve of the school directors were appointed to the position less than two years ago. The skewness is caused by one school director who has worked for more than twenty years and another who has worked between eleven to fifteen years in the position.

When asked how they were appointed to the position of school director, nine report being appointed by their respective DEDs, five by an order of the MoES, two on the suggestion of their colleagues, one was part of a rotation system in which a teacher from the school serves in this position for as long as he/she is supported by head of DED and head of the district and one by the President of Tajikistan while on a visit to the district.

There is no criteria or systematic process in place for the appointment of school directors. The selection of school directors appears to be arbitrary, made by anyone from teacher colleagues all the way up to the President of the country. Moreover, it appears that most school directors only stay in their position for a short time. The arbitrary nature of selection and the short duration directors stay in the position will possibly have a negative impact on student achievement. Further research in this area could prove illuminating.

Continuing professional development

All professionals are required to continuously update their knowledge and skills. Hence, the school directors were asked whether they had participated in any professional development activities in the last three years. From the responses of the sixteen schools' directors who answered this question in the survey, only half report participating in professional development workshops (PDWs) over the last three years and they confirmed the same during the interviews. Those who report participating in the PDWs studied one or more of the following topics: maintaining a

'director's portfolio' (4), 'school documentation' (3), 'competence-based methods'(2), and 'overall school management', 'lesson observation' and 'collaboration' (1 each).

In the survey, 61.1% of school directors report engaging '*weekly*' in activities which facilitate their own professional development. It would be important to identify these weekly activities and their contribution to the professional development of the directors.

All the directors want to receive professional development. Most want it because it will help them refresh their knowledge, whereas a few want it as it will help them better understand their job. Two directors added a caveat, "only if it is beneficial". This seems to indicate that some professional development activities do not help directors improve their ability to manage the school. The directors identified two main areas for further professional development, school leadership and management and instructional leadership. With respect to school leadership and management they want to learn financial management and how to maintain up-to-date records. With respect to instructional leadership they want to learn 'how to observe lessons and give feedback', 'how to meet the state standards', and 'different teaching methods'.

The Work of the School Director

The work of a school director is demanding and time limited, requiring them to prioritize among competing responsibilities. To find out how school directors prioritize their work, they were asked to report on how often they engaged in various activities at their school. Most of them engage in the following activities *weekly*: counseling and disciplining students (82.4%), meeting and talking to parents (77.8%), providing information to education officials at the city, district, and MoES (66.7%), observing teachers lessons and giving feedback (63.2%), and facilitating their own professional development (61.1%). Tasks that most of them do *monthly* include giving demonstration lessons (61.1%), discussing the school educational goals with the teachers (47.1%), doing administrative work (44.4%) and representing the school at official meetings (43.8%). Two activities that are done by most of them *yearly* are hiring teachers (77.8%) and curriculum revision and/or planning (62.5%).

In the interviews each school director was asked to describe a typical workday. Almost all the directors confirmed their workday starts early in the morning and ends late in the evening. They come early in the morning talk to school guards to find out if everything was fine overnight and walk through the school itself to check all is ready for the start of school-day. When lessons start, they check whether all teachers are in their classrooms, ask students to settle down so lessons can begin and deal with students who are late. This activity is repeated at the start of the second shift. In their offices they engage in 'administrative and management work' (94.4%), check teachers lesson plans to 'control the quality of teaching and learning in the school' (50%), and meet with students to discipline them (88.8%). They also observe teachers' lessons and provide feedback or go to teach their own lessons.

This shows the school directors spend most of their time in three main activities: administration and management, ensuring the quality of teaching and learning, and maintaining student discipline. It is important that school directors fulfill their administrative responsibilities as it ensures the smooth operation of the school. It is also important that school directors observe lessons and give teachers feedback, but it is problematic that most of that feedback is focused on how teachers manage their students and on their subject knowledge and not on student learning (see section on

teacher appraisal and feedback). If school directors would focus their feedback on helping teachers identify how their teaching promotes student learning, they may not have to spend so much time on disciplining students.

Except for two school directors, the rest (89.4%) state in addition to performing their role as school directors, they are also required to teach for at least twelve hours per week. They all teach in the secondary section (grades 5-12). Most teach the humanities (10), others teach biology (4), mathematics (2), and ICT (1). However, only five (29.4%) of them indicate they teach *weekly*, with the rest reporting teaching less frequently. It is concerning that most of the school directors do not fulfill their teaching responsibilities which undoubtedly has a negative impact on student learning. This maybe one reason students report several of their lessons are cancelled. While teaching adds greatly to the responsibilities of school directors, those who teach have the advantage of keeping close to the main job of the school – teaching. Teaching provides them the opportunity to work with teachers, maintain a close relationship with students and parents and identify areas for school improvement. Because of the benefits that can accrue from school directors teaching, it is important for school directors to be required to play this role, albeit by reducing the number of lessons they are required to teach each week.

In the schools, the director shares responsibilities with on average four deputy directors and six methodological heads. The deputy directors are responsible for academics (one for primary and one for secondary), extracurricular activities and student discipline. The deputy director academics is responsible for ensuring education quality in the school.

Directors also share responsibilities with methodological heads whose main function is to provide subject and methodological support to teachers to improve the quality of teaching. Most methodological heads do this mainly by observing teachers' lessons and giving feedback. Unfortunately, not all the methodological heads are clear about their responsibilities. For instance, in answer to a question about their role, one said, 'organize events', another said, 'prepare students for Olympiads' and yet another felt his/her responsibilities were limited to 'participating in methodological heads meetings'. The role of the methodological head is an important one and those appointed to the position must be helped to understand and effectively carry out their role and responsibilities.

Planning and realizing school goals

Today, more than ever before schools must develop students' curricula and 21st century skills so that graduates can go on to realize their full potential and facilitate the socio-economic development of their countries making them competitive in the global economic market. This means that school leaders must clearly identify the mission and goals of the school and provide leadership to realize them. This part looks at the work the directors do to set goals and achieve them.

Except for one school director all the rest report having a school improvement plan (SIP). Although 94.5% of them report they (*always & often*) provide teachers opportunities to participate in decision making (94.5%) and 72.2% of them report they '*always*' discuss the school's educational goals with teachers. Only eight (out of seventeen) report engaging them in developing the SIP, which is closer to teachers reports (64.9%) of directors 'always' discussing the schools' educational goals with them. Two-thirds of the school directors said the SIP is developed based

on the needs of the school, whereas the other third stated it is developed based on instructions from the DED. When asked to share the goals in the SIP for the 2018-2019 academic year, twelve of the eighteen directors reported the main goal was to 'improve the quality of education'. When asked to specify what were the areas identified for improvement, they were unable to do so. Other goals mentioned were school building repairs, provision of resources and improving student discipline.

Further the directors were asked how well they thought they had achieved the goals set for 2018-2019. Of the sixteen who answered the question, five stated they had achieved the goals very well, nine said they had partially achieved the goals, one reported being unable to achieve the goals and one observed, 'it is too soon to judge' even though the interviews were conducted at the end of the year. In response to the question regarding the challenges faced in achieving the set goals, the five directors who indicated they had achieved the goals very well reported no challenges. For the rest of them, the main challenges were the lack of physical and human resources. More specifically, they were, lack of financial resources (4), dilapidated school buildings (3), shortage of some subject teachers (2), dearth of qualified and experienced teachers (2) and lack of laboratories (2). A school director lamented, "the main challenge in achieving our goals is the lack of specialist teachers for subjects like, English Language, mathematics and physics. We have teachers but they have just graduated from university, it takes time for them to learn more" (Director, School P, June. 04, 2019).

When asked about their future school improvement plans, seven directors plan to hire qualified teachers and three want to provide professional development for their teachers. In addition to improving human resources, four want to improve physical resources: one wants to repair the school building, two want to establish science laboratories and one an IT lab equipped with advanced technology. Two want to improve student learning with one specifying through improving subject clubs and four seek to increase parental involvement in the school.

Management and Support of Teaching and Learning

The school directors play a role in the management of the teaching and learning process. They report they '*always'* observe teachers lessons and give constructive feedback (72.2%), this was reiterated by them in the interviews and by the teachers who report their school directors suggest ways to improve their teaching (69.2%). In the interviews, they report a more active response to observation of teachers' lessons. Half of them encourage teachers to work with and observe demonstration lessons of more experienced teachers and a few of them (18%) provide relevant resources. Although in the survey half of them suggest they promote teaching practices based on recent educational research (50%) none of them acknowledged they did so in the interviews. Even though most school directors (77.8%) in the survey, report they draw teachers' attention to the importance of developing students thinking and social competences and 66.7% of them indicate they praise teachers whose students actively participate in learning; in the interviews not even one of them indicated student learning as a focus of their feedback or students' active participation as a reason for praising teachers. The lack of a focus on student learning for feedback and praise is concerning.

The school directors report '*always*' keeping teachers abreast of professional development opportunities (72.2%), when teachers have problems, '*always*' taking the initiative to discuss the matter with them (66.7%) and when teachers are absent, '*always*' conducting the lessons of the

absentees themselves (44.4%). The percentage of directors stating they conduct the lessons of absentee teachers is high, given most of them do not even deliver their own scheduled lessons.

The data suggests that over two-thirds of directors both manage teaching and support teachers. They develop and discuss the school's educational goals with the teachers. They also observe teachers teaching, following which they usually suggest ways to improve their teaching, but less frequently praise teachers for effective teaching. They also take the initiative discuss the problems teachers are facing with them and inform teachers about professional development opportunities.

School directors would do well to ensure the schools' educational goals focus on student learning, they must encourage teachers to work according to the school's goals and observe teachers lessons to see how well teachers are helping students to reach the goals. They must also praise and compliment those teachers whose teaching leads to improved student learning outcomes and achievement and provide need-based professional development for teachers who need it.

Summary

The job responsibilities of the school directors are varied and many. They are expected to be visionary leaders, experts in teaching, learning and assessment, effective human resource managers, good public relations officers, and adept fund raisers. Despite their many roles and responsibilities, there is no formal educational requirements for their appointment and few opportunities for their continuing professional development. All the job responsibilities of school directors must be directed to ensure high-quality teaching directed to ensuring student learning and achievement. This study shows that schools do have a school improvement plan with the goal of 'improving the quality of education', which is good. However, it needs specific objectives that can be achieved within an academic year. The school directors as managers of teaching and learning observe teachers' lessons and provide them opportunities for their improvement. Here too, however, the focus is not on identifying the specific actions teachers can take to promote student learning nor on providing need-based professional development for teachers. Suggestions for improvement that are actionable and need-based professional development will facilitate improvement of teaching and thereby, student learning.

Practice and policy implications

Key findings

- The average age of the school directors is 46.2 years (SD = 2.3), with the oldest 59 and youngest 30 years old.
- 42.1% of school directors are female and 57.9% are male. The gender difference between directors and teachers (44.7% female and 55.3% male) is small indicating that both female and male teachers have equal opportunity to directorship.
- Except for one school director, all have a higher education diploma/bachelor's degree, the qualification required to teach. Not a single school director has a postgraduate degree!
- All the school directors have been part of the education system and have risen through the ranks. Prior to their current appointment, they served as directors, deputy directors, or teachers.

- There is no criteria or systematic process for the appointment of school directors. Appointments are made by their colleagues, education officials and all the way up to the President of the country.
- The school directors have an average of only 3.9 years' experience. 63% of directors have been in this role for less than two years.
- There is no formal professional qualification required for the position of school director. There are few opportunities for professional development prior to or after appointment to the position.
- The school directors spend most of their time in administration, support of teaching and student discipline.
- The goal in the annual school improvement plans is to improve the quality of education. It is too broad and lacks specific objectives to be achieved in the academic year. This makes it difficult for the directors to effectively monitor the progress made towards achieving the goals and to address issues that interfere with their achievement.
- In their role as managers of teaching and learning, the school directors observe teachers' lessons and suggests ways to improve. However, without identifying specific actions teachers should take to promote student learning and provide need-based professional development, there is little likelihood for improvement of student learning outcomes and achievement.

Policy and practice recommendations

Develop professional standards for school directors

Develop professional standards for school directors specifying what they should know, be able to do and the character qualities they should have. The professional development standards should serve as a framework for identification of persons for the position of director and for developing programmes for their initial and continuing professional development.

Develop formal programmes for the preparation of school leaders

School leaders are required to play many and varied roles for which they currently receive little professional development. They require professional development in many areas including school leadership and management, instructional leadership, monitoring and evaluation of the schools' educational goals, and school financing and budgeting. Formal education in these areas will increase school leaders' knowledge and skills facilitating school improvement and consequently student academic achievement.

Provide opportunities for continuing professional development of school leaders

All professionals need to remain current in their professions through participation in continuing professional development. Given the new developments in education globally and nationally, it is imperative that school directors be provided high-quality professional development as what they do in schools affects student achievement. A key focus of the continuing professional development must be on assisting school directors to make more effective use of student assessment and performance data to determine the school's educational goals and to monitor and evaluate progress towards achievement of goals. It must also prepare school directors to be instructional leaders, so

they can provide leadership with respect to the teaching, learning and assessment processes in schools.

Encourage and support the sharing of responsibilities

The school directors share their responsibilities with several key individuals. This is a strength of the school system in Tajikistan and must be encouraged. It is important that those who share these responsibilities, deputy directors and methodological heads are well prepared and supported to fulfill them.

Provide clear instructions on how to develop the annual plan for school improvement

Currently the annual school improvement plan is of little or no use for the school, as the goals are broad and unlikely to be achieved within the year. There should be clear instructions provided on how this plan must be developed. Additionally, directors should be trained on how to gather and analyse data such as students' results to determine the school's educational goals, set realistic goals and monitor and evaluate achievement of the goals.

Section VIII: IMPROVING TEACHING AND LEARNING USING APPRAISAL AND FEEDBACK

Introduction

Appraisal for this study is defined as the review of teacher's work by someone internal or external to the school against agreed performance indicators. Feedback is defined as communication of the result of the review with the purpose of identifying good performance and areas for improvement.

Teacher appraisal and feedback can be used for many purposes. It can be used to help teachers to improve their teaching practice. It can also be used to identify professional development needs of individual teachers or teachers across a school. Good performance can be identified and shared. It can also be used to determine career progression, promotion, or termination.

Research shows there is only an indirect correlation between teacher appraisal and student achievement (OECD, 2013). It has shown that when teachers receive continuous feedback on their teaching, it can be used to improve teaching and thereby student learning outcomes (Hattie, 2009; Gates Foundation, 2010). For appraisal and feedback to improve teaching and student learning it must be focused on identifying specific aspects of teaching to be improved and addressing weaknesses through targeted professional development. "[W]ithout a clear link to professional development opportunities, the impact of teacher appraisal and performance review will be relatively limited" (OECD, 2013, p.62). It must also focus on identifying and sharing effective practices across the school.

This section focuses on examining the teacher appraisal and feedback process. It identifies and examines the sources of appraisal and feedback, the methods used, and the focus of the feedback teachers receive. It then discusses the outcomes of teachers' appraisal on improvement of teaching and on teachers' careers. Finally, teachers' perceptions on the appraisal and feedback systems in their schools is discussed.

The Appraisal and Feedback Process

Who appraises and provides teachers' feedback?

Both internal and external persons appraise teachers in the schools. All the school directors (read deputy directors as well) report teachers are formally appraised by them and in most cases (94.7%) also by persons external to the school at least once a year. Most teachers confirm the directors and methodological heads from the DED appraise them at least once a year (96% & 78% respectively).

In addition to being formally appraised both the school directors and teachers report regular informal appraisals. All the school directors report frequently engaging in informal appraisal of teachers. The teachers, however, report being appraised less frequently than the school directors claim (SD 5.3%, TR 18.1%, yearly; SD 5.3%, TR 32.4%, quarterly; SD 26.3%, TR 26.7%, monthly; and SD 63.2%, TR 17.1%, weekly). In addition to appraisals by the school directors, teachers are also regularly appraised by the methodological heads. Similar to the school directors, methodological heads claim to appraise teachers more often than the teachers say they do (MH 73.7%, TR 10% *weekly*; MH 26.3%, TR 46% *monthly*). Teachers are frequently appraised by their colleagues reporting appraisals occur weekly (22.9%), monthly (20.8%), quarterly (19.8%) and yearly (16.7%). There are teachers who report '*never*' being appraised by the methodological head (10%) or by colleagues (19.8%).

Most teachers (86%) report receiving feedback from their school directors after their appraisals but only 69% report getting feedback from the external appraiser. Following their appraisal, 74% of teachers report obtaining feedback from the methodological heads (89% of methodological heads claim they provide feedback) and only 66% report receiving feedback from their colleagues. The data shows a third of the teachers do not receive feedback from the external appraiser and colleagues and a quarter from the methodological heads.

Low levels of feedback from the external appraisers can be explained by the fact that they main purpose is not to appraise teachers per se but follow up the school methodological heads to give feedback on their work. Teacher colleagues maybe constrained by time due to their teaching load and/or lack of skills in analysing lessons and giving feedback. However, methodological heads who are tasked with improving teaching and learning in schools, not providing feedback is concerning. It might be better for them to appraise teachers less frequently but to ensure they provide constructive and actionable feedback aimed at improving student learning.

Appraisal and feedback methods

The main method used to obtain data for the purposes of appraisal and feedback is observations of teachers' lesson. School directors report, they themselves, individuals external-to-the-school, methodological heads and teacher colleagues use lesson observations for teacher appraisal and feedback. Only as part of the formal appraisal process, conducted at the end-of-the-year do all the school directors report they also review results of students' tests, and the peer review of teachers' lesson plans and assessment instruments. In interviews a director reports having teachers write an end-of-the-year report whereas another director seeks students' opinions on teaching.

The appraisal is not conducted against agreed performance indicators. There is also no agreed format for recording lesson observations. Most (84%) methodological heads report they do not use any format to record their observations whereas 16% claim they use rubrics.

In the interviews the school directors report the key feedback mechanism they use is oral. About half of them provide feedback directly to teachers, while the other half provide feedback indirectly, either through the general staff meeting or through the methodological heads. Providing written feedback is uncommon with only one school director indicating using this method.

Focus of feedback

Teachers report that in providing feedback the following areas are considered with '*high'* importance. Even though the main method used for teacher appraisal is observation of their teaching, only 37.1% of teachers report '*high*' importance is given to feedback specific to the lesson observed. Much less frequently is feedback focused on students learning and achievement. Teachers report only about a fourth of the time is feedback focused on the achievement of students learning outcomes (25.2%), students test scores (23.1%) and student retention and pass rates (33.7%). The fact that 'high' importance is only sometimes given to how well teaching leads to attainment of student learning outcomes or achievement in tests is concerning, given that teaching must be directed to student learning and achievement.

The teachers report '*high*' importance is given most frequently to feedback on classroom management (66.7%), students' discipline and behavior (54.6%), their knowledge and understanding of their subject (57.5%) and subject methodologies (44.2%). This is the case

because the methodological heads whose main responsibility is to improve teaching and learning and who both observe and provide teachers feedback frequently give high importance to these areas. In interviews with them, they state the focus of their feedback is on the teachers' ability to provide to provide clear explanations of content, the teaching methodologies used, and the teacher's ability to maintain students' attention. The focus of feedback given high importance again points to lessons that are teacher-centered. The teacher is the 'sage on the stage' with students quietly attending to what the teacher says and does.

Teachers report '*high*' importance in feedback is also given on their working relationships with the school directors (47.7%), their colleagues (44.9%), students (46.8%) and parents (40.2%) and extra-curricular activities provided for students (30.3%). Innovative teaching methodologies (18.8%) is least frequently given '*high*' importance. It again shows that too little focus is given to students learning and teaching innovations both important for improving student performance.

This data shows that the appraisal is generally based on lesson observation and feedback on the teaching process with little attention to how teaching facilitates student achievement of the learning outcomes of the lesson. There is also no agreed upon performance indicators. Neither is there a predetermined structure for recording lesson observations nor for providing constructive feedback. It is important performance indicators are identified and agreed upon and the mechanisms for teacher appraisal and feedback are structured. Moreover, lesson observations must focus on how well the teacher is performing with respect to the performance indicators and realization of the student learning outcomes set for the lesson. Furthermore, feedback must be constructive, acknowledging good performance and suggesting ways to improve.

Outcomes of Teacher Appraisal and Feedback

Teachers were asked to report the extent to which the appraisal and feedback received led directly to opportunities for professional development, salary enhancement or career advancement. 80.2% of teachers report that the most important outcome from the appraisal process (*large & moderate*) is increased confidence as a teacher (46% & 35%). Other outcomes include a greater role in school development initiatives (28% & 37%), public recognition from the school administrators and colleagues (24% & 26%) and changes in job responsibilities that make their work more attractive and satisfying (22 % & 35 %). The least expected outcomes from the appraisal process (*no & slight*) are obtaining an increase in salary (55% & 27%) and receiving more opportunities for professional development (40% & 25%). It seems that appraisal in schools do not serve its main purpose, providing few opportunities for professional development, salary increases or career progression.

Teachers' Perception of the Appraisal and Feedback Systems in Schools

The teachers were asked about their perceptions of the appraisal and feedback received at their school. Most teachers think (*strongly agree & agree*) the appraisal received was generally a fair assessment of their work (19.3% & 75.2%) and the feedback received is helpful in their development as a teacher (38.9 % & 56.5%).

The teachers were also asked to share their opinions about the appraisal and feedback process more generally at their schools. Most of the teachers report (*strongly agree & agree*) a development plan is prepared for them to improve their work (90.9%), measures to remedy any weaknesses in

teaching are discussed with them (99.5%), and effective methods are used to determine how well teachers are performing (88%). Teachers were unable to produce a development plan prepared for them, they seem to view the feedback given for improvement as the plan.

With respect to the outcomes of the appraisal and feedback process at their schools, two-thirds of teachers report (*strongly agree & agree*) those teachers who improve the quality of their teaching receive monetary or non-monetary rewards (65.4%). However, many teachers found the outcomes of the appraisal process to be ineffective. 57.1% of them believe the review of their work has little impact upon the way they teach in the classroom and 50.9% teachers will be dismissed for sustained poor performance'. 58% of teachers are also of the opinion that appraisals are largely done to fulfill administrative requirements. This is consistent with what Bartlett (2000) states: "Many performance appraisal systems are weighted heavily toward accountability rather than the growth and development of teachers and their teaching practices" (p.106).

Summary

All teachers are frequently appraised and receive feedback following observation of their teaching from multiple sources both internal and external to the school. All appraisers use the observation of teaching as the main appraisal method except for the school directors who also use the results of student achievement and the peer review of teachers' lesson plans and assessment instruments for end-of-the-year appraisals. There is no agreed performance indicators nor structured mechanisms for recording observations or providing feedback. Teachers report that in the feedback, most importance is given to classroom management, students discipline and behaviour and their knowledge and understanding of the subject and subject specific methodologies and least importance is given to achievement of student learning outcomes, test scores and pass and retention rates. According to the teachers, the most likely outcome is an increase in their confidence as teachers and the least likely outcomes are an increase in salary or more opportunities for professional development. Teachers perceive their schools' appraisal and feedback process to be fair and helpful but find it ineffective as it has little impact on the quality of their teaching and teachers who show sustained poor performance are not dismissed. Moreover, from their perspective the appraisal is simply done to fulfill administrative requirements rather than improve teaching quality and students' learning outcomes.

Key Findings and Practice and Policy Recommendations

Key findings

- All the teachers are formally appraised by the school directors and by persons external to the school at least once a year. They are also appraised informally by the directors, methodological heads and colleagues.
- The most common appraisal method is the observation of teachers' lessons. In addition to lesson observations, school directors' review assessment of students' achievement and peer review of teachers' lesson plans.
- There is no agreed performance indicators to facilitate appraisal and feedback. Moreover, there are no structured mechanisms for recording observations or giving feedback.

- Feedback provided to teachers following lesson observations is generally oral. Half of the school directors provide feedback directly to teachers while the other half do so in the monthly meeting or through the methodological heads,
- Only in a third of cases is high importance given to providing feedback specific to the lesson observed and only in a fourth on achievement of the student learning outcome. High importance is given more to classroom management, students' discipline and behaviour, teachers' knowledge and understanding of their subjects and subject methodologies than to students learning outcomes, test scores and pass and retention rates.
- The most likely outcome from the appraisal is increased confidence as a teacher whereas the least likely outcomes are obtaining an increase in salary and receiving more opportunities for professional development.
- The majority of the teachers believe that the appraisal of their work and/or feedback received is a fair assessment and is helpful in the development of them as teachers.
- Many teachers believe the outcome of the appraisal system at their schools is ineffective as it has little impact upon the way teachers teach in the classroom and teachers are not dismissed for sustained poor performance. Many teachers also believe that appraisals are mainly carried out to fulfill administrative requirements.

Policy and practice recommendations

Develop agreed performance indicators

It is vital to identify and agree upon performance indicators with teachers and use them to appraise their performance. This would provide a specific focus for appraisal and feedback and facilitate those engaging in the process to make informed decisions about teacher performance and identify areas for professional development.

Use multiple sources of data for teacher appraisals

As the data suggest the appraisal is mainly based on lesson observations. It is essential that multiple sources of evidence are considered to ensure a comprehensive and valid assessment of teacher performance.

Develop structured mechanisms for recoding observations and giving feedback

This study shows that there is no structured format for recording lesson observations and for providing feedback. It is important to put these mechanisms in place to facilitate appraisal and feedback that is impactful. It is suggested to develop a rubric with indicators at various performance levels with examples from real classrooms and possible remedial actions. All staff should be coached in effective use of the tool.

Focus feedback on improving teaching and student learning

Teachers report 'high' importance is given in the feedback to classroom management, students discipline, knowledge and understanding of their subject and subject methodologies rather than an on students' learning outcomes, tests scores and pass and retention rates. Teaching must be aimed at facilitating students' attainment of the learning outcomes and feedback should be aimed at

helping teachers identify the relationship between what they are doing and whether or not it is helping students achieve the identified outcomes.

Ensure teacher Appraisal leads to further professional development

Less than half of the teachers' report that appraisal leads to opportunities for professional development. It is important that the appraisal and feedback process in schools be clearly linked to identifying specific areas for improvement and targeting professional development to address them. A key to ensuring this is the preparation of the methodological heads and school directors to help teachers identify their individual needs and ensure these needs are reflected in the school's professional development plan.

Put in place a reward system for good performance

Good performance must be rewarded by both monetary and non-monetary rewards for teachers to continue to perform at optimum levels. It is important that good performance be linked to salary increase and/or career advancement. It is also imperative that a career ladder be put in place for teachers as it will encourage teachers to improve their performance so that they can move up the ladder.

Dismiss teachers for sustained poor performance

Poor quality teaching affects the quality of student performance and achievement, retaining teachers who are not performing well means that students' performance will remain low affecting them for life. Moreover, retaining poor performers can have a negative effect on teacher morale, discouraging them from staying motivated and further improvement.

Section IX DEVELOPING AND SUPPORTING TEACHERS

Introduction

This section focuses on the teachers' experiences of professional development. Professional development refers to the activities that facilitate the development of teacher knowledge, skills and dispositions aimed at improving teaching and student learning. It begins by sharing the literature on the importance of professional development, the opportunities teachers are provided to participate in professional development including onboarding and mentoring of new teachers. It also looks at the kinds of professional development activities teachers engage in and what school and personal variables might affect participation. Teachers' needs for and barriers to participation in professional development are also discussed.

It is a well-known fact that teachers are the key to ensuring student achievement. Although most education system around the world require teachers to have both academic and professional training when they enter the teaching profession, they also must ensure teachers have opportunities to further develop their knowledge and skills and stay current in their profession. For the longest time teaching has focused on the development of students' content knowledge in different subjects, today it must also include the development of the cross curricular skills of critical thinking, collaboration, cooperation, communication, cultural intelligence, citizenship, character qualities and use of digital technologies to prepare students for success in further study, work, and citizenship in the 21st century.

Professional development is defined as the development of teachers' knowledge, skills and character qualities and the ability to transform them into effective practices to promote student learning and achievement. Professional development can be both formal (courses and workshops) and informal (discussing teaching and learning issues with colleagues) and be provided by experts outside the school (programmes of study leading to a qualification) or inside school (collaborative planning).

In Tajikistan, all teachers are required to have at least a bachelor's degree in a subject to teach. However, because of a dearth of teachers, in practice this is no longer the case. In this study over 7% of teachers do not have a bachelor's degree. Moreover, some teachers are teaching subjects they are not specialized in. For example, a teacher specialized in chemistry is teaching physics and a teacher trained to teach Russian is teaching English. Furthermore, all teachers are also required to have 72 hours of in-service professional development every five years. Inservice teacher professional development is largely provided by the Republican Institute for Inservice Teacher Training (RIITT) and its network of institutes for professional development (IPDs) in each province. However, due to a lack of teacher educators and finances many teachers do not even receive the mandatory 72 hours of training every five years. Since independence from the Soviet Union in 1991, many international development agencies have provided in-service teacher professional development in the form of short workshops focusing on for example developing teachers' skills to promote active learning and develop students reading skills. Most of these efforts have used the cascade model, targeted small numbers of teachers, and have not included support and coaching to facilitate effective classroom implementation leaving teachers unable to implement the newly learned practices in their classrooms.

The findings reported in this section come from various data sources including the survey of teachers and school directors and interviews with the school director and methodological heads. Teachers were asked about the professional development activities undertaken over the last two years and to estimate its impact. They were also asked about the support they receive from their schools for undertaking professional development, the extent to which they want more professional development than they had engaged in, the barriers they feel have prevented them from doing so, and the areas of their work they found most in need of further development. The school directors were also asked about the nature of and the school support for teacher professional development.

Importance of Participation in Professional Development

The reason teachers must participate in continuous professional development is stated clearly by the European Commission in their publication, 'Supporting teacher competence development: for better learning outcomes' which reads:

> Teaching competences are thus complex combinations of knowledge, skills, understanding, values and attitudes, leading to effective action in situation. [...] The range and complexity of competences required for teaching in actual societies is so great that any one individual is unlikely to have them all, nor to have developed them all to the same high degree. [...] Teachers' continuous professional development is, thus, highly relevant both for improving educational performance and effectiveness and for enhancing teachers' commitment (EU 2013, p. 8-9).

There is substantial empirical evidence showing that teachers' professional development impacts students' scores. These studies conclude that professional development of a considerable number of hours over 6 to 12 months shows significant and positive effects on student achievement (Yoon et al. 2007; Hill, Beisiegel and Jacob, 2013).

Participation in Professional Development Activities

Initial teacher education, no matter how good cannot prepare teachers for all the challenges they face when they begin teaching in schools. Effective induction programmes can help new teachers face the 'praxis-shock' by providing them with personal and professional support. Ingersoll and Strong (2011) reviewed empirical studies on the effects of induction programmes on new teachers and found that support and assistance for beginning teachers has a positive influence on many outcomes, such as teachers' commitment and retention and students' achievement. Most importantly studies show students taught by teachers who receive comprehensive and regular support by high quality mentors during induction demonstrate learning gains that are larger than those experienced by students taught by teachers who do not receive such support (Glazerman et al., 2010; Fletcher, Strong and Villar, 2008).

Availability of and participation in mentoring programmes

All the school directors report they have a mentoring programme in their school offered not only to beginner teachers but to all teachers. 89.5% report the mentoring programme is mandated, while 10.5% state it is a school initiative. They report 70.6% of teachers engage in the mentoring process, whereas only 60.6% of the teachers' state they do so. In describing their role, a few methodological heads stated they are responsible for supporting beginner teachers. However, there is no special

induction and mentoring programme for them. Rather they are just part of the school's continuing professional development programme. This programme includes teacher appraisal and feedback (see section VIII for details), a methodological day where teachers of a specific subject come together to learn with and from each other and demonstration lessons followed by feedback from colleagues. This would be an excellent continuing teacher professional development programme if it had clear goals and objectives, administered by professionals with the required competences and monitored and evaluated to identify and address issues as they emerge.

Participation rates

Participating in professional development is a common activity across schools in Tajikistan. Nearly all the teachers report participating in school-based professional development activities over the last two academic years. In addition, the school directors report 39.3% of teachers attended professional development activities offered external-to-the-school over the last academic year and 56.2% of teachers report participating in professional development activities externally over the last two academic years.

Professional development activities engaged in

According to the reports of the teachers and school directors, the most common professional development activities teachers engaged in, in descending order are: participating in teacher professional networks (TR 97.3%, SD 94.4%), observing each other teaching (TR 95.5%, SD 100%), reading professional literature (TR 87%, SD 100%), attending workshops in the subjects they teach (TR 84.7%, SD 94.4%) and engaging in informal dialogue with colleagues (TR 82.6%, SD 83.3%). About two-thirds of the teachers and school directors also report participating in mentoring (TR 60.6%, SD 70.6%) and attending conferences/seminars (TR 55%, SD 68.4%). There is a huge difference in teacher and school director reports about observing teaching at neighbouring schools (TR 68.5%, SD 89.5%) and teachers participating in individual and collaborative research (TR 61%, SD 31.3%). Very few teachers are in qualification programmes (TR 7.8%, SD 11.1%).

From the above it is evident the main avenues for teacher professional development are in-school activities such as observing their peers' lessons, reading professional literature, engaging in informal dialogue with peers about teaching and learning and attending subject-based workshops. This was confirmed in interviews with school directors who indicated most of the workshops/seminars are conducted in-school by the teachers themselves and occasionally by specialists invited by them.

Only 56.2% of the teachers report participating in professional development activities external-to-the-school over the last two years. The length of the activities ranged from 1 to 37 days with an average of 7 days.

While informal and in-house professional development activities are important and contribute to teachers' professional development, it is also important for teachers to have professional development opportunities external-to-the-school that help them develop new knowledge and skills to stay current in their profession.

Teachers perception of the effectiveness of their professional development

The teachers report a larger impact on their teaching from the in-house and informal professional development activities than from the activities external-to-the school. In the case of school-based activities, teachers report high impact (*large & moderate)* from networking with their colleagues (86%), observation of their colleagues' lessons (77%), reading professional literature (79.6%), and engaging in informal dialogue with colleagues (68%). The less impactful school-based activities are mentoring (42.7%) and research (43.4%). With respect to activities external-to-the-school, the most impactful is attending workshops (64.4%). Observation of lessons in other schools (45.3%) and attending education conferences/seminars (40.4%) is less impactful. The least impact is experienced from teachers attending qualification enhancing programmes (4%).

This data is surprising but understandable. Many of the workshops offered external-to-the-school provide teachers with several new ideas but without follow-up-support in-school teachers find it very difficult to translate these new ideas into effective classroom practice. Similarly, education conferences and qualification enhancement programmes are largely theoretical offering teachers little they can use to improve their teaching practice and therefore has little impact on their teaching.

Support for Teachers' Professional Development

The teachers and school directors were asked about the nature of support provided by the school for teacher professional development. Most (84.2%) school directors report they support teachers' professional development by organizing in-school teacher professional development activities and all the teachers report they participate in them. All the school directors also report encouraging teachers to participate in professional development activities offered external-to-the-schools by regularly gathering and sharing information on these opportunities, which was corroborated by the teachers.

Professional development activities, whether in-school or external, require at the very least time off from teaching. Activities external-to-the-school also require some monetary support.

Scheduled time

All the schools provide time for in-school teacher professional development. Time is provided for teachers to observe each other's lessons and give feedback. Time is also provided for teachers to learn and from colleagues on methodological days and observe demonstration lessons and workshops offered by colleagues or invited experts.

In the survey, except for one school director, all the rest indicate they give teachers time off to participate in professional development activities external-to-the-school during the academic year. However, in the interviews only half (55.5%) of them report providing time off as their way to support teacher professional development. This data is closer to the data provided by the teachers, only 30.8% of whom report being supported to engage in professional development activities external-to-the school.

Financial support

In the survey, thirteen school directors (68.4%) indicate they have a separate budget for professional development. In the interviews, less than half of them state they provide financial support to teachers to attend professional development activities offered externally. This is

possibly the reason why only 11.4% of teachers report receiving monetary support. The school directors did, however, point out that teachers attend professional development workshops offered by international development agencies for which there is no cost to the school.

The lack of financial support from the school does not stop teachers from seeking to enhance their professional knowledge and skills. 40% of teachers report attending professional development activities external-to-the-school by paying for some portion, if not all of it themselves. Teachers report paying for travel (26.4%), teaching and learning materials (12.5%), accommodation (8.3 %) and tuition (4.9%).

It appears that monetary support is not a much-used form of support for teacher professional development.

Non-monetary support

The most important non-monetary support provided to teachers is time to engage in professional development activities with 94.7% of school directors reporting they provide it for their teachers. Schools also generally subscribe to a monthly education bulletin (*Omuzgor*) which provides information about educational events and some articles on education that most teachers read. However, only 11.2% of teachers report the school provides non-monetary support for professional development.

The lack of support for teachers to attend professional development activities external-to-the-school may explain the teachers' inclination towards observing their colleagues' lessons and discussing informally with them ways to improve teaching. Collaborating with colleagues within one's own school to learn with and from each other is crucial for teachers to improve their teaching skills. However, updating themselves through external sources is of vital importance to keep current and connect with the latest developments in the world.

It is not unexpected then, that an overwhelming 92% of teachers wanted to participate in more professional development than they did and they feel there is inadequate support for it.

Teachers Need for Professional Development

The professional development support teachers receive does not always meet their needs. Teachers were asked to rate their professional development needs in ten specific areas. Teachers reports of '*high and moderate*' need for professional development are provided below in descending order: knowledge and understanding in own subject (76.5%), ICT skills (75.6%), teaching students how to learn (75.3%), knowledge of the curriculum (71.4%), cross curricular skills (critical thinking, collaboration) (68.2%), student assessment (65.5%), teaching methodology (63.8%), individualized learning (63.5%), counseling and career guidance (59.3%) and student behaviour and classroom management (51.1%). The fact that more than half of the teachers indicate a high and moderate need for professional development in all the areas mentioned in the survey indicates an urgent need to enhance teachers' professional knowledge and skills.

The top priority for professional development is for enhancing subject knowledge and understanding (76.5%). Though this data point is from in-service teachers indicating their current need for keeping current on the knowledge of their own subject area, it may also potentially imply there is a need to ensure a solid preparation in subject knowledge during pre-service teacher education.

The second highest need for professional development is ICT skills (75.6%). This high need is undoubtedly because teachers know the importance of these technologies for study, work and life and recognize how important it is to enhance their current level of skills to teach but also for use in their personal lives. It is evident from data presented elsewhere in this report that teachers are challenged in integrating ICT into their teaching and student learning. Given the importance of developing these skills in students it is imperative that future offerings of teacher professional development focus on developing their ICT skills and embedding it into the teaching and learning of their subjects.

Furthermore, it is evident from data presented in the chapters on 'teaching in schools' and 'student learning' that there is an urgent need for teacher professional development not only in the above two areas. Teachers also need professional development to understand the new competence-based curriculum, teach students how to learn, teach the 21st century skills and learn new methodologies and assessment practices. These teaching competences are crucial for ensuring better student learning outcomes.

Barriers to Professional Development

In this study, although over two-thirds of teachers report high and moderate needs for professional development, when asked if they want to participate in more professional development only 47% said, 'yes', 13% said, 'no' and 40% did not respond to the question. This may be due to the many barriers' teachers report to undertaking more professional development. The main barriers include conflict with work, cost of participation, family responsibilities and no relevant professional development on offer.

Conflict with work

94.7% of school directors in the survey report supporting teacher professional development by giving them time off to participate in these activities, but only half (55.5%) of them did so during the interviews. However, 39.6% of teachers who wanted to participate in more professional development report conflict with work as an obstacle to their participation. The difference in school director and teacher reports may be due to school directors providing more support for in-school rather than external professional development activities.

Participation too costly

All schools want their teachers to improve their knowledge and skills through engaging in teacher professional development activities. 68.4% of school directors report they have a separate budget to support teacher professional development. It, however, appears that the budget is either too small, only able to support in-school professional development activities or only provided to a select few to attend professional development activities external-to-the-school. This study shows that 40% of teachers who participated in professional development paid for some or all aspects of it themselves. Moreover, 34% of teachers who want more professional development state an obstacle to their participation is the expense involved. With teachers' salaries low, teachers find participating in professional development far too costly. The cost is felt more acutely as professional development is unlikely to result in salary enhancement or career advancement.

Family responsibilities

For nearly a third (30.2%) of the teachers who want more professional development, a barrier to their participation is their familial responsibilities. Most professional development programmes are offered in the big cities which require teachers from towns and villages to travel to and stay there for the duration of the programme. This is often difficult for female teachers as in Tajik society they are responsible for the care of the young and aged family members as well as for all the household chores. Some may also be responsible for looking after the kitchen garden or caring for animals owned by the household. Moreover, in more conservative families, even if there are other family members who could take over these responsibilities, travelling to and staying in a strange place is often unacceptable.

No relevant professional development programmes

There is a lack of a range of suitable professional development offerings that teachers can choose from, especially for teachers from schools located in towns and villages. 22.6% of teachers who want more professional development cite lack of relevant offerings as an obstacle to their participation. Moreover, school directors support participation in professional development activities offered by international organisation because they are free. School directors generally send their best teachers for these activities even though the content may not be relevant to them.

Summary

Teachers need to constantly update themselves with the latest theories and research-based best practices to facilitate students' learning and help them reach their full potential. Currently, the main avenues for the teachers to improve their professional knowledge and skills are in-house and informal activities such as networking, observing lessons, dialoguing with their colleagues and participating in workshops (internal and external-to-the school). The teachers maintain the in-house professional development activities have a larger impact on their teaching practice than the external-to-the-school activities such as education conferences and qualification programmes. Most teachers express a high need for professional development in subject knowledge, ICT skills, teaching students how to learn, teaching cross curricula skills, using new pedagogies and assessment practices. Currently, however, support for participation in professional development activities external-to-the-school where teachers can acquire this knowledge and skills is scarce with 56.2% of teachers receiving on average only seven days of professional development over two years and 40% of them paying for some or all of it. This is evidence that time off from work and coverage of expenses is insufficient. Conflict with work, cost of participation, family responsibilities and no relevant professional development are the main obstacles to teachers obtaining more professional development. It is important for schools to support and encourage need-based teacher professional development by giving teachers time off and paying for it.

Key Findings and Policy and Practice Recommendations

Key findings

- All the teachers in this study participated in professional development activities offered in-school over the last two years. However, only 56.2% attended such activities external-to-the-school during the same period.

- Teachers engage in a variety of professional development activities most of which are in-school (observing each other's classes) and informal (engaging in dialogue with colleagues). Most teachers report these activities have a high to moderate impact on their teaching.
- Professional development activities external-to-the-school such as subject content and methodology workshops have a high to moderate impact, whereas education conferences and qualification programmes have a low impact on teaching.
- Three-fourths of teachers identified subject knowledge and ICT skills as the two areas of highest need for professional development. Two-thirds of teachers identified understanding the competence-based curriculum, teaching students how to learn, developing students' cross curricular skills, student assessment and new pedagogies as high need for professional development.
- Schools facilitate teacher participation in professional development activities external-to-the-school by giving them time off and covering some costs.
- The main barriers to teachers engaging in professional development workshops external-to-the-school are conflict with work, associated costs, family responsibilities and the lack of relevant professional development offerings.

Policy and practice recommendations

Develop a comprehensive teacher professional development programme with a budget in keeping with the schools' educational goals and teachers needs

Teacher professional development should be a goal in every schools' education improvement plan. A comprehensive teacher professional development programme and implementation plan should be developed to meet the goal. This programme should include the following:

An induction and mentoring programme for new teachers

With pre-service teacher education programmes largely theoretical, it is important that schools develop and offer a strong induction and mentoring programme for teachers new to the profession. This programme should continue for the first five years of a teacher's career as research shows that mentoring programmes of this duration have a positive impact on student achievement.

An in-house professional development programme that is focused, practical and continues over time

The in-house teacher professional development programme should be in keeping with the school's education goals and data driven. Both teacher and student needs with respect to the goals should be clearly identified and the in-house professional development programme designed to meet these needs with a focus on improving practice in the teacher's own lessons. The professional development programme should continue over time as research shows that programmes of over 6-12 months positively affect student achievement.

Bring in outside experts to address teachers' development needs

A cost-effective strategy is to bring in outside experts to address teachers' professional development needs. This will allow for participation of many teachers and for support and coaching as teachers use the new learning in their classrooms.

Strategically coordinate the participation of teachers in professional development programmes external-to-the-school

With limited funds and with teachers indicating less impact on their teaching from attendance in conferences or seminars external-to-the school, participation should be strategically coordinated by identifying relevant programmes and selecting teachers expected to benefit most from attending them. On return to school, these teachers should be required to share their learnings with colleagues.

Have teachers develop individual professional development plans for themselves

Teachers indicate they need further professional development in their subject knowledge and pedagogy. They may best be helped to meet their needs by developing an individual professional development plan, outlining outcomes and strategies to meet their needs. Methodological heads could provide support and follow-up to ensure realization of the identified outcomes.

Prioritize teacher professional development in understanding and implementing the new competence-based curriculum

Most teachers have identified understanding the new competence-based curriculum and translating it into effective teaching to develop student curricula and 21st century skills as high needs for professional development. Both students and parents also report these are areas of need. There is also a need for teachers to learn how to use formative assessment to facilitate students' attainment of the competences. Schools should make this a priority for teacher professional development over the next few years.

Remove the identified barriers to teachers' professional development

The government must put in place a policy to support the continuing professional development of teachers by ensuring this is a budget line in all school budgets and allocating monies for it.

Section X: PARENTAL INVOLVEMENT IN SCHOOL

Introduction

Children learn and develop largely in two social units: family and school. It is expected that collaboration of the two units would increase and better contribute to children's learning and development. Research shows that parent attitudes, values, goals, and expectations about education as well as the opportunities and activities they make available to their children influence students' achievement, expectations, attitudes, and psychological health (Fan & Williams, 2010; Hill & Tyson, 2009; Kaplan, 2013). Research also shows that parental involvement in the school such as volunteering to help with school activities and taking an active part in school governance and decision making are positively related to student achievement and the more intensely the parents are involved, the greater are the positive effects (Vijaya, S. Vijaya, R & Rajeshkumar, 2016).

This section explores parental attitudes and expectations about education and the education related activities they engage in together with their children at home and at school. It also discusses parents' participation in school-related activities likely to increase students' performance.

Parental Attitudes and Involvement in Educational Activities at Home and at School

To find out about parental involvement in their children's educational activities at home and at school the students were asked how often their parents engaged in such activities with them at home and the interest they showed in their life at school. Teachers were asked about the participation of parents in their student's school life. School directors were asked about their expectation of parents and the parents' expectations of school. Parents were asked about their involvement in their children studies at home and at their schools. The findings from all these data sources provided below depict a positive picture of parents' involvement in the educational lives of their children at home and at school.

Strong Parent Interest and Active Engagement in Their Children's Education at Home

Parents have a strong interest in their children's education and engage in a variety of activities to support their education at home. Parents provide their children with good material conditions and a conducive environment to study at home. 92.8% of the students report they have a quiet place to study at home and 76.2% a desk to study at. 88.2% have between one and a hundred books at home. 91.5% have books to help them with their studies and 70.9% Central Asian literary works. Considerably fewer students (39.8%) have computers at home and even fewer of the computers (18%) are connected to the internet. 80.8% of the students' family members own two or more smartphones with only 36.2% of them connected to the internet. Computers and smartphones are occasionally used for learning. There are several reasons for the low number of households with computers and smartphones with internet access. Tajikistan is a low-income country and computers are relatively expensive. Electricity is not regularly available in small towns and cities. Internet penetration is low, service poor and the price exorbitant for most households.

Besides providing conditions for study at home, parents spend time talking to their children *every day* (93.7%) about what they are learning in school and about school more generally. Their parents discuss with them what they are learning (87.3%) and how they are performing (85.1%) at school. Their parents also encourage them to get good grades (94.3%), complete secondary school

(78.1%), and obtain further education (66.6%). Their parents also inquire about what they did at school that day (64.8%), how they are getting along with their peers (66.7%) and about problems encountered at school (72.4%). Moreover, nearly all parents assist their children with homework (43.2% *always*, 46.4% *sometimes*, 10.4% *never*).

Parents providing their children conducive conditions to study at home, discussing daily what they are learning and how they are performing as well as encouraging them to get good grades and complete school is likely to motivate students to perform well in their studies. Assisting them with homework could result in improved performance if the help given is not simply to complete the task but to facilitate deep understanding or skill development.

Parents Active Interest in Their Children's Life at School

At the time of this study most students report their fathers (62.3% full-time & 21.0% part-time) have paid jobs but much fewer report their mothers are in paid employment (19.7% full-time & 11.8% part-time). The above figures suggest mothers have much more time available because they are not in paid work. The reality, however, is the mothers are responsible for the care of the young and old in the family and for all the household chores. For many, household chores also include looking after the animals (students report they have a few 46.5% cows, 24.5% sheep and 10.8% horses) and cultivating the land they own (29.4% of students report they have land for growing crops). Hence, even if students' mothers are not in paid work, they have just as little time as their fathers to participate in activities at school. For parents in paid employment, finding a balance between their work and home lives is difficult, often leaving them with only a little time each day to interact with their children. Moreover, finding time to participate in their children's activities at school is difficult, because work and school times generally overlap. Of the 193 parents who filled the parent questionnaire, 87.4% were mothers and 12.4% fathers with mothers coming directly from the fields to do so. Mothers are more actively involved in school activities as they consider it part of caring for their children and can make time by rearranging their schedules.

Despite work and home responsibilities, teachers report parents are actively involved in their children lives at school. They state parents regularly attend meetings (40.5% *monthly*, 45.9% *quarterly)* and seminars (20.4% *quarterly*, 20.8% *yearly*) held for them. Even though the school regularly provides parents reports on their children behaviour and academic performance (54.1% *always*, 31.2% *often*), teachers report parents take the initiative to come to school to discuss their children's progress and behavior with 19.3% doing so *always*, 22% *often* and 35.8% *sometimes*. This is corroborated by the school directors (83.3% *yes*) and by parents who report frequent visits (39.4% *weekly*, 38.4% *monthly*) to school to track their children's progress. Furthermore, directors (94.4% *yes*) and teachers state parents ask their advice on how best they can support their children with their studies (29.4% *always*, 23.9% *often*, 31.2% *sometimes*).

Parents substantial interest and engagement in their children's life at school is known to have positive results on their children's performance at school. PISA (2017) shows students who have positive perceptions of their parents' interest in their life at school score higher in the PISA science test and are at a lower risk of low performance.

Parents' Expectations of School

Parents' expectations of school are reflected in their response to questions about their choice of school for their children and their satisfaction with the school. A substantial 40.2% of parents

report selecting the school because of the quality of education offered. This figure is high because 44.5% report there is only one school in their neighbourhood, giving them little choice. Moreover, cost in terms of transport and time is likely to hinder parents looking for schools beyond their neighbourhoods. In terms of satisfaction, 57.9% of parents report they are *completely satisfied* and 40.0% they are *satisfied* with their children's school. Moreover, most parents think the schools prepare their children *very well* for higher education (81%), future work (58%) and citizenship (67.8%).

School directors were asked which one of the given statements best characterizes parental expectations towards your school. Most directors (73.3%) chose the statement, 'majority of the parents put pressure on the school to achieve higher academic standards for their children'. To help the schools meet the high expectations of parents, most school directors expect parents to ensure their children complete their homework (94.7%) and notify the school about problems their children have at home or with peers at school (94.4%). They also expect them to support the school by serving on school committees (100%) acting as teacher aids in the classrooms (94.7%), assisting teachers on field trips (83.3%), volunteering for school projects and programmes (68.4%), and raising funds for the school (66.7%).

Parents Role in School Functioning

In Soviet times schools were required to have a Parents Committee (PC), a tradition that has continued after independence with the government legislating parental involvement in schools. Except for one school, all school directors report parents play an important role in school functioning. They mainly serve as members of parent committees and provide monetary and non-monetary support to the schools.

Membership and Role of the Parent Committees

All the school directors report parents participate in the schools' parent committees. In schools there are two kinds of parent committees, grade level parent committees and a school level parent committee. The grade level parent committees comprise of a few parents of students in that grade and is headed by one of them. The School Parent Committee (SPC) has a head and between five to twenty-five members. The school director nominates four to five candidates for the position of head of the SPC and the parents vote for the candidate of their choice at a general meeting of parents. Members to the SPC are generally selected by the parents at the same meeting. In a few cases, however, the head of the SPC chooses its members. The heads of the SPC have been in their positions from anywhere between one and seventeen years. Five have been in the position for one year, five for two years, one for three years, one for four years, three for six years and one each for eleven and seventeen years.

The data regarding the function, role and responsibility of the SPC is drawn from the interviews with the heads of the SPC. 18 heads participated in the interviews.

During the interviews, the heads were asked to identify the function of the SPC. They reported four main functions. They are to improve students' performance (9), coordinate between parents

and school (9), support the school administration (8) and provide funds and labour for school repairs (4) [5].

With respect to their role as head and that of the members, the heads report their role includes oversight of the overall management of the school (9), observing lessons (7), meetings with parents (2) and supporting disadvantaged families (2). With respect to the role of the members, half of the eighteen heads report members do not have any specific roles, rather all the activities are carried out together. Whereas the rest mentioned roles that were unique to one or two schools. Among the roles mentioned were education quality controller (4), school environment controller (2), students' behavior controller (2), secretary (1) and parent coordinator (1).

The regularity of meetings of the SPC vary greatly. In eight schools it is need-based, in seven schools it meets quarterly and in three schools meeting are held monthly. The heads visit the schools far more frequently. Most heads visit the schools as regularly as once a week (11) or two to three times a month (3). A few report less frequent visits, quarterly (1), on request (2) and when free (1). On these visits most of them meet with the school director to discuss issues (11), observe classes (4) and monitor the school performance.

The data shows there is no uniform system for the appointment of the head and members to the SPC, its function is not clear nor are there defined roles for the head and member. Furthermore, there is no structure or reporting system for the meetings and heads visits to the school. The parent committees is a good concept but will be more effective if the above limitations are addressed.

Monetary and non-monetary support for the school

According to the school directors 2% of the school budget comes from money raised by parents. Parents also report providing monetary support to the schools. The money raised from parents is used to improve the school's infrastructure and resources and to support students who come from low-income families or are disadvantaged in some way. A school director stated, 'The [parent committee] financially supports the school. For example, they collected funds and bought heaters for about 3000 somoni for winter. They provided us with one computer and a camera as well' (Director, School C, May 28. 2019). 37.9% of the parents' report providing study resources to the school *yearly*. This was reiterated by members of the parent committee during the interviews. A head of a parent committee said, 'we collect money and get members of the community to volunteer their services to undertake repair work at school' (PC head, school T, May 24. 2019).

Schools directors were asked to indicate school activities in which parents were involved during the last academic year and parents were asked to do the same. Most school directors report parents actively support the school through their active participation in parent committees. Of the 193 parents who filled the parent questionnaire, 39.4% were members of parent committees. Moreover, parents report an overwhelming 68% participate in parent committee meetings with 18.5% doing so *weekly* and 49.5% *monthly*. 66.7% of school directors report parents volunteered their skills and time to maintain the school building. 66.7% of school directors also report parents volunteer to

[5] PC heads interviews were analyzed by NVivo software and the frequencies represent references made to one or the other options and their total number do not necessarily corresponds to the total number of PC heads interviewed, as one PC head could have made several references at the same time. The cross tabulations produced provide frequencies of each references made by the directors in counts not percentage, because the number of interviews were very small, and thus it was deemed wiser to bring counts instead of percentages.

organize events (SD, 17.6% *quarterly*, 39.8% *yearly).* Parents confirmed, reporting they do so more often (11.9% *monthly*, 16.9% *quarterly*, 34.5% *yearly*). Parents also indicate they provide study resources (17.6% weekly, 13.7% monthly)

Relationship Between School and Parents

The school directors report a close relationship with parents. All of them state the schools provide a welcoming and accepting atmosphere for parents to get involved in the school. All the schools organise parent-teacher meetings and most set aside special 'visit days' when parents can come to discuss issues with staff. A school director said, 'We have a close relationship with parents. I have special days when parents can come to school for a meeting with staff' (Director, School Q, June 1, 2019). Another school director stated, 'Every Saturday is parents' meeting day, when parents can come at any time to the school and talk to the teachers or to me. Also, each class has its own monthly meeting with parents. Despite all the work the teachers have, they inform the parents about the class situation, students' development, etc.' (Director, School A, May 22, 2019). Moreover, school directors and teachers report parents seek advice on how best to support their children with their studies (SD 83.3% *yes*, TR 41.3% *always & often*) and the schools address this by organising seminars for parents (27.4% quarterly, 20.8% annually). Parents acknowledge participating in the seminars and open classes (35.3% *monthly*, 31% *quarterly*).

The collaboration between the schools and parents is very good. The schools work with parents closely through the parent committees both at the school and grade level. All the school directors report they involve parents in school decision making. This was confirmed by teachers and parents. Teachers report (*always & often*) parents give suggestions and feedback on school matters (48.1%). Parents confirm reporting they discuss school problems and provide solutions regularly (8.9% *weekly*, 22.8% *monthly*, 28.9% *quarterly*). Moreover, teachers report the school acts upon the decisions reached at parent meetings (76.9%) and parents follow up on the decisions reached to ensure they are implemented (60.4%). For instance, one of the directors said, 'When parents have any suggestions or requests, they discuss it with their PC and only then the head of the PC delivers their messages to me. We discuss it together and try to find the best ways of solving them. We always collaborate with the PC' (Director, school O, May 21, 2019).

All the school directors report they have effective communication systems to regularly inform parents about school programmes and their children's academic progress (94.4% *yes*). The teachers confirm this indicating the school regularly informs parents about their child's behavior and/or academic progress (85.3% *always & often*). This is done during parent-teacher meetings (40.5% monthly, 45.9% quarterly) or on parents frequent visits to schools. Parents communicate with school (*weekly, monthly & quarterly*) through their children (40.7%), mobile phones (38.7%), parent committees (13.4%) and other channels such as social media or teachers living nearby (5.5%).

The relationship between the school and parents is mutual with parents trying to address school needs and schools addressing parents concerns so as to improve student performance.

Summary

Parents' have a strong presence in their children's lives at home and at school. They are actively involved in the schools as members of parent committees and in providing monetary and non-

monetary support. This support is provided to schools to achieve their high expectations for their children.

Key Findings and Policy and Practice Implications

Key findings

- Parents play an active role in their children's educational lives at home and at school. They support them at home by providing them resources needed for studying, discussing what they did at school and encouraging them to study, get good grades and complete school. Many also volunteer at school to assist the school in meeting its goals.
- Almost all parents are completely satisfied with the quality of education the school provides for their children and think the school prepares their children well for college, career and citizenship.
- Parents play an active role in the functioning of the school. They are involved in the parent committees and in provision of monetary and non-monetary support.
- There is no clearly defined structure and function of the SPC. The role and responsibilities of the head and members are also not clearly defined.
- Schools have a mutually beneficial relationship with their parent community which is facilitated by collaboration and communication.

Policy and practice recommendations

Educate and support parents in the ways they can help their children meet their education goals

Hill and Tyson (2009) suggest that parents of secondary school students facilitate academic socialization into the longer term and in life-long education goals. They found that communicating higher academic expectations, fostering academic aspirations, discussing learning strategies and planning for their children's academic future increases student achievement significantly. The school should educate parents in the best ways to do this.

Provide informal learning opportunities for children

Parents should be encouraged to provide informal learning opportunities for their children including registering them in after-school clubs, taking them on visits to museums, and providing a variety of educational experiences in their homes.

Improve functioning of the parent committees by developing and providing conceptual and operational guidelines

There are no guidelines for selecting the head and members of the SPC or determining their length of service. The function of the SPC and roles and responsibilities of the head and members are also not clear. This lack of clarity limits the effectiveness with which the SPC can help the schools improve student performance and achievement. It would be good if conceptual and operational guidelines are developed and shared with all schools that can be used to provide structure and improve the functioning of the SPC.

Section X1: CONCLUSION

The results of this study indicate that schools in Tajikistan face immense challenges in providing quality education to all students. The key policy and practice recommendations to address these challenges and improve the quality of student learning and achievement are given below.

Policy Recommendations

- Increase public spending on education. Provide capital investments for new schools and renovations of existing schools, classrooms, science and ICT laboratories. Provide budgets for recurring expenditure for textbooks, additional teaching and learning resources, science equipment and materials and computers with high-speed internet.
- Improve teacher remuneration and performance evaluation system. Increase the salary for new teachers, put in place a career ladder and a systemic and transparent performance evaluation system to attract and retain high-quality teachers.
- Address the current shortage of qualified and experience teachers. Develop initial teacher education programmes that allow prospective teachers to specialize in two disciplines, recertify existing teachers to teach another related discipline and certify professionals in the field to teach.
- Develop subject curricula in keeping with the SSSE 2015. Identify outcomes for each developmental level, delineate student learning outcomes at each grade and provide exemplars of pedagogies and assessments best suited to develop and measure attainment of the outcomes.
- Provide up-to-date textbooks in all subjects to all students. Developing quality textbooks requires expertise and time. Until the expertise is developed locally, identify high-quality textbooks available in the market, make contextually relevant adaptations, translate and approve them for use in schools.
- Conduct triennial national assessments of learning. Hold national assessments at each developmental level (primary, lower secondary and higher secondary), use the findings to set improvement targets and support schools to realize them.
- Promote gender equality in educational attainment. Put in place tangible measures to keep girls in school beyond lower secondary level and ensure equal opportunities for them to higher education and employment.
- Develop professional standards for teachers. The standards should delineate what teachers should know, be able to do, and the character qualities they should have. They should be used as a framework for teacher appointment and career advancement. They must also be used to redesign the courses and practicum of the initial teacher education programme.
- Design professional standards for school directors. The standards should delineate the competences of school directors. They should be used as the basis for their appointment and initial and continuing professional development.

- Redesign the initial teacher education programme. Initial teacher education must prepare teachers with the competences identified in the professional standards equipping them to effectively realize the student learning outcomes in the curricula.

- Set B2 level on the CEFR as the requirement for English teachers. Ensure teachers attain B2 level by the end of their initial teacher education programme and facilitate in-service teachers to attain this level. In three years, the required level be raised to C1.

- Set a minimum number of days students and teachers must attend school. A minimum number of days will ensure regular attendance and facilitate student learning and achievement.

Practice Recommendations

- Use student data to set goals for student performance. School directors must use student data to identify one or two educational goals to improve student performance each year. They must provide teachers professional development with respect to the goals and monitor and evaluate implementation to make necessary improvements.
- Ensure regular attendance and lessons. School directors must reduce class cancellations and lesson interruptions by better scheduling administrative duties and encourage active and authentic learning to reduce student absenteeism. Furthermore, they must educate parents of the importance of regularity and punctuality for learning.
- Recognize all children can learn. All teachers must recognize it is not talent but effort that facilitates learning. As teachers they must design appropriate tasks, encourage the efforts of all students, and praise them when they are successful.
- Use active learning pedagogies. All teachers must become more proficient in using questioning and cooperative learning in their lessons. They must add project-based learning to their repertoire to develop student competences by doing projects to address real-world situations at class, school and community level.
- Model and guide students in conceptual and contextual ways of learning. All teachers must move students away from rote learning by providing in-class and home assignments that require them to work collaboratively, engage in enquiry, and learn by doing.
- Facilitate science investigations and enquiry. All science teachers must enable students to explain phenomena scientifically, design and conduct scientific investigations and enquiry, and interpret data and evidence scientifically.
- Solve real-world problems in mathematics lessons. All mathematics teachers must use instructional strategies that encourage students to collaboratively and individually solve real-world problems justifying the method used and explaining how they arrived at the solution. They must use general and subject-specific digital technologies for teaching and learning of mathematics.

- Use team projects to develop ICT competences. All informatics teachers must facilitate the development of students' ICT knowledge and skills through project-based learning. They must also assist all teachers in embedding ICT in class and home assignments to further develop students' digital technology skills.
- Use scripted lessons to develop students' English language skills. All English teachers use scripted lesson and unit plans to develop students' vocabulary, grammar and the four language skills. Through teaching the scripted lessons they will develop their own language and teaching proficiency.
- Use students' motivation and high educational and career expectations to improve their academic performance. All teachers must use students' motivation to learn and high educational and career expectations to improve their academic performance and make careers in professions in STEM, IT and English.
- Educate parents on ways to support their adolescent children's learning. School directors should organise seminars to educate parents on how to facilitate their adolescent children's learning by helping them become more independent learners and providing them informal, experiential and work-based learning opportunities.

It is imperative that policy makers and practitioners act on these recommendations to ensure students graduating from secondary schools are well prepared for further education and work that can contribute to the socio-economic development of Tajikistan in the 21st century.

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