THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

Baseline Study – Western Balkans

21st Century Schools Programme

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Glossary

Critical Thinking: Critical thinking involves analytical thinking, looking at problems from different perspectives, and being willing to challenge assumptions and conventional ways of thinking before reaching a position.

Problem solving: Problem solving refers to an individual's capacity to engage in cognitive processing to understand and resolve problem situations where a method of solution is not immediately obvious.

Coding: Coding involves translating logical commands in a natural language into a computer language that can be understood by a computing machine such as micro-bit.

Programming: Programming is the process of developing a functioning software solution (a 'programme') using coding procedures.

Informatics: Informatics is a broad concept which refers to the study of the structure of programmes and the use of coding.

IT: Information technology (IT) encompasses the functions and uses of computers, coding techniques and programming languages (hardware and software).

ICT: Information and Communication Technologies (ICT) combines IT with aspects of communications technologies such as the internet and mobile telephony.

Micro:bit: A micro: bit is a piece of computer hardware that allows for basic coding and programming operations that can be connected to other pieces of equipment in the classroom.

MOOC: Massive Online Open Course (MOOC) is a free online course available for anyone to enrol.

Readiness: The distance between the actual ability of teachers to provide instruction in CTPS or coding in relation to the maximum possible level of ability.

1. Introduction

The countries of the Western Balkans (Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia and Serbia) have been in a process of transition to a market economy over the past 30 years that is in some respects still not yet complete, in part due to the interrupting effects of wars and conflicts, in part due to the delayed onset of transition that in some countries (e.g., Serbia) did not really get off the ground until the democratic turn began in 2000. The economic restructuring that the transition has involved has created a demand for new skills following the introduction of new technologies and new forms of business organisation. Poor quality and irrelevance of education to labour market needs are often seen as one of the key causes for high youth unemployment rates in the region. The average youth unemployment rate is amongst the highest in Europe leading to emigration from the region due to a lack of appropriate jobs, especially for medium-skilled and highly skilled workers. Low country scores on OECD's Programme for International Student Assessment (PISA) tests implies a widespread lack of understanding among school leavers of how to solve practical problems. At the same time the digital economy is underdeveloped in the region, and the EU Strategy for the Western Balkans (2018) has set out a Flagship Initiative to develop the digital economy in the region, backed up by substantial EU funds.[1] This policy aims to support the development of the digital economy in the region by promoting the deployment of broadband connectivity and enhancing digital skills to underpin renewed economic growth led by an expansion of e-commerce. The level of internet skills is rather low in the Western Balkans and is generally below that in the EU. Whereas only one quarter of the EU population has a low level of digital skills, the proportion with only a low level of internet skills is far higher in the Western Balkans.[2] The most disadvantaged in this respect are North Macedonia where 42% of individuals have a low level of internet skills and Kosovo* where the proportion is as high as 62%. The proportion of individuals with skills above the basic level is highest in Serbia but still relatively low compared to the EU. In this context, the development of the digital skills of the population, especially of school age children, is of special importance.

The need for the development of Information and Computer Technology (ICT) and coding skills among school pupils is recognized by all governments in the region in key strategic documents. However, the roll-out of coding, programming, informatics and ICT in primary schools varies from one country to another.[3] There is a variety of approaches to introducing coding in the curriculum, and no standard terminology. In Albania, coding is not included in the curriculum, although "Technology and ICT" is taught as a compulsory subject from fourth to ninth grade and coding languages are included in the curriculum of the 8th grade. In Bosnia and Herzegovina (BIH) ICT is taught as a compulsory subject from sixth to ninth grade and although a new curriculum has been developed that includes coding it has not been implemented. In Kosovo, coding is only included in the 8th and 9th grade. In Montenegro, computer programming is taught three hours per academic year in the seventh grade and coding is part of an elective subject "Introduction to Programming" in the 9th grade. In North Macedonia, "Working with Computers and Basics of Programming" is a compulsory subject in the third grade and "Informatics" including basic programming is a regular subject in the sixth and seventh grades; "Programming" is an elective subject in the ninth grade. In Serbia, coding is a compulsory subject in the fifth and sixth grades, and from 2020 it has been included in all grades 5-8.

1.1 The British Council 21st Century Schools Programme

The British Council 21st Century Schools Programme is a three-year programme to provide training to school leaders and teachers in the skills needed to improve the teaching practice using critical thinking and problem solving (CTPS) teaching methods and the application of IT skills, primarily coding and programming within the classroom using micro:bit hardware donated by the UK government. Following an initial short course of training

[1] European Commission, "Measures in support of a Digital Agenda for the Western Balkans", SWD(218) 360 final, Brussels, 22.6.2018
[2] Eurostat online data.
[3] Coding involves translating and writing codes from one language to another, whereas programming involves the ability to write executable programmes. Informatics is a broader concept which refers to the study of the structure of programmes and the use of coding, while ICT is broader still, encompassing the functioning and use of computers and programming languages (hardware and software).

of school leaders and selected teachers, the Programme involves follow-up mentoring within schools. The Programme addresses the multiple constraints that prevent primary school pupils from developing their CTPS and coding skills. During the project inception phase, a working group of teachers, trainers, and education experts was created to work on improving the training curricula. Relevant guides and teaching materials are being developed to accompany standard training materials and facilitate teachers' learning processes and the application of their newly acquired skills in practice.

The Inception Phase of the Programme began in October 2018 and lasted up until March 2019. The Implementation Phase began in March 2019 and is scheduled to end in September 2021. The financial resources available to support the Programme are the Programme budget, announced as £10 million. The staff available to support the Programme are the BC team including the Senior Responsible officer, the Senior Programme Manager, the Project Manager, the Finance Manager, the MEL Manager and the Communication Manager, and the staff of the Ministries of Education in each beneficiary country. The project will also be supported by 158 CTPS trainers who will train the school leaders and teachers in CTPS skills and 34 school leaders' trainers. Training of ICT teachers in the use of micro:bit will be delivered through an on-line MOOC, while all CTPS trainers will have two sessions in their CTPS training dedicated to micro:bit and its use in subject teaching and cross curricular teaching. There will also be 9 validation trainers. Furthermore, the Programme will be supported by the delivery of up to 109,650 micro:bits to schools involved in the Programme as follows: Albania, 23,560 micro:bits; BIH, 19,090 micro:bits; Kosovo, 16,400 micro:bits; North Macedonia, 11,490 micro:bits; Montenegro, 3,660 micro:bits; Serbia, 35,450 micro:bits.

The Programme is being implemented in all primary schools in the Western Balkan countries. An initial group of 158 trainers (school leaders and teachers) was selected and trained by the British Council. Prospective trainers were shortlisted on the basis of their submitted application, and the shortlisted candidates attended a 3-day validation event during which they were assessed on their management of course material, their delivery of the course material, and on their personal and professional conduct. The most successful candidates were confirmed as trainers. Trainers hold regular review sessions with the British Council to review and reflect on successes and challenges in training delivery. Further guidance and materials are available to trainers throughout the Programme. Additionally, to foster exchange of experience among trainers, follow-up meetings are being organised with teachers' trainers in each beneficiary country with the aim of exchanging information on lessons learned and on emerging best practice examples.

The trainers are providing the training to school leaders and selected teachers over a period of two years from the start of the Programme. The training and associated follow-up mentoring takes place over five (or six depending on country) successive cycles of 13-14 weeks duration with the following timing: (i) March to June 2019; (ii) August/September to December 2019 (iii) January/February to May 2020; (iv) August/September to December 2020 (iii) January/February to May 2021 [and (vi) where relevant from August/September to December 2021]. During each training cycle, school leaders and teachers receive 2-3 days CTPS training, school leadership training and micro: bit training. Training for school leaders is intended to provide them with the tools and approaches they would need to ensure effective CTPS skills provision in their schools, including strategies for planning, monitoring and improving teaching and learning, and for mapping CTPS skills across the curriculum. In addition, they are provided with guidance on establishing and running coding clubs in their schools. The training programme for teachers covers practice orientation, practical application and ongoing support through mentoring, online resources and peer networks, designed to enable them to effectively teach CTPS and coding skills in the classroom. Teacher training is delivered through a phased approach comprising an initial three-day training in CTPS and pedagogy for subject teachers, involving on average 5-6 teachers per school.[4] All teachers were trained in applied computing using micro:bit through a 8-hour online MOOC covering

[4] *Teachers spend two days exploring four key features of CTPS (solving non-routine problems and questions; considering different perspectives on issues; evaluating evidence for and against different positions; understanding the deep structure of issues), and three foundational teaching strategies that support the development of these skills (asking questions to develop deeper thinking and check for understanding; modelling how to think critically and solve problems; providing systematic feedback and corrections). On the third day of the training programme, teachers are introduced to the concept of cross-curricular teaching and receive guidance on how to design and implement cross-curricular projects in their schools.*

the basics of coding and applied computing with practical exercises. Once ICT teachers have passed the on-line training, they cascade the training to their colleagues by demonstrating the use of micro:bit in practical implementations of the cross-curricular approach to teaching coding.

The training is followed by 12 weeks of practical implementation in the classroom, during which teachers and their pupils are assigned specific projects and provided with hands-on support by mentors during two site visits. The assigned projects will involve the development of two lesson plans using CTPS pedagogy, and the development and implementation of a cross-curricular project focused on using micro: bits in a practical setting. The trained teachers are expected to disseminate their newly acquired CTPS skills to their colleagues, integrate core skills into their school curricula, and integrate CTPS skills into the teaching process. School leaders are required to advocate for CTPS teaching methods among teachers in their schools, to assess how CTPS is being taught, to map areas of the curriculum where CTPS can be included, and to develop strategies to improve CTPS provision.

It was initially planned that at the end of the training cycle, a feedback day would be organised for up to three representatives from each school (the school leader, an ICT teacher and one other teacher) where School leaders could share experiences, address issues encountered during Programme implementation and discuss the challenges of sustaining the Programme beyond the intervention period. However, these sessions were organised only after the first cycle, and then abandoned in all countries except Albania, because it was agreed that in most countries the programme already provided other opportunities to cover the issues mentioned above (namely, mentoring visits) and thus there was no need for a specific additional feedback day. Albania will maintain the feedback day.

Teachers are incentivised to apply their newly acquired teaching techniques and approaches through annual award schemes such as for the best lesson plan, the best learning materials, and the best teaching of CTPS.

Each school participating in the Programme is required to establish a coding club, which acts as a meeting point for pupils and teachers to exchange ideas and improve teaching practices through the use of creative coding techniques. Coding clubs also provide a platform for pupils to exchange ideas and experiences with their peers from other schools. Coding clubs should have up to 30 members who meet at least once a week in a designated school area (e.g. an IT classroom) where pupils are expected to develop joint projects using micro:bit devices. These activities should ideally include interaction with other schools from the region and worldwide, supported by a partnership with Code Club UK which involves almost 7,000 coding clubs worldwide. The Programme provides guidance to school leaders and ICT teachers on establishing coding clubs and supports their work with online resources produced in cooperation with the Raspberry Pi Foundation. Projects will be able to take part at an annual national coding competition organised by local British Council offices. The best projects (2 per country) will be invited to take part in a regional online coding competition and in international competitions, such as the micro:bit Educational Foundation Global Challenge and the Code Club Moonhack competition.

This Baseline Report presents the characteristics of the primary education systems in the Western Balkans prior to Programme implementation that are relevant to the baseline stage of the British Council 21st Century Schools Programme. The main aim of the Baseline Report is to establish the initial measurement of the evaluation indicators, outcomes and outputs as set out in the Programme Evaluation Plan. The Baseline Report also examines the basic assumptions of the Theory of Change (Logic Model) of the Programme, which identifies how Programme interventions are expected to bring about the various outputs and outcomes of the Programme. It therefore checks the assumptions on which the effective delivery of the Programme are based.

1.2 The baseline evaluation report

An evaluation of the British Council 21st Century Schools Programme in the Western Balkans is being carried out by a team of evaluators from LSE Enterprise, UK, together with a team of local experts from each of the

six countries of the region where the Programme is being implemented. The evaluation project consists of a baseline study, an endline study, and a final evaluation study. The British Council MEL Programme Officer is establishing a monitoring system to support these studies. The target audience of the baseline and end-line studies and final evaluation are the BC staff, the Conflict, Stability and Security Fund (CSSF) WB Team, Foreign and Commonwealth Office (FCO) WB Team, and national education authorities in six WB countries. They will use the results to adapt their programming/education policies, and to transfer lessons learnt to other interventions. The results are also targeted at the MEL unit of the BC which will use the results for reporting purposes.

The evidence used in the report has been gathered through mixed research methods using surveys and in-depth interviews (IDIs). This Baseline Report analyses the data obtained from fieldwork with interviewees and surveys in sampled primary schools from the 2nd and 3rd cycles of Programme implementation, plus control schools from the 5th and 6th cycles. The information gained from this analysis will be used to answer the evaluation questions following the completion of the Endline Study in 2021.

The report is structured as follows: Section 2 describes the sample approach and implementation. In Section 3, an overview of the baseline quality of education in the Programme countries is provided, using information from the PISA 2018 national assessment implemented for 15-year-old pupils. In Section 4, the focus turns to the baseline of policymakers' support for CTPS and coding skills through curriculum reform and other policy measures, whilst Section 5 focuses on the support available from school leaders for CTPS and coding skills across the curricula. Section 6 presents baseline findings on teachers' knowledge and practice of CTPS and coding skills in the classroom. Section 7 analyses pupils' baseline situation regarding CTPS and coding skills, focusing on the results from interviews with school leaders and the pupil survey. Section 8 presents brief observations on conflict issues affecting the education systems. Section 9 presents the limitations of the study. Section 10 sets out the conclusions on the baseline situation for CTPS and coding in primary education in the countries of the Western Balkans.

2. Methodological approach and implementation

2.1 Sampling approach

2.1.1 Quantitative Research

Since the 1st cycle was already under way when this evaluation project began, our Evaluation Plan envisaged that we would survey schools from the 2nd and 3rd cycles to establish the baseline measurements at the beginning of the Programme intervention. For that reason, it was decided that the baseline fieldwork should be performed at the beginning of the 2nd cycle, in September/October 2019. At the start of the fieldwork the British Council did not have information on the schools that were to participate in the 3rd cycle trainings in all Western Balkan countries, so we split the baseline fieldwork into two phases, one to be carried out in September/October 2019 at the start of implementation of the 2nd cycle, and the second phase to be carried out in January/February 2020 at the start of the 3rd cycle. Sampling of schools was done separately for each country in a two-stage sampling procedure. In the first stage, a sample of schools was chosen by the core team at LSE known as the Main School Sample (MSS). Following this, additional schools were chosen by the local experts known as the Control School Sample (CSS), which were chosen for comparability with the schools in the MSS based on the experts' local knowledge. In the second stage, the target population (school leaders, teachers, pupils) was sampled from the schools that were sampled in the first stage.

According to the Evaluation Plan, the MSS includes the schools that participated in the 2nd and 3rd cycles of the BC Programme and will be used to evaluate the effectiveness of the Programme intervention following implementation of the Endline Survey in 2021. In the first phase of the fieldwork in September/October 2019 we sampled the 2nd cycle schools from the MSS in all countries. The same number of schools were to be drawn in each country in January 2020 from the 3rd cycle schools to establish the baseline for the second half of the MSS. However, the COVID pandemic measures adopted by governments involved school closures in most countries and led to a temporary suspension of the fieldwork with 3rd cycle schools in March 2020. This was resumed on a restricted basis in September-October 2020.

The CSS includes schools that did not participate in the first three cycles of the BC Programme and will be used as a benchmark to better evaluate the progress achieved by schools in the 2nd and 3rd cycles. Since the CSS comprises schools that are not in 1st, 2nd or 3rd cycle, it could not be drawn until November 2019 when the complete list of 3rd cycle schools was known. The exception was Albania where the list of 3rd cycle schools was confirmed earlier by the BC , and the Local Experts were allowed to survey in the first phase of fieldwork.

The MSS was drawn randomly from two segments: urban and rural, from the sampling frame of the 2nd and 3rd cycle schools provided by the BC. The sampling procedure used was PPS (Probability Proportional to Size), where the probability to choose a school was directly proportional to the number of pupils within that school. The PPS approach was chosen because the main aim is to measure results on 10-15-year-old pupils, while choosing schools using PPS allows our sample to provide the best representation of an average pupil.[5] In the MSS, 23 urban schools and 23 rural schools were sampled. Within each country the geographic distribution of schools in the main sample was pre-determined by the geographic distribution of the 2nd and 3rd cycle schools. Regarding the CSS, 8 rural schools and 8 urban schools were selected from the 5th (and 6th, were applicable) cycles, plus 4 "conflict" schools (all urban). The distribution of schools across the sample is shown in Table 1.

[5] In PPS procedure, each school is assigned weight proportional to the number of pupils in that school, and then the random sample is taken from such "weighted" population, it provides the best representation of an average pupil. This allows that in the second stage, when sampling pupils, each pupil still has an equal chance to be chosen as it had in the original pupil population. This would not have been the case if in the first stage we just sampled schools randomly within each segment, so that each school has an equal chance to be chosen, because this would lead to overrepresentation of pupils from smaller schools in the second stage sampling of pupils.

Table 1. School leader, teacher and pupil samples by country and urbanity.

	Schools				Teachers			Pupils
	MSS	CSS	"Conflict" school	Total	Trained	Non-trained	Total	
AL	10	4	1	15	31	41	72	**1,235**
Rural	5	2	0	7	12	19	31	536
Urban	5	2	1	8	19	22	41	699
BiH	7	3	2	12	49	59	108	**985**
Rural	4	2	0	6	25	24	49	497
Urban	3	1	2	6	24	35	59	488
XK	6	2	0	8	60	18	78	**641**
Rural	2	1	0	3	28	8	36	215
Urban	4	1	0	5	32	10	42	426
ME	6	2	1	9	26	12	38	**539**
Rural	3	1	0	4	8	3	11	157
Urban	3	1	1	5	18	9	27	382
MK	8	2	0	10	64	8	72	**1114**
Rural	4	1	0	5	18	4	22	699
Urban	4	1	0	5	46	4	50	415
RS	9	3	0	12	65	38	103	**777**
Rural	5	1	0	6	39	34	73	475
Urban	4	2	0	6	26	4	30	302
WB	**46**	**16**	**4**	**66**	**295**	**176**	**471**	**5,291**
Rural	23	8	0	31	130	92	232	2,579
Urban	23	8	4	35	165	84	239	2,712

Source: School leader, teacher and pupil surveys. Note: AL=Albania, BA= Bosnia and Herzegovina, XK=Kosovo, ME=Montenegro, MK=North Macedonia, RS=Serbia, and WB=Western Balkans

The coronavirus crisis disrupted the interview programme with 3rd cycle schools due to school closures and the baseline measurements for some schools were not completed until October 2020. Due to the coronavirus pandemic, schools in most of the countries were closed in February 2020 interrupting fieldwork. The fieldwork was resumed by video conferencing in May-June 2020 and through visits to schools in September-October 2020. Schools did not reopen until September 2020, at which point we resumed the survey. The pupil surveys took place through online surveys in some schools due to restrictions imposed on school activities.

After choosing the MSS in each country, within the sampled schools **the second-stage** sampling procedure selected the School Leader Sample, the Teacher Sample, and the Pupil Sample.

The School Leader Sample consists of all school leaders from the sampled schools; in total 66 school leaders were sampled and surveyed using the approved School Leader Questionnaire. The distribution of school leaders by survey category is shown in Table 1.

The Teacher Sample consists of all the teachers trained in the BC Programme (the main teacher sample, or 'trained teachers') and several teachers that were not trained (the control teacher sample, or 'non-trained teachers'). The whole procedure is explained in detail in the Fieldwork Protocol attached in Annex 2. Altogether 471 teachers were surveyed in the Programme countries. The distribution of teachers by survey category is shown in Table 1.

The Pupil Sample was constructed in a way to give a good representation of boys and girls, as well as children from vulnerable backgrounds. This was achieved by using a two-stage sampling procedure that combines stratified and cluster sampling approaches. In school, pupils are organised by their grades, and then by forms within those grades. These forms are perfect clusters of pupils, each form being a good representation of their appropriate grade (they have been originally made by school with exactly that intention – that forms do not differ one from another). This is most useful for sampling because by choosing any of those forms gives a good presentation of the whole pupil population from that grade. And at the endline the same forms of pupils from the same schools[6] will be surveyed.

In the first sampling stage we sampled the forms (clusters) within the school using a stratified sampling procedure. This sample frame consisted of all forms of pupils aged 10-15 that are being taught by the trained teachers. The forms were sampled in a stratified random procedure, where stratums were defined to ensure that all grades, all ethnicities, language groups and both boys and girls would be chosen. In all countries, schools have grade stratums, i.e., one stratum for each of the grades where the Programme is being implemented. In addition, if a school had separate forms for different language groups, those would form another stratum. In the end, one form was chosen within each stratum. Once the forms were sampled, in the second phase all the pupils from those forms (clusters) were chosen in the sample and surveyed using the approved Pupil Questionnaire (attached in Annex 1). If the sampled school did not have separate forms for different language groups, then four forms were chosen from that school one from each grade. If the sampled school had separate forms for two different languages in each grade, eight forms were chosen in such a school, two from each grade so that pupils speaking either language are equally represented. This is explained in detail in the Fieldwork Protocol attached in Annex 2. In the pupil questionnaire, in questions Q12 and Q13 the Local Expert was required to add subjects, to capture results from the trained and non-trained teachers, in a procedure that is explained in detail in the Fieldwork Protocol attached in Annex 2.

In total, 5,291 pupils were surveyed in sampled schools in the Western Balkans. The distribution of pupils across countries and across rural and urban school types is shown in Table 1. Due to the coronavirus pandemic, schools in all countries were closed from March to September 2020. In the new school year, countries adopted different policies towards school opening. As a result, in some countries, it was impossible to survey all pupils in March as planned, and so the survey was postponed until the beginning of the new school year in September/October. Even then, not all schools were opened and so the decision was taken to pursue a strategy of online surveys in these schools. Table 2 shows the impact on the survey of the different measures taken in response to the coronavirus pandemic.

Table 2. Surveyed pupils by time and type of survey.

	Main Sample Schools					Control schools				
	2nd cycle *In person survey at school*	3rd cycle *School year 2019-2020 (prior to school closures due to coronavirus) – in-person survey at school*	3rd Cycle *New school year - in person survey at school*	3rd cycle *New school year – online survey at home*	**Total Main Sample**	A *Surveyed prior to school closures due to coronavirus measures (in-person)*	B *New school year - in person survey at school*	C *New school year – online survey at home*	**Total Control**	Total
AL	422	100	301	0	**823**	197	215	0	**412**	**1,235**

[6] In May/June 2021, when the endline measurements will be performed, the current V grade would be VI, the current grade VI will be grade VII, and the current grade VII will be pupils in grade VIII. Our current grade VIII would have left the school, and we will have grade V pupils. So, we will be able to follow the progress of 3 generations by capturing the same pupils at the baseline and the endline. This will be very useful for our final evaluation.

BiH	335	288	0	0	**623**	362	0	0	**362**	**985**
XK	238	0	133	0	**371**	87	183	0	**270**	**641**
ME	232	0	52	103	**387**	0	0	152	**152**	**539**
MK	658	322	0	0	**980**	85	0	49	**134**	**1,114**
RS	314	0	154	0	**468**	0	309	0	**309**	**777**
WB	**2,199**	**710**	**640**	**103**	**3,652**	**731**	**707**	**201**	**1,639**	**5,291**

2.1.2 Qualitative Research

Qualitative research in the baseline included Individual In-depth Interviews (IDIs) with the policy makers, school leaders and trainers. The number of people interviewed in each category is provided in the Table below. Convenience sampling was used for the qualitative research. It is important to understand that the qualitative research cannot provide quantitative answers (for example, the number of the interviewed who support a view is not representative of the population's support of that particular view). For that reason the samples are small in relation to the population size and non-probability sampling techniques are used. For us, the best sampling approach was convenience sampling since it allowed us to choose the respondent that is relevant for us. For example, the number of policy makers who have expertise or mandate in a particular field in each country is limited, and some of them may not be willing or available to interview.

Therefore, we interviewed those policy makers who were approachable and were either directly involved in the Programme implementation or were involved with the other policy making aspects of the Programme (such as curricula development and teacher training). School leaders that we performed the IDIs with were sampled from our School Leader Sample that we used for our quantitative research (survey) in a procedure explained above. Trainers interviewed were also chosen using convenience sampling. We sampled them from those trainers that are involved in Programme implementation in the schools from our Main School Sample.

Choosing the school leaders and trainers who are working in schools from MSS allows us to connect the information gathered from qualitative techniques to the information gathered from the quantitative research (survey). Qualitative research illuminates better the results of the quantitative research by providing the in-depth understanding of the issues, while quantitative research may provide validity to conclusions from the quantitative research. Both implemented together on the same sample increase validity of our evaluation.

Table 3: IDIs performed across the countries and target groups.

	Policymakers	School leaders	Trainers
Albania	3	15	3
Bosnia and Herzegovina	3	12	4
Kosovo	3	4	3
Montenegro	4	9	2
North Macedonia	2	10	7
Serbia	3	3	3
Western Balkans	**18**	**53**	**22**

In Albania, IDIs were conducted with 15 school leaders, three trainers, 2 policymakers and 1 NGOs representative, who also acted as senior advisor of the Prime Minister in the previous government.

In Bosnia and Herzegovina, IDIs were conducted with 12 school leaders, 3 policymakers and 4 trainers. One school leader IDI was not done because no teacher in that school wanted to participate in the BC training. The school leader took the BC training and wanted to introduce the Programme but came across resistance and

unwillingness to participate by the teachers. The school leader at first agreed to an interview to explain the obstacles, but then changed his mind and the conversation could not be carried out.

In Kosovo IDIs were carried out with 4 school leaders, three trainers, 3 policymakers and a representative of an NGO working with pupils with Down syndrome.

In Montenegro 15 IDIs were carried out (9 with school leaders, 2 with trainers and 4 with policymakers), with some of them carried out online due to the Covid19 pandemic.

The team from North Macedonia carried out IDIs with 2 policymakers, 10 school leaders and 7 trainers. They finished all the fieldwork with the main school sample before the pandemic crisis started. They completed the questionnaires with pupils and teachers and the questionnaires and IDs with all school leaders. The team also had online in-depth interviews with two policymakers. They also finished all the fieldwork with schools from the control group, but due to the pandemic, they were unable to visit one school from the control group, since all schools were closed.

In Serbia, the IDI fieldwork covered 3 school leaders, 2 from a rural and 1 from an urban school. In addition, 2 IDIs with the trainers who were in charge of training of the schools from the 2nd cycle MSS and 3 IDIs with policymakers were also administered. In Serbia it was difficult to arrange a meeting with the Ministry of Education; instead, the IDIs were held with institutes in charge of curriculum development and planning and quality of education, that work under the Ministry of Education. A particular problem was faced with a school in Novi Pazar, where one of the trained teachers ceased to be employed by the school (during the project), and the other teacher stopped responding to the emails sent by the team (the telephone number was unavailable).

2.2 Scoring approach

The extent to which the individual assumptions are valid have been assessed by the country experts on the basis of their findings during their field research. These have been given a summary score depending upon the extent to which the assumptions have been fully met (A), mostly met (B), partly met (C), or not met at all (D). The scoring methodology involves a review of the evidence derived from fieldwork and reported in each country report by the local experts. These scores are applied to the findings from the qualitative research, mostly concerning the assumptions underlying the Theory of Change as specified in the Evaluation Plan. A score of “fully met” would require that in all respects the assumption is met, a score of “mostly met” would require that the assumption is met in large part but not fully, a score of “partly met” requires that the assumption is met only in some respects, while a score of “not met at all is self-explanatory. Averages are calculated for the Western Balkans as a whole in the last row in each Table. For the qualitative indicators, where there is an equal distribution of scores, for example three “B” and three “C” we round up to a “B” overall. It should be noted that comparisons across countries should be treated with a great deal of caution, due to the subjective nature of the expert evaluation. To the extent possible, the scores have been validated and corrected for comparability where necessary by the core research team at LSE. For the Outcome variables, numerical scores are available from the field survey in the schools. The construction of these numerical indicators is explained in detail in the notes underneath the relevant Tables.

2.3 The concept of “readiness”

The data concerning the (self-reported) skills-knowledge and confidence of teachers to deliver CTPS teaching and teaching of coding were collected using a five-point Likert scale (with possible answers ranging from “strongly agree” to “strongly disagree”). While we use this information directly in our analysis and discussion (see, for example, Table 16), we decided additionally to develop an index that expresses the underlying data in percentage form. This allows more readily comparisons of the relevant information across countries, thus

providing analysis in a way that can be easily communicated to non-specialist audiences (including to policy officials).

We refer to this index as a measure of "Readiness to deliver specific teaching" (henceforth, "readiness"). The index is constructed using the linear scale transformation method, as follows. First, we derived the average score (across all teachers) per country. Subsequently, we expressed the country-specific average scores as deviations from the maximum theoretical value (100% of confidence or, in our scale, an average score of 5 – "strongly agree"). The resulting scores give the "absolute distance" that teachers in a country would have to cover in order to reach the maximum capacity, or readiness, to deliver CTPS teaching and/or teaching of coding skills. To ease presentation, in a last stage we divided these "absolute distance" values by the theoretical maximum range of values (from 1 – "strongly disagree" to 5 – "strongly agree"). This transforms the absolute distance measures into relative ones, by expressing everything in percentage terms in relation to the absolute maximum (of readiness). Thus, a value of – for example – 60% in country A for the indicators of "readiness" in CTPS, can be read as showing that teachers in this country are 60% "ready" to teach CTPS skills compared to an ideal situation of absolute readiness.

3. Quality of primary education at baseline

Primary education in the Western Balkans performs relatively poorly in international tests of student attainment. One indicator of relative performance is the PISA international test of 15-year-olds in Reading, Mathematics and Science organised by the OECD in 37 OECD countries and reported in 2018 also for 42 partner countries. The latest round of the international test was carried out in 2018, and thus makes a good baseline of educational quality in the Western Balkans for this study. The results show that the WB6 are generally lagging behind significantly on all counts. As is shown in Table 4, the WB6 score on all three tests below any other comparator group. In reading, the region's average score (402) is at 83% of the OECD average (88% of the SEE average). The 85 points of distance to the OECD average is very large, as it represents 40% of the total range of scores across the 79 countries covered by the PISA study. For mathematics and science, the distance is smaller both proportionately (28% and 32%, respectively) and in absolute terms (76 and 81 points below the OECD average; and 46 and 49 below the SEE average), but the differences remain substantial. Indeed, the WB6 average score places the region above only 13 (out of 79) countries in the reading and science test, and above only 15 countries in the mathematics test.

Table 4: PISA 2018 test scores, aggregate by region

	Reading	Maths	Science
OECD	487	489	489
SEE	455	460	457
WB6	402	414	408
Other	428	435	437

Notes: SEE includes Bulgaria, Romania, Croatia and Slovenia. WB6 is Western Balkans. All scores are unweighted averages.

Looking specifically into each of the Western Balkan countries (Table 5), Serbia appears as the best performer in all three tests (reading and mathematics), while Kosovo appears as the worst performer in all counts (with North Macedonia and Bosnia following suit). Serbia's score in the reading test ranks her 47th out of 79 countries (standing above only two OECD countries – Colombia and Mexico), while Kosovo's performance, at some 134 points below the OECD average, ranks it 77th out of 79 countries. Similar are the ranks for the mathematics and science tests (48th and 76th for Serbia and Kosovo, respectively, in both tests).

Table 5: PISA 2018 test scores, Western Balkans

	Reading	Maths	Science
Albania	405	437	417
Bosnia and Herzegovina	403	406	398
Kosovo	353	366	365
Montenegro	421	430	415
North Macedonia	393	394	413
Serbia	439	448	440
Western Balkans	**402**	**414**	**421**
OECD	**487**	**489**	**413**
United Kingdom	**504**	**502**	**505**

Source: PISA 2018 online database

The causes of the relatively weak performance in the Reading and Mathematics tests can be located in several factors. PISA 2018 provides information from a survey of school leaders which identifies the percentage of students in schools whose principal reported that the school's capacity to provide instruction is hindered at least to some extent by various factors. One major cause is the lack of educational materials (see Table 6).[7] As is amply documented below, relatively low levels of public expenditure on education in all the Western Balkan countries has led to enormous gaps in the provision of educational materials, in particular computer equipment and textbooks. In Kosovo, as many as 86% of pupils are taught in schools where the lack of educational materials poses a severe hindrance to learning. Important differences exist also within countries in this regard, depending on the school's socio-economic profile. For example, in Albania 94.1% of schools belonging to the bottom quartile of the distribution of school socio-economic profiles report lack of educational materials as a hindrance to their capacity to provide instruction, while the percentage for schools belonging to the top quartile was only 40.7%. Such socio-economic differences – and overall reported scores – were low and broadly comparable to the OECD average only in Montenegro (a reported percentage of 36.1%). A further cause is the poor quality of infrastructure in the form of school buildings (see Table 6).[8] These problems are far more severe in the Western Balkan countries than they are in the OECD. In contrast issues around lack of teaching staff and their quality are much less of a problem in the Western Balkans compared to the OECD, at least in the eyes of school leaders.

Table 6: Percentage of students in schools whose principal reported that the school's capacity to provide instruction is hindered at least to some extent by various factors

	North Macedonia	Albania	Bosnia	Kosovo	Montenegro	Serbia	OECD
Lack of teaching staff	3.6	3.9	4.7	20.6	1.5	2.3	27.0
Inadequate or poorly qualified assisting staff	7.8	11.0	3.7	16.6	3.0	2.4	16.4
Inadequate or poorly qualified staff	1.9	4.4	4.2	9.4	2.5	3.4	15.1
Teachers not being well prepared	13.9	11.6	27.9	15.1	7.4	17.2	12.7
Lack of assisting staff	31.1	13.8	12.7	27.0	7.3	21.0	32.6
Inadequate or poor physical infrastructure	34.2	38.9	51.6	47.4	40.6	46.7	32.3
Lack of physical infrastructure	36.5	40.3	45.6	47.4	39.5	46.9	32.8
Lack of educational materials	65.3	49.6	65.4	86.4	36.1	48.8	28.4
Inadequate or poor educational materials	48.2	38.1	63.5	83.4	31.0	49.4	25.2

Source: PISA 2018 online database

The data set out in the Table 7 show the strong negative relationship between the lack, or poor quality, of educational materials and the PISA 2018 scores in Reading and Mathematics. The relationship does not hold for Science where the Western Balkan countries perform relatively well, despite deficits in equipment. Lack of infrastructure and its quality have a negative relationship with the test scores, especially in Mathematics and Science, but the effect is not particularly strong.

[7] Educational material is defined by PISA 2018 as "textbooks, laboratory equipment, instructional material and computers".
[8] Infrastructure is defined by PISA 2018 as "school buildings, heating and cooling systems, and instructional space".

Table 7: Correlation coefficients for PISA scores and education system infrastructure and materials, 2018

	Reading	Maths	Science
Lack of educational materials	-0.874	-0.898	-0.067
Inadequate or poor educational materials	-0.742	-0.784	-0.143
Lack of physical infrastructure	-0.128	-0.127	0.014
Inadequate or poor physical infrastructure	-0.053	-0.112	-0.117

Source: Authors' calculations, derived from PISA 2018 online database

Although the deficits in relation to teaching staff and their quality are not large in relation to the OECD average and to the hindrance caused by lack of teaching materials, they nevertheless bear a strong association with the PISA test scores in Reading and Mathematics (see Table 8). Lack of teaching staff and the poor qualifications of staff appear to have just as strong a negative relation to test scores in Reading and Mathematics as do lack of teaching materials and their poor quality.

Table 8: Correlation coefficients for PISA scores and teaching staff quality, 2018

	Reading	Maths	Science
Lack of teaching staff	-0.884	-0.805	-0.185
Inadequate or poorly qualified staff	-0.760	-0.616	-0.021
Lack of assisting staff	-0.505	-0.581	0.057
Inadequate or poorly qualified assisting staff	-0.883	-0.674	0.169
Teachers not being well prepared	-0.056	-0.197	0.131

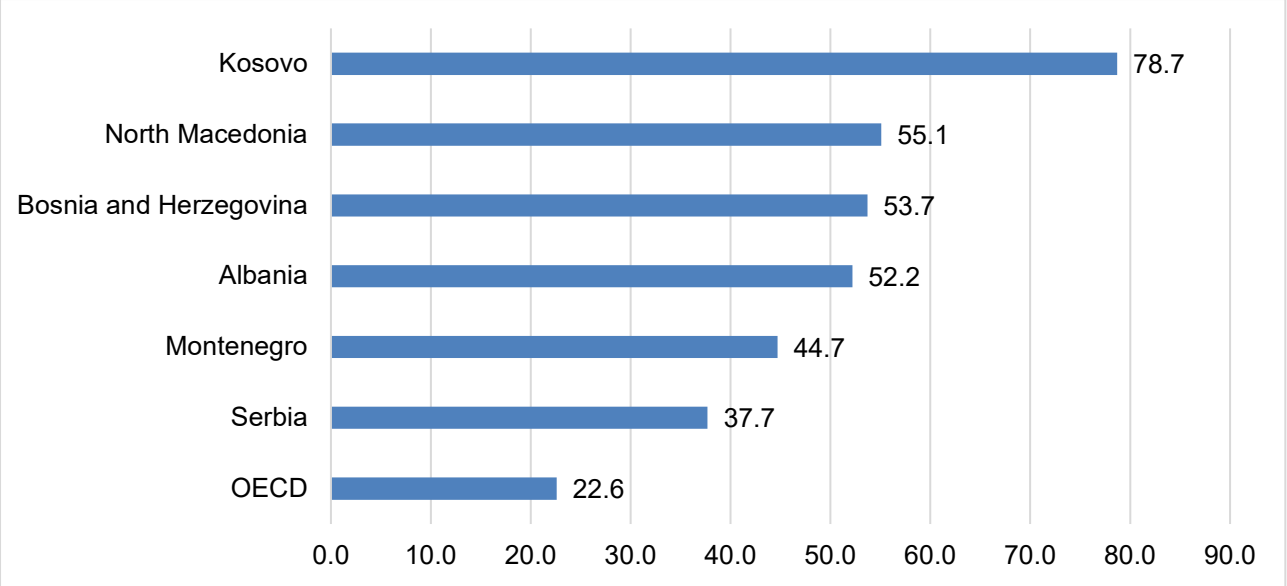
Source: Authors' calculations, derived from PISA 2018 online database

In contrast, staff-student ratios do not seem to be a factor explaining pupil performance in the WB6, at least as captured in the PISA 2018 results. Student-per-teacher ratios in the region range from 8.5 in North Macedonia (PISA 2018, Table II.B1.5.2) to 13.8 in Kosovo, with all countries except for Kosovo standing below the OECD average (12.1). Similar is the situation with regard to class sizes, with the WB6 average standing at 26.7, just half-a-student above the OECD average (26.2) (PISA 2018, Table II.B1.5.1). Some of the WB6 countries, however, perform much worse when it comes to the share of teachers who are fully certified (PISA 2018, Table II.B1.5.3), with the values for Albania, Serbia, Kosovo and – especially – North Macedonia standing below or well-below the OECD average. The same is true for the percentage of teachers with at least a master's degree, where the percentage vary from an exceptionally high 64.9% in Albania to a mere 6.9% in North Macedonia – compared to an OECD average of 44.0% (PISA 2018, Table II.B1.5.4). Interestingly, none of these teacher characteristics correlates to any noticeable degree with the pupil performance scores in Reading, Mathematics and Science – perhaps with the exception of the staff-student ratios, which have correlation scores of over 0.5 with the Reading and Science scores (however, not statistically significant). In contrast, there is a very high correlation between the reported pupils' test scores in all three subjects and the percentage of teachers who had attended a programme of professional development during the three months prior to the PISA survey (0.72 for Reading and Science and 0.92 for Mathematics).[9] This strong correlation can be taken to reflect a positive association between how much a national educational system is geared towards professional development of teachers and how well pupils perform within each system, which is perhaps particularly present in the region, as the corresponding correlation coefficient derived from the sample of OECD countries is much lower.

Besides these aspects that concern *average* performance and underlying characteristics, another striking feature of the PISA 2018 test scores is the way it reveals the wide inequalities in educational performance. Figure 1 shows the proportion of low achievers in Reading in the Western Balkan countries, defined as those who score below level 2 on the PISA test. This threshold defines pupils who are unable to identify the main idea, or reflect on the overall purpose, in a text of moderate length. The test results show that large proportions of pupils are unable to read this standard of literacy, including over one half of all pupils in Albania, Bosnia and Herzegovina, and North Macedonia and over three quarters of pupils in Kosovo.

[9] The incidence of this varies from a very low 14.1% in Kosovo (the lowest in the dataset across all 79 reporting countries) to a very high 66.0% in Albania, the only country in the region which reports a score higher than the OECD average (53.0% -PISA 2018 Table II.B1.5.6). In contrast, we obtain a very low – effectively zero – correlation between the share of teachers who had received previous training on CTPS in our own survey and the reported PISA 2018 scores across the three subjects.

Figure 1: Percentage of low performers in Reading (below level 2)



Source: PISA 2018 online database

The proportion of low performing pupils is strongly influenced by the socio-economic status of their families. As can be seen from Table 9, relatively large proportions of low-performing pupils in Reading come from families in the lower quarter of socio-economic status. For example, almost 71% of pupils who score below 2 on the PISA test come from such families, compared to only 35% of pupils from families in the top 25% by socio-economic status. The percentage point gap between status groups is especially high in Albania, Bosnia and Herzegovina, and North Macedonia.

Table 9: Percentage of low-performing pupils in Reading in the bottom and top quartiles of socio-economic status (%)

	Pupils in the bottom quarter of ESCS*	Pupils in the top quarter of ESCS*	pp gap
Kosovo	86.3	65.7	-20.6
North Macedonia	70.5	34.5	-36.0
Bosnia and Herzegovina	69.2	38.3	-30.9
Albania	67.6	36.3	-31.3
Montenegro	56.7	31.0	-25.7
Serbia	51.4	21.9	-29.5
OECD	35.6	10.7	-24.9

Source: PISA 2018 online database.
** PISA index of Economic, Social and Cultural Status.*

In conclusion, the following observations can be made. Pupil performance in the Western Balkan region is relatively poor, compared to international standards, with some cases (Kosovo) of exceptionally poor results even when factoring-in the level of economic development. To some degree (but not fully), this may relate to problems of physical and other infrastructure relating to the provision of education in these countries, as the proportion of school leaders who tend to identify aspects such as lack of materials for instruction (and other issues) is above average (compared to the OECD). Lack of qualified staff or, more broadly, wider issues about teacher quality do not seem to play a particular role. Whereas in some countries the proportions of qualified (certified) and well-qualified (holding a master's degree) staff is below, or well-below, the OECD average, such

metrics do not seem to correlate with pupil performance. Instead, aspects of staffing and staff development/deployment do seem to play a role – with class sizes and the shares of teachers who receive professional development training correlating significantly with pupil performance metrics. Perhaps more importantly, pupil performance appears to correlate significantly with family and area characteristics – at least as captured by metrics of socio-economic position: according to the PISA 2018 results, pupil performance is much weaker in schools located at the bottom of the socio-economic distribution of geographical areas and for pupils coming from families who are in the bottom of the socio-economic distribution of households.

4. Policymakers support for CTPS and coding

In this section we outline the assumptions that underpin the Programme theory of change in relation to the policymakers support for the use of CTPS teaching methods and the development of pupils' coding skills in schools and reflect upon the extent to which the assumptions were met at the baseline. We also review the issues around the expected Outcome 3 at the baseline, **namely the extent to which relevant decision makers have created a curriculum and related policy measures to advance the CTPS and coding skills learning in primary schools**. We also review the relevant associated indicators. We report on our findings concerning the state of play in the primary education system regarding these expected outcome issues at the baseline. First, we deal with the assumptions, before moving on to address the expected outcome issues.

4.1 Assumptions

The assumptions which underlie the ability of the Programme to achieve these outcomes are that Ministries of Education have an 'appetite' for the CTPS and coding skills and the existing system has the capacity to absorb the Programme approach and tools.

Table 10: Assumptions from Theory of Change relevant to short-term outcome 3: "Relevant decision makers create and implement curriculum and introduce other related policy measures to advance CTPS and coding skills".

	Ministries of Education support the British Council Programme	The school system has the capacity to absorb the Programme
Albania	B	C
Bosnia and Herzegovina	B	C
Kosovo	B	C
Montenegro	A	B
North Macedonia	A	C
Serbia	A	C
Western Balkans	**A**	**C**

Note: A = assumption fully met; B = assumption mostly met; C=assumption partly met; D= assumption not met at all. Note: the above scores combine separate scores from the baseline country reports that deal with CTPS and coding separately.

Table 10 shows that in the Western Balkans as a whole, the ministries of education are mostly fully supportive of the British Council 21st Century Schools Programme. The capacity of the countries' school systems to implement the Programme is, however, less assured with this assumption being only "partly" met in three of the countries. The rest of this section we summarise the findings of the fieldwork in each country concerning these issues. Further details can be found in the individual country reports.

4.1.1 Ministries of Education support for the British Council Programme

In Albania, all interviewed stakeholders considered that the Programme conforms completely with the priorities of the education system and policies of the country. The British Council training has been accredited by the national commission on accreditation for professional training programmes for teachers and school leaders. Currently the Agency for Quality Assurance of Pre-University Education is revising the curriculum for ICT and it is establishing a working group to introduce coding skills for grades 6th-9th.

In Bosnia and Herzegovina there is a complex situation since there are 14 ministries of education in the various entities and cantons. The representative of the ministry in one canton explained that the ministry believes that the project is beneficial for the education system as it increases critical thinking among primary pupils. However, the state-level Ministry of Civil Affairs did not have enough information on the project to be able to participate at the interview.

In Kosovo, the Ministry of Education, Science and Technology has supported the project and the opportunity to introduce coding skills in other grades than the actual 8th and 9th. The Ministry is also willing to further support the implementation of coding skills through training and funding provisions for schools, which suggest the existence of a supporting environment for delivering CTPS and coding skills in primary schools.

In Montenegro the Ministry of Education fully supports the Programme and it has been working in cooperation with the BC to improve curricula for coding skills. In addition, the Ministry has adopted a Framework for Digital Competences and it has also planned to include more coding in the classroom by improving the existing curricula “Informatics with technics”.

In North Macedonia, the Ministry of Education and Science fully supports the Programme. It has appointed dedicated persons to work with the British Council, providing access to all primary schools to Programme staff and national trainers. The Ministry has introduced appropriate policy changes (curriculum reform, training program accreditation, and teacher continuing professional development policy).

In Serbia, the Programme has the full support of the Ministry of Education, Science and Technology Development (MESTD). It is fully in line with the current education policy of MESTD and with their future policy directions. It will also be aligned with the Education Strategy that is currently being developed.

4.1.2 Capacity of the school systems to absorb the Programme

In Albania, the education system has a limited capacity to absorb the Programme. Among the factors, there is a lack of appropriate administrative staff which in turn overburns school leaders and teachers, a different degree of motivation among teachers, and structural issues, such as lack of IT infrastructure, IT equipment and access. In addition, there are also different capacities to absorb the programme depending on the school’s location, whether it is an urban or rural area.

In Bosnia and Herzegovina, the system has limited capacity to absorb the Programme. Continuous support for the development of the teachers’ network is needed to ensure sustainability of the project activities. Teachers resist change and need time to change their way of thinking and approach to teaching.

In the same vein, the school system of Kosovo also suffers from the lack of ICT equipment and overall school infrastructure. Teachers’ training is another challenge; for instance, most teachers teaching Technology courses do not possess a formal teaching qualification. CTPS is a cross-curricula component, hence there are no legal barriers to implement it in teaching. In these respects, the capacity of the school system to absorb the Programme is also dependent upon teachers’ training and commitment.

In Montenegro the capacity of the school system to absorb the Programme is relatively high, especially with reference to CTPS, while the implementation of coding skills is more challenging due to inadequate IT infrastructure. In addition, another challenge might be represented by the lack of motivation and inadequate teachers’ salaries.

In North Macedonia, the education system only has partial capacity to absorb the Programme. Significant measures have been taken in the past few years to improve the IT skills of both students and teachers. Computer equipment was purchased in all schools in 2007, however this is now obsolete and needs to be replaced. The curricula have been upgraded and special focus is placed on building critical thinking capacities.

However, substantial further investment is needed both in infrastructure and in the continuing training of teachers and school leaders.

In Serbia, the education system has a low capacity to absorb the Programme. A major limitation to absorbing the Programme is the excessively demanding teaching programme, which has too many subjects and teaching units, so that the teachers have little time to introduce new teaching methods. Some school leaders and teachers also have a limited willingness and capacity to change. In addition, pupils lack knowledge about coding, even among those who have been taught coding in accordance with the new curriculum. This is because of the insufficient time devoted to coding within the "Informatics" subject as well as the low level of IT teachers' skills. Both of these factors may limit the school system's capacity to absorb the BC Programme.

4.2 Baseline Indicators for Outcome 3

The expected Outcome 3 is that **relevant decision makers create & implement curriculum and introduce other related policy measures to advance the CTPS and coding skills learning in primary schools**. It is expected that by the end of the Programme at least 70% of primary schools in the WB region have compulsory or elective coding classes and that at least six trainings have been accredited by relevant state authorities by the end of the project. In this section we discuss the status of these indicators at the baseline of the Programme. Table 11 summarises our findings.

Table 11: Baseline for short term outcome 3: "Relevant decision makers create & implement curriculum and introduce other related policy measures to advance CTPS and coding skills learning in primary schools".

	To what extent does the current curriculum and other facets of educational policy (at the baseline) support CTPS skills?	To what extent does the current curriculum and other facets of educational policy (at the baseline) support coding skills?	Percentage of school leaders who report their school delivers programming/coding classes at least once a week
AL	B	C	30.0%
BiH	C	C	43.8%
XK	B	C	0.0%
ME	B	A	80.8%
MK	B	B	62.5%
RS	A	A	N/A[10]
WB	**B**	**B**	**43.4%**

Note: A = fully; B = mostly; C = partly; D = not at all. Source for column 3: Appendix Tables TL14 in Appendix.

Table 11 shows that the current curricula and other facets of education policy only partly support the introduction of lessons in coding/programming in the Western Balkans. Two of the countries appear likely to have particular problems in implementing coding/programming lessons. There is great variation in the proportion of pupils who receive ICT lessons at least once a week. Pupils in Albania and Kosovo do not have regular lessons in this subject, while most pupils in Bosnia and Herzegovina and Montenegro do. The rest of this section we summarise the findings of the fieldwork in each country concerning these issues. Further details can be found in the individual country reports.

In Albania, the Agency for Quality Assurance of Pre-University Education is revising the curricula of ICT subjects that are implemented in the 6-9 grades to see how much space will have programming and coding.

[10] *The Ministry of Education in Serbia did not allow the team to gather data on this indicator.*

The government has focused educational policy more on the repair and construction of schools and less on investment in teachers' skills in the area of coding (where teachers lack skills in comparison with CTPS). In this respect the Programme is a timely intervention.

In Bosnia and Herzegovina, the level of support by the curriculum and education policy varies across entities and cantons. The institutions that regulate education, the pedagogical institutes, include people who have little understanding of the need to incorporate coding skills. Ministries of Education and Pedagogical Institutes lack a vision for the development and improvement of the system, which has a negative effect on the motivation and performance of the teachers. Each level of governance develops its own curriculum based on the Common Core Curriculum which aims to increase digital skills and competences including coding and programming in primary education. The absence of reliable monitoring and assessment mechanisms at any level of government hinders constructive policy development.

In Kosovo, there is a supportive environment for delivering coding skills in schools. Education policies support the delivery of coding skills in schools. Based on IDIs with representatives of the MEST, the curricula and education legislation and policies allow for flexibility in implementation of curricula, hence there is a supportive environment for delivering coding skills in schools. However, in practice coding is not taught in primary schools.

In Montenegro, the mandatory subject "Informatics with technics" is updated in order to include more coding and to improve the implementation of the Programme. In coding, there are optional subjects as well as a possibility to form new courses.

In North Macedonia, the Ministry of Education and Science supports the implementation of curriculum reforms in coding/ programming at classroom level. A new curriculum for basic programming was introduced in all schools in the academic year 2015/2016. Pupils in III, IV and V grades take a subject on "Working with computers and basics of programming", and in the VI and VII grades take "Informatics".

In Serbia, the new curriculum that has been implemented since 2018/19 is in line with the Programme with regard to coding skills. Coding is being phased in as a mandatory subject for all grades V-VIII within the new subject "Informatics". Coding is now mandatory for pupils of grades V and VI and by the school year 2021/22 it will be mandatory for all grades V-VIII.

5. School leaders' support for CTPS and coding skills across the curricula

In this section we outline the assumptions that underpin the Programme theory of change in relation to the school leaders support for the use of CTPS teaching methods and the development of pupils' coding skills in schools and reflect upon the extent to which the assumptions were met at the baseline. We also review the issues around the expected outcome 2 at the baseline, namely the extent to which school leaders actually do support the use of CTPS teaching methods and the development of pupils' coding skills in schools. We also review the relevant associated indicators. We report on our findings concerning the state of play in the primary education system regarding these expected outcome issues at the baseline. First, we deal with the assumptions, before moving on to address the expected outcome issues.

5.1 Assumptions

The assumptions which underlie the ability of the Programme to achieve these outcomes are that school leaders support the delivery of CTPS and coding teaching in their schools, are available to participate in capacity building activities, and they are available and willing to engage with the Programme.

Table 12: Baseline Assumptions from Theory of Change relevant to short-term outcome 2: "School leaders actively support the implementation of CTPS and coding skills at school level across the curricula".

	School leaders support the delivery of CTPS teaching in their schools	School leaders support the delivery of coding teaching in their schools	School leaders are available to participate in capacity building activities (training)	School leaders are available and willing to engage with the Programme
AL	B	C	B	B
BiH	B	B	A	A
XK	A	A	A	A
ME	A	A	B	B
MK	B	B	B	B
RS	B	B	B	B
WB	**B**	**B**	**B**	**B**

Note: A = assumption fully met; B = assumption mostly met; C = assumption partly met; D = assumption not met at all

Table 12 shows that in the Western Balkans as a whole, the assumptions that school leaders support the delivery of CTPS and coding teaching in their schools is mostly met. In two countries (Kosovo and Montenegro) the assumption is fully met. Moreover, the assumptions that school leaders are available to participate in capacity building activities and available and willing to engage with the Programme are also mostly met. These two assumptions are fully met in Bosnia and Herzegovina and Kosovo. In the rest of this section we summarise the findings of the fieldwork in each country concerning these issues. Further details can be found in the individual country reports.

5.1.1 School leaders' support for CTPS teaching methods and coding teaching

In Albania, all school leaders have stated their support for the delivery of CTPS and coding skills in their schools, even though the integration of CTPS into teaching methods is considered less problematic in comparison to coding skills.

In Bosnia and Herzegovina, most school leaders support the delivery of CTPS in their schools despite having relatively little experience of it. They recognise that the size of the curriculum inhibits the use of CTPS teaching methods as it does not allow much creativity in class. The enthusiasm of school leaders for supporting CTPS is variable and depends on the individual. Some school leaders intend to leave responsibility for implementation of the CTPS entirely to teachers. Few school leaders seem ready to support their teachers to implement coding/programming in the classroom. This is partly due to the inadequate IT equipment in many schools but also due to the lack of support from textbooks and the curriculum.

In Kosovo, school leaders have been engaged with the programme as they consider it a crucial way to equip pupils with the skills needed for the labour market. However, some challenges emerged regarding the support for the delivery of coding skills, with the lack of knowledge of English language considered an important barrier for a successful implementation.

In Montenegro, school leaders support the integration of CTPS and coding skills in their schools and actively participate in implementation activities by providing teaching materials and resources, by observing classes and by conducting internal evaluations. They are ready to invest their resources and energy in the implementation of both CTPS and coding skills while simultaneously encouraging the recruitment of young teachers and trainees.

In North Macedonia, school leaders in the sample schools support the delivery of CTPS and coding teaching in their schools. However, they believe that the dissemination of the relevant skills will take time and some teachers may be slow to accept the changes in teaching methods, while others might even refuse to do so. School leaders are also concerned about a lack of equipment and about its maintenance.

In Serbia, some school leaders are highly motivated and support the delivery of CTPS teaching methods and coding in their schools. They identify the needs of their pupils as being in line with the Programme and are willing and able to motivate their teachers to implement it. However, an equal number of school leaders are far less motivated, and some do not really understand the concept of CTPS and are not supportive of implementation. Regarding support for coding the level of support depends upon the resources available and the skills of teaching staff to deliver effective IT teaching.

5.1.2 School leaders' availability to participate in capacity building activities (training)

In Albania, almost all school leaders have been available to participate in the capacity building activities, including mentoring of their deputy school leader; in this sense, the Programme is considered a good opportunity to improve not only their knowledge in CTPS and coding skills but to improve overall teachers' competences in these subjects.

in Bosnia and Herzegovina, school leaders were enthusiastically involved in the training

In Kosovo, school leaders are also committed to participate in capacity building activities by also committing to finding more resources to improve schools' infrastructure and equipment.

In Montenegro, school leaders mention the lack of equipment, funding and infrastructure as the key challenges to foster capacity building.

In North Macedonia, about two thirds of the invited school leaders participated in the British Council training courses. Those who were not able to participate sent a colleague instead.

In Serbia, while four out of the thirteen school leaders in the sampled schools did not participate in the British Council training, nine did so. Thus, the assumption that school leaders are available to participate in capacity building activities is mostly met.

5.1.3 School leaders' availability and willingness to engage with the Programme

In Albania, all school leaders have the enthusiasm and motivation to engage with the Programme as it is an innovative way to increase the quality of teaching and involve pupils in class discussions. They are also planning to be more involved in the Programme through monitoring activities in the classroom. This suggests that school leaders can play an important leadership role in further motivating teachers to engage in the Programme.

In Bosnia and Herzegovina, some school leaders were extremely enthusiastic and are keen to engage with the Programme. They see themselves in a coordination and support role and do not plan to engage directly with the Programme. They prefer to shift responsibility for the Programme initiatives to the teachers. In only two of seven schools visited by one trainer were school leaders ready to actively support their teachers in coding and programming. School leaders do not have permanent appointments, and those whose second mandate is nearing its end are less likely to engage with the Programme.

In Kosovo, most school leaders are available and willing to engage with the Programme and they are also committed to find more resources in order to acquire IT equipment to support the teaching of coding skills. Indeed, whereas the engagement in CTPS seems to be more straightforward, more criticalities emerge with coding skills, due to the lack of infrastructure and to the need of providing further training to non-trained teachers.

In Montenegro, school leaders have shown enthusiasm and motivation to participate in Programme activities themselves. Perhaps surprisingly, schools with fewer pupils, and rural schools, show greater interest and willingness to implement the Programme. However, many of the school leaders interviewed pointed out to the need to address technical obstacles which might prevent a full engagement in the Programme, such as IT infrastructure and schools' capacity to embrace new technologies.

In North Macedonia, most school leaders say they will collaborate with the Programme and be actively involved in its implementation. They plan to support and promote the new methods of CTPS and coding. To integrate coding in their schools, some school leaders will visit the classrooms themselves to ensure correct implementation of the Programme. However, other school leaders are not so interested in implementing the Programme even though they have attended training; they intend to leave it up to individual teachers to carry it out. Some of these disinterested school leaders are eligible for re-election and are not interested in the Programme activities because they believe they will not be re-elected.

In Serbia, while some school leaders are willing to engage with the Programme and are highly motivated, supportive and enthusiastic, others plan to play a more passive role and delegate the implementation of the Programme to individual teachers. Some school leaders are not at all motivated, and some did not even show up for the training. However, there is no indication that any of them are standing in the way of their teachers' implementing CTPS teaching methods or in their teaching of coding in their schools. The trainers will mentor the Programme activities in the schools, which may encourage the more passive leaders to become more engaged.

5.2 Baseline Indicators for Outcome 2

The expected Outcome 2 is that "School leaders actively support the implementation of CTPS teaching methods and coding skills at school level across the curricula". It is expected that by the end of the Programme that at least 50% of school leaders will ensure that CTPS teaching is regularly practiced by at least two non-trained teachers and that at least 70% of coding clubs established during the first and the second project year, still exist by the end of the project. In this section we discuss the status of these indicators at the baseline of the Programme. Table 13 summarises our findings.

Table 13: Baseline for Short Term Outcome 2: "School leaders actively support the implementation of CTPS and coding skills at school level across the curricula".

	Prior to programme intervention, did school leaders support CTPS across the curriculum?	Prior to programme intervention, did school leaders support coding/programming across the curriculum?
AL	B	D
BiH	C	D
XK	A	D
ME	B	C
MK	C	C
RS	C	C
WB	**B**	**C**

Note: A = fully; B = mostly; C = partly; D = not at all

Table 13 shows that prior to programme intervention, school leaders mostly supported CTPS across the curriculum, but that they only partly supported coding/programming across the curriculum. In three countries school leaders only partly supported CTPS across the curriculum (Bosnia and Herzegovina, North Macedonia, and Serbia). In three other countries school leaders did not support coding/programming across the curriculum (Albania, Bosnia and Herzegovina, and Kosovo).

In Albania, there was little prior practice of CTPS or coding in the schools, even though the basic skills of CTPS and digital competences were included in the reformed curricula of the pre-university education system, and further changes in the ICT programme for the 9th grade were implemented in 2017. Even though school infrastructure has largely improved over the years, most of the rural schools do not have internet access and the majority of the schools have outdated computers which cannot be used for coding/programming teaching. Indeed, 73% of school leaders reported that schools do not have adequate IT infrastructure for teaching coding/programming.

In Bosnia and Herzegovina, there was little evidence of any prior support for CTPS and coding/programming by school leaders. Not much was thought or done about the introduction of critical thinking through methods such as CTPS, and even less thought was given to introduce topics such as coding/programming, due to the lack of equipment to support such lessons and to the distraction of IT teachers to other responsibilities within the school. As the PISA 2018 tests revealed, inadequate or poor physical infrastructure was reported by more than half (51.6%) of school leaders as a factor that hinders their school's capacity to provide instruction, at least to some extent, while two thirds (65.4%) reported that a lack of educational materials had the same effect.

In Kosovo, although coding has been part of the curriculum for grades 8 and 9 it has not often been taught in practice, and consequently, at least in Pristina, some pupils take private courses in coding. School leaders have the idea that all they need to do is to provide the teachers with computer equipment; they have little awareness of the role of coding as a taught subject. As the PISA 2018 tests revealed, inadequate or poor physical infrastructure was reported by almost half (47.4%) of school leaders as a factor that hinders their school's capacity to provide instruction, at least to some extent.

In Montenegro, school leaders have supported CTPS and coding across the curriculum prior to the Programme intervention. An elective subject called "Basics of Programming" teaches pupils to implement computer programmes in selected programming languages and to use installed applications for software development. While not every school offers this elective subject, it may become more popular after the implementation of the Programme.

In North Macedonia, teachers were involved in a project to promote critical thinking skills among pupils in 2002/03, yet only a few of them practice CTPS in the classroom. School leaders rarely monitor teachers to check whether CTPS is practiced in the classroom. ICT/coding is mandatory in primary schools, but school leaders implement national directives only to a certain extent. The lack of functioning equipment in many schools hinders the teaching of coding skills.

In Serbia, some school leaders have supported their teachers in acquiring CTPS skills prior to the Programme. In those schools the implementation of the British Council Programme is strongly supported. However, an equal number of school leaders are less motivated to support CTPS across the curriculum. Concerning their support for coding across the curriculum, school leaders are frustrated by difficulties in hiring suitably qualified ICT teachers with good coding skills to work full-time in their schools, limiting the teaching of coding in the classroom. Such skills are in high demand and higher salaries for ICT professionals can be earned in the private business sector. As the PISA 2018 tests revealed, inadequate or poor physical infrastructure was reported by almost half (46.7%) of school leaders as a factor that hinders their school's capacity to provide instruction, at least to some extent.

6. Teachers' baseline knowledge and practice of CTPS and coding in the classroom

In this section we outline the assumptions that underpin the Programme theory of change that teachers embed and practice CTPS teaching methods and coding skills in primary schools, and we reflect upon the extent to which the assumptions were met at the baseline. We also review the issues around expected outcome 1 at the baseline, namely whether teachers actually do embed and practice CTPS and coding skills learning in their classrooms prior to Programme intervention. We also review the relevant associated indicators. We report on our findings concerning the state of play in the primary education system regarding these expected outcome issues at the baseline. First, we deal with the assumptions, before moving on to address the expected outcome issues.

6.1 Assumptions

The assumptions which underlie the ability of the Programme to achieve these outcomes are that teachers and pupils have access to adequate IT infrastructure in schools, the teachers are interested and available for training and have the right skills base to benefit from that training, and that time and resources are available to implement CTPS and coding in the classroom.

Table 14: Baseline Assumptions from Theory of Change relevant to short term Outcome 1: "Teachers embed and practice CTPS and coding skills in classrooms".

	Teachers have access to adequate IT infrastructure in schools (computers, internet) at baseline	Teachers are interested and available for training at baseline	Teachers have the right CTPS skills base to benefit from training at baseline	Teachers have the right coding skills base to benefit from training at baseline	Time and resources are available to implement CTPS at baseline	Time and resources are available to implement coding at baseline
AL	C	A	B	D	C	D
BiH	C	A	C	D	B	B
XK	C	B	B	D	B	C
ME	C	B	B	C	B	C
MK	C	B	C	B	C	D
RS	B	B	B	C	B	C
WB	**C**	**A**	**B**	**C**	**B**	**C**

Note: A = assumption fully met; B = assumption mostly met; C = assumption partly met; D = assumption not met at all.

Table 14 shows that the assumption that teachers have access to adequate IT infrastructure in schools is only partly met. As described below and more extensively in the country reports, the lack of up-to-date or even any IT equipment is a serious obstacle that hinders teaching of coding/programming in many parts of the region. The British Council Programme has aroused great interest and the assumption that teachers are interested and available for training is mostly fully met. Teachers also appear to mostly have the right skill sets to benefit from British Council training in CTPS teaching methods. However, the assumption that teachers have the right skills to benefit from the coding training is only partly met. Together with the weaknesses in the provision of IT equipment, this may pose a serious risk to the effectiveness of the British Council Programme. Similarly, while the assumption that time and resources are available to implement CTPS teaching methods is mostly met, the

assumption that time and resources are available to implement coding within the Programme is only partly met.

6.1.1 Access by teachers to adequate IT infrastructure in schools

In Albania, several schools lack computer equipment and internet access especially in rural areas. In almost all the sampled schools there were no functioning laboratories, and the computers were more than ten years old, and most of the teachers and pupils were forced to use their own laptops. Teachers and pupils find alternative methods to ensure internet access if the school does not provide it. For example, teachers in one school demonstrated the use of the internet to their pupils in a coffee bar near the school.

In Bosnia and Herzegovina, teachers mostly have access to IT infrastructure, but there are significant gaps. The IT teachers have access to equipment, but it is not adequate for teaching coding and is not made available to other teachers. Some schools are very well equipped, with a sufficient number of computers and good internet connectivity, while other schools lack sufficient equipment. At those schools that have equipment the computers are often obsolete, and pupils cannot learn to do programming and coding using them. Schools in wealthier parts of the country tend to have more equipment than in those that are located in less wealthy cantons.

In Kosovo, schools are equipped with an insufficient number of computers, laptops and projectors. One of the trainers stated that schools lack basic infrastructure, among which an internet connection is the most pressing challenge. In the sample of schools, one of the four had no computer equipment and only one had a Wi-Fi connection throughout the school, while the rest had internet connection only in the school leader's office. One well-equipped school located a rural area has equipment that was provided with the support of the community and on the initiative of the school leader. This suggests that the commitment of the school leader is of key importance in Kosovo schools. Generally, schools in rural areas have little infrastructure, and there are hardly any prospects to remedy this situation in the near future. As a result, few schools are prepared to implement coding in their teaching. Only one of the schools had internet connection in the entire building. Overall, school leaders were not very sure what IT infrastructure is required to implement coding in teaching.

In Montenegro, the IT infrastructure is not a problem for any of the sampled schools. Teachers have access to appropriate IT infrastructure, which is at a satisfactory level except in some rural areas where there is obsolete equipment. In some rural schools the internet connection is poor, and schools in rural areas sometimes have problems with electric power outages. The number of pupils in the school is also an issue, with schools with 1,000 pupils experiencing more challenges when it comes to computers' availability.

In North Macedonia, schools have access to adequate IT infrastructure although their equipment is often obsolete, which hinders the teaching of coding. A number of schools mainly in rural areas do not have an internet connection. Most computers available in schools are more than 10 years old. About 7% of teachers reported that their schools do not have adequate IT infrastructure for teaching programming, while about a half were unsure. In rural areas the proportion of teachers reporting inadequate IT infrastructure was almost double the average at 12.5%.

In Serbia, most teachers have access to adequate computer equipment and access to fast internet connections, but for some schools there is not enough equipment to provide for the needs of all the pupils. Other schools, mainly in rural areas do not have sufficiently good access to ICT infrastructure. Internet connections are poor in some schools in rural areas, but all have at least some internet connection. According to the results of PISA 2018, almost half of pupils in Serbia are taught in schools where the learning experience is hindered to some extent by a lack of educational materials including computers.

6.1.2 Teachers interest and availability for training

In Albania, teachers are interested in taking part in the training and are mostly available. Several teachers said they would like more training on CTPS in order to improve the quality of their learning. Regarding coding skills,

teachers mentioned the importance of possessing an appropriate background in Informatics or related sub-fields.

In Bosnia and Herzegovina, teachers were mostly interested and available for training. Teachers were clearly satisfied with the training but considered that CTPS training was more comprehensive and meaningful than coding training. For training in coding, they suggest giving it more time and examples in the next period so they could apply it better to their subjects.

In Kosovo, given that most teachers have been trained in CTPS before, they were not that motivated and enthusiastic about the CTPS component of the Programme. They were more enthusiastic about Micro: bit, (which covered only a few hours of the total training) but were not aware that micro:bit is a technique within CTPS teaching methods. According to the policymakers, not all teachers in all schools were available, interested, or willing to be trained within the Programme due to insufficient motivation, problems with infrastructure and problems with finance.

In Montenegro, most teachers are very enthusiastic about the training and have a high motivation and high capacity to implement the programme; they share their enthusiasm with pupils and colleagues. According to the policymakers not all teachers in all schools were available, interested and willing to receive training due to different reasons, including lack of motivation, workload and lack of familiarity with IT tools.

In North Macedonia, nine out of ten invited teachers participated in the training. However, some only took part in a formal sense and are not really interested in improving their teaching methods, while some are not interested in getting involved in the Programme at all. School leaders from the sample schools told us that the older generation of teachers are generally less interested in change. This is in line with the results of the PISA 2018 survey on teachers' behaviours and practices that may hinder students' instruction, which found that more than 15% of students in North Macedonia are taught in schools where the school leader reports that staff resistance to change is hindering pupil's learning (OECD, 2020 : 69[11]).

In Serbia, most of the teachers were available for the training, although a few teachers were not interested in the training and did not attend the sessions. Teachers in Serbia are obliged to undertake additional professional training each year, and the British Council training can be used to fill their quota.

6.1.3 Teachers' skills base to benefit from training

In Albania, most of the teachers do have their skills and confidence to teach CTPS but lack the skills to teach coding. Among the sampled schools, around 65% of teachers had a prior training on CTPS, whereas very few teachers possess IT skills, with some of them being temporarily appointed for the training until the school will be able to hire a qualified IT teacher. School leaders mention that the lack of IT teachers might be a serious obstacle and that in general IT as a subject in primary education should require more investment efforts.

In Bosnia and Herzegovina, some teachers have attended professional seminars related to the subject they teach or have trained in administering class management and lesson plans. Training about CTPS is innovative for most teachers. Among surveyed teachers, only 15.7% had received some previous training in the use of CTPS methodologies. Most have never attended any coding or programming training, and even IT teachers have never gone through such training. School Leaders say that IT teachers mostly lack the required skills and that they do not have good qualifications to teach pupils. It is believed that the best IT teachers and programmers find jobs in the business sector.

In Kosovo, while most teachers possess some prior knowledge of CTPS methodologies, very few possess the necessary skills to teach coding. Many older teachers are less interested or capable of learning and change their teaching style; they face more challenges in learning and applying the new skills gained during training.

[11] *OECD (2020), Education in the Western Balkans: Findings from PISA, PISA, OECD Publishing, Paris.*

Most of the teachers that teach the "Technology with ICT" course do not have an adequate education, and most of them had previously taught a course called "Basics of Technical Arts" which had no IT component. The lack of well-prepared teachers for IT is a major barrier to introducing coding/programming in schools as the Ministry does not plan to replace the existing teachers, but to wait for their retirement. According to school leaders and trainers, teachers do not have the skill base for coding, but they are enthusiastic to learn to use micro:bit. The lack of skills for coding was not seen as an obstacle by one trainer who stated that the aim is to introduce pupils to Micro: bit and they will learn it by themselves.

In Montenegro, while trainers told us that most teachers have sufficient skills to implement the Programme and benefit from the training, they are also aware that older teachers may not have the necessary computer/digital skills and tend to resist the introduction of new technologies and teaching methods. In our interviews, smaller schools had excellent communications and collaboration between teachers. Most school leaders consider that teachers have the knowledge, skills and confidence to teach CTPS, but are not as optimistic when it comes to coding skills. They consider that not all IT teachers have the necessary knowledge, skills and confidence to teach coding skills; older teachers may have a will but often lack the skills to teach coding.

In North Macedonia, while most teachers have the right skill base to benefit from the training, younger teachers are more ready, willing, and enthusiastic to learn and improve from the training. While all teachers have the knowledge and skills to teach CTPS, some may lack confidence; the BC training should remedy this situation by giving all teachers the confidence to teach CTPS. Most teachers do have the knowledge, skills and confidence to teach coding, and only a few have a low level of coding skills.

In Serbia, teachers' mostly have the skills base to benefit from training in CTPS teaching methods. However, some teachers are reluctant to adopt new and innovative teaching methods and are reluctant to allow their pupils to challenge their positions. Many teachers lack the motivation to change, to learn and apply the new teaching methods. Concerning coding, IT skills among teachers are weak and some IT teachers may not have the skill base necessary to teach coding. Older teachers tend to be less interested than younger teachers. IT teachers tend to have a lower baseline knowledge and confidence to teach coding than the rest of the teachers have in implementing CTPS teaching methods.

6.1.4 Time and resources available to implement CTPS and coding

In Albania, given that teachers' workload has largely increased in recent years, teachers are unlikely to be able to effectively introduce new teaching methods or coding unless they are free from other administrative tasks. School leaders note how teachers participating in Coding Clubs should be freed from administrative tasks. The lack of pedagogical resources, such as textbooks or manuals, has also been reported as an important issue that needs to be addressed, as textbooks do not often provide solid pedagogical content, such as key concepts or exercises, that can be used in the teaching practice.

In Bosnia and Herzegovina, few teachers have the time available to devote to the Programme. The existing curriculum is extensive and leaves little time for the introduction of new teaching methods. Teachers fear that they could have trouble with education inspectors if they do not cover all the lessons set out in the curriculum, or if their pupils achieve low grades in the final examination. They fear it could be blamed on the teacher being too busy and distracted by using CTPS methods. Teachers often work part-time in more than one school and the constant travelling between schools or their satellites eats into teacher's time to devote to new teaching methods. Teachers also lack resources; in most cases, the only resources available to support coding/programming are those provided by the Programme. In rural areas, only school leaders have access to computers and the internet is in many cases very limited or slow. IT teachers are often overburdened with other duties.

In Kosovo, teachers may not be very interested to use Micro: bit in their teaching, since under the new curriculum they have a high administrative burden. While school leaders are committed to finding financial sources to equip schools with the necessary infrastructure, they are not sure what the infrastructure for coding

is needed. Teachers consider that their schools do not possess adequate infrastructure to teach computer coding. School leaders claimed that teachers, and older teachers in particular, lacked time to introduce new elements into the curriculum and prepare new lesson plans.

In Montenegro, the school curriculum cannot be adapted to provide more informatics classes. A major obstacle that teachers face in implementing new lesson plans and teaching methods is a lack of time, which limits the extent to which they can implement new policies. Other obstacles are the reduction in the teaching time for classes and the ambitious curriculum content, which does not allow enough time to provide more lessons involving CTPS and coding skills. Lack of resources, such as IT equipment, is also a factor challenging the implementation of coding, especially in rural areas.

In North Macedonia, teachers face a rigorous curriculum which allows little time for the implementation of new subjects or new teaching methods. They also have insufficient space and a small number of teaching materials. Many teachers lack motivation and feel that their additional efforts will not be valued. Schools also lack the resources for teacher professional training, and for the equipment necessary for the implementation of coding in the classroom.

In Serbia, one of the main limiting factors regarding teachers' capacity to implement CTPS and coding in their teaching is that many work only part-time. They travel to different schools and, with the rigid curricula, do not have enough time, enthusiasm or motivation to engage with new CTPS teaching methods or improve their teaching skills in coding. Teachers in rural schools face severe time constraints if the school has satellite schools, because they spend a lot of time travelling between them and have even less time available to introduce new teaching methods into their teaching plan. Many IT teachers work in multiple schools and cannot devote the necessary time to support the development of coding skills in those schools.

6.2 Baseline Indicators for Outcome 1

The expected Outcome 1 is that "Teachers embed and practice CTPS and coding skills in classrooms". It is expected that by the end of the Programme at least 80% of trained teachers in the WB region integrate CTPS skills into teaching and learning activities and that 80% of trained teachers integrate CTPS skills into teaching and learning activities. In this section we discuss the status of these indicators at the baseline of the Programme. Table 15 summarises our findings.

Table 15: Baseline for Short Term Outcome 1: "Teachers embed and practice CTPS and coding skills in classrooms".

	Prior to programme intervention, to what extent did teachers have knowledge about and practice CTPS in the classroom?	Prior to programme intervention, to what extent did teachers have knowledge about and practice coding skills in the classroom?	Percentage of classes performed using CTPS teaching methods by trained teachers across all grades
AL	B	D	39.9%
BiH	C	D	30.4%
XK	B	D	52.4%
ME	B	C	36.4%
MK	B	B	47.2%
RS	C	C	34.9%
WB	**B**	**C**	**38.5%**

Note: A = fully; B = mostly; C = partly; D = not at all.

Table 15 shows that prior to the Programme, teachers mostly had knowledge about the practice of CTPS in some form, although in Bosnia and Herzegovina, and in Serbia this knowledge was less widespread. On average about two fifths of classes in the Western Balkans are performed using some variant of CTPS teaching methods (by the teachers who experienced the British Council training and therefore have a common understanding of which CTPS teaching methods are). The proportion varies widely across countries from a low of 30.4% in Bosnia and Herzegovina to a high of 52.4% in Kosovo. However, the practice of teaching coding was less widely spread, and teachers only partly had this knowledge. In three countries (Albania, Bosnia and Herzegovina, and Kosovo) teachers did not have this knowledge at all, nor did they provide lessons in coding in the classroom. The rest of this section we summarise the findings of the fieldwork in each country concerning these issues. Further details can be found in the individual country reports.

In Albania, teachers engage with CTPS differently and overall, to a moderate degree prior to the Programme. Their engagement is also dependent upon the subject taught, and it is higher for the 9th grade, regardless whether the school is located in an urban or rural area. However, around one third of teachers declare that they had no prior training in CTPS, and this might be explained by the young age of most of them. Regarding coding/programming, none of the teachers had prior knowledge, except for ICT teachers.

In Bosnia and Herzegovina, a few teachers had acquired some knowledge of CTPS acquired through studying on courses paid for by a private organisation. The institutions that regulate education, the pedagogical institutes, include people who have little understanding of the need to incorporate CTPS skills and CTPS has not been addressed in the curriculum. However, our survey shows that over one quarter of classes are already performed using CTPS teaching methods across all grades although the teaching methods used until now have not included critical thinking.

In Kosovo, CTPS training has been provided to most teaching staff since early 2000. In the Core Curriculum for lower secondary education, CTPS is integrated as a cross-curricular subject. Most teachers have undergone training on CTPS provided by the MEST. Most of the interviewed teachers told us that they apply CTPS teaching techniques for much of their teaching time, ranging from 43% to 80%, with diversity across courses. The most commonly noted techniques are clustering, brainstorming, group discussion and a two-part diary. A significant amount of class time in the school year 2018/19 was performed using CTPS. Teachers feel confident to develop pupils' CTPS (the average score is 1.5), while rural teachers are less confident that they can develop such skills. In contrast, prior to training provided by the BC Programme, teachers lacked the knowledge and skills to teach coding/programming. Only one of the interviewed IT teachers had some experience in basic programming. In 2019, coding became part of the curriculum for the 8th and 9th grades. However, so far none of the schools have provided lessons in coding/programming.

In Montenegro, more than a third of the surveyed teachers declared that they have had previous training regarding CTPS methods, though with limited knowledge of approaches and skills involved in the teaching practices. The curricula are focused on CTPS and encouraging pupils to think and explore themselves, to evaluate and analyse, and not just to learn and remember the facts from textbooks.

In North Macedonia, teachers in primary education need additional training for CTPS and coding. Although some teachers received training in CTPS provided by the Cambridge Programme, according to the result of our survey, 90% of teachers had no previous training in CTPS, and do not know how to implement it in the classroom. Coding/programming is taught in the classroom by IT teachers.

In Serbia, about one third of teachers were already acquainted with CTPS methods before the British Council training, but most lacked experience in implementing it. Teachers use CTPS teaching methods in about one quarter of classes However, their knowledge of CTPS is mostly theoretical and many lack the confidence to apply their knowledge in practice in the classroom. Coding skills are not widely known by teachers, and some even lack basic IT skills. Even IT teachers lack confidence and skills to teach coding. On average older teachers are less interested in coding than younger ones. In our sampled schools, the best knowledge and

practice of CTPS and coding skills was displayed in schools with highly motivated school leaders and in schools where teachers work as a team.

6.3 Output 2

This sub-section discusses the status of output 2 at the baseline, namely whether teachers have the knowledge, skills and confidence to teach CTPS and coding skills.

Table 16: Baseline for Output 2: "Teachers gain knowledge, skills and confidence to teach CTPS and coding skills".

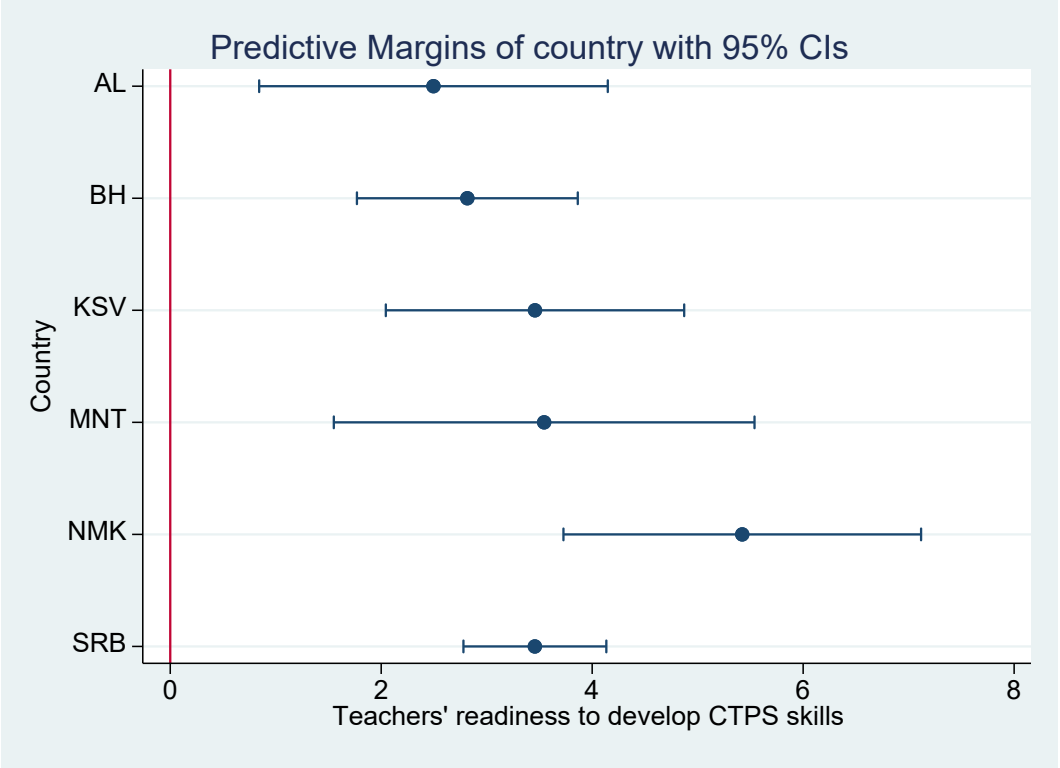
	At the baseline, do teachers have knowledge, skills and confidence to teach CTPS skills	At the baseline, do teachers have knowledge, skills and confidence to teach coding skills	Teachers knowledge, skills and confidence to teach CTPS (scale 1-5)	Teachers knowledge skills and competence to teach coding (scale 1-5)
AL	B	D	2.14	3.59
BiH	B	C	2.03	2.07
XK	B	C	1.41	2.63
ME	B	C	1.57	2.00
MK	B	B	1.33	1.57
RS	B	C	1.74	1.88
WB	**B**	**C**	**1.70**	**2.37**

Note: A = fully; B = mostly; C = partly; D = not at all. Note: a score of 1= strongly agree with the statement, 2= agree, 3= neither agree nor disagree, 4=disagree, 5= strongly disagree.

Table 16 shows that at the baseline teachers in the Western Balkans mostly have the knowledge, skills and confidence to teach CTPS skills. On a scale of 1-5 they responded to the survey with country-average scores ranging from 1.33 to 2.14, on the whole either strongly agreeing, or agreeing, that they have the relevant knowledge skills and confidence to deliver their lessons using CTPS teaching methods. However, the teachers' self-assessments of their competences regarding the teaching of coding are less optimistic. Scores ranged from country-averages of 1.57 to 3.59. Notably in Albania teachers disagree or strongly disagree that they have the knowledge, skills and confidence to teach coding, while in Kosovo they tend to disagree. In all countries the scores for coding were less optimistic than those for CTPS. We can convert these figures into percentage scores of a theoretical maximum of Teachers' s knowledge, skills and confidence to teach CTPS (henceforth, referred to as "readiness"). Using the linear scale transformation method (which expressed each observed value into a range-standardised proportion of its distance to the theoretical minimum), we calculate that for the case of 'readiness' in CTPS values range between a minimum of 71.50% in Albania and a maximum of 91.75% in North Macedonia, while for 'readiness' in coding the range is from 35.25% in Albania to 85.75% in North Macedonia.

These country differences remain to a large extent when we try to examine them while accounting for a range of possible factors that may influence the reported scores. As is shown in Figure 2, the predicted probabilities for the teachers' readiness to teach CTPS skills (calculated at mean values of the other explanatory variables) are highest for the case of North Macedonia and lowest for Albania. Statistically speaking, however, the differences are not significant as the confidence intervals of the predictions overlap, meaning that the margin of error of any one prediction is within the margin of error of any other prediction (although small sample size may be responsible for this). On the basis of this, we can conclude that Teachers' readiness to teach CTPS skills is, statistically speaking, uniform across the six countries.

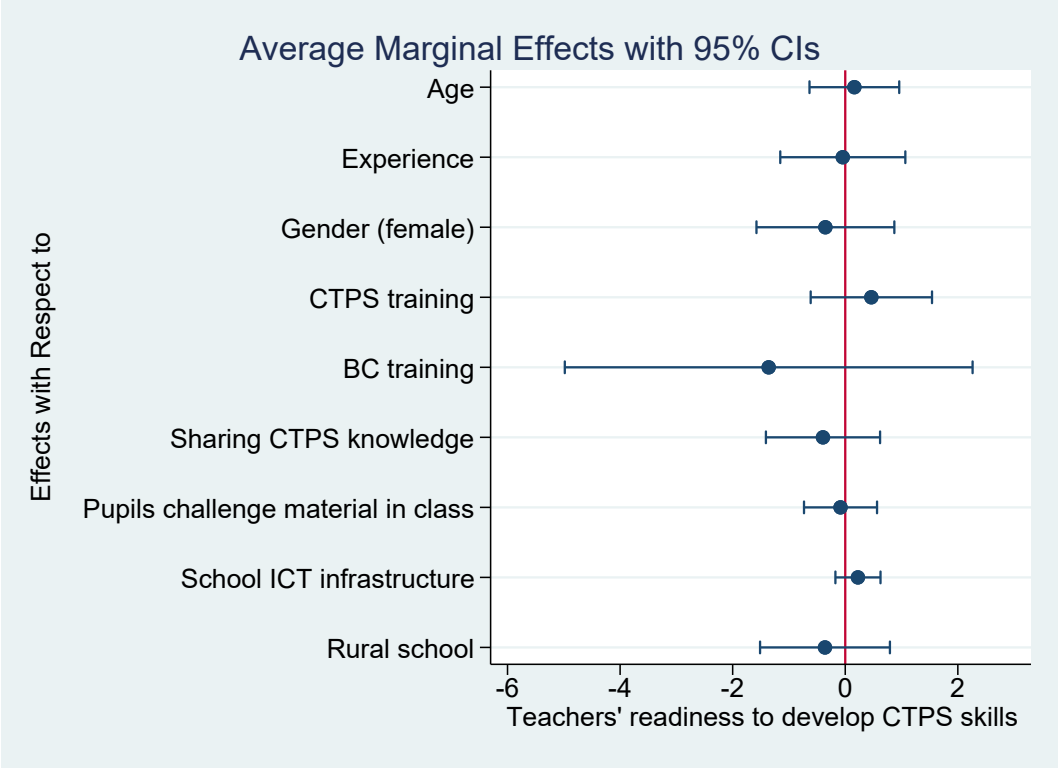
Figure 2: Predicted Teacher readiness scores for CTPS by country, controlling for characteristics.



Note: Marginal effects for the country fixed effects from a probit regression of teachers' readiness for CTPS skills. The estimated model includes controls for teacher's age, work experience and gender; whether the teacher has received BC or other CTPS training; whether they have shared CTPS knowledge; whether they self-report to enjoy challenging pupils in class; and their assessment of their school's ICT infrastructure.

A similar pattern of homogeneity (or randomness) emerges from the analysis of the effects on teachers' readiness to develop CTPS skills, from the host of other variables that we were able to include in our analysis – including both individual characteristics of teachers (age, experience, gender), characteristics related to their training and knowledge (whether BC or other CTPS training, whether they shared knowledge on CTPS with other teachers, whether they enjoy their pupils like to challenge their positions or teaching content in class), and characteristics of their school's infrastructure. As is reported in Figure 3, none of these factors turns out to be of any statistical significance in explaining the differences across individual teachers in their reported scores. On the basis of the average predictions, it appears that 'readiness' is higher for older, male and less experienced teachers, who have received CTPS but not BC training and who are in schools with good ICT infrastructure. But, statistically, none of these influences are significant and thus, again, the conclusion is that teacher's readiness to develop CTPS skills is uniform across each of these characteristics.

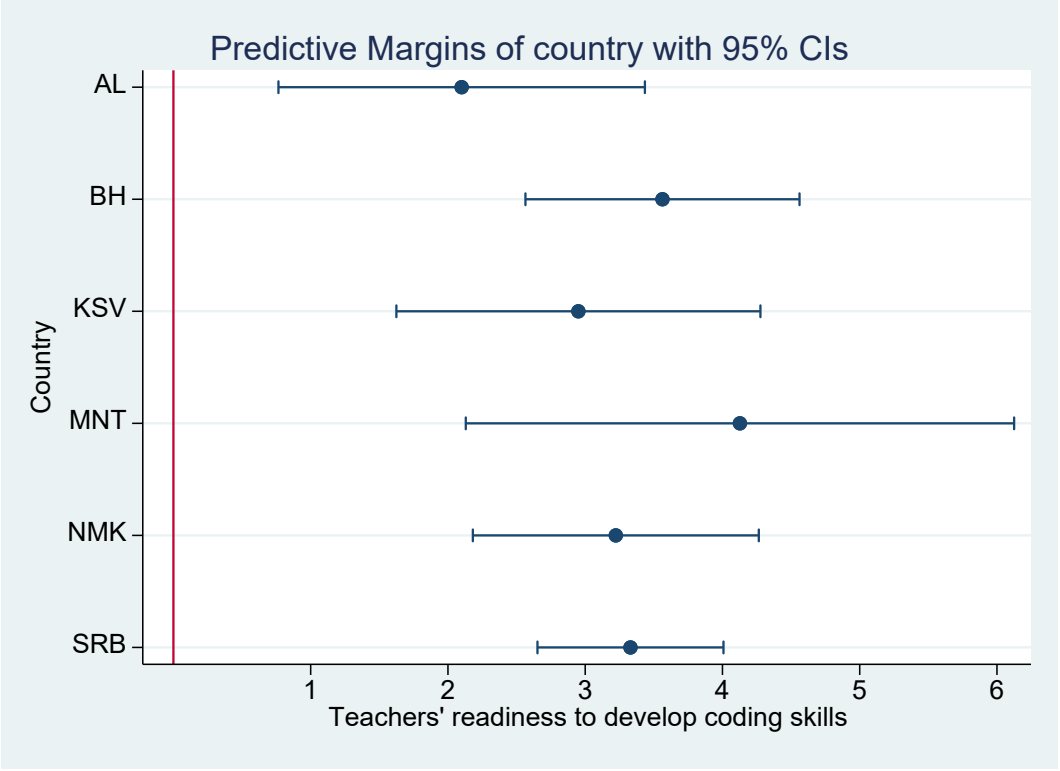
Figure 3: Impact of individual and other variables on predicted Teacher readiness scores for CTPS



Note: Marginal effects for the listed variables, from a Probit regression of teachers' readiness for CTPS skills. The estimated model includes controls for country fixed effects (see Figure ZZ1).

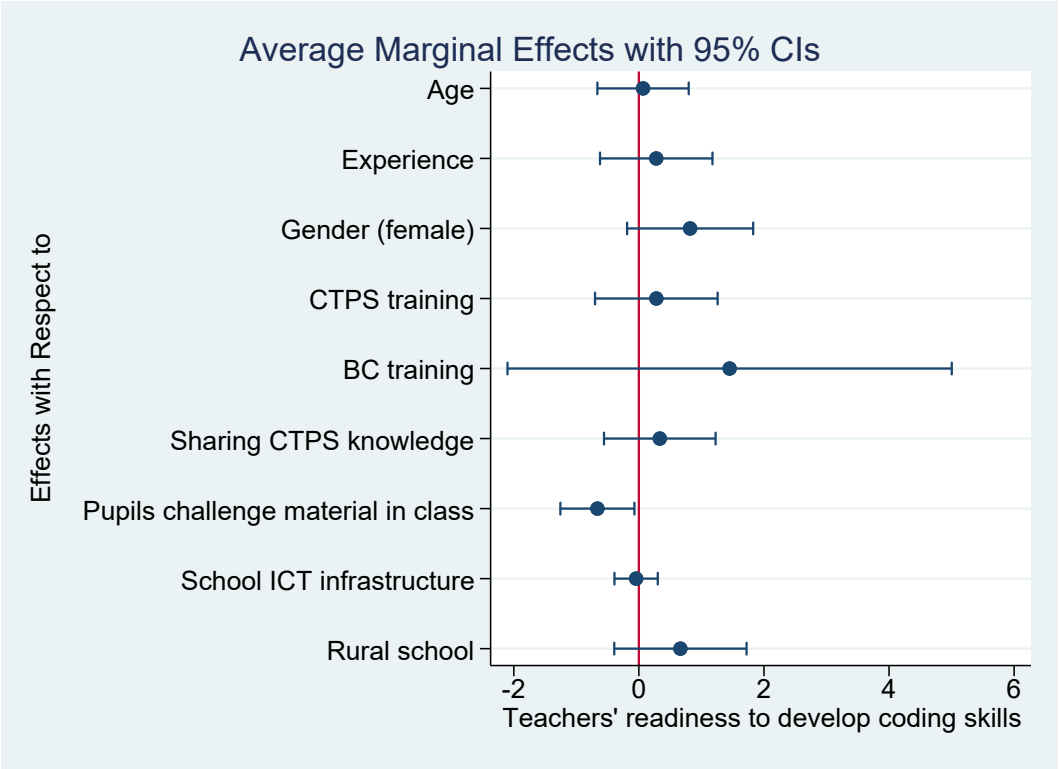
These conclusions are broadly similar for the case of teachers' readiness to develop coding skills (last column of Table 16). As noted already, country differences in this regard are similar to those found for CTPS skills, albeit the scores in the case of coding are invariably lower (worse) and the country differences wider. Despite this, country differences do not seem to be statistically significant also in this case (Figure 4), while in this case the ranking of countries with regard to the predicted scores when controlling for individual and environmental influences is somewhat different – with Bosnia-Herzegovina, for example, scoring more favourably compared to Serbia or North Macedonia in the predicted scores than in the raw (observational) scores. Similarly, none of the individual or environmental factors that we have examined returns a statistically significant effect (Figure 5). In this case, BC training seems to be associated with a higher self-assessment of 'readiness' for developing pupils' coding skills, but this association is not significant in a statistical sense. By implication, here too, our conclusion is that teachers' readiness to develop coding skills is uniform (homogenous) not only across countries but also across a series of individual and environmental characteristics – i.e., that the observed differences are largely random (in a statistical sense).

Figure 4: Predicted Teacher readiness scores for coding by country, controlling for characteristics



Note: see note in Figure 2.

Figure 5: Impact of individual and other variables on predicted Teacher readiness scores for coding



Note: see note in Figure 3.

Moving on from these aggregate comparisons, and back to the country-specific results, the following observations can be made.

In Albania, teachers have some knowledge, skills, and confidence to teach CTPS, due also to prior training undertaken which, though unstructured and non-systematic, has nevertheless helped them to grapes the key components of CTPS. In addition, around 80% of Education faculties in Albania universities include CTPS as a common subject in education methodologies. The interviewed school leaders believe that the majority of their teachers have the skills and confidence to teach CTPS. By contrast, knowledge and confidence to teach coding/programming is very limited; as reported by trainers' interviews, the majority of ICT teachers do not have the appropriate background.

In Bosnia and Herzegovina, teachers have not been trained in CTPS methods, which are not taught in initial education of teachers, and teachers' continuing professional development does not cover this topic. However, teachers are optimistic that they have the knowledge skills and confidence to apply CTPS teaching in the classroom. The interviewed school leaders and policymakers consider that most teachers lack the confidence or the skills to teach programming. School leaders even think that some IT teachers do not have any appropriate knowledge to teach programming and coding. Teachers are rather more optimistic and on the whole they believe that they have the skills, knowledge and confidence to teach coding, but that they feel less sure about this than about their ability to teach using CTPS methods.

In Kosovo, teachers' survey show that the majority of teachers rate themselves as being very confident or confident in teaching CTPS, though they agree less on the fact that pupils are able to challenge them during classroom teaching. By contrast, according to the survey results, teachers do not feel they possess the confidence or the skills to teach pupils coding/programming.

In Montenegro, school leaders say that all teachers have the knowledge, confidence and skills to teach CTPS skills, whereas not all of them possess the necessary skills to teach coding/programming. The same concerns are reported by trainers who also mention the lack if IT equipment, inadequate digital literacy and insufficient coding skills among the reasons.

In North Macedonia, CTPS has been introduced in the curriculum. Teachers express confidence in their ability to explore what pupils think about the topic they teach and enjoy discussing the topic they teach with their pupils. However, they are somewhat less confident about being challenged by their pupils over their positions and somewhat less confident about developing their pupils' CTPS skills. Most IT teachers feel they have the knowledge, confidence and skills to teach coding/programming.

In Serbia, according to the survey results teachers rate themselves highly on their ability to use CTPS teaching methods and to teach coding. However, this self-assessment is not reflected in the discussions held through IDIs, suggesting that the self-evaluation may overstate the knowledge and confidence of teachers to perform lessons using these methods. The differences between sub-questions in relation to CTPS suggests that teachers are not fully ready for pupils to question their positions in the classroom. As already mentioned, teachers lack IT skills, and this is reflected in their self-assessment of their coding abilities being below their self-assessment of their CTPS skills.

7. Pupils' baseline CTPS and coding skills

In this section we outline the assumptions that underpin the Programme theory of change relating to the expected outcome that after the Programme intervention pupils will demonstrate enhanced CTPS and coding skills. We also review the issues around expected intermediary outcome, namely the extent of pupils' initial CTPS and coding skills. We also review the relevant associated indicators. We report on our findings concerning the state of play in the primary education system regarding these expected outcome issues at the baseline. First, we deal with the assumptions, before moving on to address the expected outcome issues.

7.1 Assumptions

The assumptions which underlie the ability of the Programme to achieve outcomes for pupils are that pupils have the basic skills to benefit from the Programme.

Table 17: Baseline Assumptions from Theory of Change relevant to the intermediary outcome: "Pupils from 10 to 15 years old across the Western Balkans demonstrate enhanced CTPS and coding skills".

	Pupils have the basic CTPS skills to engage with the Programme at baseline	Pupils have the basic coding skills to engage with the Programme at baseline
AL	B	D
BiH	C	C
XK	C	C
ME	A	B
MK	C	C
RS	B	C
WB	**B**	**C**

Note: A = assumption fully met; B = assumption mostly met; C=assumption partly met; D= assumption not met at all

Table 17 shows that the assumption that pupils have the basic skills to engage with CTPS teaching methods within the Programme is mostly met. School leaders and teachers have less confidence about this in Bosnia and Herzegovina, Kosovo and North Macedonia than elsewhere in the region. However, school leaders and teachers are much less convinced that pupils have the basic skills to engage with lessons on coding within the Programme. This assumption is met with great scepticism in Albania.

In Albania, all pupils have a sufficient set of basic skills to engage with CTPS and class discussions, but it depends on teachers' efforts to change the traditional way of teaching and engage their pupils' interest. For CTPS pupils engage in group work once a month, though this is more common in urban schools rather than in rural schools. Girls seem to be more open to Pupils' knowledge, skills and competences emphasised in the curricula for ICT/coding are low for almost all pupils. Albanian pupils scored the lowest in the region in relation to their self-assessed knowledge of coding/programming. This was even without taking into account any adjustment for their knowledge of programming languages.

In Bosnia and Herzegovina pupils are mostly used to purely memorising knowledge, and CTPS is rare throughout the school system. School leaders and teachers consider that pupils are not motivated, and not interested in school activities. They consider that pupils are used to learning 'by heart' for a grade, and that they are not interested in critical thinking approaches. Pupils only have basic skills that they acquire through informatics subjects and there is a need for comprehensive approach in terms of revising textbooks, improving the curriculum and teaching methods to enable pupils to learn more advanced coding skills. Pupils lack knowledge on coding/programming, and most lack access to computers. Very few pupils were able to name

any sort of programming language. Pupils assessed their own knowledge of computer programming at 4.83 on a 1-10 scale (see Table 18 below). This is however likely to be a gross overstatement, as evidenced by the lack of knowledge of any specific programming languages. The filtered scores reveal that the pupils' knowledge of coding/programming is on average extremely low at just 1.94 on the 1-10 scale, indicating a virtual absence of knowledge on this topic.

In Kosovo girls tend to report using CTPS skills in the classroom more than boys, and a lower assessment was reported for pupils from Roma, Ashkali and Egyptian communities and among pupils with physical, mental and other special educational needs. school directors stated that pupils have basic skills to engage in coding/programming. However, pupils in urban areas have better skills than in rural areas, as some of them also have private coding lessons. Pupils in the 8th grade had less knowledge of programming than pupils in the 7th grade, and pupils in urban areas are more informed about programming and coding than their rural counterparts. Boys have a higher level of knowledge of programming than girls. The pupils give themselves a relatively high self-assessment score for their coding/programming skills (see Table 18 below). But this is likely to plummet once their knowledge of computer programming languages is taken into account, as with Bosnia and Herzegovina and Serbia

In Montenegro, school leaders believe that every pupil has the necessary set of basic skills needed for coding. Pupils use computers and mobile phones early on in their lives, and so gain a strong ability to use technology. However, according to our surveys, most pupils are not familiar with coding. Only a few pupils showed some knowledge of programming languages and skills in the area of computer coding, but many pupils have an interest in learning more about it and in exploring the possibilities of micro:bit. Pupils who are already familiar with micro:bit and are members of coding clubs show great enthusiasm and interest in coding.

In North Macedonia, pupils have a sufficient set of basic skills to engage with CTPS teaching methods. However, according to the PISA test results, many students lack the skills needed to benefit from lessons in coding/programming. Their success in learning depends on the knowledge and skill of the teacher. Pupils from socially disadvantaged families are less likely to possess the requisite skills than pupils from more socially advantaged families.

In Serbia, pupils score relatively poorly in basic skills of reading, mathematics and science on the PISA tests, with outcomes that are worsening over time. Nevertheless, teachers, school leaders and policymakers believe on the whole that pupils have the skills needed to benefit from the British Council Programme. There is a large difference in the pupils' abilities depending on their family background and their socio-economic position in society. The most disadvantaged, including Roma children, often lack internet access at home. Pupils from vulnerable rural backgrounds often leave school unable to use modern technologies. Nevertheless, the baseline survey revealed that more than one third of pupils have a high interest in coding and the baseline self-assessment of coding skills of those pupils who were able to identify at least one programming language is fairly high.

7.2 Baseline Indicators for the Intermediary Outcome

The Intermediary Outcome is that "Students from 10 to 15 years old across the Western Balkans demonstrate enhanced CTPS and coding skills". It is expected that by the end of the Programme that pupils will improve their CTPS skills by at least 20% compared to the baseline assessment and will improve their coding skills by at least 20% compared to the baseline assessment. In this section we discuss the status of these indicators at the baseline of the Programme. Table 18 summarises our findings.

Table 18: Baseline and for Intermediary Outcome (and Output 6): "Pupils from 10 to 15 years old across the Western Balkans demonstrate enhanced CTPS and coding skills"; ("Girls and boys experience critical thinking, problem solving, and coding skills in classrooms and in coding clubs").

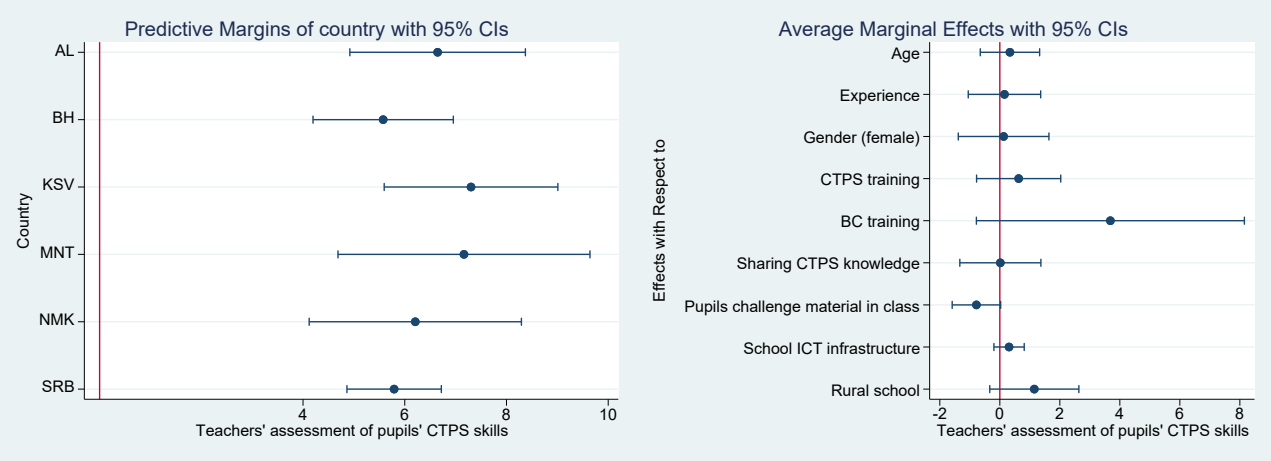
	AL	BiH	XK	ME	MK	RS	**WB**
To what extent did girls and boys experience CTPS skills in classrooms at the baseline before Programme intervention?	B	C	B	B	C	C	**B**
To what extent did girls and boys experience coding skills in classrooms at the baseline before Programme intervention?	D	C	D	C	C	C	**C**
Pupils average teacher assessed CTPS score across all grades (scale 1-10)	6.57	5.88	7.16	6.57	6.51	6.20	**6.49**
Pupils average teacher assessed coding / programming score across all grades (scale 1-10)	2.97	5.27	6.50	6.96	7.14	6.49	**5.82**
Pupils average self-assessed coding / programming score across all grades (scale 1-10) (unfiltered)	3.61	4.85	6.05	4.88	4.84	5.30	**4.75**
Pupils average self-assessed coding / programming score across all grades (scale 1-10) (filtered)	1.30	2.53	1.33	2.29	1.95	2.16	**1.88**
Boys	1.26	2.79	1.41	2.33	1.96	2.12	**1.94**
Girls	1.34	2.26	1.25	2.25	2.03	2.21	**1.85**

Note: A = fully; B = mostly; C= partly; D= not at all.

Table 18 shows that pupils in three countries have mostly experienced having lessons using CTPS teaching methods, but only partly so in Bosnia and Herzegovina, North Macedonia and Serbia. The teacher-assessed scorers for pupils CTPS skills indicate a moderate level of proficiency in this respect but may be biased upwards by a wish to show their pupils in a good light. However, the rank of scores does partly reflect the rank of the subjective scores from qualitative research. Pupils have far less experience of coding, with apparently no experience at all in Albania and Kosovo. Pupils' self-assessed coding scores range from 3.61 to 6.05 on a 1-10 scale, with an average score across the Western Balkans of 4.75. However, when adjusted for knowledge of any computer programming languages, the scores are reduced sharply to an average 1.88 (ranging from 1.30 to 2.53). This suggests that in actuality pupils have practically no coding skills prior to the start of the British Council Programme.

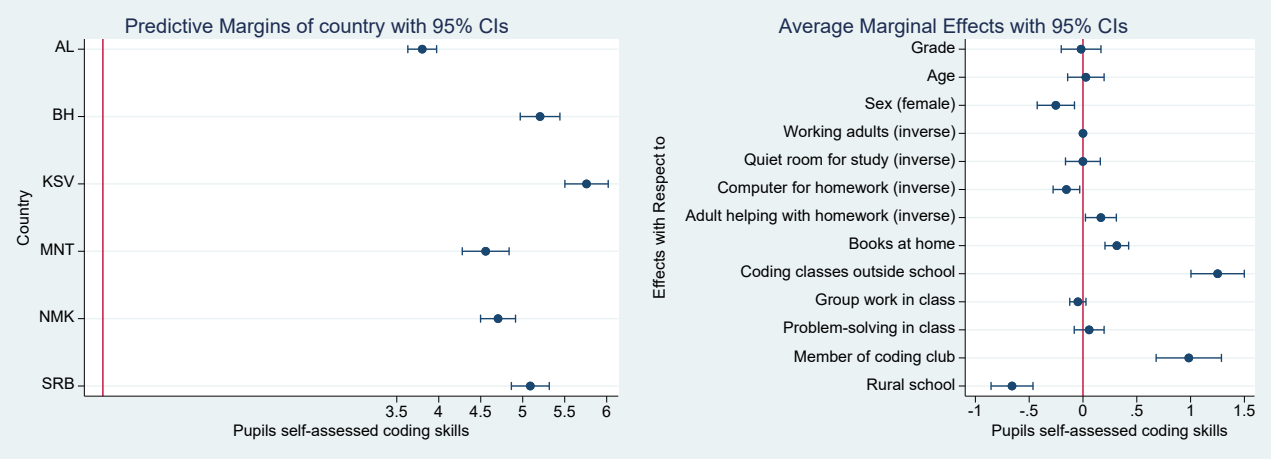
We can do here a similar exercise as the one reported in relation to Output 2 (Table 16). Specifically, we implement a regression analysis seeking to identify factors (individual and environmental characteristics of teachers and schools) that correlate with the teachers' assessment of pupils' CTPS skills; as well as the factors (individual and environmental characteristics of pupils and their families) that correlate with the pupils' own self-assessment of their coding skills. These results are presented in Figures 6 and 7.

Figure 6: Estimated predicted margins (marginal effects) for pupils' average teacher assessed CTPS scores by country and teacher/school characteristics.



Note: see notes to Figures 2 and 3.

Figure 7: Estimated predicted margins (marginal effects) for pupils' average self-assessed coding scores by country and pupil/school characteristics.



Note: see notes to Figures 2 and 3.

As can be seen, the evidence concerning the teachers' assessment of pupils' CTPS skills is similar to the evidence obtained earlier concerning the self-reported teachers' 'readiness': neither the country differences, nor the host of characteristics that we tried to associate this outcome to, produce any statistically significant effect. Teachers with BC training and teachers in rural schools seem to be making a more positive assessment of their pupils' CTPS skills, but even in these cases the margin of error of the prediction is too large to give confidence to a statistically significant result. In contrast, for the case of pupils' self-assessment of their coding skills (Figure 7), we find some statistically significant differences, implying that at least a sub-set of factors do account for the variation in the scores each pupil assigns to themselves on this measure. Country differences in this case are statistically significant, with pupils in Kosovo reporting much higher scores and pupils in Albania giving the lowest self-assessment for their coding skills (controlling for the range of characteristics shown in the second panel of Figure 7). With regard to these characteristics, we find that, whereas age and grade of the individual pupils do not matter, female pupils tend to score themselves lower than male pupils. Similarly, while whether pupils live in households with working adults or with quiet study-rooms do not have an advantage in terms of (self-reported) coding skills, having a computer and especially many books at home helps them while having an adult help with homework affects them negatively. Teaching-related factors do not seem to play a role (e.g., whether pupils do problem-solving or group-work in class), but the location of the school matters significantly, with pupils in rural schools having much lower self-reported scores. Finally, as should be

expected, being a member of a coding club at school, or taking coding classes outside of school affects strongly and positively a pupil's (self-reported) coding skills.

Turning to the country-specific information, in Albania, pupils have experienced teaching based on CTPS methods. None of the sampled pupils have followed any course outside the school on coding and programming. The IT teachers mentioned that only a small percentage, about 10% of the IT subject in grade 9, is dedicated to programming but not to coding skills.

In Bosnia and Herzegovina, CTPS is not specifically addressed in curriculum, but has been embedded in different subjects as a method of teaching. At the same time, CTPS has been included in the cross-curricular approach in the Common Core Curriculum. The school survey shows that only a small proportion of pupils have never experienced group work in class, and more than half say that they experience this form of tuition only once a month at most. Digital competences are mainly acquired through traditional IT courses and informatics/computer science. In the lower grades, IT lessons do not teach coding/programming. In the "Informatics" course in the 6th grade, pupils learn informatics and communication skills including the basic principles and practical solutions, the use of modern computers and applications, and developing problem-solving skills in various fields. This is continued in the 7th grade, where the pupils proceed with the same framework programme, at a more advanced level. As discussed above, the school survey shows that few pupils receive lessons in coding/programming; in grade 9 three quarters of pupils receive such lessons less than once per month.

In Kosovo, CTPS is a cross curricular component whilst IT is a separate course taught from grade 6 to grade 9. As written in the curricula, pupils are expected to be able to understand, analyse, synthesise, develop abstract thinking, and undertake problem solving. Prior to the BC Programme, the most commonly used CTPS techniques in teaching were the INSEERT method, the Venn diagram, brainstorming, and group work. The survey revealed that while critical thinking and discussions are often carried out in the classroom, problem solving techniques are not much applied. According to pupils' responses, group work is applied more often in urban schools. An official from MEST informed us that coding has been included in the curricula for the 8th and 9th grade, although he was not sure when it will start being implemented. Only one school had a coding club at the time of the survey, which is still active. In 2019, coding competences were embedded in the curricula for the 8th and 9th grade. From the 6th to the 9th grade, pupils are taught a course called "Technology with IT". However, so far this course has only a limited component on computing, which only informs pupils about computer components. So far none of the schools has provided lessons in computing/ programming. Pupils responded with a suspiciously high country-average score of 6.06 to the question asking to self-assess their own knowledge of programming. As in Bosnia and Herzegovina and Serbia, it is expected that this will be drastically reduced should an adjusted, filtered self-assessment score be calculated.

In Montenegro, two fifths (39%) of pupils are very interested in coding, while only 15% are uninterested. Two fifths of the sampled school already have a coding club. Given the interest of pupils in coding, and their intention to work or to consider working in computer programming in the future, it is expected that the Programme will have a major impact in the coming years. Only a few pupils are familiar with at least one programming language. On the other hand, pupils who are members of coding clubs show great interest and enthusiasm and are praised by trainers.

In North Macedonia, pupils have little experience of learning on the basis of CTPS teaching methods, although they do have the skills needed to benefit from such methods. The teacher-assessed skills of pupils in using CTPS was scored at a level of 6.6 on a 1-10 scale where 1 represents no skills and 10 represents complete set of skills. The pupils' abilities to benefit from CTPS lessons is substantially higher than their self-assessed score in coding programming skills at just 4.91. Before the introduction of the British Council Programme, many pupils had relatively little experience of coding/programming in the classroom.

In Serbia, Pupils have little experience of CTPS teaching methods. According to the baseline survey, one fifth of pupils have never experienced group work in class, while a further half have only experienced such a method once per month. In Informatics classes, more than a quarter of pupils have never experienced teaching that has involved thinking about and discussing issues in the classroom, although more than half of pupils in languages classes have done so. A similar picture emerges in relation to pupils proposing solutions to problems in the classroom. Teachers and school leaders assess pupils' potential for benefitting from CTPS teaching methods is relatively high, but that it is higher for girls than for boys. They also believe that it will be relatively easy for pupils to learn coding, but in practice three quarters of pupils were unable to identify a single programming language. Pupils' self-assessment of their coding skills is 5.3 on a ten-point scale, but when filtered by their ability to name a programming language is just 2.2, indicating a very limited level of skills in relation to coding and programming before the start of the Programme.

8. Observations on Conflict issues

Few issues related to concerns about conflict were observed in the educational systems of the Western Balkans in our fieldwork. This is not to say that there are overt or incipient issues that may affect the effectiveness of Programme implementation.

Most seriously in Bosnia and Herzegovina, ethnic division is almost inbuilt into the education system as a consequence of ethno-nationalist policies. Under the “two schools under one roof” system, teaching is organized in two different curricula in all subjects. This practice exists in 56 schools in the country, where pupils are able to enrol in either school. However, practice has shown that the school environment, including curricula, is acceptable to members of only one ethnic group.

In Kosovo the original sample included a school from North Mitrovica, in the potential ethnic conflict area. However, due to his health situation with COVID-10, the school principal was not able and willing to support inclusion of the school in the survey. The field work in Kosovo has not been subject to any issues of conflict of any type.

During the fieldwork in North Macedonia, the team of surveyors noted that while conducting the IDIs with school leaders, a strong and explicit bias emerged among school leaders from nearly every candidate school. School leaders, almost invariably, indicated that they believed that children in their school who belonged to the same ethnicity as themselves were better equipped to handle CTPS and ICT skills.

In the fieldwork in Serbia, a negative sentiment towards the UK has been expressed by few participants. As we understand it is due to the 1999 NATO bombing of Serbia. There may be more teachers and school leaders with similar sentiments that did not express them. This may be a risk factor for successful BC Programme implementation in some cases.

No conflict issues were observed having an impact on the education system in either Albania or Montenegro or that might affect the implementation of the British Council Programme.

9. Limitations of the study

There are three important methodological limitations to the study results that should be underlined here. First of all, the evaluation relies in some part on the answers to the self-evaluation questions posed to teachers, school leaders and pupils. Since we were not permitted to evaluate their knowledge ourselves, in our evaluation design we were forced to use both explicit and implicit school leader, teacher and pupil self-evaluation in our survey design. We understand that the results from the self-evaluation questions may be biased, with the direction and magnitude of such bias being varied across different countries, urbanity factor, and different population segments due to cultural, demographic and socio-economic differences. We were aware that the answers to the self-evaluation questions cannot be used on their own merit to measure the overall level of the phenomenon that those questions were designed to measure. Nevertheless, there is a strong argument that these biases will be equally at play at the baseline and the endline and that therefore comparing the two would still be a good measure of the progress achieved during the evaluation period. This is in particular the case since in our evaluation design we will be using the same sample at the baseline and the endline (we are basically having the panel data) so measuring the difference between the two is both methodologically and logically sound. Furthermore, in order to be able to make better inference from the baseline measurements, we have allowed for the data triangulation wherever possible, as well as data filtering for the question on computer programming/coding in Bosnia and Herzegovina and in Serbia, which provides an indication of the extent of the biases involved.

Secondly, since the emergence of Covid-19 outbreak, the teaching has moved either fully online or by halving the forms and providing the teaching partially online and partially in person to a varying extent across countries. At the same time many classes have been shortened, while the number of teachers has not been increased. This increased burden is hardly conducive to teachers' accepting new CTPS teaching approaches and teaching new contents regarding computer programming as promoted by the 21st Century Schools Programme. At the same time, pupils have less teaching time since the classes are shortened. This has most likely affected the quality of teaching with respect to the CTPS content. We also expect it will affect the pupils' ability to absorb the new computer programming teaching contents.

Thirdly, again due to Covid-19 outbreak we had to adapt our data collection methods to the situation on the field. Many schools closed down in March 2020, when most of the teacher and school leader training courses were finished. Hence, there were no follow-up and monitoring visits. In effect, the Programme implementation was halted. Nevertheless, country experts managed to interview most of the teachers and school leaders during the CTPS/coding courses, and where this was not possible, they were contacted subsequently by a video call or a telephone call. This did not require changing the questionnaire and, while it is a recognised fact that changing the data collection method would have an impact on the result, we expect that this impact was minimal in this case. However, in cases where pupils had to be surveyed online (and we used an approach where we have identified the forms of pupils to be surveyed both at the baseline and the endline, so are able to be fairly sure who our respondents are), as opposed to the self-administered Paper and Pencil Interviewing (PAPI) we expect the results may be more strongly affected. Since we have done the PAPI approach for all countries in the 2nd cycle, and the online approach in some countries, we will be able to compare the results and biases of PAPI vs online pupil surveying. This may prove useful especially in case we should be forced to use the online approach at the endline, as well.

10. Conclusions

This section sets out a brief summary of the conclusions that can be drawn from the above Baseline Study in the Programme countries, with an emphasis on programme impact and outcomes related to CTPS and coding/programming at the baseline. It first sets out our conclusions on the realism of the assumptions identified in the Theory of Change (Logic Model) as set out in the Evaluation Plan. It then goes on to provide our conclusions concerning the baseline situation relating to potential future Programme Outcomes that we have derived from the fieldwork survey and interviews backed up by the documentary analysis made in the accompanying Enabling Environment report.

10.1 Assumptions

10.1.1 Do Ministries of Education support the British Council Programme?

Overall, Ministries of Education in all the Western Balkan countries fully support the British Council Programme. Most countries support CTPS and coding lessons in schools, which is generally in line with their national educational policy developments, as in Albania, Kosovo and Montenegro, and the Education Strategies currently ongoing or planned, as in Serbia. The situation is most complex in Bosnia and Herzegovina where 14 separate ministries govern the education system; although all the interviewees say that they highly value the Programme, they are a bit concerned about the capacities of schools to absorb it. A fruitful cooperation has been achieved in several of the countries. For instance in Montenegro, the BC has worked together with the Ministry to include coding within the curriculum for the compulsory subject “Informatics with technics” from 5th to 8th grade, whereas in Albania the training offered by the BC has been accredited by the National Commission on Accreditation for Professional Training Programs for teachers and school leaders and in North Macedonia the Ministry of Education has appointed a representative to work with the BC and to facilitate the implementation of the programme. These positive aspects in terms of cooperation seem also suggest that the BC Programme might also have acted as a *window of opportunity* in the sense of enabling curriculum reforms - aligned not only with national strategies but with International Organizations’ recommendations (e.g. OECD, the European Union) as well - which are considered crucial in order to provide pupils with the skills needed to face the challenges - at school, personal, and societal level - of the XXI Century.

10.1.2 Does the school system have the capacity to absorb the Programme?

Despite the universal support for the programme from ministries of education, capacity to absorb the Programme is limited in most countries. Teachers’ motivation tends to be low due to low salaries, while many teachers lack the skills and training needed to deliver lessons in coding, especially older teachers. Everywhere, with the partial exception of Montenegro and Serbia, the lack or obsolescence of educational materials such as computers, or textbooks as in Kosovo, and the poor infrastructure in the form of absence or low quality of internet connectivity limits the absorptive capacities. These problems are compounded in remote rural areas. In Albania schools’ capacities are additionally limited by a lack of administrative staff. In some countries, notably Bosnia and Herzegovina and Serbia, school leaders and teachers are reluctant to implement new teaching methods and are resistant to change. Resistance to change is also a problematic issue in Kosovo and North Macedonia.

Therefore, two factors emerge as important determinants for the school system to absorb the BC Programme. On the one hand, there is the need of providing further resources for improving schools’ infrastructure and IT equipment, especially for the teaching of coding skills, as reported in Albania, Kosovo, Montenegro and North Macedonia. On the other hand, there is a need to invest in human resources development, either in terms of professional qualifications/teaching standards (North Macedonia, Serbia) and in terms of teachers’ working conditions, including salaries, excessive administrative tasks or an over-demanding teaching programme (Montenegro, Serbia) and the lack of motivation, especially for older teachers (Albania, Kosovo). However, the Baseline reports of several of the countries seem to capture an important promising aspect with reference to

the capacity to absorb the Programme, namely the ability to incorporate and maintain the BC training into the school system through some *ad hoc* initiatives which can help schools to assimilate and disseminate the knowledge acquired thanks to the Programme: for example through the setting up of the coding clubs or the "21st Century School Award Scheme" in North Macedonia; the creation of booklets from the BC on how to use CTPS techniques in the classroom in Montenegro; and the organization of workshops for sharing best practices and experiences in the school or within schools in Albania.

10.1.3 Do school leaders support the delivery of CTPS and coding teaching in their schools?

In all countries of the Western Balkans, most school leaders support the delivery of CTPS and coding/programming teaching in their schools. However, some school leaders seem to be far less motivated, while some do not even seem to understand properly the concept of CTPS and are not being supportive to the Programme implementation.

The implementation of coding skills in teaching is considered particularly important for all the school leaders interviewed not only as a way to equip pupils with the skills needed in the labour market (Albania, Kosovo) but also as an opportunity to revitalize the teaching staff by encouraging the employment of young teachers and trainers able to fully embrace IT trends (Montenegro). However, school leaders in Kosovo expressed concerns in some countries about the lack of trained staff to teach coding, while school leaders in North Macedonia expressed concerns about the reluctance of staff to accept change without proper continuous training, and about the lack of equipment. In Bosnia and Herzegovina some school leaders were reluctant to introduce "modern" teaching methods in their schools.

10.1.4 Are school leaders available to participate in capacity building activities?

School leaders in all countries were available and to participate in capacity building activities, both in the training provided by BC and in other training and capacity building activities in the school by also involving their deputies in the training activities, as in the case of Albania. However, the level of interest in the training activities does not seem to be homogeneous. There is a minority of school leaders in Bosnia and Herzegovina, Montenegro and Serbia who are not willing to participate in capacity building activities, and who either even not turn up for training, or, in another case, they sent a delegate on their behalf (North Macedonia). Other obstacles emerged in the interviews are the lack of motivation and the lack of time due to school management and administrative tasks (Kosovo).

10.1.5 Are school leaders available and willing to engage with the Programme?

School leaders in almost all countries were available and willing to engage with the Programme, which is considered an opportunity to increase the overall quality of teaching (Albania, Kosovo) and an opportunity to introduce innovative skills in their schools and motivating pupils in their learning process (Montenegro).

However, there is a minority of school leaders North Macedonia and Serbia, and especially in Bosnia and Herzegovina, who are not willing to engage with the Programme or were reluctant to get involved in their own school in supporting the implementation of the programme by the teaching staff, preferring to leave it to the teaching staff to take the initiative to implement the new lesson plans and new teaching methods. This attitude may stem partly from the structural role of school leaders as administrators rather than managers, and also in part from practice of appointing school leaders on political rather than meritocratic grounds.

10.1.6 Do teachers and pupils have access to adequate ICT infrastructure in schools?

In most countries, teachers lack the basic or modern-enough equipment to effectively teach coding in their school. In Albania many schools lack computer equipment and internet access, and there was an example of a teacher conducting a class in a nearby internet café. In Kosovo, many schools lack computer equipment and teachers rely on enthusiasm of school leaders to acquire equipment from donors, which only rarely happens. In Bosnia and Herzegovina and North Macedonia, most schools have computer equipment, but much of the equipment is obsolete, and more than a decade old. In contrast, in Montenegro and Serbia most schools have

reliable computer equipment. Schools also in general have access to an internet connection, but the prevalence of this is patchy and the speed of the connection is sometimes too low. In Kosovo, where schools do have an internet connection it is often only available in the school leader's office and not in the classrooms. In North Macedonia, around 15% of schools do not have an internet connection, which is even more problematic in rural areas, an issue that was also identified as problematic in Montenegro and in Serbia.

10.1.7 Are teachers interested and available for training?

Interest and availability vary among teachers and seems to depend upon some factors including prior training received, their age, and the overall level of working conditions, including administrative workload and salaries. In Kosovo, many teachers had already received such training and were not very interested in receiving further training in CTPS. However, they were very interested in the coding element and the use of micro:bit. In Albania and Montenegro teachers were enthusiastic about the training. In North Macedonia and Serbia, while most teachers were interested and available for training, some only took part in a formal sense and were not really interested in improving their teaching methods, especially among the older generation more reluctant to embrace new technologies. In Bosnia and Herzegovina, there is a shortage of motivated teachers available for training, and some teachers expect financial compensation or a pay increase in order to be involved in training activities.

10.1.8 Do teachers have the right skills base to benefit from training?

The skill base of teachers is variable. Most teachers have the skills to implement CTPS and many have prior experience of this methodology, although often only as a theoretical concept and have not applied it in practice. The situation is different in respect of coding/programming. In Albania, Bosnia and Herzegovina and Kosovo, few teachers have skills in IT or coding. Most IT teachers do not have a training in the subject, and do not have the right base of skills to teach coding or demonstrate micro:bit. In contrast, in Montenegro, North Macedonia and Serbia, while younger teachers have sufficient skills to teach IT and coding, few of the older teachers have the base of skills or confidence to teach coding. Overall, prior experience and the type of qualification possessed seem to be the two main explanatory factors in assessing whether teachers possess the right skill base.

10.1.9 Are time and resources available to implement CTPS and coding?

Time availability is a significant constraint on introducing new teaching methods and new subjects such as coding in many schools in the region.

In Kosovo, teachers are implementing a new curriculum and have little time to develop new lesson plans based on CTPS methods, or implement instruction on coding, especially in a context of lack of equipment, IT access and overall available infrastructure. In Albania, Bosnia and Herzegovina, Montenegro, and North Macedonia, teachers lack time due to an overloaded curriculum which does not allow enough time to develop new lesson plans. In addition, in Bosnia and Herzegovina some teachers fear penalties from school inspectors if they do not rigidly adhere to the curriculum and see CTPS as a distraction. In Serbia the time limitation is related to the large number of teachers who work on a part-time basis. Also, many teachers have to travel between satellite schools and have little time to develop new lesson plans. In most countries, resources are limited, and the lack of suitable educational materials including availability of updated textbooks and computers is a major hindrance to learning in almost all countries, especially in Kosovo. Resources are also limited in most countries especially regarding computer equipment and this is particularly relevant for schools in which the number of pupils is high. The recent PISA 2018 test survey results demonstrate that many teachers work in schools where a lack of teaching materials is a hindrance to effective education.

10.1.10 Do pupils have the basic skills to benefit from the Programme?

In most countries, school leaders and teachers believe that their pupils have the basic skills to benefit from the CTPS element of the Programme but may lack the skills required to benefit from coding/programming, although are less confident about this in Bosnia and Herzegovina, Kosovo and North Montenegro than elsewhere in the

region. The common practice until now has been for pupils to learn material through memorising rather than critically engaging with the subject matter. e to zero in most cases. Girls seem to be better prepared than boys to benefit from CTPS teaching methods (Kosovo).

In relation to coding, school leaders and teachers have relatively little confidence that their pupils have the right skills to benefit from lessons in coding/programming (especially so in Albania). This is in line with the recent PISA 2018 survey results, which showed that a large proportion of pupils lack basic reading and mathematics skills. Most pupils lack knowledge of coding/programming and have limited access to computers or IT equipment (although this seems to be less of a problem in Montenegro). Despite that, they are highly optimistic about their own knowledge of programming although our analysis shows that their actual knowledge is most likely close to zero. Pupils in urban areas have better skills than in rural areas, as some of them also have private coding lessons (Kosovo). Pupils from socially disadvantaged families are less likely to possess the required skills to benefit from the lessons to be provided on coding within the Programme (North Macedonia, Serbia). The same is true for pupils from Roma families (Kosovo, Serbia).

10.2 Outcomes

The British Council 21st Schools Programme envisages a number of short-term outcomes and an Intermediary outcome. *Short Term Outcome 3* envisages that **by the end of the Programme, relevant decision makers create and implement curriculum and introduce other related policy measures to advance the CTPS and coding skills learning in primary schools**. In this baseline study we asked the question in what ways, if any, did the current curriculum and other facets of educational policy support CTPS and coding skills prior to Programme implementation? We found that the curricula in all the countries have been reformed to include elements of CTPS and coding/programming. A new curriculum in Albania supports critical thinking competences. In Bosnia and Herzegovina, a Common Core Curriculum (CCC) at state level supports coding and programming but does not support CTPS as such although it has a key competence on “learning to learn”, although, the CCC is applied in different ways at different levels of governance. In Kosovo, a new curriculum was introduced in 2012 with cross-curricular key competences in “thinking” and “learning”. With reference to coding, all schools in grade 8 and 9 have coding classes as compulsory, but these are awaiting implementation. In Montenegro, there is a course in the curriculum on “Basics of Programming” which is included in the list of elective subjects for the 9th grade. In North Macedonia, curriculum reforms introduced coding/ programming in all schools at III grade in the academic year 2015/2016. In Serbia, a new curriculum implemented since 2018/19 is in line with the Programme with regard to both CTPS and coding skills. Overall, educational policies have been broadly supportive of CTPS and coding prior to Programme implementation.

Short Term Outcome 2 envisages that **by the end of the programme school leaders will actively support the implementation of CTPS and coding skills at school level across the curricula**. In this baseline study we asked the question whether, prior to programme intervention, school leaders supported CTPS and coding/programming across the curriculum? In most countries there have been experiences with introducing CTPS as a teaching method. In Montenegro, school leaders have supported CTPS across the curriculum, in North Macedonia a project to introduce CTPS was implemented in the early 2000s, and in Serbia school leaders have supported their teachers in adopting CTPS teaching methods. However, despite these good intentions, in practice the actual innovation in teaching methods has rarely taken place due to several barriers inherent to the school environment, such as the availability of pedagogical resources (e.g. textbooks, manuals), a clear conceptualization of CTPS and its embeddedness in the curriculum, and supportive policies for teachers and staff. A similar picture emerges from our baseline evaluation research in regard to coding. In Kosovo, coding is part of the curriculum for grade 8 and 9, in Montenegro an elective subject teaches coding and programming, in North Macedonia, ICT is a mandatory subject. However, in practice the implementation of coding is held back by a variety of factors. In Kosovo, school leaders believe that all that is needed is to provide equipment rather than initiate new teaching methods and curricula. In Montenegro, the elective programming subject is not on offer in every school, in North Macedonia, ICT/coding is a mandatory subject in primary schools, but a lack of equipment and the obsolescence of the available equipment hinders its

implementation. In Serbia, school leaders have found it difficult to hire qualified IT staff to teach coding. In Bosnia and Herzegovina, there was little evidence of any prior support for CTPS and coding/programming by school leaders.

Short Term Outcome 1 envisages that **by the end of the Programme, teachers will embed and practice CTPS and coding skills in classrooms**. In this baseline study we asked the question whether, prior to programme intervention, to what extent did teachers have knowledge about and practice CTPS and coding skills in the classroom? We found that in Kosovo, most teachers have had prior training in CTPS and apply these methods already in their teaching practice though without a proper systematization and lack of conceptualization of what constitutes CTPS. Despite that, most teachers were also interested to learn new techniques through the BC training programme. Elsewhere, while some teachers have prior knowledge of CTPS it is mainly theoretical and not used much in the classroom, although it is sometimes embedded in specific subjects by some teachers depending on the subject taught (e.g., it is more used in scientific disciplines rather than humanistic ones). In Albania, Montenegro, North Macedonia, and Serbia many teachers already possess CTPS skills but mostly from a theoretical perspective and have little experience of applying it in the classroom and could therefore benefit from additional training, a gap that could be filled by the BC Programme through a more systematised/structured teaching of CTPS including the provision of pedagogical resources and materials. In all countries, the picture is very different in relation to coding/programming, as few teachers have prior experience with that subject. It is perhaps even worse as many IT teachers lack skills and confidence to teach coding, especially among the older generation of teachers.

The *Intermediary Outcome* envisages that **by the end of Programme implementation pupils from 10 to 15 years old will demonstrate enhanced CTPS and coding skills**. In this baseline study we asked to what extent do girls and boys experience CTPS and coding skills in classrooms and in coding clubs before Programme intervention? Only in Kosovo have CTPS methodologies been widely applied in the classroom, though with some differences between the “critical thinking” and “problem solving” dimension. Elsewhere, CTPS has not been specifically addressed in the curriculum but it is embedded in different subjects as a method of teaching in some schools. Digital competences are taught in subjects such as “Informatics” (Bosnia and Herzegovina), “Technology with IT” (Kosovo), and under other titles elsewhere. However, in almost all cases these subjects do not provide lessons in coding/programming. An exception is Serbia where pupils in our survey who are now in grade VI, had coding and Scratch in their curricula in the previous school year.

11. Appendix: Survey Results (Basic Tables) for Western Balkans

11.1 Teacher & Leader surveys

TL0. Basic data on schools in the sample (number / average per school)

	All schools	Urban	Rural
No. of schools	76	33	43
No. of pupils in grades 5-8 (6-9)	5,074	2775	2299
No. of teachers in grades 5-8 (6-9)	476	271	205
No. of trained teachers	260	156	104

Source: school leaders and/or British Council

TL1. Age distribution of teachers (number of teachers/leaders)

	Teachers	Male teachers	Female teachers	Urban teachers	Rural teachers	Leaders	Male leaders	Female leaders	Urban leaders	Rural leaders
22-34	97	21	97	47	50	5	1	4	2	3
35-44	173	53	173	96	77	22	9	13	7	15
45-54	133	29	133	87	46	32	15	17	15	17
55+	67	33	67	38	29	17	14	3	9	8

Source: Teacher surveys Q5; Leader surveys Q5 & school information (urban/rural)

TL2a. Years of working experience as a teacher (number of teachers/leaders)

	Teachers	Male teachers	Female teachers	Urban teachers	Rural teachers	Leaders	Male leaders	Female leaders	Urban leaders	Rural leaders
Up to 5	59	16	43	30	29	4	2	4	1	3
From 5 to 15	191	54	137	95	96	29	15	29	11	18
More than 15	221	66	155	143	78	40	21	40	18	22

Source: Teacher surveys Q6; Leader surveys Q6 & school information (urban/rural)

TL2b. Years of working experience as a school leader (number)

	Leaders	Male leaders	Female leaders	Urban leaders	Rural leaders
Up to 5	39	18	21	17	22
From 5 to 15	22	11	11	8	14
More than 15	15	10	5	8	7

Source: Leader surveys Q4 & school information (urban/rural)

TL3. Teachers by sex (%)

	Teachers	Urban teachers	Rural teachers	Leaders	Urban leaders	Rural leaders
Female	70.38%	73.06%	66.83%	48.68%	42.42%	53.49%
Male	28.57%	25.83%	32.20%	51.32%	57.58%	46.51%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Source: Teacher surveys Q7; Leader surveys Q7 & school information (urban/rural)

TL4. Length of time in school (%)

	Teachers	Male teachers	Female teachers	Urban teachers	Rural teachers	Leaders	Male leaders	Female leaders	Urban leaders	Rural leaders
Up to 1 year	6.18%	4.41%	6.91%	5.99%	6.44%	19.74%	23.08%	16.22%	30.30%	11.63%
From 1-5 years	23.03%	19.85%	24.32%	22.47%	23.76%	44.74%	41.03%	48.65%	39.39%	48.84%
More than 5 years	70.79%	75.74%	68.77%	71.54%	69.80%	35.53%	35.90%	35.14%	30.30%	39.53%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: Teacher surveys Q8; Leader surveys Q8 & school information (urban/rural)

TL5. Whether had previous training on CTPS (%)

	Teachers	Male teachers	Female teachers	Leaders	Male leaders	Female leaders
Yes	29.51%	29.41%	29.55%	25.00%	20.51%	29.73%
No	68.58%	69.85%	68.06%	68.42%	74.36%	62.16%
Not sure	1.91%	0.74%	2.39%	6.58%	5.13%	8.11%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: Teacher surveys Q9; Leader surveys Q10 & school information (urban/rural)

TL6. Whether participated in the BC 21st Century school programme training (number & %)

	Teachers	Leaders	Teachers %	Leaders %
Yes	260	51	55.44%	67.11%
No	199	24	42.43%	31.58%
Not sure	10	1	2.13%	1.32%
Total	**459**	**75**	**97.87%**	**98.69%**

Source: Teacher surveys Q11; Leader surveys Q9 & school information (urban/rural)

TL8. Percentage of classes performed using CTPS teaching methods

	Trained teachers				Untrained teachers			
Grades	**5th grade**	**6th grade**	**7th grade**	**8th grade**	**5th grade**	**6th grade**	**7th grade**	**8th grade**
Average for all subjects, Total	34.70%	35.24%	37.39%	40.31%	46.08%	44.17%	46.78%	45.64%
Urban	37.50%	38.05%	42.67%	45.33%	43.29%	44.53%	42.12%	43.71%
Rural	31.43%	32.36%	31.53%	35.15%	44.74%	44.34%	44.52%	44.72%

Source: Teacher surveys Q12

TL9a. Assessment of average pupil's CTPS skills (average score)

	Teachers				Leaders			
Grades	**5th grade**	**6th grade**	**7th grade**	**8th grade**	**5th grade**	**6th grade**	**7th grade**	**8th grade**
All pupils	6.12	6.35	6.62	6.56	6.46	6.49	6.71	6.83
Boys	5.82	6.01	6.24	6.29	6.02	6.14	6.36	6.52
Girls	6.43	6.68	6.91	6.81	6.80	6.75	6.95	7.07

Source: Teacher surveys Q13; Leader surveys Q11

TL9b. Assessment of average pupil's programming/coding skills (average score)

	Teachers				Leaders			
Grades	**5th grade**	**6th grade**	**7th grade**	**8th grade**	**5th grade**	**6th grade**	**7th grade**	**8th grade**
All pupils	5.11	5.22	6.20	6.14	4.70	4.87	5.29	5.22
Boys	5.05	4.97	6.33	6.17	4.75	5.02	5.43	5.36
Girls	5.14	5.46	6.03	6.06	4.66	4.81	5.24	5.17

Source: Teacher surveys Q14; Leader surveys Q12

TL10. Whether teachers share CTPS knowledge with at least one colleague who has not participated in the training (number)

	All Teachers	Male teachers	Female teachers
Yes	163	46	117
No	93	30	63
Not sure	5	2	3

Source: Teacher surveys Q15

TL11. Teaching practice (mean score)

	Avg.	Min	Max
Extent to which teachers use CTPS methods (overall indicator)	1.729	1	5
In my class, I always explore what my pupils think about the topic I am teaching.	1.554	1	5
My pupils like to challenge my positions, or the contents of what I teach in class.	2.170	1	5
I enjoy discussions with my pupils in the class regarding the topic I am teaching.	1.461	1	5
[*Skip for respondents who scored 'no CTPS' on Q11-C.*] I feel confident about developing my pupils' CTPS skills.	1.733	1	5
[*Only for IT teachers*] I feel confident about developing my pupils' computer programming/coding skills.	2.240	1	5

Source: Teacher surveys Q16

TL12. Whether schools have adequate IT infrastructure for teaching programming / coding? (number and %)

Teachers	**All schools**	**Urban**	**Rural**	**All schools**	**Urban**	**Rural**
Yes	45	27	18	46.39%	46.55%	46.15%
No	29	18	11	29.90%	31.03%	28.21%
Not sure	23	13	10	23.71%	22.41%	25.64%
Total	***97***	***58***	***39***	***100%***	***100%***	***100%***
Leaders	**All schools**	**Urban**	**Rural**	**All schools**	**Urban**	**Rural**
Yes	44	20	24	57.89%	60.61%	55.81%
No	27	10	17	35.53%	30.30%	39.53%
Not sure	5	3	2	6.58%	9.09%	4.65%
Total	***76***	***33***	***43***	***100%***	***100%***	***100%***

Source: Teacher survey Q16; Leader surveys Q13 & school information (urban/rural)

TL13. Whether schools have coding clubs and if so, are they active? (number)

	Number of schools with clubs	**% of schools**	**Number of schools with active clubs**	**% of schools with active clubs**
Yes	10	13.2%	10	13%
No	62	81.6%	66	83%
Not sure	4	5.3%	4	5%
Total	**76**	**100.0%**	**80**	**100%**

Source: Leader surveys Q14 & 14B

TL14. How often pupils are taught computer programming (%)

	More than 2 per week	2 per week	1 per week	Every other week	1 per month	Less than 1 per month	Total
5th grade	6.7%	6.7%	33.3%	6.7%	20.0%	26.7%	**100%**
6th grade	0.0%	6.7%	40.0%	6.7%	20.0%	26.7%	**100%**
7th grade	0.0%	23.5%	52.9%	0.0%	17.6%	5.9%	**100%**
8th grade	6.7%	6.7%	33.3%	6.7%	20.0%	26.7%	**100%**

Source: Leader surveys Q15

TL15. How many pupils from 5th to 8th grade left your school last year, without enrolling to complete their education somewhere else? (%)

	5th grade	6th grade	7th grade	8th grade	Total
Boys	6	4	4	3	17
Girls	3	1	8	3	15
All pupils	**9**	**5**	**12**	**6**	**32**

Source: Leader surveys Q16

TL15_new. How many pupils from 5th to 8th grade left your school last year, without enrolling to complete their education somewhere else? (%)

	5th grade	6th grade	7th grade	8th grade	Total
Urban	9	4	12	5	30
Rural	0	1	0	1	2
All areas	**9**	**5**	**12**	**6**	**32**

Source: Leader surveys Q16

11.2 Pupil survey

P1. Number of pupils by grade (average number per school)

	5th/6th grade	6th/7th grade	7th/8th grade	8th/9th grade	Total
Boys	10.6	10.6	10.1	9.8	10.3
Girls	10.9	10.1	10.0	10.1	10.3
All pupils	**21.4**	**20.7**	**20.1**	**19.9**	**20.5**
Urban	11.7	11.7	10.7	10.5	11.1
Rural	9.8	9.0	9.4	9.4	9.4

Source: Pupil survey Q1, Q5 & school information (urban/rural).

P3. Adult members of household who go out to work (Percentage of responses)

	All pupils	In urban schools	In rural schools
Two or more	54.16	59.12	48.25
One	41.16	37.94	45
None	4.52	2.87	6.49
Total	**100%**	**100%**	**100%**

Source: Pupil survey Q6 & school information (urban/rural)

P4. Resources at home (% of responses)

	All pupils			
	Always	**Sometimes**	**Never**	**Total**
A quiet room to study when I need it	72.8%	22.4%	4.8%	**100%**
A computer I can use when I need for my schoolwork	58.3%	25.8%	15.9%	**100%**
An adult who can help me with my homework if I need it	52.0%	40.2%	7.7%	**100%**
An adult who is at home to care for me when I am home	78.5%	16.8%	4.8%	**100%**

Source: Pupil survey Q7 & school information (urban/rural)

P5. Books at home by location (number and % of responses)

	All schools	Urban	Rural	All schools	Urban	Rural
None	359	151	208	7.2%	5.6%	9.1%
Less than 10	1,588	667	921	31.8%	24.7%	40.3%
Between 10 and 50	2,084	1,218	866	41.8%	45.1%	37.9%
More than 50	957	665	292	19.2%	24.6%	12.8%
Total	**4,988**	**2,701**	**2,287**	**100%**	**100%**	**100%**

Source: Pupil survey Q8 & school information (urban/rural)

P6. Books read per month by sex (number and % of responses)

	All pupils	Boys	Girls	All pupils %	Boys %	Girls %
None (less than one)	852	441	411	17.1%	16.3%	18.0%
One	2,089	1,118	971	41.9%	41.4%	42.5%
Two	1,313	702	611	26.3%	26.0%	26.7%
Three or more	736	442	294	14.7%	16.4%	12.9%
Total	**4,990**	**2,703**	**2,287**	**100%**	**100%**	**100%**

Source: Pupil survey Q9 (& Q5)

P7. Computer programming outside school (Number and % of responses)

	All pupils	Boys	Girls	All pupils %	Boys %	Girls %
Yes	758	480	278	15.2%	17.8%	12.2%
No	4,216	2,217	1,999	84.8%	82.2%	87.8%
Total	**4,974**	**2,697**	**2,277**	**100%**	**100%**	**100%**

Source: Pupil survey Q10 & Q5

P8. Group work in class (Number and % of responses)

	Total	Urban	Rural	Total	Urban	Rural
Never	408	238	170	8.3%	8.9%	7.5%
Once a month	2,234	1,217	1,017	45.3%	45.5%	45.1%
Every other week	766	424	342	15.5%	15.8%	15.2%
Once a week	836	374	462	17.0%	14.0%	20.5%
More than once a week	687	423	264	13.9%	15.8%	11.7%
Total	**4,931**	**2,676**	**2,255**	**100%**	**100%**	**100%**

Source: Pupil survey Q11 & school information (urban/rural)

P9. Think and discuss issues in class (% of responses)

	Often	Rarely	Never	Total
Languages	66.5%	27.6%	6.0%	**100.0%**
STEM	53.2%	36.4%	10.5%	**100.0%**
Social and Humanities	57.8%	33.1%	9.1%	**100.0%**
Music, culture & sport	22.6%	50.3%	27.1%	**N/A**

Source: Pupil survey Q12 & school information

P10. Propose solutions in class (% of responses)

	Often	Rarely	Never	Total
Languages	54.1%	34.4%	11.6%	100.0%
STEM	44.8%	39.0%	16.2%	100.0%
Social and Humanities	46.2%	38.4%	15.4%	100.0%
Music, culture & sport	25.7%	44.3%	30.0%	**N/A**

Source: Pupil survey Q13 & & school information (urban/rural)

P11. Finding out more after class (Number and % of responses)

	All pupils	Boys	Girls	All pupils %	Boys %	Girls %
Yes	3,018	1,403	1,613	60%	56%	64%
No	2,003	1,095	907	40%	44%	36%
Total	5,021	2,498	2,520	100%	100%	100%

Source: Pupil survey Q14 (& Q5)

P13. Interest in computer programming (Number and % of responses)

	All pupils	Boys	Girls	All pupils %	Boys %	Girls %
Very much	2,077	1,188	889	41.3%	47.5%	35.2%
Somewhat	2,234	1,017	1,217	44.4%	40.6%	48.2%
Not particularly	715	297	418	14.2%	11.9%	16.6%
Total	**5,029**	**2,502**	**2,524**	**100%**	**100%**	**100%**

Source: Pupil survey Q17 (& Q5)

P15. Knowledge of computer programming (average score 1-10)

	All pupils			Boys			Girls		
	All schools	**Urban schools**	**Rural schools**	**All schools**	**Urban schools**	**Rural schools**	**All schools**	**Urban schools**	**Rural schools**
5th/6th grade	4.36	4.65	3.86	4.39	4.68	3.92	4.30	4.59	3.79
6th/7th grade	5.14	5.53	4.60	5.23	5.64	4.58	5.05	5.41	4.62
7th/8th grade	5.00	5.21	4.77	5.07	5.45	4.68	4.93	4.99	4.88
8th/9th grade	4.53	4.92	4.04	4.96	5.36	4.40	4.11	4.45	3.72

Source: Pupil survey Q19 (& Q1 & Q5) & school information

P16. Prefer to do coding/programming (Number and %)

	All pupils	Boys	Girls	All pupils %	Boys %	Girls %
No coding/ programming in school	1,265	658	607	25.4%	26.6%	24.2%
Very true	1,102	601	501	22.1%	24.3%	20.0%
Not particularly	1,769	835	934	35.5%	33.7%	37.3%
Not true	848	384	464	17.0%	15.5%	18.5%
Total	**4,984**	**2,478**	**2,506**	**100%**	**100%**	**100%**

Source: Pupil survey Q20 (& Q5)

P17. Whether a member of a coding club (% answering "yes" by grade)

	All pupils %	Boys %	Girls %
5th/6th grade	8.33	9.29	7.34
6th/7th grade	9.42	11.25	7.53
7th/8th grade	9.58	9.53	9.66
8th/9th grade	9.85	10.17	9.42
All grades	9.28	10.06	8.47

Source: Pupil survey Q21 (& Q1 & Q5)

P18. Whether intend to work in computer programming in future (Number and %)

	All pupils	Boys	Girls	All pupils %	Boys %	Girls %
Yes	1,019	664	355	20.5%	26.7%	14.3%
Maybe	2,822	1,349	1,473	56.8%	54.2%	59.3%
No	1,131	476	655	22.7%	19.1%	26.4%
Total	4,972	2,489	2,483	100%	100%	100%

Source: Pupil survey Q22 (& Q5)