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PROJECT SPRINT

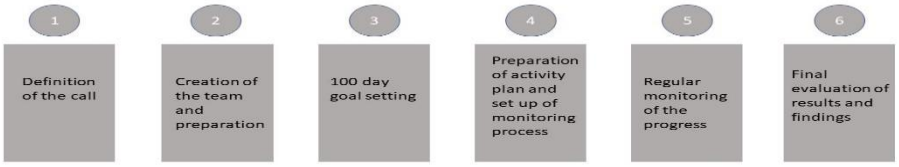
The material presents a manual for the implementation of the accelerator method (Rapid Results Interventions, hereafter referred to as the RRI method) in the field of supporting digitalization in education in the context of upcoming reforms and investments. The Institute of Educational Policy (IEP) of the Ministry of Education, Science, Research and Sport of the Slovak Republic ("hereinafter Ministry") in cooperation with the World Bank enabled schools to use this method to test their own ideas for changing teaching using digital technologies. The first part of the document defines the accelerator method, which is complemented by a description of the current state of digitalization in Slovakia. The Project Sprint plan explains in detail how a school can implement the accelerator method on a specific topic. In the conclusion, based on the experience of the project, recommendations for the implementation of this method and changes in education in other schools are defined. The method can also be used in other areas of public policy. The project was supported by the Technical Support Instrument (TSI) funded by the European Commission.

The RRI method is used by governments or public administrations to kick-start or accelerate the introduction of reforms in a short time. It is intended to help bridge the gap between setting public policies themselves and mapping implementation options before the actual practical implementation of reforms. The methodology usually involves a set of individual steps through which a complex project/reform is broken down into multiple/partial micro-projects. These are implemented by a project team consisting of service providers (e. g. ministry, teams of foreign experts) working with public administration entities, in our case schools (namely principals, teachers, digital coordinators and social assistants) and output beneficiaries (in our case pupils or parents). The RRI method differs from a conventional pilot project in such a way that the recipient of the method and its procedures (e.g., the school) sets a specific measurable goal with a deadline for its completion (Figure 1). In addition, the recipient is given a mandate to test their own ideas on how to achieve the set target. The RRI method works well for complex challenges that often require inter-institutional collaboration and parallel testing of different ideas[1].

The RRI method is often practiced abroad, but the results in the field of education are not yet known [2]. Examples of RRI targets from abroad include, for example, breast cancer screening of 2,000 women over 40 in the city within 100 days (compared to 1,500 women the previous year), the target was met when 2,201 women were screened. Another example is the reduction of mortality on the 5 busiest roads by 60% within 100 days in the city, the set target was met as the mortality rate was reduced by 63%. Another interesting international example is a project with a set target to provide shelter to 100 homeless people within the next 100 days in the city, which was also achieved[3]. The method has also been implemented by the UK National Health Service, with a focus on re-evaluating and streamlining access to healthcare as part of a 100-day challenge[4].

[1] Obong'o, Sylvester, RAPID RESULTS APPROACH / INITIATIVE: Institutionalization of Results Based Management in Public Service
[2] https://www.rapidresults.org/our-work
[3] https://u.ae/-/media/972873E458174BEBAC25D446EBD3A30D.ashx
[4] https://www.nesta.org.uk/project/people-powered-results/elective-care-development-collaborative/

Figure 1: RRI Process Steps and Timeline



Source: Own elaboration, EPI

The current state of digitalization in education in Slovakia

The Slovak Republic's Recovery and Resilience Plan (RRP) is part of the joint response of EU Member States and the European Commission (EC) to the impact of the COVID-19 pandemic. The aim of the reforms and investments from the RRP in education in Slovakia is to improve the quality of the educational process through changes in curriculum, forms of content delivery and teacher training, which should in turn be reflected in improving pupils' performance in international testing, particularly in the areas of literacy, critical thinking, and digital skills[5].

In international context Slovakia is lagging behind in digital skills of adults. International assessment of key competences for adults (PIAAC) shows that Slovakia is lagging behind in solving problems using digital technologies[6]. In the category of digital skills measured by the DESI index, Slovakia ranked 22nd among all EU countries[7]. Adults underperform in all, even basic digital skills[8].

Even the digital skills of pupils and teachers themselves are still not sufficient. Compared to previous years Slovakia's IT Fitness test results are worse in 2021[9]. In lower-performing schools, the differences with previous years are more pronounced. On the contrary, more active schools, which are intensively involved in IT education and their educational content and process is of better quality, have achieved better results in the testing. The deterioration in schools' results is visible in basic IT skills and knowledge, but also in their application to practice. Pupils have little practical experience and little understanding of the structure of a text document. There are also areas of improvement in working with interactive graphs, understanding the information displayed and searching for information according to a given criterion.

International ICILS testing has confirmed the impact of home background or equipment and facilities on pupils´ performance. The better the pupil's home background, the better the pupil's performance in computer and information literacy[10]. In addition, better results were achieved by pupils who have their own computer[11]. Slovakia will also participate in the ICILS digital skills testing in 2023 thanks to the approved RRP[12].

[5] MF SR (2021), Recovery and Resilience Plan. Komponent 7: Vzdelávanie pre 21. storočie.

[6] Skills Matter OECD Skills Studies – PIAAC 2013.

[7] European Commission (2021a), Index digitálnej ekonomiky a spoločnosti (DESI) Slovensko

[8] Slovakia in the Digital Economy and Society Index.

[9] IT Fitness test (2021) was completed by 27,436 respondents attending the higher secondary schools and higher education institutions during the certified testing (13,649 in 2020) – however, this is not a representative sample. The average pass rate is 40.18 % (2020 – 61.65 %). The test version for primary and lower secondary schools was completed by 16,698 respondents during the certified testing (2020 – 7,246). The average pass rate for 7- to 16-year-olds is 39.99 % (2020 – 64.98 %) and for the 7- to 13-year-old age group it is 36.72 %.

[10] Higher educational attainment of the parent, higher employment status of the parent and more books in the household.

[11] Medzinárodná štúdia počítačovej a informačnej gramotnosti ICILS. Slovakia's last participation in ICILS was in 2013; Slovakia did not participate in ICILS testing in 2018.

[12] Komponent 7 – Vzdelávanie pre 21. storočie.

Although the availability of computers in schools in Slovakia is better than the EU average, we are lagging behind in other aspects of digital technology. In terms of the ISCED 1 – 3 classification, and in terms of pupils per computer[13] Slovakia was below the EU average[14]. As a result of increasing investment in the digitalization of schools, the number of pupils per computer is decreasing, but Slovakia has considerable reserves in the area of classrooms equipped with interactive whiteboards. Internal document of the Ministry of Education, elaborated by IEP[15] has shown that in 40% of schools participating in the survey[16] their classrooms are equipped with interactive whiteboard. Compared to the European average, we are significantly lagging behind in this area at all levels of the ISCED classification[17].

Sufficient ability of the teacher to work with digital technologies is a key factor in delivering quality education in forms other than in person, face-to-face format[18]. There is no general consensus on how to improve the digital skills of teachers and thus the quality of the teaching process[19]. Compared to the EU average, in the Slovak Republic (2018), the proportion of pupils attending schools where teachers were provided with additional training or materials or equipment as a form of reward for using ICT in the classroom was lower at ISCED levels 2 and 3[20].

The position of School Digital Coordinator (SDC) has been created to promote digitalization in education. In 2021, a call was initiated to pilot the introduction of the SDC position in schools. 288 schools were supported in Round 1 of the call, and 88 schools were supported in Round 2, where the SDC had been in place for at least one year. SDC should help and support schools in the effective use of digital technologies in the classroom, as well as help to improve the digital skills of teaching staff, who in turn can develop these skills in pupils[21].

One of the prerequisites for improving digitalization is the development of digitalization strategies. Now only few schools in Slovakia have developed them. A digital strategy is currently not a compulsory part of the documentation a school must prepare. In 2018, only 30% of pupils attended schools with a digital strategy in some form at ISCED level 1 (EU average 35%), 26% at ISCED level 2 (EU average 38%) and 30% at ISCED level 3 (EU average 33%)[22]. The free SELFIE self-evaluation tool, which is also included in the Digital Education Action Plan 2021-2027, can also help schools to develop a digital strategy. It is designed to help schools integrate digital technologies into teaching, learning and assessment of progress.

The starting point for meeting the educational needs of schools in relation to teachers' digital competences is a properly implemented assessment and self-assessment of teachers' use of digital technologies. In addition to continuous professional development planning, assessment results can also be

[13] Desktop computer, laptop, tablet, convertible devices.
[14] ISCED 1: SK 2 vs. EU 18; ISCED 2: SK 4 vs. EU 7; ISCED 3: SK 3 vs. EU 8. 2nd Survey of Schools: ICT in Education.
[15] Key findings from a survey of digital technology provision in primary and secondary schools in the 2020/2021 school year. More than 86% of primary and secondary schools participated in the questionnaire survey, but this sample represents approximately 92% of pupils.
[16] More than 86% of all primary and secondary schools in Slovakia participated in the survey.
[17] 2nd Survey of Schools: ICT in Education. Objective 1: Benchmark progress in ICT in schools.
[18] https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2021/414/20220101.html
[19] In the field of digital technologies, incentives are mainly discussed in the form of the provision of supplementary learning materials or additional training in digital technologies. Across EU countries, the two are closely linked and implemented simultaneously.
[20] 2nd Survey of Schools: ICT in Education. Objective 1: Benchmark progress in ICT in schools: For supplementary materials or training, the pupil ratio in Slovakia represents 30% compared to the EU average of 34% (ISCED 2). At ISCED 3 level, the ratio in Slovakia was 25% compared to the EU average of 44%. For the second type of reward, 27% of Slovak pupils attend schools at ISCED 2 level where teachers are rewarded with additional equipment for using digital technologies in the classroom, which is close to the EU average (28%). At ISCED level 3, the gap is more pronounced, with a ratio of 28% in Slovakia compared to the EU average of 39%.
[21] Školský digitálny koordinátor.
[22] 2nd Survey of Schools: ICT in Education. Objective 1: Benchmark progress in ICT in schools.

used in their further education, which is not directly related to professional development[23]. The development of digital competences has been supported by several successful digitalization projects[24].

Project Sprint Intention

The intention of the Project Sprint was to apply the RRI method to create innovative ways to change teaching and learning by promoting digitalization in schools. The cooperation of the World Bank and the Ministry with schools was supposed to help them make teaching and learning more attractive and effective by means of digital technologies utilization, while ensuring its sustainability. At the same time, the process was closely monitored by the Ministry for the purpose of the upcoming reform plans implementation (Table 1).

Table 1: Project Sprint: Allocation of tasks and responsibilities

	Ministry	World Bank	Schools
1. Assignment definition and selection of the schools	• Directs strategic problem formulation with respect to RRP priorities and areas of experimentation for schools • Establishes the criteria for school selection	• Provides conceptual input and feedback on the strategic formulation of areas based on international experience	• Demonstrate their interest in the chosen areas of experimentation as well as their readiness through the application form
2. RRI preparation phase • Method of implementation • Direction • Data collection • Logistical preparation	• Co-creates the implementation procedure • Organizes the workshops • Is responsible for data collection • Agrees with schools on the form of cooperation and appropriate tools	• Proposes the implementation process, the status, and roles of the stakeholders • RRI experts and the EdTech team provide the Ministry with expert input and foreign examples	• Participate in co-ordination meetings • Provide initial data to the Ministry • Agree with the Ministry on the form of cooperation • School principals appoint the project team
3. Launch of RRI • Identifying weaknesses • Goal setting • Activity plan • Monitoring framework and practising	• Leads the launch of project implementation • Coordinates and leads schools in setting ambitious goals • Gives schools a mandate to test their own ideas • Approves the indicators and proposes a method for data evaluation	• RRI experts co-create concept for launch and mentor the Ministry team • EdTech team provides examples from abroad and the feedback on school plans	• The school team sets a measurable goal • The school team creates activity plan • The teachers identify weaknesses • The teachers propose how they want to measure the goals set

[23] Currently, teachers' professional development is guided by a professional development plan that is derived from the school's focus or priorities. Teachers receive a professional development allowance for selected professional development activities. The importance of professional development planning is underlined by making the granting of the professional development allowance explicitly conditional on the alignment of the activities undertaken with the needs of the school as set out in the professional development plan. This highlights the importance of understanding the educational needs of the school, including the educational requirements of teachers. As this is professional development, the planning of professional development takes into account the educational requirements of teachers. Once satisfied they will have a positive impact on the quality of education and training of pupils.

[24] E.g. Infovek 1, Infovek 2, Digitálni štúrovci 1, Digitálni štúrovci 2, support for digitalization and training of ICT teachers in national projects, including the position of the School Digital Co-ordinator into legislative framework, etc.

4. RRI implementation and monitoring of progress • Implementation of activity plan • Intermediate results collection	• Helps schools overcome implementation challenge • Collects intermediate results from schools	• EdTech team assists the ministry and guides schools on implementation issues • RRI experts mentor the Ministry on the appropriate way to collect data • Documents the implementation process	• Implement activity plan • Document intermediate progress • Adjust the plan based on progress and intermediate results
5. Collection of results and evaluation • Results, findings • Ensuring sustainability	• Leads the final meeting to evaluate the results • Emphasises the sustainability of the project	• RRI experts contribute to the evaluation of the results achieved	• They present the results and findings • Create a plan for sustainability

Source: Own elaboration, EPI

The call for applications for the project was communicated on 9 June 2021, schools were given the deadline until the end of June to express their interest[25]. Nearly 90 schools expressed interest, and due to the capacity of the Ministry as well as the nature of the project, they were selected for both the first and second phase of the project based on questionnaire and evaluation matrix in total of 6 schools[26] (3 schools in each phase). Prior to the official launch of the project, the school held one-on-one meetings with a team from the Ministry and the World Bank to present its vision in relation to one of the three areas of experimentation from the 8A model [27].

The schools primarily addressed one main area of experimentation, but because these areas are not isolated from the others, they also marginally overlapped with other areas of the 8-Affordances (8A) model (Box 1).

- **Multimodal aspect of digital technologies** – Passive forms of teaching prevailed over activating methods at all school levels in Slovakia.[28] Similar conclusions emerged from the TALIS 2018 study[29]. The multimodal aspect of digital technologies, i.e., the possibility to combine at least two different sign systems, (e.g., verbal text, static or dynamic images, sound, movement, etc.) cannot only increase learners' ability to process and use information obtained simultaneously from several types of media, but can also motivate teachers to rethink their classical methods of teaching[30]. The premise behind the Ministry's selection of this area was that it would support digital transformation in schools.
- **School cooperation and teacher networking through digital technologies** – information and experience sharing on different digital platforms and networking between schools is not very widespread in Slovakia. The most significant decline was observed in teacher cooperation in areas such as the team teaching, teaching materials sharing and discussing the progress of certain pupils' learning outcomes. The Ministry's assumption was that the creation of learning communities, which allow problems to be viewed from multiple perspectives, can improve cooperation between teachers.
- **Accessibility, i.e., more open use of digital tools in schools** – creation and adaptation of digital content in education (Digital Competence Framework) is a fundamental educational need for the 21st century[31]. One of the expectations from the Ministry was to start using a form of project-based and inter-subject learning[32] at schools.

[25] Tlačová správa Projektový šprint. (Project Sprint press release)

[26] The diversity of the selected schools was to be ensured by the representation of urban and rural schools from every region of Slovakia with different levels of digital technology equipment and with different composition of teachers and pupils (see Criteria table)

Box 1: Model 8-Affordances (8A)

While there is no direct evidence of the impact of digital technology in the classroom on student achievement, **there are studies that show that digital technology promotes active learning, better student engagement in the classroom, increases student satisfaction and motivation to learn[33].**
Model 8A presents the ways in which digital tools can support teachers, who are then able to devise and use more effective ways of teaching. It consists of the following areas: Ubiquitous learning (anywhere, anytime), active learning (making sense), emphasis on multimodality (different media - text, audio/visual, data), recursive feedback (formative assessment), collaborative learning (social interaction and sharing of learning activities), differentiated teaching (tailored to individual learners' needs), metacognition (the ability to think and reflect on one's own thought processes), accessibility (open and inclusive learning environment)

1. Creation of teams

The task of each school was to assemble a team of 5 to 8 members, consisting mainly of the teaching staff of the schools. The formation of the team was approved by the school management, which also gave the members the opportunity to experiment while implementing solutions to meet the goals. The cooperation between the Ministry and the schools was led by a member of the Education Policy Institute (EPI), supported by other staff from the Ministry and World Bank experts.

2. Identification of weaknesses

This is one of the key prerequisites for the successful use of the RRI method in the process of digitalization of education. SELFIE and TET-SAT (Box 2) were used as the tested tools to identify weaknesses in the digitalization process. Both tools are free of charge, schools can use them in an online environment without unnecessary administrative costs. Schools could also carry out the identification of weaknesses using a questionnaire that they created themselves, depending on what they wanted to address during the project. The questions were mainly directed at pupils' perceptions of learning with digital technologies.

[27] Mochizuki Yoko, Sandra Gudino, Russell Hazard, and Irais Santillan-Rosas (2019), Rethinking Pedagogy: Exploring the Potential of Digital Technology in Achieving Quality Education. UNESCO: Mahatma Gandhi Institute of Education for Peace and Sustainable Development.

[28] Analýza zistení o stave školstva na Slovensku – To Dá Rozum 2019.

[29] A significantly higher proportion of Slovak teachers reported, compared to the OECD average, that they use teaching strategies such as - I explain to students what I expect them to learn; I explain the connections between old and new material; I set objectives at the beginning of the lesson. Conversely, significantly fewer teachers have pupils work in small groups to find a solution to a problem together, or show pupils tasks that have no obvious solution, or have pupils use digital technology for projects or classwork – as shown in Zistení o slovenských učiteľoch v treťom cykle štúdie OECD TALIS 2018 – Part 1. (Findings on Slovak teachers)

[30] https://vzdelavanie21.sk/wp-content/uploads/2022/05/Vychodiska-zmien-v-kurikule-zakladneho-vzdelavania.pdf

[31] https://www.eursc.eu/BasicTexts/2020-09-D-51-en-2.pdf

[32] Interconnections between subjects, understanding of causes and relationships beyond the subject framework (e. g. in science, when learning about trees, it is possible to combine the topic with geography and look for rare or protected trees in Slovakia, at the same time it is also possible to connect this with the materials conductivity (wood) in physics). Source: Pedagogický slovník. Průcha Ján, Walterová Eliška, Mareš Jiří. 2003. Vyd. 4., aktualizované. Praha. 2003. ISBN 80-7178-772-8.

[33] Castañeda, L. and Selwyn, N. (2018), More than tools? Making sense of the ongoing digitizations of higher education, International Journal of Educational Technology in Higher Education, 15, Article no. 22. doi: 10.1186/s41239-018-0109-y.

Box 2: Tools to identify weaknesses in the digitalization of education

SELFIE - Self-reflection on Effective Learning by Fostering the Use of Innovative Educational Technologies

SELFIE anonymously collects the views of school management, teachers and pupils on how digital technology is used in their school[34]. The whole survey takes the form of pre-defined but also school-supplemented statements and questions. The evaluation is based on a simple scale of agreement from 1 to 5. The questionnaire takes approximately 30 minutes to complete, and the questions are always tailored to the specific group (school management, teachers, and pupils). Pupils are asked questions about their experience of learning with technology, teachers about training, management about planning and overall strategy for digitalization. Findings from SELFIE help to understand the process of digitalization within the school and can initiate discussion about possible further or different integration of digital technologies into the school's teaching or strategy. When used annually, SELFIE can also be an indicator of a school's progress.

TET – SAT - Technology Enhanced Teaching Self-Assessment Tool

The aim of TET-SAT is to stimulate self-reflection among teachers who are interested in assessing their digital competences, motivating themselves to develop them further as well as monitoring their own progress. The TET-SAT assesses 4 dimensions of digital pedagogical competence: digital pedagogy, digital content use and production, digital communication and collaboration, and digital citizenship. There are sub-areas within each dimension, and in each of them 5 outcome levels can be achieved (Starter, Beginner, Capable, Proficient, Expert). At the end, teachers are asked to relate to each level of competence and choose the statement that best describes them in practice. They do not have to share the result with school management or colleagues.

The schools´responses from SELFIE and TET-SAT were then divided into 4 areas, based on the background to the forthcoming reform of primary and lower secondary education[35]:

- Equipment and resources
- Ability of teachers to use digital technologies
- Ability of teachers to teach differently using digital technologies
- Learner´s digital competencies

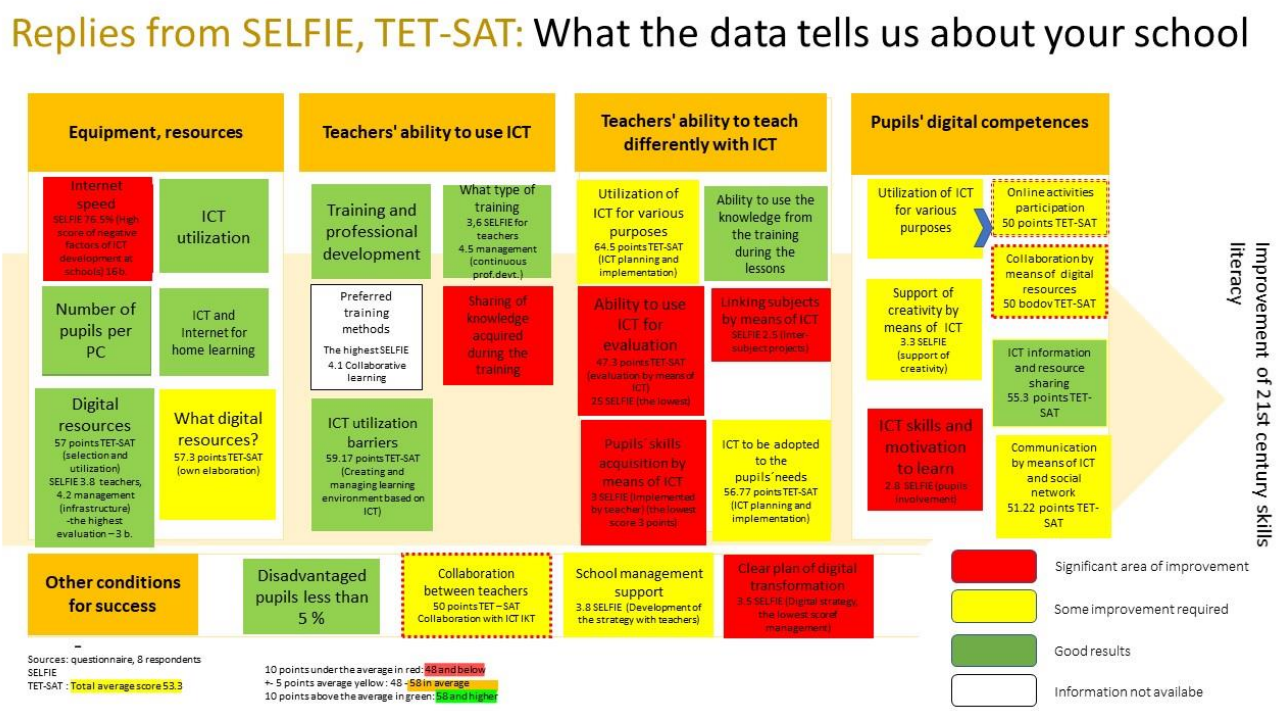
Individual sub-areas were assigned to the 4 main areas, which identified the school's weaknesses in the form of a traffic light (Figure 3). The sub-areas were mainly based on the structure of the SELFIE questionnaire. This division also allowed the Project Sprint prompt "how to teach differently using digital technologies" to be simplified to a specific school objective.

Holmes, W., Anastopoulou, S., Schaumburg, H. and Mavrikis, M. (2018), Technology-enhanced personalised learning: untangling the evidence. Stuttgart, Germany: Robert Bosch Stiftung.
Pane, J.F. (2018), Strategies for implementing personalized learning while evidence and resources are underdeveloped. Santa Monica, CA: Rand Cooperation.

[34] Video instructions available: https://www.youtube.com/watch?v=1xDhRmaKhvs

[35] Vzdelávanie pre 21. storočie východiská zmien v kurikule základného vzdelávania

Figure 3: Example of identification of weaknesses based on SELFIE and TET-SAT



3. Setting the time interval

For the RRI method, it is important to set a timeframe by which the specified results should be achieved (e.g., 100 days[36]), of course, the specifics of the project (e.g., the impact of the planned reform) may require a different interval. In the Project Sprint, two periods were set – 50 days in the first phase and 100 days in the second.

Based on the experience of the project, a longer interval (100 days) brings more comfort to the participants and does not create as much pressure as a lower number of days. Over a shorter period, in turn, the increased pressure contributes to rapid and effective change.

4. Goal setting

A properly set goal should be **sufficiently ambitious, but at the same time realistic** (e.g., with respect to capacity and time). The funnel method (Box 3) was used to specify specific goals.

[36] The 100-day challenge

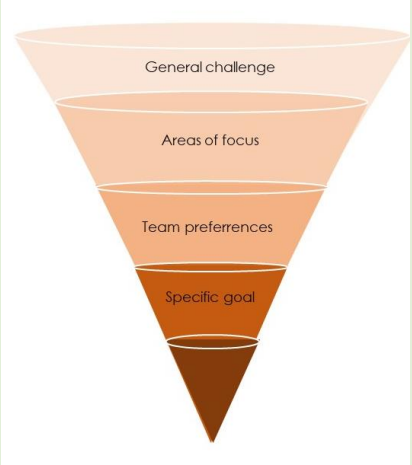
Box 3: Example of a goal setting process

Schools were looking for ways to teach differently using digital technologies as a catalyst for pedagogical change. However, they needed to simplify this challenge into a concrete and measurable goal. Based on the identified weaknesses highlighted in red (Figure 3), schools formulated their own questions. These were based on the specific area they wanted to address:

1. How to create inter-subject connections in our school using digital technologies?
2. How can we increase the proportion of experiential learning using digital technologies to enable students to apply knowledge to real-life problem solving?
3. How can we increase students' motivation to learn using digital technologies?
4. Another question (formulated by the school itself, in case they don't choose from the predefined ones)

Team members within one school agreed on question 2, where they saw the biggest area for improvement. In this way, the challenge was narrowed down to a specific question, but one that is not measurable. List of standardized questions helped to identify the problems and obstacles preventing achievement of the goals in more details. They also chose a sample of pupils or a group of teachers that the school wanted to focus on in the project and the time limit of 100 days was set. Based on question 2, it was then possible to define a measurable indicator considering the time constraint: *Over the next 100 days, we want to ensure that all pupils in the school take one lesson that covers more than 2 interrelated topics and share it with another group of pupils using digital technology.*

"Funnel"method for goal setting



5. Measurable indicator setting

The key to a measurable indicator is the ability to measure and count it over time, it is advised to avoid logical values[37]. One possible approach is to determine the current state based on the measurement and set a target value accordingly[38].

Setting measurable indicators and targets helps management to better direct activities to meet the goal. Ongoing evaluation supports the motivation of project participants in achieving the goal.

6. Project implementation

Project implementation requires staff capacity, including at least a minimum level of digital technology equipment. The experience of the project has confirmed the direct involvement of the school management as a

[37] Example of an inappropriately set measurable indicator, based on the fact that it is a logical value: Will the introduction of an electronic Pupils´Gradebook in the classrooms succeed? – target value: Yes / No. Correctly, it should be the number or proportion of classes with an e-Pupils´Gradebook in place – target value: number of classes e. g.15 out of 18 classes or at least 84% of classes.

[38] Other goals may be to catch up with the national average (e.g.T5 and T9 results, or TET-SAT scores, where each respondent can compare themselves with their national peers in each area) or the second way of setting a value for the whole sample, i. e. 100%.

major benefit. Detailed examples with specific procedures are described in 3 case studies: Case study 1, Case study 2 and Case study 3.

7. Results evaluation

The evaluation of the results is carried out by comparing the planned and achieved target value. Recommendations from the project experience suggest continuous progress monitoring at the mid-term interval. In case of lagging behind, schools motivated each other, and shared recommendations for implementing changes through digital technologies. In both the first and second phases of the project, all six schools were able to achieve their goals (Table 2).

Table 2: School results

School		Indicator	Original value of indicator	Planned target value	Actual target value	Increase (balance actual and original value)
Phase 1 (50 days)	**ZŠ Laborecká 66 Humenné**	Percentage of lessons in which digital tools were used in teaching/learning and pupil assessment	30 %	50 %	50 %	20 %
	ZŠ Rabčice	Creation of teachers'-career portfolios published on the school's website	0 %	50 %	50 %	50 %
		Percentage of pupils achieving above average digital literacy based on the NIQES table	0 %	50 %	65.5 %	65.5 %
	ZŠ Uhrovec	Percentage of lessons (out of the total) in which digital technologies were used	22.7 %	40 %	42.42 %	19.72 %
		Percentage of teachers out of the total number of teachers in the school with at least minimal digital skills	30 %	80 %	80 %	50
Phase 1 (100 days)	**ZŠ J. A. Komenského Sereď**	Number of pupils who have completed at least 1 lesson with more than 2 interrelated topics and who shared it with another group of pupils using digital technologies	0	554 (100 % of the total)	554 (100 % of the total)	554 pupils
	ZŠ Uzovské Pekľany	Number of pupils whose digital skills are at the level to be able to prepare annual project assignment with the use of digital technologies	0	40 (58 % of the total)	46 (67 % of the total)	46 pupils
	ZŠ Gaštanová 56 Žilina	Number of pupils actively learning from the shared repository materials in the classroom [39]	0	200 (37 % of the total)	259 (48 % of the total)	259 pupils

Source: Project Sprint results, EPI

In general, schools confirmed that the introduction of digital technologies or the increased use of digital technologies brought positive externalities related mainly to changes in teaching practices (changes in the role

[39] In Project Sprint ZŠ Gaštanová Žilina focused on the primary school (1st - 4th year).

of school management, teacher, and the pupil) and increased motivation of both teachers and pupils to learn, collaborate and communicate with each other, including among teachers.

Recommendations

In addition to opportunities for further RRI implementation, the proposed recommendations are based on other experience of the Project Sprint as well as already launched reforms.

At the policy level:

- Advisory services at Regional Centres of the National Institute of Education and Youth related to RRI method and its implementation at schools.
- Mentoring provided to the schools by newly established Regional Centres during RRI introduction as well as provision of quick interventions aimed at the schools´ results and active approach to the schools.
- Encouraging the schools to share elaborated teaching materials as well as their strategic documentation related to digitalization through online platforms[40].
- Supporting the financial sustainability of the position of School Digital Coordinator.
- Using the RRI method to accelerate the implementation and measurement of curricular reform results in digital literacy.
- Supporting the offer of training activities to develop teachers' digital skills.

At the level of schools or school founders:

- Using available SELFIE or TET-SAT tools to identify areas for improving digitization in education.
- Active participation and direct support of school management in utilization of the RRI method aimed at identified goals achievement.
- Support of sharing digital information between the teachers, e.g., through an internal repository.
- Establishing a school digitalization strategy as part of the School Curriculum and sharing it with other schools through online platforms.
- Support for the implementation of professional development of teaching staff mainly in the form of refresher courses[41] aimed at improving teachers' digital skills (e. g. mentoring between teachers).
- Strengthen the role of digital competences in the assessment and remuneration of teachers.

The document presents the views of the authors and the Education Policy Institute, which do not necessarily reflect the official views and policies of the Ministry of Education, Science, Research and Sport of the Slovak Republic. The aim of the analytical outputs of the EPI is to stimulate and improve the professional and public debate on current topics of education, science, and research. The document has not been subject to language editing.

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[40] Possibility to be used at national level from RRP - Component 7: Education for 21st Century

[41] Pursuant to Section §57 ongoing training and refresher courses Act No. 138/2019 Coll.

Annexes

Questionnaire

Question No. 1	If you had the opportunity to choose just one area you would like your school to focus on for the Project Sprint, which one would it be?
Question No. 2	Write how you would like to implement your chosen area from the previous question in your school during 50/100 days in cooperation with World Bank experts and the Ministry of Education, Science, Research and Sport of the Slovak Republic.
Question No. 3	Which of the following tools do you currently use in your school to make the use of online tools more effective in the teaching process?
Question No. 4	Which teaching/learning materials do you currently use in your school to improve the transfer of information to pupils?
Question No.5	Which activities do you currently use to improve the interaction and active involvement of pupils in the teaching process at your school?
Question No. 6	How do you create the educational content in digital skills tailored to the needs of learners?
Question No.7	How do you evaluate the use of digital technologies in the educational process at your school?
Question No. 8	How does your school ensure the development of the digital skills of teachers/pupils?
Question No.9	How does your school use digital technologies to share learning content and activities for pupils/colleagues and to promote active participation in the process of experience and best practice sharing?
Question No.10	What does your school's active cooperation with other schools (e. g. transfer and sharing of information) and other relevant stakeholders look like?
Question No. 11	How does your school support the use of digital learning content to improve the digital skills of pupils/teachers?

Evaluation matrix

Number of points	0	4	7	10	Weights	Total points
Selected area vision - description	No vision described. The description is insufficient to give an idea of the vision of digitalisation at the school.	The description is too general, it is not possible to form a concrete picture of the vision of digitalisation at the school.	The description is sufficient to give a basic idea of the vision of digitalisation at the school.	The description gives a complete idea with specifics that will help in the further process during the project.	4	
Area No.1: Multimodality - Effective use of digital technology tools in the educational process to improve the transfer of information to pupils, interactivity and active involvement of pupils in the teaching process.	The school did not select any of the above options and did not indicate its own tool in the "Other" box.	The school has only selected the predefined options in multimodality.	The school did not select any of the predefined options but indicated its own tool in the "Other" box.	The school responded specifically to the question by selecting at least one of the options listed, while indicating in the "Other" box its own tool for each of the sub-questions in the multimodality area.	2	
Area No.2: Accessibility - More open and inclusive use of digital tools in the educational process, including support for the learning process of both teachers and pupils.	The school did not select any of the above options and did not indicate its own tool in the "Other" box.	The school has only selected the predefined options in the accessibility area.	The school did not select any of the predefined options but indicated its own tool in the "Other" box.	The school responded specifically to the question by selecting at least one of the options listed, while indicating in the "Other" box its own tool for each of the sub-questions in the area of accessibility.	2	
Area No.3: Virtual collaboration in education - Using digital technologies to share learning activities and information and to encourage active participation in the process of sharing experiences and examples of good practice.	The school did not select any of the above options and did not indicate its own tool in the "Other" box.	The school has only selected the predefined options in the area of virtual collaboration in education.	The school did not select any of the predefined options but indicated its own tool in the "Other" box.	The school responded specifically to the question by selecting at least one of the options listed, while indicating in the "Other" box its own tool for each of the sub-questions in the area of virtual collaboration in education.	2	

School selection criteria

School size
small (1-200 pupils)
medium (201-400 pupils)
large (401+ pupils)

Type of school
town school
rural school

Digital equipment
fully equipped (100-60%)
partially equipped (59-35%)
poorly equipped (34-0%)

Geographical location
west
middle
east

Student structure
marginalised Roma community
withou marginalised Roma community

Presence of digital coordinator
present
not present

A set of standardised questions for goal setting

	Standardised questions	Team criteria that should be used to decide/answer the question
A. Choose a question * Based on the data from Selfie and surveys	Which of these areas would you most like to experiment in? Which one is important for your school?	Weaknesses according to SELFIE, TET-SAT, and survey data
B. Create the goal	What accomplishment in this area would you be so proud of that you would want to tell your friends and family about?	Results that the school team would like to achieve
C. Discuss the obstacles	Why haven't you implemented the goal yet? What are the obstacles?	Shortcomings according to SELFIE, TET-SAT, survey, and your own opinions
D. Narrow the question	What are your skills in this area and ideas on how to improve things? Which subjects/years do you want to focus on?	Your own opinions
E. Make sure the objective is quantifiable and result-oriented	What questions would you like to have answered by the end of the Sprint? Start with "How could we...".	Support of the mentor
F. Summarize the question	N/A	N/A

CASE STUDY 1

How to increase the motivation of pupils from disadvantaged backgrounds to learn by means of digital technologies

Video link: https://www.youtube.com/watch?v=CzzbC6AQeuA

Participating school – data for the school year 2021/2022

Primary school with nursery, Uzovské Pekľany, district of Sabinov
Number of pupils: 69
Number of teachers: 11
Average age of the teaching staff: 37 years
Note: Primary school only (1st – 4th year)

Background

Almost 90% of children attending school in Uzovské Pekľany are from socially disadvantaged backgrounds or with disabilities. When children enter the first year, teachers focus mainly on the teaching of hygiene standards and gradually try to improve children's motivation to learn. The school operates in new premises and is technically very well equipped – every pupil has a tablet; classrooms are equipped with interactive whiteboards. Nevertheless, neither pupils nor teachers have been able to make sufficient use of digital technologies in the teaching process. However, the school had a lot of support from the management and had a cooperative and creative team.

Problem definition

Despite sufficient technical equipment for classrooms and pupils (a tablet for each pupil), both teaching staff and pupils had low digital skills.

Solution

Increase pupils' motivation to learn by preparing the annual assignment using digital technologies. The topics will be given by the teacher, the specific topic of the assignment will be determined by the pupils themselves. Digital technologies provide opportunities for pupils to study the chosen topic independently, develop it creatively and share their final work with classmates via the MS Teams platform. A prerequisite for the completion of the assignment is a quick training and mentoring in the use of the selected applications and the MS Teams platform by both teachers and pupils by the digital coordinator.

Implementation process

1. Teachers jointly define the thematic areas of the pupils' annual assignment.
2. In collaboration with the digital coordinator, they will select appropriate apps for the students to use during the preparation of the annual assignment. The digital coordinator will create a training plan for teachers to use the apps themselves and explain their use to pupils. He/she will gradually train them on the selected apps, mentor them and motivate them.
3. The teacher assists the pupil in selecting a specific topic and in preparing the outline of the annual assignment. The teacher guides the pupil to do research on the topic using digital technologies.
4. The teacher helps the pupil to create an account on MS Teams, where he/she gradually saves the documents for his/her annual assignment. The pupil works on the assignment in MS Teams both during the lessons and from home.
5. The teacher makes sure that the pupil uses digital technologies as much as possible in the implementation of the tasks and observes where and in what he/she may need help.

6. The final version of the annual assignment is uploaded by the student via OneNote in the MS Teams.
7. At the end, each pupil presents his/her work to the rest of the class.

Results

- Teachers have strengthened their ability to guide pupils and develop their creativity, empathy, and encourage cooperation between older and younger pupils, for example when presenting their annual assignments. They have been able to start motivating pupils to take responsibility for their own equipment and technology, but especially for their own learning, thus preparing them better for further learning.
- The teachers' approach to the pupils and the method of work (independent annual assignment) increased the pupils' self-confidence (especially when presenting their achievements). It can contribute significantly to developing their internal motivation to learn. The use of digital technologies (mainly tablets) and available applications (e.g.in the creation of comics, animations, poems, puzzles) has increased their creativity and ability to cooperate with their classmates.
- The pupils' annual assignments also motivated their parents to further learning. There are courses provided by the school to strengthen parents ´digital skills.

How to measure utilisation of this innovation

- Percentage of pupils, or number of pupils out of the total number of pupils in the school, who can complete the annual assignment using digital technologies and upload it to MS Teams.
- Percentage of pupils, or number of pupils out of the total number in the school, who also use school technology for home learning.

Proposal for long term sustainability

- Introduction of so-called user licences for the use of tablets. The conditions for using and taking home the devices are set by the school. This licence can be obtained if the pupil demonstrates sufficient skills to take care of the tablet. Then he/she can then take the tablet home or work with it before and after school.
- Implementation of the annual assignment as part of the teaching process in any given school year.

CASE STUDY 2

How digital technologies can help thematic learning and increase students' motivation to learn

Video link: https://www.youtube.com/watch?v=OlT9osFnEvY

Participating school – data for the school year 2021/2022

Jan Amos Komenský Primary School, Komenského 8, Sereď, district of Galanta
Number of pupils: 547
Number of teachers: 36
Average age of the teaching staff: 46 years
Note: fully organized primary and lower secondary school (1st – 9th year)

Background

The school was relatively well equipped with digital technology, and teachers had improved their digital skills through training during the pandemic. They try to apply the knowledge they have gained in the classroom today. The school is involved in a pilot project to test the Framework Curriculum and Learning Standards. As part of this project, the school has revised the school curriculum for the 2020/2021, eliminating duplication of educational content in individual subjects, thus creating the conditions for more effective and creative learning.

Problem definition

Despite curriculum adjustments, the school did not make sufficient use of the potential of inter-subject relations in the teaching process. In addition, teachers' use of digital technologies was low.

Solution

The introduction of thematic teaching will enable effective interlinking of individual subjects. An emphasis will be put on the use of digital technologies and applications to help develop collaboration between pupils and motivate them to learn.

Implementation process

1. Teachers will choose a communication platform (e.g., MS Teams) to record, plan and share the created materials.
2. When planning thematic lessons, it is important that teachers of each subject work together and agree on a topic that will guide the lessons, e.g. on a given day[42]. Such activity is recorded in a table by the person in charge (Model table for inter-subject learning)[43].
3. The person in charge creates a spreadsheet that includes a list of teachers, the goals to be achieved in the subject on that day, and a list of applications and materials that are needed to achieve the goal[44].

Example of spreadsheet for inter-subject teaching

[42] The implementation of thematic teaching may be easier at the primary level, where almost all subjects are taught by one teacher. For example, in the school in Sereď, the third-grade teacher linked the content of the Slovak language and reading with mathematics and informatics within the topic Our Town; she used computers and notebooks while teaching art and electric ladybirds while teaching English.

[43] As part of the thematic teaching, the school took advantage of the teaching of younger pupils by older pupils on the occasion of Earth Day. Older pupils encrypted the information into QR codes, while the younger pupils had to decipher, sort and transfer the information into a readable form in their science lessons.

[44] At the beginning the school decided to do trial runs of subject content linking in some classes.
For example, in the first year of primary school, the teacher chose the topic Our Town and dealt with it in several subjects (during the Slovak language class the pupils learned about local writers and linked it to history, where they learned about cultural monuments in the town). In the fifth year, the school decided to link biology and mathematics. The school tried to implement thematic teaching in the past, at least once in a month.

Class	Subject	Teacher	Objective of the lesson	Inter-subject relations	Teaching and learning materials/apps
3.B	Slovak	Teacher 1	Slovak: Key words identification and their usage in reproduction of the text	Science, literature, mathematics, geometry, music, school club	Tablets, PCs, interactive boards, BLUE BOT Ema, Lego, Google Maps, Kahoot, Vimboard, presentation, RNA, YouTube, QR codes, PlantNet
	Mathematics Geometry	Teacher 2	Math: use of natural numbers to model real-life situations, collect data and record it in different ways GEO: use of natural numbers to model real-life situations, collect data and record it in different ways		
	Literature Science P.E.	Teacher 3	Literature: which information is key with respect to the perception of the text Science: show the village on the map, interpret pictures about the village and its inhabitants P.E.: pupils can improvise movements to music or given themes SKD: school club - environmental education		

Source: ZŠ Sereď

4. Successful implementation requires the teachers to be able to work with digital technologies. Therefore, it is important that they receive training on the applications they want/will use in the classroom (e. g. Vimboard, PlantNet).
5. The trainer may make a record of each training session to be uploaded to a designated location. Gradually, a database will be created to be used by teachers. The role of designated person in charge is very important. This person co-ordinates activities and training sessions and assists with utilization of digital technologies.
6. Reflection and feedback follow thematic teaching. It may include updating of the table or adding the information based on practical experience to be used later[45].

Results

- Increased digital skills of teachers and pupils resulting from increased use of digital technologies in the classroom.
- Increasing the attractiveness of lessons through the utilization of innovative methods and digital technologies in the classroom.
- Pupils are taught in context, resulting in development of their creativity, critical thinking, and increased motivation to learn.
- Teaching process is more attractive.
- Increased number of teachers working with multiple applications. This was achieved by sharing their knowledge/experience after training.
- Improved collaboration between the teachers as well as between the pupils.

How can we measure this innovation and its utilization?

- Percentage of teaching hours or number of hours taught in thematic teaching with emphasis on linking the content of several subjects out of the total number of lessons.
- Percentage of pupils or number of pupils (out of total) who have received thematic teaching with an emphasis on linking the content of several subjects.

Proposal for long term sustainability

- To implement thematic teaching as part of the teaching process in each grade throughout the school year.

[45] Individual project stakeholders decide about the form of feedback, whether they wish to introduce it in the form of a table for each material, questionnaire or other method of feedback collection.

CASE STUDY 3

Shared repository of digital resources and how it can increase collaboration at school

Video link: https://www.youtube.com/watch?v=OlT9osFnEvY

Participating school – data of 2021/2022

Primary school with nursery, Gaštanová 56, Žilina
Number of pupils: 537
Number of teachers: 39
Average age of the teaching staff: 54 years
Note.: Primary and lower secondary school (1st – 9th year), it focused on the primary level (1st – 4th year) in this project

Background

The school was relatively well equipped with digital technology, some of the equipment was older and the necessary technical equipment (e. g. interactive whiteboards) was not available in all classes. Prior to the project, teachers attended various training sessions. However, they did not share much information from them, and their collaboration, especially during the pandemic, was limited. Most of the teachers searched for digital materials on their own. They used mainly the materials from Zborovna.sk. It was quite time consuming to find up-to-date resources. Teaching materials were mostly shared in printed format. The school management promoted experimentation in the school, as well as the development of teachers' long-standing experience of creative teaching in a learner-centred environment and their willingness to experiment.

Problem definition

Lack of communication between teachers and the lower level of digital skills of the teaching staff prevented the creation and sharing of information and materials in digital form. Thus, the learning content was not very attractive.

Solution

Creation of a common internal repository for digital materials (e. g. uschovna.sk). Sharing of resources between teachers during lesson planning and making the teaching process more attractive for pupils.

Implementation process

1. Teachers diagnosed their digital skills individually[46] and identified applications and topics they could assist with in training their colleagues. They have also identified the areas of their own support.
2. They agreed on the structure, content, and functionalities of the internal repository on uschovna.sk.
3. The digital coordinator (or other designated person) created a shared spreadsheet to record the required data and completed trainings for teachers, e.g., 15 teachers were trained online on 30/3/2022 in how to use e-textbooks in class and create folders in the shared repository etc. (Source: ZŠ Gaštanová 56, Žilina)

4. Digital coordinator (or another authorized individual) created shared repository at https://uschovna.zoznam.sk. A folder has been created within the internal repository, for each year, and within the year´s folder there were further folders created for the different subjects taught in that year.
5. Teachers uploaded materials in digital form (text documents, presentations, tests, links to the applications used) to the folders.
6. The table included records on how many pupils attended a lesson during which the teacher used digital materials from the shared repository. Teachers recorded pupil´s feedback when actively using the materials in the classroom, which they later included in the feedback on the materials used[47], e. g. MAT 4 materials were

used on 28/03/2022 during 4 lessons with 25 pupils. Feedback received from the colleagues-teachers was excellent.

7. Once in a quarter, teachers evaluated the quality of materials shared on the internal repository to improve the quality of the shared content for their colleagues. This exercise has also improved the collaboration between the teachers. At the same time there were materials identified that required editing or update that improved their quality.

Results

Results related to the teachers:

- More efficient lesson planning and time saving while preparing lesson materials.
- Easier access and utilization of up-to-date digital materials for teachers.
- Continuous development of digital skills by working in a digital environment (e.g., preparation of teaching materials, utilization of internal repository functionalities as well as more frequent utilization of digital technologies during the lessons).
- Improvement of teachers´ collaboration by creating an internal repository, using internal assistance and the digital experience of other colleagues.
- Relevance and easy accessibility of materials, adapted to the school environment.

Results related to the pupils:

- More interesting lessons, fostering pupils' creativity, imagination, and motivation to learn.
- Smoother lesson flow in classrooms where digital technology has been adopted and the content is taken from an internal online repository.
- Increasing pupils' autonomy and collaboration during lessons.

How to measure its successful implementation

- Proportion of the number of digital resources in the repository compared to the number at the beginning of the project.
- Percentage of the total number of lessons using materials from the repository.
- Percentage of pupils out of the total number who worked with materials from the repository.
- Material quality measurement by its rating against a scorecard (feedback from colleagues who have used material from the shared repository).

Proposal for long term sustainability

- Comprehensive setup of the internal repository structure – labelling of years, grades and precise naming of folders and files.
- Regular checking and deleting of unnecessary folders and files that are outdated or not needed.
- Annual measurement of teachers' digital competences and soft skills through e.g., SELFIE, SELFIE for Teachers, TET-SAT or Ucitel21.

[46] Based on tools already in use, such as SELFIE or TET-SAT, or through self-reflection in particular areas of digital technology utilisation.

[47] For example, by interaction: pupils who liked the lesson raise their hands and those who did not like it do not do so. Based on the number of likes and dislikes, the teacher records the feedback in a table.