LearnIn – a gamified digital ecosystem

Gregory Turkawka, 2020

Author: Gregory Turkawka, https://turkawka.info/about, gregory@turkawka.ch
Orientation: C
Mentors: René Bauer, Dr. Mela Kocher

Cite as

Turkawka, Gregory. (2020, September). LearnIn - a gamified digital ecosystem. Zenodo. https://doi.org/10.5281/zenodo.4011303

hdk
Zürcher Hochschule der Künste
Zürcher Fachhochschule
Departement Design
Game Design

Masterthesis to Obtain the Academic Degree

Master of Arts in Design (M.A.)

Acknowledgment

«Knowing you might not make it… in that knowledge courage is born.»

William S. Burroughs

A great shout out loud to Jürg and Judith from Zurich University of Teacher Education and Nora from UNICEF. They supported and reflected my ideas and concepts from the very beginning. Special thanks to Nora and all others from the LearnIn Regional Task Force. Only with their work, trust and endurance during COVID-19 crisis, this thesis transformed from theory into practice. Also, I would like to thank all those critical friends I met during my journey, adding their perspective and letting me learn, grow and understand. Finally, I would like to express my humble admiration to everyone close. You made all of it happen by helping me with patience, love and infinite support.

Abstract

English

«LearnIn – a gamified digital ecosystem» is offering a solution to the human right of education. The design empowers learners through high quality, culturally relevant learning opportunities and by connecting people and resources along needs and goals. The set of interoperable tools enables collective intelligence and helps learners to find content, peers, projects and mentors.

The decentralized, OpenID system realizes single sign-on credentialing and management of data in a personal learning record store. Achievements, engagement or collaboration is rewarded with tokens. As a solution to enable also under-banked or unbanked learners' access to paid educational offerings, these tokens will be backed-up with real value as a stable coin and function as an exchange voucher.

Keywords: DID, LRS, Learning Environment, OpenID, Achievement Maps, OER, SDG4, Learning, xAPI, Tokens, Credentials, SSO, oAuth, Education

Deutsch

«LearnIn - ein gamifiziertes digitales Ökosystem» leistet einen Beitrag zum Menschenrecht auf Bildung. Qualitativ hochwertige, kulturell relevante Lernangebote ermöglichen es den Lernenden, entlang von Bedürfnissen und Zielen Lerngemeinschaften zu bilden und Lernwege zu planen. Kollektive Intelligenz unterstützt die Suche von Inhalten, Lernpartnern, Projekten oder Mentoren.

Das dezentralisierte OpenID-System ermöglicht Single-Sign-On und die sichere Verwaltung von Daten im persönlichen Profil. Errungenschaften, Engagement oder Zusammenarbeit werden mit Tokens belohnt. Als Lösung, um auch Lernenden ohne Bankverbindung den Zugang zu bezahlten Bildungsangeboten zu ermöglichen, werden diese Token mit einem realen Wert als Stable Coin hinterlegt und funktionieren so als Gutschein.

Keywords: Digitale ID, LRS, Lernumgebung, OpenID, Achievement Maps, OER, SDG4, Lernen, xAPI, Tokens, SSO, oAuth, Bildung

Long Abstract

The belief that every child has the right to an education and quality learning opportunities are at the core of UNICEF's and UNESCO's human rights approach to education. The Convention on the Rights of the Child (CRC) and the Convention on the Rights of Persons with Disabilities (CRPD), both clearly express the aim of guaranteeing quality education for all and the importance of providing the required holistic support to develop each learner's potential.

The question «How can one grant learners with limited resources identified access to formal and informal learning resources, organize the achievement storage and gamify the personal learning environment?» builds the core of LearnIn, a digital learning initiative designed to support both teachers and students as life-long learners. In light of the learning crisis, efforts to reach the furthest behind must shift focus to improve student learning outcomes and skills development, while strengthening teachers' competencies in quality inclusive education. The initiative will provide quality, personalized and culturally relevant learning opportunities within a digital environment, fostering collaboration and shared practice.

The concept of the LearnIn initiative is a puzzle of various existing elements and the thesis describes their individual necessity and their interconnection for sustainability in detail. All elements got vetted by a feasibility study and the thesis outlines the efforts and measures to be taken for a successful and scalable implementation.

Although universal digital identification systems are explored by many and personal learning record stores as part of LTI or xAPI collectors do exist, the creation of a global digital identification systems is currently contested by Google, Microsoft and Facebook as most widely used 3rd-party authentication systems. Furthermore, open access to educational resources is despite the digitalization a dream for many.

Aggregating formal and informal learning data and collecting them in a personal learning record store is a very sensitive issue and can't be trustworthy offered by companies or countries. This might be a reason there are currently no initiatives that succeed to implement a global system of digital identification nor a personal learning record store for everyone.

Creating a decentralized digital identity verification system to grant access to a personal learning record store where informal and formal learning achievements get aggregated by xAPI-protocol, is building the ground for further use. An artificially intelligent, tokenized, value-backed platform that analyzes personal achievements, badges and

certificates and further learning opportunities according to culture and field of experience will offer additional educational resources, job opportunities or new fields of interest.

The combination of institutional or open educational resources and informal learning opportunities with selectable educational achievement maps and a tokenized value system for further access to payed learning resources has not been realized yet. By creating a token system that is backed up with real funds as part of a personal learning record store, also the un-banked population can experience learning as value and gets invested in further educational resources. Achievement maps and a non-biased evaluation and matching-system will give orientation and offer individual, personalized learning paths for further exploration as well as new possibilities to proof or certify achievements and competences.

By constantly adding new resources, learning results and achievements the data can be crunched and analyzed by artificial intelligent systems to offer clusters, trends and insights. The results in combination with an engaged community of learners can be used for further, also collaborative learning, the creation of new educational resources or for paid projects, job recruitment and job offerings. The semantic matching-system will help to find fits according to industry according to its cultural backgrounds. A blockchain as ledger will store all sensible data and build the trusted system for the users.

The concept is highlighting the elements needed for an educational solution to UNESCO's SDG 4 goals and is part of a joint project of UNICEF ECARO and Zurich University of Teacher Education. It should be shared and further developed in the sense of "Working Out Loud" together with interested individuals, organizations, developers, educators, NGOs and learners. The time frame for the development and piloting of the platform is five years, starting Spring 2020 after a feasibility study and needs assessment, that are part of this thesis.

Keywords: LMS, Learning Record Store, LRS, OER, SDG 4, AI, Blockchain, Digital ID, Certificates, xAPI, Batches, Matching-System, Achievement Maps, Gamification, PLE

Abbreviations

ADB	Asian Development Bank
AI	Artificial Intelligence
AKF	Aga Kahn Foundation
ASFR	Age-specific fertility rate
BLA	Blended Learning Approach
CoE	Council of Europe
CoPs	Communities of practice
CPD	Continuous Professional Development
CRC	Convention on the Rights of the Child
CRI	Center of Research and Interdisciplinarity
CRPD	Convention on the Rights of Persons with Disabilities
DCC	Donor Cooperation Council
DID	Decentralized digital identity
EAEU	Eurasian Economic Union
ECAR(O)	Europe and Central Asia (Office)
ECE	Early Childhood Education
EMIS	Educational Management Information System
ETF	European Training Foundation
FTI	Fast Track Initiative
GIZ	Gesellschaft für Internationale Zusammenarbeit
GPE	Global Partnership for Education
HDI	Human Development Index
ICT	Information and Communications Technology
IDB or IsDB	Islamic Development Bank
JICA	Japan International Co-operation Agency
JSRs	Joint Sector Reviews
KfW	Kreditanstalt für Wiederaufbau
LEG	Local Education Group
LMS	Learning Management Systems
LRS	Learning Record Store
LTI	Learning Tools Interoperability
MoES	Ministry of Education and Science

MoLME	Ministry of Labor, Migration and Employment
MOOCs	Massive Open Online Courses
MTAP	Mid-term Action Plan
NQF	National Qualifications Frameworks
NRR	Net Reproduction Rate
NSED	The National Strategy for the Education Development
oAuth	Open Standard for Access Delegation
OER	Open Educational Resources
OSI	Open Society Institute
PLE	Personal Learning Environment
PLN	Personal Learning Network
PVET	Primary Vocational Education and Training
QESP	Quality Education Sector Project
RIITT	Republican Institute for In-service Teacher Training
RVA	Recognition, Validation and Accreditation
SDG 4	Sustainable Development Goals (4 = Education)
SES	State Educational Standards
SSO	Single Sign On
TajStat	Tajikistan Agency on Statistics
TCF	Teacher Competency Framework
TFR	Total Fertility Rate
TLSS	Tajikistan Living Standards Survey
VET	Vocational Education and Training
WB	World Bank Group
WEF	World Economic Forum
WFP	World Food Programme
xAPI	Experience API

Table of Content

Acknowledgment ..... **III**

Abstract ..... **IV**

Abbreviations ..... **VII**

Table of Content ..... **IX**

1. Introduction **11**

1.1 Problem Statement 11
1.2 Research Question 13
1.3 Aim and Scope 13
1.3.1 Context 13
1.3.2 Vision 14
1.3.3 Interest 15
1.4 Thesis Overview 15

2. Intended Learning Methods and Corresponding Features of a Digital Learning Environment **17**

2.1 Objectives, Procedures and Methods of Instructional Design 17
2.2 Motivation, Curricula and Instructional Design 17
2.3 Gamification of Learning Experiences 19
2.4 Lifelong Learning and Accessibility 20

3. Requirements and Potentials **21**

3.1 Prerequisites for Inclusive Education 21
3.2 General and Institutional Requirements 22
3.2.1 Registration and Login 23
3.2.2 Open Educational Resources, Open Licensing and Interoperability Standards 24
3.2.3 Institutional Requirements 24
3.3 Profiling, Matching and Learning Path Recommendation 25
3.3.1 Achievement Maps 26
3.3.2 Learning Support by Artificial Intelligence Systems 27
3.4 Formative Guidance and Summative Review Options 28
3.5 Dedicated Learning Networks and Social Interactions 29
3.6 Recognition, Validation and Accreditation 30
3.7 Sustainable and Trustworthy Long-Term Operation 31
3.8 Conclusion 32

4. Methodology, Data Collection and Analysis 36

4.1 Approach 36
4.2 Evaluation of the Methodology, Data Collection and Analysis 38

5. Preliminary Investigations 39

5.1 Overview 39
5.2 #LEARNINGPLANET Strategic Workshop 39

5.2.1 Digital Tools and Architecture 40
5.2.2 Growth – Partnership Strategies (Content, Communities, Media) ... 45
5.2.3 Sustaining – Social Business Model and Fundraising Strategy 46
5.2.4 Conclusion 48

5.3 LearnIn - Country Visits 48

5.3.1 Mission Objectives 49
5.3.2 Tajikistan 49

6. Analytic Results 71

6.1 Overview 71
6.2 Needs Assessment 71
6.3 Digital Ecosystem 78
6.4 Conclusion 84

7. Conclusion & Future Work 86

7.1 Answers to Research Questions 86
7.2 Implication for Practice 87
7.3 Recommendations 87

8. References VI

8.1 Bibliography VI
8.2 List of Figures XIV

9. Appendices XV

9.1 #LEARNINGPLANET Strategic Meeting, January 25th, 2020 XV
9.2 Distance Learning – from Emergency Solution to Equal Opportunities for all (unpublished draft) XXV
9.3 Needs Assessment: Example T2.3 – EdTech Challenges XXXVII

10. Statutory Declaration XLV

1. Introduction

1.1 Problem Statement

THE HUMAN RIGHT OF EDUCATION has found its instantiation within the Sustainable Development Goals (SDGs) as SDG 4, "Ensure inclusive and equitable quality education and pro-mote lifelong learning opportunities for all".[1] Nevertheless, the means to bring about necessary changes are still not clear and little has happened since the SDGs were launched in 2015: Furthermore, the provision of inclusive education for refugees or unbanked learners around the world adds to the complexity of achieving SDG 4.

The Brussels Declaration (UNESCO, 2018b) of UNESCOs Global Education Meeting states that the world is not on track to achieve SDG 4 targets by 2030. 750 million youth and adults are not literate, 262 million children and youth do not attend school at all, half of all adolescents and youth complete secondary school, with only 18% in low-income countries – and 1% of the poorest girls. It is stated that "social, political, environmental and economic changes, as well as accelerated technological innovations, have pro-found implications for education and training systems." Accordingly, lifelong learning opportunities for all should be supported to ensure necessary competencies for personal development, decent work and sustainable development. The declaration highlights the important role of higher education and technical and vocational education and training. It recognizes the importance of skills through non-formal and informal education and learning.

At the "UNESCO Mobile Learning Week 2019 – Artificial Intelligence for Sustainable Development"[2] it was clearly stated that data driven decisions and solutions to improve education are welcome and will be pursued further. In a joint UNICEF/UNESCO workshop,[3]

---

[1] In "UNESCO, Education 2030: Incheon Declaration and Framework for Action for the implementation of SDG 4". (UNESCO, 2016)

[2] UNESCO's Mobile Learning Week 2019 organized from 4 to 8 March focused on Artificial Intelligence and sustainable development. The working paper 7 on education policy analyzes how AI and data driven decisions and solutions can improve education, explores the different means by which governments and educational institutions rethink and rework educational programs, addresses challenges an implication and reflects on future directions for data driven solutions like AI in education. (UNESCO, 2019a)

[3] At the workshop Jordan Naidoo (Director of Division for Education 2030 Support and Coordination UNESCO), Juan-Pablo Giraldo Ospino (Innovation in Education Specialist UNICEF) and Tim Unwin (Chairholder of the UNESCO Chair in ICT4D, coordinator of 21 UN agencies to develop UN-wide strategy for the future of education and learning) presented a development strategy and roadmap for the future of education and learning. (Naidoo, Giraldo Ospino, & Unwin, 2019)

an UN-wide strategy on the future of education and learning was discussed and a roadmap was presented.

The SDG 4 goals got divided into three principles: education is a fundamental human right; education is a public good; gender equality. To reach the goals five strategic approaches were suggested: strengthening policies, plans, legislation and systems; emphasizing equity inclusion and gender equality; focusing on quality and learning; promoting lifelong learning; and addressing education in emergency situations. UNICEF Regional Office for Europe and Central Asia states on their website (UNICEF Europe and Central Asia, n.d.) that "Millions of children are out of the classroom". According to their focus on educational systems to improve or transform education policies, provision, inclusion and quality, the regional office has published a leaflet with an overview of how to understand inclusive education (UNICEF, 2017).

Furthermore, three train-the-trainer modules on inclusive education were made available in 2015. The companion technical booklets to the 2014 webinar series[4] assist UNICEF staff and partners to understand the basic concepts of and issues around inclusive education. The 2012 recommendation of the Council of Europe (CoE) aims to ensure quality education for all and to define the role of public authorities in making this a reality (Council of Europe, 2012). In 2009, the Council of the European Union agreed that for the period up to 2020, education and training should be established in the context of a strategic framework. One of the four strategic objectives is the promotion of equity, social cohesion and active citizenship through high-quality inclusive education (Council of the European Union, 2009).

In 2015, the 3-year joint project "Regional Support for Inclusive Education" (Council of Europe, 2017) of the European Union and the CoE ended. The "Synthesis Report" (Golubeva, 2014) emphasizes the importance of an early stage staff training followed up by monitoring and evaluation, also as peer support (e.g. mentoring). To support the realization of inclusive education through teacher education, the "Tool to Upgrade Teacher Education Practices" (Hollenweger, Pantić, & Florian, 2015) was developed.

---

4 The series composed of 14 webinars can be found at https://vimeo.com/channels/842958. (UNICEF, 2014)

1.2 Research Question

«How can one grant learners with limited economic resources identified access to formal and informal learning resources, organize the achievement storage for learning pathway mapping, locating matching communities of practice or portfolio presentation and gamify the personal learning environment for sustained motivation and engagement?»

In addition to an extensive study of the published literature on the current education crisis and possible solutions and initiatives, the conditions for the success of institutional and informal education in general and specifically regarding digital access to education was done. The thesis focuses primarily on the training and further education of teachers, as important multipliers and institutional agents in the educational system. It is based on a pedagogical reference model[5] which provides the framework for understanding the key relationships between agents/actors, activities, systems and processes relevant to supporting learning in a given environment. Overall, this thesis examines which instruments and conditions are necessary to fulfil the humanitarian right to education for all. At the same time, the possibilities of gamification to increase motivation and lifelong learning are examined.

1.3 Aim and Scope

1.3.1 Context

Based on documents and findings mentioned above[6] and against the background of the most diverse requirements of all potential stakeholders and learners, the complexity of developing a sustainable digital educational platform, addressing today's and future needs and requirements, should be acknowledged. A system-wide, holistic approach to deliver inclusive, equitable and innovative education and learning for all must be taken.

Based on today's technology, it is possible to develop versatile, sophisticated solutions to meet these requirements. There are less and less technological hurdles in designing a multinational, openness-driven learning platform. Potential challenges can

---

5 The reference model was developed within the COVID-19 Task Force activities of UNICEF ECAR from March to June and is based on the findings and materials for successful inclusive education. (Hollenweger, 2020)

6 The Brussels Declaration (UNESCO, 2018b), the UNICEF Regional Office for Europe and Central Asia concept paper (Asia, 2018; UNESCO, 2016), the SDG 4 goals \cite{UNESCO2016}, the findings at the UNESCO Mobile Learning Week 2019 (UNESCO, 2019c) (Naidoo et al., 2019), UNICEF Regional and Office for Europe and Central Asia's materials (UNICEF Europe and Central Asia, n.d.) and recommendations (UNICEF, 2017), the recommendations of the Council of Europe (Council of Europe, 2012) and Council of the European Nation (Council of the European Union, 2009; Golubeva, 2014) including the Synthesis Report of the Joint Project (Golubeva, 2014) and the results of PHZH & UNICEF Workshop March 2019 (Turkawka, Soobrayan, et al., 2019).

often be overcome by using appropriate resources. However, fundamental questions of data protection and the right to privacy are increasingly coming to the fore and become part of the political and regulatory agendas[7]. Ethical and culture-based questions regarding the use of data are getting into focus, especially with regard to vulnerable groups and biased data as well as its use for machine learning in artificially intelligent systems[8].

Furthermore, the regional differences of education systems and the digital representation of training material must be considered. The implementation of a platform serving all needs will require a close partnership between international organizations like UNICEF/UNESCO, the participating countries, other governmental and nongovernmental agencies and various technology and content providers. Ensuring a sustainable, long-term operation and ongoing technological and educational development of a digital educational service pose additional challenges.

1.3.2 Vision

End of March 2019 the importance of continuous professional development of teachers, efficient and effective policies, opportunities for sharing promising practices, professional autonomy and career pathways for teachers as stated in the Brussels Declaration (UNESCO, 2018b) were discussed at Zurich University of Teacher Education with UNICEF's Regional Office for Europe and Central Asia.

Based on the concept paper "Realising the rights of children to quality and inclusive education through a blended learning approach" (UNICEF, 2018) and against the background of the most diverse requirements of regional and national educational areas and the learners themselves, elements of a sustainable solution were identified.

After an initial reflection on the outcomes of the workshop, key components of a feasible solution were defined. Starting with the individual learner, who may be physically in different settings at different times, and the extremely heterogeneous needs and potentials of involved institutions and organizations, such a project is confronted with many challenges that require a joint, coordinated, creative and clarified use of resources.

---

7 See also "European Data Protection Supervisor" at https://edps.europa.eu/. ("EUROPEAN DATA PROTECTION SUPERVISOR," n.d.)

8 See also "DataEthics News" at https://dataethics.eu/news/ and "UNESCO recommendations". (UNESCO, 2019d)

1.3.3 Interest

The challenge of designing and implementing of a multilateral learning platform through distinctive application scenarios – by considering the needs of individual stakeholders and future users – can be addressed by a holistic approach. A suitable platform requires adequate solutions regarding

- how and in which settings we learn or teach;
- how we access, maintain and use our personal data;
- how we produce, access, reuse and exchange content;
- the skills and competences that are reflected in curricula or by employers;
- the feedback, e-assessment and certification;
- social interactions, communities of practice and personal learning networks;
- maintenance, data ownership and operational funding

1.4 Thesis Overview

This thesis has the following structure: In the next section "Intended Learning Methods and Corresponding Features of a Digital Learning Environment", the requirements of users, institutions and organizations with regard to the intended way of learning and teaching, and under consideration of various settings are elaborated. The aim is to empower the users for lifelong learning and raise their awareness in relation to culture bias, data protection and sustainable long-term operation are laid out.

The "Requirements and Potentials" of such an environment are stated in the third section. Subsequently, the paper examines the

- "Prerequisites for Inclusive Education",
- "General and Institutional Requirements",
- aspects of "Profiling, Matching and Learning Path Recommendation",
- "Formative Guidance and Summative Review Options",
- "Dedicated Learning Networks and Social Interactions" and their key role in the process of learning,
- importance of "Recognition, Validation and Accreditation",
- before ending the section by describing factors of a solution for "Sustainable and Trustworthy Long-Term Operation"

The "Results" of the literature review are summarized at the end of the section.

The approach to answer the research question of "*How one can grant learners with limited economic resources identified access to formal and informal learning resources, organize the achievement storage for learning pathway mapping, locating matching communities of practice or portfolio presentation and gamify the personal learning environment for sustained motivation and engagement?*» is described in section four: "Methodology, Data Collection and Analysis".

Section five gives insights into two selected "Preliminary Investigations". A strategic workshop that circled around similar questions to those this thesis is focusing on and the results of a country visit, reflecting the actual needs and conditions of Tajikistan. The in-depth exchange with experts at the strategic workshop in January 2020 served as well as a reality check like the results from Tajikistan, a country at the bottom of the scale of digitalized countries. Tajikistan was visited after Kyrgyzstan in February 2020, just before COVID-19 set an abrupt end to the intended research activities.

Section six "Analytic Results" displays therefore the results of a qualitative "Needs Assessment", conducted during the COVID-19 crisis by a newly build task force, tackling emerging and immediate needs of educational systems in ten countries in Europe and Central Asia. The second part of this section elaborates the design decisions taken while realizing parts of the "Digital Ecosystem", earlier described in the literature review in section two and three that also were part of a proposal to UNICEF in June 2019. During realization further questions raised and were discussed accordingly.

Finally, the thesis concludes by answering the research question in consideration of the findings and recommendations are made. Possible limitations get outlined and further research or investigations are suggested.

2. Intended Learning Methods and Corresponding Features of a Digital Learning Environment

2.1 Objectives, Procedures and Methods of Instructional Design

Before considering different requirements and frameworks to promote lifelong learning, one should think about what characterizes good learning[9]. It can be summarized as:

- Encourages reflection
- Enables dialogue
- Fosters collaboration
- Applies theory learnt to practice[10]
- Creates a community of peers
- Enables creativity
- Motivates the learner to act

In many respects, these can be achieved with adequate technologies and fostered by pedagogical approaches that can be described as associative, constructivist, situative and connectivist. In addition, one should stress the importance of ensuring and improving the quality of the learner experience in educational and instructional designs. The aim is to empower for lifelong learning. For example, requirements change before, during and after enrolment in institutional training courses or job seekers have different needs than students following a well-defined curriculum.

2.2 Motivation, Curricula and Instructional Design

Learning desires or needs may be personally motivated or initiated by an institution or organization. A personal interest in learning may be oriented towards other goals than the often curriculum-based programs of countries, organizations or institutions. An educational platform should serve both. Learners are expected to create their learning pathways according to their individual aspirations. A rich, finely segmented, filterable educational offer provides the basis for designing appropriate learning paths according to personal goals.

Institutions, organizations or countries must be able to provide learning opportunities for identifiable individuals or groups with appropriate educational resources

9 See also the nature of learning and the learner experience stated by Gráinne Conole in her article about MOOCs as disruptive technologies. (Conole, 2016)

10 Supports development of actionable knowledge.

in accordance with curricula or educational plans. Planned courses and monitoring of learning objectives in compulsory learning situations must be provided.

In order to meet the individual needs of learners and the requirements of education providers, a learning platform must also facilitate various forms of blended learning, the use of content repositories and the provision of fully virtualized learning environments. These settings can be support-ed by tutors or teachers or are designed to require complete independent studies. Every learning platform should offer help and guidance to the learners and motivate them in form of

- possibilities of an individual curricula design according to needs;
- different entry point into the materials
- formative elements like tests or learning progress indicators;
- collaborative exchange in communities of practice or feedback from peers, tutors or teachers;
- learning outcome assessments, badges, statements of accomplishments and verified certificates;
- influencing behavior while taking cross-cultural differences into account.[11]

Learning Management Systems (LMS) and Massive Open Online Courses (MOOCs) usually integrate some of these elements. LMS like Moodle, Blackboard, ILIAS, Canvas or others are often used in closed institutional environments. They provide some of the mentioned elements but usually do not take personal requirements into account and commonly hinder exchange and interactions with learners outside of the LMS. The materials and the learner's internal interactions are mostly not accessible after finishing a course or after leaving the institution. MOOCs found on platforms like Coursera, edX, Udacity, Khan Academy, Futurelearn, Udemy etc. can come in form of active course sessions with participant interaction, or as archived content for self-paced study.[12] They can attract many thousands of enrollees around the world. The learning environments in LMS and MOOCs are designed from an institutional perspective. Because they do not really support the transferability of materials and results, they are not fully supporting lifelong learning.

Informal learning outside an institutional setting also benefits from content of social networks[13] and other resources as a source of valuable information. By storing, organizing and reflecting learning materials the learner is building a Personal Learning Environment (PLE). By interacting with other learners, critical friends, mentors and experts a Personal

[11] Like culture of learning, educational system, curricula etc.

[12] An introduction to MOOCs can be found on www.reviews.com/mooc-platforms/ (Reviews.com, 2018)

[13] Like Facebook, WhatsApp, YouTube etc.

Learning Networks (PLN)[14] evolves. PLE and PLN are both strongly supporting lifelong learning and are maintained and controlled by the learner.

2.3 Gamification of Learning Experiences

One also should think of introducing game design elements or integrate game design principles to influence behavior and motivation. The hope is, that adding elements, such as those found in games, to learning activities will create immersion in a way like what happens in games. By incorporating game mechanics in the design of a learning process, we would engage learners in a productive learning experience.

Dichev's review about gamifying education (Dichev & Dicheva, 2017) "reveals that (i) insufficient evidence exists to support the long-term benefits of gamification in educational contexts; (ii) the practice of gamifying learning has outpaced researchers' understanding of its mechanisms and methods; (iii) the knowledge of how to gamify an activity in accordance with the specifics of the educational context is still limited." Further it is stated, "This does not mean though that gamification cannot be used with success in a learning context. It simply means that the educational benefits of gamification have not been scientifically confirmed yet."

Antonaci identified in her study (Antonaci, Klemke, Stracke, & Specht, 2017) game elements that are eligible for further testing within Massive Open Online Courses (MOOCs). She suggests, "Empowerment, Smooth Learning Curves and Communication Channels" to enhance users' learning performance, "Levels, Clues, Communication Channels, Smooth Learning Curves, Goal Indicators and Skills tree" to enhance the goal achievement and to enhance MOOC users' engagement "Guild, Skills tree, Storytelling."

An adaptive gamification model based on relations of player types and gamification features as suggested by Lavoue (Lavoue, Monterrat, Desmarais, & George, 2019), could enhance motivation and participation of learners separately. The suggested educational platform should be built in a way one is able to introduce game design principles and connect gamified elements with learning analytics to track the users' activity in the form of sequential streams (i.e., Activity Stream and its derivatives). Then a dynamic learner profiles adaption based on activity, could take the evolution of preferences into account.

[14] A PLN is the set of interpersonal connections to other people related to the personal learning process.

2.4 Lifelong Learning and Accessibility

To complement and complete formal school education, lifelong learning opportunities should be provided through non-formal pathways with adequate resources and mechanisms and through the promotion of informal learning, as well as through the use of ICT.[15] The learning platform outlined in this paper provides access to tested, qualitative materials and offers, links the learners, institutions and organizations and enables a comparison of learning goals, learning statuses and programs. "Around 40 percent of the world's population now has access to the internet. Increasingly, however, new users come online using a mobile phone only, especially in emerging markets such as India, Indonesia, Brazil, and Nigeria."[16] The platform must be accessible with mobile devices. It must support the demand to enable all learners to receive education at any time and almost anywhere. Thus, it also offers refugees or war victims in times of need a learning opportunity and a place of documentation (learning progress, certificates). To cover the full potential of mobile learning, one should focus on formal and informal learning[17] settings and perspectives that range from cognitive to participatory learning viewpoints.[18]

The support of boundless and frontierless lifelong learning for all is not only a technical but also a privacy and data protection issue that has to be thoroughly discussed.

---

15 SDG 4 is based on a broad understanding of education and the principle of lifelong learning.

16 See Lindberg's article "Designing for the Next Billion Users". (Lindberg, 2018)

17 Formal learning occurs as a result of experiences in an education or training institution, with structured learning objectives, learning time and support, leading to certification. Non-formal learning is not provided by an education or training institution and typically does not lead to certification. It is, however, structured (in terms of learning objectives, learning time or learning support).

18 As stated in UNESCO "A lifeline to learning: Leveraging technology to support education for refugees". (UNESCO, 2018a)

3. Requirements and Potentials

This section explains the requirements to support learners, institutions and organizations on their way to achieving the SDG 4 goals and shows the potential of connecting the elements. The following aspects are described:

- General and institutional requirements;
- Personal profiles, their comparison with competence profiles and the creation of learning path recommendations;
- Formative support systems and summative review options;
- Learning groups, social interactions and learning networks;
- Recognition, validation and accreditation;
- Sustainable, long-term operation and further ongoing technological and educational development.

The aspects presented in this section are necessary elements of a digital learning environment to meet the different needs and requirements of learners, teachers, institutions and organizations in their effort to support the realization of inclusive education. A platform designed accordingly should enable blended learning approaches as well as virtualized settings for self-paced formal and informal learning.

3.1 Prerequisites for Inclusive Education

The prerequisites of building a framework towards inclusive education were thoroughly analyzed and described during the Joint European Union and Council of Europe Project "Regional Support for Inclusive Education in South East Europe" (Council of Europe, 2017). The project promoted the concept of inclusive education as a reform principle that respects and caters for diversity amongst all learners. The summary report states that "an ideal policy would be one which recognizes the existing resources which could be invested in inclusion in order to create effective support systems on both national and local levels..." (Venäläinen, 2014).

As specified in the final report,[19] the teachers are key change agents in the process of building and establishing inclusive education. Their impact is profound. Focusing on their professional development through improved initial teacher education and by offering high-quality opportunities for further education will raise their understanding of learning. "Good practice of teacher education is not only about conveying the relevant information and training skills; it is also about addressing attitudes and values and ensuring that what has been learnt can be translated into practice. Effective teacher education seeks to change teachers' practices, not merely their under-standing. If teacher education is to be understood as a practice to change teachers' practice it should be analyzed as such. … Teachers cannot merely apply what they have learnt; they must transform the knowledge to ensure the integrity of the over-all activity. Problem-based learning or case-based approaches can help develop situational awareness."[20]

The reports and studies highlight the need of supporting networks, on site and digitally available. Tools and materials on a digital platform can support various dimensions of teachers' professional development.[21] The digital learning environment presented here will take heterogeneity and diversity of users, institutions and organizations into account.

3.2 General and Institutional Requirements

The required foundations and concepts on the organizational, pedagogical or methodological side were presented in detail in various studies and reports developed by UNICEF and in the above-mentioned joint project. Following these findings, the next sub-sections presents above all technological solutions. In order not to lose sight, the following

---

[19] The final report "Mapping existing quality inclusive education training programes within the South East Europe Region" sought to contribute to the vision-building and development process the TeacherNet and the other networks of the Joint European Union and Council of Europe Project were tasked with (Hollenweger, Pantić, & Field, 2014). The study identified a need for transversal collaboration among the diverse players in the inclusion area: universities, ministries, schools and other providers of teacher education. As a result, the "Tool to Upgrade Teacher Education Practices for Inclusive Education" (Hollenweger et al., 2015) was developed, in coordination with the development of three "Train the Trainer" modules on inclusive education by UNICEF, that can be found on their educational website (UNICEF Europe and Central Asia, n.d.).

[20] The activity theory, as elaborated in the final report, provides a useful model to analyze problems or the way people engage in activities and help develop practice (e.g. become better teachers). The model is part of the above-mentioned tool and the three modules on inclusive education.

[21] These dimensions may include the different stages of teachers' professional development (e.g. novice, experienced, expert), types of knowledge targeted (e.g. "know-that", "know-how" and "know-why"), level of changes targeted (e.g. intra-personal, inter-personal, systemic), focus of development (e.g. teachers' identity, teachers' practice or teachers' communities) as well as the over-all purpose of the activity (e.g. create teachers, improve practice, implement innovations). (Council of Europe, 2017), (Hollenweger et al., 2014)

parts are described from the perspective of the individual user,[22] partly supplemented by the institutional view.

3.2.1 Registration and Login

To grant access to a digital learning platform for as many users as possible, it is important to design the user interface and the login procedures simple, clear and flawless. Today many users are accessing platforms through 3rd-party authentication systems provided, for example, by Facebook, Twitter, Google, Microsoft, etc..[23] These comfortable opportunities to register and login are widely used. Today most learning management systems (LMS) or massive open online courses (MOOCs) offer 3rd-party authentication as an additional service to its own user registration and login process or even provide access only[24] through 3rd-party authentication.

With respect to privacy laws and (trans-)national data protection legislations, 3rd-party authentication by tech-giants might get inhibited in the future. Therefore, ideally a digital educational identity, provided by or in cooperation with international organizations like UNICEF, UNESCO, the Internet Society and so on, would grant identification and access. A strong encrypted digital identity would facilitate lifelong learning and grant learners the security of independent non-profit, non-governmental care.[25]

---

[22] Described from the first contact (registration) up to community driven quality control as part of a sustainable long-term operation.

[23] For further information on secure OAuth-Single Sign-On see Hossain's paper. (Hossain, Hossain, Hossain, Sohag, & Rahman, 2018)

[24] Registration requires usually an authentication of the provided email address. These authentication emails often get into spam folders and are not found by users. Also, users are often forced to make use of strong passwords which they then forget. The password recovery process generates again emails that will then land in spam folders.

[25] In general, authorities and institutions - including the European Commission and the European Parliament – are trusted more than commercial companies (European Commission & (Ec), 2011: p 2). While widely applauded as a tool for empowerment and inclusion, DID have also raised many red flags, especially for human rights experts as discussed at recent re:publica convention (re:publica, n.d.). Several different digital identification systems have already been or are in the process of getting developed, but none has had a global educational perspective yet. The concept of a self-sovereign identity as a novel framework for the creation, management and interaction of digital identities, represents a major leap for both digital and analog interactions (Némethi et al., 2017).

3.2.2 Open Educational Resources, Open Licensing and Interoperability Standards

Open Educational Resources (OER) "... help improve education across the globe. They are important for developing countries, where many students may not be able to afford textbooks, where access to classrooms may be limited, and where teacher-training programs may be lacking. They are also important in wealthy industrialized countries, where they can offer significant cost savings".[26]

In addition to the provision of an open-source licensed infrastructure "the primary mechanism employed in support of open access, and therefore, open learning generally, is open licensing."[27] Not only free access to content is important, but also the ability to share content thus accessed.[28] To exchange content[29] between various learning management systems (LMS), interoperability standards have to be met.[30]

A multilaterally implemented digital learning environment has to build its core upon "Open Educational Resources", aggregate content consequently and under an "Open License" policy and ensure interoperability, reusability, flexibility and scalability by applying newest standards.

3.2.3 Institutional Requirements

For institutions, organizations and other educational providers, it is not only important to be able to provide OER and open licensed materials to learners but also to ensure and be ensured that the materials provided are of good quality and meeting their educational standards.

In addition to the general requirements of a system that can enable "Education for All" in the sense of SDG 4 objectives; such a system must make participating organizations and partners identifiable and visible. Offers from UNICEF, curricula from institutions or

---

26 Further findings on UNESCO's webpages about OER. (UNESCO, 2019e)

27 See also Downes article about "New Models of Open and Distributed Learning". (Downes, 2017)

28 Typically, under Creative Commons license.

29 Also, in form of learning objects like repositories of learning resources (exercises, tests, e-assessments, parts of created courses, etc.).

30 As Bakhouyi states "The standards of content and e-learning structure are established to ensure the interoperability of e-learning systems so that accesses to sources of information such as content reuse or discrimination of subjects from different sources at different times are possible." (Bakhouyi, Dehbi, Lti, & Hajoui, 2017: p 1) Interoperability standards (SCORM, IMS Caliper Analytics, xAPI, CMI-5) lay the ground to be able to exchange, combine and (re-)use content from various environments like LMSs (Moodle, ILIAS, OLAT, etc.), MOOCs or from more informal learning resources as YouTube, Wikipedia and other cloud-based learning resources.

from a country and additional resources from further educational providers[31] should be clearly displayed, tagged by the system and easily selected by the learners.

A comparison of the materials of organizations or syllabus of countries with specified standards[32] enables selective and individual recommendation of learning paths to the platform's users the provided learning objects and materials. Organizations, institutions and teachers can address individual learners and learning groups and offer structured curricular learning paths based on their own or combined standards and curricula.

3.3 Profiling, Matching and Learning Path Recommendation

In addition to the individual recording of existing skills and competences through self-evaluation, confirmation by peers or through badges and certifications, the personal value profile in relation to skills, competences and learning objects should also be compared with the offers of regional, national or global organizations and institutions. Every learning program is based on values.

The contents conveyed, the competences to be achieved and also the way in which they are presented are culturally shaped. The concepts of the producers or the specifications of national curricula define the offer. These cultural values correspond or collide more or less with the learners' ideas and values.

As a basis for the most accurate possible fitting of learning offers with individual needs, the concepts of good inclusive education should be analyzed by interviewing selected individuals of each education system, revealing its specific cultural value pattern.[33]

Subsequently, the system can continuously analyze, review and compare both individual and institutional conceptions of currently important competences and practices. The evaluation of personal perceptions of what good practice is, enables comparison with the standards and recommendations of experts, institutions or along international frameworks. As a result, supply-specific or curricular gaps and similarities can be mapped.

On the basis of evaluated cultural patterns comparison is possible at the level of content, skills, competences and values. This could lead to the development of a shared vision of inclusive education that goes beyond the principles stated in international

[31] E.g. Kahn Academy, edX, Coursera, Pearson, Udemy, Lynda, Youtube etc.

[32] Like UNICEF's standards of inclusive teaching and learning.

[33] Cultural value patterns can be revealed with tools such as the Nextexpertizer in comparatively small survey groups. (nextpractice, n.d.)

conventions and government policies or at least will show different cultural developments among its users.[34]

On the one hand, profiling serves to control supply, as described above as an institutional need, and on the other hand, to support lifelong learning under the aspect of changing needs over time. Conversely, organizations and institutions can look at the level of competence and attitudes of a group on specific issues and compare them with their own or other organizations' and institutions' value and competence profiles. The membership of users in learning groups, classes or training courses also give group administrators an overview of the existing and still to be developed competences of their learning group and their basic attitude towards the standards on which the offer is based.

3.3.1 Achievement Maps

Achievement maps are intended to provide further access to new skills and competences in a visually appealing way. They map individual skills and competences and point to learning opportunities to acquire new ones. The achievement map supports the reflection of one's own learning status and the comparison with future learning or career goals. Further comparisons and their evaluations, also by means of artificial intelligence (AI), are conceivable and possible according to need and provisioned data.

Games often implement achievement maps or skills tree to visualize further possibilities and their prerequisites. Elements eligible for example for further testing within Massive Open Online Courses (MOOCs) are

- "Empowerment, Smooth Learning Curves and Communication Channels" to enhance users' learning performance,
- "Levels, Clues, Communication Channels, Smooth Learning Curves, Goal Indicators and Skills tree" to enhance the goal achievement
- and to enhance MOOC users' engagement "Guild, Skills tree, Storytelling."

So, achievement maps not only give overview and orientation, the also could support goal achievement and learner's engagement.[35]

---

34 The Federal Ministry of Labor and Social Affairs in Germany has made such an evaluation for the comparison against personal values on the topic of Work 4.0. (Antonaci et al., 2017; Bundesministerium für Arbeit und Soziales, n.d.)

35 See identified game elements by Antonaci. (Antonaci et al., 2017)

3.3.2 Learning Support by Artificial Intelligence Systems

As stated in UNICEF's recent "Executive Summary on Artificial Intelligence and Children's rights"[36] AI-based tools have three general orientations in terms of their use in educational settings: learner-facing, teacher-facing and system-facing. Adaptive learning systems that are learner-facing employ algorithms, assessments, student feedback and various media to deliver material tailored to each student's needs and progress.[37]

Under the teacher-facing category, AI helps teachers with administrative tasks such as grading papers or AI-incorporating robots are being brought to classrooms in a way that alters how students learn. Even though educational robots promise great benefit – such as personalized learning, helping kids develop social skills, enabling distance education for children in remote regions – they also pose risks.

Analyzing data from across schools or from learner groups can predict performance and help advise teachers or learners accordingly. The system-facing AI-tools could also help monitor and evaluate the application of newly acquired skills and competences.[38]

However, AI systems struggle to be responsive to the values, goals, and principles of different communities. We now have too many examples of systems that make incorrect tradeoffs, focus' on "needs" that do not really exist, or otherwise reflect the biases and perspectives of the developers rather than the people who are affected by the AI.[39]

The role of artificial intelligence in education is expected to increase exponentially over the coming years. Thus, it's imperative that stakeholders come together to evaluate the risks of using AI and assess opportunities to use the technology to maximize wellbeing in a thoughtful and systematic manner. In May 2019 the participants of the "International Conference on Artificial Intelligence and Education" reviewed the recent trends in the evolution of AI and its profound impact on human societies, economies and the labor

---

36 The UNICEF Innovation executive summary "Artificial Intelligence and Children's Rights" summarizes the recent research of the Human Rights Center at UC Berkley School of Law on how artificial intelligence technologies are being used in ways that impact children at home, school, and at play. (UNESCO, 2019a), (UNICEF Innovation, 2019)

37 For example, AI may be used to enhance social skills, especially for children with special needs (see Brain Power) or build career skills by language learning applications (like Duolingo).

38 As suggested in the synthesis report. (Golubeva, 2014)

39 "Big Data analytics and artificial intelligence ("AI") draw non-intuitive and unverifiable inferences and predictions about the behaviors, preferences, and private lives of individuals." (Wachter & Mittelstadt, 2019: p 2 ff)

market, as well as on education and lifelong learning systems. In their consensus[40] the Director-General of UNESCO gets invited to seek to implement the action of the establishment of an "AI for Education" platform to act as clearinghouse for open-source AI courses, AI tools, examples of policies, regulatory frameworks etc. with a view towards promoting the AI for SDG 4. The cooperation with relevant UN and multilateral partners should get expanded and the integration of AI skills into ICT competency frameworks for teachers supported.

3.4 Formative Guidance and Summative Review Options

Feedback is an important component to be able to understand one's own learning success. Proven successes have a motivating effect. A simple form of feedback is the representation of learning progress within a selected learning object, course or learning path. By offering short tests within learning units, learning success can be verified quickly.

The exchange with other learners in discussion forums, peer reviews and feedback from tutors in accompanied learning units on learning products and reflections generate further possibilities to classify one's own learning process. Communities of Practice work together on learning products. The learning process is also promoted by the group in a participatory way.

If a learning object, course or learning path is successfully completed, badges can be awarded as success badges, for example. Learning success can also be tested in automated assessments.

Learners should also be awarded a statement of accomplishment or verified certificates after successfully completing courses or modules of institutions or organizations. Usually, certification in a digital environment requires a continuous identity check.[41] The "Digital Credentials initiative" mentioned in sub-section "3.6 Recognition, Validation and Accreditation" could be part of a solution.

---

[40] Find all recommendations of the participants – including 50 government ministers, over 500 international representatives from more than 100 Member States, and some 100 representatives from United Nations agencies, academic institutions, civil society and the private sector – in the outcome document "Beijing Consensus on Artificial Intelligence and Education – Planning Education in the AI Era: Lead the Leap". (UNESCO, 2019b)

[41] If the learner's verification does not take place on the spot in an examination institution, systems, such as those described by Fenu (Fenu, Marras, & Boratto, 2018), can now also verify the learner's identity in various ways. A digital identity as described in "General and Institutional Requirements - Registration and Login" could serve as a basis for identity verification and trusted certification.

It should also be possible to award users who have acquired particularly good expertise in a field. This is how positive examples become visible. The expert knowledge can be shown on Achievement Maps (see sub-section above) and thus made accessible to others. A reward system in the form of tokens or certificates may reward special commitment.[42] The recognition of special achievements and expertise can be a great motivation, especially for teachers.

3.5 Dedicated Learning Networks and Social Interactions

Social interactions play a key role in the process of learning. At the same time, learning increasingly takes place in virtual communities and knowledge is acquired through the connections between the learner and his or her personal learning network (PLN).[43] Collaborative learning with digital technologies and open educational resources is part of the proposed learning platform.

Communities of practice (CoPs) foster both individual and group knowledge and through the common activities, a sense of common identity and its shared practice, CoPs have been identified as an important success factor in educational contexts.[44] Social media and mobile devices are creating a range of opportunities. CoPs are established as part of the PLN and rely on elaborated communication tools like chat systems, e-portfolios, blogs, wikis, forums, etc. to share, interact and co-create knowledge and practice with members of the platform.

Learning activities are not only happening on a specifically dedicated learning platform but also on numerous other (learning) platforms and social media services like Youtube, Facebook, Google, etc. As Göschelberger and Steinbauer state "while the term PLN emphasizes the micro-scale of learning networks i.e. the local network of an individual, macro-scale analytics of the network provide essential information about roles of individuals and affiliation to communities. … personal learning networks evolve over time and changes in the personal learning network reflects information about the development of the learners' focus, preferences and aptitudes."[45]

The analyzed, combined data over all activities will be stored together with formative and summative learning records, building a personal learning record store as the backbone

---

42 For example, in Communities of Practice or the engagement as mentor, peer review partner etc.

43 A PLN is the set of interpersonal connections to other people related to the personal learning process.

44 See McDonald's article about "Communities of Practice". (McDonald, 2015)

45 See their article "Global learning network analytics to enhance PLN understanding". (Göschlberger & Steinbauer, 2017)

for learning analytics.[46] The personal learning record store (LRS) connects the learning data across different learning management systems, institutions and organizations and is therefore, a crucial element of the proposed learning platform.

3.6 Recognition, Validation and Accreditation

Besides learner's satisfaction and completion, recognition constitutes as one of the three incentives of MOOCs. According to Yang,[47] "Recognition, validation and accreditation (RVA) refers to the establishment of arrangements to make visible and value all learning outcomes (including knowledge, skills and competences) against clearly defined and quality-assured standards. RVA covers the whole process, including identification, documentation". On the "MOOC List", a directory of Massive Open Online Courses and Free Online Courses from different providers, there are various forms of recognition listed. One can filter courses with "Open Badges," free "Statements of Accomplishment," to pay "Statements of Participation," "Statements of Accomplishment," "Verified Certificates" and all its combinations.[48]

Also, in traditional offline settings RVA plays an important role. While digital technology has started to transform education by enabling new learning pathways that are customized to everyone's needs, the way that educational institutions issue and manage academic credentials has not changed much. Nine leading universities announced in April 2019 that they have formed the 'Digital Credentials Collaboration' in order to create a trusted, distributed, and shared infrastructure standard for issuing, storing, displaying, and verifying academic credentials.[49]

It is yet unclear if the collaboration will allow the storage of credentials other than digitally issued. In order to facilitate lifelong learning, the platform should play the role of a bridge between formal and non-formal education[50] and store digital as analogue learning outcomes (e.g. diplomas, certificates, participation statements). The personal learning

---

46 See Ocheja et.al about "Connecting decentralized learning records". (Ocheja, Flanagan, & Ogata, 2018)

47 See Yang's article about RVA for the UNESCO Institute of Lifelong Learning. (Yang, 2015)

48 https://www.mooc-list.com/types-of-certificates. (mooc-list.com, n.d.)

49 More about the Digital Credentials Initiative can be found on MIT's webpage. (Massachusetts Institute of Technology, 2019)

50 Formal learning occurs as a result of experiences in an education or training institution, with structured learning objectives, learning time and support, leading to certification. Non-formal learning is not provided by an education or training institution and typically does not lead to certification. It is, however, structured (in terms of learning objectives, learning time or learning support). (Yang, 2015: p 6 ff)

record store mentioned above in combination with a secure (self-sovereign) digital educational identity based on a shared standard will provide the key to RVA.

3.7 Sustainable and Trustworthy Long-Term Operation

The operation of an educational system that combines all the above mentioned elements, meets today's and tomorrow's requirements and serves as a provider for other systems, can only be established and ensured by trusted technology companies or universities with the financial support of international organizations, countries, NGOs, fundraisers and philanthropic benefactors and in concordance to international policies and goals.

Already for the interconnection of OER and the support of Open Access for learning objects, as well as for an independent, secure digital ID, joint efforts of universities, countries and international organizations are necessary.

The establishment and maintenance of an independent Learning Record Store (LRS) that is easy for the user to manage and accessible from multiple platforms, requires the patronage of independent, trustworthy parties. The LRS forms the core of Learning Analytics, Profiling and Matching and of Achievement Maps. The deposited cultural patterns form an additional component. Finally, the LRS also serves as a repository for verified batches, participation documents and certificates or obtains them from other platforms. Special attention must be paid to data protection, and users must be able to expect the greatest possible efforts to protect highly sensitive information.

The quality assurance of content, settings and the platform, the qualification and classification of learning objects as well as the periodic review of cultural values and ideas could be jointly undertaken by its users and can be rewarded additionally. Collective work on the common learning environment is generating new ideas for future learning, further development and personal action.

If work and achievements are compensated with social capital in form of tokens, like Oracle's N2N platform,[51] these tokens could get collected, saved or given away to members. As a solution to enable also underbanked or unbanked learners' access to paid parts of

[51] See the Forbes' article "EdTech Startup to Release Blockchain-Based 'Lifelong Learning Ledger'". (Banks-Louie, 2018)

educational offerings like RVA (Chaia, Goland, Gonzalez, Morduch, & Schiff, 2012) the token can be backed-up with a real value and then be used as an exchange voucher.[52]

3.8 Conclusion

First the "Intended Learning Methods and Corresponding Features of a Digital Learning Environment" were described to elaborate various elements of a multilateral learning platform. Then the "Requirements and Potentials " of such got laid out in more detail.

Openness, accessibility, interoperability, profiling, individualization, adaptivity, social interaction, data control, and the comparison of learning offers by all providers – based on personal learning objectives and values – are the elements of a digital learning system, which got also recommended to UNICEF.

Profiling and matching - based on learning objectives, goals, curricula and cultural values - are an essential part and must be implemented due to cultural differences and individual needs. The learning record store (LRS) forms the core that establishes connections between decentralized learning systems, maintaining a continuous log of learning activities performed by learners. The proposed digital educational identity acts in combination with the LRS as a key for access, recognition, validation and accreditation (RVA) in free or paid learning courses.

All parts mentioned are essential to the creation of a digital learning environment that serves the purpose and needs outlined. Combined they will empower learners, institutions and organizations to achieve the goal of inclusive education, professional development and lifelong learning according to respective needs and requirements.

---

[52] Without access to financial services like bank accounts or debit/credit cards, the underbanked or unbanked population will not be eligible for RVA of paid courses and MOOCs. "In order to facilitate lifelong learning, MOOCs should play a role of a bridge between formal and non-formal education" (Pietkiewicz & Driha, 2017: p 11 ff). By providing a solution where the use of the personal learning record store in combination with a secure self-sovereign digital educational identity acting as a virtual bank account and by establishing payment solutions with educational providers, the problem could get solved.

The core elements of the solution to be considered are:

- Simple and easy registration and login procedures through a secure, decentralized, self-sovereign digital identity as single sign-on solution that also serves the requirements for RVA.
- Strict use of OER, open licensing and interoperability standards to remix learning objects according to needs and requirements.
- LRS as core for learning analytics, personalization, profiling, matching, learning path recommendation and the creation and storage of badges, certificates and other achievements.
- Various possibilities to interact with other learners to foster good and collaborative learning that leads to action.
- A secure approach of connecting learning data across different systems, LRS, institutions and organizations.
- A trusted ledger as supported by blockchain technology for tokenization and monetarization[53].

A blockchain based approach for connecting learning data across different systems, Learning Record Stores, institutions and organizations is a possible solution[54] to gain the users trust. Leveraging on the unique features of blockchain technology, solutions are proposed that ensure consistency of learning data, availability, immutability, security, privacy and access control by the user.[55] The EdTech startup N2N, as part of Oracles' cloud infrastructure, is "in the process of developing a blockchain "personal value ledger." The idea is to take work projects from employment histories and employment agencies, vet them through a transcript and credential-evaluation services, and then make those "certified assets" available to universities and employers."[56]

By building secure digital identity and LRS solutions, a tokenized reward system can be introduced. Like games, special achievements, user engagement or collaboration can be rewarded with points or tokens. Badges and free statements of participation can be issued as well. By adding social capital in form of tokens for quality assurance jobs a system is

---

53 A closed circuit that only allows the exchange of tokens for spending on further educational offerings, certification, accreditation etc. will prevent fraud but help in the same time the unbanked.

54 As proposed by Ocheja (Ocheja et al., 2018)

55 As described by Zyskind a decentralized personal data-management system is "combining a blockchain, re-purposed as an access-control moderator, with an off-blockchain storage solution. Users are not required to trust any third-party and are always aware of the data that is being collected about them and how it is used. In addition, the blockchain recognizes the users as the owners of their data." (Zyskind, Nathan, & Pentland, 2015: p 184)

56 Klicken oder tippen Sie hier, um Text einzugeben.See the Forbes' article "EdTech Startup to Release Blockchain-Based 'Lifelong Learning Ledger'". (Banks-Louie, 2018)

created that values action in education and offers the unbanked learners a possibility to "earn" capital that ideally can be spent for paid educational courses and services. Further, a whole closed educational marketplace could be created. To give the token a value, a price must be set, and a system introduced to regulate the token production and distribution. In a first step, the token is backed by initial capital from NGOs, governmental support, donations, etc. and later by revenues from the private sector.[57] Monetarizing the platform and establishing revenue streams from the private sector can be a strong part of a sustainable solution.

In view of the learning experience platform (LXP) market growing up fast and vendors like Degreed, LinkedIn, EdCast, Percipio, and IBM have started to add skills-based discovery tools into their systems, the provision of an international learning platform could benefit, support or disrupt this market. These vendors are starting to build skills assessments, skills inferences, and skills-based learning paths, like the solution described.[58]

Today we are about to dramatically fail the SDG 4 goals, but available technology could create a system that supports the future of education and learning. All proposed elements were developed, prototyped or theoretically described. By taking a holistic perspective and shifting the emphasis to the learner and good learning, institutional solutions provided first get out of focus and values as identity, access, sharing, learning objectives, skills, social interactions, collaboration, networks, motivation, opportunities, achievements, security and privacy take over.

Too many initiatives for networking learners on learning platforms have failed or are protected by the obligation of registration by institutions. An independent motive to join a platform is rarely given. Without the critical mass of users and good quality content, there are usually only a few reasons without compulsion to become part of such a community.

The solution outlined, however, takes a new perspective. It is consistently conceived from the user's point of view, with the highest standards of data security and privacy protection and a system that rewards and distinguishes learning, sharing, interacting and maintaining content. Introducing curricula according to the policies and standards of inclusive education, institutional requirements and private interests again; profiling and

---

57 The active or passive use of the culturally situated competence profiles by companies in recruiting personnel or feeding projects and tasks into the international community, as well as the verification and identification of skills from institutional certificates and training courses, could generate private sector income streams. Further financial resources could include rights of use for research or royalties for infrastructure use. The more active users the platform will have, the more network effects will have an effect, which can be used profitably and contribute to the long-term operational sustainability of the platform. (Haucap & Heimeshoff, 2013: p 5 ff)

58 See the blog of Josh Bersin. (Bersin, 2019)

matching according to culture and need broaden the perspective. A closed, tokenized monetary system is introduced as a solution to enable unbanked learners' access to education and foster additional motivation.

The integration and interconnection of various platforms and the mapping of the applicable standards and curricula affect sensitive national, potentially highly sensitive databases. The LRS as core of the solution must be designed thoroughly to ensure interoperability and performance despite the highest security requirements. A system for the generation of self-sovereign digital identities as key to further functionalities must be evaluated. Trusted identity management is typically associated with costs.

In addition to technical and procedural aspects, the cultural patterns in relation to education in general, to inclusive education in particular and to the future of learning and working has to be investigated. The cultural patterns of the individual education providers in combination with the existing curricular offerings serve as a framework to compare the needs of the users as well as their prerequisites. The cultural pattern analysis and mapping also creates the foundation for a mutual understanding which, as a viable construct, facilitates the subsequent integrations and linkages without ignoring the specific values of individual partners. This contribution in the sense of ethically responsible data processing must be made in advance.

As a result, all partners (educational institutions, multilateral organizations, ministries, etc.) and platform users should be offered tailor-made, connectable materials, tools and exchange opportunities to promote inclusive education. Various existing modules like those of UNICEF and other resources such as the Teacher-Upgrade-Tool of the EU/CoE-Partnership offer a solid basis. When dealing with information technologies and promoting 21st Century skills as part of inclusive education, there is - especially regarding the developments in the area of AI in education - a considerable additional need for development.

The development of a more detailed conception of the pedagogical-curricular-technical solution described in this document, including process specifications and the definition of necessary organizational requirements, is required. This thesis serves as a framework for further work. For example, to set up a new project organization for the project management, the acquisition of additional partners, the technical implementation and the local implementation in first countries.

4. Methodology, Data Collection and Analysis

4.1 Approach

To answer the question «*How can one grant learners with limited economic resources identified access to formal and informal learning resources, organize the achievement storage for learning pathway mapping, locating matching communities of practice or portfolio presentation and gamify the personal learning environment for sustained motivation and engagement?*» an extensive study of the published literature on the current education crisis and possible solutions and initiatives, the conditions for the success of institutional and informal education in general and specifically regarding digital access to education was done. The results are reflected in the sections "Intended Learning Methods and Corresponding Features of a Digital Learning Environment, page 17 ff" and "Requirements and Potentials, page 21 ff". The elements outlaid in this part of the thesis formed the basis for a proposal to UNICEF Europe and Central Asia (UNICEF ECAR)[59], formulated as a comprehensive vision of a digital ecosystem for inclusive education.

The insights of the literature study got then verified by various preliminary investigations. In this thesis two investigations are presented in detail. Almost identical questions to the ones previously raised, were discussed at the "#LEARNINGPLANET Strategic Workshop, page 39 ff". Two visits to potential target countries (Kyrgyzstan and Tajikistan) gave insights to real circumstances. The scope of the mission, the educationally relevant conditions and the resulting insights from Tajikistan are presented exemplarily in the section "LearnIn - Country Visits, page 48 ff".

Due to the COVID-19 crisis the investigations were abruptly stopped. The carefully planned feasibility study could no longer be continued in its initial form. Instead, parts of the proposal to UNICEF ECAR were recommended for implementation as an immediate reaction to the worsening educational crisis. After a Regional Task Force (RTF) was set up on behalf of UNICEF ECAR, as response to the crisis, theoretical work got developed and implemented by the RTF. The vision[60] of a digital ecosystem, as an answer to the educational crisis, was never forgotten. During the implementation, therefore, care was taken to never lose sight of the needs of those affected.

At the beginning of the RTF's work, a "Needs Assessment, page 71 ff" was carried out, which provided the basis for planning the activities of the follow-up work, which in turn was based on the originally outlined vision. The results became part of this thesis and replaced

59 Find the proposal at: https://turkawka.link/proposal and request access through the provided form. (Turkawka, Hollenweger Haskell, Weidinger, & Fraefel, 2019)

60 Read the brief: https://go.learnin.info/brief (Turkawka & UNICEF Europe and Central Asia, 2019)

parts of the original expected data of the intended feasibility study. The findings of this thesis are therefore based on:

- the study of relevant literature, illustrated in sections 2 and 3;
- the preliminary studies in section 5;
- and the results through the immediate implementation of parts of the vision originally outlined for UNICEF ECAR, presented in section 6
- For all reasons mentioned, this thesis combines in its synthesis the results obtained by studying the literature ("Intended Learning Methods and Corresponding Features of a Digital Learning Environment" and "Requirements and Potentials"), by working directly with focus groups ("#LEARNINGPLANET Strategic Workshop"), ethnographic observations supplemented by qualitative and quantitative data ("LearnIn - Country Visits"), qualitative online surveys on the needs of the countries directly affected ("Needs Assessment") and solutions iteratively developed with partners in the implementation and for planning future steps ("Digital Ecosystem")

Conclusion

As summarized in the article "Distance Learning – from Emergency Solution to Equal Opportunities for all (unpublished)" (see Annex, page XXIV) and based on the results of the needs assessment it is convincing that for establishing distance learning as an integral part of education, different stakeholders need to come together and collaborate:

- Education ministries need to declare digital learning a priority and support the creation of nurturing policy frameworks to provide guidance and answers that make sense in a digital and blended learning environment;
- Teacher educators must understand the struggles of teachers, their motivations and incentives and design the right training schemes (both pre- and in-service) to empower teachers to provide optimal teaching in a distance and blended learning environment;
- Teachers and school managers need to be involved to make sure regulations and technological solutions fit their context and changed roles and responsibilities as well as to get their buy-in for implementing it and making it "their own";
- NGOs should work directly with local stakeholders to provide localized support (technical infrastructure, sharing international good practices and facilitating exchange and coordination between stakeholders);
- The perspective of students and parents needs to be considered in the development of any solutions to make sure that the outcomes end up fitting

their realities and don't further increase the gap between privileged and marginalized groups.

Without a systemic perspective that includes all critical stakeholders and a shared strategy they can align on; digitizing educational systems might end up widening the gap between privileged and marginalized students.

4.2 Evaluation of the Methodology, Data Collection and Analysis

As previously mentioned, it was intended to verify or falsify the insights of the literature studies expressed as a proposed "Educational platform to `Realize the rights of children to quality and inclusive education`" through a feasibility study. The original vision would be investigated and next steps in the form of scenarios proposed.

Different as intended, the conclusion of the feasibility study got stopped by the COVID-19 crisis and implementation through immediate action followed. Nevertheless, valuable data could be gathered by two country visits and the exchange with experts and likeminded partners. During the crisis, as part of the UNICEF Regional Task Force actions, a needs assessment provided valuable data about the immediate needs of schools, educators, institutions and governments. This data, collected from 11 countries in a moment of an actual need of other forms of learning opportunities, is of great value. The data will be valuable to everyone working on solutions to help to solve the educational crisis mentioned in the "Problem Statement, page 11 ff" and is complementing existing studies and insights. A first, preliminary evaluation of the data was included in this thesis.

The findings from literature, own observations and from workshops, qualitative surveys and from the inclusion of accessible studies form the backbone for further steps on the way to the implementation of a digital ecosystem that enables qualitative inclusive education and provides new access to educational opportunities for all.

5. Preliminary Investigations

5.1 Overview

This section summarizes the results of a strategic workshop, where similar questions and topics were discussed as outlaid previously in this thesis. The gathering of experts and critical friends in Paris last January was of great value to reflect major assumptions of the thesis. The second preliminary investigation served as a reality check. The results from country visits in Kyrgyzstan and Tajikistan revealed major insights. Here one finds the results from Tajikistan, a country at the end of the digitalization scale. The detailed report reveals the diverse obstacles laying ahead for an introduction of a digital ecosystem that tries to enable secure access to quality learning materials for learners with limited resources.

5.2 #LEARNINGPLANET Strategic Workshop

On the International Day of Education, January 24th, 2020, #LEARNINGPLANET was launched at the headquarters of UNESCO in Paris. The initiative is welcoming any organization that wants to design, share and scale challenge-based learning programs around the SDG-Goals. Therefore, they invite like-minded organizations, institutions and individuals to co-create an open and data-driven platform.[61]

The following day an international group of around 30 selected partners and critical friends of #LEARNINGPLANET (#LP) met at the Center of Research and Interdisciplinarity (CRI) to share progress and prepare the next steps by specifying in particular:

- the architecture of the platform and the key other services that it must provide in priority for online communities;
- the partnership strategy vis-à-vis content providers, networks of actors, and the media;
- the elements of the business model, especially regarding fundraising.

In general, the #LP and the LearnIn Initiative share many similarities and synergies. All members of the strategic workshop expressed common interest and values towards the educational tasks laying ahead. From a perspective of growth and social business model, there were some uncertainties. Legal and governance questions were discussed as well. The presentation of the LearnIn initiative was received favorably and with great interest[62].

---

[61] Find out more about the #LEARNINGPLANET initiative at https://learning-planet.org/en (Oppong, 2018)

[62] Find the Spark presentation at https://turkawka.link/cri-presentation ("PIX-Certify Your Digital Skills! | Aix-Marseille Université," n.d.)

The strategic meeting was held in an unconference format[63]. Various topics along the agenda were worked on. In the following the results are presented, covering the topics of "Digital Tools and Architecture", "Growth – Partnership Strategies (Content, Communities, Media)" and "Sustaining – Social Business Model and Fundraising Strategy".

5.2.1 Digital Tools and Architecture

A group of partners, software experts and community builders got together to co-design the digital infrastructure needed to build and sustain a #LP. Therefore, the members of the "Digital Tools and Architecture" group worked in three workshops on following questions:

- Definition of the most important needs of the different communities
  - What are the most valuable services for the different communities?
  - How to organize, log and select priorities for development (tools, governance)?
- Creation of a map of digital services for learning communities
  - What are the key functions needed in a future ecosystem for learning?
  - What are the existing off the shelf digital tools that can be used and integrated?
  - What functional areas are not yet covered and what should be built first?
- Definition of common reference data for the ecosystem
  - What reference data for user IDs, concepts reference (Wikipedia, SDG), skills, organizations… is needed?
  - What other reference data are needed?
  - Who will manage these reference data? (Wikipedia, W3C, UN, educational organizations consortiums…)

63 See https://en.wikipedia.org/wiki/Unconference ("Sulitest," n.d.)

The resulting ideas and feature-requests from the workshops were grouped in core modules/categories and mapped according to priority and maturity. Following figure shows identified parts needed to establish a digital ecosystem serving communities and initiatives like #LP or LearnIn goals.

Figure 1: Ideas and features of a digital ecosystem

To understand who the main users are, one should think of them as individuals, members of a specific community of interest. During the process the group learned a useful typology of communities: of practice, of interest, of place, of action and of circumstance[64]. Users' motivations can also differ; find purpose of one's life, feed a specific interest, get empowered to respond to an unsolved challenge, find a job, get accreditation, get social credit, communicate on project, connect with others.... Then the degrees of variability in between users include level of knowledge, motivation, connectivity (physical and digital).

Further questions aroused: should users be able to answer to an economic need in exchange of contributions to the platform? Designing for the marginalized allows to include more people as potential users. Which "marginalized" could we include? How one can protect the platform against communities with malicious behaviors?

64 The two page summary gives an overview: https://turkawka.link/communities ("Open Collective - Make Your Community Sustainable. Collect and Spend Money Transparently.," n.d.)

Beside mapping out the ideas and features, the group also collected learning needs and resources. The figure below shows the outcome:

Figure 2: Learning needs and resources of a digital ecosystem for #LEARNINGPLANET initiative

Skills auto-analysis, skill recognition and skill validation were identified as an essential part to the future Learning Planet digital ecosystem. One major issue is that there is no globally accepted ontology for skills. European Union, BIT, LinkedIn and most educational organizations have their own specific skill lists but there are not compatible. Four ways to validate skills are identified:

- formally (degrees, certificates),
- social evaluation (by peers or mentors),
- by achievements (showing the previous projects) and
- by self-documentation

Endorsing and displaying skills could be done using technologies like Open Badges[65]. Blockchain is also potentially useful to keep track of skills for long periods. Identities (of people and organizations) that users can trust are critical.

---

65 Open Badges is not a specific product or platform, but a type of digital badge that is verifiable, portable, and packed with information about skills and achievements. ("We Believe We Can End The Water Crisis In Our Lifetime | Charity: Water," n.d.)

Some startups specialize in linking job opportunities to skills. One should onboard some of them to the initiative, as improving one's career prospects is possibly the most powerful motivation driver for using the learning ecosystem.

Understanding your own skills, strengths and weaknesses is a skill in itself. Reflexive tools are important; some frameworks like Ikigai[66] can help contextualize the skills. Linking skills to life experiences is also needed and difficult. Meanwhile various digital platforms emerge to help you evaluate and certify skills in specific domains[67].

Figure 3: Skills Management Overview

For the different tools and target groups of initiatives like #LP or LearnIn, a common language to interact and share is needed. Therefore, aggregated databases of facts and common ontologies, built on global platforms such as Wikipedia could serve the cause. On top of existing data providers, one could to build an interoperability layer All information needs to be searchable, discoverable across all tools and organizations. Traceability,

66 Ikigai is a Japanese concept that means "a reason for being". Find out more in Oppong's article about "Ikigai: The Japanese Secret to a Long and Happy Life…". (Turkawka, 2020)

67 See for example PIX certificate for digital skills based to the European Digicomp reference framework (World Bank, 2011) or Sulitest to measure and improve sustainability literacy (Development Partners of Tajikistan, n.d.)

credentialing and security can only be achieved through norms and with global identifications. For a digital ecosystem one needs to:

- Adopt an interoperable format for identities (Open ID Connect) with a federation layer
- Integrate Open Badges for skill validation, credentialing and possibly trust networks.
- Provide solutions for delegated / partially disclosed / containerized identity/authorization.

Skill certification, endorsement, credentialing is only possible if a common reference database for skills, multilingual and multicultural is available.

- Many heterogeneous skill databases coexist: Universities, governments, public works, LinkedIn etc. Linking them together through AI and collective intelligence is a major challenge.
- Skills portfolios need to be verifiable but also to protect privacy by staying under control of their owner.

Defining standards and technological solutions is not enough; getting massive adoption from users and the industry is even more important.

Figure 4: Reference Data Overview

The key lessons from the "Digital Tools and Architecture" group include:

- **Interoperability**: To create a platform for multiple tools, one needs to define shared ontologies and to choose protocols that would allow tools to easily share information between applications.
- **Purpose**: Helping users to find their own purpose in life should be a priority.
- **Recognition**: Recognizing competencies on the platform in alternative ways to the existing academic recognition is a key need.
- **Governance challenges**: How to pilot #LP is going to be key to its success.
- **Trust**: One needs to create systems build trust online for communities.

5.2.2 Growth – Partnership Strategies (Content, Communities, Media)

The "Growth – Partnership Strategies Group" was exchanging their experiences and ideas of how to reach a global awareness. There are so many initiatives happening in this space that are not all complementary to each other, although the visions are aligned. It is important not to get into the mentality of who will be the "top". The group members raised a set of questions and remarks and agreed on some action items[68]. The workshop got summarized as follows:

<u>In general</u>

- A mapping of the initiatives/networks/communities should be done
- Shared open toolkits would be useful
- A clear and shared vision is needed
  - A chart of values?
  - clear Value Proposition: Who do we serve, and how?
- Regular meetings/events/discussion/sharing to be sure stay aligned

<u>About partnerships and governance</u>

- Legal team (experienced in international law)
- Policy partners, replicating partners
- Physical iconic/inspiring spaces/hub to meet
- Money
- Resources (content, places, networks)
- Exposure, visibility
- Legitimacy: Label? Stamp?

68 See Appendix #LEARNINGPLANET Strategic Meeting, January 25th, page VII ff.

Organizational

- Give access to tools/toolkits to help them organize their work/events
- Connect upper ground to underground (mapping undergrounds, mapping upper ground, tools/events to connect them…)
- Possibility to get help from other Learning communities, to crowdsource solutions…
- Ontology of the Learning Communities

Overall, this group made It evident that a governing structure is inevitable. Back then, one couldn't agree about the next steps and who should take the lead. The COVID-19 crises and the actions taken around the world reacting to support educational systems and movements shifted priorities and windows of opportunities opened for solutions as well for first steps towards establishing governing structures, also serving initiatives like #LP or LearnIn.

5.2.3 Sustaining – Social Business Model and Fundraising Strategy

The third group of experts was working on questions and tasks around a sustainable model of an open initiative like #LP. They stated three outcome topics: "Funding digital platforms", "Leveraging #LP for grants and partnership opportunities" and "Partnership strategy with the private sector".

Funding digital platforms

1. How do we access funding specifically for digital infrastructure of LP?
2. How do we create partnerships for joint (Mega) grant applications?
3. How do we attract and manage funds from the private sector?
4. How to identify and launch projects which fit the crowdfunding model?
5. How do we streamline the funding story and build relationships with donors and active community contributors?

Key findings

- There is a need for a governance model concerning all financial aspects. A clear rulebook with principles and values related to financial management and the use of LP label on shared projects;
- It's possible to get funding for specific software modules by building partnerships with private tech companies, including in kind talent contributions
- Create trust by "packaging" existing projects/results from #LP partners and design the funding strategy by stages;
- Develop paid services/technical assistance expertise for Governments and institutions willing to pay for a transition towards learning for SDGs.

Leveraging #LP for grants and partnership opportunities

1. What are the grant opportunities to fund #LP partners? (Foundations, EU, local and regional, etc.)?
    a. Check the open collective model[69];
    b. Create a database with grants and their deadlines;
    c. Define how #LP brand can be used by member organizations to apply for funding;
2. How to organize consortia of #LP partners (guidelines)?
    a. Form partnership around core values;
    b. Fundraise via change-makers / ambassadors (annual event/ campaign). See Charity Water[70];
    c. License the brand and let the community contribute when they use the brand. Needs specific formats / use cases.
3. How to "productize" / develop services that can be monetized?
    a. Training for Jobs skills (Course Development) / Certified Trainers
    b. Acceleration Programs
    c. Marketplace of skills / projects / people.

Partnership strategy with the private sector

1. Mapping the potential donors and sponsors:
    a. Reaching McKinsey Non-profit arm (or similar organization) to perform a benchmark off all the donors;
    b. Strategic planning of Davos (e.g. via Geneva University) and other networking events with key fundraising meetings;
    c. Charter and ethics rules for financial partners
2. Ethics of investments, shared value and possible compromises.
3. Some member organizations might have a conflicting source of funding. Reasons to raise funds
    a. reach scale
    b. reduce risks
    c. protect reputation
4. Proposed ideas in a way that allows leadership from the community;
5. Big foundations might be requiring modifying #LP to fit in;

---

69 Get to know the model at https://opencollective.com (Government of Tajikistan, 2020)

70 Charity Water could serve as a possible example for setting up a fundraising structure: https://www.charitywater.org (Government of Tajikistan, 2012)

6. Break projects and funding by stages; Short-term vs long-term actions:
    a. UNESCO Learning Cities Network celebrating LPF 2021
    b. Working on UN official DAYS at WORLD EXPO
    c. Digital tools for #LP community.

The group agreed on next steps, including to

i. co-create a database of donors and work on a story-deck for philanthropies;
ii. co-create the financial guide for joint projects and general financial management ethics within the #LP community;
iii. co-create a list of events/conferences where we can pitch and network with the aim to raise funds for #LP community projects; (e.g. Davos, WISE, World Expo);
iv. explore the potential for crowdfunding by identifying specific projects as well as platforms that would secure a highly trusted process (e.g. Open Collective).

5.2.4 Conclusion

The #LEARNINGPLANET Strategic Workshop informed the participants about the work that needs done around a digital ecosystem to serve the organizational tasks of an open alliance for creating learning opportunities for #LP beneficiaries directly or indirect through partnering organizations. It got evident, that a governing structure needs to be established to create trust, organize possible fundraising activities and to promote the #LP initiative globally.

After the workshop a communication platform got introduced to keep the dialogue open and ongoing. A follow up meeting was suggested, but the COVID-19 crises changed plans with everyone. Nevertheless, CRI and UNICEF partnered as part of their response to the educational tasks raised by COVID-19. Parts of the key findings got tackled and solutions were created.

5.3 LearnIn - Country Visits

The UNICEF Regional Office for Europe and Central Asia in partnership with the Zurich University of Teacher Education PHZH, is launching LearnIn[71] - a digital learning initiative designed to support both teachers and students as life-long learners. LearnIn is designed to provide quality, personalized and culturally relevant learning opportunities for teachers and learners within a digital environment, fostering collaboration and shared practice, starting with the five countries: Albania, Armenia, Kyrgyzstan, Kosovo

[71] Read the brief at https://go.learnin.info/brief (Government of Tajikistan Ministry of Economic Development and Trade, 2016)

(UNSCR1244), Serbia, Tajikistan. The COVID-19 crisis changed the approach and after establishing a regional task force to respond to the immediate needs of the educational systems in the UNICEF ECA region, the group of five countries got expanded with Bosnia and Herzegovina, Greece, Moldova, Montenegro, North Macedonia and Romania. Due to COVID-19 only Kyrgyzstan and Tajikistan were visited.

LearnIn's pedagogical and digital ecosystem is being developed to improve the effectiveness of teaching and learning practices by mobilizing use of ICT and digital technology. A feasibility study should inform about the blended learning approach (BLA) experience in the mentioned countries, about knowledge, variations in learning models, flexibility and impact, pedagogical content and the general approach that is sensitive to cultural context, innovative instructional design, existing technology and labs, data protection and legal frameworks. In the context of the COVID-19 crisis, the approach was revised to respond to the urgent and immediate needs of the affected countries in ensuring education continuity by providing immediate expertise and experience, but with a focus on building infrastructures and capacity as the foundation for long-term capacity building for online, distance and blended learning.

5.3.1 Mission Objectives

The country visits were aimed to identify specific needs, capacities and opportunities related to quality of education and learning, innovation and technology, which will then inform the design, implementation of the initiative and complementary with other ongoing reform initiatives in the country.

LearnIn's approach is evidence-based and aimed at designing culturally relevant and content specific high-quality learning opportunities for teachers and children. The contextualization will be enabled by in-depth research in the countries that will inform the design of solutions on a regional level that truly address the challenges that key actors in the countries are struggling with and design them in a way that makes it easy and valuable for people to use.

5.3.2 Tajikistan

The insights from the country visit in Tajikistan are valuable to understand the work that needs to be done to respond to the learning crisis, affecting millions of children and young people who remain excluded and deprived from quality learning opportunities, especially the region's most vulnerable children. As part of the feasibility study the country

got visited from February 24th to February 29th, 2020. The collected information is summarized on a publicly accessible project webpage[72]

The following data and figures are, if not stated differently, taken from 2019's draft "Tajikistan Education Sector Analysis" by the Global Partnership for Education. (Global Partnership for Education, 2020a)

Demographics

The Republic of Tajikistan, hereafter referred to as Tajikistan, is a mountainous, landlocked, low-income country in Central Asia, sharing borders with Uzbekistan, Afghanistan, Kyrgyzstan, and China. It is inhabited by around 9,321,000 people[73] of various ethnic groups. The majority of the population is Tajik (84.3 %), followed by a significant Uzbek minority (13.8 %); the remaining 2 % includes people of Kyrgyz, Russian, Turkmen, Tatar, and Arab origins, among others.[74] The country remains primarily rural, with only around 27.5 % of the population living in urban centers.[75] Tajikistan is a fairly young country, with 34 % of the total population aged 0–14 years old. Tajik is the country's official State language, but Russian is regularly used as the language of business and is recognized by the Constitution in Art. II as the "language of international communication" (Tajikistan, n.d.).

Tajikistan counts a population of 8.7 million people (as of 1 January 2016), having effectively doubled since the late 1980s. The period between 2000 and 2016 saw particularly rapid growth - the population having increased by 40% in the intervening years. Owing significantly to large birth rates in rural areas, the population of Tajikistan is one of the most rapidly growing in Central Asia and the world, with its total fertility rate at 3.064 in 2015 and nominal population increase at 2.1% between 2010 and 2016. 65% of the population inhabit the country's two largest regions: the Soghd and Khatlon oblasts.

This rapid growth affected the education system, creating large demand for education that remained unmet due to the economic crisis that followed the said war. Furthermore, the education system could not recruit enough teachers, since a huge fraction of the population born before 1998, from which teachers would have been recruited, left the country en masse.

The median age of the population is 22.3 years, and the number of working-age inhabitants (ages 15 to 64) has been increasing at higher rates than other segments of the population. In 2016, 62.5% of the population of Tajikistan were of working age. The young

72 Project Webpage: LearnIn - Tajikistan https://turkawka.link/learnin-tajikistan (Turkawka, 2020)

73 United Nations Department of Social and Economic Affairs (United Nations, 2019)

74 Central Intelligence Agency World Factbook (Central Intelligence Agency, 2020)

75 Central Intelligence Agency World Factbook (Central Intelligence Agency, 2020)

population is expected to generate large and stable growth in the number of working-age citizens for several decades. However, the increasing number of young people in Tajikistan demands that the economy create jobs and guarantee education for a larger number of learners. In response, the government has taken measures to reduce youth unemployment. Nevertheless, it must be noted that the share of youth (ages 12 to 24) in the population has decreased from 50.7% in 2007 to 41.3% in 2016.

Notwithstanding, the pace of population growth in Tajikistan is slowing. The UN Population Division (United Nations, 2017) estimates that Tajikistan's population will reach 14.5 million by 2050. The age-specific fertility rate (ASFR) for Tajikistan has declined on average across all age groups by 7.7 % between 2010 and 2015, reaching 67.8 births per 1,000 women (United Nations, 2017). The total fertility rate (TFR) will fall within the replacement level of 2.1 births per woman only after 2050. Demographic trends indicate that the net reproduction rate (NRR) is steadily declining over time (1.7 between 2000–2005, 1.6 between 2005–2010 and 1.5 between 2010–2015) and the net population growth rate has also steadily gone down mostly due to immigration. Yet, despite these slowing rates, the growth of young population is expected to continue, which positions school with a unique challenge to maintain rates in pre-school and primary educational institutions, especially in rural areas given relatively high TFR, ASFR and NRR estimates.

Socio-economic context

Tajikistan is a low-income economy with a relatively low human development score. Human development can be measured along three dimensions: a long and healthy life, being knowledgeable and having a decent standard of living. In 2017, the country was assigned a Human Development Index (HDI) value of 0.650, registering the lowest HDI value

Figure 5: HDI values (2018) for post-Soviet states in Central Asia and southern Caucasus region.

amongst the post-Soviet states in Central Asia and the southern Caucasus region. Its weakest scores fall under standard of living but tends to meet its neighbors in quality of health and education. Following figure shows the HDI values in the said post-Soviet states.

When Tajikistan's HDI value is adjusted to account for inequality, it drops to 0.562. Amongst the aforementioned post-Soviet states, Tajikistan also has the highest percentage of its population living below the national poverty line (at 29.5%). A comparative graph is found in the figure below.

Figure 6: Percentage of population living below the national poverty line, select post-Soviet states. (Data from Asian Development Bank, Basic Statistics, 2019. Kazakhstan and Uzbekistan, 2018 data; others, 2017 data)

Inequality in Tajikistan has a marked geographical dimension, with rural households disproportionately affected by poverty. A joint report, developed by The World Bank, UNICEF, and the Tajikistan Agency on Statistics (TajStat), revealed an almost 10 % gap in poverty incidence between children in urban and rural households (World Bank, UNICEF, & TajStat, 2018).

However, since the population of Tajikistan is overwhelmingly rural, this gap is even starker; there are between 135,000 to 177,000 poor children living in urban centers, compared to 514,000 to 949,000 in rural areas (World Bank et al., 2018). Women and girls are disadvantaged by the significant inequalities in Tajikistan. The most recent Global Gender Gap Report of the World Economic Forum (WEF), which was published in 2018, benchmarks 149 countries on their progress towards gender parity across four dimensions: economic participation and opportunity, educational attainment, health and survival, and political empowerment. Tajikistan scored 0.638, placing it at 123rd out of the 149 participating countries and rendering Tajikistan's gender gap the largest in the Eastern Europe and Central Asia region (World Economic Forum, 2018). The figure below compares

the gender gap in Tajikistan against other post-Soviet states in the Central Asia and southern Caucasus region that participated in the WEF report.

The large gender gap in Tajikistan can be mainly attributed to widening disparities in economic participation and opportunity for women (World Economic Forum, 2018). The country also scores relatively low in terms of women's political empowerment, placing 121st out of 149, which indicates weak political representation of women. It fares slightly better in terms of health and survival and educational attainment outcomes, for which it places 74th and 118th, respectively.

Figure 7: WEF Global Gender Gap Index 2018, select post-Soviet states

National Educational System, Educational Priorities and Governance

Education in General

According to the Global Partnership for Education (Global Partnership for Education, 2019), the Ministry of Education and Science of the Republic of Tajikistan (MoES) in partnership with development partners, including support UNICEF, the series of Fast Track Initiative (FTI)/Global Partnership for Education (GPE) grants, Aga Kahn Foundation (AKF), USAid/Chemonics, the Open Society Institute (OSI), the European Union (EU), the World Bank Group (WB),[76] and others have introduced key reforms in education in recent years, guided by the National Strategy on Education Development 2020[77] and Education Action Plans 2012–2014 and 2015–2017. The role of education towards development of the

[76] Find partners in the World Bank Annual Progress Report for 2010, page 108: https://turkawka.link/fast-track-initiative (EuropeAid, 2019) and in the Development Partner's Appraisal and Endorsement Report: https://turkawka.link/TJI-2012 (Global Partnership for Education, 2020a)

[77] Find the final draft of the strategy 2021-2030 here: https://turkawka.link/NSED_2021-2030 (Helbich et al., 2019) and the strategy 2012-2020 here: https://turkawka.link/NSED_2012-2020 (Development Coordination Council Tajikistan, n.d.)

country's human capital has been strengthened with the National Development Strategy 2030[78] and the Medium Term National Development Program 2020[79].

With support from GPE-4, UNICEF and USAID the MoES, the curriculum has been moving from being knowledge-based towards being competency-based with the introduction of a new competency-based curriculum in primary grades since September 2016. According to the MoES all 33,000 primary grade teachers should have been trained, but there is still substantial work to be done to relation to implementation and further support to teachers in strengthening pedagogical approaches. In order to support the competency-based approach to education, the EU has released the document, "The Teacher Competency Framework" (TCF),[80] developed on the basis of the requirements of the National Education Development Strategy of the Republic of Tajikistan until 2020 (decision of the Government of the Republic of Tajikistan dated June 30, 2012, No. 334) with the aim of supporting professional development of teacher competencies in Tajikistan.

The National Strategy for the Education Development (NSED) of the Republic of Tajikistan for 2021–2030 states as the main and long term goal "the creation of an effective education system that provides inclusive and equal opportunities and contributes to the development of abilities, intellectual development, employment, and improvement of the general well-being of the population of the Republic of Tajikistan" (Government of Tajikistan, 2020).

National Educational System

The Asian Development Bank's Education Sector Summary states: Tajikistan's education system follows the model adopted when the country was part of the former Soviet Union. It comprises (i) preschool education; (ii) 11 years of general education, including primary (grades 1–4), lower secondary (grades 5–9), and upper secondary (grades 10–11); (iii) primary vocational education and training (PVET); (iv) secondary vocational education and training; and (v) higher education. Everyone has the right to education, and education from grades 1–9 is compulsory.

The Ministry of Education and Science (MoES) manages all levels of the education system except for PVET, which is under the Ministry of Labor, Migration and Employment

78 https://turkawka.link/NDS-2030 (Global Partnership for Education, 2020b)

79 https://turkawka.link/MTDS-2020 (Government of Tajikistan Ministry of Economic Development and Trade, 2016)

80 https://turkawka.link/tcf (Government of Tajikistan Ministry of Economic Development and Trade, 2016)

(MoLME).[81] Secondary vocational training institutions are the responsibility of the MoES, while other specialized training institutions are under different ministries and agencies.[82] Local budgets for regions (oblasts) and districts mainly fund preschool and general education, while the national budget funds most of the vocational and higher education, as well as the administration of the education sector. (Asian Development Bank, 2016)

Figure 8: Structure of the Educational System in Tajikistan

According to "Tajikistan Education Sector Analysis"[83] by the Global Partnership for Education, pre-primary education is considered one of the priority areas of the education system and it is continuously supported by the Government of the Republic of Tajikistan. The adopted legal and regulatory acts related to the preschool education demonstrate the improvement in the area of monitoring and methodological assistance to the preschool educational entities. The NSED 2012–2020 and the Law of the Republic of Tajikistan "On Pre-School Education" emphasizes the importance of pre-school education. Building on this government priority, the Ministry of Education and Science (MoES) is working closely with international development partners to improve curricula and teacher training facilities, while also making efforts to improve the quality of education and increase coverage beyond the 1990s level of around 16 % of eligible students.

In the 2017–18 academic year, there were 615 state pre-school institutions and 1,671 early childhood education centers in Tajikistan serving 136,719 children. The number of state preschool institutions increased resulting in an increase of enrollment rate by 2.2 % during 2016–2017. The recent increase in the coverage can be partly attributed to the considerable

[81] Under the 2013 reforms, the Ministry of Education was changed to the MES and the Ministry of Labor and Social Protection was changed to the MLME.

[82] Vocational education was under the MES from 2007 to 2013; thereafter, PVET (lyceums) were transferred to the Ministry of Labor, Migration, and Employment.

[83] Find the report online at https://www.globalpartnership.org/content/education-sector-analysis-2019-tajikistan (Global Partnership for Education, 2020a)

expansion of various models of pre-school institutions such as community-based or school-based Early Childhood Education (ECE) centers, private kindergartens and family-based kindergartens as well as double-shift kindergartens. Especially, the enrolment in ECE centers increased rapidly in the recent years, from 6,955 in 2011 to 43,448 in 2016. As most of the ECE centers are located in rural areas, they have contributed significantly to improve access to pre-school education in those disadvantaged areas.

Out of all enrolled children, approximately 67 % attend publicly funded state kindergartens and private kindergartens, which are full-day models, with high overhead costs. The remaining 33 % of children are enrolled in ECE centers, which offer only education services, usually on a half-day basis. ECEs are located predominantly in rural areas. At present, public kindergartens are mostly found in urban centers and offer a full-day curriculum. These ECE centers are supported by development partners (e.g., UNICEF, Aga Khan Foundation, and Open Society Institute), local governments, and communities; and tend to rely on parental fees to cover recurrent expenses.

With the high level of commitments from the Government and the development partners, the access to pre-primary education is increasing. The pre-primary education coverage in Tajikistan has grown to 15.6 % in 2017 (from 15.2 % in 2016). However, it is still low compared to other comparable countries and greatly impedes children's academic performance in later years and far from the target of the NSED 2020 (30 %). Access to pre-primary education is influenced by multiple factors. According to a Tajikistan Living Standards Survey (TLSS) 2007, the most common reason for non-enrollment was unavailability of pre-school facilities (52 %) (Tajikistan State Statistical Agency, 2016).

According to targets set in the NSED 2020, the access of children of 1–6 years old to preschools should be 20%, 3–6 years old 30%. According to the statistics of EMIS, in 2018 only 10,4 of children of ages 1–6 and only 14,7 of children 3–6 years old were covered with preschool education. The quantity of preschool institutions increases proportionally to the increasing number of children (natural increase in population) every year, however, the percentage of coverage of children with ECE has not reached the indicators of 2012, when it was 12,2% for 1–6 yrs old and 15% 3–6 yrs old.

Educational Priorities and Governance

The legislation of Tajikistan seeks to provide the quality of professional education mainly through establishing the State Educational Standards (SES) for each specialty of every level of professional education and to enforce these standards by licensing, certification and state accreditation of educational institutions. Such mechanism of ensuring, monitoring and evaluation of the quality of vocational education leads to a slight improvement in education quality; however, the current situation does not meet the goals and objectives of the national strategic documents yet. It is characterized by the absence of

statistics, structuring and systematization of the received qualifications and it is probably the result of a low level of readiness for the National Qualifications Frameworks (NQF), a lack of staff capacity required for the development of professional standards at all levels of professional education, as well as the limited financial resources of the country for the implementation of appropriate measures to improve the situation.[84]

The "National Strategy for Educational Development for 2020" (NSED) approved by the Government of Tajikistan in 2012 is the main policy document guiding the education sector development to 2020. This strategy states that: "education plays an important role in generating qualified workforce and building capacity for a stable society" and to achieve this, there is a need for "upgrading of general education content [via a] transfer from a knowledge-based to a competency-based education".

Outlined by EU's "Draft Strategy and Action Plan for Continuous Professional Development of Teachers" (European Union, 2020), the NSED states that to improve the competencies of the teachers and the quality of education overall, there is a need to modify the in-service training (retraining) system of teachers. This would entail two major policy reforms: increasing the variety of modes of trainings and training providers and changing the system of five-year cycle to a three-year cycle of teacher in-service training (retraining). According to NSED areas that need improvement include:

v. Formation of three-level teacher in-service training system for practicing teachers consisting of trainings at the regional level, local level and the level of educational institution.
vi. Increasing the teacher in-service training (retraining) delivery modalities, to be provided by a range of institutions, including NGOs, to teachers in primary, secondary and higher education.
vii. Providing competency-based training programs in modular form and providing teachers with a choice of credit-awarded training programs.
viii. Creating conditions for a needs-based training system, which will respond to the changing needs of the education system and teachers' professional development needs.
ix. Attaching all in-service training with the certification.
x. Ensuring the all teachers will complete a training not less than once every three years, in order to continually update their skills and knowledge.
xi. Ensuring that all educational institutions will have permanent access to methodical materials and resources for professional growth through Internet.

[84] See the review report "Summary and Update on Educational Systems and Policies in Central Asia - Tajikistan" (Global Partnership for Education, 2020b)

xii. Using ICT technologies and distance learning methodologies in in-service teacher training programmes.

A plan of activities on implementation of the State Program for the Development of the System of Advanced training and retraining of Educators of the Republic of Tajikistan for 2018 – 2022 (Annex 2 to the Degree of the Government of the Republic of Tajikistan dated July 28, 2017, no 357) presents the key activities with financing as follows:

7. Introduction of a unified and centralized system of advanced training and training (Term: 2018, USD 25'000, Responsible Agency: MoES, MoEDT)
8. Organization and equipping classrooms in advanced training institutions (Term: 2018–2022, USD 500'000/1'000'000, Responsible Agency: MoES, State Committee for Investment and State property management).
9. Training of scientific pedagogical staff in country and abroad for advanced training institutions (Term: Regularly, Responsible Agency: MoES).
10. Adoption of additional measures to ensure full coverage of teachers and general education staff with advanced training courses (Term: Regularly, USD 800'000, Responsible Agency: MoES, State Committee for Investment and State Property Management).
11. Obligatory involvement of teachers and employees of private, special and new types of institutions in the advanced training courses (Term: Regularly, Responsible Agency: MoES).
12. Organization and conduct of continuing courses for teachers of general education institutions (Term: Regularly, Responsible Agency: MoES).
13. Development and presentation of new training technologies, using intellectual potential land advanced experience of teachers-innovators in connection with the education reform (Term: Regularly, Responsible Agency MoES).
14. Strengthening of the material technical base and connection of the advanced training institutions to the internet (Term: 2018–2019, Responsible Agency: MoES).
15. Development of programs, organization of retraining courses and introduction of distance learning in the system of advanced training (Term: 2018–2019, Responsible Agency: MoES, MoEDT).
16. Establishment of digital libraries in advanced training institutions and enrichment of their reserve fund with educational, methodological, scientific

and fiction literature (Term: 2018–2022, USD 400'000, Responsible Agency: MoES, State Committee for Investment and State Property Management).

17. Conduction competitions, disseminating best practice, training seminars, scientific practical conferences and symposiums (Term: 2018–2022, Responsible Agency: MoES).

As learning influencers, teachers are key change agents in the process of building and establishing quality education practices. Teachers need opportunities, support and a safe environment to explore their expectations and values, their understanding of learning and teaching as well as their professional identity that may create barriers in supporting all learners. They need access to conceptual and practical knowledge, to colleagues who are open to share experience and to a community to support implementation and evaluation of new practices. Strong learning communities are a key support mechanism for teachers to implement knowledge, skills and attitudes, to explore new creative approaches, and to keep on learning and developing themselves.

In order to ensure that teachers are able to respond to the needs of the rapid changes of the global world, in which they and their students live, continuous teacher professional development (CPD) must be prioritized. There is an increasing knowledge-base that the conventional in-service teacher training in form of training workshops (by the Republican Institute for In-service Teacher Training (RIITT) and its affiliated agencies as well as other partners engaged in education sector development and Continuous Professional Development (CPD)) are not any more sufficient, but alternative means for teachers to develop their competencies, based on their needs and way of learning, are needed.

Finance and 3rd Party Involvement

In Tajikistan, the state budget system consists of two main components, namely the republican budget, which is channeled through the central government, and the local budgets, which are channeled through the various sub-national government units. Additional there are donor spendings, supporting various parts of the educational system. The Asian Development Bank states, that in 2015, the core education budget was $473.6 million, compared to $127.0 million in 2007. Education comprised 19.1% of the overall state budget in 2012 and averaged about 17.2% during 2010–2015. Approximately 75.0% of education sector financing was under the local government budget in the 2012 fiscal year, compared to 84.5% in 2000. \cite{AsianDevelopmentBank2016} According to the Global Partnership for Education's "Tajikistan Education Sector Analysis" in 2017, the government of Tajikistan made a financial pledge to increase public expenditures on education from TJS 3'013 million (≈ $386 million) in 2017 to TJS 3'893 million in 2020 (≈ $500 million by 2017) so as to maintain the share of public education expenditures at 17% of aggregate public expenditure. The Citizen's Budget 2020 states for a total budget of TJS 5'004 million (≈ $500

million) for educational expenditures, what equals around 20.5 % of all expenditures in 2020. (Ministry of Finance of the Republic of Tajikistan, 2020)

Various international agencies and NGOs are investing into the educational system of Tajikistan. In 2007 a donor cooperation council (DCC)[85] was set up and should meet on a regular basis. According to EuropeAid's Multi-Annual Indicative Programme 2014–2020, at pre-primary level, Aga Khan Foundation (AKF), Open Society Institute (OSI, Soros Foundation) and UNICEF support the revision of standards and programmes, opening of lower-cost ELCs, and the capacity building of teachers. In general education, Islamic Development Bank (IsDB), Kreditanstalt für Wiederaufbau (KfW), Fast Track Initiative (FTI), World Bank (WB), Japan International Co-operation Agency (JICA) and other DPs support infrastructure and furniture/equipment, while UNICEF supports water and sanitation and hygiene education. AKF, OSI, UNICEF, USAID, and the WB support improvements to quality mainly focused on basic primary (including curriculum development, improving teaching-learning materials and practices, teacher training). Girls' completion of basic education is supported by UNICEF. OSI supports the development of inclusive education. The Russian Federation, WB and OSI support building institutional capacity to monitor learning. World Food Programme (WFP) supports school meals for primary students. VET is supported by the European Training Foundation (ETF) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), with indications of forthcoming support from the Asian Development Bank (ADB), the IsDB, and the WB (EuropeAid, 2020). In addition to DCC, there is a Local Education Group (LEG) that consists of representatives of development partners and government. The LEG is coordinated by UNICEF. Tajikistan is also a recipient of funds from the GPE. Within the DCC mechanism, the World Bank serves as the supervising entity whilst UNICEF takes responsibility as Coordination Agency for Tajikistan GPE. (Global Partnership for Education, 2020a)

Listed in the Tajikistan 2020 Citizens' Budget the main external creditors of the Government of the Republic of Tajikistan are: (1) among international organizations - the World Bank (WB), Asian Development Bank (ADB), Islamic Development Bank (IDB), the Eurasian Economic Union (EAEU) Anti-Crisis Fund, and the International Monetary Fund (IMF); (2) among states - the People's Republic of China (PRC, Eximbank), Saudi Arabia (Saudi Fund), Kuwait (Kuwait Fund), France, and Germany (KfW Bank); and (3) Eurobonds

[85] Development Coordination Council Tajikistan. (n.d.). DCC – TAJIKISTAN. Retrieved March 11, 2020, from https://untj.org/dcc/ (Global Partnership for Education, 2020b)

issued by the Government of the Republic of Tajikistan in the amount of $500 million. (Ministry of Finance of the Republic of Tajikistan, 2020)

In its press release[86] in February 2020, the GPE announced a 10 million USD multiplier grant, leveraging another 30 million USD from IDB for a four-year project to enhance the school environment in 18 districts. The grants should also support the launch of a new learning assessment system and improve education data.

Learning Goals, Curriculum and Inclusive Education

The Government's emphasis on the education sector is reflected in the "National Strategy for Education Development"[87] (NSED) together with an Action Plan. Formally this document is consistent with best practice as regards principles of equality, opportunity and access. Tajikistan joined the Global Partnership for Education (GPE) in 2005. The current NSED focuses on universal access and quality education. The three main priorities are to: (i) modernize the curricula; (ii) re-organize the education system; and (iii) ensure equal access to quality education.

A Teacher Competency Framework" (TCF) is developed on the basis of the requirements of the NSED. The TCF introduces a generic framework which enables the teacher education and professional development system to orient teacher education institutions to prepare programs that meet the required competencies. It also enables the schools to address the professional development of their entire staff. The Quality Education Sector Project (QESP) has supported the development of a Teacher Competence Framework, which defines professional competences of teachers in general education in the Republic of Tajikistan in three domains: Professional Values and Attitudes, Professional Knowledge and Professional Skills.

According to GPE's Education Sector Analyses (Global Partnership for Education, 2020a), the rights to education for children with disabilities are recognized in various legal, policy and institutional frameworks in Tajikistan including the NSED. The National Development Strategy until 2030[88] states that limited social inclusion of children with disabilities is among the key causes of social inequity in Tajikistan and emphasizes the importance of creating a more inclusive education system. Article 22 of the Law on

[86] Global Partnership for Education. (2020). US$347 million mobilized to improve children's education in eight countries. Retrieved March 11, 2020, from https://www.globalpartnership.org/news/us347-million-mobilized-improve-childrens-education-eight-countries (Government of Tajikistan Ministry of Economic Development and Trade, 2016)

[87] NSED 2012-2020: https://turkawka.link/NSED_2012-2020

[88] National Development Strategy of the Republic of Tajikistan for the Period up to 2030 (Turkawka, 2020)

Education states that children with physical and mental disabilities can study in mainstream schools subject to the agreement of their parents and that special institutions of compulsory education, boarding schools and special classes should be opened for those "children with physical and mental disabilities who cannot study in mainstream schools". With these efforts, in recent years, there has been steady increase in number of children with disabilities attending the mainstream schools with an average 6% annual increase between 2013 and 2017. However, comparing the data from EMIS and school registries, it is evident that not all children with disabilities were reported by EMIS: according to EMIS only 447 pupils with disabilities were registered as enrolled in the target schools in 2016/17, compared to 974 in the school registries. The school administration believes that this is in part because only children whose disabilities are documented are registered in EMIS.

Sub-component 2.3 of the fourth Global Partnership for Education (GPE-4) focuses on inclusive education. The GPE-4 Fund Grant builds on achievements under the previous grants, and supports certain initiatives in new areas, such as early childhood education and inclusive education, complementing work initiated with other development partners including UNICEF, AKF, USAID and OSI.

However, these children continue to face significant challenges. According to the KAPB Study carried out by UNICEF in 2016, societal stigmatization and the negative perceptions of disability have added to the obstacles faced by children with disabilities in accessing education. The discriminatory attitude to children with disabilities prevails, e.g. doctors and teachers implying that children with disabilities should be placed in specialized institutions as they can provide specialized care and education, which cannot be provided by parents and regular schools. In addition, the gender inequality in accessing education remains an issue of concern. At the same time, the progress is being seen. An assessment carried out in 69 schools by UNICEF in 2017 showed that the majority of the students with disabilities have positive attitude to education. Their classmates also showed willingness to support their peers with disabilities. 90 % of teachers claimed that every child with disability has the right to mainstream schools and only 13 % asserted that children with disabilities should study in special schools.

Nevertheless, the delegates of the Research Institute of Education stated in their meeting with representatives of UNICEF and the Zurich University of Teacher Education PHZH end of February 2020, that in general the idea and culture is still more "of taking care of the children with special needs than really educating them". This attitude is based on lack

of knowledge of the teachers and missing professionals in schools and specialized institutions (often medical).

School Workforce, Professional Development and Teacher Appraisal

The Academy for Education Institute for Educational Development reported in its meeting with representatives of UNICEF and Zurich University of Teacher Education (PHZH) on February 28th 2020, that there are around 170'000 teachers working in 3884 general education schools in Tajikistan. Currently teachers undergo professional development in training programs of 72 hours (12 days) every five years, but the results are little, compared to the speed of change. Recently the Government has decided to shorten the retraining cycle from five years to three years. This has significant financial impacts and so far, the options for allocating these days across the years and by delivery mode (by centrally delivered, regionally delivered and school-base) has not been defined.

The key stakeholders in the development and implementation of the continuous professional development strategy for the teachers and their responsibilities are:

- **Ministry of Education** → Department in the MOES that approves the RIITT plans, and reports.
- **Academy for Education Institute for Educational Development** → Supervisory body managing a range of MOES affiliate organizations. Evaluation of new programs.
- **Republican Institute for In-Service Teacher Training** (RIITT) → Responsible for the INSET system in Tajikistan. Responsible for the development and planning of the training programs. Implementation of training for school directors and their deputies and for the Methodologists. RIITT has a Central Office in Dushanbe and five regional offices. RIITT reports to the Academy of Education and to the Ministry of Education.
- **RIITT Regional Offices** (Dushanbe, Qurgonteppa, Kulob, Khujand and Khorong) → Delivery of teacher training programs developed by the central RIITT. Aggregation of data on the training needs for the next academic year, based on the data received from the local educational departments.
- **Universities and colleges** → Provision of initial teacher training.
- **Regional Education Directorate** → Provision of in-service training for district teachers (conducted in the Institute for In-service Training for Education Sector Employees).
- **City Education Directorate** → Coordination and monitoring of education institutions (governmental, private) within the jurisdiction of the city; [Dushanbe city only: Provision of in-service training for district teachers;

Provision of education quality inspections; Attestation of school principals and their deputies; Provision of methodological and mentoring services.]

- **District Education Department** → Coordination and monitoring of education institutions (governmental, private) within the jurisdiction of the district; education quality inspections; Attestation of teachers and school employees; Provision of methodological and mentoring services; Reviews and makes decisions of awarding teaches with grades (categories); Develops a list of teachers who need in-service training; ; Gathering information about school vacancies; Employment of teachers.
- **School** → Methodologist, performance assessment by principal.

The in-service training (retraining) courses consist of General Pedagogy and Psychology, Education Policy and the Methodology of Subject Teaching (i.e. Mother Tongue, Mathematics, Art and Craft, Music, Nature). Theoretical part of teacher training (32 hours) is carried out in the RIITT branch offices mainly by RIITT trainers, while the practical part (40 hours) is implemented in schools by teachers in those schools, and not by RIITT trainers. However, due to limited funding in the regions, all teachers do not have equal opportunities to access the training because of long distances and lack of capacity of local governments to cover the costs. Consequently, the number of teachers trained is often less than originally planned.

According to the Summary and Update on Education Systems and Policies in Central Asia - Tajikistan, Review/Report (Helbich, Dubecova, & Ulbrikova, 2019), the main body, which is responsible for Quality Assurance is the State Agency on Supervision in the Sphere of Education operating under the Ministry of Education and Science. External quality assurance system currently consists of three consecutive steps of licensing, attestation, and accreditation. However, all three steps are drawing on the same standards and using more or less the same procedures and actors, thus overburdening Higher Education Institutes without adding value to system's improvement.

Teacher Attestation and Appraisal

In accordance with the Tajik legislation, teachers undergo mandatory attestation every 5 years. School leaders, teachers and other staff of educational institutions have also rights to request an appraisal after two years of the last appraisal. Specialists with no teaching qualification but involved in teaching with at least 5 years of teaching experience of a particular subject, undergo an appraisal and appraisal of young teachers shall be carried out in three years after hiring.

The purpose of the attestation is to determine the level of professional competence of the teacher and compliance with the position, identify the needs for further professional development, motivate teachers and scientific workers to improve their knowledge and

professional skills and to increase the personal responsibility to improve the quality of education. It is conducted by a committee composed of the chairman (head of the institution or his deputy), secretary and members of the committee: deputy school principal, heads of methodological unions, head of the trade union committee and 5 to 7 experienced teachers. Upon passing an assessment, teachers are awarded to one of the following three teaching categories: higher, first or second, which affect individual salaries. Teacher assessment instrument have been updated recently, but they are not yet aligned with the teacher competency framework. Many international organizations are supporting training of teachers in areas of their priority, but these are not incorporated and recognized by the official system.

Data Collection and Management, Technology, Innovation and Legal Aspects

The National Strategy for Education Development NSED 2012–2020 (Government of Tajikistan, 2012) sought to modernize Tajikistan's education management system by establishing quality assessment frameworks, restructuring the administration of the education system, developing indicators, and installing a functional education management information system EMIS.

There is no formal policy guidance system to define the in-service training themes or to set priorities for the professional development of teachers and school staff. Furthermore, there is no practice to build the teacher in-service trainings on the teachers' needs but the eligibility to training is based on the data on the number of teachers that need to be trained based on the 5-year cycle system. Quality Assurance systems for training provision are not yet developed and there is no adequate EMIS[89] in place.

The implementation of activities and corresponding budget programming in the education sector is anchored on the NSED 2012–2020 and the NDS 2016–2030.[90] The MoES has drafted documents to guide the implementation of these activities, the most critical being the Mid-Term Action Plan (MTAP) 2015–2017. The donor cooperation council's (DDC) activities are coordinated by the DCC Education Working Group with the purpose to improve coordination and harmonization among development partners (DPs) active in the Education Sector in Tajikistan, as well as to promote an effective interaction of the DPs with the Government, in light of building sector-wide approach.

However, while development partners have supported the conduct of several joint sector reviews (JSRs) for Tajikistan, none of these have been able to assess the overall

[89] In Kyrgyzstan the development and introduction of an EMIS is supported by UNICEF and the Asian Development Bank ADB. The open source solution OpenEMIS is getting adapted to the local needs. https://www.openemis.org/

[90] https://turkawka.link/NDS-2030 (Global Partnership for Education, 2020b)

performance of the education system, focusing instead on process indicators. The JSRs were unable to arrive at such an assessment owing to the lack of a results-based planning mechanism and weak monitoring systems. Moreover, the conduct of these JSRs was not linked to the results framework of the NDS 2016–2030 and other pertinent policy documents, further limiting the utility of the said JSRs. The lack of reliable, fast and permanent internet access and the missing ICT skills of teachers and educational staff in general is hindering the professional development of teachers and schools. Official digital materials, contextualized, localized and designed according to the needs in Tajik/Russian are not yet developed.

The World Bank drafted a concept to connect schools and other public institutions like libraries, local governments, hospitals, that could get finalized in 2020 and implemented in 2021, if the Government of Tajikistan agrees with its details. Various deputies of the Ministry of Education and Science and other officials emphasized their need for infrastructural investments and capacity building during their meetings with representatives of UNICEF and the Zurich University of Teacher Education end of February 2020. UNICEF's Project Connect and the UNICEF-ITU GIGA initiative[91] could support the countries will for development and modernization of the educational system.

Culture and Performance of the Educational System

"The National Development Strategy of the Republic of Tajikistan for the Period up to 2030" identifies following challenges and opportunities for the educational development:

- Poor quality and inefficient use of human potential
- Insufficient connection between the labor market and education system, … insufficiency of skills and poor quality of education of job seekers
- Alignment of regional differences and ensuring equal access to essential basic services (like basic education) for the whole population throughout the country
- Education system and science reform, which will be aimed at ensuring equality and access to education; improvement of the quality of education at all levels. Development of highly qualified human capital. All levels of education must meet quality standards;
    - Pre-school education should contribute to the early development of children, be affordable for the general public;
    - School education, laying the foundation of human capital, should not only provide knowledge but also shape the competence, skills, ensure the formation of innovative type of thinking and patriotic education;

[91] https://www.projectconnect.world/ and https://giga.partners/

  - The quality and scope of vocational education should ensure competitiveness of the country's economy;
  - A close relationship should be between the education system and the labor market, which provides a balance between the supply of experts of different level with the labor market requirements;
  - Capacity-building for innovations and self-sustaining research and development, closely connected to production;
  - Intensification of research work on biodiversity, climate change adaptation and resilience of mountain (flow generating) ecosystems;
  - Education system at all levels should contribute to the development of knowledge and skills, essential to promote sustainable development

- Promotion of social inclusion by improving an access to quality services, including education
- Development of the processes of services' customization, maintaining the diversity and opportunity to make a choice in education…
- A breakthrough in the field of education, fundamental and applied science is ensured. Established system of continuing general and vocational education contributes to «strong» staff and meets the needs of the economy. Profile universities, recognized within the global scientific-educational space, are available and «knowledge-driven economy» is emerging

Performance of the Educational System

Tajikistan does not have a systematic method in place to assess learning outcomes at the national level, which makes the measurement of student learning outcomes a difficult task. This task is further complicated by the country's low participation, if at all, in international learning assessments.

According to GPE's Tajikistan Educational Sector Analysis (Global Partnership for Education, 2020a), inadequate educational infrastructure is also a key challenge. This is aggravated by geographical disparities: For instance, while 73.6% of Tajikistan's population is rural, only 33.4% of preschools are located in rural areas. Insufficiency of pedagogical materials is also an important challenge. Persistent teacher shortage is another critical issue, which is also marked with geographical disparity. Due to the chronic lack of teachers, the government has been forced to lower teacher qualification standards. This lack of teachers can be attributed to the overall unattractiveness of the teaching profession in the country, primarily because of uncompetitive salaries.

Furthermore, the management system of Tajikistan's education sector is also generally weak. For instance, while several joint sector reviews have been conducted in the past, none of them were able to assess the overall performance of the education system,

due to the education sector's lack of a results-based planning mechanism and its weak monitoring systems. While education tends to be correlated with employment in Tajikistan, there is still a considerable lack of skills, both technical and soft skills, among people. At the same time, youth labor force is under-utilized especially among young girls. The relevance of education for future employment and life opportunities appears to be decreasing and opportunities for the highly educated population are sparse. There is limited information/data on education's impact on social development (e.g., heath, fertility, civic and social engagement, well-being). Any additional information could be welcome.

Development Scenarios and Implementation Recommendation

Representatives of UNICEF and the Zurich University of Teacher Education have met with Deputies and officials of the Ministry of Education and Science, with members if the Tajik National University, with various Donors and representatives of other international organizations between February 24th and 28th 2020. Following the meetings various materials and reports were collected and studied. Tajikistan's educational system is quite good documented and analyzed, most reports are online available. On the project webpage[92] many resources are linked and made available for in-depth reviews.

Various development scenarios for Tajikistan's educational system were written and the 2020 "Tajikistan Education Sector Analysis" from Global Partnership for Education (GPE) summarizes them in a clear structured way. European Union's "Draft Strategy and Action Plan for Continuous Professional Development of Teachers" describes the actual state of reforms, policies and programs and lists result areas and targets for Tajikistan's Teacher Professional Development Strategy.

For the last decade various donors and international agencies have influenced the educational system of Tajikistan by supporting the Ministry of Education and Science (MoES) and the Government with money and consultancy. Overall their activities seem not well coordinated, lacking evidence of success because of missing or falsely aggregated data and an educational system that roots in Soviet structures and copies international or European ideals and plans. Reading the reports, the personal impressions got verified.

Considering the learning crisis, efforts to reach the furthest behind must shift focus to improve student learning outcomes and skills development, while strengthening teachers' competencies in quality inclusive education. LearnIn has the goal providing quality, personalized and culturally relevant learning opportunities within a digital environment, fostering collaboration and shared practice. To reach this goal, following recommendations were made.

---

[92] Project Webpage: LearnIn - Tajikistan https://turkawka.link/learnin-tajikistan (Global Partnership for Education, 2020b)

1. Internet access for every school has to be provided. UNICEF Tajikistan should coordinate with the World Bank initiative and ask for support by UNICEF's Project Connect and the UNICEF-ITU GIGA initiative[93]. The infrastructure grants of GPE and IDB should also be aligned.[94]
2. Reliable data about the impact of educational reforms on culture and system has to be gathered. A mapping of the educational culture has been welcomed in talks with donors, the MoEs and other possible implementation partners and the lack of reliable data was also stated in the latest reports of GPE and EU. Without mapping the culture of education future initiatives are as ineffective or even self-defeating as former projects.
3. Capacity and know-how has to be build in the MoES and it's institutions for pre- and in-service development of teachers and directly in schools in all districts to build future distant and blended learning programmes through LearnIn. A mainly medical conception of children with special needs is hindering the development of inclusive quality education in general. A refraining of the mindsets is needed to implement successful and sustainable programmes.
4. The Donor Cooperation Council (DCC) should use its power to structure and align the various activities effectively as initially planned and agreed upon. A strong leadership, maybe by an external independent consultancy should be installed. If possible, current initiatives of donors should be halted, reviewed and coordinated in consultation with all. Further uncoordinated investments in the programmes and structure of the educational system are ineffective or even harming a prosperous development.
5. Through LearnIn there is a chance to build simultaneously a reliable database of educational data and professional teachers' development and grant teachers incentives for their professional development. Therefore, the MoES must agree on recognizing quality certifications by non-governmental organizations and allow teachers to be appraised through LearnIn. Some data should then be shared with a future EMIS, that could be build the same way as in surrounding countries.
6. LearnIn could support the efforts of building competencies and skills for future jobs according to the National Development Strategy 2030 and allow learners to apply these skills through LearnIn on jobs and tasks.

---

93 https://www.projectconnect.world/ and https://giga.partners/

94 Global Partnership for Education. (2020). US$347 million mobilized to improve children's education in eight countries. Retrieved March 11, 2020, from https://www.globalpartnership.org/news/us347-million-mobilized-improve-childrens-education-eight-countries (Global Partnership for Education, 2020b)

Taking the various problems and tasks into respect, only a joint aligned effort will have the desired effect. One has to work simultaneously on structural deficits and build knowledge and capacity directly in schools. AKF, USAid and OSI could be valuable partners as also other stakeholders and multipliers as reported on the project webpage. Until measures and interventions through the various national training facilities can take effect, an alternative teacher development programme could be directly established through LearnIn, if the results will be then recognized by the MoES.

All developing partners and the officials welcomed LearnIn as an interesting option for all. The interest is high and the momentum right. UNICEF should use this window of opportunity. The approach of analyzing first and concluding accordingly implies as a next step a thorough mapping of the educational culture and the values, requirements and needs of the Tajiks. At the same moment a study will offer the chance to unite the stakeholders once again and empower the DCC in general.

6. Analytic Results

6.1 Overview

The analytic results consist of a needs assessment, informing about the overall pedagogical and technical questions that rise while introducing digital or distance learning environments and of the description of the digital ecosystem, that got realized in most parts during the COVID-19 crises from April to June 2020. Both give insight in what already has been or will be achieved soon but also show where future obstacles and interdependent problems lay.

6.2 Needs Assessment

In spring 2020, the outbreak of the COVID-19 led to millions of children in countries in the Europe and Central Asia Region (ECAR) being affected by school closures. Even before COVID-19 pandemic, ECAR was facing a serious learning crisis with 11 million children and adolescents out of school and only 50 percent of the 15-year old reaching OECD benchmarks in basic proficiency in math, reading and science[95].

As the lockdown was imposed and schools were closed, Governments acted quickly to ensure learning continuity and mitigate against the negative effects that are associated with prolonged periods of school closure. They activated various options to deliver education (distance/remote/online) - through online teaching, digital access to learning materials, teaching through radio and television and distribution of printed learning materials. Despite significant efforts, the focus has mainly been on delivery of lessons with limited or no complementary strategies in place for teachers and schools to engage with students and parents in the learning at home.

In April 2020, UNICEF ECARO launched LearnIn - a digital learning initiative designed to support both teachers and students as lifelong learners[96]. LearnIn empowers teachers with high quality, culturally relevant, and collaborative learning opportunities and supports them in creating meaningful learning experiences for their students, across diverse learning environments. In effort to respond to the immediate needs of the countries for distance

[95] In ECA, more than 10.8 million children and adolescents remain out of school, with many more in school yet out-of-learning. Of the ten ECA countries that participated in PISA 2015, all performed significantly below the OECD average, with students from the region typically scoring 2.5 years behind their OECD peers. On average, 47 percent, 52 percent, and 54 percent reach basic proficiency in proficiency in math, reading, and science, respectively, compared to the OECD average of 77 per cent, 80 per cent, and 79 per cent.

[96] LearnIn Brief: https://go.learnin.info/brief (Turkawka & UNICEF Europe and Central Asia, 2019)

/remote/online learning, LearnIn initiative has been broadened and expanded *to benefit all countries in ECAR*. Therefore, a regional emergency task force[97] (RTF) was formed.

A needs assessment undertaken in May 2020 as part of the LearnIn Initiative across the participating countries Albania, Armenia, Bosnia and Herzegovina, Greece, Kosovo (UNSCR 1244), Moldova, Montenegro, North Macedonia, Romania and Serbia, revealed challenges at several levels. Teachers have struggled with designing digital lessons and assessing student progress. They have faced difficulties in connecting with and engaging all students, especially students with disabilities and most marginalized. They themselves have been felt scared and unprepared, and suffering from anxiety and stress connected to online teaching.

The soon to be published article "Distance Learning – from Emergency Solution to Equal Opportunities for all (unpublished **draft)**, page XXV in the Annex" summarizes the insights of the undertaken needs assessment. As part of the needs assessment, the RTF created the LearnIn Pedagogical Ecosystem Map[98]; visualizing actors, the purpose of learning, teaching methodologies, the learning environments, the outside world (culture, politics, society, economy) and the pedagogy, policy and administration, technology and actor-centric perspectives.

Figure 9: LearnIn Pedagogical Ecosystem

97 See https://learnin.wiki/en/task-force#learnin-regional-task-force ("Task Force (TF) | LearnIn Wiki," n.d.)

98 Find an interactive version at https://turkawka.link/learnin-pedagogy-ecosystem (Turkawka et al., n.d.)

The needs assessment was not about analyzing reports. The survey responses reflect the perspectives of experts in each country to get a subjective, contextual view. The three surveys in the field of pedagogy, policy and administration and educational technology consisted of seven parts[99]. In total the 41 survey submissions between May 4th and May 13th aggregated 710 individual responses. They got analyzed and for each topic a summary with "Analysis Key Points", "Analysis by Country" and "Raw Data" was created[100]. Then the summaries of each topic got placed into the LearnIn Pedagogical Ecosystem map.

Figure 10: Topics placed in LearnIn Pedagogical Ecosystem Map

Each of the topics placed in a certain sphere can be explored in detail by clicking on it. The interactive map with the needs assessment results will be introduced to the public in Phase II of the LearnIn initiative, starting from middle of September 2020. A closer view of the map illustrates the variety of topics and their placement.

Figure 11: Detailed view of placed topics in the LearnIn Pedagogical Ecosystem Map

99 More details about the Needs Assessment at https://learnin.wiki/en/Workstream/needs-assessment ("Needs Assessment | LearnIn Wiki," n.d.)

100 The example "Needs Assessment: Example T2.3 – EdTech Challenges" can be found at page XXIX

Key Insights of the Needs Assessment

Following a summary of key insights gathered through the needs assessment. It got evident that most actors were not ready for online distant learning.

Overall perception of distance learning (DL):

- Implementation of (some extent of) DL (after Covid-19) is part of the reality or even a priority for many countries.
- DL initiatives were already in the pipeline, but the current situation has made it very clear that DL can be time and cost efficient.
- Many stakeholders (e.g. school managers) didn't fully understand the potential of online or blended learning approaches.

Motivation, (self)organization and engagement of students

- For teachers: Struggle to keep students engaged and motivated, establish healthy routines, many older teachers struggle to motivate themselves to learn the (new) ways of distance learning.
- For students: Struggle to motivate themselves, struggle to (self)organize / create routines, lack of social contact has negatively impacted their motivation to learn.

Anxiety and stress connected to digital learning

- For teachers: visibility / transparency of work, recording etc., lack of guidance from ministries and school management, afraid of criticism.
- Sharing experiences, challenges and frustrations between teachers is important in the current context, in which job satisfaction is at risk, caused by a feeling of professional loneliness.
- For students: workload, digital lessons can be draining, lack of peer exchange, lack of consistency from teachers, increased need to self-organize and work individually.

Lack of access to internet / devices (key challenge)

- Not just lack of devices but also insufficient number or quality of devices or - even if there's internet - lack of enough bandwidth for video calls.
- Some countries mention lacking financial resources to provide access to devices and internet.

Digital Competencies (key challenge)

- For parents: seem to be the group that struggles most (though there is a wide variety of skill levels). lack of experience with digital tools / inability to help their kids, but generally play an important role in ensuring safe use of digital tools.
- For teachers:
  - Struggle with setting up, designing and managing digital classrooms and 1-1 interactions.
  - how to create digital content/ learning materials that are dynamic and able to motivate students.
  - adjusting from face-to-face to digital work assignments.
  - knowledge of online risks.
  - Huge differences in skill levels between different teachers[101]
  - Some countries have no teacher trainings dedicated to the integration of digital tools, in some countries, NGOs or other partners provide short, pin-pointed trainings to support some teachers.
- Students in general are seen as the group with the best technical skills - even though some say that they're mainly versed in using technology for entertainment or social purposes.
- Younger students tend to struggle more and rely on support from their parents when navigating digital learning environments (e.g. submitting homework to teachers).
- Some students lack basic knowledge.

Distance Learning / Teaching Interactions

- Difficulty to reach some students.
- How to address privacy concerns voiced by the teachers related to uploaded lessons content.
- Generally, quite a low level of interactions.
- Interaction between teachers and students in many countries turned out to not be very collaborative (more about teachers sending students assignments / transmitting their knowledge, not about finding solutions together).
- How to check whether students are learning.
- Learning / teaching processes.
- How to assess individual strengths, weaknesses and learning status, create individualized learning paths and complementary programs.

[101] See the Ipsos Report for UNICEF of Teachers in Montenegro (Ipsos, 2018) and Montenegro's children and parents' experiences online (Cortoni, 2016)

Lack of Quality DL Material

- Often improvised approaches to creating / accessing learning materials.
- Need to create digital environments that are engaging, interactive and fostering exchange and collaboration.
- Often direct translation from textbook to digital learning.
- Often lacking quality material in local language.
- Difficulty to create meaningful, individualized learning pathways from decentralized, fragmented materials.

Inclusion of Marginalized Groups:

- Difficulty to reach them due to lack of access (see above).
- Lack of additional tutoring (parents, external people) and support systems.
- Lack of data on marginalized children (problem is bigger than it seems).
- It should be a priority to enhance the participation of parents, especially within families from vulnerable groups, since having a support system at home has proven to be an important success factor for DL.
- DL often consists in the same material for all students. Makes it harder for marginalized groups to keep up.
- Different factors come together to accelerate the widening of the gap between privileged and marginalized children (digital literacy of parents, access to internet/devices, home environment, cultural diverge etc.).

Conclusion

As summarized in the article "Distance Learning – from Emergency Solution to Equal Opportunities for all (unpublished **draft)**" (see Annex, page XXV) and based on the results of the needs assessment it is convincing that for establishing distance learning as an integral part of education, different stakeholders need to come together and collaborate:

- Education ministries need to declare digital learning a priority and support the creation of nurturing policy frameworks to provide guidance and answers that make sense in a digital and blended learning environment;
- Teacher educators must understand the struggles of teachers, their motivations and incentives and design the right training schemes (both pre- and in-service) to empower teachers to provide optimal teaching in a distance and blended learning environment;
- Teachers and school managers need to be involved to make sure regulations and technological solutions fit their context and changed roles and

responsibilities as well as to get their buy-in for implementing it and making it "their own";
- NGOs should work directly with local stakeholders to provide localized support (technical infrastructure, sharing international good practices and facilitating exchange and coordination between stakeholders);
- The perspective of students and parents needs to be considered in the development of any solutions to make sure that the outcomes end up fitting their realities and don't further increase the gap between privileged and marginalized groups.

Without a systemic perspective that includes all critical stakeholders and a shared strategy they can align on; digitizing educational systems might end up widening the gap between privileged and marginalized students.

6.3 Digital Ecosystem

The digital ecosystem designed as part of this thesis and proposed to UNICEF Europe and Central Asia (ECAR) office in June 2019[102] found its way into the LearnIn Initiative[103] and is getting developed step by step as immediate response to the COVID-19 educational crisis by the LearnIn Regional Task Force (RTF)[104].

Figure 12: LearnIn Digital Ecosystem

---

102 See "Proposal Educational platform to "Realize the rights of children to quality and inclusive education" (Turkawka, Hollenweger Haskell, et al., 2019) and "A Gamified, Blockchain Based, Learning Record Store as a Personal Learning Environment could offer a Solution to the Human Right of Education" (Turkawka, 2019)

103 See "LearnIn Brief" (Turkawka & UNICEF Europe and Central Asia, 2019)

104 Find the members of the Regional Task Force at https://go.learnin.info/rtf ("Task Force (TF) | LearnIn Wiki," n.d.)

The digital ecosystem consists of various components, powering all other LearnIn elements (pedagogy, policy and administration, national task forces, insights and impact measurement, accessibility and the RTF operations). The components are:

- **LearnIn.wiki** | Informs about the LearnIn initiative, provides deep insights and guidance on all elements of LearnIn | Wiki, connects with the digital ecosystem via links and OpenID Connect
- **LearnIn.video and LearnIn.chat** | Enables video and chat-based communications between RTF, NTF, members of the Pedagogy, Policy & Administration, and EdTech workstreams | Both are embedded in the digital ecosystem through OpenID Connect
- **LabXChange / LearnInXchange** (fork) | Provides a digital learning management system (LMS) for teachers to get guidance and training on UNICEF Quality Inclusive Education. LearnInXchange provides localized content for teachers and students and enables communities of practice on the national level | LabXchange connects through OpenID Connect with LearnIn digital ecosystem, LearnInXchange forks LabXchange and provides an OpenSource clone for testing, localization and deployment on the national or school level
- **LearnIn Projects** | Workspace is the Communities of Practice around topics and to consolidate major insights and documents | Connects through OpenID Connect and links with LearnIn's digital ecosystem and additionally through Wikipedia-Reference tags to other projects at CRI ecosystem
- **OpenID Connect** | Credential issuing platform to connect with other digital platforms | It provides single sign on service through OAuth to LearnIn and any other digital platform that approves the service
- **LearnIn Records** | As an enhancement of OpenID Connect, the personal Learning Record Store (LRS) safes and organizes all personal data from the LearnIn's digital ecosystem and other platforms | The LRS connects through OpenID Connect, personal links and documents and other xAPI connected services (assessment results, digital badges etc.)

To illustrate various end user scenarios, several use cases were developed. The end user journey - after designing and realizing the digital ecosystem as whole - could look like:

- **Teachers and policymakers use LearnIn.wiki** to find guidance on Pedagogy, EdTech, Policy and Administration, and other relevant topics.
- **Learner (teacher, student) uses OpenID** to access and log into LearnIn digital ecosystem, LabXchange, Learning Passport, national Moodle platforms,

YouTube, and other platforms. Learner creates their profile and sets up their preferences in terms of what learning they want to have tracked and recorded.

- **Learner uses LabXchange** to access vetted UNICEF content and content from LabXchange partners (Khan Academy, Harvard University, Smithsonian, etc.) and they consume the content in LabXchange environment. Learners (both teachers and students) can remix the content to create their own learning pathways and share that with others.
- **Learner uses WeLearn Projects and LearnIn Chat** to interact with other learners - share and ask questions.
- **Learner uses OpenID** to track and record learning on any of the platforms that are part of the LearnIn ecosystem and record achievements.
- **Learner can use LabXchange** content to curate courses to teach to others in the LabXchange environment.
- **Learner stores achievements in LearnIn Records** and determines what achievements to share with whom.
- **Learner uses LearnIn Records** to organize their achievements and map out learning goals / future learning based on the available learning opportunities (visible LRS, curated based on their profile and goals).

Most of the components of the proposed digital ecosystem already exist. To create a learning environment that is successfully serving the learners needs, the ecosystem rather connects existing solutions and platforms than creating them oneself. Nevertheless, some crucial parts need(ed) to be realized. Beside the LearnIn Record Store (LRS), providing storage of credentials, learning analytics data, badges, digital certificates etc., first a secure, trustworthy digital identity is essentially needed to enable all components to interact[105].

[105] Find more details about the digital identity and its necessity in the sections "Registration and Login" on page 23 and "Digital Tools and Architecture" on page 39

OpenID Connect

During the COVID-19 crisis the digital identity as OpenID Connect got programmed and is ready as working prototype for productive use[106]. The OpenID Connect solution, realized under the name of Learning Planet Connect (LPC), acts as digital identity provider and federated bridge between data consumers and providers. It will get subsequentially developed towards a decentralized digital identity (DID). The figure below illustrates the basic functionality of LPC and some interactions enabled through it[107].

Figure 13: Integration of ID for various LMS and other Services

---

106 The LPC as OpenID Connect identity provider with its functionalities is documented at https://turkawka.link/lpc-documentation ("LPC Documentation," n.d.)

107 1. LPC as identity provider, and federated ID for inter accessibility to various LMS: Only very limited user data storage (user-id, name, email) - 2. LRS with a user database to profile and for credential storage, provides data to LMS by consent - 3. APIs for learning data export via data processing unit to match data/credentials to LRS database(s) - 4. Consented personal data export to 3rd party platforms and services. - 5. APIs for non-formal data provision

A simple use case is using LPC as federated OpenID to access LMS (e.g. Learning Passport[108] or others) with ID credentials of a 3rd party ID provider (e.g. a National EMIS[109]) and LRS stores learning activity data from any LMS (e.g. Learning Passport) and provides selected data by user consent to a 3rd party data consumer (e.g. a National EMIS).

Figure 14: LPC use case for LMS and EMIS

108 Learn more about the UNICEF Learning Passport Initiative at: https://www.learningpassport.org/

109 An EMIS can be defined as a system for the collection, integration, processing, maintenance and dissemination of data and information to support decision-making, policy-analysis and formulation, planning, monitoring and management at all levels of an education system. ("Educational Management Information System (EMIS) | Unesco IIEP Learning Portal," n.d.)

Governance

To use LPC productively, connecting the systems already in use (Wiki, Video, Chat, Projects, etc.) and connect other systems to LearnIn's and CRI's digital ecosystem, a robust and viable governance structure needs to be in place. The fact is reflecting the results of the preliminary investigations (see "Conclusion of the #LEARNINGPLANET Strategic Workshop, page 48ff") and already got stated in the proposal made to UNICEF ECAR in June 19. A roadmap to achieve such a structure got drawn out recently.

Figure 15: High level roadmap of LPC

The goal is to create a trustworthy governance structure to operate, supervise, further develop LPC and on-board new partners and counties. Despite everyone is keen to use open standards and open source solutions; with an increasing user database the costs must be sustainably supported by the governing structure.

Figure 16: LPC governance and funding model

Having proven its utility and built trust through partnerships with stewards of shared values, the fully user-managed and human-centric identity can outgrow the LearnIn project that was its proving ground. As its utility (in dialogue with broader initiatives to harmonize learner records) has been proven in parallel initiatives, it now has a broad enough user base to allow economies of scale and a utility or commodity funding model.

This shift is critical: the more learners use the wallet; the less donation or ongoing contribution is needed to support the millions of students. Having partnered along the way with other initiatives, costs are shared across a wide platform. A handful of national governments participating in LearnIn and universities and other institutions partnering for research purposes are substantial for sustainability.

6.4 Conclusion

The insights of the Needs Assessment and the questions rising during the development of a Digital Ecosystem show, how interdependent the various components of a solution to serve various educational system are. Beside technical challenges like lack of internet access, missing devices or low bandwidth there are general reservations towards digital or distance learning, missing quality of suitable online materials, lack of knowledge to design digital learning environments, unsuitable policies or laws and anxiety of learners and teachers to tackle.

Even an open source digital environment is realized in no time (as the Regional Task Force and CRI have demonstrated), the key to access and connect various components in

form of a trusted digital identity (ideally as decentralized, self-sovereign digital identity) needs a strong, sustainable governing body. Once in place, the components for storage of credentials, learning analytics, certificates etc. can be developed and introduced. Only then the digital ecosystem will unfold its full power, enabling teachers and learners to create their individual contextualized learning pathways according to culture and needs.

The phase II of LearnIn will deepen the knowledge about the needs and obstacles by future human-centered research in each of the participating countries. Meanwhile everyone involved in the technical parts at LearnIn, CRI and its partners is working on creating the necessary structures and parts to serve the pedagogical and social components in their best way.

7. Conclusion & Future Work

7.1 Answers to Research Questions

«How can one grant learners with limited economic resources identified access to formal and informal learning resources, organize the achievement storage for learning pathway mapping, locating matching communities of practice or portfolio presentation and gamify the personal learning environment for sustained motivation and engagement?»

Identified access is key. As elaborated in section ”Registration and Login”, a trustworthy digital identity is needed for lifelong learning. Also, during the “#LEARNINGPLANET Strategic Workshop” the topic of an OpenID was discussed and a governing structure to protect the interests of the users proposed. The country visit in “Tajikistan” revealed the necessity of digital identities in general, especially in countries, where the digitalization hasn’t reached western European standards.

Therefore, one of the first tasks of the EdTech team of the LearnIn Regional Task Force was to create an OpenID, that can then be continuously developed to a decentralized, self-sovereign digital identity (DID). The proof has been delivered and next steps towards a DID with a strong governing structure as product owner is on its way.

By taking the first step of establishing a trusted digital identity for all, all other components of the digital ecosystem can be developed or connected. Following the DID, the Learning Record Store will take over the attention of designers, developers and experts around the LearnIn initiative.

During the COVID-19 crisis it got evident, that quality online resources – formal or informal – are often missing. The “Needs Assessment” clearly showed the lack of materials but also the lack of knowledge of how to navigate through the jungle of digital offerings. Teachers and parent’s education in the field of digital competences is needed as well as the policies that allow the actors to create digital learning opportunities according to needs rather than to tests and educational systems, that are not compliant.

As discussed at the “#LEARNINGPLANET Strategic Workshop” and also seen in the “Needs Assessment” achievement storage, mapping of learning pathways and locating matching communities or job opportunities demand compliant but also contextualized sets of skills. These don’t exist yet.

Gamification is in theory possible, as reflected in the section “Gamification of Learning Experiences”. Thus, there hasn’t been a digital learning ecosystem as described and it is an open question, if gamification will have the effect on learner’s motivation as wished.

The opportunities of a gamified ecosystem will be elaborated during the design process of the LearnIn Record Store and as soon tokenized reward systems get introduced as proposed in the section “Sustainable and Trustworthy Long-Term Operation”.

7.2 Implication for Practice

As stated by Hollenweger in a not yet published LearnIn web article “Digitalization brings many opportunities to enhance learner agency, if it is used with a clear vision of inclusive pedagogy and the necessary awareness of potential conflicts and contradictions. … Digital technologies have the potential to support active learning and help teachers to become powerful mediators of knowledge by guiding students to use these resources to their full potential.”

The COVID-19 crisis has shown the need and potential for contextualized online or distance learning opportunities to everyone. To achieve the goal of a sustainable digital ecosystem a thoughtful co-design process, informed by human-centered research and reflected by all involved actors is key. The LearnIn Regional Task Force and its partners are demonstrating in their immediate response to the crisis, how iterative co-design processes can create widely accepted pedagogical and digital solutions.

Throughout the thesis it got clear, that a strong governing structure is needed for trust, operations, compliance and further development. To create a governing structure while implementing is tricky but inevitable.

7.3 Recommendations

Great achievements were done during the COVID-19 crisis. As the work at LearnIn continues and the partners of the first phase will participate also in the next phase, the digital ecosystem described in this thesis will find its way to realization. The last months have aggregated a lot of expertise and understanding throughout all involved parties and sustainable structures are getting build.

To keep up the pace while delivering on the near infinite tasks, the conglomerate of initiatives, partners and experts need to organize themselves and walk the talk. Supported by a growing community of likeminded the digital ecosystem could be real in a few years. The technology is there, the underlying pedagogy and the interdependencies of the elements of a digital ecosystem are getting better understood during iterative co-design processes. Fed by enough resources and supported by the right institutions and organizations a digital ecosystem that grants learners with limited resources access to quality online learning materials could be a reality soon.

8. References

8.1 Bibliography

Antonaci, A., Klemke, R., Stracke, C. M., & Specht, M. (2017). Identifying Game Elements Suitable for MOOCs. In É. Lavoué, H. Drachsler, K. Verbert, J. Broisin, & M. Pérez-Sanagustín (Eds.), *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics): Vol. 10474 LNCS* (pp. 355–360). Cham: Springer International Publishing. doi: 10.1007/978-3-319-66610-5_26

Asia, C. (2018). *Concept Note Realizing the rights of children to quality and inclusive education Through a blended learning approach UNICEF Regional Office for Europe and Central Asia November 2018*. (November), 3–7.

Asian Development Bank. (2016). *Sector Assessment (Summary) EDUCATION 2016-2020*. Retrieved from https://www.adb.org/sites/default/files/linked-documents/cps-taj-2016-2020-ssa-05.pdf

Bakhouyi, A., Dehbi, R., Lti, M. T., & Hajoui, O. (2017). Evolution of standardization and interoperability on E-learning systems: An overview. *2017 16th International Conference on Information Technology Based Higher Education and Training (ITHET)*, 1–8. IEEE. doi: 10.1109/ITHET.2017.8067789

Banks-Louie, S. (2018). OracleVoice: Edtech Startup To Release Blockchain-Based 'Lifelong Learning Ledger.' Retrieved May 9, 2019, from Oracle Brandvoice website: https://www.forbes.com/sites/oracle/2018/07/12/edtech-startup-to-release-blockchain-based-lifelong-learning-ledger/#1d971336e398

Bersin, J. (2019). Learning Experience Platform (LXP) Market Grows Up: Now Too Big To Ignore – JOSH BERSIN. Retrieved May 9, 2019, from joshbersin.com website: https://joshbersin.com/2019/03/learning-experience-platform-lxp-market-grows-up-now-too-big-to-ignore/

Bundesministerium für Arbeit und Soziales. (n.d.). Ergebnis | Arbeiten 4.0. Retrieved June 12, 2019, from https://www.arbeitenviernull.de/mitmachen/wertewelten/ergebnis.html

Central Intelligence Agency. (2020, August 5). Tajikistan — The World Factbook - Central Intelligence Agency. Retrieved September 2, 2020, from https://www.cia.gov/library/publications/the-world-factbook/geos/ti.html

Chaia, A., Goland, T., Gonzalez, M. J., Morduch, J., & Schiff, R. (2012). Half the World Is Unbanked. *Banking the World*, (October). doi: 10.7551/mitpress/9517.003.0003

Conole, G. (2016). MOOCs as disruptive technologies: strategies for enhancing the learner experience and quality of MOOCs. *Revista de Educación a Distancia (RED)*, (50), 1–18. doi: 10.6018/red/50/2

Cortoni, I. (2016). *Montenegro's children and parents' experiences online*. Retrieved from https://www.unicef.org/montenegro/en/reports/montenegros-children-and-parents-experiences-online

Council of Europe. (2012). Recommendation of the Committee of Ministers to member States on ensuring quality education. Retrieved June 10, 2019, from CM/Rec(2012)13 website: https://search.coe.int/cm/Pages/result_details.aspx?ObjectID=0900001680 5c94fb

Council of Europe. (2017). Regional Support for Inclusive Education in South East Europe. Retrieved June 11, 2019, from https://pjp-eu.coe.int/en/web/inclusive-education

Council of the European Union. (2009). Council conclusions of 12 May 2009 on a strategic framework for European cooperation in education and training. Retrieved June 10, 2019, from C 119/02 website: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52009XG0528(01)&from=EN

Development Coordination Council Tajikistan. (n.d.). DCC – TAJIKISTAN. Retrieved March 11, 2020, from https://untj.org/dcc/

Development Partners of Tajikistan. (n.d.). *Development Partner's Appraisal and Endorsement Report "National Strategy for Education Development of the Republic of Tajikistan until 2020."* Dushanbe. Retrieved from https://turkawka.link/TJI-2012

Dichev, C., & Dicheva, D. (2017). Gamifying education: what is known, what is believed and what remains uncertain: a critical review. *International Journal of Educational Technology in Higher Education*, *14*(1), 9. doi: 10.1186/s41239-017-0042-5

Downes, S. (2017). New Models of Open and Distributed Learning. In M. Jemni, Kinshuk, & M. K. Khirbi (Eds.), *Open Education: from OERs to MOOCs.* (Lecture No, pp. 1–22). Berlin, Heidelberg: Springer. doi: 10.1007/978-3-662-52925-6_1

Educational Management Information System (EMIS) | Unesco IIEP Learning Portal. (n.d.). Retrieved September 1, 2020, from https://learningportal.iiep.unesco.org/en/glossary/educational-management-information-system-emis

EuropeAid. (2019). *Technical Assistance to the Ministry of Education and Science in the areas of In-Service Teacher Training, Learning Assessment, Planning, Budgeting and Monitoring, and Curriculum*. Retrieved from https://turkawka.link/tcf

EuropeAid. (2020). *Tajikistan MULTI-ANNUAL INDICATIVE PROGRAMME 2014 – 2020 AND COUNTRY STRATEGY PAPER 2014 – 2020*. Dushanbe. Retrieved from https://turkawka.link/MTDS-2020

European Commission, & (Ec), E. C. (2011). *SPECIAL EUROBAROMETER 359 Attitudes on Data Protection and Electronic Identity in the European Union*. 330. Retrieved from http://ec.europa.eu/public_opinion/index_en.htm

EUROPEAN DATA PROTECTION SUPERVISOR. (n.d.). Retrieved June 13, 2019, from https://edps.europa.eu/

European Union. (2020). *Draft Strategy and Action Plan for Continuous Professional Development of Teachers*. Dushanbe.

Fenu, G., Marras, M., & Boratto, L. (2018). A multi-biometric system for continuous student authentication in e-learning platforms. *Pattern Recognition Letters*, *113*, 83–92. doi: 10.1016/j.patrec.2017.03.027

Global Partnership for Education. (2019). Education in Tajikistan | Global Partnership for Education. Retrieved March 3, 2020, from https://www.globalpartnership.org/where-we-work/tajikistan

Global Partnership for Education. (2020a). *Tajikistan Education Sector Analysis*. Retrieved from https://www.globalpartnership.org/content/education-sector-analysis-2019-tajikistan

Global Partnership for Education. (2020b). US$347 million mobilized to improve children's education in eight countries. Retrieved March 11, 2020, from https://www.globalpartnership.org/news/us347-million-mobilized-improve-childrens-education-eight-countries

Golubeva, M. (2014). *"Regional Support for Inclusive Education": Synthesis Report*. Retrieved from http://www.csie.org.uk/resources/translations/IndexEnglish.pdf

Göschlberger, B., & Steinbauer, M. (2017). Global learning network analytics to enhance PLN understanding. *Proceedings of the 19th International Conference on Information Integration and Web-Based Applications & Services - IiWAS '17*, 193–197. New York, New York, USA: ACM Press. doi: 10.1145/3151759.3151843

Government of Tajikistan. *National Strategy of Education Development of the Republic of Tajikistan till 2020*. , (2012). Tajikistan.

Government of Tajikistan. *National Strategy for Education Development 2021-2030*. , (2020). Tadjikistan.

Government of Tajikistan Ministry of Economic Development and Trade. *National Development Strategy of the Republic of Tajikistan for the Period up to 2030*. , (2016). Tajikistan.

Haucap, J., & Heimeshoff, U. (2013). Is the Internet Driving Competition or Market Monopolization? *DICE DISCUSSION PAPER*, (83), 17. Retrieved from http://www.dice.hhu.de/fileadmin/redaktion/Fakultaeten/Wirtschaftswissenschaftliche_Fakultaet/DICE/Discussion_Paper/083_Haucap_Heimeshoff.pdf

Helbich, J., Dubecova, A., & Ulbrikova, L. (2019). *Summary and Update on Education Systems and Policies in Central Asia - Tajikistan, Review/Report*. Retrieved from https://www.caep-project.org/wp-content/uploads/2019/03/CAEP_Tajikistan-HE-and-VET-Brief.pdf

Hollenweger, J. (2020). Emergency Manual for Teachers – Overview | LearnIn Wiki. Retrieved August 23, 2020, from https://learnin.wiki/en/Workstream/emergency-manual/emergency-manual-overview

Hollenweger, J., Pantić, N., & Field, L. F. (2014). *Regional Support for Inclusive Education; Mapping existing quality inclusive education training programmes within the South East Europe Region*. Strasbourg Cedex. Retrieved from http://pjp-eu.coe.int/web/inclusive-education

Hollenweger, J., Pantić, N., & Florian, L. (2015). *Tool to Upgrade Teacher Education Practices for Inclusive Education*. Strasbourg Cedex: Council of Europe. Retrieved from https://pjp-eu.coe.int/documents/1473702/8927135/Tool+to+Upgrade+Teacher+Education+Practices+for+Inclusive+Education/0cf28c1b-4f95-49ab-9fd3-de77b772ffed

Hossain, N., Hossain, M. A., Hossain, M. Z., Sohag, M. H. I., & Rahman, S. (2018). OAuth-SSO: A Framework to Secure the OAuth-Based SSO Service for Packaged Web Applications. *2018 17th IEEE International Conference On Trust, Security And Privacy In Computing And Communications/ 12th IEEE International Conference On Big Data Science And Engineering (TrustCom/BigDataSE)*, 1575–1578. IEEE. doi: 10.1109/TrustCom/BigDataSE.2018.00227

Ipsos. (2018). *GKO_Teachers in Montenegro*. Retrieved from http://www.skolskiportal.edu.me/Pages/Default.aspx

Lavoue, E., Monterrat, B., Desmarais, M., & George, S. (2019). Adaptive Gamification for Learning Environments. *IEEE Transactions on Learning Technologies*, *12*(1), 16–28. doi: 10.1109/TLT.2018.2823710

Lindberg, O. (2018). Designing for the Next Billion Users. Retrieved August 19, 2018, from https://www.shopify.com/partners/blog/next-billion-users

LPC documentation. (n.d.). Retrieved September 1, 2020, from https://infallible-meninsky-ae23a9.netlify.app/index.html

Massachusetts Institute of Technology. (2019). Digital Credentials Initiative – We are building an infrastructure for digital academic credentials that can support the education systems of the future. Retrieved June 12, 2019, from Digital Credentials website: https://digitalcredentials.mit.edu/#mit-join

McDonald, J. (2015). Communities of Practice. In *International Encyclopedia of the Social & Behavioral Sciences* (pp. 328–331). Elsevier. doi: 10.1016/B978-0-08-097086-8.92051-8

Ministry of Finance of the Republic of Tajikistan. (2020). *Tajikistan 2020 Citizens' Budget*. Dushanbe. Retrieved from http://minfin.tj/downloads/citizens' budget-en.pdf

mooc-list.com. (n.d.). Search MOOC and Free Online Courses by Type of Certificate | MOOC List. Retrieved May 9, 2019, from https://www.mooc-list.com/types-of-certificates

Naidoo, J., Giraldo Ospino, J.-P., & Unwin, T. (2019). *Towards a UN-wide strategy on the future of education and learning*. Paris, France.

Needs Assessment | LearnIn Wiki. (n.d.). Retrieved September 1, 2020, from https://learnin.wiki/en/Workstream/needs-assessment

Némethi, B., Wagner, K., Renieris, E., Lang, P., Brunet, E., & Holst, E. (2017). *Self-Sovereign Identity* (pp. 1–39). pp. 1–39. Berlin, Germany: Published by the Identity Working Group of the German Blockchain Association. Retrieved from https://www.egiz.gv.at/files/download/Self-Sovereign-Identity-Whitepaper.pdf

nextpractice. (n.d.). nextexpertizer® - nextpractice. Retrieved May 10, 2019, from https://www.nextpractice.de/nextexpertizer_en.html

Ocheja, P., Flanagan, B., & Ogata, H. (2018). Connecting decentralized learning records. *Proceedings of the 8th International Conference on Learning Analytics and Knowledge - LAK '18*, *18*, 265–269. New York, New York, USA: ACM Press. doi: 10.1145/3170358.3170365

Open Collective - Make your community sustainable. Collect and spend money transparently. (n.d.). Retrieved August 31, 2020, from https://opencollective.com/

Oppong, T. (2018). Ikigai: The Japanese Secret to a Long and Happy Life Might Just Help You Live a More Fulfilling Life. Retrieved August 30, 2020, from medium.com website: https://medium.com/thrive-global/ikigai-the-japanese-secret-to-a-long-and-happy-life-might-just-help-you-live-a-more-fulfilling-9871d01992b7

Pietkiewicz, K., & Driha, O. M. (2017). Issues for MOOC recognition / certification / accreditation. In *BizMOOC – Knowledge Alliance to enable a European-wide exploitation of the potential of MOOCs for the world of business* (No. 562286-EPP-1-2015-1-AT-EPPKA2-KA; Vol. 6). Retrieved from https://bizmooc.eu/issues-for-mooc-recognition-certification-and-accreditation/

PIX-Certify your digital skills! | Aix-Marseille Université. (n.d.). Retrieved August 30, 2020, from https://www.univ-amu.fr/en/public/pix-certify-your-digital-skills

re:publica. (n.d.). The digital identity revolution – great hopes or deep concerns? | re:publica 2019. Retrieved May 8, 2019, from https://19.re-publica.com/en/session/digital-identity-revolution-great-hopes-or-deep-concerns

Reviews.com. (2018). The Best MOOC Platforms for 2019. Retrieved June 10, 2019, from Reviews.com website: https://www.reviews.com/mooc-platforms/

Sulitest. (n.d.). Retrieved August 30, 2020, from https://www.sulitest.org/en/index.html

Tajikistan. *Constitution of the Republic of Tajikistan*.

Tajikistan State Statistical Agency. (2016). *Tajikistan - Living Standards Survey*. Retrieved from https://microdata.worldbank.org/index.php/catalog/72

Task Force (TF) | LearnIn Wiki. (n.d.). Retrieved September 1, 2020, from https://learnin.wiki/en/task-force#learnin-regional-task-force

Turkawka, G. (2019). A Gamified , Blockchain Based , Learning Record Store as a Personal Learning Environment could offer a Solution to the Human Right of Education. *EDULEARN19 Proceedings*, *11*, 8961–8972. doi: 10.5281/zenodo.3267343

Turkawka, G. (2020). LearnIn - Tajikistan: Feasibility Study and Developing Scenarios. Retrieved March 11, 2020, from https://projects.cri-paris.org/projects/g3JG8Trs/blogentries

Turkawka, G., Hollenweger Haskell, J., Weidinger, W., & Fraefel, J. (2019). *Proposal Educational platform to "Realize the rights of children to quality and inclusive education."* Zurich. doi: 10.5281/zenodo.3351426

Turkawka, G., Hollenweger, J., Shabani, N., Toplic, L., Rennhard, Y., & Weber, H. (n.d.). LearnIn Ecosystem Map - Online. Retrieved September 1, 2020, from https://miro.com/app/board/o9J_ks8j_wc=/

Turkawka, G., Soobrayan, P. B., Shabani, N., Weidinger, W., Hollenweger Haskell, J., Fraefel, J., & Turkawka, G. (2019). *Results PHZH & UNICEF-Workshop, Flip-Charts*. Zurich. doi: 10.5281/ZENODO.2997739

Turkawka, G., & UNICEF Europe and Central Asia. (2019). *LearnIn - Brief*. doi: https://doi.org/10.5281/zenodo.3708296

Unconference - Wikipedia. (n.d.). Retrieved August 29, 2020, from https://en.wikipedia.org/wiki/Unconference

UNESCO. *Education 2030: Incheon Declaration and Framework for Action for the implementation of Sustainable Development Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.* , (2016).

UNESCO. (2018a). *A lifeline to learning: Leveraging technology to support education for refugees*. Paris, France: United Nations Educational, Scientific and Cultural Organization. Retrieved from United Nations Educational, Scientific and Cultural Organization website: http://unesdoc.unesco.org/images/0026/002612/261278e.pdf

UNESCO. (2018b). *Global Education Meeting 2018: Brussels Declaration*. Paris, France: UNESCO. Retrieved from UNESCO website: https://unesdoc.unesco.org/ark:/48223/pf0000366394.locale=en

UNESCO. (2019a). Artificial intelligence in education: challenges and opportunities for sustainable development. In F. Pedró, M. Subosa, A. Rivas, & P. Valverde (Eds.), *Working papers on education policy, 7* (p. 46). Paris, France: UNESCO. Retrieved from https://en.unesco.org/themes/education-policy-

UNESCO. (2019b). *Beijing Consensus on Artificial Intelligence and Education*. Beijing, China. Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000368303

UNESCO. (2019c). *Challenges and Opportunities for Sustainable Development Education Sector United Nations Educational, Scientific and Cultural Organization*. Retrieved from https://en.unesco.org/themes/education-policy-

UNESCO. (2019d). First UNESCO recommendations to combat gender bias in applications using artificial intelligence. Retrieved May 19, 2019, from https://en.unesco.org/news/first-unesco-recommendations-combat-gender-bias-applications-using-artificial-intelligence

UNESCO. (2019e). Open Educational Resources (OER). Retrieved May 2, 2019, from https://en.unesco.org/themes/building-knowledge-societies/oer

UNICEF. (2014). Inclusive Education Webinars on Vimeo. Retrieved June 10, 2019, from https://vimeo.com/channels/842958

UNICEF. (2017). *Inclusive Education - Understanding Article 24 of the Convention on the Rights of Persons with Disabilities*. Geneva: UNICEF. Retrieved from UNICEF website: https://www.unicef.org/eca/sites/unicef.org.eca/files/IE_summary_accessible_220917_0.pdf

UNICEF. (2018). *Realizing the rights of children to quality and inclusive education through a blended learning approach*.

UNICEF Europe and Central Asia. (n.d.). Education. Retrieved June 10, 2019, from https://www.unicef.org/eca/education

UNICEF Innovation. (2019). *Executive Summary Artificial Intelligence and Childrens Rights*. Berkeley, CA, USA. Retrieved from https://www.unicef.org/innovation/reports/memoAIchildrights

United Nations. (2017). *World Population Prospects - The 2017 Revision*. New York.

United Nations. (2019). *World Population Prospects 2019: Data Booklet*. New York. Retrieved from https://www.un.org/development/desa/pd/sites/www.un.org.development.desa.pd/files/files/documents/2020/Feb/un_2019_wpp_databooklet.pdf

Venäläinen, R. (2014). *Project "Regional Support for Inclusive Education": Summary Report Inclusive Education Policy Mapping*. Retrieved from https://pjp-eu.coe.int/documents/1473702/8306757/Summary+Policy+Mapping+Report+Raisa+Venalainen.pdf/a9e8cb30-0ce9-4f89-a937-302a5765adbf

Wachter, S., & Mittelstadt, B. (2019). A RIGHT TO REASONABLE INFERENCES: RE-THINKING DATA PROTECTION LAW IN THE AGE OF BIG DATA AND AI. In *Columbia Business Law Review* (Vol. 2019). Retrieved from https://www.researchgate.net/publication/327872087

We Believe We Can End The Water Crisis In Our Lifetime | charity: water. (n.d.). Retrieved August 31, 2020, from https://www.charitywater.org/

World Bank. (2011). *World Bank Annual Progress Report for 2010*. Retrieved from https://drive.google.com/file/d/16SK9htRS7kbFOe9EruLcTLUqq3TleSzD/view

World Bank, UNICEF, & TajStat. (2018). *Child Poverty in Tajikistan*. Retrieved from http://stat.ww.tj/pages/Child_Poverty_Tajikistan_final.pdf

World Economic Forum. (2018). *The Global Gender Gap Report 2018 Insight Report*. Retrieved from http://www3.weforum.org/docs/WEF_GGGR_2018.pdf

Yang, J. (2015). *Recognition, Validation and Accreditation of Non-formal and Informal Learning in UNESCO Member States*. Hamburg, Germany: UNESCO. Retrieved from http://unesdoc.unesco.org/images/0023/002326/232656e.pdf

Zyskind, G., Nathan, O., & Pentland, A. S. (2015). Decentralizing privacy: Using blockchain to protect personal data. *Proceedings - 2015 IEEE Security and Privacy Workshops, SPW 2015*. doi: 10.1109/SPW.2015.27

8.2 List of Figures

Figure 1: Ideas and features of a digital ecosystem 41
Figure 2: Learning needs and resources of a digital ecosystem for #LEARNINGPLANET initiative 42
Figure 3: Skills Management Overview 43
Figure 4: Reference Data Overview 44
Figure 5: HDI values (2018) for post-Soviet states in Central Asia and southern Caucasus region. 51
Figure 6: Percentage of population living below the national poverty line, select post-Soviet states. (Data from Asian Development Bank, Basic Statistics, 2019. Kazakhstan and Uzbekistan, 2018 data; others, 2017 data) 52
Figure 7: WEF Global Gender Gap Index 2018, select post-Soviet states 53
Figure 8: Structure of the Educational System in Tajikistan 55
Figure 9: LearnIn Pedagogical Ecosystem 72
Figure 10: Topics placed in LearnIn Pedagogical Ecosystem Map 73
Figure 11: Detailed view of placed topics in the LearnIn Pedagogical Ecosystem Map 73
Figure 12: LearnIn Digital Ecosystem 78
Figure 13: Integration of ID for various LMS and other Services 81
Figure 14: LPC use case for LMS and EMIS 82
Figure 15: High level roadmap of LPC 83
Figure 16: LPC governance and funding model 84

9. Appendices

9.1 #LEARNINGPLANET Strategic Meeting, January 25th, 2020

#LEARNING PLANET

LP Strategic Workshop, Jan 25th 2020

Outline

Agenda

Humans of LP - Intros

Workshop 1: Services - Digital tools and architecture

Workshop 2: Growth - Partnership strategies (Content, Communities, Media)

Workshop 3: Sustaining - Social business model and fundraising strategy

Agenda

9:00 - 10:00 Welcome - Breakfast
10:00 - 10:30 Introductions
10:30 - 11:30 LP initiative updates
11:30 - 11:45 Value Proposition Presentation + Feedback
11:45 - 13:00 Breakout working groups (I)
- Tools and digital architecture
- Strategies for partnerships
- Social business model and fundraising strategy

13:00 - 13:30 Key messages + Planning next working groups
13:30 - 14:30 Lunch Break
14:30 - 16:00 Breakout working groups (II)
16:00 - 17:00 Working group presentations and next steps (inscription to long-term running working groups)

#LEARNING PLANET

			#Mapping
Bilal Ghalib	PBLEs: Community Learning Spaces -> Reducing barriers of geography high quality online facilitation -> personal combined with professional growth. Colonial Reparations	bg@pitchworthy.co	#see-feel-do #connection-across-difference #moreofwhatworks
Ilona Schelle	Patient Advocate Inspire2live (I2L). Empowering patients, doctors and scientists to do better and execute what we already know.	ilona.schelle@gmail.com	Empower Connect Turn emotion into action
Philippe Petitqueux	Agricultural Education in France/Normandy Innovation/Education/Technologies Secretary General Open Recognition Alliance Moodle community member	philippe.petitqueux@educagri.fr @misterppqx	#openrecognition #openbadges
Ariel Lindner	CRI co-founder bottom-up learning through research across the globe	ariel.lindner@cri-paris.org	#openscience #LearningThroughResearch
Elie Rotenberg	Creating primary & secondary schools for the future CRI alumni	elie@rotenberg.io	#digitaltools #schools #opensource #softwareecosystem
Bodo Hoenen	Education and open innovation. Dev4X.com	bodo@dev4x.com	
John Wilbanks	Governance breaks at internet scale, but collectively governed communities on common platforms may hold the answer.	john.wilbanks@sagebionetworks.org	#Governance #consent #communities
Tanya Pein	Sustainable finance & investment, let's repurpose money to be in the service of society, and an enabler of progressive change	tanya@tanyapein.com	#sustainability #finance #springboard #philanthropy #SDGs
Jean-Marc Sevin	Data Scientist at CRI & definitely lifelong learner	jean-marc.sevin@cri-paris.org	#lifelonglearning #brightfuture #hybridintelligence
Mélanie Ullmo	Two of the many hands building the #LEARNINGPLANET	melanie.ullmo@cri-paris.org	#curiosity #interdisciplinarity #diversity

#LEARNING PLANET

Iryna Nikolayeva	Product manager of WeLearn tool (CRI), and helping on Projects software	iryna.nikolayeva@cri-paris.org	#softwarePlatforms #AIwithHumanity #transform #education #empathy #climate
Katerina Loshkareva	Researcher of future skills. Board Member of WorldSkills Int.	e.p.loshkareva@gmail.com	#futureskills #humancentricapproach #bestpracticeexchange
David Pontalier	Editorial & Communications #LEARNINGPLANET	david.pontalier@cri-paris.org	#LearningCommunities #CollectiveInteligence #SocialAdvocacy
Alan Boldon	CEO Dartington Hall Trust https://www.dartington.org Founder/Director Weave https://weaveglobal.org	alan@weaveglobal.org	Nurturing systemic wisdom
Morgan Silver-Greenberg	Building systems for human potential, background in creating community, product and brand for organizations at scale	morgansg@gmail.com	thrivable system for society
Peter Kapitein	We know what to do, we know how to do that, we want to do it and still we are not doing it. Why and how can we change this inability to believe what we know	peter.kapitein@gmail.com	Connect Deliver Act
Gaëll Mainguy	Director of Development and International Relations CRI	gaell@cri-paris.org	

#LEARNING PLANET

Suggested Workshops, Outcomes and Questions

Workshop 1: Services - Digital tools and architecture 5.08 **Presentation (complete slides with outcomes here):** https://docs.google.com/presentation/d/1XKjzNHlxDmjCMTsy4LtYRdn9SNoJ1Y82pbq3m5xRnxk/edit?usp=sharing **Google spreadsheet:** List ot tools	
Outcome 1:	**Define the most important needs of the different communities**
Questions:	- What are the most valuable services for the different communities?
	- How to organize, log and select priorities for development (tools, governance)?
Outcome 2:	**Create a map of digital services for learning communities**
Questions	- What are the key functions needed in a future ecosystem for learning?
	- What are the existing off the shelf digital tools that can be used and integrated?
	- What functional areas are not yet covered and what should be built first?
Outcome 3:	**Define common reference data for the ecosystem**
Questions	- We need reference data for user IDs, concepts reference (Wikipedia, SDG), skills, organizations…
	- What other reference data are needed?
	- Who will manage these reference data? (Wikipedia, W3C, UN, educational organizations consortiums…)

#LEARNING PLANET

Workshop 2: Growth - Partnership strategies (Content, Communities, Media)

Preliminary notes :

Partnerships

There are so many initiatives happening in this space that are not all complementary to each other, although the visions are aligned

Important not to get into the mentality of who will be the "top"

How can we support each other in the prototyping phase (*Pavel*)

Temptation to design The global solution but that seems counterproductive to collaboration and openness (*Ross*)

Emergence is an attractive idea and a designed or rather polished approach can seem contrary to emergence, but it doesn't need to be. Why not curate a few woven projects → iterative, in-motion, mutually beneficial interactions (*Alan*)

Knowledge of all the initiatives around the world and members of the learning community is not scalable → there is no way that we can keep track of that in our minds so why not create a map that is available to all as a way to organize the things that are happening without structuring it hierarchically. It's not about rebuilding the current framework of state but rather gather all in an open "meeting" place. Better understanding what the vision and potential of each of the participants (referring to people here, but could be applied to a broader group) and work strategically to grow individually and together. The idea of the middle ground will be most practical in terms of acquiring funding as a collective. You don't design your identity while making partnerships, each needs to have their own identity that will then interlock with others'. (*Gaell)*

NGFS: Parallels with the European central bank in terms of structure of network → varying national interests working together on financial stability (have at least as much to spend next year) → NGFS change in language: we no longer talk about climate change, but rather climate *crisis*. The philosophy behind the LP, which has connections with the upper ground through UNESCO, could evolve in a similar way. More than cooperation and alignment, there needs to be a way to physically meet and share evolving ideas so that the soundness of the network does not suffer. (Peter)

In curriculum design there needs to be adaptation of context → peripatetic model of asking the same questions in different contexts. Even within events such as festivals, there can be beneficial iteration to change the kind of impact they have on the real world.

Fundable work that we do together could be these project-based programmes but also go beyond by tracking the impact chain and continue to move forward through non fundable work. (*Alan*)

→ low hanging fruit vs North Star vision → could be both simultaneously (would probably have to be a combination of the two). (*Pavel*)

- In the feasibility studies we are doing for UNICEF, we see that we need to be careful about politics and legal issues. Legal questions of the structure → the pro was definitely that behemoths don't deal with the same petty headaches as smaller organizations (no one will sue

#LEARNING PLANET

an IO over textbook copyright infringement?) → use the blockchain to bring it to people? (Gregory)
What type of partners are we talking about here? There needs to be a set of criteria discussed and agreed upon ahead of time to save a lot of time → replicating partner (wholesale) doesn't necessarily social demand, for example because in this case the users are almost forced to join (company policy → obligation) also need to stay grounded in reality *example* obsolescence of the textbooks: students still value them as the best source material for their learning, so we cannot ignore the importance of publishers, for one, in this partnership (*Flavio*)
We need to guard against staying at the global level because our actions need to be grounded in reality → place-based projects. Couldn't we involve property developers in this effort? Source of funding that remains untapped within the industry. (*Ross*)
Should universities go into these high density communities to create some dynamic learning, rather than staying in their recluse campuses approaching learning as a passive phenomenon? Metaphor of the moths and the light → if the light is everywhere you don't get many, if there's only one shining light, then you get a lot. Yes, there is a lot happening, but actually the community of people making change is really not that big so we must find a way to embolden those little shining lights around the world. (*Gaell*)
UNICEF is interested in Teacher education, but also in Educator education in general (mothers, parents, mentors...) (Gregory)
Smaller actors (schools etc.) might want access because

1. They want access to tools on how to create their own festivals for ex
2. Want to be a part of a community that leads to money or exposure (that then leads to money)

So how do we think about these smaller actors? (*Emer*)
WorldSkills members are maybe more practical (and skills excellence based) but they are making change and trying to do good in their communities, but they're completely disconnected to the networks of leadership of change (ashoka etc.). We can connect these worlds manually, but how do we scale that? Because we can't manually create synergies between so many people in so many different countries. We have the *ingredients* in front of us, but no way to *automate* the process. (*Ekaterina*)
We know that we are recreating these problematic silos (that are not complementary) so how do we avoid having friction and competition between these silos? How do we act fast enough to have seamless cooperation and mutual inspiration and support before the world of innovation in education becomes destructively competitive? (*Gaell*)
How do we export community, trust, cooperation into a digital global space? Perhaps we need to sign up to a shared set of values as a first step, like a charter or a manifest. Way can be to develop a protocol for interviews, or practical criteria, or a value-based agreement. The agreement can be actual legal documents (*Emer*)
Visibility of others' and our own actions is what we call the glue (*Gaell*)
We need to change the upperground culture. Parallel with Uber who changed the upperground culture of Taxi companies in Amsterdam (Peter)
Geography of innovation (creative clusters) → more or less cities and countries have thrown huge amounts of resources at creating those because they really want a piece of that but they

#LEARNING PLANET

have massively failed to jumpstart these spaces. The bit that we call the "school" is really just the heart of the entire place… what if we could develop the "school" without making it a closed circuit learning hub? → property development is something where he has found ways to have a ripple effect outside of a closed hub (*Alan*)
. Label ? So easy to buy stuff, but so hard to pay for people to get trained, to get involved… In response to Alan's story about the UN wanting to fund 250k greenhouses in refugee camps. The idea should be that stuff comes second, the guy comes first. (*Gaell*)
Visibility + legitimacy
Teach the other to join
A platform can make a lot of stuff visible for people to recognize themselves in other people's initiatives. But when we talk about "curating" we need to be careful NOT to propagate problems (silos etc. like schools often do). How to avoid replicating mistakes?

Risk of saturation on our extreme of the awareness spectrum (vs. the people who know nothing at all about what's happening around the world, we get bombarded with so many updates, alliances, projects etc. that we end up 1. Not being an integral member of the partnerships we join 2. Not even receiving and integrating any of the information we receive (*Ekaterina*)

Outcome 1:	**Onboarding learning communities**
Questions	- What is required to onboard the different learning communities? Notes: - A mapping of the initiatives/networks/communities - Shared open toolkits - A clear and shared vision - A chart of values? - Clear Value Proposition: Who do we serve, and how ? - Regular meetings/events/discussion/sharings to be sure stay aligned - Legal team (really robust in IL) - Policy partners, replicating partners - Physical iconic/inspiring spaces/hub to meet - Money - Resources (content, places, networks,...) - Exposure, visibility - Give access to tools/toolkits to help them organize their work/events - Connect upperground to underground (mapping undergrounds, mapping upperground, tools/events to connect them…) - Legitimacy : Label ? Stamp ? - Possibility to get help from other Learning Communities, to Crowdsource solutions… - Ontology of the Learning Communities
	- How to define our policy towards learning communities (charter)? Notes:

#LEARNING PLANET

Outcome 2:	**Local community development**
Questions	- How to link online and offline (School, City, Third place, University, Country Level)?
	- How do we identify and recognize active communities?
	- How to help develop local LP Chapters?
Outcome 3:	**Exponential development strategy**
Questions	- How to develop growth hacking?
	- Can we leverage large existing communities? (e.g. Wikipedians…)
	- What kind of partnership with content providers? With media?

#LEARNING PLANET

Workshop 3: Sustaining - Social business model and fundraising strategy	
Outcome 1:	**Funding digital platforms**
Questions	- Free model for SDG communities and individuals? Premium features for enterprises? **Notes:** - Funding parts of the software by partner organizations which get voting rights. Example of IMB / Microsoft - Invest in teleconferencing / collaboration tools for remote teams, charge for extras.
	- Support from private foundations? **Notes:** - Define a clear set of values. - Define niche / project based funding or funding for the overall initiative?
	- Public support/crowdfunding? **Notes:** - How to facilitate "followship" - Know that effort is no proportional to outcomes but it's good for overall brand trust - How to identity projects that are good for crowdfunding - Building trust via micro-funding
Outcome 2:	**Leveraging #LP for grants and partnership opportunities**
Questions	- What are the grant opportunities to fund #LearningPlanet partners? (Foundations, EU, local and regional, etc.) **Notes:** - Check the open collective model - Create a database with grants and their deadlines - Define how LP brand can be used by member organizations to apply for funding;
	- How to organize consortia of #LearningPlanet partners (guidelines)? **Notes:** - Form Partnership around core values. - Fundraise via the change-makers / Ambassadors (Annual event/ campaign). See Charity Water - License the brand and let the community contribute when they use the brand. Needs specific formats / use cases.
	- How to "productize" / develop services that can be monetized? **Notes:** - Training for Jobs Skills (Course Development) / Certified Trainers

#LEARNING PLANET

Workshop 3: Sustaining - Social business model and fundraising strategy	
Outcome 1:	**Funding digital platforms**
Questions	- Free model for SDG communities and individuals? Premium features for enterprises? **Notes:** - Funding parts of the software by partner organizations which get voting rights. Example of IMB / Microsoft - Invest in teleconferencing / collaboration tools for remote teams, charge for extras.
	- Support from private foundations? **Notes:** - Define a clear set of values. - Define niche / project based funding or funding for the overall initiative?
	- Public support/crowdfunding? **Notes:** - How to facilitate "followship" - Know that effort is no proportional to outcomes but it's good for overall brand trust - How to identity projects that are good for crowdfunding - Building trust via micro-funding
Outcome 2:	**Leveraging #LP for grants and partnership opportunities**
Questions	- What are the grant opportunities to fund #LearningPlanet partners? (Foundations, EU, local and regional, etc.) **Notes:** - Check the open collective model - Create a database with grants and their deadlines - Define how LP brand can be used by member organizations to apply for funding;
	- How to organize consortia of #LearningPlanet partners (guidelines)? **Notes:** - Form Partnership around core values. - Fundraise via the change-makers / Ambassadors (Annual event/ campaign). See Charity Water - License the brand and let the community contribute when they use the brand. Needs specific formats / use cases.
	- How to "productize" / develop services that can be monetized? **Notes:** - Training for Jobs Skills (Course Development) / Certified Trainers

9.2 Distance Learning – from Emergency Solution to Equal Opportunities for all (unpublished draft)

Summary of key Insights used for the publication here
Outline of the Publication here

Distance Learning - from emergency solution to equal opportunities for all

A systemic perspective on the key challenges and opportunities to establishing inclusive, quality distance learning in Eastern Europe and Central Asia

Yannick Rennhard, Judith Hollenweger, Nora Shabani, Leila Toplic, Gregory Turkawka

Introduction

Covid-19 has brought along an education crisis on a yet unmet scale. With schools closed and various distance learning channels established in a haste, 50 million students across the ECAR region found themselves in a **situation that nobody was prepared for**. Many of them were struggling to adjust to this new reality, having to learn new tools, develop new routines and watch their teachers struggle with online tools in an attempt to provide continued education to them. Their parents, often having to work from home themselves, scrambled to provide an adequate learning environment with a stable internet connection and adequate devices for their kids, taking on the role of teacher replacement and handling their own (often threatened) professional careers at the same time. Teachers struggled with a lack of adequate training and guidance on how to use digital tools to create engaging lessons. So it is no surprise that the lockdown generally resulted in a lot of anxiety, stress and disarray for all stakeholders in education around the globe. But despite all schools being closed, learning continued at least to some extent - thanks to distance learning.

LearnIn is a strategic digital learning initiative to support both students and teachers as lifelong learners. Created by UNICEF and supported by a group of global partners, its goal is to support countries in the transformation from traditional to inclusive education, ensuring quality learning opportunities for all, whether in digital, blended and face-to-face environments. The initiative takes a systemic perspective to establishing an inclusive digital ecosystem for teachers and students and seeks to empower them as effective learners. This includes a wide array of solutions to support the implementation of distance learning across the ECAR region, such as support for the establishment of a learner-centred, inclusive pedagogy, the facilitation of necessary education policy transformations as well as a variety of digital tools. LearnIn acknowledges that each country has a unique learning culture and a particular set of challenges to overcome and seeks to create solutions that fit the realities in each country.

LearnIn was always designed as a long-term initiative. With the emergence of Covid-19 and the education crisis that came with it, the team decided to form an emergency task force and provide immediate solutions and support to participating countries. In order to inform LearnIn's immediate

response to the Covid-19 crisis and guide future work, the team conducted an initial **needs assessment** of systemic challenges across the participating countries Albania, Armenia, Bosnia and Herzegovina, Greece, Kosovo (UNSCR 1244), Moldova, Montenegro, North Macedonia, Romania and Serbia.

The **purpose of this publication** is to share the learnings obtained so far about the immediate and long-term challenges in the region and why there is a real threat of rapid digitalization actually creating more inequality between students.

LearnIn's Guiding Principles

As part of initial conversations, our country office partners told us that before Covid, digital education was often seen as an interesting addition to traditional teaching but many stakeholders struggled to see its real potential. It appears that, thankfully, this perception has changed. So even though it wasn't entirely by choice, most countries have made the rapid digitalization of their education systems a key priority. In response to this rapid surge in demand for distance learning, many stakeholders in education pushed for developing digital solutions as quickly as possible. To ensure that LearnIn can both cater to this need for rapid support but also creates long-term solutions and uses its resources as effectively as possible, the team is driven by a set of four guiding principles:

People-centric
The Learnin team seeks to put the needs, culture and realities of all learners front and centre. Instead of jumping to conclusions and developing what seems to make sense at first glance, the team seeks to understand the real-life challenges faced by teachers, students, parents and other key education stakeholders first and to then decide on the most effective measures to take.

Iterative
To balance quick impact with ensuring long-term efficacy, LearnIn works in continuous iterations. As measures are implemented, the team will develop qualitative and quantitative impact KPIs to regularly measure and learn from what has worked well and what hasn't. Regular additional research activities allow the team to take a step back every now and then and to fill any knowledge gaps that have emerged, creating a granular, localized picture of education systems in the process.

Systemic
Education systems are incredibly complex. Creating sustainable change requires various actors, organizations and governing bodies to come together and find solutions that work for everyone. Therefore, understanding different actors, how they are connected, their individual spheres of influence as well as overlapping and conflicting areas of interests are critical elements to identifying the best measures to take.

Localized
Through the work conducted in the first phase, the LearnIn team learnt that while some challenges are shared across the region, every country has a very specific set of barriers to overcome. To meet the specific needs of the individual countries and the different actors within them, LearnIn

seeks to adapt solutions to the local context and reality in each country and not pursue a one-size-fits-all approach.

Capacity building
The team is convinced that only local stakeholders can ensure the long-term relevance, usability and impact of any intervention and therefore plans to build and leverage local capacity for long-term impact. Solutions that are pushed down into countries often end up not being used because they just don't fit the local realities and people don't feel like it's "theirs".

Research Methodology

To inform both rapid support measures as well as helping the team shape the long-term vision and planning, the LearnIn Task Force conducted a first needs assessment - a qualitative analysis of systemic and stakeholder challenges across all participating countries. The main element of said analysis was a set of qualitative surveys sent out to local experts in May and June 2020 - so during the early stages of lockdown when - in most countries - things were a bit more chaotic than they might be today.

To capture the full complexity and contribute to the systemic perspective mentioned above, the needs assessment focused on the three key pillars of LearnIn - Pedagogy, EdTech and Policy & Administration - with a separate survey for each of them. With the support of the UNICEF country offices, the team identified 41 experts across different disciplines, including EdTech specialists, government officials and teacher trainers, to describe what they see as the key challenges in their country's education systems. The survey questions were generally quite open to allow local experts to express their opinions and perceptions freely and in their own language.

[Mention how we summarized the individual responses into thematic groups and created a unified representation of education? → Introduce LearnIn Ecosystem Map?]

In addition to the main survey, the LearnIn research team engaged actively with local teachers and teacher educators as part of a first set of three pedagogy workshops and asked them about the specific challenges and unanswered questions they had at this point in time. In combination with the systemic perspectives from the surveys, the team was able to both gather a systemic overview of education challenges as well as a first-hand impression from practitioners to contextualize the picture painted by the survey respondents.

The following is a summary of the key insights gathered.

A widening gap between privileged and marginalized

In theory, digitalization promises to provide equal learning opportunities for all children. It can help connect learners to the best learning materials world-wide at the click of a button. A key concern that many respondents shared with us, though, is that digital learning tools may **end up widening the gap** between privileged and underprivileged children, leading to an increased rate of school

dropouts and an accelerated rate at which the most marginalized groups of children are falling behind the most privileged.

> *"In practice, the move to online learning typically disproportionately benefits students already advantaged in various ways (e.g. rich over poor, urban over rural, high-performing over low-performing, student in highly educated families over students from less educated families)."*
>
> Centre of Educational and Counselling Support, Greece

One of the **key causes for this widening gap** is something that has been voiced by most of the experts in our needs assessment as one of the most critical challenges to establishing distance learning long-term: in many regions there is still a **lack of sufficiently fast, stable internet connections for all**. Additionally, many families don't have enough **devices** in their households to allow all their children sufficient access to online learning platforms and collaboration tools. This lack of access to digital tools is often amplified for families with marginalized backgrounds (migration background, economically disadvantaged groups, children with disabilities, marginalized ethnic groups etc.). All of the LearnIn member countries have unanimously reported this problem and tried to reach children without internet access by introducing **TV and radio programmes** that distribute lessons and learning content over the air. Some have also distributed paper-based assignments in various languages to children in places that even those channels wouldn't reach, for example in refugee camps.

> *"Distance learning raises digital equity issues. Namely, there are huge differences among students in availability of ICT tools and internet, but also in level of digital competencies of students, members of students' households who could support their learning as well as teachers. Moreover, home environment and it's impact on learning become more evident."*
>
> Teacher Trainer, Serbia

But apart from issues connected to accessing distance learning as a whole, there are other factors that contribute to a widening gap between privileged and marginalized children. Many of our survey respondents told us that children from privileged backgrounds could often rely on the s**upport of their parents or external tutors** to help them organize their time, stay on top of their assignments, provide them with motivation and positive reinforcement as well as answering any questions they might have. Marginalized children on the other hand are often left to themselves, as their parents struggle with a lack of digital competencies, language barriers, academic difficulties or just a feeling of being psychologically overwhelmed, for example after having lost a job. The physical learning environment at home is another factor. While privileged children often have a room to themselves or at least a dedicated learning space, marginalized children had to share the little space available with many other siblings. Another factor in this was that some parents struggled to understand why their children had to keep learning during lockdown - convincing them was hard work for teachers and others involved:

> *"[There was a] lack of understanding from parents, sometimes, as they would consider students were 'on vacation', thus asking them to do house chores, work the land, gardens etc instead of allowing them to stay online and do distance learning."*
>
> Teacher Trainer, Moldova

Learners in isolation

Through the school system, most students were used to having a structure to help them organize their tasks and provide them with meaningful activities to fill their days. With Covid-19 and the lockdown that came with it, all of this structure has disappeared. Many found themselves in a **situation where they were forced to organize their time, find motivation and structure their work with little to no outside help**. This was an entirely new situation and something that most children - especially the younger ones - struggled to cope with. According to our survey respondents, many students struggled with being isolated from others and faced with increased tensions in the families during the lockdown. With schools closed, many children also **lost access to peers** and the valuable exchange with them - not just as facilitators of interactive learning opportunities but also just social interactions in general.

> *"Staying connected with the school (classmates and teachers) and not feeling left out has been a problematic issue since dropout rates are still very high in many districts, and a long period of disengagement can result in a further increase."*
>
> Teacher Trainer, Greece

On top of that, many students were faced with **massive workloads** as teachers tried to keep up with their defined curriculum for the year and the preparation of end-of-term exams. Due to a lack of guidance there was also a wide variety of distance learning approaches by the different teachers, leading to very **inconsistent learning experiences** on the student's end. It is hardly surprising that many of our respondents reported surges of a wide variety of psychological issues in students - from depression and anxiety to various degrees of stress.

> *"Another challenge is overload with homework. Teachers are not organized and don't cooperate with each other and it may happen that the same day they have many assignments and online meetings."*
>
> Teacher Trainer, Kosovo (UNSCR 1244)

But **also teachers found themselves in an isolated position.** Due to a lack of commonly accessible digital learning tools, training and policy guidance, many of them needed to show exceptional creativity and effort to ensure continuity of learning for their pupils. They often resorted to their personal experiences with digital technology to design remote lessons and assignments while struggling to reach and interact with students and their parents. Without the regular, unsolicited exchange with other teachers as well as lacking guidance and support from school managers, education policies, teacher universities and the wider education community, they were left on their own accord. They struggled to maintain their relationships with students and had to scramble to

identify the best approaches to maintaining education continuity in this highly unconventional situation.

All of a sudden, they found themselves having to **interact a lot more with parents** as one of the few remaining ways to check in on what their students were actually doing all day. Aligning with them on who would take on what role in the education of a student was a particularly difficult endeavour. Our national experts reported that a good relationship between teachers and parents with roles clearly defined and regular checkpoints were indicative of good distance learning outcomes.

> *"Another issue is how to build consensus with parents on their role in the process of students' learning. […] Therefore, distance learning with not-clearly defined roles creates risk of excluding students from the process of learning."*
>
> Teacher Trainer, Serbia

Many felt anxiety and stress connected to the fact that their work was now much more visible to a wider audience and was often recorded - something that is extremely unconventional in a normal classroom setting. We heard of many teachers struggling to maintain their work-life balance. Many of our respondents expressed a worry over the increased likelihood of the rapidly falling job satisfaction of many teachers, fuelled by the isolation they suddenly found themselves in, by a lack of guidance and support as well as a feeling of being overwhelmed with not just the mere workload that they had to take on but also the need to rethink the role they take on as teachers. One positive outcome of the lockdown, though, was that **parents seemed to have gained a lot of respect for the role and significance of teachers** as they struggled to take over some of their responsibilities.

Teachers as a key catalyst for inclusion

While some might think that the significance of teachers is reduced in a digital environment, the national experts actually reported that the sudden shift to distance learning due to the Covid-19 crisis has actually helped to reemphasize the importance of **teachers as a key catalyst for learning**. With classroom teaching suspended, many students were suddenly exposed to the harsh realities of their individual environments. Many lost access to the only source of learning support and motivation they had. Going to school provided some sense of stability and structure for all students. But in a distance learning setup, there was nobody to tell them what to do, when to get up and what to learn etc. This problem was often multiplied for children from marginalized backgrounds. With no access to external tutoring and many parents either unwilling or unable to support them, teachers were the only thing that kept them on top of tasks. Especially in a distance learning setup where students aren't able to attend school physically, teachers are one of the most critical factors for ensuring inclusive education by providing learning opportunities to all children - including the most marginalized.

identify the best approaches to maintaining education continuity in this highly unconventional situation.

All of a sudden, they found themselves having to **interact a lot more with parents** as one of the few remaining ways to check in on what their students were actually doing all day. Aligning with them on who would take on what role in the education of a student was a particularly difficult endeavour. Our national experts reported that a good relationship between teachers and parents with roles clearly defined and regular checkpoints were indicative of good distance learning outcomes.

> *"Another issue is how to build consensus with parents on their role in the process of students' learning. […] Therefore, distance learning with not-clearly defined roles creates risk of excluding students from the process of learning."*
>
> Teacher Trainer, Serbia

Many felt anxiety and stress connected to the fact that their work was now much more visible to a wider audience and was often recorded - something that is extremely unconventional in a normal classroom setting. We heard of many teachers struggling to maintain their work-life balance. Many of our respondents expressed a worry over the increased likelihood of the rapidly falling job satisfaction of many teachers, fuelled by the isolation they suddenly found themselves in, by a lack of guidance and support as well as a feeling of being overwhelmed with not just the mere workload that they had to take on but also the need to rethink the role they take on as teachers. One positive outcome of the lockdown, though, was that **parents seemed to have gained a lot of respect for the role and significance of teachers** as they struggled to take over some of their responsibilities.

Teachers as a key catalyst for inclusion

While some might think that the significance of teachers is reduced in a digital environment, the national experts actually reported that the sudden shift to distance learning due to the Covid-19 crisis has actually helped to reemphasize the importance of **teachers as a key catalyst for learning**. With classroom teaching suspended, many students were suddenly exposed to the harsh realities of their individual environments. Many lost access to the only source of learning support and motivation they had. Going to school provided some sense of stability and structure for all students. But in a distance learning setup, there was nobody to tell them what to do, when to get up and what to learn etc. This problem was often multiplied for children from marginalized backgrounds. With no access to external tutoring and many parents either unwilling or unable to support them, teachers were the only thing that kept them on top of tasks. Especially in a distance learning setup where students aren't able to attend school physically, teachers are one of the most critical factors for ensuring inclusive education by providing learning opportunities to all children - including the most marginalized.

gotten used to. They need a **wide set of digital competencies** to be able to interact with students, exchange files with them and to set up engaging classroom settings in a digital environment. According to our survey respondents, teachers generally lack even the most basic level of digital competencies. To help maintain a nurturing learning environment even in isolation, teachers also have to **be aware of the family context each student has to learn in** and to manage additional relationships, for example with parents, other family members and tutors. They also need to find engaging ways to foster the incredibly important interactions among students, not just to facilitate collaborative learning but also to contribute to the creation of social competencies and prevent students from feeling too isolated. So, in a way, teachers also need to become facilitators of various types of relationships.

Lack of preparation

Something that came out very clearly from this initial research piece was that **teachers were ill-prepared and ill-equipped** to fit this new role and to properly support all their students in a distance learning context. A wide majority of them hadn't received any training on how to use digital teaching tools - neither in their initial training nor in any in-service training later-on.

> *"Teachers feel stressed and overloaded. This is because they spend too many hours in preparing for the new lesson unit, too much time in assessing the work sent by the students and more time to communicate and assess each student."*
>
> Government official, Albania

A large share of teachers - especially older generations - **lacked even basic digital competencies** at the beginning of the lockdown let alone the complex set of skills and experiences needed to create optimal digital learning environments for students (often referred to as "digital literacy"). Some teachers struggled to even reach their students and many others had difficulty maintaining regular, purposeful touchpoints with each student outside the general online lessons. In terms of navigating various digital tools, many struggled to even use a computer or smartphone and some of the key software necessary for effective teaching. Web-based video conferencing tools were completely unfamiliar to many teachers and using digital learning platforms was a new thing altogether. Our respondents told us that a few teachers - especially in rural regions - lacked access to the internet or sufficient devices altogether.

> *"The biggest challenge for the teachers was the lack of technology skills. Some teachers didn't even have an e-mail. The old generation of the teachers don't know how to start a laptop or a computer. Most of them don't speak English […]."*
>
> Teacher Trainer, Kosovo

Many of our national experts told us that because they had no better answers to this new situation, many teachers just resorted to directly translating what they would have done in a physical classroom setting onto various digital channels. Our respondents told us that the various degrees of digital competencies and experience coupled with a lack of clear guidelines and rules from the governing bodies ended up creating a **massive variety of teaching approaches**. This in turn meant

that students were exposed to different digital teaching styles, various degrees of work loads (often more than they could handle) as well as a generally chaotic experience with the different teachers during the first weeks of distance learning.

> *"One of the biggest challenges for teachers is the question of how much to ask from students, how to assess the knowledge and value the efforts and work of students. Some teachers assign too many tasks every day, fearing that they will not be able to finish everything by the end of the school year. Others just assign basic tasks."*
>
> School Principal, Montenegro

Another major challenge for teachers is **how to assess the learning progress** of students remotely. Especially for important national exams, ensuring fair assessment of students will be challenging but even just to assess the progress of students in-class, new assessment approaches need to be identified and adapted. **Providing feedback** over digital channels can be challenging for teachers as well because communication in distributed classrooms varies greatly from what they're used to. Many teachers struggle to give feedback that feels like positive reinforcement for their students and doesn't crush their motivation even further. A few teachers and parents apparently expressed concerns over privacy, data protection and even copyright issues connected to online lessons.

> *"Having the educational process based mainly on paper, a sudden move to online activities opened a list of uncertainties related to teaching and evaluation."*
>
> Education Technology Specialist, Romania

On a more positive note, our survey respondents told us about **waves of solidarity** in their countries. Younger teachers created support groups to assist their older colleagues in navigating the unfamiliar digital environment, telecom operators offered free internet services to teachers and a wave of regional, national and international collaboration has been created as a reaction to Covid-19.

> *"Teachers had to supplement their knowledge of distance learning in a short time, and at the same time conduct classes with students through different distance learning platforms. What is worth pointing out as positive is that the teachers got involved, started planning together, sharing their ideas with others."*
>
> Teacher Trainer, Bosnia and Herzegovina

Systematic challenges

The education crisis that came along with Covid-19 has clearly shown just how unprepared education systems across the region were to include digital learning concepts into their modus operandi. Existing education **policy frameworks often failed to provide guidance** to teachers and school managers on how to set up and monitor digital learning processes. In addition to that, many of our national experts mentioned a **lack of quality digital learning materials** available for teachers.

Therefore, teachers often had to figure out by themselves how to ensure continuity of learning, often resulting in chaotic, overwhelming experiences for students.

> *"Regretfully, we do not have a big choice of quality educational software and digital teaching materials [...], as well as repositories. There is also a need for drafting a "Methodology for valuation of e-contents" which clearly and precisely defines the ways and criteria for valuation."*
>
> EdTech Specialist, North Macedonia

The massive variety of approaches, processes and tools created in this initial, chaotic phase of the lockdown caused education oversight bodies - from school managers all the way to the ministry of education - to **lose control over what's being done in schools** across the countries. Also, the rigid nature of many education policies made quick adjustments impossible, for example to adjust curriculum and national testing systems to the new reality. As a result, different stakeholders in education had to wait for politicians to hastily adjust policies which in most cases took weeks - if not months.

Bureaucratic processes in ministries, teacher education universities and school management meant that teachers had to overcome barriers and control mechanisms designed for in-person teaching and head masters had to go through tedious processes to establish even minimal digital infrastructure. And adding to the problems, many of our survey respondents reported a **lack of coordination** between different government institutions, universities and other partners in national and local education systems resulting in similar digital learning initiatives often running in parallel without one being aware of the other. One of the reasons for this lack of coordination might be that in many member countries of LearnIn there is a **lack of a national strategies** to guide the establishment of distance learning. Some countries have developed rough guidelines for digitized learning but generally there is a lack of a commonly agreed upon strategy that can align various actors in the system on a shared goal and approach.

> *"The biggest challenge is related to the level of understanding the needs for establishing quality distance learning at the decision-making level as well as allowing professionals and practitioners to affect the decisions. The process requires that a group of professionals with different expertise are gathered together and work closely and intensively towards the same goal. Not always an easy task to handle."*
>
> Government Official, Montenegro

Investments in **education technology** in many of the member countries have been delayed due to a lack of perceived value. So while many of the countries reported working on national education platforms, only a few countries had them actually operational at the beginning of lockdown. Education Management Information Systems (EMIS for short) designed to support the registration and management of students and teachers either don't exist or are outdated.

Conclusion

Only because of distance learning were education systems able to maintain some kind of education continuity during the lockdown caused by Covid-19. The education crisis that came with it has clearly shown the benefits of distance learning but also made it painfully clear that many countries have a long way to go and plenty of systemic challenges to overcome. But as described in the insights above, Covid-19 hasn't just brought along new struggles, it **has also surfaced systematic educational challenges** that existed long before social distancing was even a widely known term. Traditional education systems, built on principles like skill-based curricula, teachers as transmitters of content, performance-based assessments and textbooks were ill-prepared to provide any answers in this new reality. The rigid legal frameworks, processes, hierarchies, mindsets and oversight have proven to be a real hindrance to providing learning opportunities for all when physical interactions aren't possible anymore. And while many stakeholders in education now seem to be rushing to implement digital tools as quickly as possible, they often lack a common strategy and roadmap to unite different perspectives and guide them in the process.

Based on what we learned about the different actors in education and their individual challenges, the LearnIn team is convinced that for establishing distance learning as an integral part of education, different stakeholders need to come together and collaborate:

- Education ministries need to declare digital learning a priority and support the creation of nurturing policy frameworks to provide guidance and answers that make sense in a digital and blended learning environment
- Teacher educators have to understand the struggles of teachers, their motivations and incentives and design the right training schemes (both pre- and in-service) to empower teachers to provide optimal teaching in a distance and blended learning environment.
- Teachers and School Managers need to be involved to make sure regulations and technological solutions fit their context and changed roles and responsibilities as well as to get their buy-in for actually implementing it and making it "their own".
- NGOs should work directly with local stakeholders to provide localized support (technical infrastructure, sharing international good practices and facilitating exchange and coordination between stakeholders)
- The perspective of students and parents needs to be considered in the development of any solutions to make sure that the outcomes end up fitting their realities and don't further increase the gap between privileged and marginalized groups.

Without a systemic perspective that includes all critical stakeholders and a shared strategy they can align on, digitizing education systems might actually end up widening the gap between privileged and marginalized students.

"The biggest barriers [to establishing distance learning long-term] are:

- *Teacher competences insufficiently developed and embedded in daily teaching activities - without this fixed, the policy will be only on paper*
- *Assuring the necessary investment in infrastructure, software, maintenance [...]*
- *Creating communities of practices and offering recognition to innovative schools and teachers that champion the use of online/distance learning*
- *Address educational needs of students at risk and adapt the national curriculum to these needs."*

Government Official, Romania

Among all the different groups involved in shaping the future of education systems, teachers take up a particularly important role. In this new, digital reality they have to become facilitators of learning by supporting their pupils with critical guidance and support. But even more importantly, they can become a catalyst for inclusive education by ensuring that every child has the individualized support it needs to lead a prosperous life.

Next steps

The perspectives of the needs assessment respondents have surfaced some of the crucial barriers that need to be overcome to establish distance learning long-term. The LearnIn has taken on this initial set of systemic challenges as a starting point and plans to continue collaborating tightly with national task forces to achieve the following goals for Phase 2 that lasts until July 2021:

- Extend on pedagogical training and support with the further development of our Teacher Manuals and Learning Pathways that provide a theoretical framework for inclusive teaching practices in distance learning environments as well as practical guidelines
- Expansion of existing digital ecosystem with various tools to support collaboration and knowledge exchange across multi-disciplinary work groups tasked to initiate change, with the introduction of LabXchange, LearnIn's modular, open-source learning platform and an OpenID to provide a shared identification service that can create a shared user identity across various learning platforms
- Assist education officials and governing bodies with a cooperative policy assessment to help frame some of the key policy challenges to overcome, sharing good practices and developing digitalization strategies based on that analysis
- Continued capacity building activities on both national and regional levels to ensure the accessibility of various work results
- Establishment of the first communities of practice, groups of stakeholders tasked to facilitate change in and across various disciplines on both a regional and national level and development of recommendations around how to set up these communities
- Design and execution of further research activities to complement the systemic perspective gathered in the initial needs assessment with deeper, contextual perspectives gathered on the ground coupled with national and regional capacity building activities to foster human-centred thinking and real end-user empathy

9.3 Needs Assessment: Example T2.3 – EdTech Challenges

LearnIn

Lab X change CRI PH ZH SUPPORTING unicef for every child

Topic: EdTech challenges

ANALYSIS - KEY POINTS

Executive summary - Across all countries:

- Across the board: Access to stable **internet** and sufficient **devices** is a key issue
- Across the board: **Digital literacy and lack of experience** of teachers in planning and delivering online learning is another
- Lack of access to **good practices, peer learning and professional development for teachers**
- Very widely a challenge: Access to quality **digital content** (and , for some countries, availability of materials in national language)
- Electronic **platforms that support assessment** are either non-existing or outdated - difficulty to monitor student performance across all platforms used
- Struggle of **parents** to support their children (and the need to share devices with them) - also struggle with the variety of different tools used by teachers and shear load of homework and subjects
- **Management, monitoring and evaluation** of education system through digital tools - e.g. **EMIS** are often outdated or not suited to handle the increased complexity of entire systems running purely online
- **Verifying the identity of students** (and teachers) - especially in assessment settings
- Lack of **enabling policies** to guide priorities in establishing distance learning - a **shared approach**
- **Marginalized children** - who could benefit most from digital learning - are often overlooked in the planning and prioritization of support measures
- Low level of awareness about and focus on digital competency in national curricula
- Schools struggle to react in light of the **bureaucratic legislation of how schools should be run**
- Romania mentioned a **lack of data** on how schools are equipped for digital learning as a challenge
- Romanian mentioned eTwinning, a national competition that rewards and celebrates innovative models for using ICT in teaching, collaborative learning, curriculum development etc.
- Good quote:
  "the move to online learning typically disproportionately benefits students already advantaged in various ways (e.g. rich over poor, urban over rural, high-performing over low-performing, student in highly educated families over students from less educated families)" - Greece

ANALYSIS - By Country

Albania:

- Lack of **albanian education platforms** - teachers and students now use various platforms chosen individually
- **Digital literacy** of teachers, students and parents
- **Access to ICT** - especially for underprivileged backgrounds

Armenia:

- No stable **internet access** or a shortage of devices
- Teachers often **had to use their own internet and devices** (no access through schools)

LearnIn

- Most **teachers don't have an e-mail accoun**t dedicated to their work

Bosnia and Herzegovina:

- Bad **internet infrastructure** - now under even worse pressure (hard to do video calls)
- **Lack of teachers' experience for teaching / learning online**

Greece:

- **supporting teachers** so that they can in turn support learners in a new learning environment;
- offering high quality, curriculum-relevant **digital learning content** and assessment tools;
- promoting the development of a **variety of digital skills to enable students** to be able to use technology effectively in support of their learning;
- implementing supportive data and information management systems;
- **monitoring and evaluating** what is happening, and its impact; and
- enacting **enabling policies**.
- in practice the move to online learning typically **disproportionately benefits students already advantaged** in various ways (e.g. rich over poor, urban over rural, high-performing over low-performing, student in highly educated families over students from less educated families)
- **Children with disabilities and non-native speakers** can often benefit from digital support, but are often overlooked in the design of solutions
- Access to **devices and internet** is a big problem - especially for refugee and migrant students

Kosovo:

- Suddenly teachers who barely used any advanced educational technology are faced with the need to interact online with their students and use different platforms in their everyday work
- A small number of teachers haven't engaged in digital learning activities at all
- Especially with **parents working from home** there aren't enough **devices** for school work

Moldova:

- Access to **internet and devices** = biggest challenge
- MoE has worked with several **partners** to ensure access to devices and free internet - at least for teachers

Montenegro:

- Access to **tools and internet** = biggest challenge
- **Digital literacy of teachers**
- Large variety of **different tools used**
- Hardware and software infrastructure of the **EMIS outdated** - so hard to maintain operational
- Lack of **digital learning materials** - makes it especially hard for teachers to plan, develop and deliver their lessons.

North Macedonia:

- Internet and devices - sometimes even steady electricity supply is a key challenge
- Lack of **developed e-content** for teaching
- Need to replace **assessment platform**

LearnIn

- **Monitor performance** of pupils **across all platforms** used
- Lack of an education platform in **local language**
- Lack of **adequate legislation** that stipulates distance learning in detail
- Difficulty to manage the limited number of interactions in DL
- Verifying the identity of students for assessment

Romania:

- **Lack of data on how schools are equipped** for digital learning
- Especially **grave situation for rural areas** (where lack of stable internet access is added)
- It's **forbidden for parents to contribute** to the equipment of schools, except through parent associacions (which only exist in urban / economically developed ares)
- Lack of access to a national **repository of educational ressources** (not operational yet)
- **Digital text books** only available to prep - 7th grade
- **Teacher skills** to integrate / use digital tools - trainings on these are limited and often limited to urban centres - also not sufficient to fully prepare a teacher for the challenges of online teaching
- **Parents are overwhelmed** with setting up different tools for their kids because of variety of tools used by teachers
- Schools struggle with the **formal (bureaucratic) nature of how schools are asked to be run**
- Lack of **access to good practices, peer learning and professional development** for teachers (e.g. from initiatives like Erasmus+)
- **eTwinning = national competition to evaluate and celebrate models of using ICT for collaborative learning, curriculum development and innovations in teaching**
- **Limited data sets** related to digital education across Romania (esp. dig competencies)
- Lack of a **shared approach** of how online teaching should be implemented
- **No centralised evaluation mechanisms of digital competencies of teachers**
- **Reduced awareness about key competencies** (incl. Digital competence) in nat. curriculum

Serbia:

- Lack of **theoretical knowledge** around online teaching and learning with teachers
- **PArents struggle with homeschooling** - lots to supervise, different subjects
- Time-consuming **production of distance learning lessons**

RAW DATA (linked to spreadsheet)

Colours:
Yellow = EdTech survey | Green = pedagogy survey | Blue = P&A survey | Red = Ped/EdTech

Tech - 2.3 EDTECH CHALLENGES
Albania | Government official | Nr. 8 - The lack of Albanian education platforms dedicated to distance learning for students. Albania has taken the first steps to develop education platforms licensed and accredited by MoESY, which facilitate and support student learning. Following the closure of schools, teachers and students have used various platforms chosen by them to communicate and develop teaching activities. - The use of online learning technology and platforms by teachers, as well as students and parents. Since distance learning is not often and widely practiced in Albania, the use of technology was a major challenge for them.

LearnIn

- Equity in access to ICT-based learning is a major concern. There are learners from under-privileged backgrounds which tend to have less access to computers and other devices outside the schools.

Armenia | Education Technology Specialist | Nr. 6
In many cases, the teachers and students do not have stable access to the internet or have a shortage of appropriate devices. It should be highlighted that all Armenian schools have access to the internet. During the lockdown they had to use their own internet and devices.
Most of the teachers did not even have an email and have never used any Edutech in their teaching practice. So they started to use apps like Whatsapp, Viber, Facebook e.g.

Bosnia and Herzegovina | Education expert | Nr. 3
Internet infrastructure is being put under huge pressure considering that internet traffic has exploded. As traffic has increased, internet speeds have decreased in some areas. So, overloaded internet infrastructure is one of the main challenges. Also, schools and universities have shifted to distance learning, but many of them are trying this for the first time. Most of them don't have access to ICT equipment and infrastructure required for virtual learning. They were not prepared for remote classes as students as well. Many students don't have appropriate equipment for online classes especially for video meetings and classes.

Greece | Public centre for diagnosis, support and counselling of SEN students as well as job orientation. | Nr. 2
The Ministry of Education in Greece has been forced to make dramatic changes in order to prevent the spread of coronavirus by closing all schools in the country. Technological advances often outpace the ability of decision makers to keep up. Costs, especially capital costs, are usually quite high. Providing sufficient infrastructure is often seen a primary hurdle to be overcomed. While infrastructure is certainly important, and expensive, much greater challenges relate to

- supporting teachers so that they can in turn support learners in a new learning environment;
- offering high quality, curriculum-relevant digital learning content and assessment tools;
- promoting the development of a variety of digital skills to enable students to be able to use technology effectively in support of their learning;
- implementing supportive data and information management systems;
- monitoring and evaluating what is happening, and its impact; and
- enacting enabling policies.

While all the educational technologies implemented were accompanied by the rhetoric for the potential for technology use to close various education gaps related to access and performance between different student groups, **in practice the move to online learning typically disproportionately benefits students already advantaged in various ways (e.g. rich over poor, urban over rural, high-performing over low-performing, student in highly educated families over students from less educated families)**. The particular and individual needs of **students with disabilities** and other special education needs -- a group that can often greatly benefit from the use of assistive technologies of various sorts -- and students who do not have greek as their **native language**, are often **not sufficiently considered when deploying** online learning environments at scale.
Similar **challenges emerged for refugee & migrant children's** e-learning modalities and the main were the following:

- Inadequate internet acces, as the majority of children supported by non-formal education NGOs live in Refugee Accommodation Sites in the mainland and Registration and Identification Sites in the islands of the Eastern Aegean. In these type of locations internet access is in most of the cases not strong enough to support e-learning. Where there is internet, disruptions are common;
- Limited access to devices. For the majority of refugee and migrant children the only access to the internet is through smart-phones. However, many of primary and secondary school-aged children do not have their own devices. A whole family is in many of the cases sharing one smart-phone and therefore the child's 'share' of time with the device is limited.

Kosovo (UNSCR 1244) | Education Technology Specialist | Nr. 9
A considerable number of teachers haven't used educational technology except basic tools in the school (chalk, markers,

LearnIn

black/white board, papers) before the Covid-19 crisis. And majority of teachers haven't used any means of distant learning and interaction with their students. As a result of crisis the schools are closed and teachers needed to use distance learning tools to work with their students. **Suddenly teachers who barely used any advanced educational technology are faced with the need to interact online with their students and use different platforms in their everyday work**. So the majority of teachers are having difficulty to work in distance. Small number of teachers haven't engaged themselves at all in distance learning and left their students only with lessons broadcast on TV.
Also families in which parents are working from home and have two or more children are facing difficulties by the lack of computers or mobile devices for every person in need for them.

Moldova | Government official | Nr. 4
Internet insurance
In the process of transitioning to the distance learning system, we faced a number of difficulties. The biggest challenge is ensuring access to education for each child, or, distance learning involves certain conditions of Internet connection and equipment.
Although all educational institutions in the country are connected to the Internet, in the context of distance learning, it has been found that not all students and teachers have Internet at home.
In this context, MECC had several discussions with partners from the World Bank, the Pestalozzi Program, Soros Moldova, ATIC, Moldtelecom, Orange and Moldcell, etc. in order to provide teachers and students with Internet and computers.
Thus, Orange Moldova, in collaboration with the University Information Center and in partnership with the Ministry of Education, Culture and Research of the Republic of Moldova launched the national campaign "Connecting teachers". The aim of the campaign was to ensure the continuity of the distance learning process, and for this, the telephone operator allocated 50 GB of free Mobile Internet traffic to teachers from all over the country, from all general education institutions, both public and private, provided that the teacher to have an active number, connected to one of the Orange tariff plans. The requests were submitted to Orange by the administrations of the educational institutions.
At the same time, in order to support the educational process, Moldcell provided teachers with Internet services by allocating free internet traffic in a volume of 50 Gb for a period of 2 months to each teacher who has an active number, connected to one of the tariff plans Moldcell .
UNITE-Moldtelecom also offered Internet connection services for teachers, connected to UNITE services, also offering 50GB of free Internet.

Dotarea cu calculatoare a elevilor şi cadrelor didactice
Ministerul Educaţiei, Culturii şi Cercetării discută zilnic cu partenerii de dezvoltare privind identificarea soluţiilor pentru asigurarea cu tehnică de calcul a profesorilor şi elevilor. În acest sens:
-Guvernul Republicii Moldova a alocat 20 mln. lei pentru procurarea tehnicii de calcul în vederea dotării instituţiilor de învăţământ primar, gimnazial şi liceal din ţară;
-Fundaţia Soros Moldova a oferit 20 de laptopuri cu Windows licenţiat pentru cadrele didactice, care nu deţin tehnică de calcul necesară pentru educaţia la distanţă;
-Fundaţia pentru copii „Pestalozzi" Elveţia a donat 33 tablete cu conexiune gratuită la internet pentru elevii care provin din familii numeroase din 11 raioane ale ţării: Drochia, Teleneşti, Ştefan Vodă, Anenii Noi, Călăraşi, Hînceşti, Ungheni, Bălţi, Criuleni, Cimişlia, Comrat;
-Parteneriatul Global pentru Educaţie prin intermediul UNICEF a acordat 70 mii de dolari pentru susţinerea desfăşurării procesului educaţional la distanţă. Astfel, datorită suportului acordat de către partenerii de dezvoltare vor fi procurate 80 unităţi de tehnică de calcul pentru profesori şi elevi, procurate şi distribuite pachete de suport pentru preşcolari şi elevii claselor primare şi organizate cursuri de formare a educatorilor.
-Instituţiile de învăţământ au transmis în gestiunea temporară a cadrelor didactice şi a elevilor calculatoarele şcolii.

Montenegro | Government official | Nr. 5
Main challenges Identified are:
1. All children do not have access to all available tools and therefore uneven opportunities to collaborate with teachers and

LearnIn

follow different distance learning channels. 2. Low level of digital literacy of teachers and big discrepancies in this regard. Some teachers use very advanced tools for online work with students, while the others have limited skills and use basic tools. 3. Use of large number of different tools for communication with students which creates the need that student must know how to use more different tools and have different accounts (Viber, Zoom, Microsoft Teams, Google Classroom, Moodle, Edmodo). 4. Need to ensure stable operation of the Education Information System, whose hardware infrastructure and part of software is already outdated. Many services (such as enrollment of students or national testing) can be realized only through the EMIS and the need for this is especially emphasized in times of Covid-19. Current support from UNICEF addresses exactly these issues. 5. Lack of/scarce digital curriculum resources, making it additionally difficult for teachers to plan, develop, and 'deliver' curriculum, as well as to assess students' progress 6. Vulnerability of specific groups- challenge to find the best model to include marginalized children (Roma children, children with disabilities, children living in poverty, etc) in remote learning; to find the best way to communicate with them and share learning materials. 7. Having in mind the need for quick reaction, it was challenging to organize quickly; to find resources; find the best model to develop materialLas (across the all levels of education) and to prepare teachers.
North Macedonia | Government official | Nr. 10 Challenges faced by students (and families) with regard to possession of the required devices (computers, tablets) and Internet connection, among socially vulnerable families. This is the case in all of the regions. There are cases when even electricity supply is problem in some families. Internet penetration at certain locations (white spots) is problematic especially in rural areas, which affects both schools and students. Some teachers do not possess their own personal devices to be able to conduct this type of classes. Lack of sufficient number of developed e-contents, and the ones that exist are not being used or their use is not monitored. Assessment should undergo changes, therefore, it will be required to restore the platform which was aimed for external assessment, or to replace it, but this time, for completely different purposes and for more frequent use. Database of teachers and students has not been updated in order to be used for any platform, which is precondition for introduction of a single platform – obligation of MOE and municipalities. Pupils are juveniles and for pupils, as well as teachers and parents to be able to monitor their performance on any platform, they need to have user accounts and that is not a simple and short process. ...
North Macedonia | Education Technology Specialist | Nr. 11 1. Lack of quality educational software (in the languages spoken in the country) for various teaching subjects and reconciled with the BDE curricula and programs. 2. Lack of repositories for digital teaching materials. 3. Lack of adequate legislation that stipulates distance learning in details. 4. Lack of training for the teachers how to use online platforms and various technologies and forms of distance learning. 5. Tackling the limited interaction during distance learning. 6. Verifying the identity of pupils and students for knowledge assessment (tests, colloquium, exams etc.).
North Macedonia | Teacher, but often educating teachers on a consultancy basis through CSOs | Nr. 12 - At the very beginning, online classes were delivered proactively by ambitious teachers and professors who have not always used this type of classes, and this was based on various platforms, programs, applications and without instructions from the schools about the schedule, duration and mainstreamed curriculum.

LearnIn

- In the course of time, MOE started giving instructions about the use of technology in the teaching process, with good examples of platforms, applications, programs, websites and how to deliver them from the aspect of time, daily schedule and duration of an online class of 15 minutes.
- At the very beginning, there were difficulties with regard to regional schools. Rural schools faced more difficulties because both teachers and parents complained about lack of proper conditions, lack of Internet connection, lack of computers, and most important is that teachers would never mention what the parents would honestly emphasize and that is the fact that teachers were not professionally prepared to do online teaching.

North Macedonia | Education Technology Specialist | Nr. 13
Some of the students from lower grades do face challenges when they use the online platforms.
Some students from vulnerable groups were faced with the lack of digital devices, and MOE proposed solution , according to which they are provided with Internet vouchers etc.

Romania | Education Technology Specialist | Nr. 7
Primary and lower secondary schools face the highest challenges related to education technology, with important gaps by area of residence and size of schools. Data availability on how schools are equipped for digital education is insufficient, and is mainly focused on number of computers per students or number of ICT labs (National Institute of Statistics, Quality Assurance Agency for Pre-University Education). However, data from specific thematic research indicates huge difficulties in assuring modern education technology, in particular in schools from disadvantaged areas. At the same time these schools face the highest risk of a poor or no connectivity.

Local administration fails to offer the necessary support, due to insufficient resources but also to other priorities of investment and the project aiming at equipping 4,500 schools with wireless equipment technical infrastructure for the use of OER and WEB 2.0 resources and services is still in the preparation phase. Through different programs, companies and other private stakeholders contribute to the financing of digital equipment. There small investments based on micro-grants model (i.e. UNICEF pilot project on integrated measures in Bacau, World Bank ROSE project etc), but these initiatives are targeting a limited number of schools compared to the needs. Parents contributions are forbidden, except through the formal procedures financed through Parents Associations (with a juridical identity) and, again, are not existing in disadvantaged schools - active parent associations are often found in urban/economically developed areas

Another challenge faced by primary and lower secondary schools (students and teachers) concerns the lack of access to a national repository of educational resources for all levels. The strategic project National Education Platform (Virtual Library) is also in the development phase and the platform is not operational yet. The only specific resource concerns the digital textbooks, but they are available only for students from preparatory to seventh grade.

Teachers are struggling with the instruments that have to be used for online teaching. For many of them, there was no previous experience using „online classroom" tools.
There is also a struggling in the teaching process for quality electronic materials to be used within the online courses. Having the educational process based mainly on paper, a sudden move to online activities opened a list of uncertainties related to teaching and evaluation.
The training offer for subject specific training on learning applications and equipment specific training is limited and teachers face difficulties to attend these courses, often organised in urban centers. Moreover, the initial teacher training course on computer-assisted instruction is insufficient to fully prepare the teachers to embed ICT into their teaching

Parents are overwhelmed on setting up the different tools their kids have to use because not all the teachers from a school use the same online tools. Things are getting sometimes more complicated when more kids of school age are in a family.
Schools may be struggling, also, with the formal (bureaucrat) process of managing the online activities.

Romania faces also the challenge of an insufficient use of positive experiences of teachers' professional development and

LearnIn

further integration of ICT in education through European educational programs such as Erasmus+ and other important tools for exchanging best practices, peer learning and professional development of teachers at EU level, in particular eTwinning, School Education Gateway). For example, the annual competition of eTwinning national projects is an opportunity to evaluate and celebrate models of using ICT for collaborative classroom learning, for curriculum development and for innovations in teaching. A national commission of education researchers and practitioners is assessing hundreds of applications submitted by teachers and an award event is organised every year, however, there are limited examples of promoting these innovative practices at national level, through different policies.

Other important challenges related to digital education in Romanian education system are the following:
- Limited data sets related to digital education in Romania, in particular related to digital competences of students and teachers
- Lack of a common approach, at school level, of how online teaching should be implemented and how various actors should work together in the online space.
- Insufficient training of teachers (initial, continuous) for teaching the new compulsory subject for lower secondary level ("Informatics and ICT"), in particular teachers from rural/disadvantaged schools where largely this subject is taught by mathematics teachers
- There are no centralised evaluation mechanisms of the digital competencies of teachers, nor country-representative reports assessing the level of use of IT equipment and digital resources in the classroom/in universities
- Low coordination between different national programs in the field of digital competences, as well as the delay or even cancelling of some programs due to insufficient resources
- Delays in approval of the National Strategy for the Educational Infrastructure
- Reduced awareness on the 8 key competences (including digital competence) embedded in the curriculum and defined in the new reference framework promoted by the Ministry of Education.

Romania | Education researcher, curriculum expert | Nr. 41
In my opinion there are four major challenges related to educational technology:
- schools struggle with scarce ICT equipment, in particular schools from lower education level, and primary education level; schools from rural areas, in particular schools with a high population of Roma students;
- families offer insufficient access to learning devices and necessary connectivity to all the children that are enrolled in online learning (again with big differences by area of residence, social and economic status of the family)
- Government and Ministry have a limited capacity to provide an timely, targeted and integrated support to students at risk of being excluded from online learning
- teachers have insufficient digital skills and still adapt to the requirements of online learning, in particular teachers; as indicated by a large curriculum training conducted for primary and lower secondary teachers, needs are not only in relation with using learning platforms, but also with simple digital literacy competencies.

Serbia | Government official | Nr. 1
• Teachers are trying to find best way to maintain their role in online learning because they are lacking in digital skills and theoretical knowledge regarding online teaching and learning;
• Parents are struggling with homeschooling - lots of homework to supervise and school subjects to cover, not unique LMS at school level (confusion with multiple communication channels);
• The production of K1-K12 lessons is time consuming and logistically demanding (teachers are recording lessons, IT people are rendering, TV people are montaging...).

10. Statutory Declaration

I declare that I have developed and written the enclosed Master Thesis completely by myself and have not used sources or means without declaration in the text. Any thoughts from others or literal quotations are clearly marked. The Master Thesis was not used in the same or in a similar version to achieve an academic grading or is being published elsewhere.

Hiermit versichere ich, dass ich die vorliegende Arbeit selbständig ohne fremde Hilfe angefertigt habe. Alle Stellen, die ich wörtlich oder sinngemäss aus öffentlichen oder nicht öffentlichen Schriften übernommen habe, habe ich als solche kenntlich gemacht.

Bucharest, September 2nd, 2020 Signatur

hdk
Zürcher Hochschule der Künste
Zurich University of the Arts

Erklärung Master-Thesis Originalität, Master of Arts in Design
Version 15.02.2019

Originalitätserklärung zur Master Thesis Design

Ich, (Name Vorname) Turkawka, Gregory geboren am 8.8.1970 versichere, dass:

- die vorliegende Master-Thesis (Titel) «LearnIn - a gamifiied digital ecosystem»

  selbstständig und ohne fremde Hilfe erarbeitet wurde.
- sie bisher weder in gleicher noch in ähnlicher Form an anderen Hochschule eingereicht noch veröffentlicht wurde.
- bei Gruppenarbeiten, die Angaben darüber, wer welches Kapitel verfasst hat, genau den Tatsachen entsprechen.
- keine anderen als die angegebenen Quellen und Hilfsmittel verwendet wurden und dies sich auch auf alle in der Arbeit enthaltenen Zeichnungen, Skizzen, bildliche Darstellungen und dergleichen bezieht.

Ich anerkenne, dass diese Master-Thesis in den Bestand der ZHdK aufgenommen wird und allenfalls, in Teilen oder als Ganzes, publiziert oder Dritten zugänglich gemacht wird.

Die eingereichte Master-Thesis Theorie hat einen Umfang von 181'709 Zeichen.

Ort, Datum

Bucharest, 2. September 2020

Unterschrift