

ARMENIA
2021-2041
ideas in action

Armenia

2021–2041

Education

May, 2021



Table of contents – detailed vision by sector and by enabler

— Education

01 Where are we now?

Historical performance, previous recommendations and outcomes
Snapshot of current situation
Comparison against key peers

02 Where do we want to succeed?

Global industrial trends: what will the future look like?
Vision 2041

03 How to enable growth

Key enabler deep-dives
Best practice studies
Key initiatives and prioritization

Education – summary of sector analysis

Main challenges

- The quality of education has fallen, partly due to outdated curricula and deteriorating quality of teachers
- Armenia faces a mismatch between the needs of the labor market and the skills the education system provides e.g., resulting in a lack of STEM specialists
- Low enrolment across all stages of education, with ECEC and TVET being the lowest vs peers
- Despite multiple initiatives, the challenges call for a systemic approach to ensure a full-scale transformation

Economic contribution

	2019	Δ2014–'19	
GDP, USD mln	320	+12%	▲
Employment Headcount, thou	107	+2%	▲
Productivity Gross value added/ employee USD thou	3	+11%	▲

Sector-specific KPIs

	Armenia, 2019	Armenia, 2014–'19 change		Peers average, 2019	Leader-peer, 2019	
HDI rank	81	-4	▼	74	29	
TIMMS Mathematics	498 (38th)	-		519	567	
Enrolment – ECEC	35%	+6 p.p.	▲	75%	99%	
Enrolment – TVET	6%	-		42%	45%	
Unemployment with higher education	17%	+0.2 p.p.	▼	4%	3%	

Most teachers are not reality-focused and use outdated methods. The current system does not meet the needs of the future.

Parents in some regions prevent children from going to school. In rural communities, children – mainly boys – drop out for seasonal work or they are expelled with no consideration for their opinions.

There is no collaboration between different stakeholders and initiatives. It is important to learn from each other and consolidate efforts.

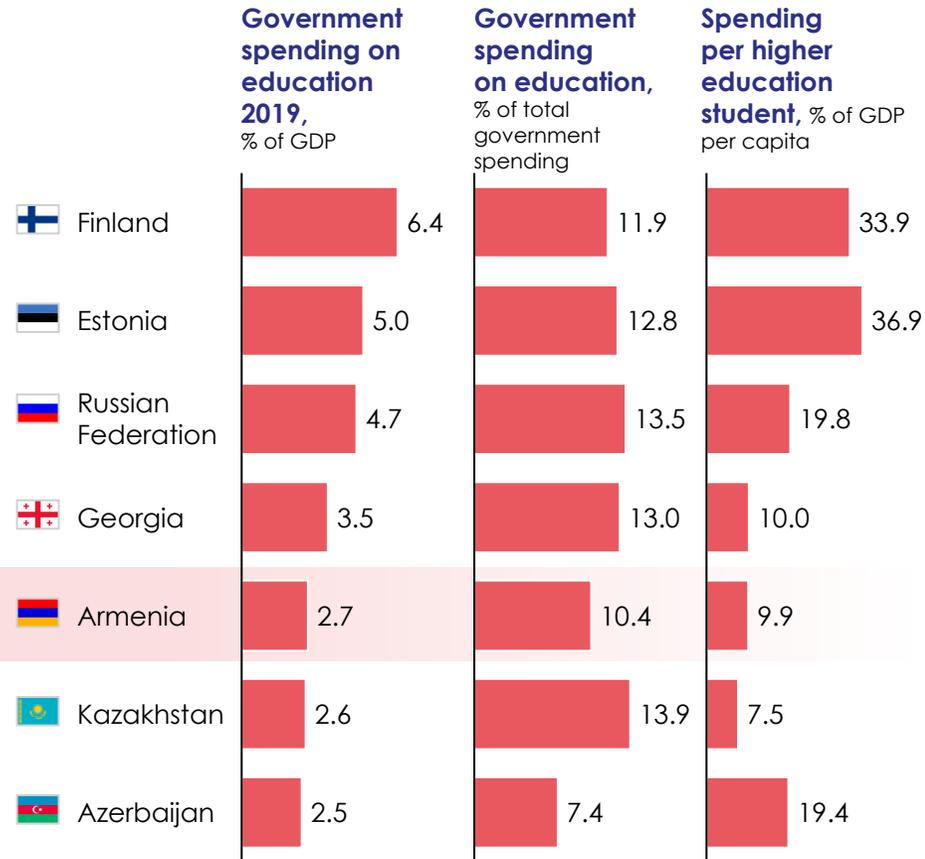
Key growth enablers

- A** **Development of digital enablers and e-learning** to ensure equal access and support sector growth
- B** **Matching education with future labor market needs (incl. focus on STEM)** to supply the most competitive sector of economy with skilled specialists
- C** **Amplification of early childhood education** to guarantee the best start in education for all citizens
- D** **Teacher and school leader development** to increase the quality of education and improve career attractiveness
- E** **Development of centers of excellence in K-12** to develop talented students and stimulate knowledge sharing among teachers
- F** **Development of successful TVET** to eliminate mismatches in the labor market and supply focused sectors with a skilled workforce
- G** **Enhancement of lifelong learning programs** to allow Armenians to learn modern skills and tools

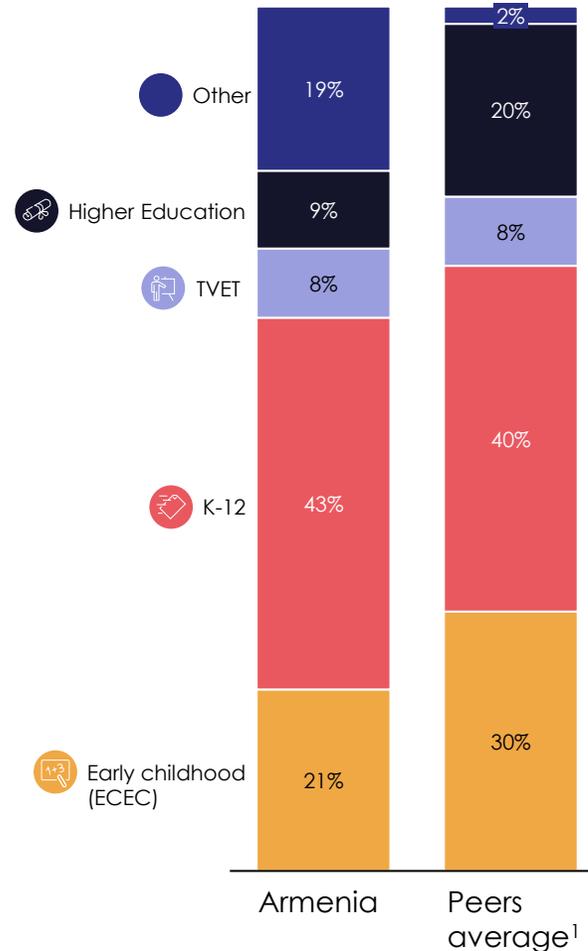
Education Experts

Government education spend relative to GDP is low compared to peers, while higher education is not in focus

Government Spending on Education



Government spending in 2019 or latest available by education level, % of total



Key takeaways

The low level of education spending seems to be a factor constraining human capital development in Armenia

Underinvestment in education seems to be affecting the quality of education at all levels

Armenia is less focused on ECEC and Higher Education in comparison to peers

Poor remuneration makes the education sector an unattractive career choice and challenges educational institutions to attract and retain qualified specialists

Limited budgets hamper the modernization of learning and research infrastructures

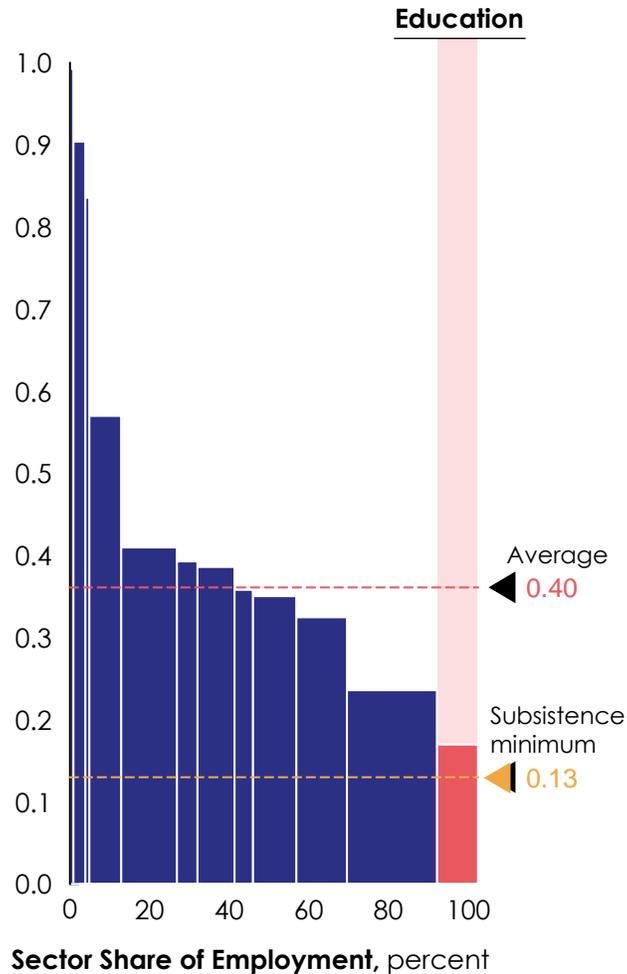
Main challenges

Underinvestment in higher education

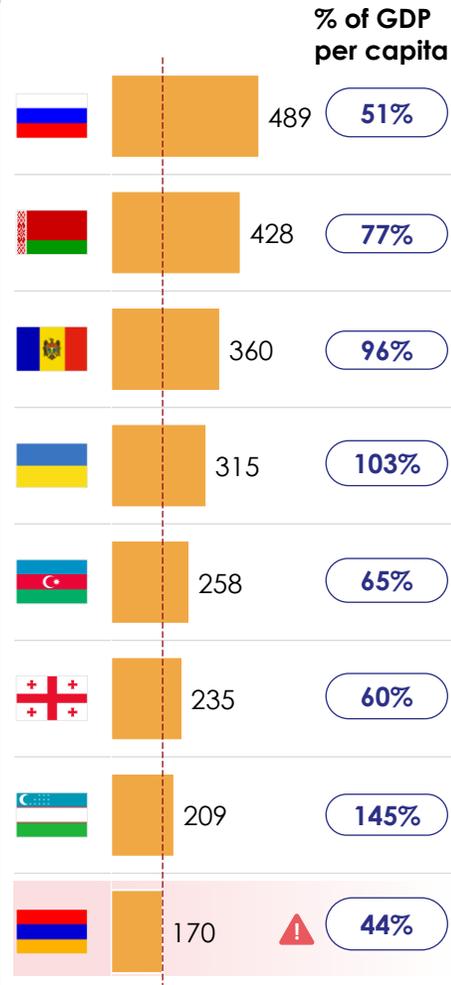
Hypothesis – low spending per student

Teaching is among the lowest-paid jobs in Armenia, with salaries lower than in all peer countries

Average nominal salary by sector, 2019, USD thou

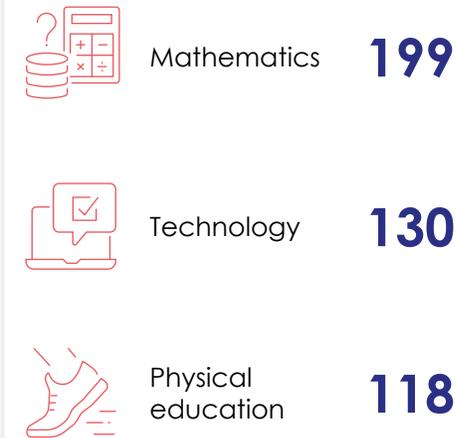


Average monthly salary vs peers, 2019, USD



457 schools had 1,245 teaching vacancies in 2018

Most vacancies by subject



People don't want to become teachers. The compensation framework needs to be updated.

Education Expert

Key takeaways

Teachers are not properly incentivized and compensation is not competitive internationally, being the lowest among peer countries

This could have implications for teaching quality due to lower average take-home salaries and possibly less motivation to participate in professional development

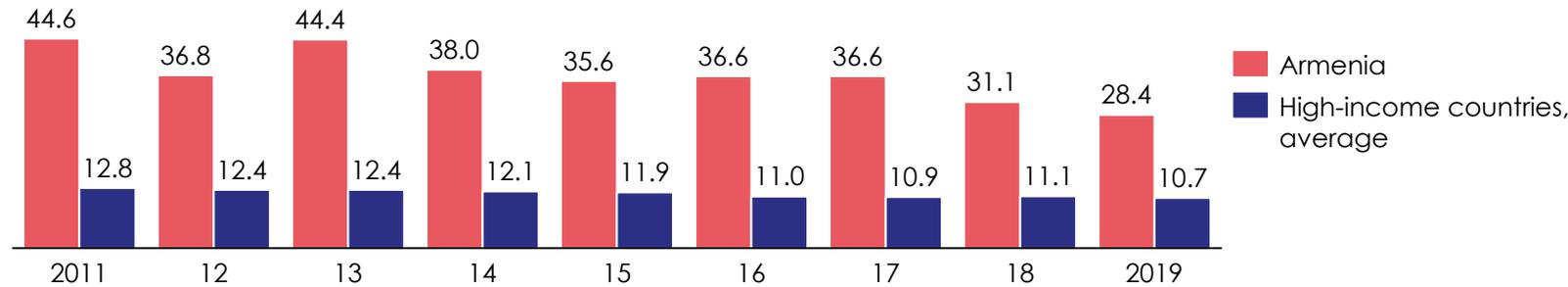
There seems to be a shortage of Math teachers: 16% of all vacancies in schools need this expertise

Main challenges

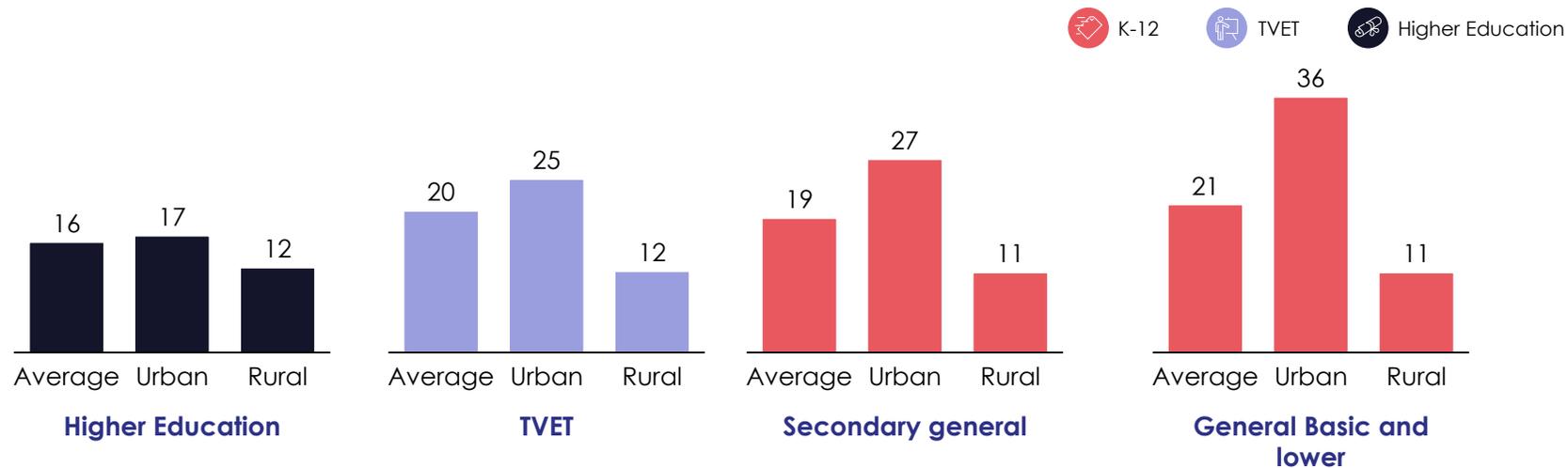
Teachers are not properly incentivized

The low relevance of student skills after graduation drives youth unemployment way above the benchmarks

Share of youth not in education, unemployed, or in training among people Aged 15–24, percent



Unemployment Rate by Education, percent



Key takeaways

High unemployment is driven by a mismatch between the skills of students after graduation and labor market demand

In **Armenia**, higher unemployment among people with education than in peer countries is partially **caused by the lack of practical skills** in the education system

Main challenges

High unemployment among people with education

Curricula in Armenia are outdated, causing a mismatch between education system supply and employer demand

Frequency of Curriculum Reform

Time period	50-'54	55-'59	60-'64	65-'69	70-'74	75-'79	80-'84	85-'89	90-'94	95-'99	00-'04	05-'09	10-'15	15-current	Number of reforms
Republic of Korea	✓		✓		✓		✓	✓	✓	✓		✓		✓	9
Kazakhstan										✓	✓		✓ ¹	✓ ¹	6
Singapore									✓	✓	✓	✓	✓	✓	6
China									✓	✓	✓	✓		✓	5
Japan									✓	✓	✓	✓	✓		5
Russia										✓	✓	✓	✓		4
Armenia											✓ ¹	✓	✓		4
Finland									✓		✓			✓	3
India								✓				✓	✓		3
Estonia										✓				✓	2

1. Multiple reforms during the period

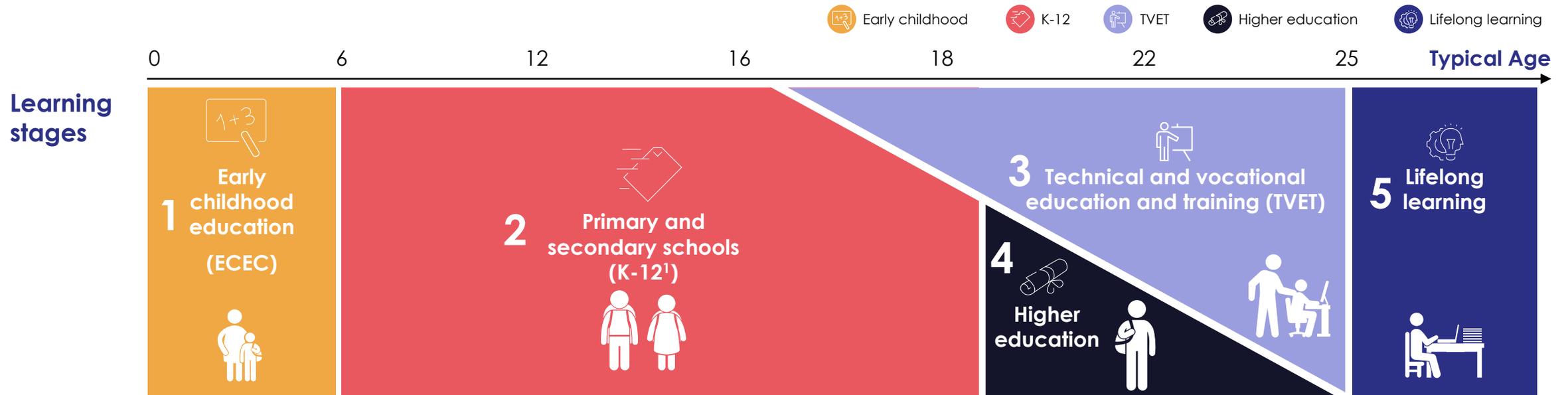
Key takeaways

The last major curriculum reform in Armenia was in 2011, whereas most countries with high-quality education continuously improve their curricula

Main challenges

Outdated curricula

To understand how to grow Armenia's education sector, multiple dimensions across the 5 learning stages should be considered



Dimensions



Access

Do learners have proper access to the offering?



Quality

What are the learning or labor market outcomes of the subsector?



Enablers

Financial Sustainability
What are the costs of delivery, including costs relative to outcomes?

Experience

Do we have improved wellbeing and satisfaction, with innovative approaches being applied in education?

Governance

What are the main stakeholders' interests and how to match them within the existing governance structure?

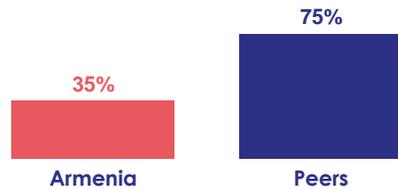
1. K-12 is an abbreviation for "Kindergarten through 12th grade"

1. Pre-primary education in Armenia does not seem to be a focus for the education system

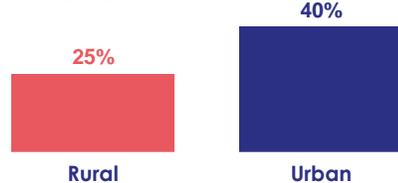


Early Childhood Education Enrolment

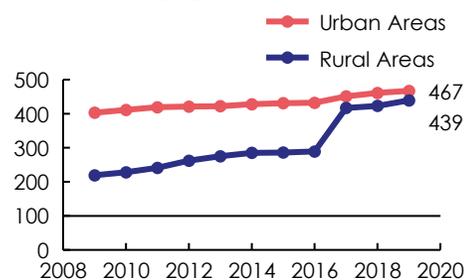
Enrolment rate 2019,
% of age group



Enrolment rate by area,
% of age group



Number of ECEC institutions



ECEC in Armenia does not seem to prepare children adequately for school and is unaffordable for many households

Access	Affordability  36.7% of HH whose children are attending kindergarten mentioned that it was not easy to arrange / enroll a 3–5 year old child in a public kindergarten in their community. Very often, either the services are not available , or they are private , which is not affordable for poor families
	Availability  Children from urban areas are twice as likely to attend pre-school educational institutions , while children in rural areas and children from poor households attend kindergartens more regularly
Quality	Quality Standards  82% of teachers in pre-primary education are trained , which is below the average level among peers (nearly 99%) The task of providing knowledge and preparing children for school scored lower (4.4 points), than other aspects of ECEC, such as working hours, developing creativity or providing life skills and logical thinking (4.6, 4.56 and 4.53, respectively)
	Monitoring  There are no dedicated tools for monitoring the quality of ECEC
Other	Governance  ECEC is under the jurisdiction of local communities (i.e. municipalities and city councils) , obtaining funding from local budgets and fees paid by parents
	Financial Sustainability  Local authority leaders do not seem to consider ECEC as a proper field for social investment or creation of social capital. It seems it is viewed as a costly burden for the community budget

Key takeaways

There is limited access to good-quality pre-school education, which is the main predictor of further education success

Lack of a legal framework and regulatory conditions seem to hinder the development of alternative solutions for pre-school education

For non-public kindergartens, the minimum fees are not affordable for young families in rural areas

Main challenges

Limited access to pre-school education in rural and remote areas

ECEC does not prepare children adequately for school

Lack of incentives and conditions for growth of private institutions

ECEC seems to be a low priority on the local authorities agenda

No quality monitoring tools are used

2. Primary education lacks trained teachers, which affects quality

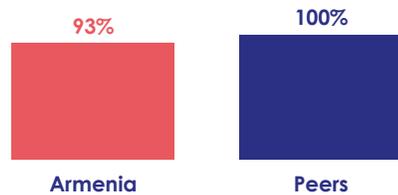


2019 value XX +XX Growth vs 2011

XX +XX Score Leader

Primary Education Enrolment

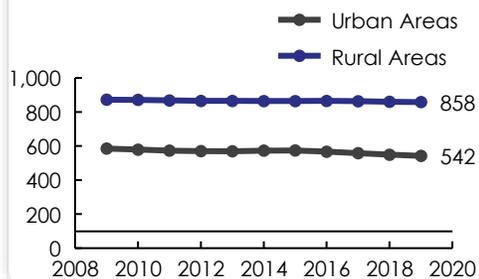
Enrolment rate 2019,
% of age group



Total enrolment 2019,
thousands of people

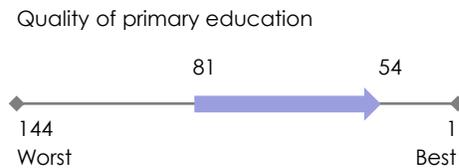


Number of Primary Education institutions

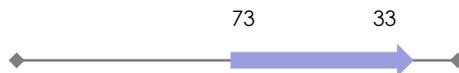


Quality of Primary Education

Global competitiveness ranking (2009 and 2017)



Quality of math and science education



TIMSS¹ 4th grade 2019 vs 2011,
score



Armenia has the lowest share of trained teachers

Country	Student-teacher ratio, primary, 2019	Trained teachers in primary education (% of total), 2019 ¹
Georgia	9	n/a
Armenia	13	73.6
Ukraine	13	89.1
Azerbaijan	15	99.8
Moldova	18	100
Belarus	19	99.5
Kazakhstan	20	100
Russian Federation	21	n/a
Uzbekistan	22	99.9
Kyrgyz Republic	25	95.4

Key takeaways

Teacher quality is the main school-based predictor of student achievement, while Armenia faces the challenge of **deteriorating teacher quality**

Armenian students suffer a learning gap of 3.2 years due to the education quality issue (confirmed by below average (500) performance in TIMSS)

Students from poor families and rural and remote areas have higher dropout rates from formal education and often fail to pursue other training opportunities

Main challenges

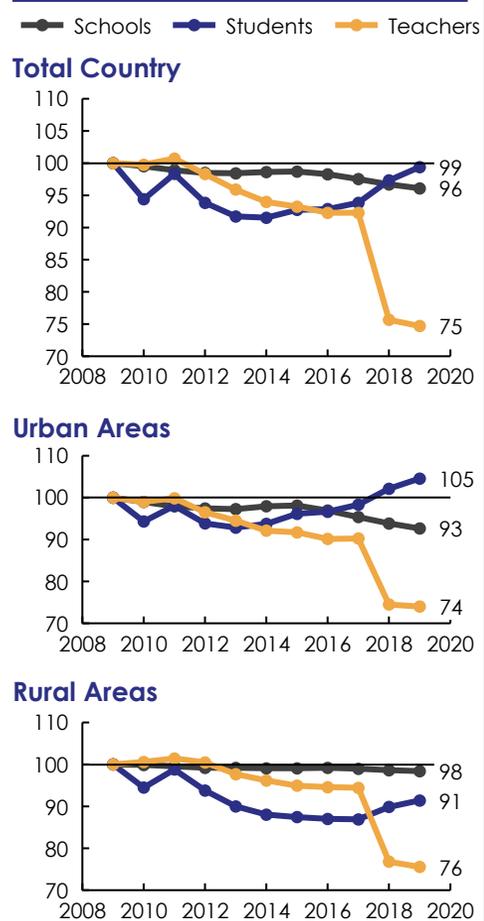
- Deteriorating teacher quality
- Below-average student performance in TIMSS
- Armenia does not measure performance: not included in PISA, PIRLS, TIMSS 8th grade
- Low enrolment rate
- Lack of successful role models for students

1. Trends in International Mathematics and Science Study
2. Kazakhstan, Russia, Georgia, Azerbaijan, Belarus, Moldova

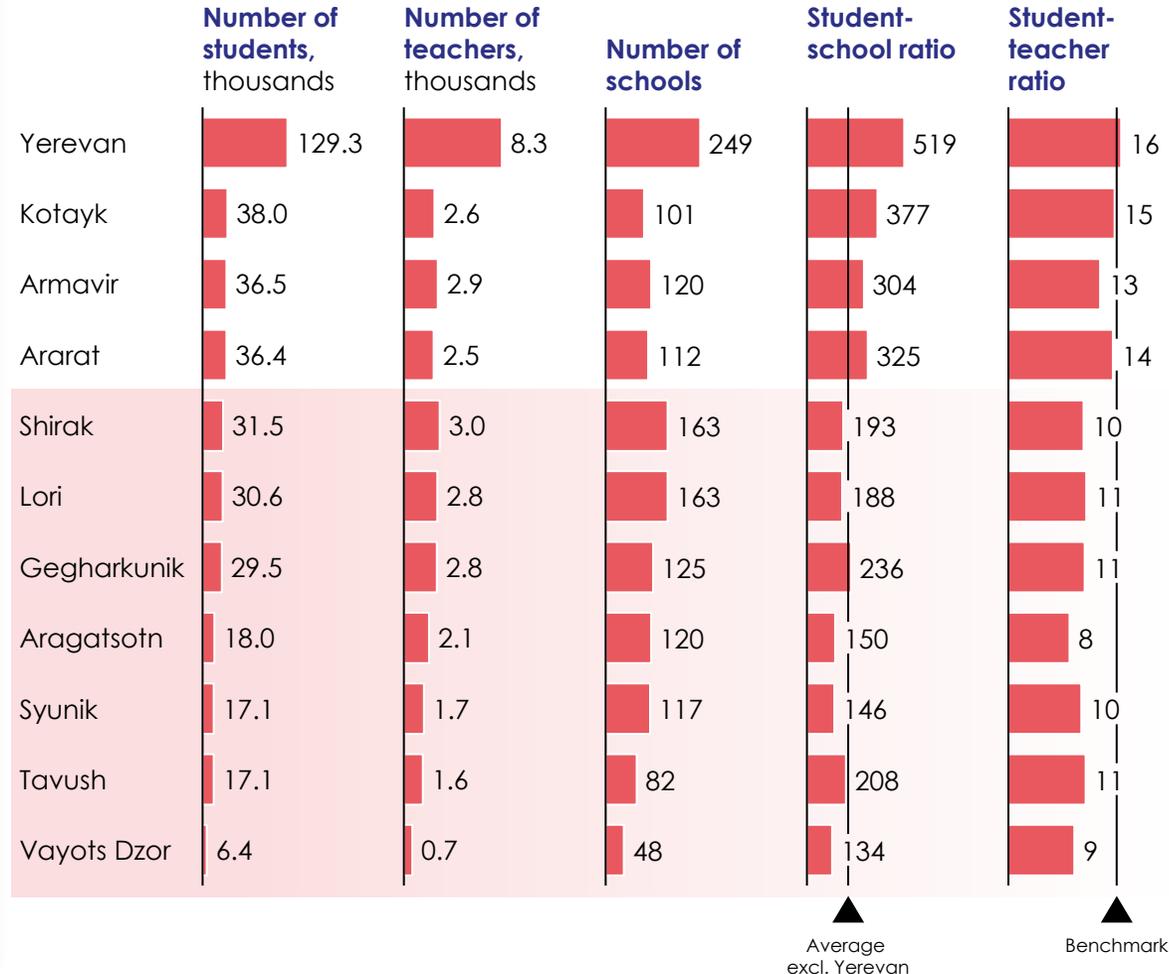
2. The student-teacher ratio in Armenia is among the lowest due to a lack of students in regional schools



Number of schools, students and teachers, index to 2009



Student-teacher ratio is below benchmark level in most regions



Key takeaways

Though the number of teachers has decreased significantly over recent years, the student-teacher ratio in Yerevan, Kotayk, Armavir and Ararat remains at the benchmark level

At the same time, there is a shortage of students in other regions, which may lead to suboptimal workloads for teachers and generate additional costs. This indicates that there may be room to optimize school placement or size, coupled with remote learning e.g., leveraging best teaching talent from cities

Main challenges

School and teacher distribution

2. Teachers and school principals seem to lack the relevant skills



Developing the next generation of school teachers and principals

- ✓ Needs basics
- ✓ Highly important



1. PEDAGOGICAL SKILLS

Ability to choose the right approach to students: select materials, develop student interest etc.



2. SUBJECT EXPERTISE

In-depth knowledge of specific subjects



3. LEADERSHIP

Ability to lead the team and drive changes, organizational and community-building skills

Teachers



Principals



Current pedagogical programs are not practice-oriented, teachers are not skilled for the right activities.

Education Expert

There is no proper assessment of teacher quality. Most teachers use outdated methods.

Education Expert

The root problem behind the current issues is a lack of good leadership in education. Leadership training is needed for principals and teachers.

Education Expert

Key takeaways

There seems to be a lack of leadership training in the current pedagogical system

To ensure education quality, teachers need a wide range of competencies and skills

- Leadership skills are important for teachers and critical for school principals
- Teachers need to be reskilled in line with modern international standards

Currently there is no qualitative assessment of teacher performance

Main challenges

Deteriorating quality of teachers

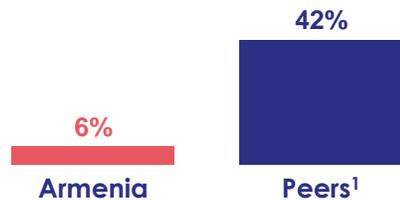
There are no frameworks for assessing teacher quality

3. TVET Education is underleveraged in Armenia due to limited accessibility and perceived poor quality

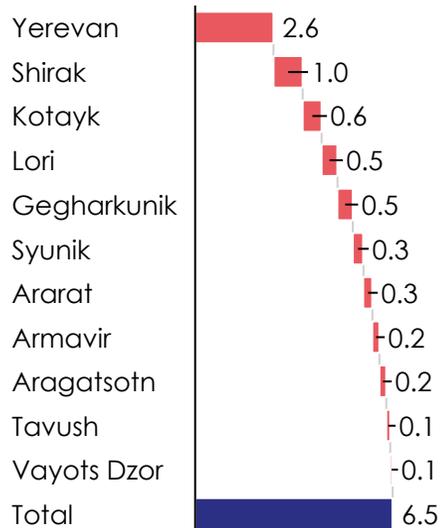


Technical and vocational education enrolment

Enrolment rate 2019,
% of age group

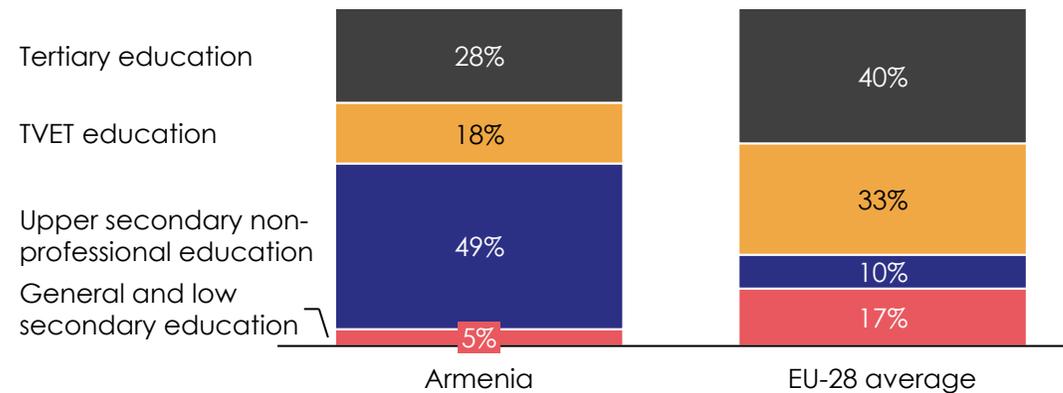


Total Enrolment 2019,
thousands of people

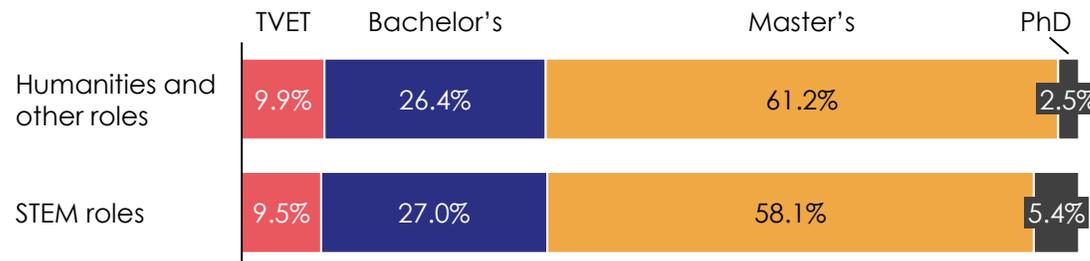


Employers perceive TVET in Armenia as low-quality and seek to hire candidates with higher education for more than 90% of roles

Educational attainment among the 30–34 age group in Armenia, 2019



Education levels required for key STEM and non-STEM roles in companies, %



Key takeaways

Armenia ranks 55/140 in the Skills Pillar, mainly because of the perception that staff are poorly trained and the **low quality of vocational education**

TVET education in Armenia is underdeveloped and cannot provide a sufficient supply of graduates, so jobs are mostly filled by graduates with higher education

Persistent mismatches can result in a misallocation of talent and lower productivity

Low enrolment rates (especially in rural areas) prevent the adoption of modern skills in manufacturing, agriculture and services

Main challenges

- Low supply of high-quality TVET education
- Limited access in rural and remote areas
- Low enrolment rate
- Outdated curricula
- Lack of successful role models for students

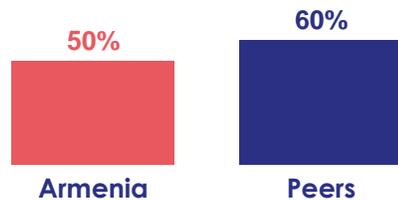
1. OECD average enrolment to TVET of upper secondary students

4. Armenia's higher education is perceived to be of average quality and lacking practical focus

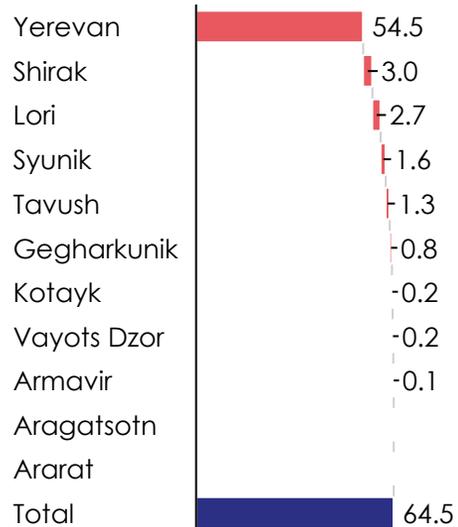


Higher Education Enrolment

Enrolment rate 2019,
% of age group



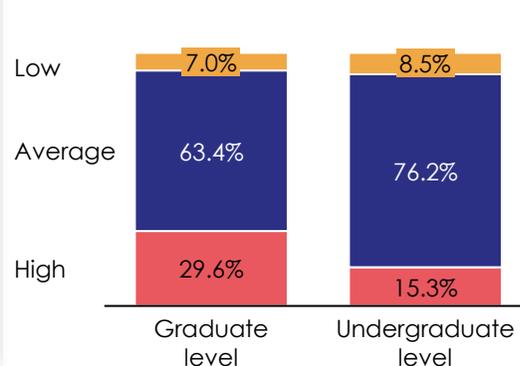
Total Enrolment 2019,
thousands of people



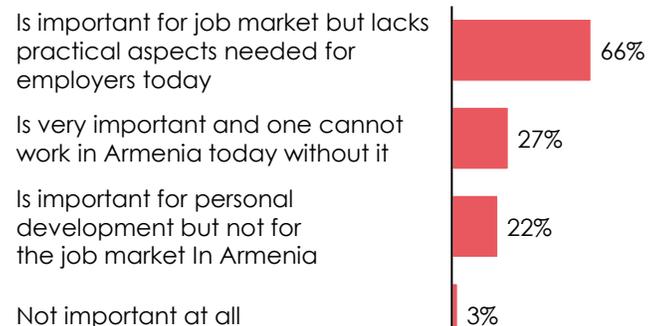
Higher education is perceived to be of average quality

	Number of universities	Universities per 100,000 population	Universities in top 1,000 worldwide	Universities in top 400 EECA
Russia	877	0.6	23	105
Azerbaijan	39	0.4	5	0
Kazakhstan	105	0.6	10	27
Armenia	58	1.9	0	5
Georgia	32	0.9	1	2

Perception of overall quality of higher education in Armenia



Perception of the necessity and importance of higher education



Key takeaways

Higher education in Armenia is perceived to be of **average quality** by the majority of students

The main reasons for student dissatisfaction with education are: **obsolete curricula**, infrastructure, demotivating environments and quality of faculty

2/3 of students believe that higher education in Armenia **fails to provide the practical skills** required by employers

Enrollment rates are lower than in peer countries since many young Armenians from rural areas **cannot afford the cost of education**

Main challenges

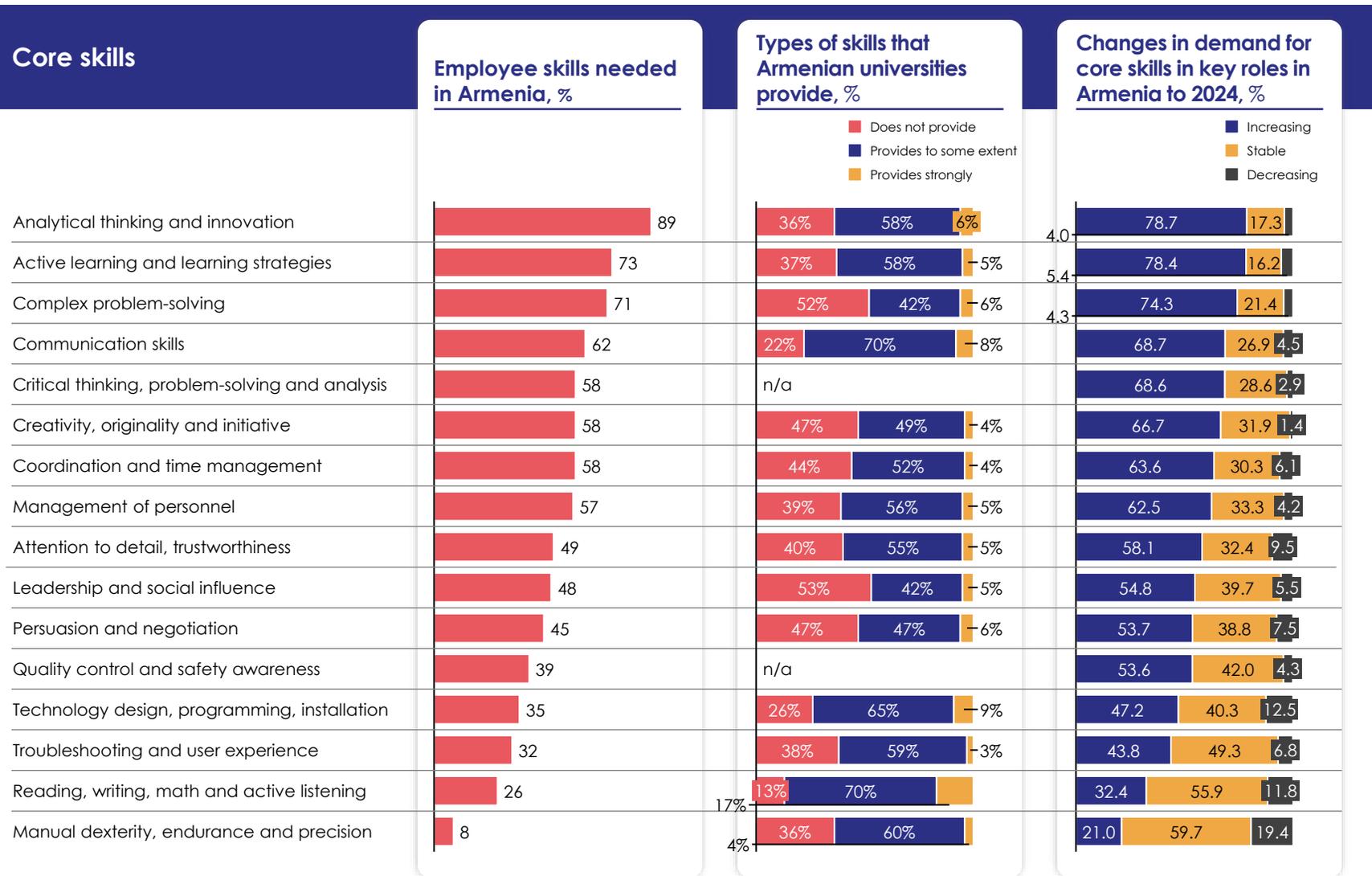
Average quality of higher education

Outdated curricula

Low enrolment rate

Lack of successful role models for students

4. There is a significant gap between graduates' skillsets and employers' demands in Armenia



Key takeaways

Emerging industries require modern skills such as analytical thinking, problem solving and soft skills, which are not provided or only moderately provided by Armenia's universities

These skills are expected to be in greater demand by 2024

Therefore, this gap could widen unless curricula and teaching methods are updated

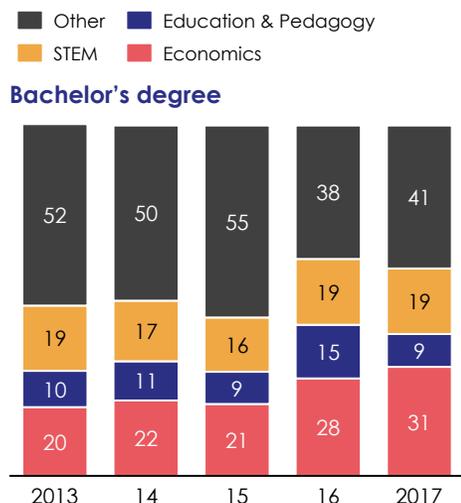
Main challenges

Outdated curricula and teaching methods

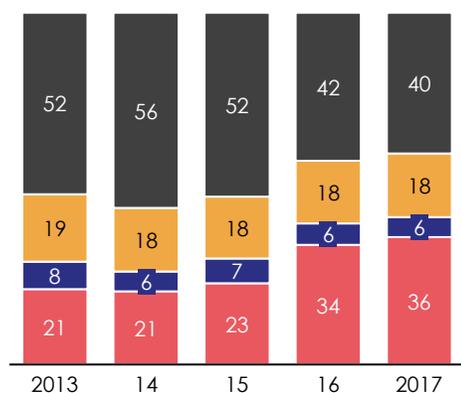
4. The share of STEM education is below peer level, with graduates preferring careers in finance and insurance



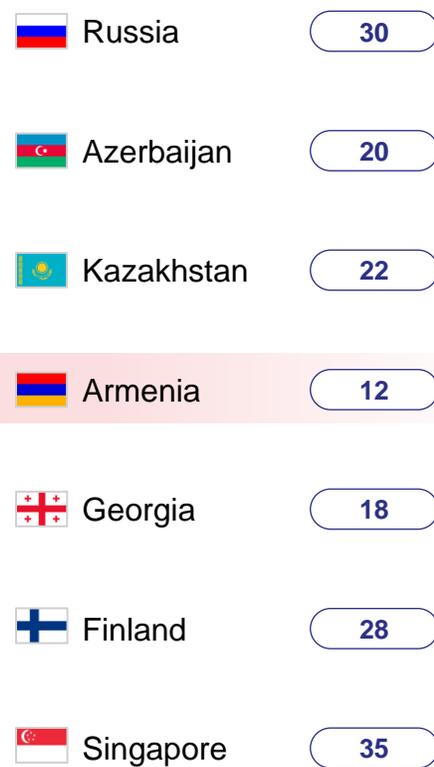
Higher education specialization in Armenia, %



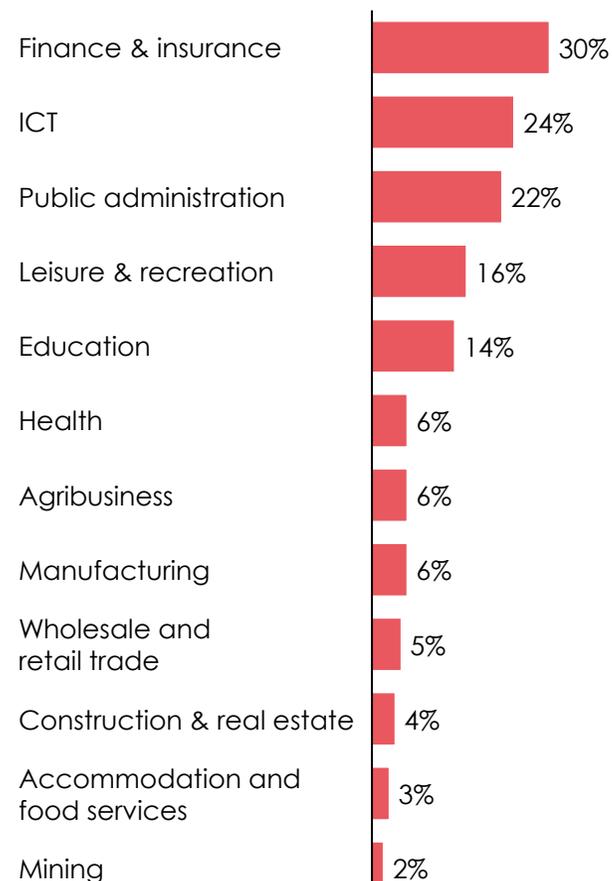
Master's degree



Total share of STEM education



Preferred Industries for Career Opportunities among Students



Key takeaways

Higher education in Armenia produces an oversupply of humanities graduates in higher education and inadequate prioritization of investment to improve the quality and delivery of education in STEM fields

Students (often influenced by their parents' misperceptions) **tend to prefer careers in Finance and Administration**, perceiving these sectors as the most stable and higher-paying, while interest in STEM is low

Main challenges

Shortage of STEM specialists

Students display low level of interest in STEM careers

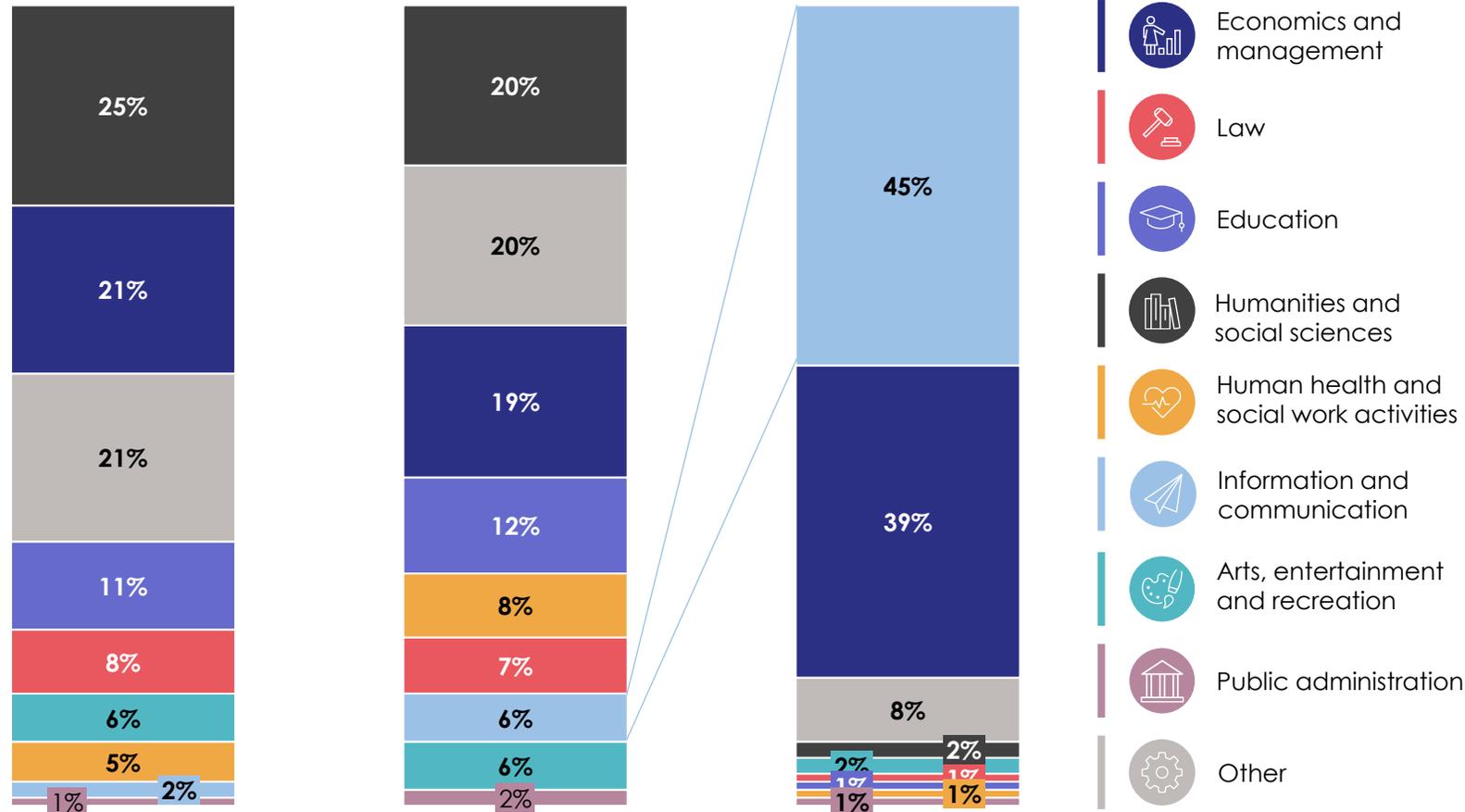
4. There is a mismatch between current education specializations and the needs of the labor market



% of total graduates from higher and vocational institutions, 2014

% of total graduates from higher and vocational institutions, 2019

Estimated number of job vacancies¹



Key takeaways

Job vacancy websites indicate a **mismatch between current education specializations and the needs of the labor market**

The education system appears to be lagging in meeting the demand for skills related to IT

Low student enrolment in STEM at the tertiary level also means that the education system is not prepared to meet the predicted rise in demand for workers with technology skills and, as a result, is falling behind in innovation

Main challenges

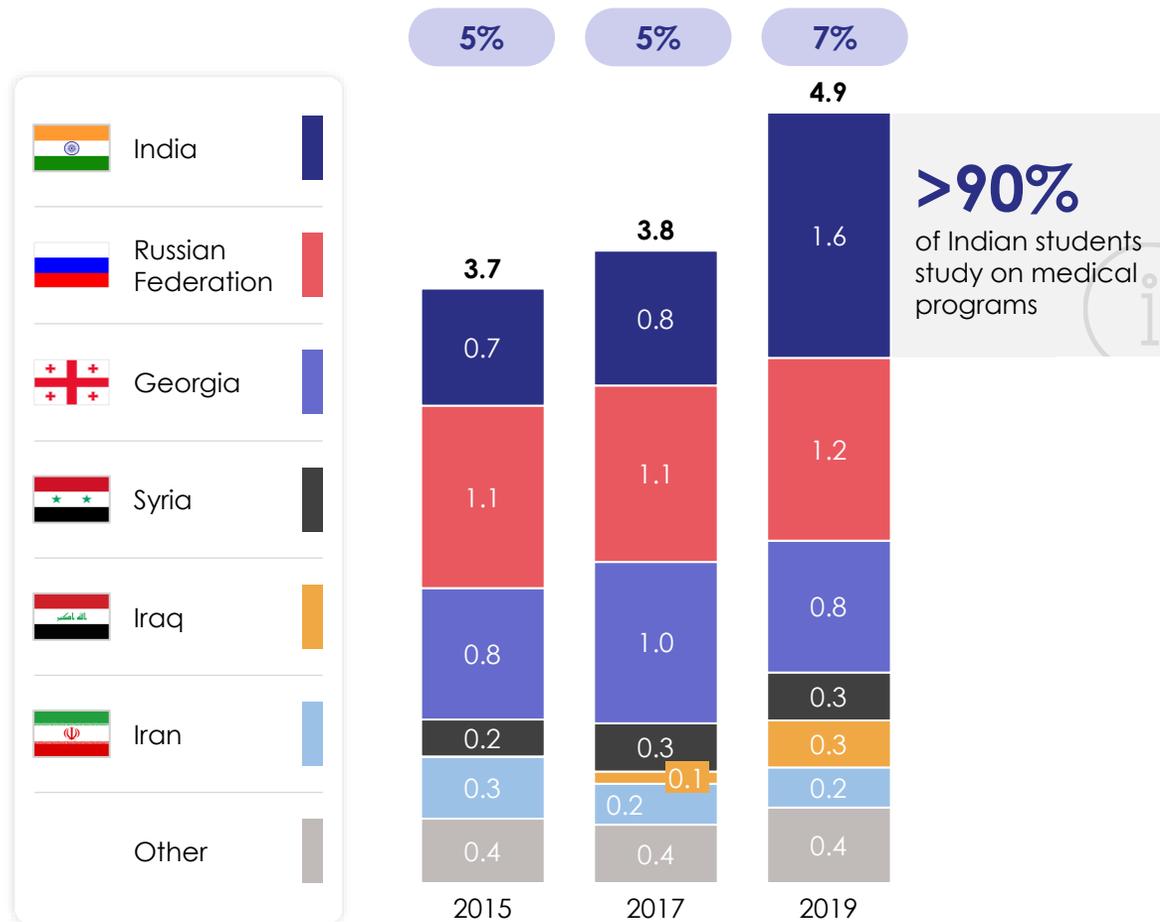
Shortage of IT specialists

1. Based on Staff.am search
Source: Armstat

4. The number of foreign students has increased over the past 5 years



Number of foreign students in higher educational institutions by country, thousands



x% Share of international students

Share of foreign students by university, 2019, % of total university students

Yerevan State Medical University	22%
Russian-Armenian State University	3%
American University of Armenia	2%
Armenian State University of Economics	<1%
Yerevan State University	<1%

Key takeaways

Since 2015, the share of foreign students has increased to 7%

Yerevan Medical University has the highest share of foreign students

The number of Indian students has more than doubled since 2015, with a high proportion on medical programs

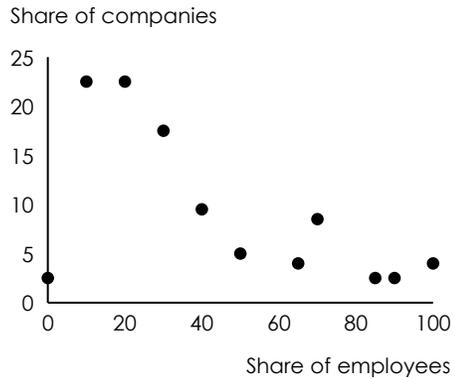
There is potential to leverage attraction of foreign students by developing competitive STEM courses and further enhancing medical programs

5. Lifelong Learning is underleveraged and mainly driven by employers themselves

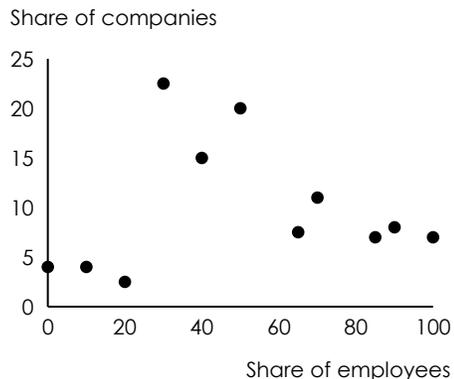


Percentage of employees being reskilled

Share of employees reskilled in 2018, percent



Share of employees requiring reskilling in the future, percent



Employers tend to have control over reskilling of their workforce due to a lack of government supported reskilling programs

Institutions that are being considered for reskilling training by companies, percent



Key takeaways

Only 34% of companies in Armenia reskilled more than 30% of their employees in 2018

Currently more than 90% of organizations surveyed think that at least 30% of their workers will require reskilling in the future

Companies are willing to take the necessary actions to handle the shifting skills requirements of the labor market, while government participation is limited

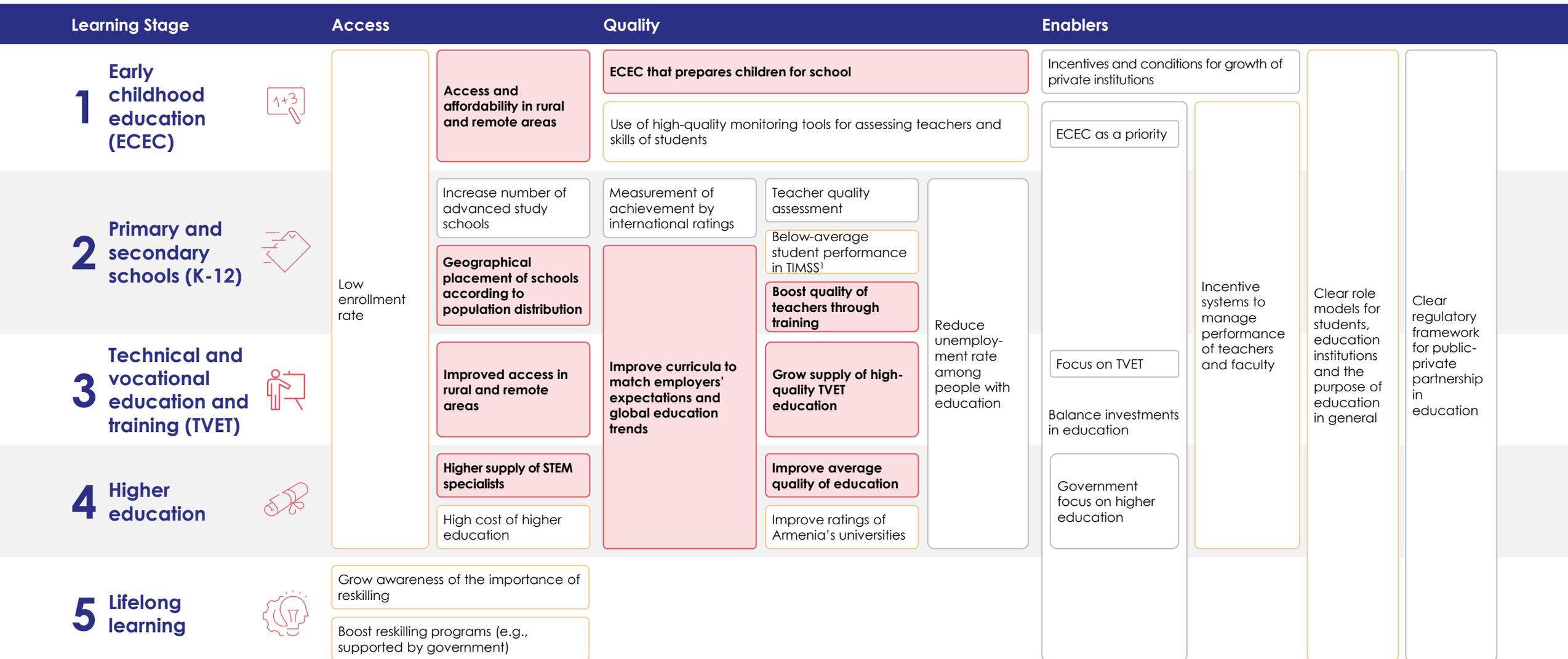
Main challenges

Lack of reskilling programs supported by government

Low awareness of importance of reskilling

Supporting levers for developing the education system in Armenia

Less Critical Most Critical



1. TIMSS (Trends in International Mathematics and Science Study) is a series of international assessments of the mathematics and science knowledge of students around the world

Table of contents – detailed vision by sector and by enabler

— Education

01

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Best practice studies
Key initiatives and prioritization

Global trends will increasingly shape the education sector in the future, some of them being particularly influential for Armenia



IMPLICATIONS FOR ARMENIA

	Selected Trends	Description
Who is learning? 	1 Rise of continuous learning and re-skilling for adults	Dynamic environment and less predictable jobs market mean adults are increasingly likely to need to re-train
	2 Increased attention to importance of early childhood education	Early childhood education is growing globally, with greater attention to the importance of children's well-being
What do they learn? 	3 Growing focus on social and emotional skills	The curriculum of the future is based on skills such as emotional intelligence, learning agility, critical thinking and leadership
	4 Increased importance of technology skills for work in the future	Advanced Analytics, Artificial Intelligence and other technological skills will be in demand in the future
How do they learn? 	5 Rise of online learning and digital forms of education, including new hybrid models	Online courses are seeing unprecedented growth, knowledge will continue to be more easily accessible
	6 Increasing professionalization of teachers with new capabilities, tools and techniques	Increasing focus on 'enabling teachers to teach', expanding relevance of supplemental training and supporting tools
	7 Personalized learning	True adaptive and personalized learning solutions, e.g., powered by AI technology

Opportunity to increase the productivity of the current workforce by stimulating reskilling and proficiency improvement

Focus on developing a compulsory system for early childhood education accessible to more people

The curricula and teaching approaches should to be changed to align with the needs of employers

Focus on STEM across all stages of education, thus forming a transparent lifepath for students

Online education should complement traditional education in rural areas and be leveraged to increase access and quality

Make teaching a more attractive career for skilled professionals, offering ambitious and lucrative growth opportunities, introduce regular teacher assessment

Early education can help to identify a child's vocation and adjust their learning path across all stages to their aspirations and talents

1. Lifelong learning & reskilling

Description



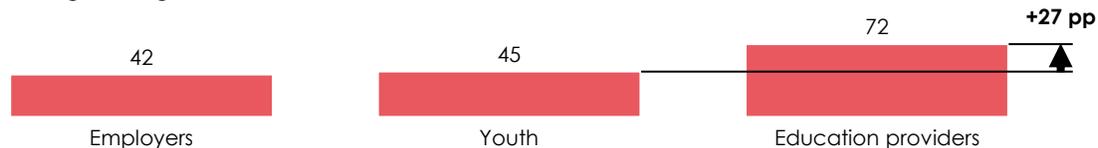
- Globally, **up to 375 million workers may need to switch occupational** categories by 2030, driven by a labor market mismatch caused by 'future of work', increasing automation and rising unemployment in light of COVID-19 (~60% of all occupations have at least 30% of constituent activities that could be automated)
- The landscape contains a **mix of publicly and privately operated (semi)formal and informal formats**, including i) public sector agencies, ii) private sector employers looking to train employees, and iii) third-party vendors helping with employment/reskilling
- Regions with **growing adult populations and industries with high automation potential** are seeing relatively higher demand and larger impact
- Europe and Central Asia expect to see a jump of ~10% in adult education between 2019 and 2025
- COVID-19 impact: acceleration of existing trends**, as unemployment has seen an unprecedented increase while industries have transitioned towards a new 'post-COVID' world

Workers needing to move out of current occupational categories, driven by automation and future of work (2016–2030), % (represents upper range of estimates)



Respondents who agree that graduates/new hires are adequately prepared, % (global)

Mismatch between beliefs around required skillsets and adequate workforce preparation fuels ongoing and lifelong learning



What the experts are saying



What is being taught today in K-12 is not sufficient in today's world, which gives rise to supplemental skill-based education

Former MD of Global Education, Major global tech leader

Acquiring new skills and certification on demand will be part of the new normal

Former MD of Global Education, Major global tech leader

Employers want skills, but education institutions are geared towards degrees. There is a skill shortage today

Former MD of Global Education, Major global tech leader

Case examples



skillsoft

Provides corporate training across a wide variety of topics/skills (more than 180,000 modules)

Serves 65% of the Fortune 500 companies and delivers employee training and up-skilling through courses, books and videos in multiple languages

Makes learning accessible in various delivery formats, including mobile devices, e-books and live learning (all resources are available online and via cloud to enable access anytime, anywhere)

Resources are used more than 130 mln times each month in more than 160 countries

Udemy

MOOC provider targeting both students and professional adults (moved beyond HE equivalent into adult/corporate training with Udemy for Business)

Total of ~35 mln students/users, 57,000 instructors and 130,000+ courses offered in 65+ languages

Serves 80% of Fortune 100 companies (has 7,000+ enterprise customers)

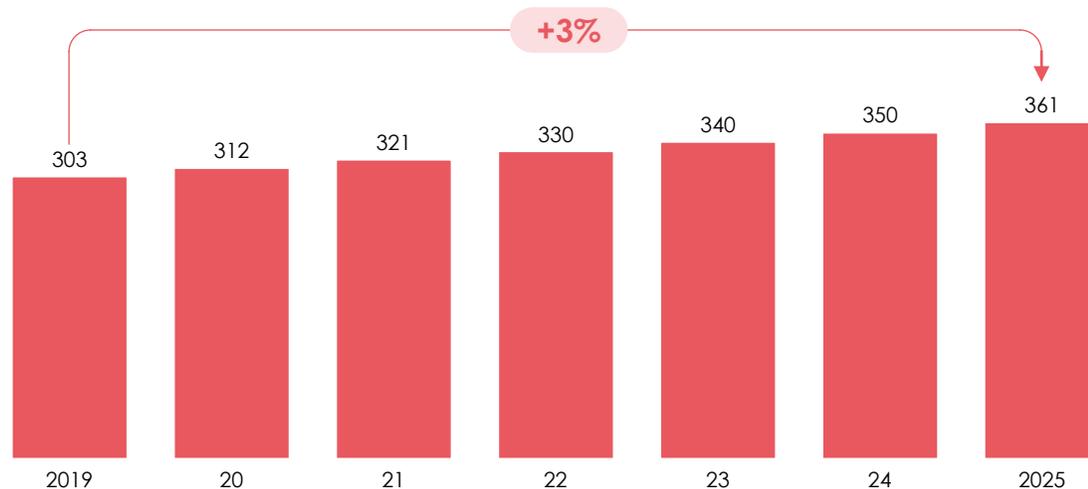
2. Early childhood education

Description



- **Early childhood education is growing globally**, with increasing enrolment rates and larger attention to the importance of PK stimulation
- Growth is partly driven by a focus on **equipping children with foundational knowledge to succeed** in the early K-12 years (math, basic literacy) and attention to the current **achievement gap in education** (caused by children entering primary school with different ability levels correlating with their socioeconomic backgrounds)
- **Shift towards more online formats**, driven by growing penetration of **devices**; offline likely to continue accounting for majority of delivery with emerging **skepticism around 'screen time for youngsters'**
- Strong focus observed in **Asia (e.g., China)**, driven by growing importance of education and **'future proofing' children**
- **COVID-19 impact: acceleration of existing trends**, with COVID-19 driving increased attention to learning loss and learning gaps and the importance of stimulating children early in life

Global early childhood education market size, USD bn



What the experts are saying



This is about setting our children up for success from Day 1 and frontloading struggling with the basics

Former VP, Major online learning provider

Early childhood education is the single biggest area where we can solve the equity and achievement gap in education

Former VP, Major online learning provider

Early childhood education is becoming very important for a lot of parents

Former Director of Product, Large edu. game provider

Case examples



Offers childcare solutions catering to several needs of parents and employers

Services within childcare and education are based on playful and experimental learning by leveraging interests, exciting and immersive formats and "whole child" focus to build cognitive, social and emotional skills

97% report that their children are ready and prepared to meet requirements when entering elementary school



KinderCare local daycare centers offer year-round childcare and early childhood education for kids aged 0-12

Equips children to succeed early in life and empowers children to reach milestones earlier (~6 weeks ahead at 2 years old; ~9 months ahead at 5 years old; KinderCare kindergarteners test at 1st grade levels)

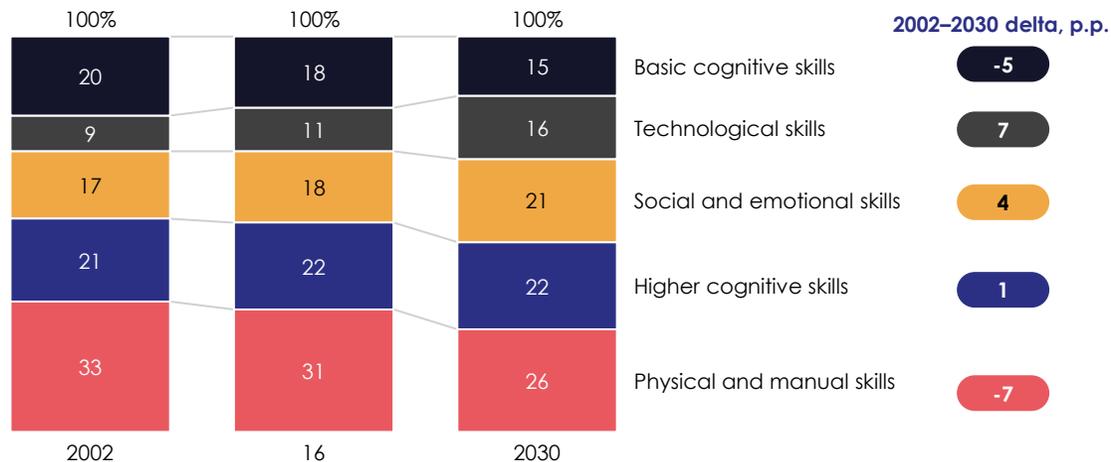
Provides wide range of programs across age groups, including daycare, pre-school, transitional programs, interactive programs, elementary programs, enrichment classes/programs

3-4. 21st century skills

Description

- Skills requirements **are shifting towards a new 21st century skillset** for learners across the world, with a move away from application of core subjects **towards more holistic** character qualities, creativity, social & emotional skills (next-generation (life) skills is one of the top 3 elements for parents when searching for a school!)
- The competitive space is widening**, with new and non-traditional players having a 'license to play' and credibility through propositions adjacent to / correlating with 21st century skills beyond purely core academic subjects
- Out-of-school and supplementary activities are increasingly integrating 21st century skills** implicitly and explicitly (online games, apps, physical activities, etc.)
- Online formats are gaining momentum** (apps and gamified learning increasingly embed creative and cognitive skills into their offerings, e.g., Minecraft, brain training apps, etc.)
- Regional nuances exists**, driven by stage of progression of the economy, while **regulatory rigidity and agility of national education systems** will drive differences in pace in adopting core / formal curriculum
- COVID-19 impact: acceleration of existing trends** – 21st century skills appear more important as COVID-19 has drawn attention to 'future proofing' individuals

Hours worked across skill categories (US example), % of time distribution



1. K-12 national survey What Parents Want, Fordham Institute, 2013

Source: Future of jobs report, World Economic Forum, U.S. Bureau of Labor statistics, expert interviews

What the experts are saying

There is an opportunity to teach some of these skills in the supplementary market

Former CMO, Global online learning and curriculum provider

Acquiring new skills and certification on demand will be part of the new normal

Former MD of Global Education, Major global tech leader

The skills you need for the 21st century are very different

Former CMO, Global online learning and curriculum provider

Case examples

GUILD



KIPP

SHANKAR FOUNDATION

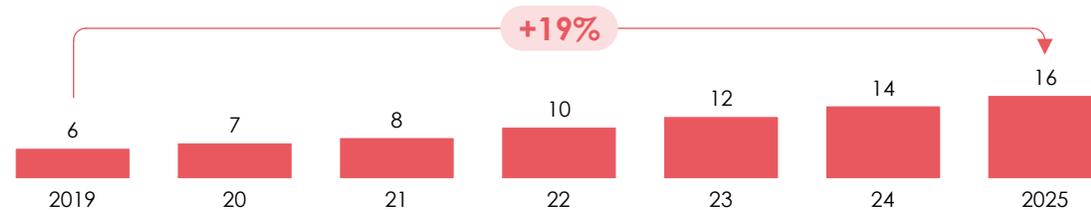


5. Online learning (courses and prog.; MOOC) is growing but is unlikely to replace offline education

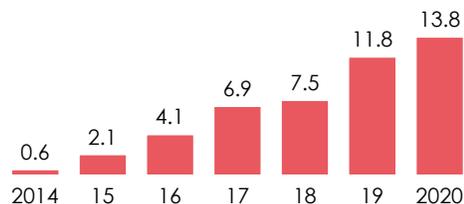
Description

- **MOOCs are seeing unprecedented growth driven by COVID-19** as learning and education have moved towards online and hybrid formats – future growth projection at ~19% CAGR (~110 million users of MOOCs globally in 2019, while major MOOC platforms have seen **25–30% uptake in number of users by mid-2020**)
- **Significant growth within higher education** and users seeking lifelong learning offerings; some emerging growth at K-12 levels (current course offering skewed towards higher education and adult learners)
- **Easy to implement in the workplace setting**, less disturbing to the company's day-to-day workflow than face-to-face training seminars and **enables companies to train employees in highly specialized roles** with skills that are not required by most other employees
- **Uplift in online delivery** gives rise to **cost effective business models** that let students from all geographies and backgrounds pursue learning
- **COVID-19 impact: structural uplift in the trend**, as institutions entered lockdown and remain partially open; online and hybrid formats have seen unprecedented momentum increasingly believed to be here to stay

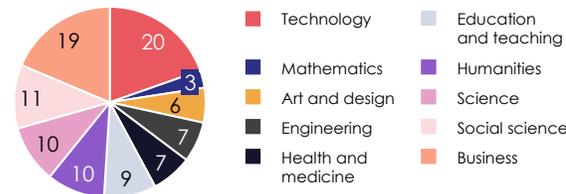
MOOCs market value (global), USD bn



MOOCs are growing rapidly ... Number of courses, '000



... And cover a wide variety of topics % breakdown



What the experts are saying

The market for acquiring new skills and certification online and on demand will be part of the new normal

Former MD of Global Education, Major global tech leader

Whole schools are becoming remote. And we have seen how remote learning brings a lot of flexibility to a historically very rigid system

Former VP, Major online learning provider

The reality is that I don't believe we will ever go back to how things were

Former MD of Global Education, Major global tech leader

Online learning options really provide you access to that long tail of skills and opens up doors for 'on-demand' learning

Former VP, Major online learning provider

Case examples

coursera

Major MOOC provider offering certificate programs and pay-for content on top of free open courses

Besides offering free learning materials, Coursera also offers courses at affordable rates with prices ranging from USD 39 to USD 89 per month depending on the course, giving people affordable world-beating learning experiences

Upon completion of the courses, Coursera provides people with certificates from some of the world's most renowned universities

Udemy

MOOC provider targeting both students and professional adults (moved beyond HE equivalent into adult / corporate training with Udemy for Business)

Total of ~35 mln students / users, 57,000 instructors and 130,000+ courses offered in 65+ languages

Serves 80% of Fortune 100 companies (has 7,000+ enterprise customers)

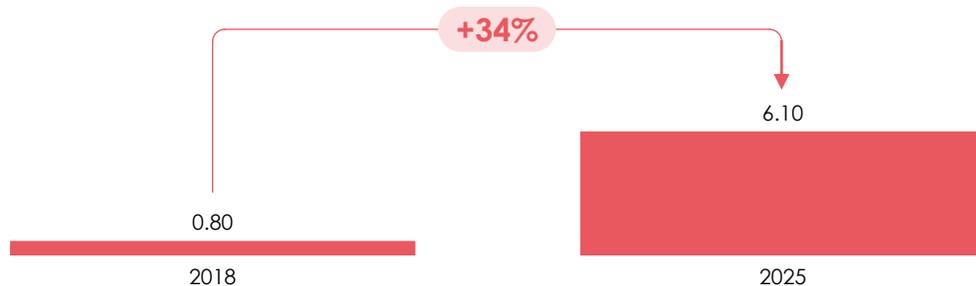
7. Personalized learning

Description



- **Personalized learning is emerging as a core theme** in the future of learning and teaching, tailoring both content, pace and instructional approach to help learners reach their full potential (**increasingly fueled by technology, including Artificial Intelligence**, VR/AR and collaboration platforms, and has increasing traction when combined with gamification)
- **Proliferation growing among K-12 and older** audiences (limited PK relevance)
- **There is an equity gap** as stronger socioeconomic background correlates with receiving personalized/adapted learning
- Fundamental shift towards **'meeting students where they are'**
- **Predominantly online channels** (apps, websites, platforms) based on AI and predictive analytics and adaptive learning algorithms (offline in-school personalized learning centers around basic planning and grouping of students to match capability and progression level)
- **Increasing industry-wide search for developing a strong personalized tutoring** solution for advanced 1:1 coaching on-demand
- personalized learning is **skewed towards more technical and linearly progressing subjects such as math** and literacy, while there are fewer strong offerings in softer subjects/skill areas
- Relative amount spent on personalized learning offerings is **higher in Asia as pricing often reflects Western rates** without PPP adjustment
- **COVID-19 impact: acceleration of trend**, as post-COVID-19 realities bring increased focus on learning gaps/loss, and the need to think beyond cohort-based learning (e.g., through uplift in tutoring services; limited viable fully digitized offering on the market)

Advanced education technology expenditure on AI (2018–2025), USD bn



What the experts are saying



This could disrupt how we think about formal school progression. Today, formal schooling is cohort-based. New technology raises the question of whether students of the same age should consume the same material

Former CMO, Global online learning and curriculum provider

Most personalized learning offerings relate to curriculum-aligned content with a skew towards subjects such as math

Former CMO, Global online learning and curriculum provider

Personalized learning is picking up globally, but in China and India, the relative value spent is higher as most offerings are based on Western pricing

Former Senior Product Manager, Major educational game provider

Personalized learning is the way education will evolve. It is the future of learning

Former MD of Global Education, Major global tech leader

Personalized learning has become the holy grail of EdTech. The next frontier is a human-like tutor

Former CMO, Global online learning and curriculum provider

Personalized learning is currently mostly focused on the voluntary and supplemental space rather than in formal learning

Former Senior Product Manager, Major educational game provider

There is acknowledgement that student growth is as important as student achievement. There is increasing focus on meeting the student where she is

Former VP, Major online learning provider

Case examples



duolingo

Personalization of language learning with embedded gamification features that have scaled rapidly in terms of language services offered and across formal and informal education provision

Tailors exercises to the learner's capability level and keeps track of mistakes made throughout the learning process – prompts included at end of lessons to revisit mistakes to ensure comprehension

Armenia's education system could embark on an improvement journey to progress from "Unsustainable Fair" to "Excellent" by 2041

 Armenia's Vision

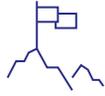
 2021

 2031

 2041

Improvement journey

Goal



Actions

Poor to fair

Achieving the basics of literacy and numeracy

Providing motivation and scaffolding for poorly skilled teachers

- Scripted teaching materials
- External coaches
- Instructional time on task
- School visits by center
- Incentives for high performance

Getting all schools to a minimum quality level

- Outcome targets
- Additional support for low-performing schools
- School infrastructure improvement
- Provision of textbooks

Getting students in seats

- Expand school enrolment
- Satisfy students' basic needs to improve attendance

Fair to good

Getting the foundations in place

Data and accountability foundation

- Transparency for schools and/or public on school performance
- School inspections and inspection institutions

Financial and organizational foundation

- Optimization of school and teacher numbers
- Decentralization of financial and administrative rights
- Increase in funding
- Funding allocation model
- Organizational redesign

Pedagogical foundation

- School model/streaming
- Language of instruction

Good to great

Shaping the professional

Improving the caliber of new teachers and principals

- Recruiting programs
- Pre-service training
- Certification requirements

Improving the caliber of existing teachers and principals

- In-service training programs
- Coaches
- Career tracks
- Teacher and community forums

School-based decision-making

- Self-evaluation
- Independent and specialized schools

Great to excellent

Improving through peers and innovation

Cultivating peer-led learning for teachers and principals

- Collaborative practice
- Decentralization of pedagogical rights to schools & teachers
- Rotation and secondment programs

Creating additional support mechanisms for professionals

- Release professionals from admin burden by providing additional administrative staff

System-sponsored experimentation/innovation across schools

- Provide additional funding for innovation
- Share innovation from front-line to all schools

Common across all journeys



Six interventions

1 Revising curriculum and standards

2 Reviewing the reward and remuneration structure

3 Building the technical skills of teachers and principals, often through group or cascaded training

4 Assessing student learning

5 Utilizing student data to guide delivery

6 Establishing policy documents and education laws

2041 vision for Armenia's education sector: aligning with national priorities and improving access and quality

x3

Annual education
direct GDP
contribution by 2041



5k → 15k

0 → 6

Foreign students in Armenia

Armenia's universities in top 1,000

Purpose of education

- **Identify and develop** Armenian talent to its full potential by providing a wide range of high-quality education opportunities to master skills for the 21st century
- Supply the economy with highly-skilled graduates to **ensure growth in the productivity and competitiveness** of Armenia

Priorities

- Ensure **equal access to high-quality education** in all regions of Armenia
- Make **education careers attractive** and prestigious
- Focus on **early childhood development**
- Develop competitive **STEM education and creative hubs**
- Attract more foreign students to study in Armenia

Flagship initiatives



Enhancement of lifelong learning programs to help Armenians learn modern skills and tools



Development of digital enablers and e-learning to ensure equal access and support sector growth



Matching education with future labor market needs (incl. focus on STEM) to supply the most competitive sector of the economy with skilled specialists



Amplification of early childhood education to guarantee the best start in education for all citizens



Teacher and school leader development to increase the quality of education and improve career attractiveness



Development of centers of excellence in K-12 to develop talented students and stimulate knowledge sharing among teachers



Development of successful TVET to eliminate mismatches in the labor market and supply focused sectors with a skilled workforce

Vision 2041: Improving quality and enrolment in education to ensure a well-trained workforce and availability of talent

Stage	2021 – Unsustainable Fair 	2031 – Fair to Good 	2041 – Good to Great 
1 Pre-Primary (ECEC) 	<p>Underleveraged stage with low enrolment rates due to unequal access in different regions</p>	<p>ECEC becomes a compulsory stage (enrolment rate is 75%+) that provides the most important skills and ensures childcare with equal access across all areas</p>	<p>ECEC serves to identify a child's talents and provides inputs for the creation of a personalized learning program</p>
2 Primary (K-12) 	<p>Falling enrolment and quality of teachers with poor performance in TIMSS, outdated curricula and lack of achievement measurement</p>	<p>K-12 is an attractive career for skilled professionals, ensuring a high level of quality and relevance of school education confirmed by international testing (TIMSS 500+, above average in other tests)</p>	<p>Advanced capabilities of teachers and principals allows for broader autonomy for schools to prepare world-class graduates with a focus on STEM (among the leaders in international tests)</p>
3 Technical and vocational education and training (TVET) 	<p>The TVET education system in Armenia is underdeveloped and largely fails to equip Armenians with the required skills</p>	<p>Quality TVET allows employers to hire graduates with modern skillsets to more roles in manufacturing, agriculture and services instead of higher education graduates (20%+ enrolment for TVET)</p>	<p>TVET is a source of skilled STEM graduates employed in focused sectors capable of boosting productivity (15%+ attainment of TVET for 30–34 year old)</p>
4 Higher Education 	<p>Education of average quality that fails to provide practical skills and has insufficient focus on STEM. Low accessibility and enrolment</p>	<p>High-quality education (3+ universities in top 1,000) with a focus on practical skills and STEM, accessible to more people in Armenia and attractive for foreign students</p>	<p>World-class STEM education that supplies the economy with well-trained talents and contributes to GDP growth as an education destination (x3 GDP contribution vs 2019)</p>
5 lifelong learning 	<p>Underleveraged stage of education with low awareness of its importance and lack of reskilling programs</p>	<p>High level of awareness of the importance of reskilling, various opportunities supported by government and companies to acquire modern skills</p>	<p>Lifelong learning is an essential element of productivity growth available to all Armenians</p>

Vision 2041: Main KPI targets

Stage	KPI	2021	2031	2041
1 Pre-Primary (ECEC)	GDP contribution, USD mln	320	500	1,100
	ECEC enrolment rate, %	35%	75%	85%
	Qualified teachers in ECEC, %	82%	95%	99%
2 Primary (K-12)	TIMSS rating, 4 th grade average	482	510	590
	PISA	Not measured	500	540
	Qualified teachers in K-12, %	74%	95%	99%
3 TVET	TVET Enrolment rate, %	6%	20%	30%
4 Higher Education	Higher Ed. enrolment rate, %	50%	60%	65%
	Number of foreign students, thou	4.9	8.0	15.0
	Number of universities in top 1,000	0	3	6
	Share of STEM graduates, %	12%	25%	35%
5 lifelong learning	Number of registered users by top MOOC providers, mln	Not measured	1.0	2.0

Table of contents – detailed vision by sector and by enabler

— Education

01 Where are we now?

Historical performance, previous recommendations and outcomes
Snapshot of current situation
Comparison against key peers

02 Where do we want to succeed?

Global industrial trends: what will the future look like?
Vision 2041

03 How to enable growth

Key enabler deep-dives
Best practice studies
Key initiatives and prioritization

Several flagship projects have been created with diaspora support, mostly focused on K-12 and Higher Education

Project

Basic concept



Impact

Primary
(K-12)



UWC
Dilijan



Teach for Armenia



AYB
School



TUMO



Higher
Education



AUA



UWC Dilijan College is the 14th member of the United World Colleges movement and the first international boarding school in Armenia

TFA aims to expand educational opportunities by recruiting, training, and supporting high-achieving graduates and professionals to teach for a minimum of two years in the most underserved schools across Armenia

Includes school, science and technology center, campus, green areas, etc.,
Comprises elementary school, middle school and high school

The TUMO learning program consists of self-learning activities, workshops and project labs around 14 learning targets for teens

AUA and the University of California signed an affiliation agreement under which UC provides valuable technical support and educational experience to help AUA grow

502 alumni and **229 students** from **over 80 countries** in 2019–'20
International faculty of **37 teachers from 16 countries**
280 permanent jobs in Dilijan
More than 330 donors from across the world support the initiative

121 teacher-leaders working in more than 100 rural communities
80+ ambassadors for education quality

472 students in 2019–'20
Scholarships for **79%** of Ayb High School students

Over 19,000 teens participating
Centers in Yerevan, Dilijan, Gyumri and 3 more cities
Outside of Armenia, there are centers in Paris, Beirut, Moscow, Tirana and Berlin
Hyper-personalized educational software

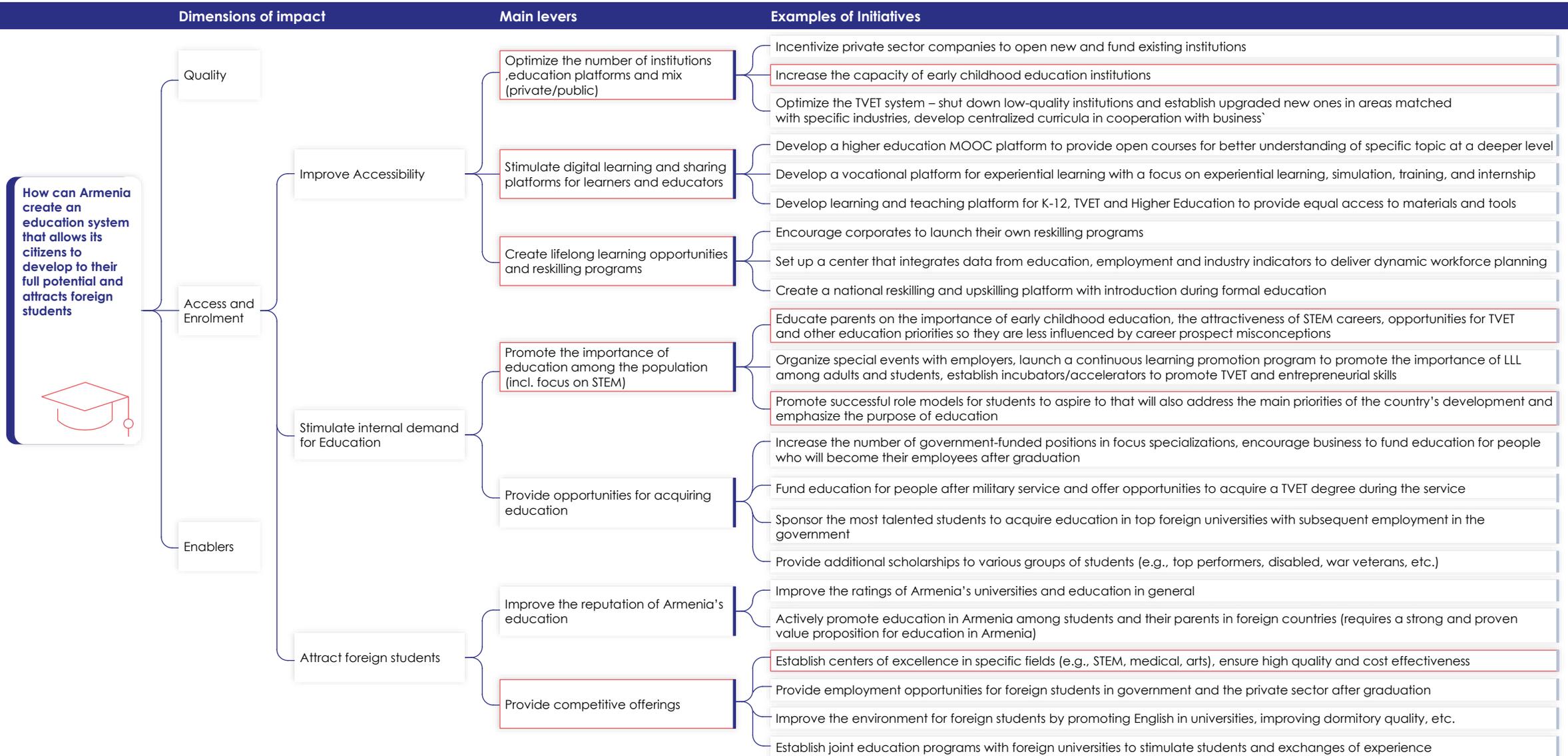
>2,000 students (1,474 undergraduates, 495 graduates)
International and Aurora Scholarships
14 programs (Business, English & Communications, Politics & Governance, Computer, Engineering, Data Science)

Full-scale transformation of the education system is possible through a set of levers applicable across multiple stages of education

Dimensions of impact		Main levers	Applicability by stage of education					
			1 Pre-Primary	2 Primary	3 TVET	4 Higher	5 Lifelong	
How can Armenia create an education system that allows its citizens to develop to their full potential and attracts foreign students	Increase access	Improve accessibility	Optimize the number of institutions, education platforms and mix (private/public)	✓	✓	✓	✓	✓
			Stimulate digital learning and sharing platforms for learners and educators		✓	✓	✓	✓
			Create lifelong learning opportunities and reskilling programs			✓	✓	✓
		Stimulate internal demand for education	Promote the importance of education among the population (incl. focus on STEM)	✓	✓	✓	✓	✓
			Provide opportunities for acquiring education			✓	✓	
		Attract foreign students	Improve the rankings of Armenia's education		✓	✓	✓	
	Provide competitive offerings					✓	✓	
	Improve quality	Enable transparent achievement measurement across all stages	Improve the quality, credibility and frequency of joint national exams		✓			
			Prove the quality of Armenia's education		✓	✓	✓	
			Enhance data-driven performance management		✓	✓	✓	
Improve the quality of education		Update curricula to match the needs of employers and economic development	✓	✓	✓	✓	✓	
		Improve the quality of teachers through training and re-skilling	✓	✓	✓	✓		
		Revising education funding based on outcomes (e.g., employment of the graduates)	✓	✓	✓	✓	✓	
Enablers	Financial Sustainability	Focus on improving salaries in education	✓	✓	✓	✓		
		Reduce the number of levels of regulation, with autonomy for education institutions	✓	✓	✓	✓		
	Governance	Ensure collaboration between stakeholders to stimulate knowledge sharing		✓	✓	✓		
		Create a cross-cutting national education development plan	✓	✓	✓	✓	✓	

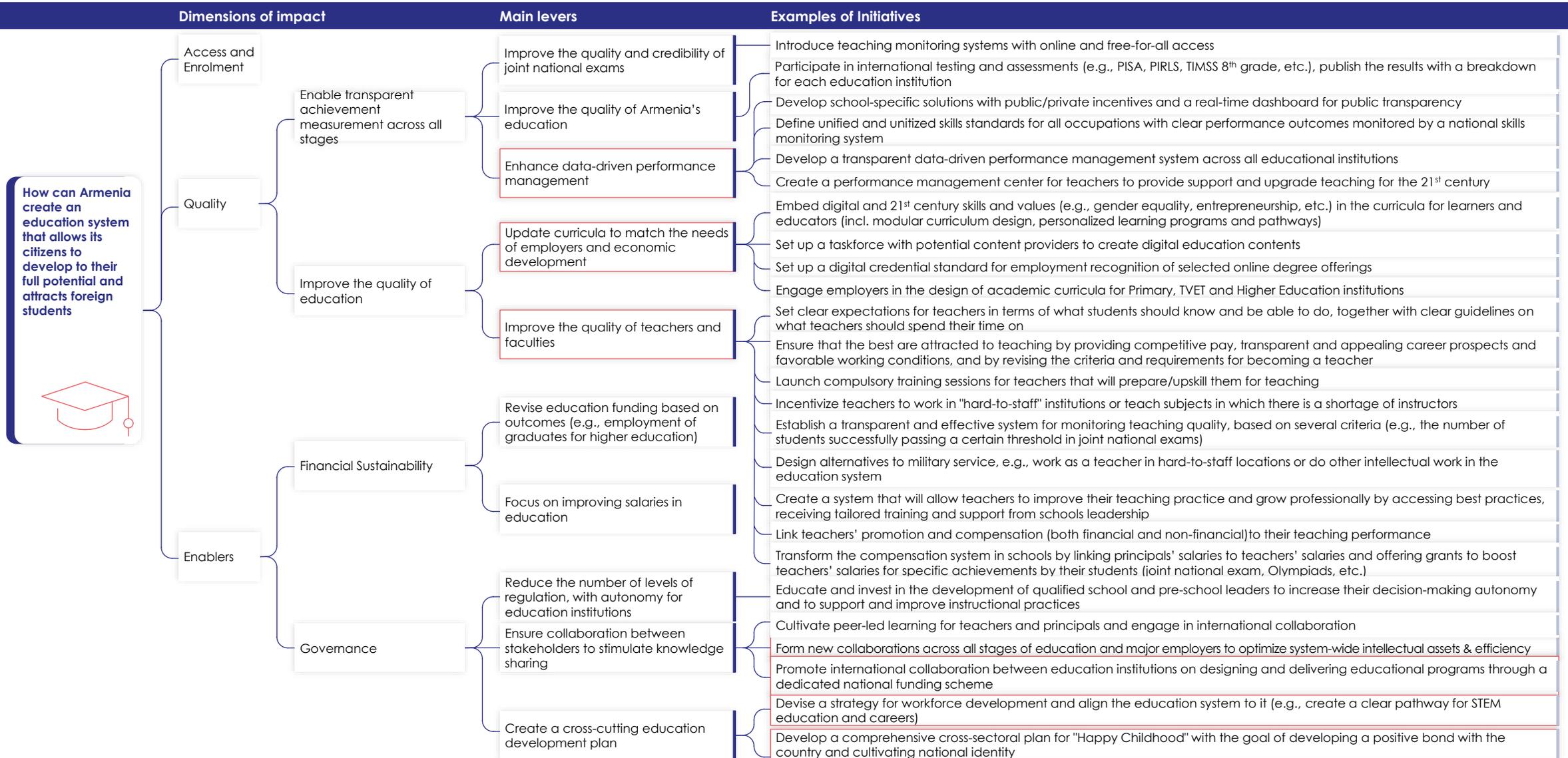
Each lever can be pulled through various initiatives (1/2)

Initiatives with high potential impact



Each lever can be pulled through various initiatives (2/2)

 The most impactful initiatives



Seven strategic moves in education for Armenia to consider



Early childhood



K-12



TVET



Higher education



Lifelong learning

Countries with Best Practices

Prioritized initiatives



Amplification of early childhood education



Continuous development of school leadership and teachers



Development of centers of excellence in K-12



Matching education with future labor market needs (incl. focus on STEM)



Enhancement of lifelong learning programs



Sector-specific enablers



Development of digital enablers and e-learning



Increasing the attractiveness of education careers using both financial and non-financial levers

Based on Armenia's challenges and global trends, there are 6 strategic moves in education to be considered



Early childhood



K-12



TVET



Higher education



Lifelong learning

Initiative	Description	Countries with Best Practices
Cross-cutting Initiatives	A Development of digital enablers and e-learning  <ul style="list-style-type: none"> Improve access to high-quality education in remote and rural areas Develop education programs combining online digital media with traditional classroom teaching Leverage digital technologies to improve the quality of education, transparency and effectiveness of governance 	
	B Matching education with future labor market needs (incl. focus on STEM)  <ul style="list-style-type: none"> Align the curriculum with the latest international standards and engage employers to add more practical elements Update the curriculum with a focus on 21st century skills: e.g., resilience to change, critical thinking, creativity, learning agility, starting from K-12 (e.g., early focus on STEM) Increase collaboration between education stakeholders in and across the stages (institutions, employers, parents, etc.) 	
Stage-specific Initiatives	C Amplification of early childhood education  <ul style="list-style-type: none"> Define a clear quality framework with detailed definitions of standards Create a dedicated center of excellence for ECEC development Encourage pre-primary access in remote areas and incentivize private sector companies to open new centers 	
	D Teacher and school leaders development  <ul style="list-style-type: none"> Create a dedicated entity to ensure the development of teachers and school leaders with a focus on knowledge sharing Improve perceptions of teaching as a career, attract high-caliber teachers and upskill current teachers through training programs and short courses Offer a clear and attractive career path for teachers 	
	E Development of centers of excellence in K-12  <ul style="list-style-type: none"> Create dedicated K-12 education clusters with a focus on different subjects (e.g., science, art, sport, etc.) for the development of talented students and knowledge sharing and upskilling for teachers Attract international faculties and leverage collaboration with top Armenian and foreign universities Encourage local and foreign employers to participate in curricula development and career counselling 	
	F Development of successful TVET  <ul style="list-style-type: none"> Optimize existing TVET institutions with a focus on practically oriented and modern skills Strengthen MoE's focus on TVET quality improvement Leverage strategic partnership with employers to design and run educational programs in TVET 	
	G Enhancement of lifelong learning programs  <ul style="list-style-type: none"> Develop a comprehensive national system for reskilling and upskilling through all stages of the citizen's life Attract international providers of educational services and nano-degrees to operate in the country Incentivize and encourage corporations to launch their own reskilling programs 	

A: Development of digital enablers and e-learning – an example of initiative description with a high-level action plan

Initiative Description

Development of an e-learning platform to ensure equal access to high-quality education in remote and rural areas

Enabling growth of the education sector in Armenia by focusing on digital tools for improving learning outcome, efficiency and transparency of governance, and by preparing Armenians for the demands of the modern labor market

Main challenges the initiative is addressing

- Poor accessibility of education in remote and rural areas
- Outdated curricula and mismatch with labor market needs
- Limited cooperation between the main education stakeholders
- Low awareness and penetration of lifelong learning

Tailwind of global trends

- Increased importance of technological skills for work in the future
- Rise of online learning and digital forms of education, including new hybrid models
- Increasing professionalization of teachers with new capabilities, tools and techniques
- Rise of continuous learning and re-skilling for adults

Related Initiatives

B Matching education with labor market needs

D Teacher and school leaders development

F Enhancement of lifelong learning programs

Expected Results

- Equitable access to education for students and teachers in rural areas to address teaching quality inconsistencies while improving efficiencies via digital material at scale
- Improved cooperation of all education stakeholders to boost the transparency and efficiency of governance and ensure a better match between education system outcomes and labor market demands

Possible Actions

- 1 Develop a transparent data-driven performance management system across all educational institutions
- 2 Build a performance management center for teachers to provide support and upgrade teaching for the 21st century
- 3 Develop a learning access platform for all stakeholders across education levels
- 4 Embed digital and 21st century skills and values in the curriculum for learners and educators
- 5 Set up a taskforce with potential content providers to create digital education contents
- 6 Establish a digital credential standard for employment recognition of selected on-line degree offerings
- 7 Create a reskilling and upskilling system for dynamic workforce management
- 8 Encourage corporates to launch their owned reskilling program
- 9 Launch a digital agent program to drive device adoption linked to improving learning outcomes via digital platforms
- 10 Develop school-specific solutions with public/private incentives and a real-time dashboard for public transparency