REIMAGINING EDUCATIONAL LEARNING IN INDIA

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TEAM

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ABBREVIATIONS

GenU	Generation Unlimited
NCF	National Curriculum Framework
NEP	National Education Policy
SIPA	School of International and Public Affairs
UNICEF	United Nations Children's Fund

EXECUTIVE SUMMARY

India is at a significant crossroads in its education sector, the second largest in the world, with approximately 1.5 million schools, almost 9 million teachers, and more than a quarter billion students. Despite gains in enrollment rates, with India reaching near universal enrollment in primary and secondary school, the country still faces several challenges. A major overhaul of the education system is required to bridge the gap between the education students receive and the skills and knowledge necessary for a sustainable, productive, and fulfilled livelihood in today's world and the skills required by employers.

The 2020 National Education Policy (NEP), approved by the Union Cabinet of India in July 2020, is progressive and ambitious in its aims; it expands universal education, advocates for a multi-disciplinary approach to secondary and higher education, and reimagines vocational education. The 2020 NEP presents an enormous opportunity for India to tap into the potential of its young people. India, with one of the world's largest youth populations, has a tremendous opportunity for economic growth and development. However, without improving the country's education system to ensure its students receive a comprehensive, skills-based education that equips them with the 21st century skills needed to be productive participants in the labor force, the country will be unable to benefit from this vast potential.

In 2018, UNICEF launched Generation Unlimited (GenU), an initiative to address urgent needs for expanded education and skill development for young people worldwide. YuWaah is the localized chapter of GenU in India. YuWaah aims to work with youth to determine solutions that ensure young people in India have opportunities and choices for learning; access to vocational training; and have agency in their choice of employment.

Primary to YuWaah's aims is to help connect 200 million young people to aspirational socio-economic opportunities, and to engage them as active changemakers. Part of this is to help them acquire the relevant skills for a productive life, with an emphasis on 21st-century skills (or "life skills"), which are intended to respond to the demands of employers and to the shift towards a knowledge-based economy. A team of students from Columbia's School of International and Public Affairs collaborated with UNICEF India to develop a set of recommendations for the YuWaah project.

This workshop project relied on a qualitative methodological approach that incorporated substantial desk research and stakeholder interviews with partners ranging from non-profit organizations, to consulting firms, foundations, and government ministries. Considering Yuwaah's focus on facilitating 200 million youth to gain relevant skills for the 21st century, the team's primary research question for the project was: *"How can 21st-century skills be integrated into India's schooling system, under the NEP framework for the age groups 14 to 18?"* We synthesized the insights of desk research on the Indian education system and on comparable international models as well as our interviews with stakeholders to develop a key set of recommendations and considerations for UNICEF and the Indian government for the successful implementation of 21st-century skills in the Indian education system.

Ultimately, this report is about students and their families, and their mutual relationships with Indian civil society, its government, and its productive industrial and service sectors. While 21st-century skills have gained global recognition in the face of shifts in employment and technological evolution, the core importance of 21st-century skills is to supply each student with the capacity, resourcefulness, agency, and resilience to seek and enjoy a chosen livelihood. The intended result of this project is to develop recommendations that could help UNICEF India formulate a framework that will allow students, families, and society to thrive.

Our recommendations aim to improve and diversify livelihoods, generate employment opportunities and develop human capital in India through 21st-century skills under the NEP. These goals can be achieved through collaborations with public-private partners and increasing awareness of 21st-century skills. This can be done through activities such as a national campaign, grassroots planning by states, collaboration with communities and schools and other grassroots organizations, training teachers, and building digital networks.

RECOMMENDATIONS SUMMARY

1. **Increase alignment and awareness**
   - 1.1. Increase alignment among stakeholders around 21st-century skills through bringing about a mindset shift through heightened awareness of definitions, the importance of 21st-century skills, challenges in implementation, and the need for appropriate evaluations.
   - 1.2. Bring awareness to parents, youth, students, and the general public through a national campaign.

2. **Develop an adaptive and comprehensive curriculum**
   - 2.1. Embed 21st-century skills in the curriculum through experiential learning
   - 2.2. Prioritise inter-personal and intra-personal skills.
   - 2.3. Adopt group learning and team building skills in a classroom setting to develop critical thinking skills and social and emotional skills.

3. **Create non-conventional assessments**
   - 3.1. Develop a portfolio-based approach to measure skills and competencies.
   - 3.2. Use formative assessments rather than summative assessments.

4. **Emphasize innovation and partnerships**
   - 4.1. Establish more inclusive and low-cost local tinkering labs with emphasis on gender and regional language.
   - 4.2. Incentivize vocational and higher education institutions to partner with schools.
   - 4.3. Establish information systems to guide and mentor students on different pathways post-schooling.

5. **Transform the role of teachers to facilitators and mentors**
   - 5.1. Train teachers in 21st-century skills and then give them more autonomy in curriculum development

6. **Create digital and alternative models**
   - 6.1. Use social media as alternative education resources and as an inclusive tool for marginalized students (including girls) and families.
   - 6.2. Reach students with no internet access (in rural and remote areas) through SMS text-messaging and phone calls.

7. **Prepare students in early childhood education**
   - 7.1. Prepare students early for the development of 21st-century skills as outcomes in secondary school depend directly on the foundation set in early years.

INTRODUCTION

About YuWaah

In 2018, UNICEF launched the Generation Unlimited (GenU) initiative to address the urgent need for expanded education, skill development, and employment opportunities for young people worldwide. The localised chapter of GenU in India is called YuWaah (Yuva is Hindi for "young person"). At the heart of YuWaah's project is the mission to serve adolescent girls and boys and to impart foundational knowledge. There is a particular focus on what YuWaah has termed *21st-century skills*, which will enable young people to develop sustainable livelihoods in the context of the 4th Industrial Revolution (Generation Unlimited India n.d.). The aim of YuWaah is to modernise education in India and to prepare young people for the knowledge-based economies that demand a higher level of knowledge and skills. India is one of the first countries to start a national education initiative linked to GenU. By focusing on engagement, learning, skill development, and employment, YuWaah aims to support a generation of empowered, young change-makers in India. Envisaged as a strategic, long-term initiative, it is intended to serve as the much-needed bridge between solution providers, the private sector, the Government of India, academia, and civil society organizations to fund and scale-up innovative and effective solutions (Generation Unlimited India n.d.). In December 2020, UNICEF India invited a team of graduate students from Columbia University's School of International and Public Affairs (SIPA) to collaborate on the YuWaah project through a capstone workshop.

Objectives

The workshop project focuses on the YuWaah initiative's goal to *"facilitate 200 million youth to gain relevant skills for productive lives and the future of work,"* included in their mission statement, with a specific focus on 21st-century skills.

The workshop project had a research component and a recommendations component. The SIPA team undertook an in-depth investigation through secondary research and through primary data gathered from stakeholder interviews. The objectives were to:

1. Develop strategic recommendations for the integration of 21st-century skills into existing educational programs rolled out by the government, and
2. Develop case studies on comparative models in countries that have successfully developed and executed 21st-century skill-based education programs

The above recommendations are intended to focus on the states of Maharashtra and Karnataka. The two states have been shortlisted by the UNICEF team based on their existing relationship with the local government agencies, and the state governments' apparent openness to be a part of the YuWaah initiative.

Additionally, the SIPA team worked in tandem with a task force previously established by UNICEF India to develop a strategic roadmap to attain the above two objectives. The task force comprises members from government, civil society, private sector, and youth members and

supported the SIPA team in various aspects, including establishing required connections for interviews with different stakeholders.

This report begins with a review of the background, including an introduction to how 21-st century skills are defined and the Government of India's most recent initiatives around education. This is followed by a description of the workshop project's methodology. Then, a discussion of the key themes and trends that emerged from the project's secondary research (completed through a literature review) and primary data research (completed through a series of interviews with stakeholders) will follow. The report ends with a list of recommendations and considerations supported by our analysis of the literature and interviews.

BACKGROUND

Introduction to 21st-Century Skills

Traditionally, and throughout much of the twentieth-century, reading, writing, and arithmetic were considered to comprise an adequate curriculum in India with an emphasis on traditional rote learning of concepts such as math and science. Skills like critical thinking, logical analysis, and conceptual understanding have, in general, not been a focus of the public schools in the Indian education system. India's 1991 economic crisis and subsequent economic reform and liberalization first introduced the need to focus on human capital development through educational reform. This prompted a recognition of the need for a wide-scale shift in how children are taught and learn in India. Rapid changes in technology and employment have made such an educational shift even more pertinent. The fourth industrial revolution necessitates a more comprehensive approach to education and a recognition of cross-sectoral linkages, such as the tie between health and education, which is especially apparent in the post-Covid-19 environment.

This more comprehensive approach highlights the need to imbue students with life skills outside of traditional academic subjects, such as critical thinking, problem solving, and effective communication in an increasingly technology-driven society. It is largely recognized that formal education is not adequate to prepare students to face the rapidly evolving world. To address these new challenges, the global education community has advocated for broad changes to curriculum. Mobilization of support for such change has resulted in a wide array of research and initiatives around the broadly defined concept of 21st-century skills (Vivekanandan, 2019). This effort has culminated most notably with the United Nations' adoption of Sustainable Development Goal 4 (SDG 4). SDG 4 aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (UN Department of Economic and Social Affairs 2020). While SDG 4 explicitly addresses education, it should be noted that the seventeen Sustainable Development Goals are interrelated, and attainment of each of the SDGs will need to be cross-sectoral and cross-sectional with reference to other SDGs.

Definitions of 21st-Century Skills

A wide range of organizations including NGOs and universities have undertaken research projects to establish a conclusive, universal definition of 21st-century skills. However, there has been a lack of consensus on the definition. Joke Voogt and Natalie Pareja Roblin, faculty and educational researchers at the University of Amsterdam, define 21st-century skills as the "new competencies" society increasingly demands of the existing workforce, and of the youth who will be trained today for future careers. They state that the term 21st-century skills, or "21st-century competencies," are "an overarching concept for the knowledge, skills and dispositions that citizens need to be able to contribute to the knowledge society." Voogt and Roblin (2010, 2012) provide a summary that succinctly gathers the names and types of 21st-century skills identified by a range of frameworks (Appendix A), and in doing so, they highlight the ambiguity in the terminologies used to describe these skills. They note that existing 21st-century skill frameworks frequently refer to different skill sets and types, making comparison difficult. The researchers conclude that the ambiguity in terminology and definitions hinders the ways in which such skills are taught (*Snapshot*, n.d.).

21st-century skills are nearly impossible to summarize in a single definition. Various research reports cite focus on different components to better explain 21st-century skills. An OECD Education Working Paper, authored by education scholars Magdelena Claro and Katerina Ananiadou, focuses on building the communication aspect of skills, and they focus on the use of different media to communicate various ideas (Claro et al., 2012; Siddiq et al., 2016). Finally, in a report, Jay P. Greene, an education reform scholar at the University of Arkansas, highlights critical thinking and logic as essential components of 21st-century skills (Greene et al., 2014, Lee et al., 2016).

It is important to also note that organizations outside of the education sector have also created frameworks and asserted the importance of 21st-century skills education. In 1999, the World Health Organization first developed a framework of ten core life skills (Appendix B) (Central Board of Secondary Education, 2020; Department of Mental Health, World Health Organization, 1999). This demonstrates the importance of the interconnected nature of education and the health sector; it also suggests that the description and attainment of 21st-century skills will necessarily be intersectoral and will require coordination across health, employment, and information technology sectors.

21st-Century Skills and the National Education Policy

Approved by the Union Cabinet of India in July 2020, the National Education Policy (NEP) 2020, is a landmark education policy initiative and comes more than three decades after the previous education policy, which was announced in 1986 and revised in 1992. The adoption of NEP 2020 marks a significant achievement in India's approach to education "as a public service" (NEP, 2020, p. 6) and is the culmination of a tremendous effort: "it took six years of work and consultations with thousands of educators, policymakers, and members of civil society. It was truly a democratic effort and is highly aspirational, aiming for India to have an education system

by 2040, that is second to none, with equitable access to the highest quality education for all learners, regardless of social and economic background" (Sahni, 2020).

As part of this initiative, the Central Government of India has advocated for the adoption of a 21st-century competency-based education model. This approach is expected to contribute to economic progress and to harness the country's high demographic dividend. The NEP policy aims to bridge inequality in education and learning gaps. Policymakers expect the shift from a grades-oriented education model to a learning-oriented model will reduce learning gaps (*We Have To Equip Students With 21st-Century Skills, NEP Will Ensure Holistic Development*, n.d.)

The changes envisaged in the NEP primarily rest on a new curriculum design, part of the National Curriculum Framework. The NEP intends to "ensure the holistic development of learners" and provide students with 21st-century skills, defined broadly as: "Critical Thinking, Creativity, Collaboration, Curiosity, Communication." Reports have highlighted that the "NEP will bring in a reduction in curriculum content to enhance essential learning and critical thinking. Stress will also be given to removing language barriers in order to achieve better results in learning" (*We Have To Equip Students With 21st-Century Skills, NEP Will Ensure Holistic Development*, n.d.).

The NEP proposes a move away from content-heavy curricula in order "to make space for critical thinking, more holistic, inquiry-based, discovery-based, discussion-based and analysis-based learning." Giving equal importance to co-curricular activities (e.g., arts, sports, vocational skills), it mandates a shift towards multidisciplinary education, away from rigid silos of "arts," "science," and "commerce," with focus instead on life skills that cross subject areas (Sahni, 2020).

METHODOLOGY

Context

Considering Yuwaah's focus on facilitating 200 million youth to gain relevant skills for productive lives in the 21st century, our primary research question for the project was:

"How can 21st century skills be integrated into India's schooling system, under the NEP framework for the age groups 14 to 18?"

To answer this question, we took a qualitative approach to review a wide body of both secondary and primary data in arriving at our recommendations. Given the lack of available literature for these skills in the Indian context, we planned to bring expertise from across the world through preliminary desk research and use the stakeholder interviews and other data available to us to obtain local context and fine tune our recommendations. A qualitative research approach offered a strong framework for streamlining our desk research, synthesizing our results and evolving key themes to direct further action.

We conducted our research in two phases before arriving at our recommendations in Phase III, where results from Phase I guided our research in Phase II.

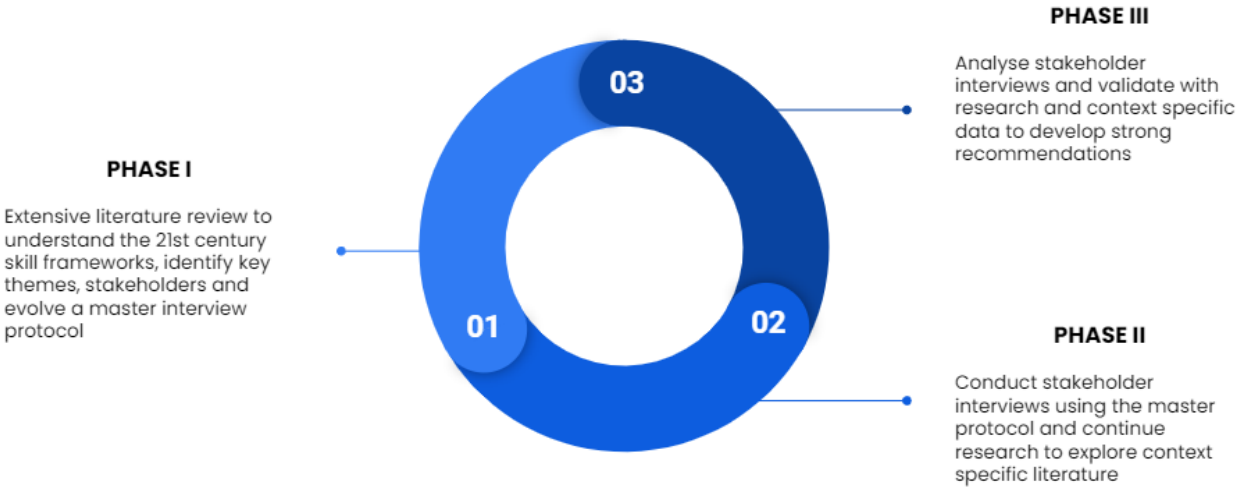

Figure 1: Three Phases of our Project

Research Design

Phase I: In this initial phase we used desk research to:

1. Understand the 21st-century skills framework
2. Learn about key influencing factors
3. Identify best practices at the national and international level
4. Identify barriers and opportunities to implementation
5. Identify key themes and relevant stakeholders

We used the following to synthesize our findings and direct our next phase:

1. **Grouping and Clustering:** We created "buckets," or categories, to organize our findings from the literature review and further evolve key emergent themes
2. **Textual description:** We developed a one-paragraph synthesis of each report in our literature review to understand their relevance to our objectives

At the end of our Phase I we were able to identify key themes and questions to stakeholders on curriculum, pedagogy and teacher training; key 21st-century skill clusters such as interpersonal skills, socioemotional and employability skills; and elements of context specific data, such as on a gender gap and a digital divide, that are crucial to develop relevant recommendations. This helped us develop a strong master interview protocol that provided a foundation to interact with diverse stakeholders. The master protocol is made available in the Appendix C section of the document.

Phase II: We used the results from Phase I to guide our next phase of qualitative research. In Phase II, our team interviewed eleven stakeholders from February 26, 2021 to March 31, 2021. Stakeholders included non-governmental organizations, private sector organizations, and government officials (Appendix: C). We also conducted further desk research. In Phase II, we were able to:

a. Conduct stakeholder interviews using the master protocol to generate meaningful insights on the following themes:
    i. Their vision for the 21st century skills and their priorities
    ii. Their role and experience in promoting 21st century skills or working with the education system
    iii. Their understanding of barriers/limitations with respect to curriculum, infrastructure, assessments and teacher capacity
    iv. Key partnerships or opportunities that must be leveraged for implementation
    v. Impact of Covid-19 on their current work as well as mitigation and adaptation strategies
    vi. Addressing inclusion and digital divide
    vii. Suggestions on existing projects or best practices that could be scaled or studied further
b. Conduct further desk research to identify and explore context specific literature on:
    i. Impact of Covid-19 and the emergence of new employment sectors
    ii. Links between higher education institutions and industry
    iii. Skill gaps and progress of 21st-century skill clusters at the state level

Using secondary data, we were also able to collect national level information and state level information for the states of Karnataka and Maharashtra on the following factors:

1. Generic geographic and demographic data such as population, growth rate, per-capita income, percentage of young population
2. School-related statistics such as Enrolment, dropouts, infrastructure (labs/technology), gender, types of schools, learning gaps, Student teacher ratio, School Management Committees, education budget, per child cost
3. Employability: past, current, projected, unemployment rates, skill gaps
4. Civic and social participation of youth
5. Internet access and the digital divide
6. Covid-19 impact on incomes, drop out rates, employment, mental health, and gender
7. Higher education institutions

Phase III: We performed qualitative content analysis and thematic analysis to synthesize our findings from Phase II by using tools such as NVivo and a Note Capture document (Hong, 2017). We validated our findings from qualitative research using secondary contextual data and our desk research from both Phase I and Phase II. We used data from both phases in the following manner:

1. Identify key suggestions using Note Capture & NVivo from the stakeholder interviews:

   We used NVivo to code all interviews based on the emerging themes from the interviews. We clustered themes as major and minor based on word similarity as shown in the cluster diagram below. Further, we used two types of charts to explain our analysis and findings :

   a) Hierarchy charts to see emerging themes and sub-themes
   b) Word cloud charts to see top features in a theme or a sub-theme.

   Each word cloud displays 50 most frequent words in a theme or a sub-theme and has words which have a minimum length of five. Screenshots of the NVivo project can be seen in Appendix E.

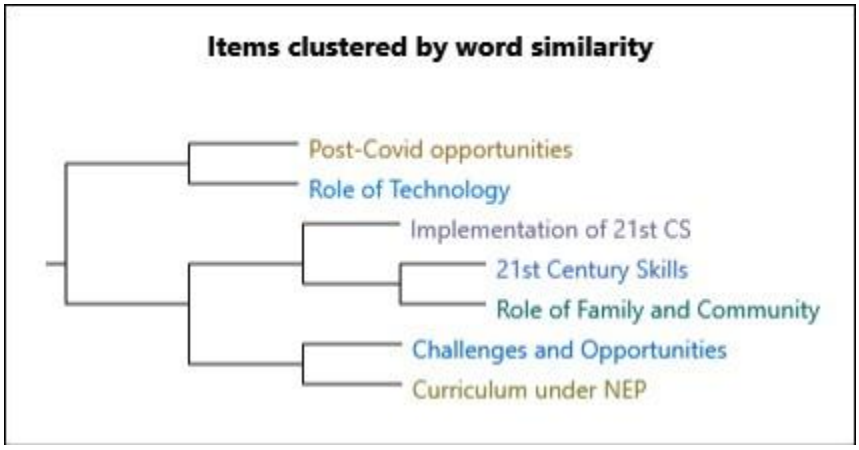

Figure 2: Grouping and Clustering used to Synthesize Findings and Qualitative Analysis

2. Identify supporting literature and validate feasibility using local contextual data:

   Further analysis of the literature relating to the identified key themes and subthemes such as curriculum under NEP, 21st-century skills, role of technology, post-Covid-19 opportunities, curriculum and teacher training, family and community, adopting a gender lens was done to locate prior evidence for successful implementation. Support for implementation in the local context was also thoroughly researched through secondary data such as DISE data and ASER reports.

3. Recommend actions under the themes and sub-themes with strong supporting evidence:

   Factors such as institutional capacity, support from existing government schemes/policies, infrastructure, industry presence, per capita expenditure on students were considered along with findings from the stakeholder interviews and literature review to develop meaningful and actionable recommendations.

LIMITATIONS TO THE PROJECT

There were a few limitations to our project, particularly in terms of methodology. Due to Covid-19 travel restrictions, we were unable to meet stakeholders for interviews in person and had to rely on remote interviews. We conducted a limited number of stakeholder interviews (11 interviews in total) due to time zone constraints and fiscal year end cycles interfering with the availability of stakeholders.

In Phase II of our research, we gathered secondary information on Karnataka and Maharashtra. However, there was a limited amount of publicly available information about education initiatives and 21st-century skills at the state level; further, stakeholders had expertise and experience at the national level. As such, our Phase III analysis focused on the national level and project recommendations are therefore country-specific; implementation at state level will require further contextual deep dives.

Covid-19 also altered data collected significantly and will shift the education and employment landscape. Some of these shifts have been predicted by stakeholders and are referenced in the literature while other shifts are unforeseeable. We have addressed these concerns as much as possible in our findings.

QUALITATIVE FINDINGS AND DISCUSSION

Cross-Country Comparison from the Literature Review

We looked at India's neighboring countries to develop comparable case studies and to better understand how other countries are approaching 21st-century skills implementation. Singapore is widely recognized for its exemplary education model. As such, the Singapore model suggests some best practices. China's recent progress around moving away from rote memorization is particularly relevant to the Indian context, and the country's adaptation of life skills serves as a good working model for India. Lastly, Australia's work to identify relevant skills and build resources for teacher training provides additional relevant insights.

Similar to India, where school enrollment is high but learning levels are lower than the grade-level expectations (ASER reports), Botswana faces similar challenges As such we looked at Botswana because of the country's recent progress around digital learning. This is particularly relevant given the NEP 2020's focus on e-learning and the digital divide that will need to be bridged in India to ensure equitable learning.

1. China: China is currently embarking on education reform, the 2020 education reform plan, which seeks to update the country's curriculum to address real-world needs (*How High-Performing Nations Teach Global Skills*, n.d.). In an effort to adopt a 21st-century skill-based education, China is attempting to minimize rote learning with an increased focus on critical thinking skills and logical thought processes. To this end, China's education reform seeks to shift away from the memorization of challenging concepts and

an exam-oriented pedagogy towards the development of skills. For instance, “math will no longer emphasize a student's response time and the need to memorize complex and seldom-used formulas” and instead will focus on conceptual understanding (*How High-Performing Nations Teach Global Skills*, n.d.).

Further, in Hong Kong, 21st-century curricular reforms recognize that students will need to develop flexibility and adaptability to meet dynamic labor market needs. Therefore, the curricular emphasis is on "learning to learn" to build the required competencies. The aim is to design assessments that will enable students to "conduct self-directed learning activities" and that will allow educators to forgo traditional practices such as "teaching-to-the-test and mere transmission of information" (Raja & May, 2018).

2. Singapore: Singapore is also restructuring its education curriculum to embed the 21st-century skills concepts of critical thinking, digital innovation, and creative thinking into the curriculum. Further, Singapore is focusing on extracurricular subjects, and a key element of the Ministry of Education’s plan to implement life skills is to “strengthen the curriculum in classes such as physical education, art, and music.” (*How High-Performing Nations Teach Global Skills*, n.d.). The Ministry of Singapore has described outcomes of success at various stages of learning from primary school and through post-secondary school (*21st Century Competencies*, n.d.). Some important outcomes of success from post-secondary learning include (but are not limited to) collaboration across cultures which the ministry defines as a direct outcome of using “culturally responsive curriculum” (Lim & Tan, 2018) to equip students to think critically. The Singaporean model of 21st-century skills also incorporates national pride and awareness of national history and culture as an important result of 21st-century successful skill development. The country also highlights career readiness as another important aspect of life skills (Tan et al., 2017).

1. Australia: Australia’s national curriculum of 2010 identified seven general capabilities, which teachers are expected to integrate throughout their teaching. These seven capabilities are synonymous with different 21st century skills that are deemed as essential for the development of children. Teachers are guided by online resources provided by the Australian Curriculum Assessment and Reporting Authority (the Authority) (Brookings, 2017), to effectively inculcate these skills among students. The Australian Curriculum achievement standards, set by the Authority, are an important focus for teachers in their initial planning of teaching and learning activities. The standards provide teachers with a statement of expected learning outcomes for students at the end of a year or a set of years. With this expected outcome in mind, teachers are able to develop learning programs.

   Teachers use the achievement standards at the end of a period of teaching, to make judgements about the quality of learning demonstrated by students – that is, to assess whether the students have achieved below, at, or above the standard. To make judgements, teachers draw on assessment data they have collected as evidence during the course of the teaching period. If an individual student’s achievement is below the expected standard, this suggests that the teaching programs and practice should be adjusted to better assist the student in their learning in the future. It also suggests that additional support and teaching that targets the student’s specific needs is necessary to

ensure that the student does not fall behind (Australian Curriculum website*, Implications of Teaching, Assessing, and Reporting*). As such, Australia's curriculum is end-goal oriented and responsive to student needs and capabilities.

3. Botswana: In 2021, the Abdul Latif Jameel Poverty Action Lab (J-Pal) began a program to impart learning through text messages and phone calls in Botswana. The 2021 randomized control trial developed by J-Pal focused on tracking and remedial education. The researchers provided remote learning support through mobile phones, testing weekly SMS messages against weekly SMS messages and phone calls. Both the SMS-only and combined SMS and phone call interventions had positive impacts on students' learning, particularly for lower-performing students. The programs also led to higher parental engagement in educational activities and improved the accuracy of parents' perceptions of their child's learning level.

   SMS remote learning could help cover the digital divide in India given cell phone—both smartphone and non-smartphone—penetration in urban and rural India. One of the aims of the NEP is to provide a mechanism for e-content dissemination through platforms such as SWAYAM, an online open course platform, and DIKSHA, a digital teacher training platform (Ministry of Education, 2020). In addition to these platforms, UNICEF, in partnership with UNOCIT, launched a global e-learning platform, UNiLearn, in April 2020 to address Covid-19 school closures (UNiLearn, 2021).

   While e-learning platforms facilitate online learning for children and youth with devices at home, only 12.5 percent of Indian households have internet access, "ranging from 27 percent in urban areas to 5 percent in rural areas" (Goel 2021). Therefore, for the context of India, solutions like the phone call and SMS-based education interventions in Botswana have the potential to help bridge the digital divide.

Discussion and Findings from Stakeholder Interviews and Literature Review

In the process of understanding 21st-century skills, we identified seven key themes that emerged from the stakeholder interviews and the literature review process. As discussed below, these constitute aspects that need to be taken into consideration while designing implementation frameworks for imparting 21s-century skills to students. The below section presents findings from our stakeholder interviews and literature review and incorporates a discussion of those findings. For a summary of themes and sub-themes cited by stakeholders reported by frequency, please refer to Appendix E.

1) Need to Adapt 21st-century Skills to Student Needs

The focus on 21st-century skills is visible in education reforms globally, and has been promoted by global discussion of changing work and societal needs. In our consultations, stakeholders defined 21st-century skills in a variety of ways, and the most common characterizations that occurred in the eleven interviews were: interpersonal, emotional, social, confidence, critical

thinking, and problem solving. While stakeholders offered a variety of definitions for life skills, the common principles were the end goals of providing students with the agency to make effective life decisions in the context of family and community, the flexibility to adapt to evolving global conditions (such as technological change, climate change, or the Covid-19 pandemic), and the ability to re-skill for emerging employment opportunities.

There have been several discussions around defining exactly what these skills constitute, but increasingly important is the adaptability of such skills frameworks to changing needs. Stakeholders mentioned that while jobs were lost in Covid-19 new jobs emerged, and students should be able to reskill and adapt to changing circumstances.

Imparting 21st-century skills requires a holistic approach that establishes the required social infrastructure through multi-stakeholder partnerships and integrates these with the needs of the students and the job market. For instance, in a growing economy such as India, there is an uptick in employment opportunities within certain sectors such as physical infrastructure. While vocational education systems impart the technical skills to succeed in these sectors, industry requirements are tilting towards soft skills such as ability to work remotely and to work collaboratively. Hence, it is crucial that capacity building efforts are aligned with the actual needs of the economy and employers, and this is especially true for life skills.

In a diverse country like India, the ‘no one size fits all’ principle is highly relevant. To build the required capacity, teachers will require support in the form of roadmaps that define successful learning of 21st-century skills; teachers will also need the autonomy to build lesson plans that suit the local context. Such autonomy, along with the required professional training and support, will allow teachers to adapt the standard learning plans to the needs of their students.

In addition to the required capacity building efforts, addressing language barriers across regions and accounting for resources and expertise required to develop learning materials and plans in different languages will be important as well. There is a wealth of research that proves that learners are more likely to engage in the learning process when the learning occurs in their native language. The interactive learner-centered approach thrives in an environment where learners are sufficiently proficient in the language of instruction (EducationLinks, USAID, Sep 2020). The National Education Policy 2020 has emphasized the importance of learning instruction in the mother tongue and the importance of addressing the resource requirements for this. This is especially important for effectively implementing 21st-century skills learning.

2) Importance of An Integrated Curriculum and Teacher Training

The majority of 21st-century skills frameworks highlight the need to integrate life skills into the curriculum due to their cross-disciplinary nature. Teaching practices will need to be significantly overhauled in order to facilitate such a critical reorganization to the curriculum. Teacher

competencies are widely recognized as critical for curriculum innovations (Voogt and Roblin, 2012). The “attitudes, beliefs, competencies, and practices" of teachers are key factors to shifting teaching and learning. As such, providing teachers with competencies and changing their attitudes, beliefs, and understanding of 21st-century skills will be essential to successful implementation.

The Teachers Eligibility Test (TET) is the minimum qualification required in India to become a teacher and was devised under the Right of Children to Free and Compulsory Education Act (RTE Act) to manage teacher recruitment. Only a small portion of those who take the eligibility test qualify to teach: "only 17% of 1.7 million candidates" who took the exam then qualified as primary school teachers and only "15% candidates as middle school teachers" (Protiva Kundu, 2019). While the eligibility test certainly sets a standard for teaching abilities, eligibility tests are only the beginning of recruiting high quality teachers. They must also be adequately trained and given professional development opportunities as well as continuing educational options to keep updated in their subjects.

Studies have shown that high-performing education systems consistently focus on developing teacher practices beyond the initial eligibility test. Strengthening teacher education also translates into higher attendance rates, teacher motivation, teacher satisfaction, better employability, and benefits for school systems as a whole. Improvement in educational outcomes will nurture a skilled labor force and increase employability. Therefore, a high-performing education system with high-quality teaching capital is imperative for India to achieve long-term social and economic stability.

Throughout our interviews, the importance of experiential learning, defined as acquiring new understanding through reflection around action, and appropriate teacher training emerged frequently. Interviewees in the education consulting space urged caution around an overly prescriptive curriculum if the goal of 21st-century skills development is to prompt creativity, critical thinking skills, and innovation. Instead, four of the eleven interviewees (including two non-profit organizations, an education consultancy, and a foundation) each specifically urged the need for experiential learning, and also asserted that life skills cannot be taught without being experienced. Echoing our findings in the literature review, three stakeholders (foundations) pointed to the need to embed 21st-century skills throughout the curriculum and cautioned that the implementation of life skills in India should not be reduced to 21st-century skills becoming a subject.

Stakeholders offered several curriculum solutions geared towards embedding 21st-century skills into the curriculum and delivering experiential learning. Three stakeholders (a foundation, non-profit, and education consultancy) suggested small modules, projects, and micro-credits to allow for multiple entry points and multiple ways of exposing students to life skills, as well as multiple career choices and opportunities. In addition, labs and spaces where students could

experiment and "tinker" were advised to enable experiential learning. Stakeholders suggested tinkering labs as an important place to teach STEM skills. An example provided was a tinkering lab in Karnataka, FabLabs, set up in collaboration with the Massachusetts Institute of Technology (MIT) as a particular success. Another example provided was the Atal Tinkering Lab, established by the Government of India. Eleventh and twelfth graders at the Atal Tinkering Lab were given ownership of a classroom and were given autonomy to run the tinkering lab on their own. The autonomy given to students meant the lab was in constant use, driven by student engagement, and the lab avoided the overly-prescriptive nature of other 21st-century skills curriculum initiatives. In addition, it allowed creativity and an experiential learning environment.

In line with our findings in the literature review, stakeholders also commented on the importance of teacher training; however, stakeholders were able to provide specific recommendations around how teacher training might change. A foundation stakeholder highlighted the difficulty of requiring more from teachers when they are overburdened with a high student-to-teacher ratio. Reducing teacher workload was seen as key to enabling teachers to have the capacity to develop what will amount to a new way of teaching. During teacher training, four stakeholders (including two non-profit organizations, an education consultancy, and a foundation) recommended that teachers experience 21st-century skills themselves. If teachers are just told what life skills are, but do not experience the skills for themselves in meaningful ways, they will likely be unable to adequately impart 21st-century skills onto their students. One education consultancy suggested that pre-service training will be more effective than in-service training.

And, after teachers have conceptual and real-life experience of 21st-century skills and life skills, they should be given the autonomy necessary to implement these skills in their syllabi and lesson plans. Less prescriptive curriculum mandates, providing teachers with the experience of life skills, and providing teachers with autonomy will enable teachers to develop the lesson plans and modules needed to transmit appropriate skills. Two stakeholders (an education consultancy and non-profit) suggested that instead of making syllabi prescriptive, teachers should be given information around desired outcomes and then should be given the autonomy to determine how to get to those outcomes in their own lesson plans.

Ultimately, successful curriculum and teacher training depends on experiential learning, potentially delivered through modules and tinkering labs, and a non-prescriptive curriculum that allows teachers to develop the lesson plans and syllabi they understand their students to need. Additionally, as a final note, two of the stakeholders (a consultancy and a non-profit) noted that curricula need to be multilingual where necessary to fit India's diverse context, echoing findings from the literature review on the importance of mother tongue instruction.

3) Providing the Skills that Result in Employment Tomorrow

India has the most extensive education system globally with over "250 million students enrolled across 1.5 million schools" (UNICEF, 2018). This presents a significant responsibility to prepare a substantial number of students to join the workforce following primary and secondary school. According to a study by the World Economic Forum, 65% of children entering primary schools today will ultimately work in new job types and functions that do not yet exist. Technological trends such as the Fourth Industrial Revolution will create new cross-functional roles for which employees will need technical, social, and analytical skills (World Economic Forum, 2020).

With the second-largest youth population globally, India's "youth bulge" presents an opportunity for social and economic growth. Six hundred million children are under the age of 2. Twenty-eight percent of India's population is less than 14 years of age. In the coming years, this segment of society will be eligible to enter the labor force (Trines 2018). This demographic shift could be a powerful engine of economic growth and development. As of now, however, India is struggling to employ its growing population. Currently, youth are overwhelmingly employed in the informal sector with little protection. For example, most young workers lack job security or labor protections in the agricultural sector (Trines 2018).

Moreover, the employment landscape and skill requirements have transformed, and will continue to transform, due to technological, demographic, and social-economic disruptions. Therefore, the progressive development of transferable skills is essential for adolescents (14-18 years) (Brookings, 2018). With the change in the labor market, skills that employers seek in the next five years include "critical thinking and analysis as well as problem-solving, and skills in self-management such as active learning, resilience, stress tolerance and flexibility" (World Economic Forum, 2020). It is important to engage the private, or employing, sector and understand their views on skills gaps and to allow the private sector a part in the definition of 21st-century skills. Should employers be actively engaged in defining the skills needed to succeed and to obtain employment in the 21st-century, the gap between education and employment might be bridged. The youth bulge presents India a tremendous opportunity, but only if students are provided with the skills needed to become meaningfully employed and to then make a strong economic and intellectual contribution.

To this end, a stakeholder (a non-profit) asserted the importance of linking the employment market with education from the perspective of students. While employers should play a role in defining 21st-century skills, students should also be aware of potential career opportunities and how to obtain those career opportunities. One stakeholder (non-profit) mentioned that skills should be looked at as part of a career path and that exposing students to career choices was crucial. It will be important to link the employing sector to the education sector by both giving

the employing sector an active role in defining life skills and in providing students with the information they need around career possibilities.

For example, the Occupational Information Network (O*NET) is a key source of occupational information in the United States. Developed by the U.S. Department of Labor, O*NET is an online database that provides occupational definitions and information to students and job seekers. India's National Career Services website can incorporate a framework similar to O*NET to drive career awareness and readiness amongst students and teachers. A study suggests that centralized career path information can be effective in India to reduce "career-decision making difficulties." (Mohit Bhatnagar, 2017).

4) Building Assessments for Non-Traditional Learning

There is general agreement that 21st-century skills are difficult to measure with no clear formative or summative assessment approaches. Traditional and standardized tests do little to assess life skills.

Currently, India's focus on the "3R's - Reading, wRiting, and aRithmetic" means that assessments are generally summative and are not structured in such a way as to gauge the skills deemed essential in the 21st-century and to employers, such as "critical thinking and analysis as well as problem-solving, and skills in self-management such as active learning, resilience, stress tolerance and flexibility" (World Economic Forum, 2020). Instead, current evaluations are structured "for use in certification, identification of eligibility for education progress, and system accountability" (Care et al. 2019). The transformation of education will require a similar and radical transformation in the way students are evaluated.

There is increasing visibility for the concept of formative assessments, or "assessment for learning" (Care et al. 2019). In the Asia-Pacific region, there is evidence that some countries have begun to shift their focus from content-correctness to capturing behaviours and processes. For example, using group work activities to teach and assess collaboration, or using behavioral checklists to capture global citizenship skills, have been reported in the UNESCO case studies (UNESCO, 2016). Adopting formative assessment models and reorienting the education system from one focused on grades to one focused on human development will be essential to ensuring students adequately master 21st-century skills.

5) The Role of Family and Community

The role of the family (including parents and grandparents) and community members in enabling students to learn and imbibe 21st-century skills cannot be overstated. Families were noted as often being very score-driven and also unaware of life skills and their importance. Stakeholders pointed to a need in shifting perspectives and attitudes in order to get parents on board (a consultancy and four non-profits). By the very nature of the conventional education system in India, parents are focused on the grades their children attain. Good grades are seen as a prerequisite, and very often, the only key factor in ensuring access to employment opportunities

to the children. Hence, parents tend to focus on their children's academic achievements, as defined by grades, instead of building the skills that are needed in the 21st-century. This further leads to parents' focus on their children's employability via grading achievement rather than their obtainment of skills; this is further reinforced by the social stratification (non-profit stakeholder).

However, many new skills are required in this new era, and parents' perceptions need to be changed alongside the evolving conditions. It was suggested that public educational outreach (via radio, TV, movies) demonstrating success and behavioral changes would be one way to convince parents of the need for 21st-century skills in the classroom (government ministry and education consulting stakeholders). Learning should continue outside of the classroom, and the family is crucial for supporting this (two non-profit stakeholders). Also, students with family support are more likely to continue their education and obtain adequate life skills (seven out of eleven stakeholders referenced this).

6) The Role of Multi-sectoral Partnerships

Several stakeholders noted that effective implementation of 21st-century skills will require a confluence of ideas, interests, and institutions. They noted that central and state governments, multilateral organizations, civil society, and the private sector will need to work jointly to develop strategies for implementation that take into consideration the underlying challenges of India's socio-economic conditions and that leverage the advancement of life skills frameworks by several organizations within the country and across the globe.

Partnerships will play an important role across different aspects of implementation of 21st century skills. In our literature review, we also found examples of existent partnerships. Recently the Delhi government proposed a "virtual Delhi model school" that can be accessed by any student in the country and with the goal of reducing the divide in digital access (Hindustan Times, 2021). The proposal requires creative partnerships and improving the digital infrastructure in rural and urban areas. This project reflects a multi-stakeholder approach with the aim to develop innovative solutions and resource pooling. The virtual model school also suggests that state governments can engage in public-private partnerships with technology companies to address digital infrastructure gaps.

Certain global examples highlight the importance of such partnerships as well. For instance, in 2019, the Inter-American Development Bank (IDB), alongside 22 partners from the public and private sector, announced the launch of a 21st-century skills coalition to support the implementation of a new generation of education and training policies in Latin America and the Caribbean. As a part of the initiative, Google and IDB Lab (the innovation laboratory of the IDB Group) established an alliance for the implementation of an IT Certificate in several countries to

increase the employment opportunities of vulnerable young people -particularly women- in the information technology sector. Moreover, this contributes to creating a sustainable and inclusive job training. The initiative has also supported the creation of a Coalition for Universal Musical Education in Latin America and the Caribbean in collaboration with the Grammy Foundation. This coalition will foster 21st-century skills by supporting the universalization of music education in Latin America, and the Caribbean (Inter American Development Bank October 2019).

7) The Landscape post-Covid-19: Role of Technology and Gender Lens

A. The Digital Divide:

The education landscape in India has significantly shifted due to Covid-19: schools have faced the challenge of establishing alternatives to classroom learning, and existing educational disparities have worsened. Even prior to Covid-19, according to the Annual State of Education Report (ASER), in 2018, a quarter of Class 8 students in rural areas could not read a Class 2 text, and over half of Class 8 students could not solve problems involving basic division (ASER, 2018).

Additionally, there is a gap in access to digital devices. According to a study conducted by ASER (ASER 2018), across 619 districts, only 21.3 percent of students had access to computers (The Policy Times, 2020). While 23 percent of households in urban areas had access to computers in 2018, only 4 percent of rural households had access. (Manish Prathim Gohain, 2020).

Covid-19 has worsened this education gap. Lockdowns have affected approximately 250 million students from preschool through high school (BCG, 2020). In response to Covid-19, government schools across the states continued classes or shared content through "three or more means such as textbooks, worksheets, T.V. and, radio broadcast, videos/recorded classes, and live online classes" (Firstpost, 2020). This has resulted in huge disparities in access to education and the mode of instruction.

In 2020, ASER conducted a phone survey of 59,251 children across 30 states. After seven months of school closures, only one in ten students had access to live online classes. Further, in the week of the survey, one in three rural children had no form of learning, and two in three students received no learning materials or activities from their schools (The Hindu, 2020).
The ASER survey revealed that smartphone ownership across all the households increased with 61.8 percent of the families owning at least one device. However, as indicated by the survey results, this expansion of smartphone ownership has not resulted in access to education. A third of children with smartphone access still did not receive any learning materials (The Hindu, 2020).

A BCG study, in collaboration with NITI Aayog National Institution for Transforming India (NITI Aayog) and state governments, and with the goal to develop a remote learning strategy for 22 million students and 800,000 teachers affected by school closures, reported that more than 60% of the targeted student population lacked either the necessary equipment or infrastructure to access digital lessons (BCG, 2020).

Despite these disparities and challenges, the 2020 BCG study also noted enthusiasm for digital lessons, especially among students with smartphone access. The BCG study suggested that rising mobile phone ownership in India should be leveraged due to its high impact potential and low cost implications for households and for the government (BCG, 2020).

The stakeholders our team interviewed also emphasized the potential of technology to accelerate the pace of learning, especially in the case of 21st-century skills, through the development of synchronous and asynchronous learning methods (two consulting firms and one non-profit). Further, one stakeholder noted that they are currently working with UNICEF-India to develop social media applications. In their work, they noted that students considered WhatsApp to be a safe and non-judgmental space.

Digital literacy advancements have contributed to students' adoption of social media (Greenhow, 2011). According to an IndiaFacts report, Facebook is the most popular site used in India by children aged 13-17 (93%), followed by YouTube (87%) and WhatsApp (79%) (IndiaFacts). According to a survey by Global Web Index, a London-based market research company over half (52%) of India's youth (8-17 year olds) access social media while at school (Global Web Index 2021). Researchers note that social media can provide high school students with opportunities for validation and appreciation of creative work, peer support, and school-task related support (Mao 2014). Researchers also suggest that it is possible to integrate social media tools in classroom teaching to increase student engagement and quality of assignments (Mao 2014). This presents an opportunity to potentially leverage social media and demonstrates that rapid advancements in digital literacy are possible.

With the introduction of the new National Education Policy (NEP) 2020, India is at a crucial crossroads. The NEP presents a platform to incorporate holistic, experiential, and student-centered education through equitable opportunities. The government aims to promote India as a "flag-bearer of the digital revolution" (World Economic Forum, 2020). However, according to various studies, e-learning cannot adequately replace physical classroom experiences. Further, as the ASER survey reveals, access to a device alone is not enough to ensure students receive educational material or that the educational material is itself effective.

The NEP will need to address accessibility to digital resources. This includes considering digital literacy, access to handheld electronic devices, and building the required infrastructure to meet the disparities.

B. Gender Issues:

The gender divide in equitable access to resources is a major challenge in the implementation of 21st-century skills in India. Even before the pandemic, there was a wide gap in educational achievement and literacy between boys and girls—85 percent of boys were literate as of 2018 while only 70 percent of girls could read and write (Household Social Consumption: Education in India, 2018). While enrollment rates have increased in India, there is a high dropout rate among women at the secondary level in particular. This poses a risk to female civic participation and employability.

The gender divide also extends to digital access: "boys in India are much more likely than girls to use a computer, internet and other forms of technology regularly" (Sanjay Singh, 2020). Part of this is attributable to access: girls from underserved communities, especially in rural areas, have significantly lower levels of access to digital resources than boys.

Covid-19 has made the digital divide even more crucial, as discussed in the previous section. And the impact of Covid-19 combined with lower levels of digital access has been devastating for girls: the drop-out rate is expected to increase for girls and 20 percent of girls are predicted to not return to school following the pandemic (Sanjay Singh, 2020). Increased rates of poverty, household responsibilities, child labor, and teen pregnancy have furthered the impact and may prevent as many as 20 million secondary school-aged girls around the world from ever returning to the classroom (Malala Fund Report 2021).

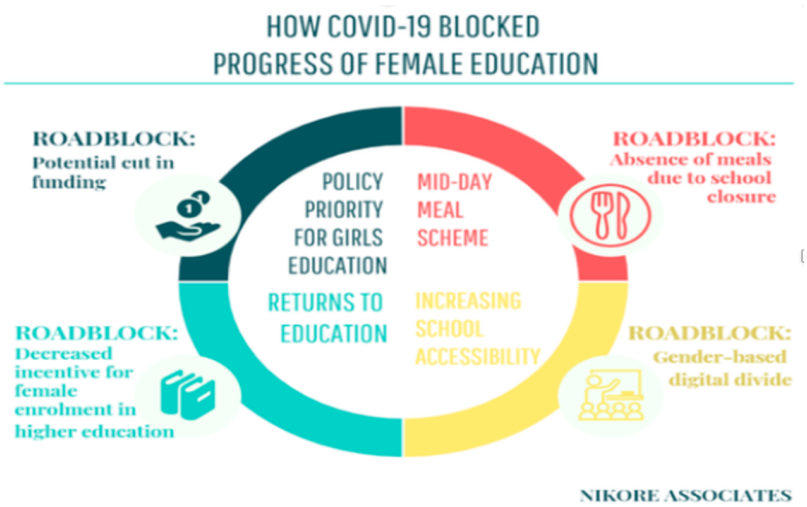

Figure 3: Four Factors of Female Education Improvement
Source: Nikore, Forbes India 2021

Stakeholders (two non-profit organizations) echoed the concerns raised in the literature review around the impact of COVID-19 on student achievement and the implications on implementing 21st-century skills in India. The pandemic has exacerbated issues related to unequal access to education and opportunity. In particular, the stakeholders emphasized the potential of a disproportionate impact on girls in India, a segment of the population already disadvantaged by the education system, as noted above.

Hence, incorporating measures to bridge the digital divide and adopting approaches that take into consideration the disproportionate impact of the pandemic on girls will be needed for a comprehensive approach to transmitting life skills. The introduction of a Gender Inclusion Fund under the National Education Policy 2020, which aims to promote equitable treatment for girls and transgender students, is a heartening inclusion and this provision should be leveraged effectively.

While not explicitly discussed in stakeholder interviews, the literature review revealed gender issues that extend beyond school and affect girls and women in the labor force. Limited investments in future pathways for girls is reflected in India's declining female workforce participation. Female workforce participation has declined from 30.3 percent in 1990 to 20.5 percent in 2019 (World Bank, Labor force participation rate 2021). Furthering low female workforce participation, women have lost more jobs than men during the pandemic. This is partially due to different career prospects available for women compared to men due to underlying gender norms and restrictions on the types of careers women can enter while meeting the demands of childcare and early marriage. Additionally, women are often required to prioritize domestic work and caregiving over formal employment. There is also social stigma around women working outside of the house, especially for those who can afford to stay at home (Kamdar 2020).

RECOMMENDATIONS

Our recommendations come from a combined understanding and analysis of the literature review and our interviews with stakeholders. These recommendations are also informed by the educational experiences of five of our team members who have experience working with India's education system. In addition, three of our team members have had hands-on experience of teaching as Teach for India Fellows and staff.

Figure 4: Recommendations Snapshot

1) INCREASE ALIGNMENT AND AWARENESS

UNICEF-India/ YuWaah to increase alignment among stakeholders around 21st-century skills through bringing about a mindset shift through heightened awareness of definitions, the importance of 21st-century skills, challenges in implementation, and the need for appropriate evaluations.

Goal and Action*:* Increase alignment and awareness of 21st-century skills among relevant stakeholders through a national UNICEF-India/Yuwaah campaign. On the industry level, increase awareness among the private sector, civil society, government agencies, especially state educational departments. On the grassroots level, increase awareness of communities especially teachers, students, and youth outside of the education system. To deepen the campaign effect, respective state governments should adopt the campaign for their respective states in their local languages. In this process, the employing sectors should be given an active role in helping to define skills gaps and relevant 21st-century skills.

This could be accomplished through an awareness campaign that focuses on four key themes: 1) problem-solving, 2) socio-emotional skills, 3) design thinking and 4) livelihood. Change the causal story from 'only good marks guarantee a good job' to 'good marks are necessary, but life skills, in addition to marks, will help young people achieve a 1) good job, 2) decisions about life pathways including decisions around marriage and family, 3) livelihood and 4) critical thinking abilities.'

Rationale: In our research and interviews, we came across a variety of definitions and a wide range of views around relevant 21st-century skills. To achieve the successful implementation of life skills, it is necessary to bring all relevant stakeholders, especially the government, corporate sector, teachers, students, civil society and communities who demand and are in need of these skills to a level of consensus and get their buy-in. Greater involvement of the private and not-for-profit sectors in NEP implementation is paramount to the successful implementation of the plan. This employing sector should have a role in defining life skills to help close the gap between education and employment, and their participation is critical to success.

Our recommendation suggests a campaign that changes the causal story around 21st-century skills. For example, the No Toilet, No Bride campaign in Haryana is an example of a campaign successful at changing the causal story around sanitation. The campaign "encouraged families with marriageable girls to demand construction of a toilet in the prospective groom's family as a precondition" to girls getting married. As a result, households with toilets inhabited by men looking for marriage increased by 21% (Wire 2017). The campaign is also noted for helping to increase women's bargaining power in the marriage market.

Finally, there could be increased impetus placed on ensuring young men and women are developing the skills to get absorbed and integrate with the workforce. For instance, skills around negotiation, building self-confidence, and planning for future career pathways would play a critical role in how 21st-century skills impact the overall progress of the youth in the job market, especially in making them career-ready and more-so, women than men.

2) CONSTRUCT ADAPTIVE AND COMPREHENSIVE CURRICULUM TO INCLUDE 21ST-CENTURY SKILLS

2.1 Embed 21st-century skills into curriculum instead of making it another subject

Goal and Action: Embed 21st-century skills into the core curriculum instead of making 21st-century skills standalone subjects. Central and state governments to embed 21st-century skills—cognitive, personal and interpersonal skills—into the curriculum and core subjects through modules, tinkering labs, and micro-credits. UNICEF-India to provide expert support through their stakeholders in building these curriculums. Schools to create a shared understanding of these skills and build teacher competencies through teacher development interventions for specific grade levels. For-profit, non-profit and non-governmental organizations to help build teacher capacity in their local areas.

***Rationale*:** The competencies associated with life skills relate to almost every aspect of life, and as such, they cannot be taught in a vacuum but instead need to be embedded throughout the curriculum. Much like the Singapore approach that incorporates 21st-century competencies, including civic literacy, global awareness, and cross-cultural skills; critical and inventive thinking; communication, collaboration and information skills; as well as social and emotional competencies into the core curriculum

2.2 Adopt group learning and team building skills in a classroom setting to develop critical thinking skills and social and emotional skills

Goal and Action: Adopting group learning and team building skills will allow students to be creative, share their ideas with the class, build on ideas of their peers. Make peer learning a strategy to reduce teacher burden as well as incorporate group learning and critical thinking. This will also help students develop social and emotional skills. After teachers are trained in 21st-century skills, give them autonomy to develop homework exercises for students to submit in groups and modules for students to complete in groups. The government of India should also establish additional tinkering labs in partnership with technology firms, the private sector, and organizations focused on STEM skills.

Rationale: Group work in lab-based settings (such as tinkering labs) were referenced by stakeholders as being a particularly successful model in India. Further, social and emotional skills are of growing importance in work and in life and the group work embedded in the curriculum should prioritize interpersonal and intrapersonal skills. Various research reports highlight the negative impact of poor social and emotional skills on important academic, work, and life outcomes. The Indian education ecosystem does not recognize social and emotional skills as an essential aspect of the developmental stages. Therefore, a curriculum that incorporates SEL (social and emotional learning) through group work will be a critical step towards promoting positive societal outcomes.

3) DEVELOP NON-CONVENTIONAL ASSESSMENTS

Develop portfolio-based approach to measure skills and competencies; create formative rather than summative assessment tools

***Goal and Action*:** Develop standard assessment for measuring 21st-century skills through non-conventional methods rather than paper-based assessments. Develop portfolios which capture student mindset-shift based on formative rather than summative assessments. UNICEF-India can work with the private sector to provide expertise in development of assessment tools and spaces. Additionally, establish a set of desired outcomes for students and have teachers assess student achievement continuously rather than at one point in time at the end of a term.

Work with the private sector to establish standalone assessment centers at the district level where a student can get certified. The assessments need not follow the format of paper-based. For example, convert a few schools with tinkering labs into centres which can assess life skills such as problem solving, collaboration, critical thinking, and creativity along with computational thinking and prototyping ability. This can be done based on project based observations rather than paper based. State education departments can identify which private and public schools can be developed into maker spaces, or tinkering labs.

Rationale: Firstly, we found consensus in our literature review and stakeholder interviews that 21st-century skills are difficult to evaluate and will require non-conventional mechanisms. Australia, mentioned in our Cross-Country Comparison from the Literature Review, has seen success in using assessments drawn from data collected about students over the entire course of the teaching period. This approach allowed Australia to evaluate students relative to an end-goal and to use assessments to determine how students might be better assisted if they do not meet standards. This approach also suggests that evolving portfolios that capture a student's journey alongside formative, observation-based assessments will more accurately capture the acquisition of 21st-century skills than a traditional, summative assessment or exam.

Secondly, stakeholders pointed out the lack of school level capacity to assess some skills, since assessment itself is a specialized skill on its own. The skills are too sophisticated to be properly assessed in every school due to the knowledge gap, the infrastructure to do so does not currently exist, and developing standalone testing centers will bring credibility and boost demand from the industry (or private sector) side.

4) EMPHASIZE INNOVATION AND PARTNERSHIP

4.1 Establish more inclusive and low-cost local tinkering labs with emphasis on gender and regional language

Goal and Action: Emphasize learning innovation as a process instead of simply learning new technology. This will also ensure engagement of more students and could help increase participation of girls and make the content more accessible. A reduced focus on infrastructure will also result in lower infrastructure costs per school and will reach more students at the same

cost.

State governments should partner with private corporations, and non-government organizations to establish more inclusive, low-cost local tinkering labs. This can be achieved through relaxing the space and prior performance requirements, reducing the high-tech infrastructure and encouraging a whole classroom approach to reach more schools and students. ATL teams can assist state curriculum teams in developing design thinking modules in regional languages to make them more accessible to all students. UNICEF-India/YuWaah may provide guidance and support to state governments.

Rationale: Developing experiential learning mechanisms based on the Atal Tinkering Lab approach can be a viable solution. The central government of India developed, as a flagship initiative, AtaL Tinkering Lab or ATL in order to "create an environment of scientific temperament, innovation, creativity amongst Indian school students." According to materials provided by the ATL Tinkering Labs, "ATL is a workspace where young minds can give shape to their ideas through hands-on do-it-yourself mode and learn innovation skills" (*Atal Tinkering Lab – India STEM Foundation*, n.d.). There is significant evidence that students learn new skills as they build, tinker, redesign, and hack, and especially when they do so in a group. Another benefit of tinker-centred learning is that it can help children develop a sense of self and a sense of community. Later on, this may lead to students trying to solve community problems by being able to identify issues and applying the concepts of analysing and designing for designing solutions." (*Enabling Students with 21st Century Competency Skills for Delivering Innovation*, n.d.-b)

4.2 Incentivize vocational and higher education institutions to partner with schools

Goal and Action: State governments can launch school adoption programmes to help build capacity. Platforms for mentorship programs can be provided to support students to prepare for school and industry skills. Such a program can help students, especially in the age group of 14-18, become ready in case they choose to join the workforce post school completion. This will help bridge the gap between schools and colleges. Emphasis must be laid on engaging and supporting girls, who have a higher dropout rate compared to boys in the same age group. Increasing female participation in mentorship can lead to a role model effect, inspiring more girls to continue education. State governments can provide incentives for students in the form of course credits, certification, skill workshops and industry exposure, with a special focus on additional incentives (in-kind or cash transfer) to girls, and exposure to women in the industry. Higher institutions and state governments to train students on mentorship and other 21st-century skills with support from the private sector (industry). This includes training, encouraging and incentivising college students to engage as mentors. Educational institutions, both higher education institutions and private and public schools to provide platforms to students to identify and map mentors. State governments can incentivize colleges through direct grants or by establishing incubation centres on the lines of Atal Incubation Centre established by the central government.

***Rationale*:** Some of the components of 21st-century skills require specialized mentors; augmenting teacher capacity with support from external mentors can help students. Training and

incentivising college students to engage as mentors and providing a platform to identify and map these mentors to schools in a structured manner can help address the capacity gap at the school level. Training college students on these skills could also help them become future ready and bridge the gap between industry and colleges.

4.3 Establish information systems to guide and mentor students on different pathways post schooling

Goal and Action: Provide awareness, to students and parents, of various opportunities available and diverse pathways (academic, vocational and otherwise) for their children to become successful and confident individuals. Engage parents actively in awareness opportunities. Schools, employers (private and non-private) provide workshops, access to information on employment opportunities and job-choice options and requirements through e-platforms.

***Rationale*:** Students will be unable to prepare for careers if they do not have adequate knowledge around career options. Additionally, the rapidly evolving nature of the career landscape and available job opportunities requires an adaptable platform for delivering information. The world is complex, uncertain, and ambiguous with rapidly changing industries and skill requirements. Students and parents need to be aware of the various opportunities available and diverse pathways (academic, vocational, and otherwise) to become successful and confident individuals. We propose ongoing guidance and mentoring systems that are readily available for students and parents to chart their learning journeys.

Indian parents have a disproportionate say in student's careers and learning journeys. Therefore, we strongly recommend that parents are actively engaged and aware of these mentorship opportunities. Gender sensitization workshops must be conducted for parents to break the myths around different pathways, with a strong focus on parents with a girl child. Additionally we recommend improvement in access of graduates, and of course pre-graduates to reliable, current e-information on employment opportunities and job-choice options and requirements. As an international model, the United States has seen particular success with O*NET, an online database with occupational information. This is referenced in our Findings and Discussion section above.

5) TRANSFORM THE ROLE OF TEACHERS TO FACILITATORS AND MENTORS

Train teachers in 21st-century skills and then give them more autonomy in curriculum development

Goal and Action: Train teachers by providing them with the experience of 21st-century skills. State governments with the help of the Central government to properly train teachers After they are trained, teachers are given autonomy in developing curricula and syllabi to meet their students' needs. Teachers should also be encouraged to create formal and informal networks on social media to share and learn from the classroom experiences of other teachers.

Rationale: Teachers need to be able to understand and experience 21st-century skills themselves. With a solid training of 21st-century skills, it will be possible for teachers to impart these skills.

After teachers have the conceptual and real-life experience of 21st-century skills, give them the autonomy to develop lesson plans and modules to transmit 21st-century skills. Also, encourage them to share their experiences and classroom stories with a network of teachers formally with their colleagues or informally through social media or online teacher forums.

6) CREATE DIGITAL AND ALTERNATIVE MODELS

6.1 Social media as alternative education resources and as an inclusive tool for marginalized students (including girls) and families

Goal and Action: Promote digital literacy to help bridge the digital divide and to deliver equitable access and solutions. Schools to adopt social media platforms, other e-learning platforms such as UNICEF-India/ YuWaah's e-platform, UNiLearn, as learning tools for both teachers and students. A multi-stakeholder approach can lead to innovative solutions and resource pooling. State governments can invest in public-private partnerships with leading technology companies to improve digital infrastructure, literacy, and the use of applications and social media.

***Rationale*:** Digital literacy is key to building equitable solutions, and our literature review revealed that despite an increase in smartphone ownership, access to education in the Covid-19 landscape has been uneven due to gaps in digital literacy, access to the internet and ineffective modes of transmission. Further, families and communities have taken precedence as important stakeholders, and social media is a way to include families and to leverage their participation to make digital interventions effective.

6.2 Reaching students with no internet access (in rural and remote areas) through SMS text-messaging and phone calls

Goal and Action: The goal is to bridge the digital divide and help students who do not currently have internet access. The telecom industry could support state governments to add this to the Government of India's National Digital Framework, the blueprint for which is ready (Team meeting with UNICEF-India, 2021).

Rationale: The digital divide emerged as a key concern in the literature review and stakeholder interviews. It is a roadblock in delivering equitable education. According to the Internet and Mobile Association of India male internet users account for 67% and female internet users account for 29% in India (Mint, 2019). This has consequences for women's empowerment as well as on the economic outcomes in India. According to GSMA's The Mobile Gender Gap Report 2019, closing the gender-gap in mobile internet use in a developing country could add $700 billion to its combined economy over the next five years (Mint, 2015). As an immediate step to cover the digital divide and deliver educational materials to students, J-PAL's project in Botswana, a country similar to India in student learning levels, demonstrates success in using SMS text-messaging and phone calls.

7) PREPARE STUDENTS IN EARLY CHILDHOOD CARE AND PRIMARY EDUCATION

Goal and Action: Help prepare students for the new kind of secondary education and for the development of 21st-century skills in their formative early education years. Schools with the help from State governments and UNICEF-India/ YuWaah's expertise to develop curriculum and expected learning outcomes for secondary school in tandem with primary school to ensure a continuation and a cohesiveness and to ensure primary education paves the way for success in secondary education.

***Rationale*:** Successfully imparting 21st-century skills during the 14-18 year old age range will require preparation before students enter secondary education. Over 85 percent of a child's cumulative cerebral development occurs by the age of 6; this indicates the critical importance of preparation in the early years to ensure proper brain development and growth (Trivedi, 2021). It's necessary to shape student capacity in their early education years in order to make the most of their learning opportunities in their later years of primary education.

CONCLUSION

The 2020 National Education Policy is one of the most ambitious and forward-looking education policies in India to date. India, with one of the largest youth populations in the world, has tremendous opportunity for economic growth and development. However, without improving the country's education system to ensure its students receive a comprehensive, skills-based education that equips them with the 21st-century skills needed to be productive participants in the labor force, the country will be unable to benefit from this vast potential. The recently launched YuWaah program seeks to understand the skills desired by employers in the knowledge-based economy of the 4th Industrial Revolution and to determine a plan for implementation.

Our workshop project contributes to a broader understanding of the needs of youth in India, important implementation challenges and considerations for India, and examples of successful national and international extant programs. And our recommendations seek to help UNICEF India/ YuWaah determine an implementation plan that will allow students to gain the 21st-Century Skills needed for a happy, fulfilling, and productive life of their choice. The project of implementing 21st-century skills in India's education system is both ambitious and necessary and has the potential to impact millions of youth in India. Further, India is one of the first countries to implement a GenU project, meaning a successfully implemented project could influence other countries as they embark on their own educational changes.

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APPENDIX

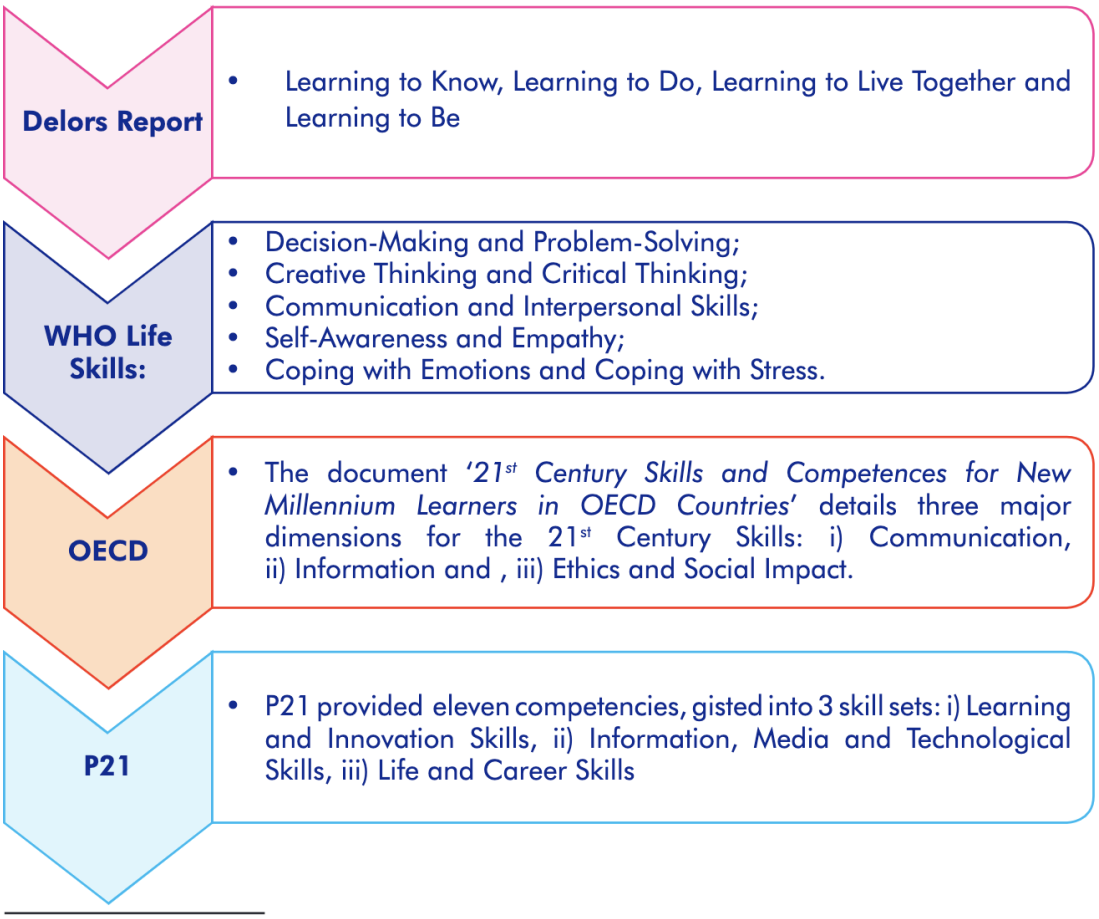
Appendix A: Overview of 21st-century skills/competencies frameworks

Table 1. Overview of 21st century skills/competences frameworks.

Framework	Main focus	Sponsors	Countries involved
Partnership for 21st century skills	• Identification and definition of 21st century skills/competences • Implementation issues • Considerations for assessment	• US Department of Education • AOL Time Warner Foundation • Apple Computer, Inc. • Cable in the Classroom • Cisco Systems, Inc. • Dell Computer Corporation • Microsoft Corporation • National Education Association • SAP	USA
En Gauge	• Identification and definition of 21st century skills/competences • Implementation issues	• Metiri Group • Learning Point Associates	USA
Key competences for lifelong learning. European Reference Framework	• Identification and definition of 21st century skills/competences	• European Commission: Education and Training 2010 work programme	European Union member states
New Millennium Learners: DeSeCo	• Identification and definition of 21st century skills/competences	• OECD: Centre for Educational Research and Innovation	OECD countries
National Educational Technology Standards	• Identification and definition of ICT competences	• International Society for Technology in Education	USA, Norway, Costa Rica, Malaysia, Japan, Australia, Philippines, Micronesia, Korea, Turkey (among others)
ICT competency Standards	• Identification and definition of ICT competences	• UNESCO • Cisco • Intel • ISTE • Microsoft	United Nations
Assessment and Teaching of 21st century skills	• Considerations for assessment	• Cisco • Intel • Microsoft	Australia, Finland, Singapore, United States, Costa Rica, Netherlands and Russia
NAEP - Technological Literacy Framework	• Assessment of technology and engineering literacy	• National Assessment Governing Board • West Ed	USA

Source: A comparative analysis of international frameworks for 21 century competencies: Implications for national curriculum policies

Appendix B: 21st-century skills frameworks, including WHO Life Skills



Source: 21st Century Skills: A Handbook

APPENDIX C: Overview of Stakeholders

Table 1: Types of stakeholders interviewed

S.No.	Type of Stakeholders	Interviews (number) 11
1	Central government (CG)	1
2	Non-Profit/Foundation (NP/F)	7
3	Private Sector (PS)	2
4	Non-Governmental Organizations (NGO)	1

APPENDIX D: Master Interview Protocol

Linked here

APPENDIX E: Key Themes Emerging from Textual Analysis of Stakeholder Interviews

Below is a summary of the themes and sub-themes emerging from a textual analysis of the stakeholder interviews. Frequency refers to the number of stakeholders who discussed or referenced each particular theme or sub-theme.

Key Themes Emerging from Stakeholder Analysis

Major Themes	Frequency of stakeholder reference
21st-Century Skills	
Definition of 21st-century skills:	8/11 stakeholders
Skills needed by employers:	3/11 stakeholders
Incorporating 21st-Century Skills	
21st-century skills in the Indian context:	4/11 stakeholders
21st-century skills in coursework:	5/11 stakeholders
21st-century skills in implementation:	7/11 stakeholders
Desired outcomes of 21st-century skills	5/11 stakeholders
Evaluation and assessment	6/11 stakeholders
Challenges and Opportunities	10/11 stakeholders
Capacity constraints	8/11 stakeholders
Infrastructure	6/11 stakeholders
Implementation	9/11 stakeholders
Implementing 21st-century skills	10/11 stakeholders
Crucial partnerships	8/11 stakeholders
Infrastructure, tools, and resources	5/11 stakeholders
Engagement, partnerships, and implementation	6/11 stakeholders
Importance of family and community	8/11 stakeholders
Minor Themes	**Frequency of stakeholder reference**
The role of technology and technological constraints	4/11 stakeholders
Digital divide	3/11 stakeholders
Improvement in technology	4/11 stakeholders
Anticipated impact of COVID-19 and post-COVID-19 opportunities	2/11 stakeholders

APPENDIX F: Word Clouds from NVivo

Our project used NVivo to code and analyze interviews, as described in the Methodology section. We coded interviews according to the "buckets" or categories stakeholders discussed, and the coding then allowed us to analyze responses to various questions. Through this process, we were able to analyze the most frequently used words and combinations of words in response to various questions. The below word clouds indicate the most frequently used words by stakeholders.

Defining 21st-century skills:

Through word cloud analysis in the figure below, top features of 21st-century skills that emerged in all eleven interviews were: interpersonal, emotional, social, confidence, solving, technical, literacy, digital, group, relationship, machines, navigate, funding, critical, and readiness among others.

Challenges and opportunities of implementing 21st-century skills in India: capacity constraints, infrastructure, implementation:

The word cloud analysis below contains ten stakeholder interviews that discussed challenges and opportunities of implementing 21st-century skills in India.

1. Biggest challenge: Infrastructure

2. Biggest Infrastructure challenge: schools sector

3. Biggest capacity constraint: training, content, people

4. Solution: Create means

<u>Ideas on implementing 21st-century Skills in India: crucial Role of multi-sectoral partnerships and engagements, tools and resources:</u>

Below is a word cloud analysis of ten stakeholder interviews which discussed ideas on implementing 21st-century Skills in India.

1. Biggest idea: Approach everyone

2. Crucial partnerships: Government ecosystem and policy agencies

3. Tools and resources: Digital space

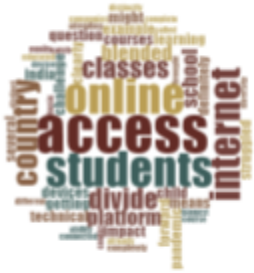
4. Engagements: People and teachers

<u>The Landscape post-Covid-19: Role of Technology and Gender Lens:</u>

The below is a word cloud analysis for interview questions targeted around the landscape following the pandemic.

1. Biggest digital divide challenge: Access and opportunity

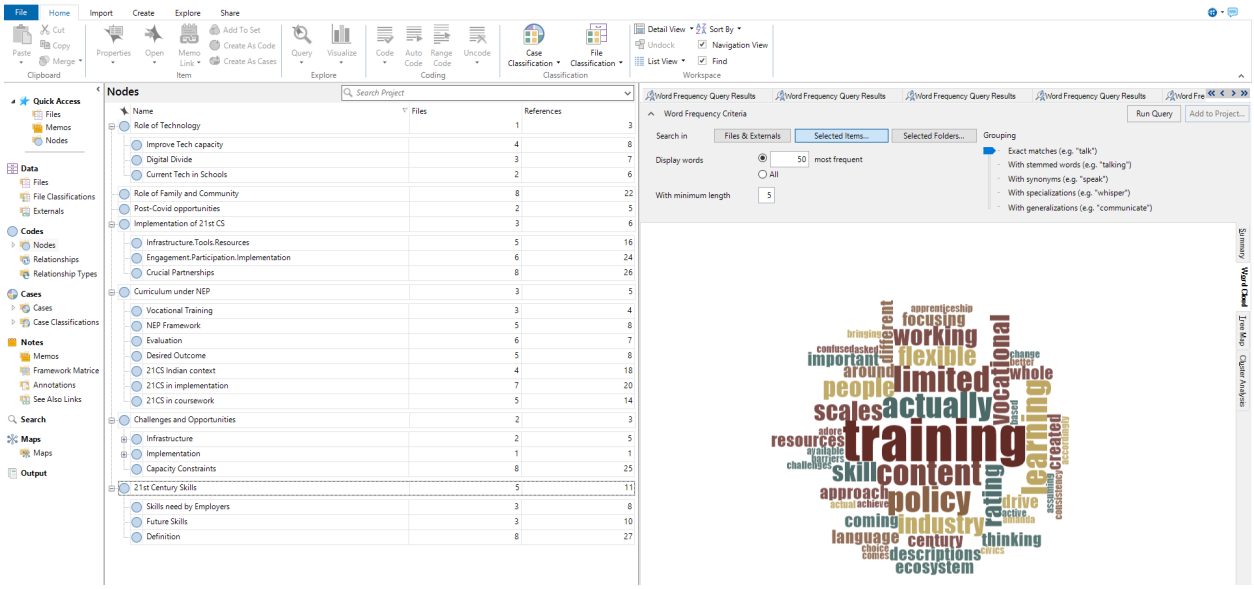
2. Solution for digital divide: Access learning, teach population



3. Post-pandemic opportunities: Blended classes, online access

APPENDIX G:

A screenshot of NVivo software. The left panel shows themes and sub-themes. The right panel shows a word cloud analysis.



APPENDIX H:

Codebook generated from Nvivo. It explains each theme/ NVivo node

NVivo node names	Description of themes/ NVivo nodes
21st-century Skills	Research question: What 21st-century skill gaps do 14-18 year-old students face?
Definition	How are 21CS defined by various stakeholders?
Future Skills	What skills do you think students will need to develop in order to obtain meaningful employment in the future?
Skills need by Employers	What 21st-century skills are valued by employers, and how can students get them? How do you foresee this developing or changing in the future?
Challenges and Opportunities	What are the key opportunities and impediments for attaining this successful 21s century skills framework within India's current education system?
Capacity Constraints	What are the capacity constraints?
Implementation	What are the challenges and opportunities in implementation?
Challenges	Challenges in implementation
Opportunities	Opportunities in implementation
Infrastructure	What are the challenges and opportunities infrastructure wise?
Challenges	Infrastructural challenges

Curriculum under NEP	Research question: What modifications should be made to the school curriculum for 14-18 year-old students who will be entering the fourth school division (that is 5+4+4+3) under the NEP?
21CS in coursework	Sub-questions covered: 1) How do you think 21st-century skills can be incorporated into the school curriculum. 2) how do you think 21st-century skills can be translated into coursework.
21CS in implementation	Sub questions covered: 1) What systemic changes are needed to implement 21st-century skills (curriculum, pedagogy, teacher training, etc.). 2) Which change do you think is the most crucial?
21CS Indian context	Following sub-questions will be covered in this sub-theme: 1) What do you think 21st-century skills mean in the context of India. 2) Which skills do you think are most important to impart in the formal education system
Desired Outcome	What are the desired outcomes?
Evaluation	What are discourses on evaluation metrics (of both teachers and children)?
NEP Framework	What is the discourse on the NEP framework?
Vocational Training	What are the ideas on Vocational Training?
Implementation of 21st CS	Research question: What are some key opportunities and challenges for integrating 21st-century skills into the education system in India?
Crucial Partnerships	What partnerships are crucial to achieve successful implementation of programs related to 21st-century skills?

Engagement.Participation.Implementation	Who are the key supporters and detractors, including additional stakeholders for engagement, participation, and implementation of the Reimagining Learning in India Initiative (a partnership between Columbia University's School of International and Public Affairs and UNICEF India)?
Infrastructure.Tools.Resources	What are some key infrastructure, tools, and resources needed to integrate 21st-century skills into education systems? (e.g., data tracking, curriculum, personnel (recruitment, retention, credentialing), budget/funding, communication with students and families)
Post-Covid opportunities	Discourse about post covid challenges and difficulties and other possibilities of collaboration etc
Role of Family and Community	What is the role of family and community? How can it be leveraged?
Role of Technology	Research question: What role does technology play in 21st-century learning?
Current Tech in Schools	What technologies are currently available in schools, and what can be done to use them better?
Digital Divide	How can the digital divide be bridged?
Improve Tech capacity	Based on the challenges schools face while using current technologies (such as zoom and internet applications), what suggestions can we give to the states to improve their technological capacity? And how can technology aid resiliency?