

Position Paper 5 – Vocational Education

1. Preliminary information

1.1. Content outline/chapters (Filled by system) – This will be auto generated by the system by using the document template shared with us.

1.2. Executive Summary (300-500 words)

This position paper summarises the state of vocational education in the country today, with a focus on the state of Karnataka. The layout of the document has been dictated by the template that was shared. The position paper covers all aspects of the vision, perspectives, and implementation plans that relate to the integration of vocational education into schools as envisaged by NEP 2020. It describes in some detail the specific steps that need to be taken to support and integrate vocational education and Indian knowledge traditions at each of the four stages, namely the foundational, preparatory, middle, and secondary stage. The NEP 2020 recommends two distinct tracks for the introduction of vocational education. Indicative examples of the vocations that can be introduced within each track, ‘vocational exposure’ and the ‘career track’ have also been provided.

Given that NEP 2020 is seeking to achieve multiple goals through the integration of vocational education, a careful assessment has been made of the challenges facing the successful integration and the steps that need to be taken to overcome them. The special feature of vocational education is that it requires considerable practical work to be done, 60 to 70% of the course time, which requires access to expensive physical infrastructure that cannot be replicated in every school. Innovative models of sharing existing infrastructure in the country, with PMKKs, KVVKs, ITIs, and with industry are needed. Apprenticeships/ internships are an important way to help students access such state-of-the-art infrastructure and the document recommends that a formal method of bringing industry, academia, and government together to provide quality apprenticeships to students be brought in through an enabling legislation, as is done in Germany for instance. The acquisition of critical soft skills or 21st century skills by students and ways to inculcate these through changes in pedagogies have also been discussed.

Approaches to handling the challenge of selecting the specific vocations that can be offered in the career track at different schools within the state have been laid out, as also approaches to introducing local contexts at various stages. The position paper points out that the successful integration of vocational education depends heavily on a cadre of vocational education teachers/ coordinators being hired and stationed at each secondary school. It recommends that a Karnataka Council for the Integration of Vocational Education (KCIVE), along the lines of the NCIVE mentioned in NEP 2020, be set up that can oversee the implementation of vocational education within the state on a continuous basis. It also recommends that a Karnataka Institute of Vocational Education (KIVE) be set up within DSERT, along the lines of the PSSCIVE at the centre, so that curriculum and content for vocational education courses can be prepared and disseminated widely within the state.

1.3. List of members of the focus groups (Filled by system) – This will be auto filled by the system as the system already has a list of members in each group and committee

1.4. Acknowledgement - 200-300 words to be filled in by the user.

The team would like to thank Dr Reju Thankachan IAS, Mr Mahesh Venkateswaran of KNACK, Dr Abdul Aziz Mulla of RDPR University Gadag, and Shri Ashwin Gowda of KSDC for extremely valuable inputs. Dr Giri Balasubramaniam and Mr Ram Prasad N of the Nudge Foundation also shared some of their research and documents. We are very grateful to them. The Department of Skill Development, Entrepreneurship & Livelihood and the Department of Industrial Training and Employment, shared data on upskilling in disruptive and advanced technologies meant to train youth for opportunities in global industries and assembly lines.

We are also very grateful to two members of the NEP Task Force in Karnataka, Ms. Suparna Diwekar and Mr A.N. Ramachandra, both of whom have taken considerable interest and shared ideas as well as documents during the work of this group. Mr A.N. Ramachandra also reviewed the draft document as did Mr Ashok Kamat and Mr Krishna Murthy. We thank them for their reviews. We have incorporated their suggestions and those of other Task Force members made during the presentations of the position papers.

2. Introduction

The term **Vocational Education** as used in this document refers to those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life. This broad definition of the term ‘vocational education’ is aligned with the international definition of the term ‘Technical and Vocational Education and Training or TVET’ as defined by UNESCO¹ and the two terms will be used interchangeably in this report.

TVET/ Vocational education connects education to the world of work and is also a part of lifelong learning. The learning experiences may occur in a variety of learning contexts, including educational institutions and workplaces. TVET systems tend to vary from country to country. In most countries technical and vocational education and training are under one umbrella, while in others such as India, technical and vocational education are looked upon as separate entities. TVET/ Vocational education also includes a wide range of skills development opportunities attuned to national and local contexts.

Skilling/ Skills Training/ Skill development/ Vocational Training are terms that are widely used in the Indian context to refer to work-related training, primarily on the practical, hands-on, aspect of

¹ <https://unevoc.unesco.org/home/TVET>

the training. The terms skilling or skill development is therefore just one part of ‘vocational education’. It is generally not sufficient to prepare students either for long-term engagement with their chosen vocations or for lifelong learning, both of which is done by vocational education. The word ‘training’ refers to just practical hands-on training in most contexts.

Lifelong learning refers to all learning activity undertaken throughout life with the aim of improving knowledge, skills and/or qualifications for personal, social, and/or professional reasons. Learning to learn and the development of literacy and numeracy skills, transversal skills and citizenship skills are therefore also integral components of TVET/ vocational education.

The NEP 2020 uses the term vocational education in the broad sense defined above and refers to not just the acquisition of domain/vocation related knowledge, skills and competencies, attitudes and understanding, but also generic skills that are applicable to all domains/vocations such as critical thinking, problem solving and teamwork; and personal and interpersonal skills such as persistence and grit, empathy, negotiation skills, communication skills, and more. The latter set of generic skills is also referred to as ‘21st century skills’ or ‘soft skills’ in literature.

There are **two major threads of vocational education as envisaged by the NEP**. The first is ‘vocational exposure’ in which students are exposed to different vocations depending on their age groups, with the intent of introducing them to vocations that are available in the world of work, and for giving them practical hands-on learning experiences that would eventually help them select the vocation they may be interested in. The second thread is vocational education for the world of work, aligned with National Skills Qualification Framework (NSQF) levels 1 to 4. This thread of vocational education for the world of work is referred to as ‘Career Track’ in this document to distinguish it from ‘vocational exposure’.

The term ‘**vocationalisation**’ of education has been used in the implementation of past education policies to refer to the integration of vocational education with general education at all stages in schools. It continues to be used even now in the Samagra Shiksha Abhiyan (SSA) that includes vocational education for Grades 9-12. However, the vision of vocationalisation at NSQF levels in the SSA is different from the integration that is envisaged in the NEP. The former is being outsourced to private-sector vocational training partners of the National Skills Development Corporation whereas the NEP envisages that the integration will be achieved through schools, which is an important difference.

Historically, Gandhiji’s call to integrate work and education in his ‘Nai Talim’ have formed the basis of Indian perspectives on vocational education. These ideas have been captured beautifully in the position paper on work and education brought out as part of the National Curricular Framework (NCF) effort in 2005 [NCERT 2007]. As per this view, ‘participation in productive work under conditions approximating to real-life situations is pedagogically linked to learning and simultaneously becomes the medium of knowledge acquisition, developing values and skill formation. Engagement with work will promote multi-dimensional attributes in the cognitive,

affective, and psycho-motor domains in a holistic manner i.e., by integrating head, hand, and heart'. Similar goals are embodied in the NEP 2020.

2.1. Introduction to Vocational Education (To include present status/ position regarding Vocational Education. This needs also to include existing practices in the State/UT) (200-300 words)

India has made enormous strides in the provision of Technical and Vocational Education and Training (TVET) since the start of the implementation of the Eleventh Five Year Plan (2007-2012). There is now considerable infrastructure available in the country for offering short-term training courses that last between a few weeks to a few months in duration [UNESCO 2020]. Nearly 20 ministries/ departments of the Union and state Governments are conducting training programmes, and according to the Ministry of Skill Development and Entrepreneurship (MSDE), a total of approximately 10 million Indian youth are being trained each year across all ministries [MSDE 2019].

The setting up of the National Skill Development Corporation (NSDC) as of 2008, has helped to build an ecosystem in the Public-Private Partnership (PPP) model, with Vocational Training Partners (VTPs), Sector Skills Councils (SSCs), and other stakeholders playing a considerable role in the development of physical infrastructure, and in the implementation of government-funded schemes for training youth such as the Pradhan Mantri Kaushal Vikas Yojana (PMKVY) and the Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDUGKY). These schemes, being implemented through the Pradhan Mantri Kaushal Kendras (PMKKs), provide short-term skills training to youth, outside the formal education system.

Longer-term training courses that run over periods ranging from one to three years, are at present being offered largely only through the Industrial Training Institutes (ITIs) and the Polytechnics. Between them these have a capacity of over 3 million students. Karnataka has over 1700 ITIs that come under the Department of Skill Development, Entrepreneurship and Livelihood of the Government of Karnataka (GoK) and 85 Polytechnics that are part of the Department of Technical Education. The training period at the ITIs range between one to three years and those at the polytechnics is three years.

Secondary schools have also been engaged in the provision of vocational education at the higher secondary level (grades 11-12 in school) since the early 1990s as part of the programme of implementation 1992 [FOA 1992] of the 1986 National Policy on Education [NPE 1986]. As of 2019-2020 there were approximately 10,158 state-government run schools that were offering vocational education to over 1.2 million students in Grades 9-12, through the Samagra Shiksha Abhiyan (SSA), a centrally funded scheme of the Ministry of Education (MoE). In Karnataka, 240 schools have been approved as part of SSA. Of these, 150 have been operationalised while 90 more are in the process of being operationalised. In all, approximately 18858 students are receiving vocational education in sectors such as: i) Automotive; ii) Beauty & Wellness; iii) Healthcare; iv) IT-ITeS; v) Retail; vi) Apparel: Made-ups and Home Furnishing; and vii) Electronics and Hardware. The

curriculum, delivery methods, and impact of these courses are discussed in later sections of this report.

Unlike in the State of Maharashtra, public schools in Karnataka do not run their own vocational education programmes in schools at present. Apart from the Samagra Shiksha Abhiyan, vocational education for children of school going age is primarily through the ITIs and Polytechnics and to a smaller extent through other institutions such as the Government Tool Room and Training Centre (GTTC), nursing colleges, and so on. Not enough is known about the history of job-oriented courses that were funded and run by the GoK in the past, in secondary schools, as part of its own implementation plan of the National Policy on Education (NPE) 1986. The courses offered were in areas such as carpentry, sericulture, tailoring and so on. However, there was insufficient enrolment of students so the teachers who retired were never replaced, the remaining were shifted to other streams, and the programme was discontinued.

2.2. A brief of mobile app-based survey and district-level consultations conducted by States/UTs (Brief on Vocational Education) (300-500 words)

2.3. Process of consultations including number of consultations, meetings, participants, collaborations etc. (Filled by system)

3. The Vision, Perspectives, and Implementation

The vision for the development of vocational education in Karnataka and the entire country is based on NEP 2020 which has also taken into consideration the Sustainable Development Goals (SDGs) adopted by the United Nations in 2015, to which India is also a signatory. SDG 4.0 on Education consists of 10 targets of which as many as 4 targets are related to TVET. Target 4.4 states: 'By 2030 substantially increase the number of youth and adults having relevant skills, including technical and vocational skills for employment, decent jobs and entrepreneurship'. Other policy documents that have been kept in mind include the National Policy on Skill Development and Entrepreneurship 2015 [NPSDE 2015], the National Rural Livelihoods Mission Framework², the Karnataka Skill Development Policy:2017-2030 [KSDP 2017], and the Karnataka Economic Survey 2020-21 [GoK 2021].

The NEP 2020 gives considerable importance to vocational education and suggests that vocational education at appropriate levels be integrated into ALL educational institutions - schools, colleges, and universities. The policy envisages that the distinction between curricular, co-curricular and

² <https://aajeevika.gov.in/en/content/nrlm-framework-implementation>

extra-curricular subjects will be done away with and suggests that vocational education, arts education including the performing arts, and sports education, all be offered to students in an integrated manner, as per their interests and their aspirations. The policy envisages that schools will expose students to different vocations at the earliest, particularly during Grades 6-8, and then offer every student a choice to take up education and training in at least one vocation at a high level of proficiency, up to NSQF level 4, during their secondary school stage (Grades 9-12). Since the practical work component of vocational education is very high (typically 60% of the course time), integrating vocational education in this way will help bring focus back on experiential learning, on learning by doing and reflection on the learnings, and on the development of important 21st century life skills such as problem solving, teamwork and communication skills, among many others, that are key attainment goals of NEP 2020.

It is important to understand the difference between the two streams of vocational education that is being envisaged in NEP 2020 in some detail. The first stream namely ‘vocational exposure’, sometimes also called pre-vocational education, refers to spending relatively shorter lengths of time on introducing different vocations to students, including by visiting places and observing expert practitioners at work, and allowing students to work with their hands in activities that are safe for children at appropriate grade levels. The aim of providing vocational exposure to students is to introduce them to various occupations related to their local communities and economies, to instil respect among them for various vocations, to encourage learning by doing at all stages in school and to help them find their own interests and aspirations.

The second stream namely, vocational education for the world of work up to NSQF level 4 in at least one vocation chosen by the student, is meant to ensure that students are prepared adequately to step out into the world of work post either Grade 10 or Grade 12, enabling them to either find jobs, or become self-employed, or even becoming entrepreneurs in time. This ‘career track’ as mentioned earlier, is meant largely for students in secondary school (Grades 9-12). However, it may need to be offered even earlier, in middle school, to assist the more than 50% of boys and girls who drop out of school due to economic reasons [PRS 2020].

The vocations offered in this stream must preferably be connected to the local economy so that students can continue to live and work near their homes, an option that is very attractive to the youth of Karnataka as shown by many surveys. Other vocations that could be included are those that are sufficiently broad-based such as vocations in IT and IT enabled services, Electronics, Healthcare, Automotive, and other streams that offer livelihood opportunities and physical mobility to the students throughout the state and the country.

In terms of targets, the NEP 2020 sets a much more ambitious target than any of the previous policies, by suggesting that at least 50% of all learners have exposure to vocational education by 2025. Most of these students may continue into higher education after secondary school. However, if as in the case of South Korea, even 25-40% of the secondary school cohort complete vocational education at NSQF level 4 and move out into the world of work or even continue into undergraduate

courses at colleges and universities, this will give rise to a large workforce that is trained in different vocations of relevance to the economies of the respective states and the country.

The NEP 2020 has also recommended bringing youth and adults, those who are not in formal education, employment, or training (referred to as the NEET segment by the NSDC), particularly women, back to schools if possible so that they can complete Grade 12 of their education. School complexes can be pressed into service appropriately for this effort and certification can be done either through the National Institute of Open Schooling (NIOS) or its equivalent in the state. The policy stipulates that all students must try and complete Grade 12 so that they are prepared for the fast-growing and fast-changing knowledge economy. Those who cannot return to school need to be provided with options to complete their education, including technical and vocational training, through a programme on adult education that focuses on literacy as well as livelihoods, also through the NIOS. The latter will need to be grown for the purpose.

It is important to note that the Karnataka Skill Development Policy: 2017-2030 [KSDP 2017] makes many similar observations. Some of their observations will be integrated into the recommendations in this document and into the State Curricular Framework (SCF).

3.1. Historical perspectives in Vocational Education (Provide historical perspective with regard to earlier National\State education policies. Also deliberate upon the transformation that took place in Vocational Education). (200 – 250 words)

Technical education in the country at the time of independence was available through 38 engineering colleges offering degree courses, with an intake capacity of nearly 3000 students, and 53 polytechnics offering diplomas, with an intake capacity of 3700 students. The focus of governments in the early years after independence was on technical education for students completing Grade 10 in school and on education for school dropouts. The Craftsmen Training Scheme (CTS) for students passing out of grade 8 in school was initiated at approximately 50 ITIs as early as 1950. The number of polytechnics in India grew quickly after independence and became 284 by 1966, with an intake capacity of approximately 49,000. The first National Policy on Education 1968 [NPE 1968] stated that practical training in industry should be made an integral part of technical education, and that free flow of personnel should be encouraged both ways to allow for continuous cooperation in the provision, design and periodical review of technical education and facilities. However, this did not really take place and does not happen even now.

The Programme of Action (POA) 1992 of India's second National Policy on Education [NPE 1986], assessed that the intake in the vocational stream at the time was of the order of 72,000 students and that only about 2.5% of the student cohort entering higher secondary stage were receiving vocational education [POA 1992]. It went on to identify the many factors responsible for the slow progress, such as:

- i) the absence of a well-coordinated management system

- ii) unemployability of vocational pass outs due to poor choice of vocational courses and the poor curriculum design and delivery
- iii) mismatch between demand and supply of trained students in different vocations
- iv) lack of acceptance of the concept of vocationalisation by society; and
- v) absence of proper provisions for professional growth and career advancement for the vocational pass outs etc.,

factors that are of concern even today. In addition, there were no organised efforts to support entrepreneurial ventures with financing and other support.

The Kothari Commission report [Kothari 1966] had envisaged that 50% of higher secondary students and 20% of secondary school students would take up vocational education. The NPE 1986 set out more modest goals of covering 10% of higher secondary students by 1995 and 25% by the year 2000, numbers that have not yet been achieved till today. The POA 1992 resulted in the setting up of the Central Institute of Vocational Education (CIVE) as a constituent unit of the NCERT, now known as the Pandit Sundarlal Sharma CIVE (PSSCIVE). Some of the other institutions set up at the time such as a Joint Council for Vocational Education at the Ministry of Education (MoE), the State Councils for Vocational Education, and the district coordination committees, have since wound up. This is particularly true in the case of the state of Karnataka. As mentioned earlier, as of today Karnataka offers vocational programmes in schools only under the Samagra Shiksha Abhiyan scheme.

The demand for skilled workers began to grow strongly in the mid-1990s after the economic liberalisation and a truly concerted effort to strengthen vocational education and training came into being, as part of the Eleventh Five-Year Plan (2007-2012). The first National Skill Development Policy (NSDP) formulated in 2009 set very ambitious targets for skilling, aiming to train as many as 500 million youth by 2022. The newer National Policy on Skill Development and Entrepreneurship (NPSDE) 2015, recommended that 25% of schools and colleges offer vocational education courses [NPSDE 2015] and targeted training a more modest 100 million youth by 2022. The Government of India (GoI) also set up the Ministry of Skill Development and Entrepreneurship (MSDE) in 2015 to try and bring together the disparate efforts at skill development in various ministries. In terms of implementation therefore, the period since 2008 has seen rapid growth of vocational education and skill development initiatives in the country led by the NSDC and subsequently the MSDE. The Karnataka government set up the Department of Skill Development, Livelihood and Entrepreneurship (SDEL) in 2016 and formulated a Karnataka Skill Development Policy covering the period 2017-2030 [KSDP 2017].

These skill development efforts have also resulted in the creation of considerable infrastructure for Technical and Vocational Education and Training (TVET) outside the school system. The SSA also makes use of this infrastructure since it is the vocational training partners of the NSDC and its Sector Skills Councils (SSCs) that implement this program. As mentioned earlier, NEP 2020 would like vocational education to be completely integrated into the school system so that students can learn

about vocations and their scientific, technological, and social basis in an integrated way. The NEP 2020 suggests making use of all infrastructure that is available outside schools, with PMKKs, Krishi Vigyan Kendras, ITIs, Skill Hubs, industries, and many others, but it also emphasizes that some critical infrastructure for training, such as workbenches, computer labs, and so on must be set up within the school premises.

3.2. Challenges to vocational education at different stages (Provide the key challenges to Vocational Education at various stages of school education in view of State\National perspective).

The challenges to vocational education come primarily due to the large practical hands-on training component that requires infrastructure support and makes vocational education more expensive. Another difficulty is governance/ administration related since vocational education requires much more coordination across educational institutions, ministries/ departments that oversee education and skill development, and also with local industry and businesses so that students who pass out of vocational programmes can find livelihoods after their education. The challenges to vocational education can therefore be classified into broadly three categories. These include:

- i) governance issues related to the role of state governments in the funding, administering, and monitoring of vocational education to be responsive to the needs of students and of their potential employers. The lack of coordination with industry, businesses, agriculture, and with professional bodies stands in the way of ensuring that vocational education and skill development programmes are aligned with the aspirations of students and the economy of the State. The difficulties of state governments in ensuring coordination across various departments engaged in skill development is another key concern.
- ii) administrative challenges that are closely connected to the above governance issues. These include: a) the lack of provision of adequate infrastructure including consumables for practical training; b) the narrow selection of job roles in various sectors that are offered to students under the vocationalisation stream; c) the poor nomenclature of these job roles that make them very unattractive to students; d) the serious issue of lack of linkages with higher education and with government jobs; e) the lack of career options for vocational teachers/trainers; and f) most importantly the lack of vertical and horizontal mobility for students; and
- iii) the poor societal perceptions regarding vocational education that have been reinforced to a considerable degree by the poor implementation of vocationalisation of school education in the past. These perceptions include the belief that vocational education is meant only for those students who are academically weak and that only practitioners at the top end of the vocational education value chain such as Doctors and Engineers, are worthy of respect. These beliefs are also reinforced by a class and caste ridden society. Lastly, students are also unable to make choices of vocations that are available locally and are aligned with their interests and aspirations. Students are also not given any career counselling or guidance in schools.

State governments have failed to a very large extent in their constitutional mandate of delivering quality education in schools, particularly of vocational education. The education and skill development policies of the past have largely had the right focus. However, it is the lack of follow through on addressing the observed deficiencies in implementation of policies that has done the most damage, leading to students and parents losing interest in the programmes. Worldwide, it is well known that only about 1 in 7 policies are implemented successfully [reference] for precisely these reasons. There is a need for a standing council that can take up the task of monitoring and making course corrections as needed, by consulting with the intended beneficiaries of the policy and making the necessary changes to implementation. This will help address the unintended consequences of policy implementation and ensure that the policy succeeds in its goals.

The importance of sufficient coordination across all stakeholders cannot be overemphasized. The latter include departments within the state government and with industry, businesses, and industry bodies, to identify and project the manpower needs on a continuing basis in line with the economic development trajectory of the state. Industry bodies have also been reluctant to share projections for manpower requirements at regular intervals. The district wise skills gap mapping that is available in the public domain for the state of Karnataka continues to be from the year 2013 [SkillsIP 2013], when in fact the need of the hour is to have fine-grained projections of manpower requirements at least once every two years, particularly across non-agricultural sectors that include services and manufacturing, since these contribute the major share of state GSDP.

The Karnataka Skill Development Policy (KSDP) document lists some of the key lessons learnt from the implementation efforts of the 2008 policy in the state. These include the observation that short-term skilling does not result in the desired outcomes and that sustained and substantial investment is needed. Skill missions at the district level and below are needed along with the District Skilling Committees (DSCs) under MSDE. There is also a need for an institutional framework that not only identifies the roles of different stakeholders but also makes provision for the identification of beneficiaries, dynamic and real time information on the labour market including the skills required, monitoring and evaluation of vocational education programmes, and impact assessment of the education and skill development policy. These and other observations of the policy are addressed in later sections of this document.

The choice of vocations to be offered for study at various stages is also a very tricky issue and will be discussed in detail in subsequent sections of this report. Unfortunately, the job roles that are being offered to students under the Samagra Shiksha programme have used names that do not communicate the value of the content of the courses. The choice of vocations must be such that students receive a futuristic training and not training that will be near obsolete by the time they graduate. This will help make vocational education aspirational.

There is also a need for a coherent approach towards the preparation and deployment of teachers/trainers of vocational education that also pays adequate attention to their career development paths, so that quality talent can be drawn into this critical area of education. Almost all vocational

teachers/ trainers in the states/ UTs work on contract and are not paid during the vacations, irrespective of whether they are employed by the government or the private sector. This will need to change if we want to achieve the goals of quality education as envisaged in NEP 2020. Unless the government invests in teachers in schools, none of the goals of vocational education at any stage can be achieved. The requirement for teachers for teaching vocational courses will be discussed in detail in further sections.

The experience of countries around the world has shown that vocational education succeeds when government, industry and academia come together in a three-way partnership, each with a commitment to deliver value to the student, to the industry/ employer and to society. Such a coming together of these three groups has been the secret of the success of the Dual Apprenticeship³ model in Germany, Austria, and Switzerland where there is also regulation governing the roles of these stakeholders. The NEP had recommended the creation of a National Council for the Integration of Vocational Education (NCIVE). One of the tasks that NCIVE was intended to take up is the bringing together of the different stakeholders so that they can collaborate seamlessly to achieve equitable and better social and economic outcomes of TVET.

On specific inputs for the various stages of education requested in the following sections, it is important to note that the challenges listed above are common to all levels. We reiterate that the most important of these challenges is the lack of adequate funding support leading to a lack of infrastructure for vocational training. Vocational education is more expensive given that it requires considerable physical infrastructure, including a lot of consumables such as material for arts and crafts, chemicals in laboratories, and so on.

Another challenge that is common to all stages is the need for extensive digitalisation of vocational education. Digitalisation refers to the use of computers, hand-held devices, the Internet, and software of various kinds to teach students of all ages. The special feature of digitalisation is that it provides the opportunity to re-imagine the way vocational education is taught [ILO-UNESCO 2020]. Given that digital skills are driving competitiveness in today's economy, digitally supported education and training can make learning more flexible, help to strengthen individual skills and competencies, and enhance the quality and attractiveness of TVET. The digital resources on vocational education developed by the various agencies/institutions, including NCERT-PSSCIVE, NSDC, Sector Skill Councils, etc., can be disseminated widely by the States/UTs so that teachers and students can be greatly benefitted.

The goal of digitalisation will however require more basic infrastructure to be in place first. We will need to invest towards addressing not just the widespread digital divide but to also find innovative

³ Dual apprenticeship combines apprenticeships in a company with vocational education at a vocational school or VET institution. The apprentices receive practical training in a company, which is supplemented by theoretical instruction in the vocational school.

solutions towards ensuring the availability of stable and sustained electric power in many areas of the country, to be able to run the necessary computer and communications systems.

3.2.1/3.2.2 Foundational stage and preparatory stage (100 – 200 words)

The challenge at these two early stages are not really related to vocational education in the conventional sense. However, given that almost 85% of the brain development of the child is completed during the foundational stage and it is well known that children learn languages very easily at this stage, before the age of 10-11, stationing adequate number of human resources at Anganwadis, play schools, and primary schools become very important. These teachers must be well trained in early childhood care and education (ECCE) so that they can stimulate the minds of children in multiple ways and teach them multiple languages. It is important to keep in mind that children can only learn multiple languages if there are different teachers available to them who can each speak to them consistently in a different language. Students can then develop fluency in speaking all the languages of interest and be transitioned into the chosen medium of instruction (if it is different from their mother tongue) and/ or be given bi-lingual education in higher grades.

There is also a need for a lot of other learning material – recordings of music, rhymes and songs in different languages, paints, clay for modelling, lots of educational material including alphabets in multiple languages that are pasted on the walls at the eye level of students, etc., all of which will require investment into each Anganwadi, play school and primary school.

3.2.3 Middle Stage (Grades 6-8) (100-200 words)

This stage is very critical because it is during these three years that the maximum dropouts happen. Many children do not transition from Grade 4/5 into the middle stage (Grades 6-8, also known as upper primary) and many others dropout at Grade 8 or when they attain the age of 14 which is the legal age for work. Some drop out even earlier. Data from 2015-16 from the Ministry of Education (MoE) shows that as much as 54% of male children drop out of school for economic reasons [PRS 2020], to help supplement their family income. This is the real challenge that needs to be addressed at this stage namely, how to ensure that students who drop out can be encouraged to return to school and be supported with access to classes outside their work hours so that they can complete their Grade 12 as required by NEP 2020. Vocational exposure made available to students at this stage can optionally also be supplemented with some minimal training for the world of work.

3.2.4 Secondary stage (Grades 9-12) (100 – 200 words)

There is now an unhappy situation prevailing in the country whereby youth who are eagerly looking for jobs are unable to find them, even as industry and businesses are unable to find the trained labour they need [NCAER 2018]. Unemployment rates among youth in the country is at a 45-year high. At the all-India level well over 10,000 schools are offering vocational education to

more than 1.2 million students as part of the SSA. In Karnataka this number is 240 schools and 18,858 students. These numbers are just a drop in the ocean relative to the actual enrolment at the secondary stage (Grades 9-12), approximately 25 million all-India and over 3 million in Karnataka.

As mentioned earlier, vocational education in the SSA is provided by vocational training providers of the NSDC while the assessment of students is done by the Sector Skills Councils (SSCs). This approach does not allow for integration of the curriculum in school, does not promote discussions in school/ class around different vocations and the sharing of learning experiences of students, since the schoolteachers are not involved. No experience or expertise is being built up within schools and among the teachers in the long term, despite the government paying for and running these courses year after year. This model needs to therefore be replaced by a more integrative, sustainable and scalable model that is run from within the schools by schoolteachers who are trained to make use of resources available outside. Vocational teachers must be hired at secondary schools and trained, also as assessors. Third-party assessment should be implemented in collaboration with experts from local industry or enterprises where students visit and get practical training, to achieve the objective of 360° holistic assessment of the child.

One important additional challenge at the secondary stage is the need to make Grades 9-12 available in every school. Given the past implementation of the 10+2 model, higher secondary school education is offered by Pre-University (PU) colleges that are independent entities in many states and the move to merge Grades 9-12 is likely to meet with some resistance. There are economic compulsions for this in terms of salary structures of faculty members so there is the need to harmonise the Pre-University board and the School Education Boards. Political will is required to overcome these challenges. Without a successful merger however, it will be difficult to give students the necessary choice of vocational subjects as per their interests and aspirations. Capacity building of the officials and staff of the Boards is to be done for implementing competency-based education and assessment.

3.2.5 School Dropouts (100 – 200 words)

As mentioned earlier, data from MoE shows that the large numbers of school dropouts (over 50% of both male and female students [PRS 2020]) happen due to economic reasons. Youth are expected to contribute to the family finances either through low-wage employment or through self-employment, either individually or as part of the family business. Many years of continuing dropouts have resulted in very large numbers of youth and adults who are not formally trained for the tasks they are engaged in. They only have informal training acquired either through hereditary learning, self-learning, or learning on the job. This group has been the target of most skill development efforts in the past decade or more. MSDE and other ministries, NSDC, the SSCs and many hundreds of training providers have been offering them short-term courses ranging from a few weeks to a few months. However, it is now generally accepted that these short-term courses are not preparing them to engage with their vocations in the long term. This is a serious challenge to overcome and will require a slew of measures tailored to local contexts that will be discussed in the following sections.

3.2.6 Adult Education (100 – 200 words)

According to the Periodic Labour Force Survey (PLFS) 2019-20, 28.68% of the Indian population are either not literate or literate without formal schooling [PLFS 2021]. It is estimated that there are approximately 280 million or more adults who are illiterate. Many of them are likely to welcome the opportunity to learn how to read and write if they are taught in a functional way. Besides this, there are

many adults who would like to upskill or learn new skills as part of lifelong learning for personal or professional reasons. Creating opportunities for learning for all of them will require not just massive digitalisation but also making all existing physical infrastructure including computers, available for extended hours so that adults as well as school going children and school dropouts can access them at convenient times. For instance, school complexes will need be kept open, say from 6am till 10pm. This is a challenge that will require innovative models of financing, maintaining, and running such infrastructure in a sustainable manner to be created, so that experts are available on hand to assist and train learners for long hours.

3.2.7 Teacher Education

A large proportion of schoolteachers, including subject teachers, are working on contract basis at lower wages relative to their counterparts who have tenured government jobs. However, teachers engaged in vocational education and skills training are even worse off since they are often hired on clock-hour basis and have little assurance of the continuity of their employment. They are also paid very erratically. Even the schools that are offering vocational education under SSA have not appointed dedicated teachers/ coordinators. This lack of career opportunities has made vocational education very unattractive for teachers and this is a threat, a potential showstopper, as far as successful implementation of the NEP goals are concerned.

It is also important to note that education will need to become very decentralised with the implementation of NEP 2020, relying on a lot of local content and local practitioners to help students with their hands-on learning experiences and livelihood opportunities. It will therefore be important that school education departments of state governments are willing to empower local teachers and managements and put decision making in the hands of local teachers.

Another important challenge is the need for integration of all vocational exposure related activities as well as vocations for the career track to be integrated into the various subjects that are related to them. Teachers of all subjects, science, mathematics, history, social sciences, and languages must be oriented towards working with vocational teachers/ coordinators to incorporate the domain knowledge of various vocations being offered by the school into their discussions of their subjects in class.

3.3 Specific objectives for vocational education at different stages of school education (What will be the specific objectives at different stages of school education in line with learning outcomes).

Through the integration of vocational education into schools and colleges NEP 2020 seeks to achieve multiple objectives overall:

- i) To move school and college education away from a needlessly theoretical education, based largely on rote learning, and turn it into one that is based on experiential learning at all levels of education.
- ii) Vocational education has a large practical hands-on learning and allows for alternative ways of learning though engaging in group projects and so on that also allow students to pick up key 21st Century skills or soft skills such as problem-solving, teamwork, communication skills, negotiation, resilience, and more.
- iii) A focus on helping students learn about their local habitats, natural resources, and sustainability aspects critical to attaining the SDGs.

- iv) Students must learn about everyday life around them including the economy of their communities and the larger society.
- v) Through vocational exposure students must be able to discover their interests, their talents, and their aspirations. They must also have access to career guidance and counselling.
- vi) A focus on providing futuristic skills training to students such as in the areas of green jobs relating to renewable energy, sustainable transport, and others.
- vii) An opportunity to help stem dropouts from school by assisting those students who have economic difficulties complete their education through alternate routes such as the NIOS.
- viii) Lastly, preparing students for the world of work. The NEP has stated that every student will learn at least one vocation from a selection that will be offered at higher levels of competencies by every secondary school. The students who would like to enter the world of work must be able to complete vocational education at NSQF level 4 in the vocation of their choice.

These objectives of NEP 2020 will translate into specific ones at the various stages.

3.3.1 Foundational stage (100 – 200 words)

Very young children need to be assisted in developing their language abilities, numeracy skills, psychomotor skills (music, movement and motor skills), and social skills, through guided learning, at their own pace, using toys, painting and clay modelling, music, rhymes and songs sung by their local communities, and conversations with adults and peers. It is important to note that a single teacher/adult speaking to children in multiple languages at different times of the day will typically result in the child mixing up all the languages. The age group of 3 to 8 spans a very wide range of development of the child that must be catered to accordingly. For instance, older children will need to start learning how to read and write, while younger ones need to get familiar with the alphabet. They can be exposed to fonts in one or more languages through posters on the walls in school so that they learn to recognise the letters.

3.3.2 Preparatory stage (100 – 200 words)

This stage is envisioned to be one in which students continue in the directions set during the foundational stage to firm up their literacy and numeracy skills, especially their language skills in as many languages as possible. A specific objective would be to help them start learning subjects bi-lingually or multi-lingually, in the regional language (if different from the mother tongue) and English, so that in higher grades they can transition smoothly to using either of them as the medium of instruction. A focus on ensuring mastery over languages is critical at this stage, on speaking, listening, and reading and writing. Children can be introduced to writing in a second language as appropriate.

At this stage children also begin to observe and learn about the society around them, the various activities and roles that adults play around them and so on. So it would be good to take them on visits of various centres of arts, heritage, and culture, and to centres of economic activity in the local region that are safe for young children. These include farms, health centres, a railway station, post

office, industries and businesses, including factories. The principal of the school must be empowered to arrange these visits and must be given a fund for the purpose.

In addition, students must be allowed to actively participate in tasks that are safe for them such as gardening, theatre, music, dance, star gazing, pottery, sports, yoga and more.

3.3.3 Middle stage (100 – 200 words)

This is the stage where many more participatory, hands-on, experiential learning opportunities must be given to students. They should be allowed to work in labs and use tools and workbenches of various kinds such as for electrical wiring. They can be given access to appropriately designed activities in tinkering labs, electronics labs, computer hardware labs etc., and be taught programming using flow charts. Given that students drop out at this stage, some basic financial and digital literacy must also be imparted to them. They can be taught the rudiments of budgeting, costing, and pricing of goods and services etc., and to be able to use computers to do some of these activities. It is important to keep in mind that the vocational exposure given to them at this stage should preferably be tied to livelihood opportunities in the neighbourhood or to more broad-based and generic knowledge such as computer hardware and software. It would be preferable if some of this vocational exposure is delivered at NSQF levels 1-2 in early preparation for the world of work. This would be important for students who are forced to drop out for economic reasons. Some students will also move out of school and into ITIs at the end of this stage and may require some career counselling. Their mobility beyond this step also needs to be investigated, with a view to allowing them to return to school if they would like to.

3.3.4 Secondary stage

There will now be two distinct groups of students undergoing vocational education at the secondary school stage (Grades 9-12), and it is important to cater to both groups. These are: i) students who intend to continue into higher education but are looking for exposure to vocations, particularly in Information and Communication Technologies (ICT) or other futuristic domains such as Artificial Intelligence, Machine Learning, and Internet of Things, etc.; and ii) students who intend to move out of school into the world of work/ or go in for specialised training in ITIs/ Polytechnics after completing Grade 10 or Grade 12 depending. The Samagra Shiksha Abhiyan focuses on the latter group. Both sets of students must receive courses that are aligned with NSQF levels: students opting for the world of work must be adequately prepared in a particular vocation - at NSQF level 2 or higher in Grade 10 and NSQF level 4 by grade 12. Students opting for vocational exposure can either take the same courses or stop at lower levels of NSQF. Again, provision of horizontal and vertical mobility for all these students is a key consideration and students must have adequate choice of vocations in both streams.

3.3.5 School Dropouts

The NEP suggests that school dropouts be brought back to school. They must have access to evening/night school, access to computers and Internet through the school complexes so that they can take online classes and access material from the National Institute of Open Schooling (NIOS). Massive digitalisation of vocational education will help to create videos and teaching material related to different vocations so that they can learn the basics offline before approaching their practical training.

The NIOS works through Accredited Vocational Institutes (AVIs). School complexes must therefore register either as AVIs or as their sub-centres.

One of the main difficulties that students have is that much of educational material, particularly the advanced material, is available only in English. It must be ensured that all students should be taught functional English with good communication skills in it which will empower them to make use of all the digital material that is available on the Internet. Ensuring the availability of translations of all this material into multiple languages would be ideal.

3.3.6 Adult Education

Adult education in Karnataka has been renamed as Mass education as of 1988-89. It is managed by the Directorate of Mass Education under the Department of Skills, Livelihoods and Entrepreneurship. There is also a Karnataka State Literacy Mission Authority (KSLMA) which is an apex body for funding and monitoring of literacy programmes in the state. Some of the programmes focus on livelihood generation and vocational training. However, there does not appear to be any concerted effort to measure and check whether the persons selected for the education programmes have attained the desired basic literacy levels. No recent data is available for such mass education programmes. It must be ensured that all adult education programmes including vocational education and training is delivered at high quality.

3.4 Implementation of NEP 2020 recommendations relating to vocational education (100 words)

It is important to begin by reiterating the fact that vocational education is expensive and that unless both the central and state governments provide generous, additional, funding the implementation of vocational education cannot succeed. In terms of governance and administrative approaches, it is necessary to learn from the experiences of the past, also listed in other sections including section 3.2, and to adopt agile implementation models in which monitoring is centre stage and implementation plans are revised based on outcomes that are reviewed continuously. The National Committee for the Integration of Vocational Education (NCIVE) recommended by NEP 2020, will consist of experts in vocational education and representatives from across ministries and industry. It will oversee the integration of vocational education and keep the implementation agile. A committee on similar lines can be considered in Karnataka, aligned with the objectives of the NCIVE. Such a Karnataka Council for the Integration of Vocational Education (KCIVE) can be a standing committee that is the go-to place for stakeholders and implementers to report both challenges and successes. The KCIVE can help them resolve issues and disseminate best practices, speeding up implementation. In line with the NEP 2020, the state must aim is to ensure that by 2025, at least 50% of learners in the school and higher education system shall have exposure to vocational education, for which a clear action plan with targets and timelines needs to be developed. The development of vocational capacities must go hand-in-hand with the development of academic and other capacities. Vocational education needs to be truly integrated into the educational offerings at all levels of secondary school (Grades 9-12) in a phased manner over the next decade. Towards this, secondary schools must be

empowered to collaborate with ITIs, polytechnics, PMKKs, KVKs, Tool rooms, local industry, etc. for use of their physical infrastructure for practical training. Workbenches and skill labs for one or more specific vocations, called skills hubs, must also be set up within schools in a hub and spoke model. With regard to the theoretical knowledge related to the various domains of vocational education, a two-way connection needs to be established between the vocations that are being offered by the schools and all the other common subjects that are taught in schools such as science, mathematics, history, social science and so on. The textbooks for the various subjects must indicate connections to various vocations and the material for vocational domain knowledge must draw from these subjects. The latter is of course easier to do than the former.

Higher education institutions can offer vocational education either on their own or in partnership with industry, businesses, Non-government organisations (NGOs) etc. The Bachelor of Vocation (B.Voc.) degrees introduced by University Grants Commission (UGC) in 2013 will continue to exist, but vocational courses can also be made available to students enrolled in all other bachelor's degree programmes, including the new 4-year multidisciplinary bachelor's programmes. HEIs will also be allowed to conduct short-term certificate courses in various skills including soft skills. 'Lok Vidya' i.e., important vocational knowledge developed in India, will be made accessible to students through integration into appropriate vocational education programmes. The focus areas for vocational education in different locations, in school as well as higher education, will be chosen based on skills gap analysis and mapping of local opportunities.

Individual institutions that are early adopters must innovate to find models and practices that work and then share these with other institutions through mechanisms set up by NCIVE and its state counterparts, to help extend the reach of vocational education. Different models of vocational education, and apprenticeships, can also be experimented with by higher education institutions. Incubation centres will be set up in higher education institutions in partnership with industries.

Work on detailing the National Skills Qualifications Framework (NSQF) is in progress and a new National Higher Education Qualification Framework (NHEQF) was recently put into the public domain by UGC for comments. The NSQF needs to be specified in detail for each vocation/ profession and mapped to the appropriate National Occupation Standards (NOS). Most importantly, the NSQF needs to be associated with a credit framework just as the NHEQF has been.

In tandem with the NHEQF, the NSQF will allow horizontal and vertical mobility between the present world of skill development that is being overseen by MSDE, NSDC, and the skill development initiatives of the states/ UTs; and the world of vocational education that is overseen by MoE and the departments of Education in the states/ UTs. These frameworks will also provide the basis for Recognition of Prior Learning (RPL) through which dropouts from the formal education system will be reintegrated, by aligning their practical experience with the relevant level of the appropriate Framework. In addition, Indian standards will need to be aligned with the International Standard Classification of Occupations (ISCO) maintained by the International Labour Organization (ILO)

and some of the international qualification frameworks such as the European Qualification Framework (EQF) to support student mobility internationally. At present this is not so.

3.4.1. Vision and plan for implementation (Please provide responses to the issues raised in NEP 2020, such as whether Vocational Education to be introduced as a separate curricular area or whether in integrated manner at different stages of education? How Vocational Education should be taught at different stages/classes highlighting stage-wise approaches. Also, its relationship with other subject areas, integration with pre-vocational education, scope for providing indigenous knowledge, multilingualism, etc. at all stages).

The draft NEP 2019 [DNEP 2019] contains many suggestions for the implementation of vocational education that are based on the introduction of the semester system, in Grades 9-12. Many states including Karnataka will need to offer PU colleges the option of either expanding their offering to include Grades 9-10 or give up the school sector and upgrade themselves into undergraduate colleges. Existing secondary schools must be allowed to offer Grades 11-12 and the school and PU Boards must be harmonised. This will double the capacity across Grades 9-12 which is a silver lining since the NEP envisages that every child will be kept in school till Grade 12. As of now the higher secondary system is catering to only approximately 56% of students because of dropouts [UDISE 2020]. However, it remains to be seen if state governments and PU colleges are open to these changes. *Without being able to institute a semester system within a consolidated secondary school, and a credit framework that supports common courses and electives, it will be near impossible to integrate vocational education* while also offering students a choice of subjects as per their interests and aspirations as mandated by the NEP.

3.4.1.1 Foundational stage (100 – 200 words)

Vocations and their connect to real life are very attractive to young children who are generally very curious about the people around them, the languages they speak, the tasks they do, and so on. They want to emulate most roles they see around them, their teachers, artists of all types, even people offering services at home and their community such as cooks, security persons/ policemen and more. Parents contribute to satisfying their natural curiosity and are happy to encourage these interests at early stages, and the same must be done in school. Since this age group is perhaps too young to make visits to various locations, imaginative projects in schools such as tracing their own family trees, mapping the professions/ vocations of each grandparent, uncles, aunts, and so on would be interesting and safe ways to introduce children to vocations.

It is important to remember that there is a wide variation in the capacity of children in this age group. 6–8-year-olds can be handled differently from 3–5-year-olds for instance. The former can and be introduced to the diversity of the country, the costumes, cuisines, languages spoken and so on, by also involving the parents who can help source the necessary material. They can also be

introduced to flora and fauna, the night sky and so on, besides becoming fluent at speaking and listening 2-3 languages, and beginning writing in just one language.

3.4.1.2 Preparatory stage (100 – 200 words)

The focus at this stage should be on consolidating language skills, speaking, listening and reading fluently in 2-3 languages and seeking to make them bi-lingual in the regional language and English, after having transitioned them away from their mother-tongue should it be different from the regional language. The activities towards these goals include reciting rhymes/ poetry, singing songs and reading library books in multiple languages and consolidating writing skills in one language while beginning a new alphabet. As in the foundational stage, Arts including performing arts and sports, particularly team sports, are very important to build upon. Volunteers can be drawn from local communities and from among parents to help with all activities - storytelling, poetry, music, theatre and so on, as well as building up their knowledge of the local flora and fauna, and the local arts, heritage, and culture.

Students in this age group can be given demonstrations and be taken for visits to various locations of economic and social activities to learn about their communities, the various occupations people are engaged in and so on. As mentioned by the Prime Minister of India, Shri Narendra Modi, in Shiksha Parv, if there is a train station in a village children must be taken there when the train is on the platform. The train itself, its workings, and a range of activities around transportation including various services can be discussed with them. Similarly visits to post offices, primary health centres, farms, factories etc. can be organised. One interesting activity could be to invite a parent/ community individual each week to discuss their source of livelihoods with the children. Parents and other family members and community members are important resources that must be tapped into to the maximum extent possible. Schools can draw upon local artisans and crafts persons, people with knowledge of local habitats, and other expert practitioners to give interesting demonstrations to children. Some of these activities can also be continued into the middle school stage.

3.4.1.3 Middle stage (100 – 200 words)

This stage is vital from the point of view of vocational education. Besides all the other goals listed above, vocational education must contribute to helping children find their interests and abilities. Schools must provide them with career guidance and counselling and seek to stem the excessive dropouts that happen during and at the end of this stage. Some of the provisions of NEP 2020 such as preparation for the world of work, career guidance and counselling would normally be made available to students at the secondary stage. However, since over half the children that are dropping out are doing so for economic reasons, these provisions can be made available to them already at this stage.

Students can be exposed to food processing, many aspects of agriculture such as dairy, poultry, horticulture, and floriculture, aspects of arts, heritage, and culture such as weaving, sculpture and handicrafts, monuments, their history and preservation, certain fundamental aspects of electrical

services, construction related activities such as woodwork, plumbing, water supply, etc., knowledge of their local habitats, its natural resources such as medicinal plants, and so on. Mapping of locally available crafts/ trades and the drivers of the local economies can be done collectively by government departments and the schools to plan their exposure activities and career track vocational education offerings accordingly. The District Skilling Committees (DSCs) that have been set up by the MSDE can help with relevant local information and guidance [UNESCO 2020]. In addition, schools should be provided with computer labs and devices so that students can be introduced to computer hardware and software, concepts of programming, some computer games that aid learning, and so on.

3.4.1.4 Secondary stage

The vocational exposure related activities can continue up till Grade 12 but the focus of this stage must be the introduction of ‘career track’ programmes of vocational education. Here the choice of the vocations that will be offered to students will be the most important factor that determines the plan for implementation in each secondary school (Grades 9-12). This choice of vocations will be different in rural schools relative to urban schools. In the former, some vocations must be selected largely on the basis of the local economy and its capacity to absorb trained youth. This task will require skill, commitment and effort on the part of the planners, and can be entrusted to a newly formed KCIVE or another suitable body that can assist principals and teachers and coordinate with them, with the DSCs, with industry and employers and with the government for this purpose. As in the case of urban schools, some vocations that are offered in rural schools must also be from industry 4.0 and from green skills which are futuristic new areas and aspirational for children.

The National Skills Qualifications Framework is being associated with a credit framework and is being detailed further for each vocation/ profession across domains by MSDE. Each NSQF level is also being mapped to the National Occupation Standards (NOS). It must be ensured that this activity corrects the existing anomaly in the nomenclature of the NOS and the Qualification Packs (QPs) and align them with the International Standard Classification of Occupations maintained by the International Labour Organization. This Framework can also provide the basis for Recognition of Prior Learning for youth and adults. Through this, dropouts from the formal system will be reintegrated by aligning their practical experience with the relevant level of the Framework. The credit-based Framework will also facilitate mobility across general education and vocational education. Towards this, secondary schools will need to collaborate with all sources of physical infrastructure, ITIs, polytechnics, PMKKs, Tool rooms, local industry, etc. Skill labs will also be set up and created in the schools or school complexes in a hub and spoke model which will allow other schools to use the facility. In addition, school complexes and will be provided with the infrastructure and staff to support all the activities of all the schools in the neighbourhood.

3.4.1.4 Adult Education (100 – 200 words)

The pandemic has interrupted all mass (adult) education activities. The way forward appears to be the roll out of the state’s approved plan under the Padma Likhna Abhiyan of the Government of India that focuses on basic literacy in a four-month cycle and is open to integration with the Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA), and activities of other ministries/ departments such as skill development, culture, sports, youth welfare and so on. Assessment of the attainment of basic literacy will be tested by the NIOS three times a year.

All interested adults must have access to adult education and lifelong learning. A key initiative in this direction will be to use schools/ school complexes after school hours and on weekends and all available public spaces for adult education and for other community engagement and enrichment activities. The sharing of infrastructure for school, higher, adult, and vocational education, and for other community and volunteer activities, will be critical for ensuring efficient use of both physical and human resources as well as for creating synergy among these five types of activities. Community members who are willing to support these activities must be roped in, and a financial model adopted that will ensure their continued involvement in keeping the infrastructure in use continuously.

For similar reasons, Adult Education Centres (AECs) can also be included within other public institutions such as HEIs, vocational training centres, etc.

3.4.2 Implementation strategy (What are your approaches/ strategies for infusing state/ regional flavours, such as, local traditions, knowledge, practices, wisdom, stories, rhymes, proverbs, toys, games, etc. in curriculum and pedagogies).

Although the approach to implementing plans for the integration of vocational education into all levels of school and higher education will be the similar across states and UTs, many details of the actual implementation will be different within these regions, depending on local contexts relating to local economies, the types of infrastructure available at various schools, the availability of sufficient human resources - teachers, expert resource persons, community volunteers - for teaching and providing practical, hands-on, training at various locations.

The most important step that needs to be taken towards successful implementation of vocational education is to hire, train, and station adequate human resources at every school. In particular, a cadre of vocational teachers/ coordinators must be hired, trained, and stationed at every upper primary (Grades 6-8), secondary and higher-secondary schools (Grades 9-12). The responsibility of these vocational education teachers/ coordinators would be to: i) to cover the theoretical aspects of the knowledge of different vocations that they are competent to take up and to coordinate with other teachers including subject teachers in the school to integrate the discussion of various vocations into their classes; ii) to coordinate with industry and employers to bring in expert teachers/ trainers as needed; iii) to oversee the induction, running and maintenance of various labs, workbenches, and other infrastructure at the school; and iv) to conduct all the practical sessions for vocational courses with assistance from attendants and volunteers including senior students, as needed. Since vocational education involves technical knowledge including that of computer hardware, software, networks etc., this cadre must preferably be drawn from among engineers. The latter can manage the labs and workbenches more confidently and can also teach some of the theory classes associated with various domains alongside subject teachers.

Regional flavours can only come from drawing upon the knowledge of local resource persons who have the knowhow and the expertise in aspects of arts, crafts, language, culture, and so on. The knowledge and experience of parents and other family members of the students can also be made use of judiciously. The vocational teachers/ coordinators can be given the responsibility to actively seek out such persons from within the community and schedule their interactions with students. For this reason, vocational teachers/ coordinators must preferably be engineers who hail from the local region of the school. In this connection, the recent move of the Karnataka government to expand eligibility for schoolteacher positions to include engineers is a step in the right direction. They can be given a specially designed one-year B.Ed course (as specified in the new NHEQF) that will serve to orient

them towards their key responsibilities in the successful implementation of vocational education. Further details are discussed in the following sections.

3.4.2.1 Foundational stage (100 – 200 words)

Anganwadi and primary school staff must be chosen and stationed in such a way that between them they speak at least two languages, and preferably three, including the regional language and the mother tongue of most of the children in class in rural areas. In terms of resources, children must also have access to toys, art material, music, dance, and storytelling sessions, etc. Interesting posters with a lot of learning material including the alphabet in various languages, must line the walls of the classrooms at the eye level of the child. Existing Anganwadi and primary school staff can be trained and their numbers supplemented as needed. The content of the training for them can be left to the Foundational Literacy and Numeracy scheme and other planned activities in ECCE.

3.4.2.2 Preparatory stage (100 – 200 words)

Students have learnt social skills by this age and are able to play with their peers and to learn from them. A focus on communication skills, motor skills, and callisthenic skills through sports and yoga, and most importantly as mentioned earlier, learning how to speak fluently in two to three languages and writing in one or two languages is the key at this stage. Primary schools are typically serviced by just one or two teachers, but this will need to change and a sufficient number of teachers with fluency in all the languages of interest to the school and to the students will have to be hired and stationed. With Grades 1-5 now split into two stages, there will have to be careful assessment of the need for additional teachers and state governments must be committed to hiring and stationing them. Teachers can of course be shared across these two stages provided they are co-located.

3.4.2.3 Middle stage (100 – 200 words)

At this stage students can begin to engage in a lot of hands-on activities. One best practice that has emerged is a module known as Introduction to Basic Technology (IBT) that originated in Maharashtra at the Vigyan Ashram in Pabal, Maharashtra, as far back as in 1987. It involved students in Grades 6-8 working with their hands on one of four sets of experiments each week for a whole afternoon. IBT has had phenomenal success after its initial foray into government schools. In recent years the NGO Lend-A-Hand-India (LAHI) has taken this model out to many states in the form of Multi Skilling Foundation Courses (MSFCs) that are offered to students in Grades 9 and 10. These consist of four sets of experiments in diverse areas: i) Workshop and Engineering Techniques; ii) Energy and Environment; iii) Food processing techniques; and iv) Gardening, Nursery and Agriculture Techniques. More such groups of multi-skilling courses can be designed in new and upcoming areas of the economy and the content of existing MSFCs revised as per local needs, also for students in the middle stage. Since hands-on activities take time to work on, these must be treated like lab courses and be offered over a longer period, preferably one whole afternoon each week at minimum.

In addition, courses involving computational thinking, knowledge of computers, commerce, programming and so on, meant especially for students who are either moving out into ITIs or into the world of work can be offered to students at this stage. ITIs need to be integrated with local schools and students moving to the ITIs must have the opportunity to complete their grade 12 certification from either a nearby school or through the AVIs of NIOS. As mentioned earlier, vocational courses of the

NIOS are delivered in partnership with AVIs (Accredited Vocational Institutes) of which there are over 600 in number around the country at present. The feasibility of registering all school complexes in the country as AVIs needs serious consideration since this would expand the reach of NIOS enormously and also help to serve those states that do not have open schools.

To facilitate learning for all students, with special emphasis on Socio-Economically Disadvantaged Groups (SEDGs), the scope of school education needs be broadened to facilitate multiple pathways to learning involving both formal and non-formal education modes. The aim must be to ensure that students who drop out for various reasons have the opportunity to complete their education. Students must be encouraged not to drop out to the extent possible and by providing them with counselling and guidance. It is important to keep in mind that counselling and guidance must be provided to students without prejudice. For this reason, online models of offering counselling and guidance such as the career portal prepared by UNICEF⁴ in multiple Indian languages [UNESCO 2020], can be considered for adoption by the state of Karnataka. Another option would be to commission such a module for the state. Vocational interest inventories has been prepared by PSSCIVE, Tata Strive and others. However, it must be kept in mind that student interests can change considerably during their time in school and after. Vocational Aptitude testing has been seen to be unreliable in children below the age of 18 and its use must therefore be avoided.

Open and Distance Learning (ODL) programmes offered by the National Institute of Open Schooling (NIOS) and State Open Schools must be expanded and strengthened for meeting the learning needs of all young people who are not able to attend a physical school. As per the NEP 2020, NIOS and State Open Schools will offer the following programmes in addition to the present programmes: i) A, B and C levels that are equivalent to Grades 3, 5, and 8 of the formal school systems; ii) secondary education programmes that are equivalent to Grades 10 and 12; iii) vocational education courses/programmes; and iv) adult literacy and life-enrichment programmes. States are encouraged to develop these offerings in regional languages by establishing and/ or strengthening their respective State Institutes of Open Schooling (SIOS).

3.4.2.4 Secondary stage: Classes 9 & 10 (100 – 200 words): Classes 11 & 12 (100 – 200 words)

As discussed in Section 3.2.1.4, this stage will focus largely on the career track although the vocational exposure track will also continue to be available to students. The difference in the treatment of these two tracks would be the shorter duration of the exposure course. These would last one semester and offer NSQF certification up to level 2 at most. On the other hand, the career track would guide the student through two or more courses spread over multiple semesters leading up to NSQF level 4 certification in a particular vocation.

At this stage, a bouquet of courses must definitely include some vocations relating to the IT and ITeS (IT enabled Services) sector, and the green skills in construction, transport, energy and so on, and select vocations in other domains that are seeing shortages in manpower locally and are suitable for introduction in schools. Some examples in Karnataka would include [KSDP 2017]: i) Agriculture and allied, including horticulture, cold chains, food processing etc.; ii) Construction, covering green standards and green jobs; iii) Tourism, travel, hospitality, and trade; iv) Transportation, logistics, warehousing, and packaging. The aim must be to prepare students for long time engagement with their vocation, not on narrowly defined job roles as is presently defined by the individual National Occupation Standards. The Qualification Packs which represent groups of NOSs need to be done away

⁴ <https://www.unicef.org/documents/india-every-child-learns-education-strategy-2019-2030>

with and the NOSs itself defined more expansively to include multiple skills and job roles within a sector, as is done internationally.

There must also be adequate choice of vocations for women, particularly in rural areas. As mentioned earlier, each NSQF level must be mapped to a collection of job roles, across multiple sectors if called for, so that they form a coherent whole. The aim is to make sure that the credentials of students who leave school with NSQF level 2/ 4 certification in a particular vocation are recognized by the employers. For this the Karnataka SCF and NCERT's NCF teams must engage with MSDE and its bodies at the Centre and all the concerned bodies in the states to map curriculum to the requirements of various vocations.

All existing infrastructure for training available with different institutions must be used maximally by running them for long hours, say 6am – 10pm. The infrastructure must not just be accessible, they must also be serviced in terms of having trainers available to help novice users during this time. This will require the infrastructure to be managed innovatively in a self-sustaining way that pays for staff to man the facility and optionally also to pay for its maintenance. The costs of maintaining the infrastructure including replenishing consumables, and of paying trainers, could be large in some cases and require government investments periodically. Local youth who are looking for economic opportunities can also be trained and stationed at these facilities to support users.

3.5. Strategies adopted for teaching-learning in schools (200 -300 words)

Irrespective of the vocations that are being taught, the focus must remain on ensuring that students develop all 21st century skills which include not just the social and emotional skills such as persistence and resilience to rise from failures, empathy, negotiation skills and so on as are listed in the UNICEF comprehensive life skills framework for India [UNICEF 2019] but also higher-level cognitive skills that include problem solving ability, critical thinking, and teamwork. These will require moving away from the lecture format that is so prevalent today and relying much more on experiential learning, on project work both individually and collaboratively in teams, and on discussion among students of the experience of doing the project as well as its outcomes in class. Students must be treated as fellow learners by the teachers so that their confidence, motivation, and enthusiasm are channelled into productive outcomes, tempered by an experienced view of the realistic level of achievement, that is brought in by the teacher.

The use of digital technologies is here to stay, and the World Economic Forum has discussed ways to inculcate 21st century skills using technology [WEF 2016]. Audio and video recordings are extremely useful tools for reinforcement of learning. Recording lectures and discussions must become a routine task in schools to the extent possible given that this is easy to do today due to the availability of resources. The recordings can be stored online and students can go back and hear the discussions and jog their memory regarding important aspects they may have missed. Even audio recordings out to be enough for this but the optimal usage of audio/ video will only become clear after some experience.

A complete reinvention of not just the present lecture format but also classroom arrangements is necessary. Students must be seated in groups in circular arrangements so that they can discuss with each other during class hours. Teachers must shuffle the groups each week so that students interact with all their classmates. There are many other such best practices that need to be gathered and implemented.

3.5.1 What teaching strategies are to be adopted if the pandemic continues (200 – 300 words)

The pandemic resulted in the widespread adoption of technology for teaching/ learning against all odds. Irrespective of the future course of the pandemic, digital technologies must continue to be used to the maximum extent, given their ability to supplement and reinforce learning among students. Both digitisation of existing educational material, and digitalisation of education must be adopted in a big way. The latter involves making use of computers and the Internet to introduce new ways of teaching, learning, and assessment such as hybrid models of physical and online learning, flipped classrooms, and the extensive use of videos and podcasts, both in classrooms and outside.

The need for digitalisation of vocational education is critical. There is increasing automation in all sectors of the economy. This forces students and teachers to treat sophisticated machinery as black boxes. It then becomes important to make use of videos of their internal workings to explain the concepts to students. Knowing about the insides of smart phones and laptops are a simple example. As technology becomes more sophisticated, short modules on battery technologies, the design of solar panels, designs of various parts of cars and aircraft, and so on, can be incorporated into video recordings and into simulators, and embedded into online learning material for students, replacing textbooks.

Any discussion of the use of digital medium must be accompanied by solutions for bridging the digital divide. As discussed in earlier segments of this report, schools and school complexes must be given adequate computer hardware and software that would be the responsibility of the Teacher/ coordinators to maintain and ensure fair and continuous use of. The Karnataka government can also consider giving devices to students from low-income families.

3.5.2 Different levels within subjects at the secondary stage (300 words) (What should be done to provide flexibility in choice of subjects to students as per the policy perspective? What would be its implications for the lower classes?). (300 words)

As discussed earlier, the introduction of a semester system for the entire secondary stage, Grades 9-12, is the first step towards introducing different levels of individual subjects and providing choice for students. The curriculum at the secondary stage must be split into a common curriculum that is mandatory for every student to take, and a large set of electives that the students can choose from. Courses in many subjects could be split up into basic and advanced levels. The basic level courses can be made part of a common curriculum that is assigned up to 60% of the semester time. The balance, advanced level courses such as advanced mathematics, data structures and algorithms (meant for students of Industry 4.0 courses), etc., including other vocational courses, can be offered as electives. Such a split in course content is unlikely to have any impact on the lower stages since we are only reviewing the syllabus of the secondary stage holistically, reducing the present content in these courses and introducing more activities that prepare students to learn how to learn, and splitting some (not all) courses into a common basic curriculum and an elective. The lower stages, especially the middle stage, can be arranged in a similar fashion if necessary.

The common curriculum can include such as basic mathematics, one language, social science, introduction to computer hardware and software courses that focus on usage of computers and the Internet in everyday life, (digital literacy) financial literacy (if it has not already been taught at the middle stage), and so on, while advanced mathematics, programming, and other IT related courses such as algorithms, data analysis, etc. can be left to student choice. Sciences can be taught as a single

subject in grades 9-10, but the separate subjects of physics, chemistry, biology, can be offered as electives in grades 11-12, along with electronics, economics, and many other subjects.

The challenge of timetabling of the courses can be overcome by making use of appropriate software. Schools can for instance, choose to use the mornings to run common courses and the afternoons to offer electives. Given that some students will move out of school into specialised courses after Grade 10, into ITI and Polytechnics, some planning will be required to ensure that these students receive all the common courses they need during Grades 9-10. In this effort, the present curriculum could be used as guidelines. All students can be offered volunteer work or additional training in the summer.

In terms of subjects/ disciplines/ sectors of the economy, one of the most important sectors that need focusing on in secondary schools, both in rural and urban areas, is IT and IT enabled services (ITeS). The course offerings from PSSCIVE in these areas is minimal at present. It is critical that India leverage the native comfort that young students have with technology to introduce them to programming, knowledge of computer hardware including mobile phones, operating systems and software, and related topics. All secondary school students must be encouraged to work with computers irrespective of whether they will eventually specialise in the arts including performing arts, humanities, social sciences, or sciences, since all these subjects are now IT-enabled. Secondary school is the best time to target achieving this goal, and with the help of engineers inducted as vocational teachers, as discussed earlier. They should be able to setup and run a modest IT lab in all secondary schools. Innovative financing methods including corporate sponsorships, PPP models, and philanthropy can be made use of as needed to deploy these labs.

A report by the Ministry of IT, Government of India, called out a USD 1 trillion digital opportunity for India which led to NASSCOM partnering with the ministry to launch India's digital skilling platform FutureSkills Prime in November 2020. MoE's vocational education program could consider working with NASSCOM, the SSC of the IT and ITeS sector, to introduce appropriate versions of their courses in secondary schools. Early versions of courses on Industry 4.0 and emerging technologies such as Robotics, Nano Technology, Internet of Things, Autonomous Vehicles and so on can give Indian students an early edge.

3.5.3 How do you suggest having different levels within courses/subjects as proposed in NEP 2020 (200 – 300 words)

This question is similar to the previous question. The suggestion for the secondary stage has been outlined in 3.5.2. The ideas would be similar in all stages.

With regard to the middle stage and below, it would be ideal to also have a semester system in the middle school stage to accommodate choices for students especially those who would like to opt for vocational education for the world of work at this stage, irrespective of how few they may be in number. At the lower stages it could be either an annual or a semester system. The choice would have to be made keeping in mind the need to minimise the pressure on students appearing for the key stage assessments at the end of grades 3, 5 and 8 as suggested by the NEP.

As discussed earlier, the choice of vocations that can be offered must be made by individual schools based on a study of the local economy. IT and ITeS courses can be common to all schools. Technical courses that will be beneficial to students in the longer term need to be given preference over more lightweight topics such as courses in the Retail sector that are being offered at present. The former can benefit from the longer timeframe available to teach students during school whereas the latter can

more easily be taken up by students at a later stage, as an elective sometime in the middle or secondary stage. The same is true of courses in tourism, beauty and wellness, etc.

3.6. Basis for identifying core competencies (What should be the basis/ criteria/ consideration for identifying core competencies/ major themes/ core content in Vocational Education to be included at different stages?) (300 words)

The word competency refers to the ability of a student/ youth to apply knowledge, skills, and attitudes (KSA) to complete a task that can be evaluated. Competency Standards are nationally recognized, industry-agreed definitions of competency. National Competency Standards align the expectations of training institutions with the expectations of industry. Training institutions understand the level that graduates need to be able to perform at to meet the needs of industry. Industry understands what level of performance they can expect from graduates. Graduates understand what will be expected of them once they complete their training and enter the workplace. In vocational education there are four types of competencies: i) generic competencies, that refer to 21st century skills that are essential for all workers at all levels; ii) Domain/ sector specific skills such as in healthcare, electronics, construction, and so on; iii) occupation specific skills that relate to a specialty within a sector; and iv) elective competencies that are not essential to the employability of a worker.

The word ‘core’ has not been defined in this question. Going by the definitions used in the NSQF which defines professional knowledge, professional skill, core skills, responsibility, and process required, we can identify core skills to refer to foundational literacy and numeracy, communication (reading, speaking, writing, listening) skills, and a basic understanding of the social, political and natural environment, up to level 4. Another way is to identify the knowledge, skills, and attitudes that are required for the chosen vocation, if these have not already been described under the other three parts of the NSQF specification such as professional knowledge, professional skills and responsibility. As an example, one can think of people choosing to work in the healthcare sector needing to have empathy, not just towards sick people, but also towards their families.

If professional (domain and occupation related) competencies are what is being referred to, then these are listed in India’s National Occupation Standards (NOS) and their Qualification Packs (QPs) that have been prepared with the involvement of industry for different vocations in each domain/ sector of the economy. The mapping of the NSQF levels with NOS and QPs for different sectors of the economy are updated and published from time to time by MSDE.

Unfortunately, however, these names of these standards are not aligned with the international usage of this name. In India, the word NOS is used to mean a standard (KSA) for a particular activity in the workplace associated with a job role. For example, for a sales associate, one NOS would be ‘To help customers choose the right product’ [Rai 2018]. This has led to a proliferation of NOSs (over 6000 in 2019) and the word QP was then coined to define the KSA for a sales associate. The unusual definition of NOS and QPs causes considerable confusion for students who are seeking to travel and work abroad. This mismatched definition needs be corrected during the implementation of NEP 2020.

3.6.1. Proposed core competencies at different stages (What are those core competencies that should be included in Vocational Education at different stages?) (200 words)

Given that the meaning of the word ‘core’ is unclear, the core skills that have been defined in the NSQF, listed below, will have to be complemented by the inclusion of appropriate levels of the

various 21st century skills and the special attitudes that are required for each vocation at the time of preparing the SCF and the curriculum.

3.6.1.1 Foundational stage (100 – 200 words)

Core skills at this stage are those associated with the attainment of foundational literacy and numeracy. Other aspects, such as respect towards elders and the environment etc., are commonly included at this stage. It is important to mention here that students make very fast progress in their mental and physical capacities during this stage. Therefore, there should be nuanced approaches to the expectations of what children between the ages of 3-6 need to know and what children between the ages of 6-8 know. These need to be specified in detail as part of the NCF for ECCE.

3.6.1.2 Preparatory stage (100 – 200 words)

Core competencies at this stage are those associated with consolidating foundational literacy and numeracy and attaining fluency in two to three languages. While children must be able to speak fluently in multiple languages, they must be expected to write comfortably, including ability in grammar, in preferably only one language, but optionally also a second language. For reading, they may be encouraged to become familiar with the fonts of a second or third language depending on their individual aptitudes.

3.6.1.3 Middle stage (100 – 200 words)

Training at NSQF levels for the world of work is generally thought of as being necessary at the secondary stage. However, as mentioned earlier, given the tendency for dropout among children at this stage, some of the vocational exposure courses offered at this stage can also be aligned with NSQF levels.

The core skills specified by NSQF level 1 are the following: Reading and writing, addition and subtraction, personal financing, familiarity with social and religious diversity, hygiene and environment. Similarly, the core skills specified by NSQF level 2 are the following: receive and transmit written and oral messages, basic arithmetic, personal financing, understanding of social political and religious diversity, hygiene and environment. As mentioned earlier these must be complimented with the introduction of various aspects of 21st century skills [UNICEF 2019].

3.6.1.4 Secondary stage

The NEP requires that training up to NSQF level 4 in at least one vocation is provided to every student at the secondary stage. Since we have defined the NSQF levels 1 and 2 in the previous section we describe only the requirements for training at NSQF levels 3 and 4 here. It is important to note that students can be given professional knowledge and skills even at level 5 in the NSQF, but they should not be expected to shoulder responsibility beyond level 4, given their age profile.

It is also important to remember that Multi-Skill Foundation Courses for vocational exposure can continue to be provided all the way till grade 12 since this represents an opportunity to expose students to many more sets of vocations. A wide exposure to many vocations can also help students better chose a vocation that appeals to them, to master at NSQF level 4. Although the latter prepares students

for the world of work it is entirely possible that several students will continue into higher education. This is acceptable, since the competencies gathered by the student are valuable to them.

Classes 9 & 10 (100 – 200 words): Classes 11 & 12 (100 – 200 words)

The core skills specified by NSQF level 3 are the following: Communication written and oral, with minimum required clarity, skill of basic arithmetic and algebraic principles, personal banking, basic understanding of social and natural environment.

The core skills specified by NSQF level 4, in the original NSQF notification, are the following: language to communicate written or oral, with required clarity, skill to basic arithmetic and algebraic principles, basic understanding of social political and natural environment. It is apparent that the core skills as described at level 4 is inadequate. These need to be expanded and supplemented in order to ensure that students are ready for the world of work.

The NSQF itself requires revision and improvement. If this is either underway or proposed to be done then we can wait for it, else we will need to supplement the above listed expectations for core competency during the work on the Karnataka SCF. Also, the NOSs and QPs will need to be aligned to the NSQF levels for defining the professional competencies. This activity is presumably in progress at the national level, in the context of the NEP 2020.

3.6.2 Time allocation for vocational education in school timetable (Time to be allocated (in percentage) for Vocational Education in the timetable across the stages, internships during bagless days, practical's, experiential learning, etc.?) (300 words)

The discussions regarding time allocation are being done here assuming that the length of the working day in school is 6 hours per day, 5 days a week with approximately 20 weeks per semester. This means that an activity for one afternoon a week, lasting three hours, would constitute 10% of the school time. The time allocation for vocational exposure, for the multi-skilling courses should ideally be in units of this slot, at a minimum of 1 slot or 10% of the school time. The single slot of 3 hours will ensure that students have sufficient time to work on their experiments/ projects etc. The time allocation for the pursuit of a vocation for the career track can then be completed by stringing these slots together over multiple semesters to make up the requisite times

3.6.2.1 Foundational stage (100 – 200 words)

At this stage most of the time should be reserved for activity based, play-based and inquiry-based learning including music and movement, songs, poetry, speaking different languages, conversations with adults around them on a variety of topics and so on. Children at this stage have shorter school hours so the time can be shortened proportionately. One other consideration is the higher level of stimulation that older children in this grade require relative to the younger ones.

3.6.2.2 Preparatory stage (100 – 200 words)

It would be good if a minimum of 20% of school time, or two afternoons a week, were to be reserved for vocational education, not including sports education, art education and so on. However, time allocation will also depend on the requirements of the curriculum so we may need to be flexible.

3.6.2.3 Middle stage (100 – 200 words)

Since it would be preferable to allow some electives at this stage, a minimum of 20% of the time and a maximum of 40% of the time can be reserved for vocational education. The compulsory 20% of time can be reserved for vocational exposure that is meant for all students and up to 20% more which represents one full day can be used in imaginative ways to enable students who may potentially drop out prepare for the world of work. The time for vocational exposure can also be used for making visits to industry and be counted as part of bagless days. Bagless days do not have to be contiguous.

3.6.2.4 Secondary stage

Since this stage will involve core subjects and many more electives than the middle stage, there will need to be more flexibility in offering electives and incorporating apprenticeship opportunities. For instance, one day a week can be reserved for using infrastructure outside the school for practical work and for apprenticeships if safe opportunities are available. As in the middle stage, between 20-40% of school hours can be used for vocational education at the secondary stage.

3.6.3 Vocational Pedagogy (200 – 300 words) (What pedagogies are being proposed to address Vocational Education (As per the NEP-2020, pedagogical approaches are to be joyful, competence-based, experiential integrated with Educational Technology/Information and Communication Technology etc.). Also mention the good pedagogical practices being followed in this regard in the State/UT).

For this discussion it is important to remind ourselves that vocational education in a particular vocation comprises multiple elements: i) imparting of theoretical knowledge related to the domain/ sector and the vocation/ occupation, at a particular NSQF level; ii) practical hands-on training in the practical component of the vocation/ occupation which requires the largest time allocation, approximately 60 to 70% of the course time; and iii) generic 21st century skills including higher order cognitive skills such as critical thinking, problem solving, teamwork, among others, and the personality characteristics such as persistence and resilience that help students recover from failures, empathy for others, negotiation skills, and so on. These skills that can be built most directly from change in pedagogies, from including project work, apprenticeships, internships, and team work as part of the learning process. One additional aspect is the integration of the occupations with other subjects, discussed below in the secondary stage.

Therefore, pedagogies that build these 21st century skills need to be adopted. The pedagogical practices being followed in Karnataka are only those of the Samagra Shiksha Scheme which is focused on training students for the world of work. Their method is to involve private sector training partners of NSDC in this effort which means that there are no activities in the school classrooms and there is no information about the pedagogies being followed by the training partners. The NEP seeks to change this by returning vocational education to school classrooms.

Apprenticeships and Internships are an important pedagogic tool since the students learn a lot more from their overall experience at their workplace than just about their own job. However, apprenticeships require considerable commitment from the industry/ business partners in terms of investing the time of their staff to train the students, in terms of ensuring safety for students and much more. It is not very common that students can contribute to production during these sporadic

apprenticeships. They will need to spend most of their time shadowing the staff who are working at these places. Therefore, it remains to be seen as to what kind of apprenticeships industry and businesses can make available to students in different geographies. The better approach could be to focus on providing summer apprenticeships to the extent possible, to students in the secondary stage who are preparing for the world of work.

Since the focus in the NEP is on competency-based learning, teachers must be trained to be able to specify what the students ought to know and be able to do at the end of each of their classes.

3.6.3.1 Foundational stage (100 – 200 words)

As mentioned in NEP the pedagogies will be play-based, activity-based and inquiry-based learning. The focus is on learning language, developing motor skills, callisthenic skills and so on as discussed in earlier sections including section 3.5, and developing school readiness among 5-6 year olds.

3.6.3.2 Preparatory stage (100 – 200 words)

The pedagogies to be used at this stage builds on the pedagogies of the earlier stage to ensure that foundational literacy and numeracy has been attained, and to build further on language skills. Students become ready for learning abstract concepts.

3.6.3.3 Middle stage (100 – 200 words)

Vocational exposure through multi-skilling will focus pedagogies on activity-based and project-based learning. Students must be encouraged to reflect on what they have learnt and how it relates to the community and the society around them. Teamwork and problem solving needs to be emphasized.

3.6.3.4 Secondary stage

While the domain and vocation/ occupation related aspects of theoretical knowledge and practical training will be reflected in the curriculum, achieving the third aspect of soft skills will rely heavily on the use of appropriate pedagogies. We discuss each of these in detail using an example from the healthcare domain. When students study the human body (they do this at different levels of detail in different classes) the classroom discussion must include the examination of blood reports, X-rays of various parts of the body, CT-scans etc. depending on the level of detail. Such reports are not difficult to collect from parents or the diagnostic institutions themselves and can be suitably anonymized if needed. During the discussions of these reports, the science teachers and/or the VE coordinators (role explained elsewhere) must mention/ introduce vocations such as nursing, lab technicians of various kinds working in diagnostic centres (blood, urine, stool analysis), blood banks, pathology labs, dialysis centres, and many more. In tandem with this, during the theory classes for vocational exposure, the teacher/ coordinator can explain some of these technologies at the appropriate level of detail. If there is a primary healthcare centre (PHC) in a rural area, or a hospital/ appropriate diagnostic centre in an urban area, students must visit there as often as necessary to witness different staff members in action (nurses, doctors, technical staff such as phlebotomists, X-ray technicians and so on) at work, and to learn about each of their roles and responsibilities from either the PHC/ hospital staff themselves or their teachers/ Coordinators. This would be sufficient for vocational exposure. In this example, it

would not be possible to provide sufficient practical training for the world of work unless apprenticeships can be arranged, during the summer holidays for instance.

With regard to pedagogies, students could be assigned project work to prepare case studies of health issues that have occurred in their families and the lines of treatment that were followed. They could be assigned projects in which they research the various solutions they have come across and present these in the classroom to improve their presentation and communication skills. They could be asked to investigate the costs of equipment, where they are manufactured, how many patients are served during the life of the instrument and therefore unit costs and so on. They can even be asked to investigate for side effects if any and think about the need and challenge of finding holistic solutions to health issues. In general, the pedagogies must involve reflection on individual and group projects, research work to learn more about various aspects of healthcare, trips to manufacturing facilities and more.

3.6.4 Strategy for holistic assessment (200 – 300 words) (What assessment strategies should be adopted so that holistic/360-degree assessment (for learning as learning of learning) both in theory and practical work can be done (300 words)

It is important to recognize that when the focus is on experiential learning, much of the assessment will automatically become subjective. Teachers will need to be trained to assess the students, in alignment with the parameters listed in the holistic report card.

With the induction of vocational teachers/ coordinators in schools, assessment of students should ideally be done wholly in school for students of vocational exposure, and for the most part in school for the career track. Practical work in apprenticeships/ internships will however, need be evaluated at the place of work. The present system of the SSCs assessing every student is not just expensive but also causes considerable delays and angst.

Finding apprenticeships and placement for students seeking work is a challenge that will have to be embraced by schools and a concerted effort put into this. Schools led by vocational teachers/ coordinators must build relationships with local industry and the latter must come forward, not just to employ apprentices/ interns, but also to employ more students pass outs at fair wages. A website listing the courses and the number of graduating students in each state/ region can help. At present the training partners of NSDC ‘assist’ with placements in the SSA but they do not provide any guarantees.

3.6.4.1 Foundational stage (100 – 200 words)

As per holistic report card, the progress being made by the student in foundational literacy and numeracy, in the development of interpersonal skills, motor skills, callisthenic skills etc., needs to be recorded and shared with parents.

3.6.4.2 Preparatory stage (100 – 200 words)

Assessment at this stage is similar to that of the foundational stage with one key difference. Students will take the national assessment survey at this stage, at the end of grade 3 and grade 5. The format of this assessment is something that students will require preparation for so that they can approach the NAS without fear or worry.

3.6.4.3 Middle stage (100 – 200 words)

Vocational exposure through multi-skilling can be assessed internally by teachers, both vocational teachers and subject teachers working in tandem, as part of internal assessment at this stage as well as at the secondary stage. The knowledge related to the domain/ vocation can be tested either as part of subject learning, or separately. The former can only be done if the topics covered under the multi-skilling courses are integrated into the curriculum, which would be ideal. The focus must be on ensuring that the aims and benefits of integrating vocational education into schools, listed in section 3.3, are being achieved.

3.6.4.4 Secondary stage (200 – 300 words)

Assessment of vocational exposure has been discussed in the previous section. Here we discuss assessment of vocational courses for the career track. Assessment of the practical component of the vocation will depend on whether the students are undergoing their practical work within school or outside school. In either case, the supervisors of the practical work can be asked/ trained to assess them. Students can be asked to maintain a record of the work they have been doing towards learning professional skills, much like a lab report and this can be used as the basis for assessment. Formative and Summative assessment of the professional knowledge in various vocational courses can also be offered online to give students the chance to complete this stage more conveniently. Holistic rubric-based assessment should be a part of the assessment and evaluation system for class participation, marking assignments, student portfolios and overall grades.

The last component namely the attainment of soft skills must also be assessed internally through the holistic report cards that document the progression of the student in attaining each of the skills. Assessment by the SSCs is expensive and can be offered as an additional evaluation so that only those students whose employers ask for certification from SSCs can opt for it.

3.6.5 Integration of cross-cutting issues and concerns (200 – 300 words) (What are the proposed modalities for integrating cross-cutting issues such as Vocational Education, employability skills, values, arts, inclusion of disadvantaged children and children with disabilities, ICT, health and physical education, indigenous knowledge and practices of India, role of community, gender, equity, environment conservation and protection, green skills, etc. in Vocational Education?) (300words)

Most of the topics mentioned in the question have been discussed elsewhere in the document except perhaps the support for disadvantaged children including children with disabilities. It is well known that technology can be used very effectively to integrate children with disabilities into mainstream schools or even to support them to study from home. However, we do not have the exposure to this area to be able to detail the specific solutions here. Many of them are likely to need tailoring for the specific needs of students.

3.6.5.1 Foundational stage (100 – 200 words)

3.6.5.2 Preparatory stage (100 – 200 words)

3.6.5.3 Middle stage (100 – 200 words)

3.6.5.4 Secondary stage

3.6.6 Plan for bagless days (200 ~300 words) (As per the State/National context, what kind of internships can be offered in the vocational area related to vocational subjects during the conduct of 10 bag less days from Classes 6 onwards?) (300 words)

The plan for bagless days must be made locally by schools and schoolteachers based on local contexts, availability of experts and resources, and based on the choice of vocations that are being offered in the school in both the exposure and the work streams. It is useful to remember that the bagless days don't all have to be taken together. They can be spaced out and planned for by both the teachers and the students working together. This could include demonstrations of various kinds and visits to the centres of economic and social activity around the school.

3.6.6.1 Middle stage (100 – 200 words)

3.6.6.2 Secondary stage (100 – 200 words)

3.7 Guidelines for curriculum developers (200 – 500 words) (Please provide guidelines for the syllabus and textbook writers including templates for the textbooks as well as those who develop teacher training material in line with the perspective of Vocational Education) (200-500 words)

The most important guideline to curriculum developers specified in NEP 2020 is to cut the content of present curriculum by half and to focus more on ensuring that students are picking up the concepts, and that they are learning how to learn. These goals can only be achieved through a change in the pedagogies that are adopted by teachers. Teachers must make innovative use of group work and assignments so that students become confident of being able to learn on their own and also work as teams. Towards this, students will need to be guided on the discerning use of the Internet, and to develop the ability to assess good and reliable sources of information.

The process of preparing the curriculum and textbooks, must involve multiple briefings by the vocational education teams to the science education, social science education, mathematics education and other teams and vice versa, so that the latter can incorporate these into their own curriculum. This activity that must continue on an ongoing basis, year after year, so that the curriculum is continuously improved and textbooks revised regularly.

Some aspects of the integration can also be left to the teachers in the schools to do, through using examples from vocational education as discussed in 3.6.3.4, to highlight the impact of concepts in science and other subjects.

3.7.1 Foundational stage (100 – 200 words)

In principle, no textbooks are needed at this stage. However, many books must be available to students in class so that they can flip through them at will and absorb the material at their own pace. Given also that many students may not have access to books at home, children above the age of say 5 years can be given story books that they can take home each day to read and discuss with their family members.

The school library must be stocked with many books in multiple languages for this purpose. Older students can be given activity sheets and they can record their activities on plain paper and file them.

3.7.2 Preparatory stage (100 – 200 words)

Students need access to school libraries that have books on many different topics in many different languages that are suitable for their age group. Since this stage is about consolidating foundational literacy and numeracy and introducing science and mathematics bi-lingually with English, and other subjects with the regional language, students need textbooks in these subjects in all the languages that are offered in schools. All other activities and the associated learning at this stage can be accomplished using worksheets and student workbooks.

3.7.3 Middle stage (100 – 200 words)

Textbooks must have wide margins that are annotated with notes, activities that students can take up including links to further material, and markers for various vocations connected to the material that is being discussed. For instance, as mentioned earlier, when children learn about the human body including the bone structure, circulatory system, the heart and the brain, they can respectively view X-rays, blood reports, ECGs, EEGs and CT scans of the brain in class, and discuss how the ancillary vocations/ professions in medical diagnostics assist doctors to arrive at decisions regarding the appropriate line of treatment. Such reports are not expensive to procure since old reports that are discarded can be anonymised and used. This can then be combined with visits to medical facilities at which children can view the machines that are used to prepare these reports. The depth of discussion and analysis will depend on whether this is being taken up at the middle stage or the secondary stage, but they can in principle be discussed at both levels. Perhaps ECGs and EEGs and CT scans can also be reserved for the secondary stage.

Textbooks must be accompanied by guidebooks for teachers that contain additional details regarding the material and also tips on how best to present the material to the children. Once the curriculum framework is ready, the government can make a call for textbooks and teacher guidebooks. Juries can be set up in various subjects. Jury members can review each textbook-guidebook combination and pass them for being compliant. Then schools and teachers can choose the particular combination of textbooks and guidebooks that they would like to use.

3.7.4 Secondary stage

A similar approach must be taken for textbooks in the secondary school stage. Vocations must be connected to every subject that are being taught in schools, including history in which vocations relating to tourism and preservation of tangible heritage structures and archaeological sites can be discussed, as also social sciences in which the various trades that people engage in within the community can be discussed along with the economics of these trades.

In addition to teacher guidebooks, textbooks will also have to be complimented by lab manuals for all vocational subjects that are being taught. These need not be printed ahead of time but must be available online for printing on a just in time basis in the form of worksheets. The use of worksheets that are constantly updated based on accumulated experience is also the best way to adapt learning material to local contexts. The study/ lab material can be made available on a central server and local schools can adapt it to their own contexts. Secondary schools must have heavy duty printers and paper that they can make use of for this purpose.

3.8 How can the entrepreneurial attitude and abilities of students be developed in schools?

Parents are a very critical resource for this task. Schools can invite parents who are either self-employed and run businesses of their own, or are entrepreneurs running larger companies, to come to school and talk to the students about their own journeys, especially the social contexts, the financial challenges and so on.

The case study method is likely to be most interesting and the most impactful method for developing the right attitudes and abilities. Students can be asked to prepare case studies of the entrepreneurial journey of other members in their families. These can be discussed in detail in class to highlight some of challenges that entrepreneurs face and specific ways in which these challenges can be addressed.

Students can also be allowed to experiment with running businesses while they are still in school, even if it is only at one-day fairs that are organised periodically for the community for which they prepare items for sale. However, in larger schools, students can also be allowed to participate in running canteens, gift shops, stationary stores, printing shop and so on, offering items that students consume regularly. Students can also be allowed to run classes for out of school youth and adults for a nominal fee. These experiences can feed into their own plans for themselves.

There can be regular sessions, either during school hours or outside, at which groups of parents and members of the school management committees and school complex management committees can have students present their business plans and discuss these plans with them. Business plans with potential can be developed with support from the community.

Seed funding can also be made available to students or student groups through many different arrangements with angel investors, and venture funders. The government can maintain a list of such funders whom schools can approach. Schools and all partner resource institutions must be given a clear message that entrepreneurial ventures are to be encouraged. The school and school complex managements can be given escalation paths which they can use to support students further. The challenge with doing all this is to find the right people to anchor this activity. It is not necessarily the teacher. Schools will have to look among parents and the larger community to find one or more resource persons who can anchor this activity.

3.9 Implementation of the recommendations on vocational education by Stakeholders

3.9.1 Students (100 – 200 words)

Students must be assisted to make use of the exposure available to them. They have to learn from their experiences to identify their interests and their abilities and plan their own career pathways. The vocational exposure they receive must be sufficient to help them make their choices. As mentioned earlier, aptitude testing is not reliable for students below the age of 18, but all students must receive career counselling and guidance without prejudice. Online versions of career guidance, such as the one developed by UNICEF are best for the purpose since they are neutral. Students must not feel under any pressure to join the world of work after having studied one or more vocations at NSQF level 4. They must feel free to carry on into higher education if they wish to do so. They will be enabled to do this (they will have vertical and horizontal mobility) through the mechanism of a credit system being associated with the NSQF and the NHEQF which will both work in tandem.

3.9.2 Teachers (100 – 200 words)

As discussed earlier in the document, there are presently no career pathways for teachers in vocational education. The implementation of the NEP will however create many jobs for vocational teachers/ coordinators in schools and will empower them. These teachers/ coordinators, working together with other subject teachers in schools and expert resource persons, the management of schools and the state government, have a unique opportunity to transform vocational education in the country. They can exercise their agency to help offer vocational education in schools in the spirit in which it is intended in the NEP. They can take charge of curriculum, pedagogy, and assessment for both vocational exposure and vocational education for the world of work.

3.9.3 Parents (100 – 200 words)

Parents are an extremely valuable resource for the implementation of vocational education in schools. They can contribute by functioning as resource persons and sharing their own expertise in their respective professions with students and by tapping into their acquaintances to help find more resource persons as needed. They need to be sensitised to the aim of the NEP of developing the creative potential in every child so that they can assist as many children as possible to find their calling.

Parents involved in various vocations can be invited as experts to schools for training students on different skills and for sharing their life experience.

3.9.4 School heads (100 – 200 words)

As a leader of a team of teachers in either a primary or a secondary school (grades 9-12), school heads have the responsibility to lead the change that is envisaged in the provision of vocational education by providing enabling leadership to all the teachers in the school. As discussed in the document, schools will need to interact much more with the outside world, with industry and businesses for visits, apprenticeships, resource persons, etc., but also for ensuring placements locally for their students.

It is well known that school heads have many responsibilities. An appropriate model of administration that can support school heads with their additional responsibilities towards vocational education can help improve their effectiveness.

3.9.5 Teacher educators (100 – 200 words)

This can only be addressed once the Karnataka government agrees to deploy vocational teachers / coordinators and releases details on their hiring.

3.9.6 Community members, including volunteers and entrepreneurs (100 – 200 words)

This group will have a role that is similar to that of parents described above.

3.9.7 National Skill Development Corporation

The NSDC, in its role as the key arm of the Ministry of Skill Development and Entrepreneurship (MSDE) is already playing an important role in the implementation of the Samagra Shiksha Abhiyan. Its vocational training partners are delivering the NSQF based courses in the SSA and its SSCs are conducting evaluation and providing certification. Going ahead, NSDC also has very important additional roles to play in the implementation of NEP 2020.

The NSDC ecosystem, including SSCs, as well as industry and businesses who provide apprenticeships and are referred to as Skill Knowledge Providers (SKPs), has a distinct preference to work with NOSs (National Occupation Standards) and QPs (Qualification Packs). Many thousands of job roles have been defined with narrowly defined content, as mentioned earlier, designed to be delivered as short-term courses. However, in line with the vision of NEP 2020 of moving vocational education into schools, SSA and the school education system will need to take a more long-term view from the students' perspective and design higher-value courses at each NSQF level that incorporate many relevant NOSs, from different QPs as necessary for each vocation. NSDC is working with MSDE and MoE to associate a credit-system with the NSQF levels and to align NSQF with the upcoming NHEQF. It must address all the deficiencies that have been highlighted so far in the NSQF itself and in the mapping of NSQF levels to NOSs that are aligned to international standards.

3.9.8 Sector Skills Council (SSCs)

These are for-profit organisations and they have been charging relatively high fees for conducting assessments of students. It would be wiser in the long run for governments to create the capacity within the school system to assess school students for the training that happens within schools. The students can always be invited to seek additional certification from the SSCs if they wish to do so.

3.9.9 Polytechnics

We are not very familiar with the quality of education that is currently being provided by polytechnics. Their course content and quality of delivery must be in line with the spirit of NEP 2020. If polytechnics have labs and other infrastructure that can be shared with schools and school complexes or even colleges, then they must be empowered to do so. In fact, as mentioned earlier in the document, there must be a framework for sharing infrastructure across institutions that is set up by Karnataka government. The framework must cater to the need to station staff who can support the use of the infrastructure and also the need to maintain the equipment. Financially self-sufficient models of sustaining infrastructure in the need of the hour.

3.9.10 Industrial Training Institute

As with the polytechnics, the quality of courses available at the various ITIs, in particular government ITIs, need considerable upgradation based on the new SCF that will be finalised for the state of Karnataka. The Department of Skill Development, Entrepreneurship and Livelihood in conjunction with the Department of Industrial Training and Employment are already working on transforming 150 ITIs into technology hubs offering innovative courseware that provides training to students in advanced technology areas on state-of-the-art equipment and software provided by the industry. ITIs have considerable physical infrastructure that can be shared and it is critical to put in place the right kind of infrastructure sharing models as discussed in the context of polytechnics.

3.9.11 Colleges and Universities

Colleges and Universities would not normally have a role to play in the integration of vocational education in schools. The NEP 2020 recommends that all educational institutions connect with their community. In this sense, they can always come forward to support schools by allowing their teachers

and students to volunteer to support school students and to provide shared usage of any physical infrastructure they own.

3.9.12 Skill & Knowledge Provider/ Vocational Training Providers

Skill Knowledge Providers (SKPs) are companies that offer apprenticeships/ internships to students. It would be good to discuss with them to understand whether they are in a position to provide shorter term internships to younger school students including summer internships of the kind that we are envisaging in this document. As mentioned earlier, apprenticeships/ internships only succeed when industry, academia and government come together to provide value to students.

Vocational Training Providers are generally for-profit companies that provide vocational training. SSA engages with many of them for its NSQF courses. The difficulty with contracting out the delivery of these courses to school children to them is that schools have no visibility into the quality of the trainers that they employ and the quality of the courses that they offer. Ideally, vocational courses in schools must be anchored/ taught by teachers/ trainers/ coordinators/ expert resources associated with schools.

3.9.13 Central and State Boards

All boards will have to revise their syllabus and textbooks, subject textbooks as well as vocational education books should they choose to create them. Boards must also help to build capacity to assess students of vocational courses, both the domain knowledge aspects and the practical domain skills.

3.9.14 Industry/Employers

NEP's vision for vocational education cannot succeed unless there is much tighter integration with industry and potential employers. The products from academia must be ready for induction to industry and this cannot happen if the education does not deliver on the competencies specified in the NSQF levels. The state government must create the methods, processes and fora where such interactions can occur in a meaningful way and on a continuous basis. Governments must also consider issuing a mandate to industry and businesses to contribute some of their expert resources to help roll out quality vocational education in Karnataka.

3.9.15 NGOs/VOs

NGOs and voluntary organisations can help but they are generally relatively small in size, and many are often strapped for funds. It is extremely difficult for the principals of schools to interact with many such organisations to try and understand what they can offer and to make use of their help appropriately. A better model of engaging them needs to be thought of.

3.9.16 PSSCIVE and SIVEs

PSSCIVE has been doing an excellent job of designing curriculum for courses and training teachers, despite being a relatively small group. However, catering to the diversity of the entire country in all sectors of the economy is simply too large a task for a single institution. One good way to strengthen the PSSCIVE therefore would be to decentralise their work and to involve many more people into vocational education by creating/ reviving State Institutes of Vocational Education (SIVE) (first set up

as part of POA1992) linked to the PSSCIVE, like the linkage between NCERT and the SCERTs. The SIVEs, as part of the SCERTs, can either adapt PSSCIVE courses for local needs or create new courses as needed, and train teachers locally within the state, thus ensuring that the diversity of needs and regional variations in various sectors of the economy are addressed. They can also share the curriculum and course content that they have designed with the PSSCIVE for sharing with other states.

PSSCIVE can be charged with assisting these SIVEs to be setup/ revived and train their staff as needed. PSSCIVE and the SIVEs can also work together with the NCERT and the SCERTs during the preparation of the National Curricular Frameworks for School Education (NCFSE) and Teacher Education (NCFTE) and their associated curricula and course content, to ensure that vocational education is indeed completely integrated into mainstream education as per the vision of NEP. The NCFTE must factor pre-service teacher education to cater to the burgeoning need for professionally qualified vocational teachers while continuous professional development of vocational teachers can be undertaken by SIVEs with the PSSCIVE at the helm.

The creation of the SIVEs can also help ensure that the vocational courses that are offered at secondary schools around the country are aligned not just with the needs of the local economies of the various regions but are also futuristic in nature. The courses that are offered in schools must be changed as often as necessary in consonance with the needs of the industry and some flexibility must also rest with teachers and the heads of schools. The NSDC has conducted skills-gap analysis at a macro level and the District Skilling Committees have been charged with assessing skills gaps at the district level, but in reality skill gaps need to be assessed at a more micro level of taluks and panchayats. In fact, the real knowledge of the gaps are likely to come out of the placement data of students, in apprenticeships and jobs, particularly in rural areas. SIVEs can assist individual schools to select the courses they offer, apart from the broad-based IT related courses that can be offered by all schools.

3.10 Collaboration of various agencies in the implementation of vocational education (100 -200 words) (What are the roles that various agencies, for example State Institutes of Vocational Education (SIVEs), SIETs, SCERTs, DIETs, CTEs, IASEs, NIEPA, NCERT, KVS, NVS, CBSE, School Education Boards, Universities, CSR initiatives, philanthropic organizations, NGO, SIEMAT, etc., can play in the implementation of Vocational Education?) (100-200 words) (SE,TE,AE)

The main role of NCIVE (National Council for the Integration of Vocational Education), as envisaged in DNEP 2019 is to oversee the integration process, largely by gathering and disseminating best practices during implementation. NCIVE can also assist with finding solutions to many of the challenges listed in this document. Karnataka Council for the Integration of Vocational Education (KCIVEs), if it gets set up, can perform a similar role within the state. Some additional tasks that NCIVE/ KCIVE can perform towards ensuring quality vocational education include:

- Gathering feedback and data continuously during early integration of vocational education to help improve outcomes
- Ensuring interaction between stakeholders – educational institutions, industry and businesses, and all government bodies, to help achieve the desired outcomes
- Helping to introduce high value courses in many strategic areas, including in areas that create green jobs such as renewable energy, electric vehicles, etc., and courses that address the SDGs.
- Overseeing the process of continuous review and updating of curriculum and textbooks to keep pace with the changing needs of the economy of the stage.

The roles of most players listed here are covered in the previous question. Schools and school boards can take the lead in preparing curriculum for various vocations and share them widely so that the limited knowhow available for vocational education can be shared more widely. Similarly well-endowed schools such as KVS and NVS can be early adopters who launch and run many different types of courses and share their experience. NGOs can help schools and school management roll out vocational education initiatives. CSR initiatives, philanthropic agencies, can support all these initiatives by providing resources either in cash or kind.

3.10.1 Local organisations (100 – 200 words)

3.10.2 State-level organizations (100 – 200 words)

3.10.3 National-level organisations (100 – 200 words)

3.10.4 Any other (100 – 200 words)

3.11. Requisites for the implementation (100 – 200 words) (Please provide details about the requisites for the Implementation, such as school complex, human resource, teaching-learning material, ET/ICT resources, etc.) (200 words) (ECCE, SE, TE)

The Samagra Shiksha scheme document [Samagra 2021] make important provisions for resources for implementation of vocational education, some of which have been referred to below.

3.11.1 School complex (100 – 200 words)

School Complexes had been recommended as far back as the Kothari Commission Report but remained unimplemented for various reasons including the lack of connectivity between schools in a particular region. Today, with much better connectivity, cell phone connectivity, and accessible transport options these can more easily become a reality.

In particular, select senior secondary schools can be turned into school complexes and become sites/hubs of shared infrastructure for school education including vocational education. MSDE, as far back as in 2019 [MSDE 2019], has talked about setting up 500 skill hubs and labs in government schools in collaboration with the CBSE.

For vocations in the manufacturing or other sectors that require access to expensive equipment for training, secondary schools can consider partnering with local industry and businesses, through apprenticeships/ internships to the extent possible so that students can learn on the state-of-the-art infrastructure available with them. Infrastructure available with NSDC training providers in the region can also be made use of through appropriate financial arrangements. These efforts can also be coordinated by the vocational teachers/ coordinators in schools. Other models of sharing infrastructure such as that of the Community Skills Parks (CSP) in Kerala can also be explored as models for running school complexes. In Karnataka, there is a special position paper being created on School Complexes. Their recommendations must be incorporated here.

3.11.2 Human resources (100 – 200 words)

Inducting vocational teachers/ coordinators into schools as regular teachers is an important step towards mitigating the poor perception of vocational education. The lack of viability of careers as teachers/ trainers in vocational education so far, has been a critical challenge. Most vocational trainers who are presently working for vocational training companies, barring a few who are associated with the larger training partners of NSDC, do not have permanent jobs. They work on contract and are paid a few hundred rupees for each hour of training they conduct. This is a fundamentally flawed model to use when it comes to teaching young adolescent students in secondary schools. Most of these trainers hired on contract basis do not have any training in handling adolescents or any formal training in pedagogies. There is a large churn among these trainers which means that there is no continuity of thinking and planning and no adaptation of teaching learning strategies to suit the needs of students.

The orientation of secondary school teachers towards vocational education can be brought in by initially inducting one or two engineers as vocational teachers in each school. NEP 2020 makes provision for providing a one-year teacher training course for candidates with a strong subject background. If such a course could be designed and administered at the earliest to a large initial cohort of engineers, then it would be possible to reproduce the positive experience in Haryana where was found that vocational teachers are versatile and contribute in many other ways to their schools. They can also teach subjects in the sciences, mathematics, and technology, manage the laboratories and the ICT infrastructure, and coordinate with industry and businesses for apprenticeships and employment for their students. In the longer term they can also be entrusted with coordinating the integration effort by inviting their colleagues who are subject teachers to discuss aspects of different vocations with students, from the perspective of their own subjects. Also in the longer term, full awareness regarding vocational education can be brought to the secondary school teacher cadre, as part of the stage-specific 4-year B.Ed. programme.

3.11.3 Teaching-learning materials (100 – 200 words)

Mentioned all across the document

3.11.4 Technology related (100 – 200 words)

As mentioned in the NEP 2020 there are multiple uses of technology. One important one related to vocational education is the provision for access to online textbooks and lab manuals with an option to print on a need-basis at the premises of the school. This will require the availability of uninterrupted power supply during the day which can be ensured through the implementation of suitably sized solar mini grids for schools. Good quality Internet access for schools, especially at the middle and secondary stages, and adequate computer labs for students and heavy-duty printers are some of the other resources that are needed.

3.11.5 Horizontal mobility (100-200 words)

The credit system associated with the NSQF and the interlinkages between NSQF and the NHEQF are the methods envisioned in the NEP to enable horizontal mobility. These are in the process of being readied. They should, between them enable multidisciplinary education with students being admitted to courses on the basis of pre-requisite knowledge/ courses. Faculty of various courses will need to specify the pre-requisite knowledge that a student must have in terms of courses that the

student has previously attended. If a student has not taken the pre-requisite course, he/she must be able to take the course and then return to the original course of interest. Such a system is followed in many universities abroad where many of them also provide bridge courses that students can take.

3.11.6 Vertical mobility (100-200 words)

Students completing their education from polytechnics have the option to enter the engineering stream in the second year and this has been an attractive option that has kept polytechnics popular among students. In the future more options at the undergraduate level including access to the new multidisciplinary 4-year undergraduate programme must be available to them. Students who complete 2 years of ITI education after grade 10 have fewer options. ITI curriculum is in the process of being revised in many states. It should be made more broad-based and holistic so that it can serve as an equivalent to grade 12. Alternatively, ITI students should be able to complete their grade 12 from NIOS so that they have the option to enter higher education easily at a later date. In short, multiple pathways into higher education must be provided to all students till the age of 18. The admission criteria of all higher education institutions must be broadened to allow for NSQF and NHEQF based admissions.

3.11.7 Any other (100 – 200 words)

Our school system is generally not very good at making use of the resources that they have in the form of senior students, at the secondary stage. Senior students can be a huge resource for many activities, working either as volunteers or for a small fee, to help younger students attain foundational literacy and numeracy, to help them learn languages and to communicate/ write well in multiple languages. They can also help with keeping school complexes and other resources such as libraries and laboratories running for longer hours, and with education for out of school youth and adults.

3.12 Specific recommendations for the state/national curriculum frameworks (100 – 300 words)

The requirements for all four curricular frameworks are indicated throughout the document.

3.12.1 Specific recommendations for NCF/SCF ECCE (100 – 200 words)

3.13.2 Specific recommendations for NCF/SCF school education (100 – 200 words)

3.14.3 Specific recommendations for NC F/SCF Teacher education (100 – 200 words)

3.15.4 Specific recommendations for NCF/NCF Adult Education (100 – 200 words)

3.13 The development of vocational textbooks and other material in different languages (200 – 300 words)

The main recommendations regarding preparation of textbooks have already been made in section 3.7. As mentioned there, vocational material can be offered in worksheets so that they can be revised frequently. With regard to the need to prepare educational material in different languages, the different stakeholders associated with schools can be invited on a contract basis to make good quality translations for a small fee. Senior students and teachers can also be roped in for the purpose. In fact,

activities such as this can be part of a group of activities that give students who need financial support the opportunity to earn some money to support their own education.

3.13.1 Foundational stage (100 – 200 words)

3.13.2 Preparatory stage (100 – 200 words)

3.13.3 Middle stage (100 – 200 words)

3.13.4 Secondary stage

Classes 9 & 10 (100 – 200 words)

Classes 11 & 12 (100 – 200 words)

3.14 What changes are needed in the implementation of the School Vocational Education programme under National Skills Qualification Framework (NSQF)?

As mentioned in several places in this document, the present implementation of vocational education in schools as part of the Samagra Shiksha Abhiyan, and other state initiatives, are making use of private sector training partners for course delivery and the sector skills councils for assessment. This model is not only more expensive, no integration of vocational education into school is being achieved since the students are trained outside the school.

It is therefore necessary to bring vocational education for the career track into schools, with vocational teachers/ coordinators overseeing the training and coordinating with other subject teachers to deliver at minimum, the theoretical aspects of the curriculum. The practical aspects of the curriculum may need to be taught outside the schools for some vocations, through accessing common shared infrastructure such as skill hubs and other options discussed earlier. If this is done, then the assessment of the practical aspects will have to be done jointly with the supervisors at the locations of the infrastructure. Students can be asked to maintain a logbook of the work they do which can become the basis for assessment.

In addition, as mentioned earlier in this document engineers must be hired as vocational teachers/coordinators and stationed at all schools offering middle and secondary (grades 9-12) education. This will create many jobs and if the working conditions of these teachers can include social security benefits, then we will be able to draw talent to the profession.

3.14.1 Uniformity in qualifications across institutions

The Karnataka State Curriculum Framework is intended to achieve just this goal. Based on the SCF a curriculum can be created and shared across the state. The content and the textbooks can have local variation depending on local contexts and the curriculum can signal this freedom to schools.

3.14.2 Collaborations between different stakeholders for implementation of VET

Has been discussed throughout the document.

3.14.3 Implementation of National Occupation Standards

Industry and businesses have shown a distinct preference to work with NOSs (National Occupation Standards) and QPs (Qualification Packs), which are narrowly defined and are not aligned with the International Standard Classification of Occupations (ISCO) defined by the International Labour Organisation (ILO), creating difficulties for students seeking to work abroad. As per the latter NOS represents groups of broadly defined and related job roles. However, in India the word NOS is used for individual, narrowly defined, job roles and the word ‘Qualification Pack or QP’ is used to indicate a related group of job roles. This is unfortunate and has been a source of great confusion for students needing to travel abroad in search of work. The implementation of the NEP presents the perfect opportunity to change over into an internationally aligned system.

Many thousands of job roles have been defined with narrowly defined content, meant to be delivered as short-term courses. However, the school and higher education system will need to take a more long-term view and design higher-value courses at various NSQF levels through associating a credit system with each level, and mapping groups of NOSs across QPs at each NSQF level.

3.14.4 Curriculum Implementation

Discussed throughout the document.

3.14.5 Promotion of horizontal and vertical mobility

This requires support from regulators at the central and state level. A clear and unambiguous set of guidelines for horizontal and vertical mobility will encourage students to make use of these provisions. Additionally, UGC and state governments must issue guidelines for the eligibility criterion for admissions in higher education and encourage managements of higher education institutions to implement them.

3.15 Recommendations

One of the key recommendations for the successful implementation of vocational education in schools is the need to consider bringing out legislation that encourages and supports the widespread use of apprenticeship scheme. Although the National Apprenticeship Promotion Scheme (NAPS) exist it does not bind academia, industry, and government together into taking up their joint responsibility to train the young minds of the country, as is done in Germany, Austria, and Switzerland. The legislation that is prevalent in Germany can be studied and learnt from towards this goal.

The legislation could also provide the necessary mandate for industry to support schools by sending their employees on deputation to teach at schools, by providing short period immersion opportunities for teachers within their organisations in the summer and more.

During the period 2017-2019 the NCERT brought out documents on learning outcomes for students at various stages in school [NCERT 2017, NCERT 2019, NCERT 2021]. However, these documents do not specify any learning outcomes for vocational education. This must be done on a priority basis and all learning outcomes must be fine-tuned in the context of the goals of the NEP.

The need to address the governance issues highlighted in this document and the need for generous additional funding to support the rollout of vocational education in the state and crucial inputs into the successful implementation of vocational education in Karnataka. NEP 2020 has recommended the simplification of regulation of educational institutions and separation of the different functions such as

regulation, accreditation, funding, and standard setting. Karnataka must also adopt this principle and simplify regulations to help the uptake of vocational education in the state. For instance, all the professional standard setting bodies in the state of Karnataka such as the pharmacy council, and many others need to be brought together to give single window clearances to schools and colleges to run vocational education programmes and revise them as often as needed, eliminating unnecessary delays. In fact, as mentioned in the NEP 2020, these councils need to be transitioned into becoming standard setting bodies that do not regulate educational institutions.

3.16 References/Sources

[DNEP 2019] The Draft National Education Policy 2019, prepared by the Dr K. Kasturirangan Committee, May 2019

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