LINKING SKILL PROGRAMMES WITH ACADEMIC PROGRAMMES IN HIGHER EDUCATION

Santosh Panda
Linking Skill Programmes with Academic Programmes in Higher Education

By
Santosh Panda

Commonwealth Educational Media Centre for Asia
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Abbreviations

ADB: Asian Development Bank
AICTE: All India Council for Technical Education
AISHE: All India Survey of Higher Education
APL: Accreditation of prior learning
AQF: Australian Qualifications Framework
BSkills: Bachelor of Skills
BVoc: Bachelor of Vocational Education
CBCS: Choice-based credit system
CC: Community college
CEMCA: Commonwealth Educational Media Centre for Asia
CPD: Continuing professional development
DEI: Distance education institution
DGIT: Directorate General of Training
DSP: Dual studies programme (Germany)
EQF: European Qualifications Framework
FIT: Federal Institute of Technology
GCE: General Certificate of Education
GoI: Government of India
HE: Higher education
HEI: Higher education institution
HESF: Higher education skills framework
HEQF: Higher education qualification framework
ICT: Information and communications technology
IGNOU: Indira Gandhi National Open University
ITI: Industrial training institute
IVET: Institutional vocational education and training
IWP: Integrated work practice
MOOC: Massive open online course
MSDE: Ministry of Skill Development and Entrepreneurship
Abbreviations

NCVET: National Council of Vocational Education and Training
NGO: Non-government organisation
NIOS: National Institute of Open Schooling
NITI Aayog: Policy Commission (India)
NOS: National occupational standards
NPSD: National policy on skill development
NQF: National qualifications framework
NSDA: National Skills Development Agency
NSDC: National Skills Development Corporation
NSDM: National skills development ministry
NSQC: National skills qualification committee
NSQF: National Skills Qualification Framework
NSSO: National Sample Survey Organisation
NVQ: National vocational qualifications
NVEQF: National Vocational Education Qualifications Framework
OER: Open educational resource
QCA: Qualifications and Curriculum Authority
RPL: Recognition of prior learning
SC: Scheduled caste
SSC: Sector skills council
ST: Scheduled tribe
SWAYAM: Study Webs of Active-Learning for Young Aspiring Minds
TVEC: Technical and Vocational Education Commission
UAS: University of Applied Sciences
UG: Undergraduate
UGC: University Grants Commission
UKIERI: UK-India Education and Research Initiative
VET: Vocational education and training
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The quantum growth in the Higher Education sector is spearheaded by universities which are the highest seats of learning. The higher education institutions are expected to give an overtly vocational focus to all their academic programmes. In addition to being knowledgeable in the specific subject matter associated with an academic discipline or field of study, every student must be fully equipped, at graduation, with the skills necessary for the very important transition into the world of employment and for better living. To embed employability skills into each level of the Undergraduate and Postgraduate curriculum, major emphasis should be laid on the establishment and strategic embedding of links between the university and employers –both local and national.

In this regard, the CEMCA prepared guidelines for linking the skill programmes with academic programmes to provide additional skills to the students during their formal academic programme of study so as to increase employability and sustainability. The guidelines have been discussed in two Think Tank committee meetings under the Chairmanship of Prof. Nageswar Rao, Vice Chancellor, Indira Gandhi National Open University (IGNOU), New Delhi and accordingly finalised in the present shape. The think tank was constituted with senior academic leaders, senior administrators, academics, skill development practitioners and experts.

This guidelines and plan of action provide the higher education institutions, regulatory bodies, and governments with a strategy to engage in a systematic manner, in decision making, implementation and reflection, not just to promote but also help the learners for better learning for sustainable development.

I am grateful to Think Tank chair and members for providing very significant inputs and suggestions for bring out this guideline. My sincere thanks to the Prof. Santosh Panda, Indira Gandhi National Open University (IGNOU), New Delhi for his expertise support and for development of the guidelines along with the plan of action. Special thanks to Dr. Shahid Rasool, Director CEMCA for his continuous advice and support.

We look forward to your comments and feedback based on your experiences of implementing and using the guidelines on linking skill programmes with academic programmes. These will go a long way in helping us to revise these guidelines and plan of action to serve the specific needs of higher education students in varied contexts.

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Acknowledgement

It has been a rewarding experience while developing the monograph on Guidelines for Linking Skill Programmes with Higher Education Programmes. I am grateful to CEMCA/ COL to have given me an opportunity to articulate and put up a plan of action on how to strengthen the Undergraduate programmes in terms of developing a host of skills and competencies—discipline competencies, 21st century skills, social and life skills, and occupational skills—and enhance the employability of graduates. Higher education in India needs significant reforms, and the current work may contribute to contemporary initiatives in this direction. The guidelines reported in this monograph falls within the high priority pursuits of CEMCA/ COL which took up this initiative as an ongoing work in the area of skilling, livelihood and sustainability. I am grateful to the CEMCA Think Tank chair and members for providing very significant suggestions to further strengthen the guidelines and the plan of action. Special thanks to Dr Sahid Rasool, Director and Dr Manas Panigrahi, Programme Officer, CEMCA for continuous support and their faith in my endeavours. Hoping that these guidelines and plan of action shall reach the policy makers at highest level for their further consideration and implementation.

Santosh Panda
Executive Summary

Though school VET is well articulated and also that the National Skill Qualifications Framework, and National Policy for Skill Development and Entrepreneurship 2015 are in place, there was a felt need to address the three areas of concern in higher education: i) vertical mobility within VET; ii) horizontal mobility between VET and HE; and iii) skilling for general higher education. COL/ CEMCA took up the responsibility of reviewing the international good practices and develop further articulation and guidelines to operationalise the third area of concern, i.e. skilling and employability in undergraduate education.

This write-up addresses the global meanings ascribed to skills and competencies; summarises the 21st century skills; reviews select international skill qualification frameworks for school education, VET and higher education; critically looks into the practice of VET and HE in three European countries of Austria, Germany, and Switzerland; discusses the Indian National Skill Qualifications Framework vis-à-vis the skilling system/practices in India (including those for higher education); and outlines guidelines for operationalising linkage of skill programmes with higher education (UG) programmes in India.

The following have been suggested:

- Movement through a Basic, Progressive, and Higher Order skilling pathways by institutions and VET providers.

- Determination of broader and specific skill sets, institutional mechanisms, and support structures for skilling in higher education.

- That since the major goal of higher education is knowledge generation and innovation in various fields of study, it may not be desirable to confine skilling to only the NSQF, and therefore it should go beyond to include discipline-specific competencies (both cognitive and non-cognitive), professional/occupational competencies, social and life skills, soft skills (and other global and local skills including those of 21st century skills), and the general concern of developing a good citizen.

- That a prerequisite for the above formulation is national skill mapping and job/occupational mapping for all types of skills noted above. This needs to be done alongside their levels, credit values, standard level, and learning
outcomes (in terms of knowledge, attitude, skill, values, and innovations). This, therefore, needs to go beyond the skill mapping within the NSQF to have a national HEQF/HESF for all the three areas of concern noted above.

- The operationalisation of skilling in higher education would essentially require a life-cycle skilling/ competency system, and a network/basket of regulator-compliant, NSQF-compliant, credit-based, modular, flexible, resource-based, blended learning, with built-in equivalency across VET and HE, and assessment rubrics. There exists a need for a national agency for assessment of skill/competency qualifications and for competency-based curriculum (with provision for lateral entry-exit, RPL, and credit transfer).

- In the case of moving toward blended learning for skilling in higher education, and especially in the context of distance and online learning, there is a need to develop and adhere to indicators and standards for evidence-based skill development, combining self-study, mentoring and on-the-job training, and continuous and comprehensive monitoring of skilling. This also requires a system of combining self-learning and tutoring/mentoring with well-established workplace training.

- A framework of: Skills/Competencies-Levels-Credits-Indicators-Learning Outcomes-Resources-Delivery Strategies has been suggested for implementing skilling in higher education.

- Six factors—structure, curriculum development, professional development/ training, assessment and evaluation, quality assurance, and regulators—are discussed to operationalise skilling in higher education.

- Finally, an Action Plan is outlined to operationalise 'skilling and employability in undergraduate education' / linking skill programmes with academic programmes in higher education.
In many developed countries, skills within general education at both school and higher education levels are well developed; and vocational education and training (VET) is well developed and policy-ingrained. In the developing world, constant debate and articulation at policy level is a stark reality, though a number of countries have succeeded in developing a VET system vis-à-vis their national qualifications framework (NQF) (King, 2009). It is quite often discussed and debated that 'skills' have been narrowly defined (which are generally employer-specified, and for low-level job); that there is separation between skills and power; and that skills are considered as substitute for redistribution of wealth in an economy (Allais, 2012).

In this monograph, skill development has been considered as essential at all levels of education, and that this encompasses a broader framework comprising personal, social, professional, vocational, academic/cognitive skills, theoretical-practical knowledge, competencies, attitude and values so essential for an individual to comprehensively develop and contribute to individual progress and socio-economic-cultural development of a country.

Articulations are galore that 'Skills and VET' should not only be based on what the employers or the enterprises require, but more so on the broader definition of knowledge areas and student engagement in that inter-disciplinary knowledge exploration, and also be based on a broader view of sustainable competencies as well as with due consideration to occupational mobility and social security.

VET is distinct from other professional education globally. 'Vocational Education' generally refers to a combination of general education useful for doing a job better (like communication, language, mathematics, technology) as well as skills required of a job. An extension of this is 'Professional Education' which requires a 3-5 year diploma/degree and is geared towards the requirements of established professions (like engineering, law, medicine, teaching). While keeping in view these two dimensions, 'skill development' is visualised encompassing all areas required of a balanced living, progressing in life, and contributing to tasks/occupations/professions effectively.

It must be clarified that VET or skilling would, in no way, mean only work-related education/ training meant for those who could not possess a level of academic
achievement/qualification to compete to enter the regular general and professional (higher and further) education. Besides, while considering lower as well as higher level skills in VET and general HE, reference has of late been made by policy-makers and academics alike to develop 21st century skills and/or transferable skills.

1.1 21st Century Skills

VET for any identified and targeted 'occupation' needs to be distinguished from the broader view of VET for increasing 'employability'. It could be desirable that employability may be built into the larger system of education itself. What is important in this formulation is integration of both intellectual and manual tasks, based on a comprehensive understanding of the entire work process. It has to be seen as a comprehensive part of 'education', rather than considered as mere 'training'. In this sense, skill development goes beyond aiming at a job, rather it should aim at occupation(s) where execution of a task presupposes the skills of planning, coordination, evaluation and control, and also involves innovation and social security.

The 21st century skills which cover a host of occupational skills, non-cognitive skills, interpersonal skills, life skills, and application skills presuppose that it is not only important what knowledge students or graduates have about them, but more so what they can practically 'do' with that knowledge for integrated individual, community, and socio-economic development (Silva, 2009). Even if one considers outcome-based learning, skills such as independent thinking, problem-solving, decision-making, innovation – all of these skills are to be specifically and transparently integrated into curricula at all levels of education and training.

Today many of the 'routine' skills are done by computers; and therefore, strategically one needs to build the skill of handling computer-managed skills into the compulsory part of any curriculum. However, students will still require the skills of effectively navigating through the complex, chaotic and shifting nature of vast information for problem-solving, decision-making, and developing innovative ideas, even in low-skilled work contexts.

The European Qualifications Framework (EQF), in the context of skills in higher education, distinguished specifically among knowledge (learning), skill (application for a task), and competence (use of integrated abilities for professional and personal developments). In this context, the European Commission (2016) listed three types of skills, i.e. cognitive skills (analytical,
critical, creative, reflective), methodological skills (decision-making, time management, problem-solving), and social skills (team work, interpersonal communication, conflict resolution) which need to be developed within both VET as well as HE.

Based on an extensive review of published literature, Andrews and Higson (2008) identified the following transferable soft skills meant for graduate employability; and these are considered as essential graduate learning outcomes:

- Professionalism
- Reliability
- Ability to cope with uncertainty
- Ability to work under pressure
- Ability to plan and think strategically
- Ability to communicate and interact
- Written and verbal communication skills
- Information and communication technology (ICT) skills
- Creativity and self-confidence
- Self-management and time-management
- Willingness to learn and accept responsibility

The above were located in a 4-nation European study; and the researchers located the following skills emphasised by both graduates and employers alike: business-related knowledge, skills and competencies; work experience; work readiness; and graduate mobility. These skills may be considered in curriculum design for higher education and training.

Further to the above, 'life skill development' is considered as an integral part of any progressive higher education system today. Post-fulfilment of basic psychological needs, specially designed life skills programmes focus on experiencing positive psychological development and optimal psychological well-being (Hodge, et al, 2012). Therefore, life skill development should also form an integral part of HE including VET.

In the UK, the most influential reports within education and training have been the Dearing Report on Post-16 Qualifications (Dearing, 1996) and the Dearing Report on Higher Education (Dearing, 1997) which recommended some most important core/generalisable/transferable skills for all types of education and
training in higher and further education (for both general as well as vocational). Those skills were as much concerned with VET as to lifelong learning and effective 'living' in the 21st century. The Curriculum Reform 2000 undertaken in the United Kingdom had nation-wide changes and transformations based on these reports. The following four skills were specified:

i) communication skills,

ii) numeracy,

iii) use of information technology, and

iv) learning 'how to learn'.

In the UK, the whole system of education including the HE curriculum reforms, the vice-chancellors association (CVCP), the QA agencies, and the regulators-- is geared toward this. Of late, as recognised by the Qualifications and Curriculum Authority (QCA) in UK, some key skills were identified to be followed by all concerned with education and training: communication, application of number, information technology, working with others, problem solving, and improving own learning and performance (Murphy, 2001). Alternative modes of delivery had also to follow these recommendations; and therefore, for instance, the UK Open University has implemented this through the 'key skills assessment units', emphasising on developing these skills specifically through discipline-based courses, learner support provisions (i.e., workplace learning), self-learning, and assessment through portfolios.

In continuation to the above, the UK-NARIC (2016) listed eight key competencies, besides those specific to VET, for vocational education and training in England, Scotland, Wales, and Northern Ireland:

- Communication in the mother tongue
- Communication in foreign languages
- Competencies in maths, science and technology
- Digital competence
- Learning to learn
- Interpersonal, intercultural, social, and civic competencies
- Entrepreneurship
- Cultural expression

It was pointed out that while English, maths and ICT are compulsory courses in Apprenticeship VET, it may not be so in case of College VET. Besides these,
additional skills of blended learning and extra-curricular activities were required of both students and teachers.

1.2 Competencies

Though quite often used in case of VET, the concept of 'competence', beyond the concept of 'skill', cropped up in the domain of higher education in the 1990s. The graduates of higher education are expected to develop their 'professional skills' alongside the development and application of learning competencies, social competencies, and career competencies to be able to effectively carry out an occupation, while at the same time maintaining a balanced life. The concept of 'competence' itself needs explanation so that this can be properly seen in the context of skill development in HE as well as national skill qualifications frameworks (NSQF). The one given by Klink et al (2007) (Table 1) provides much clarity.

Table 1: Views on the concept of competence

<table>
<thead>
<tr>
<th>View</th>
<th>Location</th>
<th>Emphases in the definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geographical area</td>
<td>United States</td>
<td>Competence (American: competency) refers to behavioural and personality characteristics underlying possibly excellent performance.</td>
</tr>
<tr>
<td></td>
<td>United Kingdom</td>
<td>Competence refers to the ability to perform to standards specified in advance.</td>
</tr>
<tr>
<td></td>
<td>Germany</td>
<td>Competence refers to the broad capacity to act that enables an individual to do a job. Aspects such as interpretation and professional identity are also part of this capacity.</td>
</tr>
<tr>
<td>Teaching theory</td>
<td>Constructivism</td>
<td>Emphasises the importance of convictions, motivation and ambition as major aspects of the term competence. Stresses more on involvement of participants in developing teaching practices, based on competence.</td>
</tr>
<tr>
<td>View</td>
<td>Location</td>
<td>Emphases in the definition</td>
</tr>
<tr>
<td>--------------</td>
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<td>---------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Cognitive teaching theory</td>
<td>Acquisition and selection</td>
<td>Stronger accent on teachable aspects of competence, more emphasis on top-down approach to the development of teaching practices based on competences. Competences consist of a combination of partly developable potentials and partly non- or hardly changeable personal characteristics for a range of jobs.</td>
</tr>
<tr>
<td>Teaching and training</td>
<td>Job evaluation</td>
<td>Competences are regarded as something to be learned or to be developed further. Competences are defined in terms of specific actions within one job. Competences are defined in terms of the desired output of a job. Competence is regarded as the predictor of performance.</td>
</tr>
<tr>
<td>Performance pay</td>
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</tr>
</tbody>
</table>

**Source:** Klink, Boon and Schlusmans (2003)

While the European countries underline broad capacity of students to perform as per 'standards', the American view includes behavioural and personality characteristics as determinants of excellent performance. 'Competencies', interchangeably used with 'expertise' or 'key qualifications', must be coherent, stable over a period of time, and context-specific. The competence-based approach to teaching and training suggests that there is a job out there in the labour market for which the students need to acquire competencies as graduates to be able to achieve that job. While 'specific' competencies lead to doing a job effectively, 'broader' competencies enable individuals to have wider employability skills, and skills of horizontal and vertical occupational mobility.

It has been argued by Harvey (2001) that 'employability' or percentage of graduates getting a job is a crude measure of 'outcomes'; and that employability/job percentage as outcomes is often projected as an achievement.
by the 'institution', rather than 'propensity of the individual student, to get employment' (p. 79). Consideration therefore needs to be made for:

i) generic attributes versus sector/company-specific attributes, and

ii) fulfilling the required criteria for getting a job versus developmental ability for nurturing attributes of future innovation and progress.

Harvey (2001) further underlines that since disciplines like philosophy, literature and social sciences (unlike those of nursing, social work, or teacher education) do not have in-firm practice settings, other methods like work-shadowing, projects, and field visits can be useful for developing these attributes. Further, instead of waiting for post-graduation employability training leading to a job, employability itself can be built into the graduate programmes of study through employability development opportunities and experience gathering activities.

[This is important from the point of view of developing nurturing skills in the existing general higher education students.]
Qualifications Frameworks provide for 'learning outcomes' at various levels of education and training, based on (or specifying clearly) what a student or graduate knows, understands, and puts into practice/able to do after completing a 'level' or equivalent certification/degree.

The National Vocational Qualifications (NVQs) of England is considered as the oldest framework which has largely been followed by many countries including the African nations of Botswana, Mauritius, South Africa; Australia; the Caribbean countries; Latin American countries; and some Asian countries where the qualifications framework is largely based on the following:

- Is employer/stakeholder-driven, and the individual students are required to conform to the standards in order to enhance employability.
- There is dominance of informal markets, without much credence to social policy and labour market regulations. The qualifications framework defines required competencies or learning outcomes at each level, with full state regulation.

On the other hand, and especially in the context of European Qualifications Framework, besides employability and addressing the skills required of a particular work or job, the following two aspects are equally addressed:

i) addressing VET holistically within the system of education and with due consideration to occupations and occupational mobility, and

ii) underlining firm and comprehensive pathways between school VET, higher education VET, and general higher education.

[In the present monograph, both of the above aspects have been considered as much as possible, within the given context of post-secondary education in India.]

2.1 NQFs and School Education

Some of the important NQFs vis-à-vis their application in school education are summarised below (based on eight issues and concerns) so as to derive lessons for future improvements for VET and IVET for HE. Though Brazil and China could not be located to have NQFs, however they have been included in the review for skill development, along with England, Germany, Malaysia, Poland, and Scotland (Mcdonald and Dunbar, 2015).
2.1.1 Competencies

Besides developing competencies/skills for a job or job market, there is development of other broader and higher skills of planning, execution, and evaluation based on professional judgement and decision-making. For example, the German *Beruf* system (i.e. vocational education vis-à-vis the labour market) specifically focused on cultivated, qualified and dignified labour. There is a requirement of formal knowledge, skills, and experience-based competence, not necessarily linked to workplace.

On the other hand, in the Anglo-Saxon countries, especially for instance in England, the liberal market oriented VET in the 1980s focused on market qualifications and sets of competencies acquired through modular courses and work experience. Training specifically aimed at 'jobs', not 'occupations'. However, this at least provided an opportunity to do away with the traditional knowledge-based examination approach, and to move toward competencies/learning outcomes, i.e. expected work performance as per standards set by the employers. Qualifications were derived from work functions and assessment in the workplace (rather than linked to a curriculum). While in England competence is referred to as task-based bundles of skills, in Europe (EQF) skills and knowledge were associated with regulated occupations and professions.

In the Indian case of skill development for HE (discussed later), it seemingly goes beyond the competency model to include many of the broader skills.

2.1.2 Balance of VET and General Education

In the reviewed countries, there was presence of some general curriculum in the VET curriculum, though especially in Brazil and England general education dominated VET. So much so, it was so high in Poland that students generally dropped out due to greater length of courses dominated by the component of general education.

[In India, in case of VET, literacy, numeracy and information technology are taught through vocational subjects, rather than as stand-alone courses.]

2.1.3 Internship

A balance needs to be maintained between work experience with an employer who can later give a job versus well-planned and monitored development of required practical skills. This requires specification of clear objectives, identified workplace competencies, employer/management guidance and mentoring. While in England and Malaysia there is a partnership between formal education
and business, in Germany work placement itself is part of structured apprenticeship. In addition, there is a need to take into account workplace liability and insurance.

### 2.1.4 School and College Vocational Education

In Malaysia, the focus is on college vocational education, though some of the skills are learnt at the school stage.

In England and Scotland, there exists less coordination between secondary and post-secondary vocational education.

[In India, there is employer engagement through sector skills councils (SSCs), though VET is not categorically fitting into an 'educational system'. There is though convergence of school-level infrastructure at ITIs and polytechnics as part of NSQF offered through AICTE.]

It may be underlined that in the Australian case (AQF), autonomy is ensured on the part of graduates to demonstrate achievement and qualifications alongside multiple pathways to achieve that, as also flexibility leading to further engagement in workplace settings as well as further education.

In Germany too, VET students are allowed to proceed to both higher education and teacher education.

### 2.1.5 Employer Dominance

Clearly, in most cases, there is dominance of employers in VET – in South Africa, the NQF is based on employer and stakeholder-specified competencies, and in India there is employer engagement through SSCs. Internationally, apprehension has been expressed about this skewed dominance.

### 2.1.6 Teachers

In most of the countries, teachers from general education teach VET, though in Germany craftspersons with industrial experience generally teach vocational courses; and in China there is engagement of part-time teachers who also work halftime in industries.

### 2.1.7 Informal Sector

In Brazil, agriculture being the largest sector belongs to the informal sector, so also in Malaysia and Poland. India has the largest informal sector in the unorganised labour market. Therefore, work experience in the informal sector is
problematic in formalised VET, which needs to be further analysed and reflected upon.

2.1.8 Regulation

The German dual-system is integrated with the larger education system, and VET focuses on well regulated and protected occupations.

When the focus is on 'employability' (as in case of England), VET is regulated through 'market of qualifications', and in some instances the state regulates both public and private providers. In the 'employability' model, the employers develop qualifications which students select to enhance further employability. Informal markets, rather than labour market regulation and social policy, dominate decision-making. This is the case with the model followed in England, Mauritius, Australia, Botswana, Caribbean, Asia, Latin America, and South Africa. In terms of sustainability and social justice, there is flaw in this model which needs to be addressed.

2.2 South Asian Countries: Sri Lanka

Of all the South Asian countries (excepting India on which this monograph is focused), Sri Lanka presents the most formidable example of a strong and sustainable NQF for VET.

Following the establishment of a Technical and Vocational Education Commission (TVEC) by the Tertiary Vocational Education Act of 1990, a Vocational Training Authority in 1995, and a Ministry of Skills Development in 2004, the National Vocational Qualifications Framework (NVQF) was launched in August 2004 by adopting the level descriptors of the New Zealand National Vocational Qualifications.

NVQF provides for the trainee students to enter and exit the VET system at any stage with qualifications levels of the corresponding stage.

The NVQs are based on technical and employability competencies which are identified by various industry stakeholders, and which correspond with respective levels of higher education.

Levels 1-4 range from the unskilled stage to the stage of full master craftsperson (and linked to competency standards of particular occupation). With recognition/accreditation of prior learning through industry practice (with 5 years of experience), one can directly enter level 4. Completion of this leads to national certificate in relevant occupation (equivalent to GCE for final schooling).
Levels 5-6 deal with supervisory level competencies with enhanced 'knowledge' components leading to a diploma in relevant occupation. Since levels 1-4 graduates come from different occupations, a bridge course before entry to level 5 ensures entry parity across occupations (along with gap-filling modules for those who lack certain competencies).

Besides the courses of process supervision and management competencies, the students study English, mathematics, science, and computer literacy.

The graduates can enter Level 7 (equivalent to B.Tech or BE Tech), with level 6 graduates entitled to have some credit transfer to this final level (which is determined by the national agency of Univotec). For example, the certificates at levels 1-4 may cover occupations like mason, plumber, carpenter, while the levels 5-6 may lead to a diploma in construction technology, and level 7 to a B.Tech in construction technology (ADB, 2011).

The TVEC has ensured strict quality assurance through self-assessment and continuous improvement. The competency standards focus on workplace performance (rather than the learning process), transfer of learning to workplaces, and ability to perform/do tasks in a given context (i.e. task handling and management, problem solving, and application to new environments). A credit system is followed from level 5 onward, based on the European Credit Transfer and Accumulation System (where 1 credit = 25 notional hours).

In implementing the NVQF, the TVEC (which deals with policy matters, including accreditation) is assisted by the National Apprentice and Industrial Training Authority (for setting competency standards and assessment strategies) and Univotec (for curriculum design, learning resources development, and training of assessors). Sri Lanka has since been training officials from Bangladesh, Bhutan, Maldives, and Pakistan on government-to-government basis to develop their respective NVQFs. Except that there is linear progression from level 1 to level 7 vis-à-vis the University of Vocational Technology, there is no instance of integration of and cross-exchange between VET and higher education.

### 2.3 European Qualifications Framework, VET, and Skills in Higher Education

- The European Qualifications Framework (EQF) was developed in 2004 and was finally implemented in 2008, based on the premises of supporting lifelong learning, and educational and professional mobility. The various levels (8 levels) provide for a common reference framework for national
qualifications frameworks (NQFs) to translate equivalency of qualification systems at various levels (and with reference to knowledge, understanding, and practical skills). It is reported that about 34 countries have implemented this framework.

- While those of Croatia, Iceland, and Poland go beyond the EQF in terms of relevance and quality, those of France, England, and Ireland also play a regulatory role for VET.

- Now 'competencies' (including communication, social, professional competencies) are replacing the traditional 'learning outcomes' – in the sense that the former relate to self-directed use of all the aspects of human personality for study, work, individual growth, and professional behaviour.

- While in almost all countries, the national qualifications and certification are recognised by respective NQF, in quite a few countries like Netherlands, Norway, and Sweden, non-official qualifications/certifications awarded by enterprises are also included.

The EQF underlines that confining learning outcomes to officially recognised taught courses is a narrow concept; rather, it covers formal, informal and non-formal learning, as a continuing process of lifelong learning; and also links to a credit system, and the quality assurance bodies.

- Though education and training levels are governed independently, the EQF/NQFs have brought in broader frameworks of connection/convergence between academic education and VET.

- There must be 'trust' among countries in respect of how the actual teaching-learning align with the EQF, especially in respect of applied learning outcomes, standards of achievement, curriculum and course design, learning methods, assessment strategies, among others.

The 8-level EQF is given in Table 2. The EQF is the most promising of all the frameworks, and therefore needs consideration, especially with reference to the three countries that are analysed below.
Table 2: European qualifications framework (8 levels)

<table>
<thead>
<tr>
<th>Levels</th>
<th>Knowledge (theoretical/factual)</th>
<th>Skills (cognitive, practical)</th>
<th>Competencies (responsibility, autonomy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Basic general knowledge.</td>
<td>Basic skills for simple tasks.</td>
<td>Direct supervision in a structured situation.</td>
</tr>
<tr>
<td>Level 2</td>
<td>Basic factual knowledge of a field.</td>
<td>Basic cognitive and practical skills to solve routine problems.</td>
<td>Under supervision, but with some autonomy.</td>
</tr>
<tr>
<td>Level 3</td>
<td>Knowledge of facts, principles, processes, general concepts in a field.</td>
<td>Range of cognitive and practical skills for task accomplishment and problem solving by using methods, materials, tools and information.</td>
<td>Taking responsibility of task and adjust to context of problem solving.</td>
</tr>
<tr>
<td>Level 4</td>
<td>Broad factual and theoretical knowledge in a field.</td>
<td>Range of cognitive and practical skills to generate solutions to practical problems.</td>
<td>Self management as per task guidelines; supervision of others' routine work and suggest improvements.</td>
</tr>
<tr>
<td>Level 5</td>
<td>Specialised but comprehensive factual and theoretical knowledge in a field and its boundaries.</td>
<td>Range of focused cognitive and practical skills for creative solutions to practical problems.</td>
<td>Management and supervision of situations of unpredictable change.</td>
</tr>
<tr>
<td>Level 6</td>
<td>Advanced knowledge (critical understanding of theories and principles) in a field of study.</td>
<td>Advanced skills with mastery and innovation for complex and unpredictable problem solving in a field.</td>
<td>Management of complex and professional activities involving decision-making, and professional development of others.</td>
</tr>
<tr>
<td>Level 7</td>
<td>Highly specialised knowledge toward original thinking and research; awareness of interdisciplinarity/interfaces between different fields.</td>
<td>Specialised problem-solving skills for research and innovation, and integration of knowledge from various fields.</td>
<td>Transformation of unpredictable work contexts with strategic management; contributing to team professional knowledge and strategic performance.</td>
</tr>
<tr>
<td>Level 8</td>
<td>Knowledge at advanced frontier of a field and interface with other fields.</td>
<td>Advanced skills of synthesis and evaluation for critical problem-solving, research and innovation, and refining professional practices.</td>
<td>Authority, autonomy, innovation, scholarly and professional integrity, and sustained perseverance for new ideas of practice and research.</td>
</tr>
</tbody>
</table>

Source: Graf (2013)
2.3.1 Germany

The German case, within the EQF, is a finer case of the dual-studies programme (DSP) which combines VET, HE and world of work in a more effective manner. The following four models are in vogue.

i) **Dual Studies Programme:** Bachelors and masters programmes can be studied along with in-company training in four types of institutions (vocational academics stream 16%, cooperative universities stream 20%, universities of applied science stream 59%, universities stream 3%).

ii) **Integrated Work Practice (IWP):** In this case, a non-VET student is integrated with practice in a firm. Though the UGC BVoc is closer to this model, what IWP suggests is full 3-year bachelor degree programme with integrated work practice in-firm. Students with university entrance certificate but without any VET qualification study three-year degree along with contract with a firm for work experience at different spells. Curriculum in the college/university is adjusted as per the in-firm study and practice.

iii) **Integration of Occupation:** In this case, students with initial VET and university entrance certificate enter tertiary education. Formal study is done on-the-job, and the curriculum refers to in-firm experience. There is also provision that a higher VET with Meister (Master craftsperson) can enter into the bachelor programme of short duration. In the Indian case, this can be considered as part-time three-years bachelors degree for students with VET qualifications, to study on-the-job, and integrate and brush up own vocational work further.

iv) **Accompanying an Occupation:** Students without university entrance certificate, but with full-time job, study on their own and attend university seminars; firms provide paid leave for some higher education tasks as also provide for specialised work experience. This could be an attracted option in case of Indian distance education institutions (DEIs), combining degree study and skill certification (through blended mode) by tieing up with firms of related occupation for higher level skills training or specialised skills training.

The German schooling system provides for general schooling, and VET (one-year dual apprenticeship; vocation oriented secondary school with specialisation; full-time vocational schools leading to occupations). The DSP is different from the regular programmes of the University of Applied Sciences (which initiated DSP in 1980s and strengthened further in 1990s). In the DSP: there is coordinated
curriculum (HE and world of work) based on two principles of practical training and scientific orientation; theory and skills are integrated; academic institutions dominate over firms in setting the curricula; 21st century skills (responsible citizen, balanced individual, employability) dominate the skill modules; teaching-learning is outcome-based (evidence-based, portfolio-based) and blended (theory, practical, self-study, resource-based, ICT-pedagogy integrated). The teachers are from industry trainers, vocational school teachers, university lecturers, and from university of applied sciences. The dual studies programmes are available in areas of engineering sciences, mathematics, natural sciences, agriculture and forestry, medicine and health care, law/economic/business, and social sciences.

2.3.2 Austria

The Austrian example of BHS (i.e. VET + HE) is important to consider which was expanded in the 1970s, though dual-apprenticeship was started in 1990s and University of Applied Sciences (UAS) was started in 1994. Schooling has traditional programmes of dual-apprenticeship (i.e. 2-4 years trade and company training with part-time schooling for apprenticeship) as well as the recent innovative school-based programmes for 2-4 years for the age group of 15-18 years (BMS = VET schools with 80% students; BHS colleges of 5-year programme with 20% student enrolment). The BHS provides for vocational qualification along with certificate for access to higher education. BHS expanded more than BMS due to more of privatisation where the government takes care of BMS and the BHS is dominated by the private players of the knowledge economy. While the BMS caters for the manufacturing sector, the BHS serves the industrial sector and the service and knowledge economy.

The BHS dual-qualification programme is governed by a combination of federal bodies – Federal Ministry of Economy (for company-based training), Federal Ministry of Education, Art and Culture (for school-based VET), Federal Ministry of Science and Research (looking after general universities and universities of applied sciences), and Federation of Austrian Industries (for major industry activities). In case of BHS, a grade-8 graduate can enter higher education of 5-years study and obtain two certifications – Academic Baccalaureate (leading to further HE) and VET Diploma (leading to occupations). The students study in colleges of engineering, arts and crafts (most reputed), business administration, management and service industry, fashion and clothing, and agriculture and forestry. Though BHS graduates are equivalent to upper secondary level and the University of Applied Sciences UAS) graduates are equivalent to higher education level, the former are generally preferred by the employers than the latter. BHS
graduates can apply to general universities and universities of applied sciences who are credit-exempted for 1-2 semesters. Though BHS is higher than the German and Swiss model of Dual-Apprenticeship and Academic Schools, it has been pointed out that there exists institutional divide between VET and HE in the Austrian NQF (Graf, 2013). The best part of BHS-NQF is that social partners dominate politically and significantly influence its VET policy.

[This is a case which can be further examined by the Indian VET-HE integration.]

### 2.3.3 Switzerland

The Swiss case presents a comparatively better VET-HE integration than what Germany and Austria have achieved. In Switzerland, the upper secondary system offers two streams – general education through Baccalaureate Schools (for 4 years with about 21% students) leading to university entrance; and Specialised Middle Schools (for 3 years with 69% students) (IVET) leading to College of Higher VET and one-year specialised Baccalaureate leading to University of Applied Sciences. Of the second category, nearly 61% students go for Dual Apprenticeship (German part of the country) and 8% offer full time/part time school-based VET (French part of the country). The Dual Apprenticeship requires 3-4 days in a firm in a week and the rest in a vocational school, with inter-company vocational training organised by respective professional associations (which is considered very prestigious in the country). Nearly 76% of school students go for VET leading to either a job or entry to University of Applied Sciences.

The HE sector comprises of i) Universities, Federal Institutes of Technology (very prestigious), and University of Applied Sciences; ii) Colleges of Higher VET (federal diploma of 2-3 years); and iii) Preparation for Higher VET Exams – ii) and iii) above are considered very prestigious for a professional career. Within the University system, nearly 65% go for general universities, while 35% go for UASs and a few go for FITs. While universities are the responsibility of cantons/provinces, the UASs are governed by the Union Ministry of Economic Affairs (UMEA), and the FITs by the Union Ministry of Home Affairs (UMHA). Within Higher VET, about 39% students go for College of HVET, 29% for Preparation for Professional Education College Diploma, and 9% for Preparation for Professional Education College Degree.

In the Swiss system, the business community dominates (over political or labour movements) the decision-making, within a framework of liberal democratic corporation. The German-speaking students (about 69%) study IVET at the
school stage, dominated by dual-apprenticeship (DA), leading to the world of work; the French-speaking students (about 7%) get to Specialised Baccalaureate leading to entry to University of Applied Sciences. Since in Germany there is no VET Baccalaureate, VET graduates getting into a general university is very difficult, though they can enter UASs (school students 56%, VET students 34%). In case of Switzerland, entry into UASs by students with vocational baccalaureate is 55%, with academic baccalaureate 25%, and others 20%. Dual Apprenticeship is supported by all the political parties in the country. The coordination of IVET and HVET is organised as follows:

- Strategy Development (Federal Office for Professional Education and Technology – BBT)
- Curriculum and Apprenticeship (Professional Organisations from World of Work)
- Implementation and Control (Cantons)
- VET Network (Professional Associations, Social Partners)

There is a clear German influence on the Swiss VET in forms of Dual Apprenticeship and University of Applied Sciences. It has been observed that there is lack of coordination between the Federal Department of Economic Affairs / Federal Office of Professional Education and Technology (which handles HVET and UASs) and the Federal Department of Home Affairs / State Secretariat for Education and Research (which handles universities and FITs). This creates constraints for smooth convergence of VET and HE. However, the Universities of Applied Sciences (UASs) present the best example of combining traditional processes of VET and HE, learning processes in both, and upper secondary VET and post-secondary HE (Graf, 2013).
A National Vocational Qualifications Framework (NVQF) was developed by the Ministry of Labour and Employment, while the Ministry of Human Resource Development had developed a parallel National Vocational Educational Qualifications Framework (NVEQF) in 2011. Subsequently, due to non-congruence of these two schemes by two separate ministries, the Cabinet Secretariat created an Inter-Ministerial Committee which finally combined the two into National Skills Qualifications Framework (NSQF) in December 2013, and the National Skill Development Agency (NSDA) was created the same year to coordinate skill development between the government and the private sector, and undertake quality assurance and policy research.

Many skill development programmes were being implemented much before the NSQF was in place, especially those offered by polytechnics, and industrial training institutes (ITIs). However, the NSQF provided national benchmarks across sectors, levels, and skill sets. All the formal (schooling, higher education, professional education) and non-formal streams offering VET are governed by these qualifications frameworks. Realising the need for a nation-wide policy, the Government had formulated the National Policy on Skill Development (NPSD) in 2009 which was replaced by a new National Policy for Skill Development and Entrepreneurship 2015 with more clarity on frameworks, objectives, and outcomes. One of the objectives was to link VET with formal education as well as with entrepreneurship education. Along with this, the same day, the National Skill Development Mission (NSDM) was also launched to implement skill development in a mission-mode vis-à-vis state skill development mission to converge/integrate, coordinate and monitor these activities all over the country.

Further to this, the National Council for Vocational Training (NCVT) established in 1956 was reformulated as National Council for Vocational Education and Training (NCVET) with merger of NCVT and NSDA in 2018 as a single regulatory oversight body for VET in the country. Also, the National Skill Development Corporation (NSDC) which was regulating through the Sector Skill Councils will be housed in the NCVET.

Like other national skill (and qualifications) frameworks, the NSQF sets the levels of knowledge, skills and attitude into various qualifications based on required competencies. The Indian framework comprises of Levels 1-10, each one with
specific learning outcomes that a student has to pass irrespective of learning through formal, non-formal or informal means. The NSQF has provisions for recognition of prior learning (RPL) as well as comparability with such international frameworks. Four categories of competencies are defined for each of the 10 levels: professional knowledge (depth, breadth, kinds, complexity), professional skill (cognitive, creative, communication, interpersonal), core skill (job-based methods, materials, tools, instruments), and responsibility (relationships, management, accountability). The detailed table for the 10 levels, as gazette notified in 2013 (GoI, 2013) is given in Appendix 1.

The learning outcomes are expressed in terms of credits at a given level of qualification which may include formal learning, self learning, community based engagement, work based activities, workplace learning and assessment. Whether it is prior learning for credit transfer or actual learning in a given qualification level, there is standardisation of curriculum and syllabus, learning resources, learning hours, informal learning, etc. All qualifications are registered in NSQF, including learning pathways and accreditation agencies. For recognition of prior learning, one has to go through the Modular Employable Skills tests to prove achievement of given credits/learning outcomes at a given level of qualification.

While the NSDA operationalises the sector-specific requirements of quality and standards, the Sector Skills Councils (SSCs) for specific jobs/occupational/work sectors bring in industry-specific skill requirements and certification thereof. This is done through establishment of National Occupational Standards (NOS) and creation of qualification packs (QP) and curriculum packages. The regulatory bodies for higher education and professional education like UGC, AICTE and NCVET specify the entry and exit parameters in terms of competencies. This facilitates both horizontal and vertical mobility, including lateral entry, meaning thereby the school/VET, ITI and polytechnic graduates can enter into college vocational education like BVoc of UGC and/or general education offered by colleges (provided the school education boards and higher education regulators have provisions for this entry as per NSQF levels). Skill gaps, if any, shall be compensated by doing bridge courses specified for those skills. All government recruitment rules and qualifications there in shall be aligned to the NSQF levels.

As per the skill alignment process across various Ministries (14 in total), 307 qualifications have been prepared by DGT and ministries of textiles, IT and communication, chemicals and fertilisers, MSME, and rural development to be approved by the National Skills Qualifications Committee (NSQC). It has been
proposed that, as intended in the NSQF for mobility between VET and HE, all diplomas and degrees covering all economic sectors and academic disciplines shall be aligned to the NSQF through defining the competencies required of such formal qualifications.

The entry level qualifications are given in Figure 1, and the qualifications pathways are demonstrated in Figure 2.

<table>
<thead>
<tr>
<th>Certifying Body</th>
<th>Vocational Qualification</th>
<th>Certifying Body</th>
<th>Vocational Qualification</th>
<th>Certifying Body</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td>Grade IX (Vocational)</td>
<td>School</td>
<td>Grade IX (Vocational)</td>
<td>School</td>
</tr>
<tr>
<td>School</td>
<td>Grade X (Vocational)</td>
<td>School</td>
<td>Grade X (Vocational)</td>
<td>School</td>
</tr>
<tr>
<td>School</td>
<td>Diploma (Vocational)</td>
<td>School</td>
<td>Grade XI (Vocational)</td>
<td>School</td>
</tr>
<tr>
<td>School</td>
<td>Diploma (Vocational)</td>
<td>School</td>
<td>Grade XII (Vocational)</td>
<td>School</td>
</tr>
<tr>
<td>University</td>
<td>Advanced Diploma (Vocational)</td>
<td>School</td>
<td>Degree (Vocational)</td>
<td>University</td>
</tr>
</tbody>
</table>

Source: AICTE (n.d.)

**Figure 1: Duration and entry level qualifications under the framework**

While the secondary school included vocational subjects, the higher secondary education leads to a diploma in VE, and the bachelors level leads to an advanced diploma in VE, both certified by the Board of Technical Education. In this area, the considerable work undertaken by the National Institute of Open Schooling (NIOS) on skill development in elementary, secondary and senior secondary levels needs to be underlined. Besides, the post-elementary ITIs and post-secondary Polytechnics continue to offer VET leading to lower technician-level jobs in the country.

As can be seen in Figure 2, the secondary education certificate as well as the ITI certification lead to tertiary education of polytechnics and then to the job market; the secondary education also leads to technical degree institutions from where a
graduate can enter either tertiary level polytechnic or to masters levels in specialised technical fields before entering the higher-level technical job market.

**Figure 2: Pathways in NSQF (Source: AICTE)** Source: AICTE (n.d.)
Before we describe the existing skill development programmes at all levels of education and training in the country, the existing formal system of education and training for skill development is given in Figure 3 which is self explanatory. The resulting outcome starts from an 'unskilled worker' to the level of 'scientist' at the highest level.

Figure 3: Technical and vocational education system (India) (Source: Goel, n.d.)

As per Government of India Ministry of Skill Development and Entrepreneurship (GoI, 2018), over 20 Ministries/Departments are implementing over 40 skill development programmes. Recognising that there is lack of quality, coordination, and focus on the unorganised sector, the government established the Department of Skill Development and Entrepreneurship in 2014, almost three months after which this was upgraded to the Ministry of Skill Development and Entrepreneurship (MSDE). The major objectives were to promote skill development, youth entrepreneurship education, academic equivalence of skill sets, establishment of national skill development corporation/agency/trust, and coordination among all ministries and agencies.

As quoted in the above report, the NSSO data for 2011-12 showed that only 2.2% of the age group 15-59 years received formal vocational training and 8.6% non-formal vocational training. This, therefore, shows that while the figures are depressingly low, there is serious need as well as enough scope for people to be
formally skilled in various vocational areas. The sponsored NSDC study for the country shows that during 2017-22, there is an additional need for 103 million skilled persons in 24 high priority sectors, including in rank order, building construction and real estate, retail, beauty and wellness, logistics/transportation/warehousing, textile and clothing, furniture and furnishing, tourism and hospitality, handloom and handicraft. Interestingly, the agriculture sector was found to have about 13.5 million less requirement over these five years. Education, private security, domestic help, gems and jewellery, and electronics and IT hardware had a requirement of 3 million+ in each sector. Similarly, the 29 states put together needed during 2013-22, about 120 million skilled people (highest in Maharashtra, followed by Sikkim, Tamil Nadu).

4.1 School Vocational Education

The school level vocational education leads to either IITs (with additional apprenticeship training, one can become a craftsperson), or to polytechnics (with additional apprenticeship training, one can become a technician). The polytechnic graduates can also enter engineering colleges to become engineers. In this sector, the NITI Aayog underlined that there are critical missing pieces of 'pedagogy that focuses on teaching at the right level, outcome linked incentives, and a governance that enables the system to operate smoothly' (GoI, 2017). Suggestions have been made to bring in outcomes-based teaching-learning with new tools for effective learning, and also to improve the existing governance mechanisms.

4.2 Bachelor of Vocational Education

The UGC BVoc guidelines underline the intended objective as 'It is important to embed the competencies required for specific job roles in the higher education system for creating employable graduates' (UGC Guidelines for BVoc). BVoc was conceptualised as part of higher education based on skills development comprising multiple exit points of diploma, advanced diploma, and degree, with a mix of general education and skill development for specific job roles, and within the framework of integration of NSQF levels 5-7 with higher education. At present there are 10 vocational sectors (like automobiles, telecommunication, agriculture, etc.) with further specialisations. Graduates with 10+2 in any stream could study a mix of general and vocational competencies (knowledge, practice, attitude) through sector-specific curriculum embedded with national occupational standards (NOS) with specific contextual implementation through practical, portfolio, training, and projects. The general education curriculum comprising upto 40% specifically focuses on language and communication skills,
and the skill components comprising 60% conforms to NSQF levels 5-7 in respect of process, professional knowledge, professional skill, core skill, and responsibility. As per the overall UGC guidelines on credit calculation, one credit is equivalent to 15 classes each of 60 minutes, and any practical and e-content based self-learning shall be half of the credits allotted to lectures. Completion of 60 credits leads to a diploma, 120 credits for advanced diploma, and 180 credits for the degree. While the focus is on learning outcomes, even the practical/hand-on can be through distance or blended mode. The students are advised to take up those specialisations with skill-gaps in industries. While the general education component is taught by college teachers, the skill components are generally taught through tie-up with partner industries. By 2014, about 127 colleges/universities were funded for offer in about 80 trades.

### 4.3 Community Colleges

Community colleges were visualised as formal educational institutions above higher secondary school and below a degree college, managed by the community, for offer of a mix of general education and employable skill development leading to certificate, diploma, and degree programmes. Mid-way, one receives an associate degree with vocational components and joins the world of work to come back at a later stage to complete rest of the credits in line with one’s job to obtain the full UG degree. The CC movement has its roots in the Scandinavian Folk High School, German Volkshochschulen, European Polytechnics, and American Junior Colleges. Though initiated in India in 1995 with Pondicherry University Community College, and with massive expansion by the Indira Gandhi National Open University (with 534 CCs), those could neither have sustained state funding, nor accreditation by any regulator. However, it received authentication only after a centrally-sponsored scheme was endorsed in 2012 conference of State Education Ministers to start 200 CCs from 2013-14. Both the Indian and the British governments signed a MoU for development of CCs under UK-India Education and Research Initiative (UKIERI). Since then, 157 CCs have been funded by the UGC, and 107 CCs run in polytechnics have been approved under NVQF of which 72 have been funded by AICTE. Within higher education, the UGC-CCs are of three years duration, whereas of the 3500 polytechnics and equivalent technical institutions from which the AICTE-approved polytechnics were selected based on availability of physical facilities, qualified and trained faculty, and technicians and craftpersons, the levels span from 1 to 5 (corresponding to NVEQF levels 1-7), each of 1000 hours of inputs. For self-employment, it is basically multi-skill training; and for the production sector it combines specialised designated skills with multi-trade skills.
Like many other VET schemes, CCs aim at equipping the youth with knowledge and skills (employable and self-employable) for a sustained livelihood. While the CC scheme on the one hand clearly operates within the domain of 'higher education', on the other hand there exist skill-sets leading to gainful employment, but not leading to a sustained 'occupation'. Though the AICTE-CC scheme through polytechnics stipulates for lateral entry and vertical mobility to higher education (through the NVEQF), in practice, the graduate is awarded a community diploma (and may be community degree) without any possibility of entry to either higher education or professional education.

4.4 Continuing Education and Training

There are many agencies (government, private, and NGOs) which are offering crash/modular short-term skill development training to fill the skill-gaps. The Directorate General of Training (DGT) of the Ministry of SDE formulates policy, standards, curricula, assessment, and certification for school leavers, ITI graduates and teachers/instructors, technicians, industrial workers, women, SC/ST, PWD, and middle-level executives on skill-related VET. The DGT has now become the executive wing of the NCVET.

4.5 Private Initiative

It has been reported that, a collaborative venture of the Gujarat Government, Team League Skills University started functioning in 2014 with about 4000 students. The modalities involve corporate, cloud-based, apprenticeship-based, and campus-based strategies. Preference is given to ITI and vocational higher secondary graduates for an associate degree of four semesters and a full bachelors degree of six semesters. In addition to this, there are Skills Universities in the states of Rajasthan and Haryana; and the Symbiosis Society has established the Symbiosis Skills and Open University recently. The Government of India has initiated processes and draft norms for establishment of skills universities to provide for higher education level skills education and training (and research) by creating skills training labs and centres of excellence in collaboration with industries.

As in case of all other academic and professional programmes, the nomenclature shall be standardised for skill-based programmes, like for instance, Bachelor of Vocation (BVoc) and Bachelor of Skills (BSkills) and similar masters programmes. All the regulators along with the skills universities shall work with the NCVET (skills education and training national regulator) to formulate norms and standards for such universities. It is apprehended that this might bring into focus
the skills-degree programmes and professional-degree programmes to be aligned at some stage for clarity of students, employers, international institutions, and employers. While, as long as these are universities, the recognition has to be obtained from the UGC, all other aspects of regulation and accreditation shall be governed by NCVET.

### 4.6 Open and Distance Learning

Skill-based courses/programmes have been offered through ODL for the past decades. The best examples are the Indira Gandhi National Open University (IGNOU) and the National Institute of Open Schooling (NIOS) offering respectively post-secondary and elementary/secondary level skill-based programmes (certificates and diplomas). In these instances, the major focus has been to bring the unorganised sectors to the scenario of skill development and job market. These experiences need to be further worked upon toward credit-transfer and recognition/accreditation of prior work-place learning, and flexible and seamless linkage to VET and skill development within the formal higher and further education. Within the Action Plan given in the sixth chapter (which is equally applicable to all ODL programmes), a few specific bullet points have been suggested exclusively for DEIs/OUs to look into.
From the review of international frameworks and good practices on skill development vis-à-vis education and training (especially higher education), the following variables have been located as essential for a sustainable and useful skill development strategy within higher and further education.

i) There must be a flexible framework of horizontal and vertical mobility, with lateral entry and exit options, within vocational education and general education. Given this broader goal for VET and HE, within the UG programme (which these guidelines focus), there should be provision for recognition of prior learning (RPL) and option for lateral entry.

ii) The skill development is not only to be seen as leading to some kind of ‘job or work’, but be clearly linked to sustainable ‘occupations’, and go beyond a competency model to a model of holistic society-citizen development. This, in way, should balance good citizen skills with employability skills.

iii) As against the dominating British and Australian models, the German, Austrian, Swiss and other European models provide for more pragmatic, socially cohesive, qualitatively richer, more life sustaining and life enriching models within a convergence but flexible framework of VET and HE, thereby categorically dispelling the age-old criticism that VET is ‘training’ (and, therefore, limited) and general HE is ’liberal development’ (and, therefore, largely unemployable). The congruence between the two is essential for sustainable VET in HE.

iv) When the skill, knowledge, competency, and attitude levels along with their credits are finalised and firmly located within an institutional framework, the students must be provided with ample flexibility to accumulate credits through, on the one hand, by swapping formal education and training and work/occupational experience, and on the other hand, through a combination of mediated learning and blended delivery strategies. Skilling and development of employability through F2F or ODL or any other blended mode must be considered as equivalent to each other. Further, skilling needs to go beyond the conventional mode of transaction to include a blended system of organisation and delivery—whether within campus-based education or distance learning or online learning.
v) The skill and occupational sector cannot always be employer/entrepreneur-driven or market-driven. The government and civil society have a role to play for visualising it within the broader economic and social policy, and macro socio-economic development.

vi) Examples of erstwhile 4-year UG programme of University of Delhi, other institutional examples of good practice like Sant Longowal Institute of Technology, Bharatiya Skills University and other state skills universities contribute to further enrichment of the 'action plan' given in the next chapter.

vii) In learning design for skilling, each knowledge and theory module/credit must accompany with appropriate application and practicum.

viii) The Guidelines and Plan of Action include skilling and/or employability at the UG level. It excludes other significant areas (and, therefore, needs further work) like vertical mobility of school vocational education and ITIs/polytechnics in the skills ladder up to skills university, as also linkage of VET and HE.

5.1 Emerging Formulation

The existing nodes of skill development within higher education is depicted in Figure 4. While each one is effective within their domains of work and are/need to be NSQF-compliant, there is absence of seamless coordination and convergence between themselves, as also with the pathways of VET and HE. Based on the existing strengths, a framework and guidelines need to be visualised and worked out in respect of: i) strengthening VET in its own pathways starting from unorganised sector and informal training to the higher professional and managerial levels, including up to the skills university; ii) coordination and convergence between VET and HE with entry/exit/RPL options; iii) skilling and employability within the UG education through provision of a NSQF-compliant 'system' of seamless, flexible, blended learning and resource-based and credit-based modular learning (combining self-learning, mentored distance/online learning, and F2F internship) with significant but appropriate use of ICT including the national platform of SWAYAM, within the broader framework of 'lifelong learning'.
However, it may be noted that of the three pathways noted above, the present 'Guidelines' deals with the third pathway, i.e. skilling and employability within undergraduate education. Movement within VET and mobility between VET and HE need to be worked out separately, and could be linked to these Guidelines.

Within the UG choice-based credit system (CBCS), the framework needs to consider a flexible pathway—starting from a qualifications framework which is 'basic' (direct transfer of skills to world of work), to a framework which is 'progressive/developmental' (holistic competencies development through multiple pathways), and to a framework of 'higher-order' holistic discipline competencies, social and life skills, and occupational skills development (Figure 5). This is though not linear, attempt should be progressively made to achieve the higher-order framework. [However, the skilling at the UG level can consider all the three in its theory-practicum-internship formulation to achieve the learning outcomes of discipline competencies, job skills, soft skills, and social and life skills.]

**Figure 4: Existing institutional Mechanisms for VET/ skills in HE**

**Figure 5: Progressive competency / skill development pathway**

- **Rudimentary/Basic**
  - Development and direct transfer of skills to the world of work/job.

- **Progressive**
  - Holistic development of competencies, occupational and 'other' skills/competencies through multiple and flexible pathways, leading to sustainable, developmental, and mobile jobs within an occupational/career perspective.

- **Higher-order**
  - Holistic development of general education and discipline competencies, problem-solving work skills, social and life skills, with integration and congruence of discipline and inter-disciplinary competencies and occupational competencies, by providing multiple opportunities for formal, non-formal and informal learning (and also through APL/RPL), leading to sustainable occupations, creative engagements, innovations, self-enterprises, etc.
The framework can be extended further to include: skill sets, institutional mechanisms, and support mechanisms as a system (Figure 6). As is the case with EQF and American position on holistic personality development, and as the review of good practices presented in earlier sections suggests, the skills sets in any level of skill development needs to include all four types of skills: personal skills, occupational skills, social and life skills, and 21st century skills (besides the discipline/domain-specific skills). Cognitive and non-cognitive skills are embedded in these skills.

To facilitate skill/competency development in students of higher education, sets of skills need to be carefully identified and nurtured. This shall obviously include, but will go beyond, the skills and competencies mapped in the NSQF. As a further explanation to Figure 6, four sets are listed below for a comprehensive skill framework, each one of which needs detailing, as also more can be added to these as per contexts and needs.

| 21st century skills (including learning to learn skills). | Occupational (including teaching, training and research competencies). | Social and life skills. | Skills for happiness: integrated/holistic peaceful living. |

The institutional mechanism includes curriculum mapping, and development and availability of a basket of level-wise and sector-wise skills modules (compatible with NSQF, as also discipline and allied skills beyond the framework), which are credit-based and modular, through a variety of delivery strategies (with individual freedom/flexibility to choose from, based on personal and occupational contexts)—F2F interaction, hands-on/ internship, self-study, distance learning, non-formal mechanisms. The institutions though will have freedom and flexibility to adopt any extent of blended learning strategies depending on requirements and available resources.

There is a need for built-in, seamless, need-based support mechanisms in place: (standard-compliant) institutional F2F support, learning centre/ work centre support, online support, non-formal and informal support by service providers; aligned with indicators of accrediting and regulatory authorities; and with development and standardisation of curriculum/ resources/ assessment jointly by the SSCs and academic institutions.

[This is being visualised to extend the existing mechanisms in higher education institutions to a seamless standards-compliant 'system' which is absent today. Currently, the student is in search of the 'system'; what is visualised is that the 'system' is just there for the student to choose and engage with.]
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### Varieties of Skills
- Discipline and inter-disciplinary competencies.
- Personal skills.
- Occupational skills.
- Social and life skills.
- 21st Century skills.

### Institutional Mechanisms
- Curriculum mapping and outcome-based learning.
- Basket of multimedia skills modules (level-wise and sector-wise).
- Credit-based modules available through a variety of delivery strategies – F2F, hand-on / internship, self-study, distance learning, online learning (through institutional LMS SWAYAM, social networks).

### Support Mechanisms
- F2F formal institutional support.
- Distance learning study centre support.
- Online support through institutional and national platform.
- Non-formal and informal support by service providers, NGOs, communities.
- Alignment with and accreditation by regulatory bodies.
- Curriculum, resource development, and assessment by joint body of SSCs and academic institutions.

**Figure 6: Implementation possibilities**

### 5.2 Operational Guidelines

To operationalise the above, the guidelines as briefed below are applicable to the three areas on concern in higher education: i) vertical mobility within VET; ii) horizontal mobility between VET and HE; and iii) skilling for general higher education. However, as is the focus of these guidelines, the last one will be addressed as our concern for the purpose.

- The major goal of higher education being knowledge generation and innovation in various fields of study, it may not be desirable to confine skilling to only the NSQF, and, therefore, it should include discipline-specific competencies (both cognitive and non-cognitive), specific professional/occupational competencies, social and life skills, soft skills, and other global and local skills including those of 21st century skills as discussed above. While it is essential to adhere to the NSQF as much as possible and desirable especially in the area of job/occupation-specific skills/competencies, skilling in higher education must have a judicious combination of the above skills and competencies, alongside the disciplinary/inter-disciplinary study.
A prerequisite for the above formulation is national skill mapping and job/occupational mapping for all types of skills noted above. This needs to be done alongside their levels, credit values, standard level, and learning outcomes (in terms of knowledge, attitude, skill, values, and innovations). This, therefore, needs to go beyond the skill mapping within the NSQF to have a national HEQF/HESF for at least the last area of concern noted above.

The operationalisation of skilling in higher education would essentially require a life-cycle skilling/competency system (i.e. skilling within UG education, and beyond, including continuing skill development), and a network/basket of regulator-compliant, NSQF-compliant, credit-based, modular, flexible, resource-based blended learning resources, with built-in equivalency across institutions, and concomitant assessment rubrics. There exists a need for a national/nodal agency for assessment of skill/competency qualifications and for competency-based curriculum (especially for lateral entry-exit, RPL, credit transfer).

In the case of moving toward ‘blended learning for skilling in higher education’, and especially in the context of ‘distance and online learning’, there is need to develop and adhere to indicators and standards for evidence-based skill development, combining self-study, mentoring and on-the-job training, and continuous and comprehensive monitoring of skilling.

5.2.1 Modalities

For making a beginning, it is essential to locate the NSQF level for the start-point and end-point of each of the entry-level vocational education/competency development programme, starting from the unorganised sector to the level of skilling for UG/PG higher education (Figure 7). Though this is not a pre-requisite to skilling in undergraduate education, working out such a start and end-point pathway shall facilitate to extend these ‘guidelines’ to vertical mobility within VET, and mobility between VET and HE.
At the next level, for each of the entry-level programme, the following design principles are required for each of the skill/competency from the basket of competencies. For each of the discipline-specific, professional-occupational, non-cognitive, social and life skills, and soft skills, within a comprehensive and integrated approach, it is essential to decide the level of each competency (or competency group); determine the credit values; develop the skill development/competency indicators; determine the learning outcomes; select appropriate learning resources; and finalise (a flexible) delivery strategy(ies). This is applicable to all types of delivery—including F2F, distance/online learning, workplace training, among others.

Each of the above factors can be/needs to be further expanded for each of the skill/competency types (Figure 8). To take one example of 'learning outcomes', each of the skill types needs to specify the entry-level learning experiences, and learning outcomes listed semester-wise (six semesters for undergraduate programmes, and four semesters for postgraduate programmes).

In continuation to the above inter-related factors, the 'skill/competency indicators' shall suggest if the educational/training interventions have been effective, especially for skilling, but also in relation to the established generic outcome factors of access, equity, relevance, quality, and cost (Sanghi et al, 2018).
### Figure 8: Expansion of the variable ‘learning outcomes’

The curriculum design and transaction must judiciously combine Theory+Practicum+Internship formulation as depicted below (and, a beginning has been made in the CBCS of UGC, and Internship programme of AICTE).

**Theory + Practicum + Internship**

To operationalise such skill/ competency development, as also for mobility across VET and HE, additional reforms/ provisions in the following six areas are visualised:

### 1. Structure:

This requires policy specification as well as strategisation (both horizontal and vertical) across general education–vocational education–professional education–lifelong learning for seamless support, understanding, and facilitation. For instance, in case of hospitality and tourism occupation, a host of ancillary/subsidiary/peripheral trades (like transport, traditional wellness, logistics, hotels and restaurants, traditional arts and crafts, public law and order, public administration, police and security, private individual attitude and behaviour, historians and guides, banking, among others need to seamlessly support it (as per the competency/skills standards) to make this occupation successful.

While this is generally the case in many countries, in India the situation is wanting. This is just one example to show how integrated support and mobility are crucial structural elements to consider for enhancing employability at the undergraduate level.
2. Curriculum Design, Course Content, Learning Resources:

This is the most crucial reform which also covers how teaching-learning and training transactions take place. Some initiation has been made, for instance, in choice-based credit system (CBCS) of UGC, blended learning by UGC and AICTE, Pandit Madan Mohan Malviya National Mission for Teaching and Teaching (including the reformative Teaching-Learning Centres), among others.

It requires flexible attitude and ability to map curriculum and design competency-based curricula, especially the matching between the course contents and skills in-operation. This needs to be a mix of short-term professional competencies and long-term competencies toward employability and occupational mobility. Strategies for interweaving theory-practice and/or building theory around skills need to be decided. Both pedagogic innovation and the labour market need to gel well. Irrespective of institutions involved in the formulation and implementation of skilling in HE, what is required is development and availability of standards- and skill-compliant curricula, multiple-media courses/modules, and learning resources (including OERs and MOOCs) for institutions and students to pick/choose from. This may further require establishment of Skills Department within the institution, as also enhancing the professional competency of the statutory bodies, including the Academic Council.

3. Teacher Professional Development:

This is a crucial link (and often neglected) area within VET and HE. Some efforts are already in place at both F2F institutional mechanisms and by IGNOU to develop NSQF-compliant teachers for VET and skill development. This needs to be augmented; and, as in the case of EQF-Germany and also in VET-China, workplace/occupational trainers and professionals, and industry experts must form an integral part of not only work place internship but more so for F2F teaching/tutoring and resources development. A scheme of adjunct faculty may be developed.

When it comes to skilling within HE, the most important requirement (and therefore an existing constraint) is availability of qualified and trained teachers and mentors to operationalise this. While one may consider fulltime-part time teachers by combining the institutional and industry expertise, for initial training and CPD of teachers/trainers from both institutions and industries can be carried out within the existing system of training/CPD in higher education and professional education. This needs to
be built into the CPD system through competency level-based, credit-based, modular CPD resources (print, multimedia, F2F, online) and certification thereof. This is an area which is at a lower level of development when compared to international/global practices, and which needs a comprehensive and integrated overhaul within the framework of ‘professional learning’ (Panda, 2018).

4. Assessment and Evaluation Strategies:

Such a formulation needs to go beyond the traditional forms of testing and assessment, to include innovative methods involving evaluation of self-responsibility, cooperative and collaborative learning, creative engagement in-context, problem-solving, and tendency for innovation. Evidence-based evaluation in the context of skilling in higher education requires portfolio development and personal development plans. Besides the mechanisms of assessment and evaluation, what is further required is a seamless system of aligning assessment with theory-practice-internship, and with a networked system of assessment rubric. ICT could play a significant role in this network.

There is the need for a single Assessment Board for standardisation of assessment of skills/competencies at various levels of the skills basket and pathways. This will also ensure equivalency across various national providers as also with international standards.

5. Quality Assurance Agencies:

At present QA agencies in higher education, technical education, and VET are independently doing assessment and accreditation within the existing sectoral formulation. It is intended, and crucially so, to have a coordinated and seamless quality assessment/assurance/accreditation across the regulators, including the NCVET and the newly created regulator in the Ministry of Skill Development and Enterpreneurship. This, therefore, presupposes a newly developed system for Skilling & HE.

6. Regulators:

As noted above, the current regulators are independently regulating their domains. The UGC is yet to develop a system/mechanism for seamless and networked VET and Skilling in HE. The NCVET, as a new regulator for VET, could play the role of nodal coordinating agency for the three focus areas listed at the beginning paragraph of this document. This needs further cross-checking if any other national regulator exists for regulation of skills education.
Once the competency levels, credits, modular pathways, and achievement/certification standards are specified, it will be up to the respective regulators (Vocational Boards, AICTE, UGC, NCVET) to recognise outcomes certification at that level falling under the jurisdiction of the concerned regulator. All the regulators need to agree and adhere to the equivalence of competency-basked/ network equivalency (compatible to the joint outcome of NSQF and global HE knowledge and competency standards).

It is also important to ensure that there is a comprehensive and integrated 'system' for skill/competency development within higher and further education. Otherwise, each of the well-intended and excellent interventions would be sporadic without the intended impact. Coupled with this is the 'standard' of quality of resources and their transaction. In spite of significantly massive work undertaken by the NSDC, it has been reported that majority of the surveyed graduates and employers underlined institutional interventions and quality skill courses as poor (Sengupta and Chapman, 2018). Therefore, what is important is not only to have a provision, but more so to ensure the quality or standard of the provision and its implementation.
6.1 Context

This Action Plan focuses on the existing and prospective undergraduate students from various streams, and various disciplines/areas of study within those streams, in respect of: i) relating to skill/job/occupational sectors; ii) relating to skill standards specified by NSQF and the related SSCs; iii) judicious combination of curriculum for discipline core and skill courses; and iv) enhancing employability/entrepreneurship while increasing the GER in HE. Skilling in undergraduate education reported here is to be distinguished from the scheme of SHREYAS launched by GOI in 2019.

As articulated clearly in this report earlier, undergraduate/higher education must prepare the would-be graduates to have greater understanding of the discipline area of study; to nurture as good citizens; to develop generic skills of problem solving, critical thinking, interpersonal relationship, leadership in the area of work, democratic values, etc.; to sharpen the soft skills and allied 21st century skills; and to master, as per NSQF levels, the skills required of a job/occupation, especially in areas where there is considerable future expansion and demand, and which preferably have specialised National Occupational Standards.

As per AISHE report for 2017-18, out of above 36.6 million higher education students, there were about 29 million undergraduate students studying in colleges/university colleges in the country. Of those, 40% were Arts, 17% Sciences, and 16% Commerce/Management students. To these could be added about 2.33 million UG distance education students (BA 1.65 million, BCom 464 thousand, BSc 222 thousand). Therefore, other than those studying in the undergraduate BVoc degree and in the Community Colleges, millions of UG students need to be skilled in one’s own discipline, as also for specific occupational skills. It may be noted that, as per *India Skills Report 2018*, of the existing graduates/degree holders, about 66% BSc/BCom, 62% BA, 61% MBA, 56% MCA, 52% BPharma, and 48% Engineering graduates are unemployable. On the other hand, while about 93% of students wanted to have apprenticeship training in vocational courses, only 37% could be offered by existing organisations due to lack of support from respective industries. Next to Engineering, college undergraduates have the second highest job opportunity, and ‘employability’ has been the major concern at this level.
6.2 Required Skill Areas

The existing skilling structure for vocational education, upward from schooling to higher education, is given as follows:

- 10+ schooling (vocational secondary), with 1-year certificate DGET and 2-year certificate lead to become .......... Craftsmen/Craftspersons.
- +2 equivalent (vocational senior secondary, with 3-year diploma at polytechnics), with diploma at ATIs lead to become .......... Technicians.
- +2 (senior secondary general) graduate can pursue further: i) 3-year B.Voc; ii) 2-3 years Community Colleges; and iii) 3-year/4-year general Under-graduation.

While it is imperative to consider: i) vertical mobility from campus-based schooling and open schooling upward within VET, and ii) horizontal mobility between VET and HE, the Guidelines in this report is specifically concerned with 'skilling and employability within higher education'. And, therefore, the concern here is iii) i.e. last bullet point in the box given above.

Broadly, three types of skills are visualised to be comprehensively integrated within the UG curriculum, and which could balance between discipline skills, social and life skills, and occupational skills:

i) Job/Occupational Skills

Keeping in view the human resource requirements, as projected by the Ministry of Skill Development and Entrepreneurship, Government of India, till 2022, the following industries (Table 3) require massive skilled human resources at various levels, ranging from technician to managerial:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Skill Areas</th>
<th>S.No.</th>
<th>Further Skill Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Retail</td>
<td>1.</td>
<td>Automobiles (electronics)</td>
</tr>
<tr>
<td>2.</td>
<td>IT (software development)</td>
<td>2.</td>
<td>Media and Entertainment (theatre and acting)</td>
</tr>
<tr>
<td>3.</td>
<td>Renewable Energy</td>
<td>3.</td>
<td>Telecom (mobile communication)</td>
</tr>
<tr>
<td>4.</td>
<td>Food Processing</td>
<td>4.</td>
<td>Agriculture (GHT, renewable energy, food engineering, water conservation)</td>
</tr>
<tr>
<td>5.</td>
<td>Health Care</td>
<td>5.</td>
<td>Construction (building technology)</td>
</tr>
<tr>
<td>6.</td>
<td>Hospitality &amp; Tourism</td>
<td>6.</td>
<td>Fashion Technology/Apparels</td>
</tr>
<tr>
<td>7.</td>
<td>Green House Technology</td>
<td>7.</td>
<td>Printing and Publishing</td>
</tr>
</tbody>
</table>

Table 3: List of high-priority industries/ occupations
The above skill areas may be further compared with the existing 37 SSCs in the country as given below (Figure 9). These SSCs have National Occupational Standards (NOS) in place, and also have identified workplace training/service providers which need to be utilised by a college/university for hands-on practical and/or internship.

Source: Ministry of Skill Development and Entrepreneurship, Government of India. [https://msde.gov.in/ssc.html](https://msde.gov.in/ssc.html)

**Figure 9: Priority sectors for Sector Skills Councils**

**ii) Discipline Competencies**

The students of each discipline are required to develop 'specific' skills of their discipline at the UG level, which need to go beyond theory/concepts to their application in-context, by engaging in projects, assignments, collaborative learning, problem-based learning/problem solving, field study, etc. Further, the students of one discipline could acquire skills 'related' to the discipline (from an interdisciplinary perspective) from another discipline.

**iii) Social and Life Skills**

The defined social and life skills, taught at undergraduate level in many universities globally and by a few universities in India through especially a 4-year UG programme, are essential to be built into various discipline and allied courses, and also as separate credit-based modules.
As a whole, both for an effective and happy living as also for successful occupational success, soft skills of various types, ranging from information and communication skills, leadership, mindfulness and self-regulated learning, to socio-psychological/emotional intelligence and overall happiness (including building meaningful and purposeful life) are required to be embedded into discipline, occupational, and life skills.

6.3 Skill/Competency Levels

The 3-year UG education falls under Levels 5-7 in respect of the NSQF; and therefore, any occupational skilling initiative at UG level must conform to these given standards (Table 4):

**Table 4: Level explanation for Levels 5, 6, 7 of NSQF**

<table>
<thead>
<tr>
<th>Level</th>
<th>Knowledge</th>
<th>Core skills</th>
<th>Professional skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 5</td>
<td>Facts, principles; processes; concepts in a field of work/study.</td>
<td>Mathematical; socio-political understanding; collection and organisation of data/info.</td>
<td>Cognitive and practical skills for task accomplishment and problem solving</td>
</tr>
<tr>
<td>Level 6</td>
<td>Factual and theoretical in a field of work/study</td>
<td>Good mathematical calculation; socio-political understanding; collection, organisation and logical communication.</td>
<td>Cognitive and practical skills for generating solutions to specific problems.</td>
</tr>
<tr>
<td>Level 7</td>
<td>Wide ranging factual and theoretical knowledge in a field of work/study.</td>
<td>Good logical and mathematical skill; socio-political and natural environment understanding; collection, organisation and presentation</td>
<td>Wide range of cognitive and practical skills for generating solutions to specific problems in the field/context.</td>
</tr>
</tbody>
</table>

Further, the levels and rubrics of discipline-related competencies and social and life skills can be worked out by the programme coordinators, based on some best practices available internationally, as also by using select open educational resources (OERs).

6.4 Curriculum and Credits

After senior secondary (i.e. 10+2 yrs) education, a school graduate has choice to move to either undergraduate education general (UG-G), or undergraduate
education vocational (B.Voc), or community college (CC), or a host of undergraduate professional diplomas and degrees, like Tourism and Travel, Mass Communication, Business Administration, Apparel Design, Food Technology, Health and Nutrition, Human Resource Management, SME, Material Management, Retail Business, Marketing of Insurance, Actuarial Science, Information Technology, etc. Our concern here is skilling and employability of UG; and, therefore, it is essential to consider the credit structure of undergraduate degree studies, i.e. the choice-based credit system (CBCS) of the higher education regulator University Grants Commission (UGC) which is compulsorily applicable to all higher education institutions in the country.

The UGC specifies that for an undergraduate degree in Arts (BA), Commerce (BCom) and Sciences (BSc), five types of courses are to be studied (Table 5):

**Table 5: Five course types in the CBCS**

<table>
<thead>
<tr>
<th>Sl.</th>
<th>Type of Course</th>
<th>Course Credits</th>
<th>Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Theory</td>
<td>Practical</td>
</tr>
<tr>
<td>1.</td>
<td>Discipline Core (within the discipline)</td>
<td>48</td>
<td>24</td>
</tr>
<tr>
<td>2.</td>
<td>Discipline Elective (can be skills on the discipline)</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>3.</td>
<td>Generic Elective (outside the discipline)</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>4.</td>
<td>Ability Enhancement (soft skills; 21st century skills)</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td>5.</td>
<td>Skill Enhancement (basically job-related skills)</td>
<td>16</td>
<td>-</td>
</tr>
<tr>
<td></td>
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**Notes:**
1. 1 credit = 1 hour theory teaching; or 1 hour tutorial; or 2 hour practical over a 14-week semester
2. In B.Voc of UGC, 1 hour of theory teaching is equivalent to 2 hours of self-learning and/or study of e-content which needs to be considered here for self learning in either F2F context or in the context of ODL.
3. Universities are free to deviate up to 30% in the core syllabus prescribed by UGC.
4. 24 credits in specific discipline is enough for a graduate as eligibility to apply for further Masters/Technical/Professional studies.
The undergraduate higher education is required to address competency/skill development in: i) discipline areas, ii) 21st century skills (including social and life skills), and iii) occupational skills. It is suggested that skilling/employability at UG level can be best achieved, if the following formulation is adopted:

- **Development of Discipline-'Specific' Skills** within 'discipline electives' for at least 8-12 credits; preferably as far as possible 'aligned with' the skill areas listed by the Sector Skill Councils (SSCs) with defined National Occupational Standards (NOS). This needs to be developed by universities themselves or by the regulator University Grants Commission to be adopted by all higher education institutions.

- **Development of Discipline-'Related' Skills** within 'discipline electives' for at least 8-12 credits. This will be 'directly related to' discipline-specific occupations/jobs; and should be fully aligned with the NOSs of SSCs.

- **Development of Ability Enhancement** within the specified 8 credits, which could include soft skills, ethical skills including environment ethics, 21st century skills, among others.

- **Development of Skills Enhancement** within the specified 16 credits, which needs to focus on one particular occupation, and be aligned with and developed together by the college/ university faculty and the SSC. The Occupational Standards, which were developed by industry-driven initiatives, need further updating with the help of both academia and experts from the industry.

The above curriculum formulation will require, at the first instance, curriculum mapping as well as concept mapping for the entire UG programme, as also for each of the above five types of courses. This is the most important exercise for which the Boards of Studies and Academic Council of HEIs need to be strengthened and further capacitated. Aligned with this is 'advocacy' and engagement of various stakeholders in the design, development and implementation of the programme.

### 6.5 Teaching-Learning

The teaching-learning strategies will involve teacher-student interaction for theory classes, self-learning of multiple media resources, guided student-student interaction for collaborative conceptual clarification and possible in-context application, hands-on practical and/or internship at designated service providers (workplaces/workshops) for specific occupational competencies
identified by the SSCs. To start with, the SSCs need to refine their respective skill/competency sets and standards, and develop required teaching-learning resources and assessment rubrics for further use by higher education institutions. While doing so, involvement of academic experts as also pedagogy experts/instructional designers is essential. The following needs consideration (Figure 10).

**Figure 10: Holistic considerations for implementation of skilling/ employability**

[Note *In so far as competency standards are concerned, as pointed out by the Sharda Prasad Committee Report (MSDE, 2016), it should be kept in mind that the SSCs have developed National Occupational Standards (N = 4783) and corresponding 1801 Qualification Packs (QPs) which were about 5.5 NOSs per QP (while it should have been 10-30 NOSs/number of skills to be able to get a job). Further, the competency standards (NOSs) were developed by a small number of people with limited trade expertise. These, hence, should be developed by a 'Team' comprising related trade experts, academicians, educational technology experts, pedagogy experts, and trainers. While all the above need to be developed/confirmed, the most crucial is orientation of the faculty and training of trainers for hands-on internship.*]

An important constraint has been lack of experts in the pedagogy of competency-based and multiple media resource-based modules. It is essential to have training of trainers (TOT) programmes organised on continuous basis to address this prerequisite toward skilling and employability in higher education.

As could be seen from the graphic representation below, the six broad teaching-learning components need to be developed for the entire UG education, as also for each course of study, covering discipline competencies, social and life skills, and occupational skills. This is equally applicable to discipline core as well as generic elective courses (Figure 11).
There should be development of specific competency-based 'learning outcomes' for each module/unit of the course. The fundamental premises underlying the learning outcomes-based approach to curriculum framework, as has been stipulated by the UGC in 2018, include the following:

- Higher education qualifications are awarded on the basis of demonstrated outcomes, expressed in terms of knowledge, understanding, skills, attitudes, and values, and academic standards expected of graduates of a programme of study.

However, it may be underlined that outcome-based learning does not confine to compartmentalised, pre-fixed, rigid outcomes; rather, it also involves flexibility toward innovation beyond pre-stipulated outcomes.

- Based on the learning outcomes, the curriculum contents (theory, tutorial, self-study, internship) need to be selected, and 'activities/tasks' to be carried out for each learning outcome need to be specified.

- For each learning outcomes, multiple media learning resources need to be developed, including identification and adoption of OERs.

- There shall be blended delivery strategies combining F2F, self learning, distance learning, online learning, and F2F internship.

- All practicum/hands-on must be F2F only, especially at designated workplaces for occupational skills.
The most crucial is compulsory learner support F2F or online or onsite, or combination of these.

Provision of continuous formative assessment and remedial mentoring.

For TEE, the occupational skills must be assessed by the respective SSCs.

One of the significant strategies of implementation has been outlined by CEMCA (Figure 12) which could facilitate the concerned faculty at the institution level to formulate curriculum organisation and implementation at the discipline-level. Keeping this in view, each discipline/programme coordinator may work out the most viable, economical and time-bound strategy to implement the competency-based discipline-related undergraduate skilling in higher education.

(Source: 'Concept Note', CEMCA, 2018)

**Figure 12: Framework of curriculum implementation**
For undertaking compulsory practicum/internship, the existing skill centres/workplaces for each SSC need to be upgraded as per the occupational standards/benchmarks of an occupation.

As noted earlier, this also requires specific and focused Training of Trainers (ToT), based on competency models, to undertake a variety of tasks, ranging from curriculum design and development of multiple media learning resources (including e-contents) to application of the assessment rubric in consonance with specified learning outcomes and occupational standards. The professional competency model articulated by Bawane and Spector (2009), involving a graded linear progression of ‘Roles-Competencies-Tasks-Skills’, will be of specific help in designing competency-based ToTs.

This can further be juxtaposed with instructor training model given by Alvarez, et al (2009) involving ‘Role Setting-Identification of Competencies by Roles-Describing Tasks by Competencies and Roles’.

For especially programmes offered through distance learning/online learning/blended learning, the following essentials need to be confirmed:

- Provision for existing skilled persons (with or without any occupation) with avenues to undergo undergraduate education relating to their preferred occupation.

- The informal sector, where skilling by trial and error already exists, should be linked to undergraduate education through APL/RPL and redesign of UG curriculum. Those graduating from school vocational and open schooling may be provided pathways to enter UG skilling programme. In this context, the Australian model of lateral entry may be examined further.

- Adherence to credit equivalency in terms of CBCS (while each credit for ODL may be 30 hours of student engagement in learning).

- The curriculum components need to be judiciously combined for discipline competencies, social and life skills, and occupational skills through blended delivery approaches.

- Pre-delivery learning outcome/competency-based multiple media resources need to be developed (or OERs need to be adopted) for blended delivery, in which occupational skills must be delivered F2F.

- Specific training programmes need to be undertaken for all learner support centres and their collaboration with designated skill centres/workplaces for practicum and internship.
6.6 Graduate Outcomes

The graduate outcomes are visualised to be multiphierarchical and superior to the existing graduate employability, including the following:

- Higher competencies in the application of discipline knowledge to practical development contexts, as also to related job/occupational contexts.

- Development of superior social and life skills (including 21st century skills) for effective management of personal and social life and communities, and for balanced life style toward increasing happiness in individual and social persona.

- Adequate occupational skills at specific level required for chosen job/occupation, and/or self-entrepreneurship.

- With required credits acquired in 'discipline core', the graduates can further study Masters programme in that discipline in any university, and/or study masters in an Open University while doing a job.

- Undertake further study at an appropriate level at the National Skills Universities for further specialisation at a higher level.

6.7 Timeline

The following tasks need to be completed within or less than the specified timeline before such skilling programmes are rolled out for national implementation (Figure 13).

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Tasks</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>M1 M2 M3</td>
</tr>
<tr>
<td>1.</td>
<td>National skills mapping for all types of skills (discipline competencies, occupational skills, social and life skills and happiness, 21st century skills. (M1-M3)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Finalisation of credit-based, modular, competency-based national curriculum (with flexibility in institutional adoption) for all the above skills/competency areas within DE, AE, SE credits of CBCS. (M4-M5)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Development of (standard-compliant) 'learning outcomes'. (M4-M5)</td>
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</table>
### Figure 13: Time frame for implementation

<table>
<thead>
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<tbody>
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<td></td>
<td><strong>4.</strong> i) Development of multiple media learning resources (credit-based, modular) for theory, practicum, alongside activities, tasks to be achieved for learning outcomes; and ii) Development of learner support sites. (M6-M8).</td>
<td>M4 M5 M6</td>
</tr>
<tr>
<td></td>
<td>5. Identification and national listing of teachers/tutors, trainers, and institutions/agencies for practicum/internship. (M6-M8)</td>
<td>M6 M7 M8</td>
</tr>
<tr>
<td></td>
<td>6. Training of Trainers (ToT) for all types of competency development, esp. NSQF-compliant L5-L7 skills. (M8-M9)</td>
<td>M8 M9 M10</td>
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<td></td>
<td>7. Roll out 'Skilling in Higher Education'</td>
<td>M10</td>
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<td></td>
<td>8. Programme evaluation (formative and summative)</td>
<td>M10</td>
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</table>

Note: M = month.

### 6.8 Programme Evaluation

- Formative (each semester) and summative (after 3 years of UG cohorts) evaluation needs to be built into the curriculum design for skilling in higher education.
  - The formative evaluation components must focus on: competency mapping, learning outcomes, multiple media resources, delivery strategies, assessment rubrics, etc. while summative evaluation must include, besides these, the additional components of student/graduate satisfaction, cost-effectiveness, effectiveness of blended delivery, and appropriateness and applicability of blended skilling in higher education.


# APPENDIX 1

## National Skills Qualifications Framework (NSQF) - India

<table>
<thead>
<tr>
<th>Level</th>
<th>Process required</th>
<th>Professional knowledge</th>
<th>Professional skill</th>
<th>Core skill</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Prepares person to/carry out process that are repetitive on regular basis require no previous practice</td>
<td>Familiar with common trade terminology, instructional words meaning and understanding</td>
<td>Routine and repetitive, takes safety and security measures</td>
<td>Reading and writing, addition subtraction personal financing, familiarity with social and religious diversity, hygiene and environment</td>
<td>No responsibility always works under continuous instruction and close supervision</td>
</tr>
<tr>
<td>Level 2</td>
<td>Prepares person to/carry out process that are repetitive on regular basis with little application of understanding, more of practice</td>
<td>Material tools and application in a limited context, understands context of work and quality</td>
<td>Limited service skill used in limited context, select and apply tools, assist in professional works with no variables differentiates good and bad quality</td>
<td>Receive and transmit written and oral messages, basic arithmetic personal financing understanding of social political and religious diversity, hygiene and environment</td>
<td>No responsibility works under instruction and close supervision</td>
</tr>
<tr>
<td>Level 3</td>
<td>Person may carry out a job which may require limited range of activities routine and predictable</td>
<td>Basic facts, process and principle applied in trade of employment</td>
<td>Recall and demonstrate practical skill, routine and repetitive in narrow range of application</td>
<td>Communication written and oral, with minimum required clarity, skill of basic arithmetic and algebraic principles, personal banking, basic understanding of social and natural environment</td>
<td>Under close supervision some responsibility for own work within defined limit</td>
</tr>
<tr>
<td>Level</td>
<td>Process required</td>
<td>Professional knowledge</td>
<td>Professional skill</td>
<td>Core skill</td>
<td>Responsibility</td>
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<tr>
<td>Level 4</td>
<td>Work in familiar, predictable, routine, situation of clear choice</td>
<td>Factual knowledge of field of knowledge or study</td>
<td>Recall and demonstrate practical skill, routine and repetitive in narrow range of application, using appropriate rule and tool, using quality concepts</td>
<td>Language to communicate written or oral, with required clarity, skill to basic arithmetic and algebraic principles, basic understanding of social political and natural environment</td>
<td>Responsibility for own work and learning</td>
</tr>
<tr>
<td>Level 5</td>
<td>Job that requires well developed skill, with clear choice of procedures in familiar context</td>
<td>Knowledge of facts, principles, processes and general concepts, in a field of work or study</td>
<td>A range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information</td>
<td>Desired mathematical skill, understanding of social, political and some skill of collecting and organising information communication</td>
<td>Responsibility for own work and learning and some responsibility for other’s works and learning</td>
</tr>
<tr>
<td>Level 6</td>
<td>Demands wide range of specialised technical skill, clarity of knowledge and practice in broad range of activity involving standard non-standard practices</td>
<td>Factual and theoretical knowledge in broad contexts within a field of work or study</td>
<td>A range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study</td>
<td>Reasonably good in mathematical calculation, understanding of social, political and, reasonably good in data collecting organising information, and logical communication</td>
<td>Responsibility for own work and learning and full responsibility for other’s works and learning</td>
</tr>
<tr>
<td>Level</td>
<td>Process required</td>
<td>Professional knowledge</td>
<td>Professional skill</td>
<td>Core skill</td>
<td>Responsibility</td>
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<tr>
<td>Level 7</td>
<td>Requires a command of wide ranging specialised theoretical and practical skill, involving variable routine and non-routine context.</td>
<td>Wide ranging, factual and theoretical knowledge in broad contexts within a field of work or study</td>
<td>Wide range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study</td>
<td>Good logical and mathematical skill understanding of social political and natural environment good in collecting and organising information, communication and presentation skill</td>
<td>Full responsibility for output of group and development</td>
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<tr>
<td>Level 8</td>
<td>Comprehensive, cognitive, theoretical knowledge and practical skills to develop creative solutions, to abstract problem. Undertakes self study, demonstrates intellectual independence, analytical rigour and good communication</td>
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<td>Exercise management and supervision in the context of work/ study having unpredictable changes, responsible for development of self and others.</td>
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<tr>
<td>Level 9</td>
<td>Advanced knowledge and skill, critical understanding of the subject, demonstrating mastery and innovation, completion of substantial research and dissertation.</td>
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<td>Responsible for decision making in complex technical activities, involving unpredictable study/work situations.</td>
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<td>Level 10</td>
<td>Highly specialised knowledge and problem solving skill to provide original contribution to knowledge through research and scholarship.</td>
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<td>Responsible for strategic decisions in unpredictable complex situations of work/ study.</td>
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## APPENDIX 2

1st CEMCA Think Tank Meet
“Guidelines for Linking the Skill Programme with Academic Programme”
Date: 20 November 2018
Venue- IIC, Lodi Road, New Delhi

### LIST OF THINK TANK COMMITTEE MEMBERS

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<thead>
<tr>
<th>Sl No</th>
<th>Name</th>
<th>Organisation/Place of Work</th>
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<tbody>
<tr>
<td>1</td>
<td>Prof Nageshwar Rao</td>
<td>Indira Gandhi National Open University (IGNOU), Maidan Ghari, New Delhi</td>
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<tr>
<td></td>
<td>Vice Chancellor</td>
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<td>Mr. Ashok Thakur</td>
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<td></td>
<td>Former Secretary</td>
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<tr>
<td>4</td>
<td>Mr. Sunil Kumar</td>
<td>State Planning Commission, Chhattisgarh, India</td>
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<td>Vice- Chairman</td>
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<tr>
<td>5</td>
<td>Dr. B K Bhadri</td>
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<td>Dy. Educational Adviser</td>
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<td>6</td>
<td>Prof. M M Pant</td>
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<td>Former PVC</td>
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<tr>
<td>7</td>
<td>Prof. C B Sharma</td>
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<td></td>
<td>Chairman</td>
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<td>Vice-Chancellor</td>
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<tr>
<td>9</td>
<td>Dr. T R Kem</td>
<td>CEC, New Delhi, India</td>
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<td>Former Director</td>
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<td>10</td>
<td>Prof Ashok Ogra</td>
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<td>Director</td>
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<td>11</td>
<td>Lt. Gen. S P Kochhar (Retd.)</td>
<td>Telecom Sector Skill Council (TSSC), India</td>
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<td>CEO</td>
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<td>12</td>
<td>Mr. Rakesh Khare</td>
<td>TV 18, Noida, U P, India</td>
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<td>13</td>
<td>Mr. Munish Kumar</td>
<td>Ministry of Information and Broadcasting, Govt. of India, New Delhi, India</td>
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<td>14</td>
<td>Dr Satender Arya</td>
<td>Agriculture Skill Council of India (ASCI) New Delhi</td>
</tr>
<tr>
<td>15</td>
<td>Prof Biswajit Das</td>
<td>Centre for Culture, Media &amp; Governance Jamia Millia Islamia, New Delhi, India</td>
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<td>16</td>
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<tr>
<td>18</td>
<td>Dr. Vineeta Sirohi</td>
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</tr>
<tr>
<td>19</td>
<td>Dr. Dalip Raina</td>
<td>Shri Vishwakarma Skill University, Faridabad, Haryana</td>
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<tr>
<td>20</td>
<td>Prof. Santosh Panda</td>
<td>STRIDE, Indira Gandhi National Open University (IGNOU), Maidan Ghari, New Delhi</td>
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<tr>
<td>21</td>
<td>Dr. Manas Ranja Panigrahi</td>
<td>Commonwealth Educational Media Center for Asia (CEMCA) 7/8 Sarva Priya Vihar, New Delhi</td>
</tr>
<tr>
<td>22</td>
<td>Dr. Shahid Rasool</td>
<td>Commonwealth Educational Media Center for Asia (CEMCA) 7/8 Sarva Priya Vihar, New Delhi</td>
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</table>
## APPENDIX 3

### 2\textsuperscript{nd} CEMCA Think Tank Meet:
**Finalisation of “Guidelines for Linking the Skill Programme with Academic Programme”**

**Date:** 11 April 2019  
**Venue:** IIC, Lodi Road, New Delhi

**LIST OF THINK TANK COMMITTEE MEMBERS**

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Dy. Educational Adviser | Ministry of Human Resource Development, New Delhi, India |
| 4     | Mr. Lalit Panwar  
Vice- Chancellor | Rajasthan State Skill Development University, New Delhi |
| 5     | Prof. M M Pant  
Former PVC | Indira Gandhi National Open University (IGNOU), Maidan Ghari, New Delhi |
| 6     | Prof. C B Sharma  
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| 12    | Prof. H C Pokhriyal  
Executive Director | School of Open Learning, University of Delhi, Delhi, India |
2nd CEMCA Think Tank Meet:
Finalisation of “Guidelines for Linking the Skill Programme with Academic Programme”
Date: 11 April 2019
Venue- IIC, Lodi Road, New Delhi

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</tr>
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<td>14</td>
<td>Dr. Peer Gulam Nabi</td>
<td>J &amp; K Skill Development Mission, Kashmir, India</td>
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