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Skilling India: The Role of Pedagogy in Developing Life Skills

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Abstract

In response to recent concerns expressed by Indian industry about the ‘employability’ of school and university graduates, this paper examines the role of pedagogy in developing life skills (or 21st century skills) and how these can be incorporated in the school/university curriculum. In recent curricular frameworks, life skills have been incorporated within the school curriculum by stressing the importance of inquiry and collaborative work through all subjects taught in school. The paper finds a similar emphasis in the National Curriculum Framework (NCF) in India. Using classroom observations and textbook analyses, it shows that learning objectives in schools are frequently incorrect or misaligned with the NCF vision. The paper briefly touches on how the beliefs of teachers affect their classroom practices and recommends that attention should be paid to the professionalisation of teachers, as only then can students acquire skills that are relevant for the 21st century, which is what employers want.

Keywords: Education, Non-cognitive Skills, Employability

JEL Codes: I29, J24

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1. Introduction

Employers have recently raised concerns about the ‘employability’ of school and university graduates, pointing to their lack of skills in numerous areas. As an example, Blom and Saeki (2011) list the following skill gaps that employers identified in new engineering graduates: reliability, self-motivation and willingness to learn (under core employability), and problem solving, creativity and the use of modern tools (under professional skills). The solutions to this problem seem to revolve around equipping new hires with a set of skills that the employer identifies. These could range from short workshops on sexual harassment to re-teaching skills and content that were poorly taught/learnt in school and college. In effect, companies (and now the government) are taking on the enormous task that formal education is supposed to handle over a period of more than 12 years.

This scenario raises two issues. Although the efforts by companies are laudable, their solution is merely akin to a band aid. As and when employers identify skill gaps, they arrange for staff training in areas that are not their core competence. More importantly, the scenario raises the question of what is being taught in the formal education system. If these skills are not taught/learnt in school, what are schools teaching? There is disagreement about the purpose of education—the societal goal would emphasise job market skills, whereas the individual goal is to enable students to realise their potential. In both cases, the formal education system is expected to equip students with skills that are relevant to their social and economic lives beyond school.

Studies on student achievement have found that many school students fail to acquire even the basic skills that employers need. The data on rural India shows abysmally low skills in basic literacy and numeracy (ASER, 2005–2011), wherein a high percentage of children in Class 5 are unable to manage tasks designed for students of Class 2; without these foundation skills, learners are unable to understand complex texts and advanced mathematical concepts in the higher grades (Pritchett, 2013). In urban schools, studies find that students lag behind their international counterparts in middle school (Educational Initiatives and Wipro, n.d.) and secondary school (World Bank, 2009) in science and mathematics.

The low level of student achievement has led to a focus on the quality of education. In a review of factors that could impact quality, Muralidharan (2013) found little or no impact of inputs such as school infrastructure, teacher pay and teacher–pupil ratios. He points to the successful learning outcomes seen in remedial teaching and recommends a stronger focus on ensuring that learning outcomes are met, which is echoed in the draft of the National Education Policy (2016). These two documents focus on achieving learning outcomes, but they do not touch on what these learning outcomes are, who specifies them, whether they are appropriate, or how they are interpreted by teachers and students. These issues fall under pedagogy, which is not merely about teaching but also pertains to the discussion surrounding it—why instruction is framed in particular ways, the role of the curriculum and assessment, the expectations of society, etc. (Alexander, 2001). Pedagogy would address the following questions:

- *How are the learning outcomes specified?* To take the case of reading, the definition of reading has changed from “reading aloud with correct pronunciation” (Ed.CIL, 2009) to “reading for comprehension” (NCERT, 2012). Has this change been communicated to teachers?
- *Does the curriculum support learning outcomes?* The curriculum may be over-ambitious in terms of the students’ age and ability levels, with no concessions given to the pace of learning (Pritchett and Beatty, 2012).
- *How do schools/ teachers/textbooks interpret the learning outcomes and translate them into classroom instruction?* The learning outcomes may get limited to what can be observed and measured.
- *What do students understand of the learning outcomes?* Students may get the impression that the goal is merely to “crack the examination”.

Within a wider framework, the question is whether or not the current curriculum is relevant. On this, the concerns expressed by employers have served a crucial function—they have highlighted the need to re-examine and reform the school/university curriculum so that students learn the relevant skills. This does not imply that the sole purpose of education is to supply workers for the job market, but it does suggest that the curriculum (and instruction) may need to be aligned with what is required for living and working in the 21st century.

This paper is divided into two major sections. The first section, *Life skills and Pedagogy*, describes the skills that employers want and the responses of educators in terms of suggestions for new curriculum frameworks and how to incorporate life skills in the curriculum and instruction. The second section, *Pedagogy in India*, examines some components that impact school instruction. It finds that the curriculum framework and even the school examination system advocate instruction that incorporates inquiry skills and collaboration, but data from classroom observations and textbook analyses show that these are either misunderstood or bypassed. The concluding section touches upon a few proposals—remedial teaching and the use of technology—but these are merely stop gaps; the focus should instead be on educating and training teachers.

2. Life Skills and Pedagogy

2.1 What Are Life Skills?

There have been attempts to list life skills, which appear to constitute an endless, and often overlapping, list. One list is given in Scott (2015), who summarises the suggestions from research under four heads: (a) learning to know, (b) learning to do (critical thinking, problem solving, communication and collaboration, creativity and innovation, information, media and technology literacy and ICT literacy), (c) learning to be (social and cross-cultural skills, personal responsibility, self-regulation and initiative, sense-making skills, metacognitive skills, entrepreneurial thinking skills, and learning to learn and habits of lifelong learning), and (d) learning to live together (seeking and valuing diversity, teamwork and interconnectedness, civic and

digital citizenship, global competence and intercultural competence). A list of the skills by organisation can be found in the Central Square Foundation report by Singh and Menon (2016).

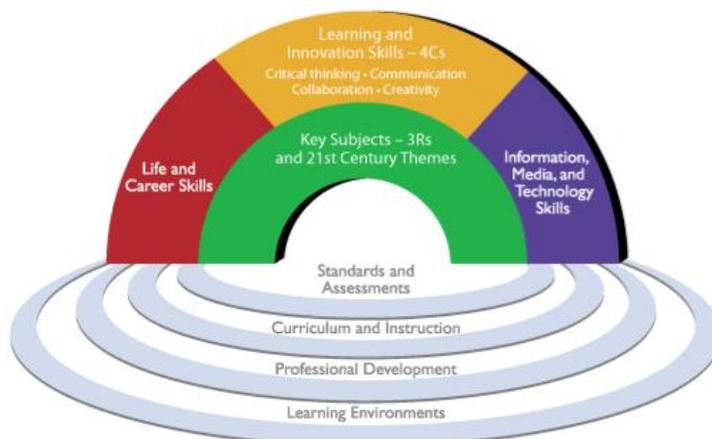
One parsimonious and useful distinction can be found in the World Bank’s STEP program (2014), which lays out three types of skills: (a) Cognitive skills, which include literacy, numeracy, and the ability to solve abstract problems; (b) Socio-emotional skills (non-cognitive skills or soft skills), which relate to social, emotional, personality, behavioural, and attitudinal domains; and (c) Job-relevant skills, which are task-related (such as computer use) (pp. 7–8). Of these skills, cognitive and socio-emotional skills fall (or should fall) under the purview of school education.

2.2 The Recent Emphasis on Life Skills

Life skills have always been part of education, but they have acquired significance in the 21st century. One reason is that the advent of digital technologies has led to fundamental changes in how people interact and work. Dede (2010) points to three fundamental changes: a shift to a knowledge-based economy because computers can perform routine tasks, the increased role and importance of collaborative work in the workplace, and the need to handle vast amounts of information in order to separate signal from noise. Employers do not need to hire people who can perform calculations by hand or people who can spell obscure words because computers can do this faster and more accurately; instead, the workplace is looking for people who can select appropriate procedures and interpret the results that the computer provides as well as people who can sift through volumes of contradictory and often inaccurate information in order to write a coherent report or paper.

This involves a cluster of skills that educationists have termed “21st century skills”, one example of which is the P21 framework (Figure 1). Such frameworks are intended to replace the 20th century curriculum that Dede (2010) terms the “legacy curriculum”.

Figure 1: P21 Framework for 21st Century Learning



Source: P21 Framework, 2011 (<http://www.p21.org>).

The problem of low employability is not limited to India; employers in some other countries have expressed the same concerns, but they have responded by revamping their education systems. As early as the 1980s, the US began examining the skills required for a new knowledge economy and envisaged a fundamental shift from memorisation of facts to the development of inquiry skills. In Asia, both Singapore and China have modernised their education systems through planning at the central level. Singapore, like India, inherited an education system from the British, and China followed a competitive examination system for centuries; both countries have, however, moved beyond these “legacy systems”, whereas India still needs to address this issue.

2.3 Life Skills within the Formal Education System

There seem to be three ways to teach life skills in school (UNESCO, 2016, p. 3):

1. As a specific subject. For example, Behrani (2016) describes a module on the life skills education programme in CBSE schools.
2. As part of extra-curricular activities in school.
3. Cross subjects, so that they underpin the traditional school subjects.

Educationists have focused their efforts on the third option in which life skills are imparted through all the subjects taught in school. However, curricular frameworks such as the P21 Framework view life skills as a separate component that includes the following: flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, and leadership and responsibility.

The problem is how to translate and integrate such skills in the curriculum. Scott (2015) reviews different research-based curriculum models, such as Sternberg and Subotnik (2006) who suggest fostering learners’ capabilities in three areas: *Reasoning* (analytical, critical thinking and problem-solving skills), *Resilience* (life skills such as flexibility, adaptability and self-reliance) and *Responsibility* (wisdom or the application of intelligence, creativity and knowledge for a common good). Scott’s review concludes that the following three components are common to these curriculum models: inquiry, design,¹ and collaborative learning for effective instruction. The focus of education thus turns away from teaching a body of content to making students work in groups to explore and understand concepts.

In short, research shows that the life skills that employers want can be taught within the school curriculum by incorporating and emphasising **inquiry** skills and student **collaboration** (see Chu *et al.*, 2017, for how this is done in Hong Kong).

¹ The term ‘*design*’ remains unclear; it could mean the design of the learning environment or the design of the curriculum.

2.4 Inquiry Skills and Collaboration in the Curriculum

2.4.1 Inquiry Skills

The dominant model used to design a school curriculum comes from Tyler (1949). It lays out four steps: set objectives, select learning experiences, organise instruction, and evaluate progress. This model remains enormously influential because it focuses on measurable teaching outcomes and provides an efficient path to deliver these outcomes. In contrast, Bruner (1963) places learners at the centre of the curriculum, with inquiry being central to learning and instruction. Bruner (1963) lays out four elements of a theory of instruction that is based on the following proposition: “[I]n order to learn or to solve problems, it is necessary that alternatives be explored and that you cannot have effective learning or problem solving without the learner’s having the courage and the skill to explore alternative ways of dealing with a problem” (p. 526). He envisages learning as exploration in a safe environment that is guided and supported by the teacher.

Inquiry skills are most clearly articulated in the teaching of science based on Schwab (1962). They can range from mere confirmation of facts, through structured and guided inquiry to open inquiry, where students formulate their own research questions (Rezba *et al.*, 1999, cited in Bell *et al.*, 2005). Banchi and Bell (2008) provide examples of how this translates into classroom activities for science and Box 1 gives an example from the National Council for Educational Research and Training (NCERT).

However, inquiry skills are also being emphasised in other disciplines, as seen in the Common Core Standards (CCS) in the US. For English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects,² students are expected to ‘engage in the skills of research and inquiry, with a focus on gathering evidence from multiple information sources, evaluating the credibility of those sources, and writing an integrated synthesis that appropriately cites evidence from those sources (Sparks and Deane, 2015). This begins in Grade 1, where the standards specify that students should learn to:

“**Explain** major differences between books that tell stories and books that give information, drawing on a wide reading of a range of text types.”
(Common Core Standards for English Language Arts & Literacy in History/Social Studies, Science and Technical Subjects:³ p.11)

This focus would move students away from studying and learning from a single source of information (the textbook) to using and evaluating multiple documents.

² See http://www.corestandards.org/assets/CCSSI_ELA%20Standards.pdf

³ http://www.corestandards.org/wp-content/uploads/ELA_Standards1.pdf

The teacher plays an important role in developing inquiry skills. As a knowledgeable adult, s/he guides the learning by providing a structure and input that is appropriate for the learner's level; this is termed 'scaffolding' (Vygotsky, 1930-1934/1978).

2.4.2 Collaboration

The focus on collaborative work comes from the theory that learning is a social rather than an individual activity (Vygotsky, 1930-1934/1978). When students work together to accomplish a task, they pool their resources and student achievement is higher (Slavin, 1980). Collaborative work has been found to improve cognitive skills, such as critical thinking and metacognition, as well as social skills, because students need to negotiate with members of the group.

Collaborative learning has assumed greater importance now for two reasons. First, digital environments offer and require collaboration, which can be seen in the use of chats and discussion forums. Second, collaborative work within teams has become the norm in work environments and employers have identified the ability to collaborate as one of their desired skills.

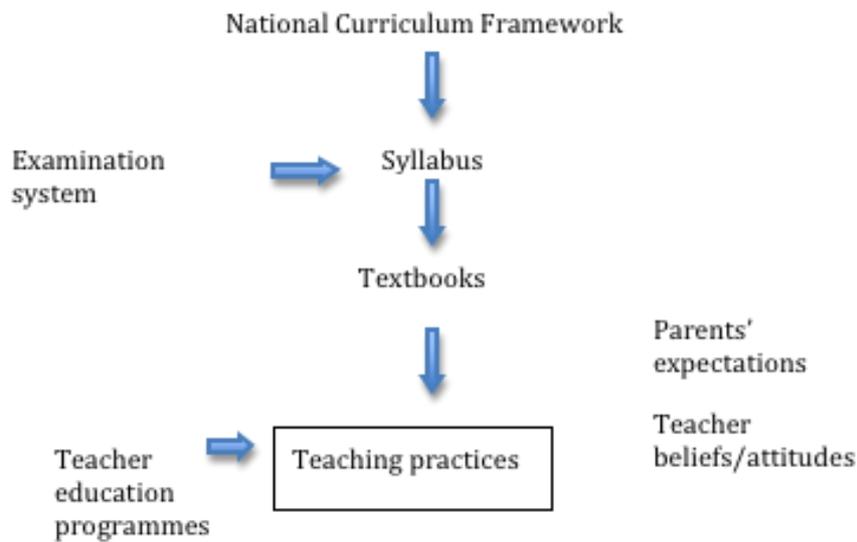
In short, curriculum design envisages a shift from memorisation to fostering inquiry skills and collaborative work. These have always been central to education but have assumed new importance in the 21st century if students are to manage their careers in a changing world.

3. Pedagogy in the Formal Indian Education System

The Indian education system has been criticised for emphasising rote learning rather than developing the skills that lead to independent, lifelong learning. Much of the blame has been placed on the examination system which supposedly encourages memorisation rather than conceptual understanding and application. This section looks at some components of pedagogy in the formal Indian education system in order to examine how learning outcomes are framed and transmitted. The description cannot even begin to capture the enormous variation in syllabi, textbooks and schools across the country; it is limited to extracting a few broad features of curriculum and instruction even in 'elite' urban schools, without the 'noise' of poor implementation.

Figure 2 is a stripped-down version of how these components could influence teaching practices in the classroom. At the highest level, the curriculum framework lays out what should be taught, and the examination system tests whether students have learnt it. Between these high-level specifications and classroom teaching there are two major influences: (a) how the high-level goals are translated into syllabi and textbooks; and (b) how adults perceive pedagogy, that is, what society, parents, teachers and teacher educators consider important in curriculum and instruction.

Figure 2. Influences on teaching practices



Source: Author's conceptualisation.

3.1 Curriculum Framework and the Examination System

The National Curriculum Framework (NCF), developed by the NCERT (2005), lays out national commitments in education (such as inclusiveness and gender equality) and a vision of education that prepares students for ‘meaningful and productive lives’. The document consistently places the emphasis on the learner and learner engagement/ activity as the basis of learning. Chapter 3 on *Curricular Areas, School Stages and Assessment* lays out the goals of the core subjects at different levels, moving from using learner experience at the primary school level to an engagement with disciplinary concepts at the secondary level. In this, it is close to the P21 Framework. In terms of inquiry skills and collaborative work, the NCF stresses the importance of inquiry skills in science, and notes that interactions are important in learning (Chapter 2, *Learning and Knowledge*). The NCF also contains an important section that addresses the language of instruction. Given the multilingual nature of India and the increasing importance of English, the NCF reiterates the findings from numerous studies—that schooling should begin with the home language of the child and other languages can be introduced gradually.

The NCF is a high-level vision document that has to take into account the vast differences across the nation. It is left to the NCERT and the education bodies of the respective states to specify how this vision can be translated into instruction through the syllabus and textbooks.

The examination system can be roughly divided into end-school examinations (which have a syllabus) and entrance examinations into institutes and universities (which supposedly test aptitude). Since this distinction is often not made by

schools/parents, the school curriculum may attempt to address both types of examinations.

The focus here is on the end-school examination conducted by the Central School of Secondary Education (CBSE), since it is the major school examination board in India. The question papers are broadly in line with the NCERT's formulations. For instance, in history at the Class 12 level, the NCERT emphasises the process by which historians arrive at their conclusions; the CBSE question paper for history has a section that requires students to perform the task of a historian, namely, to interpret a document. In such questions, the students cannot rely on memorised answers but have to read and interpret an unfamiliar text. An example of such a question is given in Box 1.

Box 1: Source-based Questions in the History Examination

Read the following extract carefully and answer the questions that follow:

A rural city?

Read this excerpt on Madras from the *Imperial Gazetteer*, 1908:

... the better European residences are built in the midst of compounds which almost attain the dignity of parks; and rice-fields frequently wind in and out between these in almost rural fashion. Even in the most thickly peopled native quarters such as Black Town and Triplicane, there is little of the crowding found in many other towns ...

1. Where and why were better European residences built?
2. Explain the condition of black towns.
3. State the meaning of gradual urbanisation of Madras.

Source: CBSE Class 12 history question paper 2016 (Part D: Source-based questions).

In English, the NCERT emphasises language use and downplays grammar; the CBSE question paper for Class 10 tests language *use* (whether students can spot the language errors) rather than language *usage* (knowledge of grammatical terms).

Taken together, the NCF/NCERT and the CBSE attempt to move classroom instruction from memorisation of facts and mechanical procedures to understanding and applying knowledge to life situations. However, the stage-wise specifications are left to the syllabus and textbooks.

3.2 The Syllabus and Teaching/Learning Material

During the 12 years of schooling, instruction occurs in stages that are appropriate for the learners' age and ability levels. These stages are specified in a syllabus as learning objectives (with sub-objectives) and then broken down into lesson plans that the teacher transacts in the classroom.

The stages in the syllabus can be broad stages—primary, secondary, and higher secondary—which the NCERT syllabus does, thereby giving schools and teachers the time and freedom to achieve the learning objectives. At the same time, such a minimal syllabus offers teachers little guidance on the steps (sub-objectives), their sequence and how to assess learning. This is left to the textbooks and their interpretation of the NCF vision.

There is considerable variation across states in their choice and clarity of objectives. As an example, the NCERT syllabus and textbook for English at the primary level deviate from the NCF document and have significant gaps. The NCF document downplays grammar, but the syllabus includes grammar items (nouns, pronouns, tenses, empty subjects, etc.); these may be a concession to teachers and parents who want to see grammar in the syllabus, even though it is not tested in the CBSE examination. In terms of the textbook, the NCERT syllabus states that the learner should be able to read and write simple words, phrases and short sentences, but the NCERT textbook for Class 1 (*Marigold*) provides fragmented, incomplete and sometimes inaccurate techniques for teaching children how to read.

In contrast, the syllabi and textbooks developed by the SCERT in Kerala are detailed and incorporate inquiry skills even in the primary grades. For instance, critical reading is a learning objective in primary school and the textbook materials are chosen with a view to developing this objective. In each chapter, students read several short, authentic texts such as newspaper reports on an incident, which they subsequently discuss. There are intensive and on-going teacher education programmes that enable teachers to understand and follow these objectives in their classroom instruction.

For most teachers, the curriculum comes down in the form of a textbook that lays out both the content and the sequence along with questions on each lesson. As a result, the teacher's lesson plan is often merely 'Cover pages x to y in the textbook' with little understanding of why and how to teach the material. However, teachers still have the option of going beyond the textbook by using additional resources to teach the content and devising their own tests to assess student learning.

3.3 Translating Education Goals into Classroom Instruction

Both the NCERT and the CBSE have attempted to translate the NCF goals into practical forms that teachers can use. Two examples are the introduction of project work and Continuous and Comprehensive Evaluation (CCE), which is partially

intended to provide feedback to the teacher on the effectiveness of instruction. The NCERT has prepared a few manuals that show teachers how to assess student learning of concepts that have been introduced in the NCERT textbooks (see Box 2).

Box 2: Example of Continuous Assessment

A class on magnets

Prior knowledge: Students are familiar with the poles of a magnet and have already classified materials as magnetic and non-magnetic.

Students have to identify the N and S poles of an unmarked magnet, working in groups. They propose different experiments, and the teacher assists them when they are lost.

Students start to discuss but seem to be at a loss.

The teacher (giving a hint): A compass needle is a magnet, free to move. It always settles in the North– South direction. Does that give you some clue?

The groups set up an experiment by suspending the magnet so that it swings freely, but they have problems getting the magnet in a horizontal position. The groups come up with different solutions to fix the problem, and the teacher asks them to share their solutions.

When the groups have marked the poles on their magnets, they test their results against another group's magnet and record these results, which helps them understand that like poles repel and unlike poles attract.

The teacher moves around the class, encouraging all the students to participate in the exercise and requiring peer explanations.

Source: NCERT (n.d.). *CCE packages in Science for Upper Primary Stage* (pp. 7-10). Available at

http://www.ncert.nic.in/departments/nie/dee/publication/pdf/CCE_Science.pdf

In 2013, the CBSE introduced a test called Problem Solving Assessment (PSA) for Classes 9 and 11 that tested application of knowledge rather than knowledge of facts in three domains—language, qualitative reasoning, and quantitative reasoning—but the test was abruptly withdrawn in 2015.

These efforts by the NCERT and the CBSE show attempts to move instruction away from memorisation of facts to developing and applying skills in real situations.

However, the translation from the vision through the syllabus to the textbook gets diluted and sometimes does not match the high-level goals (see Srinivasan, 2015, for a similar observation on CCE). Such interventions also require intensive in-service teacher training, which ideally belongs in a teacher education programme such as the B.Ed.

3.4 The Choice of Learning Outcomes

This section examines the learning objectives/outcomes that are emphasised by (a) teachers/schools and (b) textbooks.

3.4.1 What happens in the classroom

Reading and writing constitute the foundation for further academic work and enable a child to continue learning even if s/he drops out of school. The observations below come from the first two years of instruction in English-medium schools—Lower Kindergarten (LKG), which the children enter when they are 3½ years old, and Upper Kindergarten (UKG), from which they exit at the age of 5½, after which they go to Class 1 where they are expected to be able to read one-page texts in English.

The data come from three schools that have been divided into two categories based on their instructional approach: the standard approach and an alternative approach. All three schools have excellent resources—the teachers have teaching qualifications and teaching experience, they are committed, and there is no teacher absenteeism; the classrooms are large and airy; and the school has funds to buy audio-visual aids and even multimedia lessons. Hence, we can examine teaching practices without being distracted by the usual problems associated with the quality of education. Box 3 describes how reading/writing is taught and what children learn; for details, see Gupta (2013a, 2013b).

Box 3: Two Approaches to Teaching Initial Literacy

A. Standard Approach

The data come from classroom observations in two private, English-medium schools in Karnataka—an urban school for children of middle-class parents and a semi-rural school for first-generation learners that mimicked the instructional practices of the urban school.

Most of the children are Kannada speakers. To teach them English, teachers use only English in the classroom for directions and explanations. The children rely on their classmates to understand what the teacher wants. At the end of one year in LKG, no child could understand or say a word in English; at the end of two years, children could understand simple questions in English and provide one-word answers. However, the non-Kannada speakers had learnt Kannada so that they could speak with their classmates.

Additional language input comes from nursery rhymes in LKG and short stories in UKG that children memorise and recite.

The English teachers selected commercial textbooks and copywriting books for instruction—writing uppercase and lowercase letters in LKG and spelling out isolated words in UKG. This is known as the Alphabet-Spelling Approach. In class, children chanted the required sequence and then wrote it out in their copybooks. The teacher stood in front of a class of 28 students who were seated at desks; if space allowed, she would walk around, checking that students were on task. At the end of class, students handed on their copybooks, which the teacher corrected.

It does not take long to complete the exercises in the textbook. Children figure out how to do them mechanically. In LKG, one child copied out lowercase *i* by drawing all the lines first and then filling in the dots above them. In UKG, the students memorise and chant a sequence of spellings without looking at the book. Within seven months, teachers have completed the textbook and need to devise new material for the remaining three months. In LKG, the teacher decided to teach grammar (prepositions). In UKG, the teacher brought out boxes of commercial games such as matching pictures, or matching pictures to words.

Meanwhile, children are struggling to understand basic concepts of print during these two years. First, they have to separate two symbol systems—letters and numbers—which most children managed; however, even after one year of instruction, one child was spelling out *ball* and *wall* as *b-a- eleven*, *w-a-eleven*. In the textbook, each letter of the alphabet has an illustration of an object that begins with the letter; for example, the letter *u* has a picture of an umbrella. Since the teacher does not explain the link between sounds and letters, the point is lost; one child told me, ‘*U* for *chhatri*’. Children also had to figure out the direction of print, experimenting with left to right, right to left, and even boustrophedon writing and top to bottom in LKG. At the end of UKG, most children could not read a sentence (left to right) because the words in their textbook were arranged in columns. They had to realise that printed words have meaning; by the end of UKG, although the children could spell out a word (*w-a-l-l wall*), most of them could not point to the relevant picture or the object in the classroom.

Some children came to understand these concepts through experimentation, but others learnt them from their parents, a resource that first-generation learners do not have.

Memorisation emerges as a learning strategy in UKG. One child knew how to read because her mother taught her. In class, she sat with a friend and taught her to read the words in the storybook. Then they came up to me and recited the text with the book closed.

B. An Alternative Approach

An alternative school for first-generation learners developed effective reading skills in first-generation children by first building their base in the home language (Kannada) and then teaching them the Kannada script but with meaning being central. For instance, children combine letters to form the Kannada word *mara* and match it with the picture of a tree. English is introduced in the following year, starting with spoken English. Children first narrate their own story in English and draw pictures; then they write sentences beneath each picture.

There are no textbooks and copywriting is discouraged. The school has developed its own instructional material—sandpaper and cardboard letters, flashcards, etc. Teachers are trained so that they can handle this instructional approach. Children are not divided into classes; instead, instruction is based on the ability level of the student. When a specific teaching point comes up, teachers pull together a group of four children and teach them while seated on a mat. Then children are assigned tasks to practise what has been taught.

Unlike children going through the standard approach, children in this school knew the meanings of words. When one child who was matching pictures with words was asked what the word ‘can’ meant, he promptly said, ‘Dustbin.’ Through this approach, children are able to read aloud at around Class 3 and comprehend texts that are designed for Class 4.

Sources: Gupta (2013a, 2013b).

There are three primary differences between the two types of schools: class sizes, dependence on published textbooks, and teacher training.

- In schools that use the standard approach, class sizes are large (with approximately 28 students in a class) with the children seated at desks in rows and the teacher standing/seated in front. The alternative school teaches small groups of four students at a time, with the students and teachers sitting on mats on the floor.
- The standard approach relies on commercial textbooks that they follow faithfully, whereas the alternative school has developed its own teaching–learning material such as flashcards and sandpaper letters that they use when appropriate.
- In schools that use the standard approach, the teachers have been through a conventional teacher certification course, whereas in the alternative school the teachers are re-trained in a new instructional approach.

The learning outcomes at these two types of schools are very different. Through the standard approach, children are able to write and spell isolated words, but cannot understand what they read. In contrast, the alternative approach produces students who can comprehend texts above their grade level, but their handwriting skills may not be as good.

The standard approach has efficiency on its side. It is based on the Tyler model (1949) of curriculum design in which objectives are set (to write the letters of the alphabet and to spell out a set of words), the textbook provides the learning experiences and sequence, and student progress is evaluated through their written work. Class sizes can be large, instruction is standardised across sections because all teachers follow the same textbook, and the learning outcomes are visible to parents and principals in the form of written work. The teacher’s primary role is to ensure that students complete the written work.

Alternatives to the standard approach are commonly used in schools for first-generation learners where the gaps in learning cannot be filled by parents or tuition. They use the NCF suggestions to begin instruction in the mother tongue and build literacy on the spoken language. They do not rely on commercial textbooks but devise their own instructional materials. For instance, to teach an Indian script such as Devanagari, children are not taught the standard sequence of letters; instead, they are introduced to small sets of letters that they can instantly combine to form meaningful words (Eklavya, 2003; Jayaram, 2008).

The standard approach continues to be the dominant approach used by schools. Note that most of the data in Box 3 comes from a middle-class school, which is considered to be a successful school based on its results in the CBSE examinations and IIT entrance examinations. The approach is efficient from the perspective of adults and focuses on teaching objectives; unfortunately, it does not consider whether learning has taken place.⁴ One teacher made a telling statement: “This student can read very well—her mother taught her to read.” It raises the question of whose job it is to teach the students—the teacher’s or the parent’s?

Muralidharan (2013) points out that the ‘business as usual’ approach will not work with first-generation learners because they do not have the parental support that middle-class children can count on. However, this approach is not effective even for students from the middle class as can be seen from Box 3. There are substantial gaps in what students learn that must be filled either by parents or through tuition.

It is not easy to change these instructional practices. The semi-rural school realised that children in Class 4 were unable to read their textbooks, so they tried to switch to a phonics programme, which teaches reading in a systematic manner. This met with resistance from parents until they realised that it equipped their children with the skills to read unfamiliar English words (Gupta, 2014).

3.4.2 Learning Objectives in Textbooks

To understand how objectives are translated into instruction in textbooks, a well-researched example from middle-school mathematics—the relationship between perimeter and area—has been used here.

The NCF states that “developing students’ abilities for mathematisation is the main goal of mathematics education. Maths should help develop the child’s resources to think and reason mathematically, to pursue assumptions to their logical conclusion and to handle abstraction.” On problems pertaining to school mathematics education, it notes that “[p]roblems, exercises and methods of evaluation are mechanical and repetitive, with too much emphasis on computation.” (NCERT, 2005: p. 42)

⁴ There is an old joke in medical circles that applies here about the surgeon who said, “The operation was a success though the patient died.”

Most teachers are comfortable with calculating the perimeter and the area of a closed figure but may not know how the two are related. In a study of middle school mathematics teachers, Ma (1999) compared the explanations offered by teachers in the US and China on how they would respond to a student who offered an incorrect explanation of the relationship between perimeter and area. She found that teachers in the US were unable to explain that an increase in the perimeter did not necessarily lead to an increase in area; teachers in China, on the other hand, explored the problem mathematically—by finding counter-examples and examples that show possible relationships between area and perimeter, and clarifying the conditions under which the possible relationships hold true.

Students too do not understand the relationship between perimeter and area. In a study in India, only 23 per cent of the students in Class 8 could correctly answer a question that tested whether the perimeter of a rectangle would increase if the area decreased (Educational Initiatives and Wipro, 2006).

How is the relationship between area and perimeter explained in a textbook? The NCERT textbook deals with it in Class 7 in Chapter 11. Instead of asking students to explore the relationship by drawing different rectangles on squared paper, the textbook provides the following explanation:

From a sheet of paper, Tanya cuts out a square. Do the area and perimeter increase or decrease?

[Several irrelevant tables and figures follow.]

A bald statement follows: ‘It is clear that the increase of perimeter need not lead to increase in area.’

The rest of the 76-page chapter is devoted to calculating area and perimeter for different types of figures.

As a result, students learn to perform calculations for complex figures, but both students and teachers would be unable to answer a simple question: Can the area change while the perimeter stays the same? Note that examinations are designed to test calculations, whereas an interviewer is more likely to test understanding of a fundamental concept.

This focus on mechanical procedures in mathematics has been noted in other studies. In the study by Arvind (2008), the transcript from mathematics highlights the emphasis on learning a mechanical procedure. The teacher explains the method to be used (divide and then multiply), solves a sample problem on the blackboard, and then assigns four problems for the students to work on individually. Since students have merely learnt a procedure without understanding the concept, they apply it mechanically to a different mathematical problem and get the wrong answer.

The focus on teaching procedures rather than conceptual understanding and application may be true of language teaching as well. In Pakistan (which seems to face the same problems as India), Andrabi *et al.* (2007: p. 23) found that students

could mechanically convert masculine nouns into feminine nouns (and vice versa) in Urdu but were unable to identify whether a noun was masculine or feminine.

The two sections above on classroom practices and textbooks show that one important component has crept into instruction, namely, the need to see visible evidence of learning. In the context of basic literacy, the acquisition of reading skills is a long and invisible process; writing, on the other hand, results in an immediately visible product that satisfies all the concerned adults—teachers, parents, and school inspectors. In mathematics, students could be asked to experiment and understand the concept, but this takes up valuable time that could be spent on filling up a copybook with sums to demonstrate that activity has taken place. It can be seen that learning objectives have been translated into visible outcomes that can be measured. This emphasis on visible evidence of learning seems to run through all instruction and may explain why students are required to memorise and recite poems and stories, or to solve innumerable mathematical problems on the same concept. The gaps in their conceptual understanding are masked by their ability to perform mechanical exercises.

Such an approach to instruction does not help to build the life skills that students need, irrespective of whether they are cognitive or non-cognitive. Skills such as self-motivation, problem solving, creativity, reasoning, leadership and collaboration are then relegated to a separate course or module instead of being incorporated in the formal education system.

3.5 Teacher Knowledge and Beliefs

The NCF lays out a vision of teaching–learning that emphasises inquiry and collaboration, which would foster 21st century skills; but in classrooms it is the teacher who has to implement these visions. Studies on teaching practices show that teacher talk continues to dominate, and teachers rely on the textbook.

- a. *Quantity of teacher talk.* In the primary grades, Jhingran (2012) found that in Grades 1 and 2 (in government schools in Rajasthan and Assam) children spent 90 per cent of their time ‘listening, “watching”, repeating after the teacher or another student and copying’. A study by Smith, *et al.* (2005) in private schools in Hyderabad averaged the time across Grades 1 to 10 and found that students spent 62.9 per cent of the time listening. The type of teacher talk was explanation (54 per cent) and giving directions (10 per cent); pupil answers to questions made up only 7 per cent of the time, and were responses to closed questions, often requiring a single word response.
- b. *Dependence on textbooks.* Many teachers depend on textbooks, both for what should be taught and the sequence of content. For instance, Sinha *et al.* (2016: p. 34) found that in rural schools in Bihar, most of the teachers were reading

from the textbook (89 per cent), asking questions from the textbook (67 per cent), or asking students to recite (49 per cent).

School teachers are required to obtain a teaching certificate or a B.Ed. degree in order to teach. However, studies find that pre-service or novice teachers hold strong beliefs about effective teaching and it is difficult to change these beliefs (see Borko and Putnam, 1996, for a review of studies). Many of these beliefs come from the “apprenticeship of observation” (Lortie, 1975); as schoolchildren, teachers have spent thousands of hours watching their teachers at work and so they continue to teach as they were taught. Teacher education programmes that attempt to change the beliefs of novice teachers are only partially successful. In India, Clarke (2003), reporting on DIET programmes in Karnataka, found that schoolteachers were ready to incorporate learner-centred techniques that encourage “activity and joyful learning”, but they believed that the teacher is more knowledgeable than the student and has a duty to transmit knowledge. This perception of the teacher’s role leads to lecturing and providing answers, making it difficult to implement inquiry-based instruction in the classroom.

The NCERT and state education bodies such as the DIETs conduct workshops and training programmes for in-service teachers to explain and show them how to incorporate learner-centred teaching, project work, CCE, etc. However, these programmes are usually very short, lasting a few days or even one day. If teachers are to change their beliefs about teaching and learn how to implement new instructional methods in their classrooms, it will have to be done through longer programmes that allow time for reflection and practice. This falls within the domain of teacher education programmes.

Current teacher education programmes focus on foundational knowledge in the philosophy, sociology and psychology of education that are primarily theoretical, and back it up with practice teaching. Little attention is paid to how to teach a subject in ways that suit the age and ability level of learners, which has been termed “pedagogical content knowledge” (Shulman, 1986) and separates, for example, the biologist from the biology teacher. The teacher cannot go into a classroom and merely transmit information; the content has to be transformed so that it is understood by learners. Further, there seems to be no critical examination of the current curriculum/textbooks. One explanation is that teacher education programmes have accepted that instruction (selection and sequencing of materials and activities) is already provided in textbooks.

Teacher education programmes also seem to assume that teachers have adequate subject matter knowledge, but this is not always true. A series of studies tapped teachers’ understanding of what they taught in their classes (Bhattacharjea *et al.*, 2011: Chapter 5; Kingdon and Banerji, 2009; Sinha *et al.*, 2016: Chapter 3). Teachers in Bihar were asked to answer typical questions that they gave their students; they were then asked to provide the steps to arrive at the answers. Many mathematics teachers were unable to give the correct answer, but even those who gave the correct answer could not list all the steps in the calculation, which indicates that teacher explanations are often inadequate. Among language teachers, most of them knew

that to teach vocabulary they should use a simpler word to explain a difficult word. However, most of them were unable to write a summary—a skill that they teach their students.⁵

In the case of language teaching, it is assumed that proficiency in the language is sufficient qualification to teach the language. This can be seen in the Central Teacher Eligibility Test (CTET) for the post of teachers in central government schools, where half the questions on English test the language proficiency of the candidate, a few questions test subject matter knowledge (grammar), and the few questions that test knowledge of teaching are linked to terminology rather than what to do. Teaching language requires knowledge about the structure of language. Without this background, teachers make assumptions about learning that are incorrect. For instance, teachers in the early grades assume that learning to read in English is easier than learning an Indian script because “English has only 26 letters”. This view ignores the complexity of the English script, where the link between sounds and letters is not consistent or obvious, whereas in Indian scripts such as Devanagari there is a close correspondence between sounds and letters. As one international organisation noted, “All else equal, children learning to read in English required two to three times the amount of instruction as children learning to read in languages that are more regular in their construction” (Early Grade Reading Assessment [EGRA] 2009: p. 10).

Finally, teachers need to become familiar with 21st century skills and technology; even at the university, teachers resist the idea of allowing students to compose their work on the computer because “we give marks for neat handwriting”. This does not prepare students for 21st century jobs.

In a comparison of the school education systems in China and India, Goldman *et al.* (2008) highlight a critical difference between the two countries. Due to political turmoil in the 20th century, China frequently had to reform its school education system; since its most recent iteration was in 1996, China was able to formulate a curriculum that emphasised 21st century skills. In India, on the other hand, the focus was always on higher education and basic education was neglected until 1986. As a result, India was a late entrant into the sphere of basic education and perhaps we are still trying to understand how to deliver quality instruction at the school level.

4. What Should Be Done

How does one teach students the skills that they need for the 21st century and for employability? There appear to be three solutions to the problem.

The first solution is to use volunteer teachers and remedial teaching to fix problems in the system. Muralidharan (2013) reports on studies that have found improved

⁵ This is not true just of rural schools. At a workshop for university lecturers in Delhi, the author found that lecturers were unable to write a one-page group essay in 30 minutes—a skill that they would be teaching their students in a remedial English course.

learning outcomes through such interventions. However, remedial teaching does what should happen in the formal school system—individual attention and instructional material that is suited to the ability level of the learner. There is also a potential problem with remedial teaching—volunteers may teach as they were taught. For instance, remedial courses in English at the university still teach grammar in the belief that this will improve students' language proficiency.

The second option is to use technology. Currently, schools and teachers seem to have a limited view of what technology offers, using it to display supplementary lessons or PowerPoint presentations, and universities prepare videos of professors lecturing. However, there is a wide range of options in the use of technology for education. At one end of the spectrum, there are small learning objects and simulations; for instance, the Tata Institute of Fundamental Research (TIFR) creates simulations for science and mathematics that allow students to manipulate variables in order to understand the underlying concepts and relationships. At the other end of the spectrum, there is learner-driven education through technology that is proposed in minimally invasive education (Mitra, 2003) and self-organised learning environments (SOLEs);⁶ however, these still need to be driven by a curriculum. Between the two extremes, simple technology using smart phones offers access to multiple sources of information on the Internet so that teachers and students are not dependent on the textbook. Students can also use the technology to create documents that combine text, graphics and video, and they can analyse data. However, it is the students who have to use the technology, and it cannot be used merely as a tool for the teacher to display information.

The third option is to address the issue of professionalisation of teachers, which is the long-term option. McKinsey (2007) examined the education systems of the top-performing countries in OECD's Programme for International Student Assessment (PISA) and found that these countries get the right people to become teachers, because the quality of an education system cannot exceed the quality of its teachers; they also develop those people into effective instructors through teacher education programmes that provide support for effective teaching. High-performing school systems, such as in Singapore and Japan, use four broad approaches that provide ongoing support to trainee teachers: (a) they build practical skills during initial training by moving the lecture into the teacher's classroom; (b) they place coaches in schools to help the novice teacher; (c) they get the right teachers to become principals and provide instructional leadership; and (d) they enable teachers to learn from each other.

5. Conclusion

This paper examined the role of pedagogy in developing life skills or 21st century skills. Recent curricular frameworks incorporate life skills within the school curriculum by stressing the importance of inquiry and collaborative work in all school subjects. There is a similar emphasis in the National Curriculum Framework

⁶ See <https://www.theschoolinthecloud.org>

(NCF) in India; however, their translation into the syllabus and textbooks remains weak, with learning objectives that are misaligned with the NCF.

Since it is the teacher who handles classroom instruction, adequate teacher preparation is critical because as the McKinsey report (2007) points out, “the quality of an education system cannot exceed the quality of its teachers”. This preparation cannot be handled through short training sessions for in-service teachers that do not allow time for reflection, mentoring and practice.

There is a clear need to reform both the formal education system and teacher preparation if we want to equip students with the skills that employers desire as well as the skills they need to manage life and work in the 21st century.

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