UNIT 3 DISCIPLINARY KNOWLEDGE AND SCHOOL EDUCATION

Structure

3.1 Introduction

3.2 Objectives

3.3 Pedagogical Demands of Disciplinary Knowledge
   3.3.1 Pedagogical Concerns of Disciplinary Knowledge
   3.3.2 Pedagogical concerns of Disciplinary Knowledge at different Stages of School Education

3.4 Classifying and Accommodating Specific Areas of Knowledge
   3.4.1 Understanding Specific Areas of Knowledge
   3.4.2 Implementation Strategies for Including Specific Areas of Knowledge in the Teaching Learning Process

3.5 Framing School Subjects
   3.5.1 Academic Disciplines and School Subjects
   3.5.2 Framing School Subjects – Scholastic and Pedagogical Considerations
   3.5.3 Need of Reframing School Subjects

3.6 Let Us Sum Up

3.7 References and Suggested Readings

3.8 Answers to Check Your Progress

3.1 INTRODUCTION

Teaching is both a complex and an interesting activity. To become a teacher is, therefore, a challenging task. A good teacher needs to have both content and pedagogical knowledge of the subject as well as the discipline that he/she deals with. As you know from the previous units of this Block that knowledge pertaining to a particular academic area forms the basis of discipline. The academic knowledge deduced from that discipline constitutes the contents for the subject of a school curriculum. A true teacher needs to understand not only the subjects and contents what he/she supposed to teach but also the development and philosophy of those subjects.

Keeping in view the above, this Unit has been designed to understand the disciplinary knowledge of teaching subjects and their pedagogical concerns. A school curriculum does not only deal with the core disciplines and subjects, but also deals with many other special disciplinary knowledge areas such as Arts and Crafts, Work Education, Peace Education, Health and Physical Education, etc. The difficulty of our curriculum system arises from the fact that the specific disciplinary areas of knowledge are not given the same importance as that of the core school subjects. This Unit deals with these issues. Apart from these issues, the principles of framing or reframing school subjects are also discussed in this Unit.
3.2 OBJECTIVES

After going through this Unit, you will be able to:

- explain the pedagogical demands of disciplinary knowledge at different stages of school education;
- critically analyse the need and difficulties of classifying and accommodating specific disciplinary areas of knowledge as part of teaching-learning process at the school level;
- discuss the broad structure of curriculum of the school subjects;
- describe scholastic and pedagogical considerations of framing school subjects; and
- analyse the need for reframing of school subjects.

3.3 PEDAGOGICAL DEMANDS OF DISCIPLINARY KNOWLEDGE

Teacher education is one of the specialized areas of study in the discipline of education. The main concern of teacher education is to prepare quality teachers for the school education. Many factors are responsible for preparing quality teachers especially for the school education. Among these factors, understanding disciplinary knowledge and pedagogical practices to transact that disciplinary knowledge at different stages of school education are major factors. A teacher needs to understand both disciplinary knowledge and innovative pedagogical practices. Disciplinary knowledge need to be integrated systematically in curriculum at different stages of school education. Similarly, the connection between various strands of a discipline can be explained with good pedagogical tools. The pedagogical demands of disciplinary knowledge at different stages of school education need to be understood and worked on. Pedagogical content knowledge includes an understanding of what makes the learning of specific topics easy or difficult. The preconceptions of students of different ages and backgrounds needs to be linked with their new learning experiences. This requires learner centric (constructivist) pedagogy (Grayson, 2004).

The current pedagogical practices in school education are contextualized in the light of the specific needs of the learners. According to NCFTE, 2009, ‘the key departure of pedagogical courses from conventional teacher education would involve shifting the focus from pure disciplinary knowledge and methodology to the learner and his/her context as well’. For example, a course on language pedagogy would promote an understanding of the socio-linguistic profiles of the learners, and of the classroom and the functional use of language(s) across the curriculum. In a multilingual milieu, we optimize learning by harping on ‘A’ medium of instruction (MoI) or we do better by bringing in multilingual rapporteur of children as well the teachers. We may need to move away from the conventional use of language as a subject, which emphasizes its grammatical structure rather than usage (NCFTE, 2009). In view of this, we discuss pedagogical concerns of different disciplines at different stages of school education.
3.3.1 Pedagogical Concerns of Disciplinary Knowledge

In Unit-1 and 2 of this Block, you have already learnt the concept of disciplinary knowledge and the evolution of an academic discipline. You have also learnt that a discipline has the following characteristics:

- It is a recognized area of study
- It has a substantial body of knowledge founded on core concepts and theories
- It uses of critical inquiry methods for studying problems
- It has a definite scope for research
- It has significant contributors of knowledge, research, and practices within a discipline
- It is associated with learned societies and academic organizations
- It has its own intellectual history
- Scholars continue their interest in studying the discipline

One of the most important characteristics of an academic discipline is that, it has a substantial body of knowledge and theories. Curriculum planning and development are made keeping in view the nature of knowledge of the discipline and the pedagogical treatment required for transacting the same knowledge. The curriculum transaction is guided by various schools of thought on teaching: behaviorism, cognitivism and constructivism. All the pedagogical approaches may not be suitable for transacting every content areas in a discipline. The pedagogical practices vary from content to content and for different stages of school education. To understand how disciplinary knowledge is mediated by pedagogical concerns and approaches, we need to understand what these pedagogic approaches are and what implications they have for teaching - learning practices.

Table 3.1: Pedagogical approaches and their implications for teaching and learning

<table>
<thead>
<tr>
<th>Pedagogic Approaches</th>
<th>Pioneers</th>
<th>Concept</th>
<th>Implications for Teaching Learning Processes</th>
</tr>
</thead>
</table>
| Behaviorist          | I.P. Pavlov, E.L. Thorndike, J.B. Watson, and B.F. Skinner | Behaviorism is a school of thought in psychology which is based on the proposition that behavior can be researched scientifically without studying inner mental states. The changes or the modification of behavior occurs when the bonds of stimulus and response are established in the process of learning. | - An emphasis on producing observable and measurable outcomes in students.  
- Pre-assessment of students to determine where instruction should begin.  
- Emphasis on mastering early steps before progressing to more complex levels of performance.  
- Use of reinforcement to impact performance.  
- Use of cues, shaping and practice to ensure a strong stimulus-response association.  
(Ertmer and Newby, 1993) |

Disciplinary Knowledge and School Education
| Understanding Knowledge and Disciplines | Cognitive theories focus on how information is received, organized, stored, and retrieved by the mind. It assumes that human brain is hardwired to perform complex cognitive tasks that make human learning possible. An understanding of how cognitive tasks are accomplished by brain and how mind mediates in performing those tasks. Such understanding helps the pedagogues develop unique teaching learning tools for children. | Emphasis on the active involvement of the learner in the learning process.  
Use of hierarchical analyses to identify and illustrate prerequisite relationships.  
Emphasis on structuring, organizing, and sequencing information to facilitate optimal processing.  
Creation of learning environments that allow and encourage students to make connections with previously learned material.  
Discovery learning  
(Ertmer and Newby, 1993) |
| --- | --- | --- |
| Social Constructivist | John Dewey, Jean Piaget, Jerome Bruner, and Lev Vygotsky | Social constructivism assumes that a child is an active constructor of his/her own knowledge. Teachers help the students to construct their knowledge by using their experience. The children cannot be coaxed to learn but to be motivated by meaningful participation in the classroom discourse (Panda, 2007). The classroom pedagogy needs to encourage students to ask questions, investigate and inquire individually and collectively the questions, and reflect on their own solutions. The teachers’ role will be that of a collaborator of mutual construction of meaning and not a dictator of meaning. Textbooks play the role of a meditational tool for knowledge construction. | Developing a classroom discourse around the concept using children’s own experiences and knowledge at the beginning.  
Creating multiple contact points for the children with the classroom discourse. Taking help of textbook, children’s own experience and innovative pedagogy to create these contact points  
An emphasis on learner’s agency in the construction of his own ideas and knowledge  
The need for information to be presented in a variety of ways so that children find multiple scaffolds to their learning.  
Supporting the use of problem solving skills that allow learners to go beyond the information given and develop critical learning tools for themselves.  
Assessment focuses on multiple ways through which the knowledge can be constructed and contested.  
Use of critical pedagogy for development of reflexive engagement with oneself and knowledge.  
(Ertmer and Newby, 1993) | Developing a classroom discourse around the concept using children’s own experiences and knowledge at the beginning.  
Creating multiple contact points for the children with the classroom discourse. Taking help of textbook, children’s own experience and innovative pedagogy to create these contact points  
An emphasis on learner’s agency in the construction of his own ideas and knowledge  
The need for information to be presented in a variety of ways so that children find multiple scaffolds to their learning.  
Supporting the use of problem solving skills that allow learners to go beyond the information given and develop critical learning tools for themselves.  
Assessment focuses on multiple ways through which the knowledge can be constructed and contested.  
Use of critical pedagogy for development of reflexive engagement with oneself and knowledge.  
(Ertmer and Newby, 1993) |

The above pedagogical approaches need to be taken into consideration while selecting the contents of the curriculum for different stages of school education. In India, one or more of the above three pedagogical approaches are used by the teachers for transacting curriculum at the school level. The NCF, 2005 and NCFTE, 2009 emphasize the use of constructive approach in school education. It emphasizes construction of knowledge on children’s own experiences. It provides freedom and autonomy to children for constructing their own knowledge from various life experiences that they gather and the academic scientific discourse that the textbooks provide. Thus cognitivism and social constructivism provide a better pedagogic approach to teaching and learning in a particular discipline. Pedagogical approaches based on cognitivism and social constructivism provide enough freedom and scope to children to analyse and synthesize the observations that they gain from different social, personal and intellectual traditions.

For developing an understanding of the pedagogical approaches specific to disciplinary knowledge of different school subjects at school level, we present in Table 3.2 the disciplinary knowledge of the subjects taught at different school levels along with specific pedagogical approaches.

**Table 3.2: Disciplinary knowledge and pedagogical approaches in school subjects**

<table>
<thead>
<tr>
<th>School Subjects</th>
<th>Disciplinary Knowledge</th>
<th>Pedagogical Approaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Science</td>
<td>- Citizenship education</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Reflective socio-political enquiry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Informed social criticism and ethical decision making to social issues</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Social dynamism, mobility and transformation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Believe in constitutional values like democracy, justice, and equality</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Personal engagement and development</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Culture – Local, National, and Global</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- People, place, and environment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Individual development and identity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Individuals, groups, and Institutions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Power, authority, and governance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Production, distribution, and society</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Science, technology, and society</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Global connections</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Civic ideas and practices</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Social research and innovations (Ross, et.a. 2014)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Reflecting on one’s own experience of various social and political situations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Observing various social and political situations and engaging in critical political inquiry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Case analysis of individuals and institutions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Field visit to places of historical, social, and political importance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Classroom debate and discussion on concepts and ideas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Peer and group interaction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Individual and group projects and assignments</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Use of portfolios and maintaining rubrics for assessment</td>
<td></td>
</tr>
</tbody>
</table>

| Science         | - Scientific literacy |
|                 | - Science in everyday situations |
|                 | - Understanding the world around the learners |
|                 | - Socio-scientific issues |
|                 | - Sources in and outside schooling |
|                 | - Science as a way of knowing, thinking, and acting |
|                 | - Matters in our surroundings. |
|                 | - Atoms and Molecules |
|                 | - Diversities in living organism |
|                 | - Scientific inquiry to understand every day experiences |
|                 | - Observation, discovery and experimentation |
|                 | - Repeating classic experiments in Science and discussing how inventors encountered novel scientific ideas |
|                 | - Engagement in the scientific discourse |
### Understanding Knowledge and Disciplines

<table>
<thead>
<tr>
<th>Language</th>
<th>Socio-cultural issues in language learning</th>
<th><strong>Contestation, investigation, and evidence based conclusions</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Forces and laws of motion</td>
<td>Construction of language knowledge during the early years of life</td>
<td>Peer and group works on scientific concepts, ideas and methods</td>
</tr>
<tr>
<td>Work and energy</td>
<td>Age wise language development.</td>
<td>Scientific quiz and workshop</td>
</tr>
<tr>
<td>Natural resources and its management</td>
<td>Multilinguality and language learning.</td>
<td>Visiting science labs located in institutions of higher learning</td>
</tr>
<tr>
<td>Improvement in food resources</td>
<td>Differences between school and home language</td>
<td></td>
</tr>
<tr>
<td>Acid and chemical reactions</td>
<td>Usages of languages</td>
<td></td>
</tr>
<tr>
<td>Metals and non-metals</td>
<td>Language development and cognitive skills</td>
<td></td>
</tr>
<tr>
<td>Life processes</td>
<td>Language usages in diverse social households</td>
<td></td>
</tr>
<tr>
<td>How do organisms produce?</td>
<td>Development of languages</td>
<td></td>
</tr>
<tr>
<td>Heredity and evolution</td>
<td>Skills development in language learning – speaking, listening, writing, reading</td>
<td></td>
</tr>
<tr>
<td>Electricity</td>
<td>Teaching various texts of languages – drama/fiction, grammar, poetry, prose, narratives, etc.</td>
<td></td>
</tr>
<tr>
<td>Scientific research and innovations</td>
<td>Creation and appreciation of language and literatures</td>
<td></td>
</tr>
<tr>
<td>(Corrigan, et. al. 2011)</td>
<td>Multi and cross cultural issues of languages</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Language research and current practices</td>
<td></td>
</tr>
</tbody>
</table>

Table 3.2. highlights the disciplinary knowledge under the subjects taught at the school level with the pedagogical approaches required to transact the same knowledge. The present practices of transacting school subjects are mostly learner centred. The pedagogical approaches reflected in third column of the table has emphasized child centered learning and teacher’s place in the whole process is that of a facilitator. The pedagogical approaches need to address the disciplinary knowledge included in the subjects as a part of teaching-learning process at different stages of school education.

#### 3.3.2 Pedagogical Concerns of Disciplinary Knowledge at Different Stages of School Education

In the section 3.3.1, we discussed about the general pedagogical approaches for transacting disciplinary knowledge at the school stage. Let us discuss the specific pedagogical approaches that need to be used for transacting disciplinary knowledge as a part of teaching learning process at different stages of school education.
Table 3.3: Pedagogical approaches for transacting disciplinary knowledge at different stages of school education

<table>
<thead>
<tr>
<th>Stages of School Education</th>
<th>Subject Areas</th>
<th>Specific Pedagogical Approaches for Transacting Disciplinary Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary</td>
<td>Language(s)</td>
<td>• Interactive, participatory, and collaborative methods</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Use of narratives</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Dealing with textual exercises</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Listening and producing oral discourses</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Interpreting tables, graphs, diagrams, pictures, etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reviewing content of Book/article</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Writing discourses and editing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Use of dictionary, encyclopedia, and internet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Theme based brainstorming</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Use of concept mapping</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Audio-lingual method, communicative approach, teaching diverse classroom – addressing socio-psychological factors of language learning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Conducting seminars, workshops for preparation of materials</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Linking reading and writing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Using literature across the curriculum</td>
</tr>
<tr>
<td>Social Science</td>
<td></td>
<td>• Issue based dialogue, debate and discussions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Discovery, project, problem solving, narration, comparisons, observation dramatization, and role play</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Utilization of the resources like; audio-visual materials, photographs, charts, maps, replicas of archaeological and material culture</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Practice of process skills – observations, classifications, questioning, framing hypothesis, data analysis, drawing inferences, interpretation of results, reporting, etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Map reading, cartoon analysis, writing slogans, etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Conducting inquiry - discussion, field work, peer and group activities, surveys, etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Interactive, participatory, and collaborative methods</td>
</tr>
<tr>
<td>Science</td>
<td></td>
<td>• Conduct of activities and experiments, observation, classification, inferences, discussion, conducting inquiry, discovery, projects, etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Science-museum, field-trips, projects and exhibition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Probing, documenting and analyzing children’s ideas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Science and society interface</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Survey, organization and presentation of data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Use of concept map, peer and group learning, collaborative learning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Engaging in joyful learning</td>
</tr>
<tr>
<td>Mathematics</td>
<td></td>
<td>• Inductive and deductive, problem solving,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Preparing mathematical models</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Use of concept map to understand Mathematics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Interactive, collaborative, and participatory methods</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Understanding two and three dimensional shapes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Analysis and synthesis, puzzles, play, mathematical games, analyzing time-table, time-line, data handling, etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Representation and interpretation of mathematical calculations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Development of spatial reasoning and visualization skills</td>
</tr>
</tbody>
</table>
### Understanding Knowledge and Disciplines

| Secondary Language(s) | • Addressing multilingualism  
|                       | • Gaps between home and school languages  
|                       | • Classroom discourses – Questioning, discussion, debates, elocution, brain-storming, communication, dramatization, role pay, language games, etc.  
|                       | • Analyzing texts – expository vs. narrative, transactional vs. reflective  
|                       | • Note-making, summarizing, connecting reading-writing, process writing, writing to learn and understand  
|                       | • Analyzing texts across the curriculum  
|                       | • Flow of communication in schools and the society  
| Social Science | • Enquiry-based and problem-based learning,  
|               | • Methods of teaching – Source, field study, folk lore, oral history, balpanchayat, mock parliament. Project, story telling, exhibition, peer and group discussion, etc.  
|               | • Visit to Historical, ecological, commercial, and political places  
|               | • Organising awareness and other important activities—Environment, social, election, blood donation, etc.  
| Science | • Use of science process skills  
|         | • Understanding science and society  
|         | • Enquiry and problem-based learning  
|         | • Use of integrated, ecological, inductive, deductive, problem-solving, and constructivist approaches to learning  
|         | • Use of lecture, discussion, debates, demonstration, field trips, individual-peer and group presentation, experimentation, scientific discovery, etc.  
| Mathematics | • Mathematical modeling, data analysis and interpretation, content analysis in Mathematics  
|           | • Exploring connections and patterns, visualization and generalization  
|           | • Problem-solving, inductive-deduction, analysis-synthesis, project, demonstration, Mathematical activities, Use of Mathematical laboratories, etc.  

(Source: NCF, 2005; NCFTE, 2009; and NCTE New Curriculum Framework, 2014)

The Table 3.3 depicts specific pedagogical approaches required for teaching at the elementary and the secondary stages of school education. From the Table-3.3, it is understood that most pedagogical approaches suggested for teaching subjects at different stages of school education are based upon the learner centered approaches to learning.

**Activity 1**

Select a topic from the text of any subject that you teach at the secondary level and identify the specific pedagogical approaches required to teach/learn that topic, also specify the justification of such pedagogical approaches.

.............................................................................................................
.............................................................................................................
.............................................................................................................
.............................................................................................................
.............................................................................................................
Check Your Progress 1

Notes: a) Write your answer in the space given below.
    b) Compare your answers with the ones that are given at the end of the unit.

1. Discuss, with an example, how constructivist theory of learning can be applied in selecting topics for the curriculum of secondary school subjects.
   .............................................................................................................
   .............................................................................................................
   .............................................................................................................

2. Critically analyze the specific pedagogical approaches that are required for the subject you teach at the elementary/secondary classes.
   .............................................................................................................
   .............................................................................................................
   .............................................................................................................

3.4 CLASSIFYING AND ACCOMMODATING SPECIFIC AREAS OF KNOWLEDGE

Traditional approach to organize school curriculum is mostly based upon the subject contents which are drawn from the core disciplines. Hence, many areas of knowledge such as: Art and Craft Education, Work Education, Peace Education, Life Skills Education, Sports and Physical Education, Value Education etc. cannot be incorporated in school education as separate subjects since these areas of knowledge are not treated as disciplines like; Language, Social Science, Science, and Mathematics. ‘Those important areas of knowledge become sidelined and are then described as ‘extra’ or ‘co-curricular’ areas of study instead of being an integral part of the curriculum’ (NCF, 2005, p.29). This section will particularly address the issues and problems of incorporating these areas of knowledge in school curriculum.

3.4.1 Understanding Specific Areas of Knowledge

Gandhiji defines education as; “by education I mean an all-round drawing out of the best in child body, mind, and spirit”. He therefore, stressed not only on the development of human intellect but also on holistic development of human beings. The existing school curriculum mostly comprise subjects pertaining to disciplines like Social Science, Mathematics, Science, etc. Specific areas of knowledge like work education, craft education, etc. have not been integrated in disciplinary knowledge of school curriculum. This is evident from the subject areas included in the school curriculum. Let us examine core disciplinary areas of knowledge in school curriculum.

Core Disciplinary Areas of Knowledge:

Mostly in our school system, the curriculum includes the core subjects of study that is; Languages, Social Science, Science, and Mathematics. If we analyze different stages of school education, we find that the subjects are presented in school curriculum with different nomenclatures. See Table 3.4.
### Table 3.4: Core Subjects in School Curriculum

<table>
<thead>
<tr>
<th>Stages of School Education</th>
<th>Subject Areas</th>
<th>Presented in School Curriculum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary (I-VIII)</td>
<td>Languages</td>
<td>Mother Tongue, Regional Languages, Hindi, English</td>
</tr>
<tr>
<td></td>
<td>Social Science</td>
<td>Environmental Studies (EVS), that includes the themes/topics of both Science and Social Science</td>
</tr>
<tr>
<td></td>
<td>Science</td>
<td>Mathematics as independent subject of study</td>
</tr>
<tr>
<td>Upper Primary (VI-VIII)</td>
<td>Languages</td>
<td>Mother Tongue, Regional Languages, Hindi, English</td>
</tr>
<tr>
<td></td>
<td>Social Science</td>
<td>Study of History, Political Science, and Geography under the subject area of Social Science.</td>
</tr>
<tr>
<td></td>
<td>Science</td>
<td>Study of Physical and Natural sciences under the subject area of Science.</td>
</tr>
<tr>
<td></td>
<td>Mathematics</td>
<td>Mathematics as an independent subject of study</td>
</tr>
<tr>
<td>Secondary (IX-X)</td>
<td>Languages</td>
<td>Mother Tongue, Regional Languages, Hindi, English</td>
</tr>
<tr>
<td></td>
<td>Social Science</td>
<td>History, Political Science, Geography and Economics under the subject area of Social Science</td>
</tr>
<tr>
<td></td>
<td>Science</td>
<td>Physical and Natural sciences under the subject area of Science</td>
</tr>
<tr>
<td></td>
<td>Mathematics</td>
<td>Mathematics as an independent subject of study</td>
</tr>
<tr>
<td>Senior Secondary (XI-XII)</td>
<td>Streams</td>
<td>Languages</td>
</tr>
<tr>
<td></td>
<td>Arts and Humanities</td>
<td>History, Geography, Economics, Political Science, Sociology, Psychology, Languages etc.</td>
</tr>
<tr>
<td></td>
<td>Science</td>
<td>Physics, Chemistry, Mathematics, Botany, Zoology, etc.</td>
</tr>
<tr>
<td></td>
<td>Commerce</td>
<td>Accounting, Business Studies, Marketing, Finance, etc.</td>
</tr>
</tbody>
</table>

Table 3.4 presents the core subject areas included in school curriculum. Besides the above subject areas, many other specific areas of knowledge are also included in the school time table without integrating them in the disciplinary
knowledge of school subjects. Let us understand those areas of knowledge and difficulties in including in school curriculum.

Art and Craft:

For decades, there have been debates on inclusion of Art and Craft education in school curriculum. However, no development has taken place till now. Sometimes, it is included in the school curriculum but is kept out of the core subject areas. The art and craft education needs to be an important component of learning in the school curriculum. Children need to develop skills and abilities in these areas. These areas should not be treated as mere entertaining fringe in the school curriculum. The sense of creativity, appreciation, skills, aesthetics, and value based learning opportunities are possible through art and craft education. Though there is an increasing scope for career and jobs in art and craft at the higher stages, but they are yet to be integrated in school curriculum.

Work Education:

Work is an integral part of every individual’s life, be an adult or child. A child needs to be educated in the school for world of work. Work education needs to be included in the school curriculum as an opportunity for learning for the children and for preparation for their further life. Children learn through work at home, school, society, or work place. The inclusion of Socially Useful and Productive Work (SUPW) in school curriculum makes the children appreciate the worth of social life. It makes them disciplined, self-controlled, focused mentally, energized and emotionally balanced. But the inclusion of SUPW in the present school curriculum hardly helps the children to achieve its objectives. It needs to be effectively integrated in disciplinary knowledge of school curriculum.

Peace Education:

Unprecedented growth of violence, intolerance, fanaticism, conflicts, and discordance are the constant threats to our society. Hence, there is the need to train the children and the young adults to practice tolerance and peace at home, school, and society. In this regard, school is the important agent to include ‘Education for Peace’ in its curriculum. It essentially nurtures ethical development, inculcating the values, human rights, justice, tolerance, social responsibility, attitude and skills required for living in harmony with oneself and others. If we analyze our school curriculum, we find that very little contents are included which address the issue of peace education, that is also limited to a few topics and subjects. It is important to mainstream peace education in school curriculum, not limiting it to a few topics or subjects. It should be presented in the contents across the subjects of the curriculum in various forms like; stories, narrations, activities, interactions, etc. The inclusion of peace education in school curriculum may help the children understand the importance of peace in life.

Life Skills Education:

Life skills education has also been neglected in school curriculum. The aim of education is not to provide learners merely disciplinary knowledge and certify them, but also to acquaint them with life skills and values. “Nurturing Life Skills” includes developing an improved self-esteem, building empathy towards others and different cultures, etc. improving on their critical and creative thinking and making them better at problem solving with a balanced approach towards decision-making. The core life-skills must be integral to the whole process of education
As a teacher you might be knowing that the practice of life skills in school curriculum is limited to conducting a few activities and including them in students’ report cards. This will not serve the basic purpose of practicing life skills in school curriculum. Sometimes, it is difficult to assess attainment of life skills as most of them require to be assessed in qualitative form. They can only be observed and qualitative description of student performance on these skills may be done. But the challenge is how to integrate them in the school curriculum. There is the need of including core life skills in the topics of various subjects of the school curriculum. They should be necessarily an integral part of core curriculum.

**Health and Physical Education:**

Health and physical education has a significant contribution to the physical, social and emotional development of a child. It constitutes an important component of school education. The NCF (2005), therefore, recommends health and physical education at all levels of schooling with special attention to vulnerable social groups and girl children. Introducing Yoga is also another important addition to health and physical education. Yoga, health and physical education need to be part of core curriculum. Time for yoga, games and sports in school curriculum must not be reduced, rather enhanced.

**Value Education:**

Like life skills education, there is also a need to incorporate value education in the school curriculum. ‘The aims of education are landscaped in the guiding principles of constitution which reflect a commitment to democracy and the values of equality, justice, freedom, concern for others’ well-being, secularism, respect for human dignity, and human rights. Education should aim to inculcate these values, which are based on reason and understanding. The curriculum, therefore, should provide adequate experience and space for dialogue and discourse in the school to promote such a commitment in children’ (CBSE, 2015-16). The concept of value education in school curriculum is not new. Almost all the education committees and commissions have recommended for inclusion of value education in curriculum, especially at the school level. The Central Board of Secondary Education as well as State Boards of School Education have tried to incorporate constitutional and other personal and social values in their curriculum, but still they seem to be inadequate in the curriculum. There is the need of integration of constitutional and other values across the subjects in the curriculum at all level of school education.

### 3.4.2 Implementation Strategies for Including Specific Areas of Knowledge in the Teaching Learning Process

The problem of classifying and including the specific areas of knowledge in the school curriculum has always been faced by the educationists and the curriculum designers. Time and again there has been the problem of including specific areas in the school text books, especially, the text books developed after NCF, 2005. The specific areas of knowledge which are not considered as core disciplines of study at the school level and often perceived as co-curricular or extra-curricular activities need to be included in the school curriculum. Making the specific areas of knowledge as an integral part of teaching and learning may help the learners develop their total personality. Let us discuss the strategies to include these areas of knowledge in school curriculum.
<table>
<thead>
<tr>
<th>Specific Areas of Knowledge</th>
<th>Strategies for Including in School Curriculum</th>
</tr>
</thead>
</table>
| Art and Craft Education     | • May be taught as a compulsory subject in every school up to Class – X  
                               • Four basic streams such as: music, dance, visual arts and theatre should be included  
                               • Awareness campaign for the parents needs to be built  
                               • Craft could be integrated into the study of History, Social and Environmental Studies, Geography, and Economics  
                               • Craft should be taught as a lively experimental exercise  
                               • Craft should be taught as projects, and not as classroom exercises  
                               • More resource materials for art and craft heritage needs to be made available in the schools  
                               • Art and Craft teacher needs to be appointed in the schools  
                               • A culture of art and craft education should be developed in the schools |
| Work Education              | • Integrating various forms of work activities in school curriculum  
                               • Unleashing the potential of work in knowledge acquisition  
                               • A culture of world of works in the schools needs to be developed  
                               • A set of work related generic competencies could be at all stages of education  
                               • In the name of work education, exploiting children needs to be avoided |
| Peace Education             | • Setting up peace clubs and reading rooms in schools that focus on peace news and events.  
                               • Procuring document films relating to peace, values and justice and screening them from time to time  
                               • Arranging special interaction session of the journalists, editors, peace advocates with the children and publish views of children in newspapers  
                               • Organising various programmes for promoting peace and respect for women  
                               • Acquainting Senior Secondary students with peace laws |
### Understanding Knowledge and Disciplines

<table>
<thead>
<tr>
<th>Yoga, Health and Physical Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Topics in Languages, Social Science, and Science subjects need to address the peace issues</td>
</tr>
<tr>
<td>• Teachers can take advantages of hidden components in a lesson by using appropriate strategies to awaken positive feelings, identifying experiences for reflecting, exploring, discovering, constructing and understanding peace related values</td>
</tr>
<tr>
<td>• Teaching learning methods and techniques like; questioning, story telling, anecdotes, games, experiments, discussions, dialogues, clarification of values, giving examples, analogies, metaphors, role playing, and simulation on peace issues should be practiced in schools</td>
</tr>
<tr>
<td>• Multi and cross curricular integration of yoga, health and physical education in schools need to be encouraged</td>
</tr>
<tr>
<td>• Yoga, Health and Physical Education may be included both as a subject of compulsory study or in forms of integrated activities in school curriculum</td>
</tr>
<tr>
<td>• Health and physical education related activities such as: National Service Scheme, Bharat Scouts and Guides, and National Cadet Corps need to be organised in the schools</td>
</tr>
<tr>
<td>• Adequate time needs to be allocated to Yoga, Health and Physical Education in the curriculum</td>
</tr>
<tr>
<td>• Material and human resources should be made available to the schools for organizing daily activities and events</td>
</tr>
<tr>
<td>• Specific need based approach should be adopted for teaching health and physical education</td>
</tr>
</tbody>
</table>

(\textit{Source: NCF, 2005})

As per the Table 3.5, specific teaching learning strategies can be adopted for transacting Art and Craft education, Work education, Peace education and Yoga, Health and Physical education in school curriculum. It is important to note that our schools are currently integrating the above specific areas of knowledge in their school curriculum. In NCERT text books, these areas of knowledge have been already partly integrated, whereas the State Boards are in the process of integrating these areas of knowledge in their curriculum. It is again a good sign to note here that ‘Yoga’ is considered as an integral part of school and teacher education curriculum. In this regard, NCTE, in its Curriculum Framework, 2014, has made Yoga and Art Education compulsory in teacher education curriculum. But the real challenge lies in its proper implementation in the schools.

### Activity 2

\textit{Analyze a topic that you teach your students at the secondary class in terms of the way the specific areas of knowledge have been integrated. What pedagogical strategies would you prefer to teach your students on those areas of knowledge and why?}
Check Your Progress 2

Notes:  
 a) Write your answer in the space given below.

 b) Compare your answers with the ones that are given at the end of the unit.

3. Analyze the difficulties of classifying and integrating specific areas of knowledge in school curriculum.

4. Identify the pedagogical methods and techniques for transacting specific areas of knowledge in school curriculum.
   a) Art and Craft Education:
   
   b) Work Education:
   
   c) Peace Education:
   
   d) Yoga, Health and Physical Education:

3.5 Framing School Subjects

The understanding of academic disciplines and school subjects is important for teachers and teacher educators. The present education system does not provide teachers with a complete understanding to critically analyze an academic discipline and how disciplines help to frame different broad subject areas for teaching in school curriculum. Quite often, certain questions bother us like;

How does the knowledge take the frame of academic discipline?
What are the basic characteristics of an academic discipline?

How are school subjects framed?

How are school subjects related with the academic disciplines?

How are the contents of the subject selected for school curriculum at a particular stage of education?

Getting answer to these questions is very much important for the teacher. In the coming section, we discuss how the Academic Disciplines are related with the school subjects, and then we will proceed to understand how school subjects are framed.

3.5.1 Academic Disciplines and School Subjects

Stengel (2010), analyses relationships between academic disciplines and school subjects in two steps:

- Examining a range of possibilities regarding the relationship between academic disciplines and its related school subjects; and
- Attempting to interpret the meaning of each, using the various possible relationships as the content for meaning.

Further clarifying the steps, Stengel made it clear that, both academic disciplines and school subjects are not independent. In order to understand content incorporated in a subject area, we need to understand the philosophy and aims of that subject. To understand the subject areas in school curriculum, accordingly, we need to understand the disciplines from where the subjects are conceptualized. Therefore, there is the need to understand both academic discipline and school subjects together.

Further establishing relationship between the two, Scheffler (1991) suggested that:

- Subjects are not, in fact, drawn directly or readily from their parent studies, and parent studies are not all disciplines.
- The academic disciplines and the school subjects are not written without a base, the authentic knowledge and the research constitute their base.
- The former is arranged for the expedient advancement of investigations and researches, and the latter for the facilitation of learning and teaching in particular contexts and purposes.
- The academic disciplines and the school subjects are continuous, interdependent, and linked to the same goals.

Critically analyzing the above points, the possible logical relationship between academic disciplines and school subjects may be stated as follows:

1. Academic disciplines and school subjects are essentially continuous.
2. Academic disciplines and school subjects are different but interdependent.
3. Academic discipline precedes school subjects.
4. School subject proceeds academic discipline.

Disciplines and subjects continue to evolve as knowledge grows due to new thinking, intellectual discourse and research in those disciplines and subjects. Accordingly, our school and higher education curricula undergo changes with inclusion of new academic disciplines and subjects. Therefore, disciplines and subjects are dynamic in their nature.

Academic disciplines are the primary source of school subjects because they provide ‘the knowledge, understanding, skill, and disposition that are to be learned
by school children’ (Shulman, 1987). The academic discipline precedes the school subject and the latter is derived from the former. The academic discipline differs from the school subject because the latter is a ‘transformed’ version of the former. The process of transformation, of course, is influenced by the teacher’s conception of the purposes of teaching, pedagogical content knowledge, and knowledge of learners, of learning, of relevant curriculum materials, and of contexts (Shulman, 1987, Wilson et al. 1987). Nevertheless, the teacher’s orientation to and understanding of the intellectual discipline, is the foundation for the transformation (Shulman, 1986).

Although academic discipline precedes school subjects, there exists a continuum between them. Whereas teachers deal with relatively simple facts, concepts, and principles in classroom situations, they nonetheless teach the same facts, concepts, and principles taught by the discipline expert. The academic discipline constitutes an essential criterion for the school subject. The subject-matter knowledge ‘that is central to teaching is also knowledge that is central to “knowing” a discipline’ (Grossman et al. 1989). Accordingly, teachers need to know not only the information and facts, but also the substantive and syntactic aspects of the academic discipline (Grossman et al. 1989; Shulman, 1986).

3.5.2 Framing School Subjects – Scholastic and Pedagogical Considerations

We have discussed that academic disciplines are framed by classifying and categorizing specific knowledge. School subjects are the transformation of academic disciplinary knowledge through the school curriculum by using suitable pedagogic approaches.

There are three levels of curriculum making such as: ‘Institutional, Programmatic, and Classroom’ (Doyle, 1992), to frame school subjects and include them in curriculum.

The ‘institutional’ level curriculum emphasizes interfaces between the school, culture and society. It embodies what schooling should be in respect to the society and culture. The desirable social and cultural orders become the main base in this level of framing school subjects.

The ‘programmatic’ curriculum is the transformation of institutional curriculum into school subjects, programmes, or courses. It is the official curriculum document in the form of syllabus wherein content is organized in a logical sequence in the form of school subjects.

The ‘classroom curriculum’ is characterized by a cluster of events jointly developed by teachers and students for the purpose of a particular classroom (Doyle, 1992). Classroom curriculum-making involves transforming the programmatic curriculum embodied in curriculum documents and materials into teaching learning processes. It involves further elaboration of the programmatic curriculum, making it connect with the experience, interests, and the capacities of students (Westbury 2000).

Further as per CDC/HKEAA (2007) and Deng (2007), the following curriculum goals are also necessary to be undertaken to frame school subjects.

- To enhance students’ understanding of themselves, their society, their nation, the human world, and the physical environment;
- To enable students to develop multiple perspectives on perennial and contemporary issues in different contexts (e.g. cultural, social, economic, political, and technological contexts);
Understanding Knowledge and Disciplines

- To help students become independent thinkers so that they can construct knowledge appropriate to changing personal and social circumstances;
- To develop in students a range of skills for life-long learning, including critical thinking, creative problem-solving, communication, and information technology skills;
- To help students appreciate and respect diversity in cultures and views in a pluralistic society and handle conflicting values;
- To help students develop positive values and attitude towards life, so that they can become informed and responsible citizens of society, the country and the world;

Apart from the above, Dewey (1966) opined that a school subject involves distinct psychological, epistemological, logical, and social issues. Academic disciplines provide necessary guidance and directions for the implementation of school subjects and use of pedagogical principles to transform them. To certain extent, the school subject can be viewed as reformulation of the academic discipline which is called ‘psychologizing the subject matter’. Therefore, the following considerations need to be taken into account while framing subjects for the school curriculum:

- Specific pedagogical consideration to transact the subject – all subject demands specific pedagogy
- Knowledge inputs and scholastic consideration
- Concerns of contemporary socio, political and pluralist cultures
- Adherence to the aims of local, national, and global societies
- Changing scenario of social norms, standards, development in technologies, and global demands

3.5.3 Need of Reframing School Subjects

Earlier, we have discussed that both academic disciplines and school subjects continue to evolve giving rise to new disciplines and school subjects. Therefore, you might have come across new disciplines and subjects both at school and higher education level.

What is the need of reframing school subjects?

What parameters should be taken into consideration while reframing the school subjects?

Let us try to answer to the questions with the help of two questions. Since the mid-1970s the Government of Hong Kong has ‘initiated a series of reforms to broaden the curriculum to meet the political, social, and educational needs of Hong Kong. New school subjects of cross-curricular nature were introduced, such as social studies (1975) and integrated science (1976)’ (Deng, 2007). Again another initiative had also been taken for ‘infusion of cross-curricular themes across the school subjects in China with an intention to promote civic, moral, sex and environmental education’ (Morris and Chan, 1997). The above two examples depict that as and when the Government requires its citizens to acquire certain type of knowledge, it ensures that the same knowledge is taught at the school, and included in the school curriculum. In India, you might have observed that time and again the contents of school subjects have changed, and even new subjects have been included in school curriculum. Of late, you might have observed that ‘Yoga and Health Education’ have been made a compulsory subject/component of study at the school and teacher education institutions in India. The socio-political system of the country also influences reframing subjects in school.
Apart from the above reasons, new knowledge, new concepts, new areas of study, need for micro study, etc. necessitate reframing of new subjects. For example, the new areas of study, i.e., ‘Bio-Informatics’, ‘Microbiology’, ‘Biochemistry’, or ‘Biotechnology’ Bio-Engineering’, etc. emerge from the parent discipline of ‘Biology’; ‘Astro-Physics’, ‘Nano-Technology’, ‘Electronics’ etc. from ‘Physics’; and ‘Computer Science’, Information and Communication Technology’, etc. from ‘Mathematics’. Moreover, many ‘new subjects’ have also emerged from the cross and multi disciplinary areas of studies.

Reframing school subjects and introducing new subjects in the school curriculum is a continuous process. Let us summarize them in the following lines:

- Socio political system, culture and economy of the country, the form of government in the country determine reframing of school subjects.
- Emergence of new areas of knowledge, concepts, theories, and practices from the parent disciplines determine reframing of subjects.
- Scope for further higher education, career, job opportunities, demands in global market influence reframing and introduction of new subjects in schools.
- Change in pedagogical practices and approaches necessitate reframing of the subjects in curriculum.
- Skills development, inculcation of values, community living, etc. are other factors for reframing school subjects.
- Academic disciplines with vast knowledge base may give rise to new areas of study or subject.

**Activity 3**

*Select a text book of NCERT in any subject for the secondary classes published after implementation of NCF, 2005. Compare the texts with the NCERT books for the same class and subject published before NCF, 2005. What new things, do you find, which have been included while reframing the subject?*

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**Check Your Progress 3**

**Notes:**

a) Write your answer in the space given below.

b) Compare your answers with the ones that are given at the end of the unit.

5. How are the school subjects and academic disciplines related with each other?

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...............................................................................................................
.................................................................................................................
6. Write at least two new disciplines been emerged from Science and Arts, which have recently introduced as subjects study in school/higher education.

3.6 LET US SUM UP

The current practices in school and teacher education have changed a lot. Preparing future teacher is a challenging task. A school teacher is not only expected to perform the task of teaching and learning, but also he/she is required to transform the school curriculum in a way to integrate disciplines and subject knowledge, pedagogy, and process of teaching and learning across the curriculum. It is, therefore, a thorough Knowledge on Content and Pedagogy (KCP) is required for the teacher. For understanding content of a subject, there is the need to understand the disciplinary knowledge; pedagogical approaches to select disciplinary knowledge for school subjects; difficulties in accommodating specific areas of knowledge; and understanding the framing of school subjects. All these aspects have been addressed in this Unit.

3.7 REFERENCES AND SUGGESTED READINGS


3.8 ANSWERS TO CHECK YOUR PROGRESS

1. Self exercise
2. Self exercise
3. Specific areas of knowledge are rarely integrated in the curriculum. Time allowed in the curriculum for dealing these areas through various activities are also comparatively less. These are wrongly called either extra or co-curricular activities. Still these are not treated as subjects in school curriculum and mainstream learning.
4. Self exercise
5. Academic disciplines and school subjects are:
   - essentially continuous;
   - different but interdependent;
   - academic disciplines precedes school subjects; and
   - both are dialectical related.
6. Self exercise