

Teaching Economics in India

– A Teacher’s Handbook

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PREFACE

Curriculum reform is a continuous process. Economics curriculum has also undergone in India tremendously. The task of developing the present handbook has been initiated by the department as part of the package of materials to be used by teachers to implement National Curriculum Framework (NCF) 2005.

In 2005-07, the NCERT has brought out new economics textbooks based on the NCF 2005. These textbooks contain many new topics. These textbooks require some assistance for teachers on how these contents can be transacted in classrooms. It was also felt that those who aspire to become economics teachers in schools can be given learning materials which can help them to use a variety of teaching learning materials specifically related to economics. Also many teacher training institutions and universities provide pre-service and in-service training to teachers. There is no support material available for teacher educators specialised in economics education.

Even though lecture is the important method with which economics is imparted in secondary students and chalk and black boards are the only aids used in economics classrooms, the scenario is changing. Thanks to globalisation and information technology, a large

number of economics teachers look forward to use of information technology and wish to teach economics in innovative ways.

In the 1970s, as part of its mandate, the NCERT brought out Teaching units and Instructional Objectives for various subject areas including economics. A support material for economics teachers in view of changes in the economics curriculum brought out in the light of NCF 2005 is an overdue and this handbook is trying to fill that gap.

The handbook was prepared collectively by practising school economics teachers, teacher educators and economists teaching in universities. The draft outline of the handbook and the draft manuscripts were presented to economics teachers for their comments and suggestions. The list of participations of three workshops conducted to develop the framework of this handbook and for giving suggestions on the draft chapters is given in the next page. Many economics teachers gave their comments through e-mail. We wish to place on record our gratitude to each one of them.

The contents of this handbook were written, revised and edited in a collective manner by a group of school and university teachers and teacher educators. Their contribution to this handbook as members of editorial team and as contributors is duly acknowledged. Development of learning material is a continuous process. Any suggestions and feed back to improve the quality of this material will be highly appreciated.

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4	Teaching a Topic in Indian Economy Using Unit Plan Approach	Manju Agarwal, CIE, Delhi University, Delhi.
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Learning Economics: Some Basic Questions

You may recall that when we started learning economics, we were introduced to three basic questions in economics viz., (i) what to produce; (ii) how to produce and (iii) for whom to produce. These questions then took us to the world of economics knowledge. As teachers of economics, we are confronted with yet another three broad questions from students and parents: (i) How does the study of economics improve our understanding of society and human behaviour? (ii) What employable skills do we acquire from it? (iii) How is economics learnt? Each one of us gives a different answer to these relevant questions. As graduates of the subject, we all know the broad areas in Economics. Enriching ourselves to look for answers to the three questions would help us in motivating our students to learn better.

This chapter is divided into two sections. The first section briefly introduces the relevance of learning economics. Two other questions – how economics is learnt and the skills acquired in the learning process are taken up in the second section. Students learning economics are required to take certain precautions. A few important ones are discussed in the final section.

Topics dealt with in this chapter are elaborately discussed in the introductory sections of most graduate level textbooks. Besides references mentioned in the

end of this chapter, the reader is suggested to refer some of textbooks for better understanding of issues.

Importance of Learning Economics

The use of learning economics can be seen from three dimensions: (i) personal satisfaction; (ii) social benefits and (iii) an intellectual exploration.

Personal Satisfaction

Most of the activities carried out in a family are economic in nature. As a member of the family, a student of economics witnesses his parents going to work, earning their wages or salaries, purchasing goods and services in the market, saving a part of their income and depositing it in a bank, chit fund, investing in land, shares and bonds, borrowing for various purposes, and paying income tax to name only a few activities. The advantage students of economics have is that they learn a lot about real life economic activities in a systematic way in schools. This enables them in understanding various economic activities taking place in their surroundings compared to those who do not study economics. For example, every student purchases goods in a market. However, it is a student of economics who understands the logic behind how much of a good is purchased and why. This is explained to students in the topic of Consumer's Behaviour in Class XII. It introduces students to the concept of satisfaction or benefit that a consumer derives when units of a commodity are consumed along with how much the consumer needs to pay for the good.

Social Benefits

The study of economics widens our understanding about and adds value to democracy and good citizenship. As Barbara Wooten says, "No one can claim to be a citizen of the country unless he / she has the knowledge of economics." Students of economics get the opportunity to learn about various economic issues faced by the nation. A large variety

of economics curricular activities help them to critically analyse economic issues and make suggestions based on economic principles that are studied over the years. For instance, class XII students can understand some basics on Macroeconomic principles being used to bail out economies reeling under the global financial meltdown of 2008.

Economic theories train students to think like a scientist - to put it rightly - as an economist - logically and rationally. In the learning process, students are exposed to the scientific methodology of collecting evidence - facts and figures and analysing them by using statistical tools and economic theories. For instance, in Class XI, the statistics project work allows students to demonstrate the following skills:

- Collection of data - whether primary or secondary
- Interpretation and presentation of data and
- Analysing data to come towards a meaningful conclusion to their findings.

Intellectual Exploration

Learning economics is an exciting intellectual adventure. Indian economy, for instance, contains hundreds and thousands of economic activities. There are many organisations and institutions in both private and public sectors engaged in solving the basic economic problems of India. While trying to understand the Indian economy, students of economics learn and use various skills that economists need to possess. Economics students also get excited when they master many facets of the Indian economic system.

"Learning economics is the real adventure" Lipsey says. At first students of economics encounter economic theories. These theories add to their understanding of the world. Like in any other discipline, there is a constant interplay between theories and facts in economics, and students learn to think like an economist.

Peterson says "economics offers a pleasing blend of the purely intellectual and the artistic, for pure economic analysis has the rigour and symmetry of science and mathematics, whereas the economic policy partakes more the uncertain character of an art than a science. The policy

maker must develop the skill to relate pure economic analysis to such real world problems as inflation, unemployment and poverty." Why do we think we have to agree with what Peterson says.

How is economics learned?

Learning a subject differs from subject to subject. Those who learn mathematics, for instance, study simple arithmetic in the lower classes and their mathematics world expand as they move to higher classes. In universities and colleges, they learn mathematical theorems and discover different ways of proving them or invent a new theorem. Also there are different ways of learning mathematics. Different tools may be required to learn different topics. In the same manner, learning economics also involves certain steps and methods. It requires certain tools. They differ from topic to topic. We shall now discuss some of the learning requirements of an economics classroom.

Learning Economics is a Scientific Activity

Economics is a social science, distinguished from the physical, biological or environmental sciences, because it is concerned with the behaviour of "human beings as members of societies". We all know that human beings do not behave in the way animals do when kept in laboratories. This poses a greater challenge to economists as they need to establish hypotheses and assumptions, which are general statements that formally show the existence of cause and effect relationships between observable events.

Since people's behaviours cannot be controlled, while learning and developing economic theories, students of economics allow for a large element of unpredictability and even capriciousness in human behaviour. This makes generalisation and predictability difficult in economics. However, since we live in societies and behave mostly in an orderly manner, behaviour can be considered as predictable. Such orderly behaviour is the basis for any

generalisations and predictions.

Students of economics use several statistical tools to generalise observable behavioural patterns. One such tool is the Law of Large Numbers, which states that if the action or movements of a very large number of individual items is analysed, the random movements of the individual items will be found to cancel one another out. This results in a pattern of behaviour, which is similar to a bell-shaped normal distribution curve. This type of analysis is useful for predicting the behaviour of a group when the behaviour of individual entities that makes up the group is governed by many small factors.

The above discussion highlights the fact that economics is concerned with the behaviour of a group not an individual. Also economic theories do not and cannot tell us how any individual will react in a particular situation, but they can frequently predict very accurately the way in which a group reacts under a given set of circumstances. For example, generally it is considered that a firm selects that level of output which maximises its profits. However, a particular firm's goal may be to increase its sales, even if it means that its overall profits are not maximised.

Analysing Economic Aspects

Learning economics requires understanding of economic phenomena - relationship between various economic aspects of an economy. For this, students of economics gather, measure and analyse information related to various economic aspects. Since people's economic behaviour frequently manifests itself in measurable ways, the behaviour is coded and tabulated. They result in tables and large sets of numerical data. This data is used by young economists to interpret different economic situations. For instance, students of classes VIII-X collect data relating to few economic variables for a specific project in social science. They might collect details of income and employment from households or income, expenditure and profitability of a particular establishment or enterprise say - a milk

cooperative. These activities help them to not only understand the dynamics of a particular economic phenomenon of the group of households or an enterprise but also lays the foundations for learning economics.

National Sample Survey Organisation, for example, collects information relating to many aspects of people's life in India. The NSSO particularly collects the details of employment and unemployment and consumption expenditure from selected number of households or enterprises. They collect details on the basis of requirements made by economists working in universities and in government departments. Once data is collected, economists from all over the country investigate the data and use it for various purposes. Even students in Class XI use the data collected also called secondary data to develop insights into the Indian economy. For example, students enhance their understanding of the Indian economy by analysing data on the contribution made by various sectors to the Gross Domestic Product (GDP) of the economy. Based on a single statistical table, an entire classroom discussion is held on how the Indian economy has evolved from being an agrarian economy to being a service oriented one. The factors that have contributed to what the data highlights, key terms and concepts are explained, and skills of reading and analysing time series data is also introduced to the young learners. Hence, the NSSO's work enriches and updates our understanding of economic behaviour of people in India.

Understanding Economic Theories

Students of economics are expected to understand various theories / models developed by economists. Models are nothing but a simplified version of reality. They are tools used by economists to understand the "way an economic system" functions or "general behaviour" of people or organisations in an economy.

An economic theory is broadly defined as a "broad statement that embodies a meaningful relationship between observed economic events." Every economic theory pertains to the general behaviour of groups and institutions because

they reflect elements common to many specific situations. But the economic theory does not purport to describe the behaviour of specific persons or institutions.

Students of economics use economic theories for various purposes. Economic theories, under given circumstances (*ceteris paribus about which you will know later*) help students of economics to predict, forecast and make tentative statements about the behaviour of an economic system or economic events. For example, in Class XII students are introduced to the simple tools of demand and supply which determine market price for a commodity and how a firm maximises profits. These principles are used by economists engaged in private companies in explaining how much output a company should produce in order to maximise its profits. Similarly, Class XII Economics textbooks introduces students to the basic components of a government budget and simple Keynesian model of income and employment determination. Now economists who work for government departments use macroeconomic theories to reach out to people through planning and executing developmental activities.

Economic Theories and Assumptions

Learning economics requires understanding of various aspects of economic theories. For example, economics students are required to understand assumptions or postulates. While teaching perfect competition, we list out the assumptions of a perfectly competitive market. Every economic theory is grounded in a set of assumptions.

There are a few assumptions common to any economic model. For example, the idea of other things being equal, to put it in a popular Latin phrase, *ceteris paribus*. It is similar to, as Peterson says, "intellectual equivalence" of controlled experiments done by physical and biological scientists. However, we are aware that biologists can hold or regulate physical conditions such as human, soil type and manure while investigating the growth of plants. Such things are not possible in

economics. This is also one of the reasons why economic theories are considered less precise and exact as compared to theories of other sciences.

Sometimes economists make assumptions, which are not observed in reality. We may tend to think that economic theories based on such unrealistic assumptions are not important. However, economic models based on such unrealistic assumptions "open door to powerful insights" into the behaviour of the economic system or economic relationships under study. For instance, a perfectly competitive market structure does not exist in reality. Yet students of economics require to understand its features and implications as it is the most efficient market structure. A deep understanding of perfect competition allows students to compare and contrast other market structures like monopoly, monopolistic competition etc. in terms of price and output efficiency.

Understanding Abstraction

Economics is introduced to students in lower classes as simple depiction of economic aspects closer to their real life. However, as students move to higher classes and particularly when they enter higher secondary and undergraduate levels, they take up economics as a special course. During this stage, economic theories are introduced to them in abstract language.

Peterson defines abstraction as the "process of forgetting unimportant details". Economists construct a theory "to create an oversimplified - or abstract - picture that will make the complexities of the real world intelligible". Students are expected to understand the nature and purpose of abstraction in economic analysis. This will help in mastering the subject. We live in a world, which contains a complex web of relations between institutions and individuals. The abstraction helps in drawing out only those elements thought to be of strategic importance for understanding how things actually work in most parts of the world.

Use of Logic and Mathematics

Each economic theory has a logical structure. An analysis of economic theory involves deriving a set of conclusions from a given set of assumptions through the process of reasoning. This means economic theories also build their logical structure from stage to stage. In order to understand the logical structure of economic theories, students of economics are expected to acquire skills, which enable them to understand long chains of logical reasoning. Lipsey suggests that it is essential to follow an argument several times, step-by-step, until one becomes familiar with the argument to overcome difficulties in understanding long chains of reasoning in economic theories.

In recent times, a large section of economists suggest that students should get familiarised with a few topics in mathematics. We are aware that graphs are used to derive theoretical results in economics. This is the use of geometry in economics. Economists use mathematical symbols in stating economic theories and assumptions and use mathematical theorems in the logical reasoning. A.C.Chiang argues that learning economic theories mathematically has the following advantages: (i) the 'language' used is more concise and precise; (ii) there exists a wealth of mathematical theorems at our service (for drawing conclusions on the basis of logical reasoning); (iii) in forcing us to state explicitly all our assumptions as a prerequisite to the use of mathematical theorems, this approach keeps us from the pitfall of an unintentional adoption of unwanted implicit assumptions; and (iv) it allows us to treat the general n-variable case. You will learn more about the use of mathematics in economics in Chapters 9 and 10.

Familiarisation of Vocabulary

Like any subject, economics also contains a lot of technical terms. In the beginning students may feel that economists have unnecessarily coined different terms or jargon for many common sense ideas. However, as Lipsey argues that it is required as an essential "brevity of expression" as the subject grows and expands. For instance, we all know the meaning of the terms "demand" and "supply" in economics. They are different

from the way they are used in common parlance. Further, suppose each word or phrase used in an economic theory is replaced with the full verbal description of the ideas expressed, the argument might become cumbersome. When several ideas are combined in a logical fashion, then use of concepts and terms becomes inevitable for precise expression. Also, when economics students continue to use these jargons, they get understood by them easily.

Precautions in Learning Economics

Though learning economics is an exciting experience, students should also guard themselves from errors in logical reasoning. Three common and important problems are described below.

1. *Fallacy of composition*: While learning economics we tend to assume that things that may be true for the individual entities of the economic system, for instance, business firms or household, may also be true for the system as a whole. Let us take one well known concept in macroeconomics: “paradox of thrift.” This concept states that though it may be good thing for the individual to save some of his income, it does not necessarily follow that it is always a good thing for the whole country to save.
2. *False analogies*: Economics students also tend to use false analogies – generalise for the country as a whole on the basis of personal or individual experience. For example, we find an individual who consistently spends more than he earns becoming bankrupt, but it is wrong to generalise the same if the government spends more than the revenue that it would go bankrupt. We know that most governments believe in welfare state principle work with deficit budget. In fact, it is also the principle which led to birth of Macroeconomics after the Great Depression.
3. *Post hoc ergo propter hoc*: This fallacy means “after this, therefore, because of this.” When

students of economics are not able to understand the sequence or the cause and effect of economic events they tend to fall into this fallacy. Suppose the Government of India cuts taxes to increase employment and stimulate a depressed economy. Since this is an appropriate measure, which leads to a reduction in unemployment and a rise in the gross domestic product, students may conclude that, the cause of the recovery is the tax cut. But this is not necessarily true. The forces taking the economy towards recovery might have gathered momentum prior to the decision of cutting taxes and the timing of the tax cut in relation to economic recovery may have been purely coincidental. Very careful analysis of the events is necessary before one can be sure that a particular event is necessarily the cause of a subsequent event.

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Economics Education in India: A Review of Syllabi

In the previous chapter we have looked at why economics education is an important curricular knowledge in the formal education system particularly for the young learners. In this chapter we will look at the nature of economics curriculum taught in Indian schools.

Economics is a subject introduced to the children in Indian schools for more than 80 years. In those days, princely states or provinces had the responsibility of providing schooling for the people. This has led curriculum developers to introduce economics topics in the initial years of post-independent India along with topics related to political science in some states or separately in others. However, the systematic planning of economics education in India started in 1976 after the introduction of national system of education i.e. 10+2+3. One of the factors responsible for this phenomenon is the inclusion of Education in the Concurrent List of the Indian Constitution. This enabled both state and central governments to take interest in planning the curriculum and financing of education.

This chapter is based on the syllabus documents brought out by examination boards of states - Nagaland, Manipur, Assam, Andhra Pradesh, Tamil Nadu, Gujarat, West Bengal, Madhya Pradesh, Orissa, Rajasthan and all India boards such as Central Board of Secondary

Education, International Baccalaureate and Council for the Indian School Certificate Examinations and National Council of Educational Research and Training (NCERT), New Delhi.

This chapter has three sections. In the first section, we will look at the role of government agencies in formulation of economics curriculum in India. The broad areas covered by different school boards at the higher secondary stage are presented in the second section. The third section provides some insights into the nature of economics curriculum presented in the second section.

National Curriculum Framework 2005 and Economics Curriculum

Children acquire knowledge through various sources – their parents, neighborhood, media. Formal education has been recognised as the important source through which they acquire skills and competencies required for their social life. How economics curriculum is evolved? When government is the prime mover of formal education, various policy documents of the government provide direction and formulation of curricular knowledge.

Like other subject areas, economics curriculum also evolves from those policy documents. These documents also provide guidance in formulating the objectives of teaching a particular subject and the pedagogical considerations the material developers will have to take into account. For instance, the National Curriculum Framework 2005 a national level policy document brought out by NCERT suggests that economics component of social science courses introduced at the upper primary stage, i.e., classes VI, VII and VIII could be prepared in such a manner that they “enable students to observe economic institutions like the family, the market and the state”. The NCF 2005 also states that the topics of economics course introduced

at the secondary stage should be discussed from the “perspectives of the people” (NCERT, 2005, p.53). Though this document does not provide clear cut specifications of a course introduced at the higher secondary level, it gives the general perspectives which any course at that stage could keep in mind. To quote,

“The higher secondary stage is important as it offers a choice of subjects to students. For some students, this stage may be the end of their formal education, leading to the world of work and employment; for others, the foundation for higher education. They may choose either specialized academic courses or job-oriented vocational courses. The foundation at this stage should *equip them with basic knowledge and the necessary skills to make a meaningful contribution in the field they choose*” (emphasis added) (ibid).

One of the important outcomes of the National Curriculum Framework 2005 is the revision of syllabi of classes I to XII. NCERT also develops model textbooks based on its syllabi and give free copyright permission for state governments to adopt or adapt and use in their schools. The CBSE recommend these books to students studying in its affiliated schools.

These syllabus documents (NCERT 2006b) form the basis for developing textbooks and other curricular activities relating to different subjects. At the higher secondary stage, four courses are suggested for students opting Economics: (i) Statistics for Economics; (ii) Indian Economic Development; (iii) Introductory Microeconomics and (iv) Introductory Macroeconomics. It is suggested that one course should be covered for each semester. The syllabus document also provides the rationale for the semesterisation of courses. To quote,

“Economics courses are being introduced in such a way that, in the initial stage (in class XI), the learners are introduced to the economic realities that the nation is facing today along with some basic statistical tools to understand these broader economic realities. In the later stage (in class XII), the learners are to be introduced to economics as a theory of abstraction.” (NCERT, 2006b, p.114 & 115).

Although NCERT as an apex body develops model syllabi and textbooks and suggest various steps in transacting the curriculum, to what extent these guidelines are followed?

Economics Syllabi: A Review of National and International Boards

Syllabus document brought out by examination agencies form an important guiding material for all the activities in economics classrooms. The syllabus documents brought out by NCERT are public documents which can be adopted or adapted by any examination board in India.

Objectives of Teaching Economics

The answer to the question - why economics is taught in schools, is not only essential in answering students but also for the teachers when they teach economics in schools. Teachers are expected to understand why economics is taught so that they can plan the classroom activities effectively. The details of objectives would also helpful in understanding the contents - topics and sub-topics and why they are included in the curricular contents. Every syllabus document is supposed to provide the details of objectives of teaching economics. The CBSE adopts the NCERT syllabi as it is and gives the details of syllabus topics for economics courses. According to the CBSE (2008) document, the objectives of teaching economics at the higher secondary stage are: (i) make students to understand some basic economic concepts and developing economic reasoning which the learners can apply in their day-to-day life as citizens, workers and consumers; (ii) enable learners to realise their role in nation building and sensitise them to the economic issues that the nation is facing today. (iii) To equip learners with basic tools of economics and statistics to analyse economic issues. This is pertinent for even those who may not pursue this course beyond the higher secondary stage; (iv) To develop an

understanding among students that there can be more than one view on any economic issue and to develop the skills to argue logically with reasoning.

Another national level agency is the Council for the Indian School Certificate Examinations (CISCE). The syllabus document brought out by CISCE provides the following as aims of teaching economics at the higher secondary stage: (i) To enable candidates to acquire knowledge (information) and develop an understanding of facts, terms, concepts, conventions, trends, principles, generalisations, assumptions, hypotheses, problems, processes, etc. in Economics; (ii) To acquaint candidates with tools of economic analysis; (iii) To develop an understanding of important economic problems; (iv) To acquaint candidates with the main institutions through which the productive process is carried out; (v) To develop an understanding of the role of institutions in the functioning of an economy and (vi) To enable candidates to compare their own economic structure with that of the other areas of the world.

The International Baccalaureate Organisation offer diploma courses in its affiliated schools. It is equivalent to higher secondary stage in Indian boards. The IB syllabus document presents the aims of the economics course as follows: (i) provide students with a core knowledge of economics; (ii) encourage students to think critically about economics; (iii) promote an awareness and understanding of internationalism in economics; (iv) encourage students' development as independent learners; (v) enable students to distinguish between positive and normative economics and (vi) enable students to recognize their own tendencies for bias. The IB syllabi contain two levels - higher level and standard levels. The high level includes a few topics at the in-depth and higher level whereas the standard syllabi contain important and fundamental level. The economics course syllabi of these three boards are given in the following table.

Table 2.1 shows that there is no uniformity of syllabus formulation. While CBSE and CISCE broadly follow a pattern that during the first year, students are introduced to the topics that are either issue-based ones

Name of Agency	First Year		Second Year	
	Semester 1	Semester 2	Semester 3	Semester 4
CBSE	Statistics for Economics	Indian Economic Development	Introductory Microeconomics	Introductory Macroeconomics
ICSE	Four modules: (i) Understanding Economics, (ii) Indian economy-challenges, (iii) Money and Banking and (iv) Statistics		Four modules: (i) Microeconomic theory, (ii) National Income, (iii) International Trade and (iv) Public Finance	
IB	Five Sections: (i) Introduction to economics; (ii) microeconomics; (iii) macroeconomics; (iv) international economics and (v) development economics			

(Indian economy, money and banking) and a few basic aspects in economics, the IB follows a different pattern. There is no separate syllabus for the first year. The theoretical topics are taught during the second year in CBSE and ICSE schools whereas students studying in IB schools start learning from first year onwards. A careful examination of course objectives show that the students studying in ICSE and IB schools are expected to develop international perspective, students studying in CBSE schools are required to sensitise themselves in "nation building". The IB syllabus contains a separate section with the title, "Internationalism in the Economics Course." To quote,

"Economics has an important role to play in promoting such international cooperation and mutual understanding because of its focus on global issues. Teachers of the course must aim to promote an awareness in their students of how the impact of economics can both improve cooperation and understanding between countries and, unfortunately, cause extensive damage.

If all participants in the global economy are to achieve a better quality of life for their populations, there must be economic cooperation between all countries. This does not mean that developed countries must control the destinies of less-developed countries. Instead, it means sharing concepts across cultures, against a background of economic awareness.

To achieve this understanding, students must be taught to consider economic theories, ideas and happenings from the points of view of different individuals, nations and cultures in the world economy. Although complete

knowledge is impossible, students can search for understanding through a wide range of different aspects of the global economy. Their search may inspire a lifelong interest in the promotion of international understanding. (p.5)"

The syllabi of all the three boards reveal a considerable amount of differences in the curricular practices. Both IB and ICSE school students study international trade topics - both theoretical and issues, whereas CBSE school students appear to study a few basic issues only. While appearing for the final year examination, the IB school students can opt for any one of the two economics syllabi - higher level and standard level, students studying under ICSE and CBSE boards do not have such options. The IB students are assessed both internally and by the written examinations. They also have many assessment tools - portfolios, assignments and so on. They are awarded 20 marks for internal assessment and the remaining 80 marks are for external assessment. Students studying in ICSE and CBSE schools face examinations in the similar fashion - 100 marks for external examinations but without any internal assessment. The IB diploma examination assesses students' performance in the entire course meant for both the years whereas ICSE and CBSE students face board examinations only in the second year and hence what is taught in the second year becomes important for final year examination and award of the course certificate.

Even though the syllabi of these agencies and particularly the CBSE is trendsetter for other boards, the number of schools affiliated to these national and international boards in India is very small - roughly about one-tenth of total number of higher secondary schools in the country. The rest are affiliated to state level examination boards. In the following section, the syllabi used in state boards are examined.

Economics Syllabi in states

As pointed our earlier, NCERT plays important role in preparing National Curriculum Frameworks which form the guiding document in preparing the model syllabi

and textbooks for various stages of school education (Srinivasan, 2005). These model curricular materials help state agencies to develop their own syllabi which they can use in schools affiliated to state government examination boards. The table 2.2 shows the details of syllabi in some selected states. Due to paucity of space, all the topics and sub-topics are not provided. What is there for economics teachers, teacher educators and curriculum developers to learn from these state syllabi?

Table 2.2: Higher Secondary Economics Syllabi of State Boards

State	First Year		Second Year	
	Semester 1	Semester 2	Semester 3	Semester 4
Jammu & Kashmir / Nagaland / Mizoram/ Manipur / Punjab / Himachal Pradesh / Kerala/ Goa, Delhi and Haryana				
	Statistics for Economics	Indian Economic Development	Introductory Microeconomics	Introductory Macroeconomics
Andhra Pradesh	Introductory Economic Theory		Economic Development	
Assam	Economic Theory and Problems of Indian Economics		Economic Theory and Problems of Indian Economics	
Tamil Nadu	Indian Economy (including two units in statistics)		Introduction to Economic Theory	
Rajasthan	Concepts in Economics	Economics of Rajasthan	Principles of Economics	Indian Economics
Madhya Pradesh	10 topics related to basic concepts in economics, Indian economy and statistics		10 topics related to microeconomics, macroeconomics and statistics	
Gujarat	Indian Economy		Microeconomics and Macroeconomics	

The contents of syllabi show little uniformity in the structure (Srinivasan, 2008). However, a careful examination of topics and sub-topics of economics courses for two-year higher secondary stage available in the latest syllabi and documents of states suggest reveal three patterns: (a) the dominant one is based on NCERT syllabi in which four courses are taught - one per semester. States such as Jammu & Kashmir, Himachal Pradesh, Punjab, Nagaland, Mizoram, Manipur, Goa, Kerala, Delhi and Haryana follow this pattern; (b) two courses are taught - one per year and the course contents are mixed. Examples are Andhra

Pradesh, Assam, Gujarat, Orissa, Pondicherry and Tamil Nadu; (c) a set of topics from four broad areas (Indian economy, statistics, microeconomics and macroeconomics) are mixed and taught in each year. Rajasthan and Madhya Pradesh are examples of states following this pattern. One can also see these patterns are similar to what is found in the preceding section - syllabi followed in national and international boards.

Besides these patterns, there are a few topics taught in all the states. They fall under the following ten broad areas of economics: (a) Nature and Scope of Economics; (b) Statistical Tools and Sources of Statistics; (c) Microeconomics; (d) Macroeconomics; (e) Development Economics; (f) International Trade; (g) Regional Development; (h) Developmental Issues; (i) Sectoral Issues and (j) Public Finance and Financial Institutions (Srinivasan, 2008).

NCERT recommends four courses - one per semester, the rationale behind the syllabi structured is unclear in most state syllabi documents. In some states, theoretical topics and economic issues are mixed up and provided whereas in others, they are taught separately during the first and second year respectively.

In a few states while adopting the NCERT syllabi or developing their own syllabi, students are taught economic issues of their own states. For example, in Assam, Goa and Rajasthan, a few topics containing economics issue pertaining to these states are also taught. This shows that students studying in schools affiliated to state boards are encouraged to develop the understanding of the regional perspectives whereas their counterparts studying in schools affiliated international and national boards (CBSE, ICSE and IB) are encouraged to develop regional, national and international perspectives.

Some state syllabi appears not to any provide perspective and do not the details of course objectives and specific objectives. For example, it is stated in Madhya Pradesh syllabi document that the main aim of the syllabus is to develop "student's competence for higher studies in colleges and universities. Hence, basic knowledge of the subject, related to theory and applied

aspects, should be imparted to the students". Syllabus document of both Tamil Nadu and Madhya Pradesh show the teaching the course content as the objectives of teaching economics. The expected specific outcome of teaching the topic, "economic growth and development, is to "To make the students understand the concepts of economic growth and development." This lead to difficulty for economics teachers in their classroom practices. They have to invent course and topic-wise instructional objectives. This could be one of the important reasons for their dependence on particular textbooks.

The economics syllabi appear to be over-burdening (Srinivasan, 2008): A large number of topics are given in the syllabus - both outdated and latest ones. For instance, the syllabi of Tamil Nadu Board cover almost all economics topics taught at the undergraduate level. In the first year, topics covered are: (i) economic growth and development, (ii) population, (iii) poverty, (iv) unemployment, (v) planning, (vi) agriculture, (vii) industries, (viii) banking; (ix) foreign trade; (x) human resource development; (xi) statistics - measures of central tendency, measures of dispersion, index numbers. Another nine topics are included in the second year viz., (i) nature and scope of economics; (ii) basic economic problems; (iii) theory of consumer behaviour; (iv) laws of demand and supply; (v) price equilibrium; (vi) market structures and pricing; (vii) marginal productivity theory of distribution; (viii) simple theory of income distribution; (ix) monetary and fiscal policies. One may wonder how all these topics could be covered in 216 hours. The West Bengal economics syllabi also have similar structure. The Maharashtra Board still provide 10th FYP as part of the course where as India has moved to implement 12th FYP. All these factors led to textbook developers to present contents like guidebooks in which bulleted points are given for each syllabus topic. This promote rote learning and may pose a major challenge to learners in understanding economic theory and issues better achieve the objectives of teaching economics curriculum as envisaged by the curriculum developers.

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WEBSITES OF BOARDS FROM WHERE SYLLABI DOCUMENTS ARE AVAILABLE

<http://www.cbse.nic.in>

<http://www.cisce.org>

<http://www.tn.gov.in>

<http://mpbse.nic.in/academics.htm>

<http://rajeduboard.nic.in>

Planning for Effective Teaching of Economics

Planning is required at several levels if a good economic education programme is to result. A properly designed economic education programme focus attention upon those understanding, attitudes and skills, which ought to be learnt by every citizen irrespective of who he is and where he lives. These purposes, as stated in National Curriculum Framework 2005 are the common threads woven throughout the curriculum units for teaching economics at all levels. Broad goals, objectives and content areas have also been specified in NCF 2005 for teaching economics at the Higher Secondary level. Since each school, each class, each child presents some degree of uniqueness in background, interest and special needs, curriculum planning necessarily becomes more specific and detailed as the classroom level is approached. The planning at this level thus becomes teacher specific. From planning curriculum units we move on to the planning of teaching units which are prepared by the schools and teachers based on the whole. In this chapter an attempt will be made to develop the guidelines needed to prepare such resource units which would help teachers to plan out their day-today activities in economics classes.

"Sometimes a teacher might say I planned the topic - Balance of Payments so well and the whole thing fell flat. But the other day I just went to the class and started off; and this lesson on Poverty I taught was terrific. So,

why plan?" This can happen. Planned lessons may not always go well as expected. Instead of abandoning planning, one can try to review the strategy and the points of failure. The reasons could be many. The students may not be in a mood to listen or work. The beginning was wrong, the content should have been approached differently, the material was not well sorted so the students messed it and so on.

A lesson plan is a guide and there should always be scope for changes; the teachers should keep scope for handling a particular content and material in different styles in the event of unanticipated reactions in the class. Then, for many schools there may not be any choice about writing out lesson plans. Most school administrators require teacher to do long term planning and also submit daily lesson plans. The fact that lesson plans must be submitted is an indication of the need for planning the content, strategies, assignments, material aids, evaluation and so on. How it is done is a teacher's prerogative. The teacher is the most crucial factor in planning Teaching Units.

It is very important here to draw a distinction between the Textbook Units and the Teacher made Units. The Textbook Units normally represent the unit structures presented in the syllabus. The textbooks published by NCERT follow the course structure and details suggested in NCF. The Textbook Units follow a logical sequence to make the write up reader friendly. For example, the narration of facts and concepts related to National Income ought to be presented in such an order that each concept is explained separately one by one, explaining the components of the respective concepts. Comparative analysis of the components and the illustrations can follow thereafter. Teaching Units however, might follow a different order. The Teaching Units have to consider the transactional aspects of the subject matter. Achievement of the goals of curriculum along with the learning outcomes have to be visualised in varied teaching-learning situations in a specific classroom setting from the learners as well as the teacher's perspective. Therefore, the sequencing of the

content could be different. This is a very demanding task and requires a multiple task-oriented strategy to be structured for a given period of time. A Teaching Unit has to be flexible enough to allow a complete reorganisation of the subject matter if the situation so demands. A Teaching Unit, often called an Unit Plan, 'comprises of a complete plan of teaching a specific topic or an area of a subject with a set of interrelated topics for a set of learners. It would consist of the advanced or preconceived planning of all kind of preparations, activities types of learning activities required to launch, proceed on and evaluate the given contents.

The inputs of an Unit Plan

Various components of an Unit Plan in economics are :

- (i) Objectives
- (ii) Content organisation
- (iii) Preparation of material
 - Material for developmental activities.
 - Enrichment material for the enhancement of skills and abilities.
 - Provisions for individual differences
- (iv) Sources of information
- (v) Developmental procedure - approaches, methods and teaching - learning activities
- (vi) Evaluation plan
- (vii) Time plan

A good teacher prepares a **Perspective Plan** for the whole academic year, where the entire syllabus is looked into and a termwise plan of different units is prepared. This can clear confusion created when the concerned teacher is absent and another one takes over. Also, it leads to transparency and coordination among the group of teachers, teaching different sections. Besides the over all plan, each unit / content area needs to be structured with regard to the **objectives**, content coverage, methodology, specific learning activities and so on, as laid down in the basic components of a Teaching Unit. Let us briefly discuss each component of a teaching unit.

Objectives

Contextualizing the **objectives** of teaching specialized academic courses at the Higher Secondary Stage, NCF 2005 clearly states. “It is expected that the study of a subject will enable children to develop those skills and abilities to make judgement, analyse rival claims and evidence, enter into debates, and undertake independent project work using a wide range of resources.” It is evident that within the given syllabus and the textbook units, the teachers need to carefully perceive the specific objectives for the chosen content.

Acting with an aim allows us to act intelligently”, says NCF 2005. “The class, the classroom, and related learning sites are spaces where the core of educational activity takes place. These must become spaces where learners have experiences that help them achieve the desired curricular objectives. An understanding of learners, educational aims, the nature of knowledge and the nature of School as a social space, can help us arrive at principles to guide classroom practices”. Thus, more than the content, the most important task in setting the objectives is the **learner**. Knowledge is to be acquired in the learner’s context. The teacher has to seek the answer to the very basic question:

- why should my learners acquire this knowledge?
- what contribution will the study of this topic make toward helping the children become more competent in life?

Content

The next step is to organise the **content** to be covered in the Unit in a logical sequence that suits the learners’ level of understanding. Planning to teach a specific content area would involve the knowledge and understanding of the related **concepts**. The concepts in Indian Economic Development for example provide the baseline structures in developing the subject matter which revolves around a set of events, issues and

concerns reflected in problems, policies and programmes of action. These concepts are important to develop an understanding of the fundamental principles and premises taught at higher secondary level. Planning a unit to help the learner relate the economic concepts, theories and generalizations to economic problems and policies is very important in understanding the subject matter of Indian Economic Development. The content and the concepts covered in a Unit also need to be sequenced so that the required learning activities fall in line.

Sources and Materials

An important area of working at this level is the teacher preparation. Various *sources* tapped and **material** collected by the teacher which would be required during the process of learning, by both the students and the teacher. While teaching Units from Indian Economic Development, several charts, graphs, flow charts, handouts, worksheets, models, pictures, articles, films, filmstrips, OH transparencies will have to be prepared as support materials.

Evaluation and Assignments

The Unit Plan will also consist of details of all the assignments and evaluation strategies to facilitate on-going evaluation of the learners' performances should be thought of and the preliminary preparation for the same done in advance. The last minute changes and the alternatives plans could always be made while the Unit is in the transactions mode.

The concept of evaluation is to be understood with a changed perspective. As mentioned in the guiding principles of NCF 2005. "The examinations should be made more flexible and integrated with classroom life." This is possible only when the process of evaluation is more formative in nature and integrated with the learning activities, as and when they are performed. Whereas every activity is not to be evaluated,

examination need not be the only method of evaluation. Nevertheless, the progress made each time has to be assessed transparently, to motivate the children and develop confidence in whatever tasks they do. Since the learning takes place in varied situations and through a variety of tasks children do, the evaluation should also be broad based. All such abilities and skills focused during the learning processes should be assessed. "Participation, interest and level of involvement, extent to which abilities and skills have been honed are some markers which can help teachers to gauge the benefits of what children learn and gain through such activities", says NCF 2005. The teacher should develop strategies to evaluate the performances accordingly. However, the examination needs also not to be ignored. The teachers are required to prepare materials to cover the exercises given in the textbooks as well.

Time Planning

Time planning which is integral to teaching is one of the objectives of learning too. Since time management is an important skill of the skill development programme in a subject, special efforts should be made in this regard. While structuring the activities for a day's plan it is important for a teacher to preconceive the time spent on each activity in the class. The students must learn to perform a task within the stipulated time e.g. when a group discussion as a developmental activity on the consequences of population growth in India is organised in the class, the teacher will distribute some materials on different aspects of economic development, to be read by each group as home **assignment**. They would be expected to elicit the important points, write down a Power Point Slides and do a 5 minute **presentation** in the class. The rest of the class will be provided with a handout of the same for reference during the presentation and **discussion**. The teacher coordinates the points, helps each group **develop** their points and summarises to make the discussion coherent. The material could be **displayed** for a free-

time **reading** and later could be filed by each group. To see that the learning is optimum and participation maximum – each groups' material must be photocopied and distributed to all the learners before the discussion starts. *Thus reading, referencing, writing and presenting can be clubbed in a single activity by making sure the time limit for every activity during the class hours. Every other activity in the classroom should be well structured and managed according to the time available for it.*

The next stage is to prepare the details of a particular day's lesson. The specific activity or set of activities along with the complete classroom organisation strategy should be planned out step-wise. Keeping in mind the specific objectives, the materials to be used should be ready. A daily **lesson plan** is different from a Unit Plan in the sense that it is the actual plan of work for a day. *The objectives, content and the procedural plan should be written down step-wise.* The trainee teachers often have to do more preparations so that they may not forget and as for the reason that their plans are required for the supervisors. The practicing teachers who have enough experience of managing the content and the learners with sufficient ease may just prepare a draft of such a plan. But that does not eliminate the role of planning for them either. All teachers must plan and prepare their lessons. Those who don't, harm their learners to unknown limits.

Chapter 4

Teaching a Topic in Indian Economy Using Unit Plans

In this chapter one teaching unit based on the topic titled: *Growth pattern of Indian Economy– Before and After Independence* is presented.

- **An Overview of the Unit**
- **Sample Unit Plan**

This Unit comprises of the chapters dealing with the development of different sectors of Indian economy, before and after independence. A critical review of policies, programmes and achievements of the economy in the period before the economic reforms and the post reform era is presented. It is suggested that a complete overview of the economy at present, the past legacy, the dark and destructive phases, the recovery phase, along with the present status of a sector could be taught easily, if the discussions over a theme are carried forward and backward in a time line fashion. This kind of content linkage is thought to be helpful while linking the present with the past.

It is often observed that children find it easier to relate the facts when we move from present to past. The presentation of data and the respective comparative content analysis becomes more complete and logistic. It is also believed that this kind of thematic organisation of content will save a lot of time and repetition while strategising a particular learning activity. Thus, presenting a wholistic picture of a sector of the economy meaningfully will be possible.

Nevertheless, if a teacher feels uncomfortable with this arrangement, or, while discussing the conditions of a sector of the economy, the inferences from the other areas become inevitable, there should be no such lines drawn. The class can easily switchover from one sector to the other.

Sample Unit Plan given here presents the content areas to be covered and the learning objectives. Based on the objectives the instructional strategies have been planned. The details of the developmental procedure for a particular content and the respective activities are also given. The planning is done in such a manner that the class and the home assignments are woven together. Most assignments done by the students are developmental in nature, i.e., they facilitate the teaching - learning process. Care has been taken to incorporate the exercises given at the end of the chapters of the textbook in the worksheets, so that the students do not find the teaching and the testing alien. The subject matter in the Unit Plan here is approached differently than how normally the teachers teach. A comprehensive approach to facilitate the comparative analysis of the economic trends, concepts, processes and policies is presented here. Learning through discovery is attempted, hence the methodology is child centred. Keeping the learner in the focus several activities have been planned to see that the concepts as the foundation stones and the content structures are not diverged. It is expected that the learning will take place in the multiple settings. While exploring the issues related to the growth patterns, on their own, the learners develop their own perspectives, give judgements on the developmental processes and achievements of our economy. They surely reconstruct the knowledge during the processes of understanding.

Thematic Organisation of the Content

Content area I

India's Economic Development – before and after independence

- Developmental goals - Five Year Plans.
- Structural Composition - GDP, GDP-Per Capita.
- Occupational Structure

Content Area II

Demographic conditions – before and after independence.

Content Area III

Agricultural sector - growth pattern-before and after independence.

- Characteristics of Indian agriculture.
- Agricultural production, problems, policies and achievements.

Content Area IV

Industrial sector – before and after independence

- Growth pattern of Indian industries
- Overview of production, problems, policies and achievements before 1991.
- An assessment of the economy after economic reforms of 1991.

Content Area V

Infrastructure and their role in the development of Indian economy.

- Education as social infrastructure leading to human capital for motion
- Health as a social infrastructure.
- Energy as an economic infrastructure

Out of the five themes forming this unit's content, the details of the teaching strategy for one are given here:

Sample Unit Plan

Class : XI Topic : India's Economic Development – Before and After Independence

Content Area 1

India's Economic Development

- 1.1 The sectoral division of the economy representing its institutional set-up and the mixed economic system.

- 1.2 Colonial nature of economic policies - protectionism, production structures
- 1.3 Development planning and Five Year Plans - Growth of GDP & GDP-PC before and after independence.
- 1.4 Development goals - Growth equality, self reliance and modernisation
- 1.5 Structural composition, occupational structure before and after independence

Objectives

This area of content will help the learners to understand

- how an economic system works
- various sectors, processes and institutions of an economy.
- analyse the trends in the growth of GDP, GDP-PC, pattern of structural growth and occupational structure of Indian economy during the British and the post-independence period.
- critically understand the long-term goals of development planning in India.
- be sensitive about the glorious past of the country's economy and the systematic destruction, in a variety of ways, done by the colonial rulers.
- develop the skill of critical thinking, a positive attitude towards the economic development after independence.
- acquire the social skills of assuming responsibility, taking turns, respecting ideas and rights of others.
- be able to prepare group reports, summarise the information collected, and present it in a comprehensible manner.

Time

- 10 study periods.
- A few hours (1 hour everyday) spent at home doing preparations, reading, solving work sheets.

Resources

- Economic Survey (India) 2012-13
- World economic survey 2012-13
- Five year Plans (XIIth Plan)
- UNESCO Handbook

Materials

Power Point Slides on Sectoral Division of an economy.

- Handout to discover production patterns before independence.

- Reading materials as case studies on some economies of world
- Handout and a Power Point Slides to teach the GDP through the Five Year Plans.
- Handout on goals of five year plans - probing questions

Procedure and Suggested Activities

Instructional Strategy 1

Activity	: Class discussion
Teaching Point	: Institutional set-up of an economy
Specific objective	: To get acquainted with the basic structural division of activities constituting an economic system.
Time	: 1 study period
Materials	: (i) Power Point Slides containing the generalization and the flow chart. (ii) Students' Handout for home task

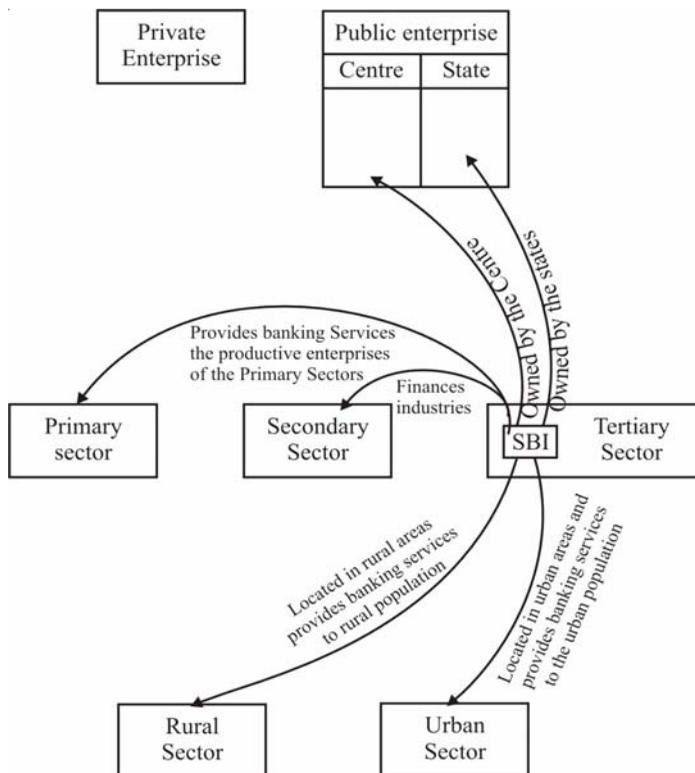
Procedure

- Tell the class that they are going to recall the basic concepts of an economy and its institutional set-up which they learnt in class X.
- Ask them to name one economic good/service they use in their daily life.
- Write it down on the board in a manner to develop a three fold sectoral division of the economy, depicting its institutional framework. Develop the interdependence of all the sectors for one item (Box 1).
- Let all the students develop their individual charts. Three basic questions they must answer, should be written on the board –
 - i) Ownership of its enterprise- (who owns the enterprise?).
 - ii) Type of productive activity it is (what type of productive activity it is?)
 - iii) Location of the enterprise (which area is it located - rural or urban?)

Conclude by generalizing – explain through a Power Point Slides
Sectoral Division of an Economy (Class Task)

- Different sectors of the economy are interdependent. They can't function independently.
- Often, the same good can be produced by more than one sector.
- Goods produced in the primary sector are used as intermediate goods for processing by the secondary sector and vice-versa.
- Productive enterprises could be situated either in the rural or urban areas.
- Goods produced in the rural sector could be marketed in the urban sector and vice-versa.

Flow chart of interdependence among the different sectors of an economy.



Prepare for the next class: assign home task. Let each student choose any 10 goods and services and find out from their grand parent / great-grand parent who was of their age before independence, the kind of goods they used, their prices, quality, durability, availability and usability.

Prepare a 'Handout' -write down the task with the criteria and the guidelines. Also mention the class task based on this work which students will have to perform.

Students' Handout

Home Task : An investigation into the 'Production Structures during the British rule, before independence Pick up 10 goods / services or both which you use in your daily life. Find out from your grand parent / great-grand parent who was a citizen of India before independence the following features of those goods:

- the kind of good it was
- its price
- quality
- durability
- availability
- variety
- origin

Write down the details in order (brief) and prepare a report covering the above points. You will be expected to share your findings with the class. You can also ask questions like –

- Do you think common people were happy?
- Were you happy?
- Did you get enough money to feed your family?
- Could you study in school / university?
- Did you have T.V./radio? How many hours did you spent watching / listening to radio?

Instructional Strategy 1.2

Activity : Group discussion developmental activity based on the teaching point - production structures during British rule

Specific objectives : • To do a comparative analysis of the production structures in the country, present and in the past

Time : 1 study period or approx. 40 mts.

- To share each other's views.

Procedure

- Divide the class into groups and let them discuss their findings.
- Ask them to prepare a group report on the given criteria highlighting some aspects of the production structures existing in Indian economy during British rule.
- Write down some other points or guidelines on the board - e.g. common exports, imports, agricultural goods, different industries which would have existed, type of farms, transport and communication services, garment factory, car industry and so on.
- Give them 10 minutes for the above task and let each group take 3 minutes to present their report.
- The teacher should highlight the status of an individual sector and other economic conditions at that time.
- Let the students display their interview and presentation on the wall / board, groupwise, so that those who could not speak also share their work with the others. After the unit is launched through these two activities, the students are motivated to know more facts about Indian economy - its present status and past conditions - sectorwise.

Instructional Strategy 1.3

Activity : Case study

Teaching point : A justification for India's mixed economy and planned approach to development.

Time : 1½ to 2 study periods.

Materials : Extra reading material on economies of the world (Refer to Textbook page 17 and Box 2.1).

Specific objective : To do a comparative analysis of Indian economy with some other economies of the world.

Procedure

- Provide material to the students on some economies of the world e.g. Russia, Japan, USA, China, India. The material could be in the form of their experiences on the journey towards development.
- The students should also be asked to look up other materials on their own depending on their resource availability (Home task). Let them read through the material and come prepared to discuss.
- The criteria for discussion could be given by the teacher on the board.
- Class task : Group discussion with each group taking turns.
- Systems of economic organisation
- Their pattern of growth
- Their problems
- Their policy parameters.
- Some time can be spent on the same day to help students read meaningfully in the class itself. Later the discussions can continue when they have read the material and prepared to discuss fully.
- They should be given some time in the class to compile their points and decide who would speak what?
- The teacher should try to substantiate and enrich the presentation.
- Later the teacher should conclude by giving a justification for India's system of economic organisation.

Sources to be tapped

- World Development Report
- Economic Survey
- Five Year Plans Report

Instructional Strategy 1.4

Activity : Analysis of trends through data

Teaching point : Planning for development - Five Year Plans

Specific objective : To analyse the plan wise growth of GDP.

Time : 1½ to 2 study periods

Materials : 1 Chart / Power Point Slides accompanied with a student's handout
2. Students' handout on goals of Five Year Plans

Student's Hand out (Class task)

Table showing all the Five Year Plans with Years. 1951-2013

Five Year Plans	Years	GDP	GDPPC	Long Term Goals
I				
II				
III				
IV				
V				
VI				
VII				
F.Y. P VIII				
F.Y. P IX				
F.Y. P X				
F.Y. P XI				

- What is GDP? How is it different from the NI?
- What is GDP-PC?
- Why do you think the rate of GDP increased more than GDP-PC?
- Why has GDP increased? Is it enough?
- Why could it not increase more?
- Has the increase in GDP and GDP-PC helped India develop and develop in the right directions?
- Why were these goals of development integral to our five year plans?
- How far have we moved ahead to achieve them?
- Why didn't British also aim at these goals?

Procedure

- Introduce the students to the planning phase - from the beginning till present and the trends in the growth of GDP and GDP-PC.
- Let the students read through the handout and elicit some obvious trends in the growth - with the help of the chart / Power Point Slides Ask questions in between to lead you to the discussion on disparities, inequalities and the other goals of self-reliance and modernization.
- Frame some questions related to the gaps in the economic status of the people causing inequalities. Give the handout to the students as home task. Let them pick-up one question for themselves and do some reading - original thinking on the question and answer like an economist and a policy maker for a progressive nation like India.

Distribute the following handout and explain the home task to be done by the students as preparations for the next class task. Also refer Textbook page 19, 20, 22, boxes 2.2, 2.4, and 2.5

Students' Handout : Goals of Five Year Plans (Home task)

Imagine yourself to be an economist and a policy maker for a progressive nation like India. From whatever knowledge you have, of the three phases of Indian economy, pick up one of the following questions related to the gaps between the economic status of people causing inequalities. Do some reading and thinking and present your point of view in the next class.

1. How do you think it happened in India that some people are very poor and some very rich?
2. How can this be prevented?
3. Does technology have to do something with it?
4. Should there be choices regarding which technology should we use?
5. Do we need to redefine modernization for us in our own interest?
6. Before thinking global, do we need to think as national and, if national means the entire nation

i.e. those who live in affluence, as well as the ones living in poverty?

7. Can the benefits accruing to the two groups of population be separated?
8. Would indigenous technology lead to higher / same gains in different fields?
9. Do we need to do more research in the field of indigenous technology and facilitate its uses for masses?
10. Suggest a plan of action.

Instructional Strategy 1.5

Activity	: A discussion debate -
Teaching point	: Equality, self-reliance and modernisation as long- term goals of five year plans in India.
Specific objective	: <ul style="list-style-type: none">• To create a sensitivity towards those who remain poor for generations.• How to help the poorest of the poor and make sure that people don't get trapped into poverty?• How to work for bridging the gap between poor and rich?
Time	: 2 study periods
Material	: Handout with probing questions (given in the previous class as home task)

Procedure

- Let all the students form question wise groups and have a discussion on what work they have done (10 minutes) and present their views on the issue they have researched upon.
- Give all the members of a group freedom to present.
- Reflect on what students say. Add on to the information collected and conduct a research based dialogue. Do some research yourself and on the feasibility of indigenous technology - its long term uses, gains and losses in terms of growth, sustainability, self reliance and modernization. Present some case studies with facts.
- Try to help students link all the four goals and how they can be realised simultaneously.

- At the end, motivate students to take up a project on indigenous technology
- Suggest some topics and give them time to think and choose.

Instructional Strategy 1.6

Activity	: Launching a Project
Teaching point	: Planning the project - Making Bio-Fertilizer for School Plants
Specific Objectives:	To sensitize the students about the uses of indigenous technology and its role in achieving a sustainable growth.
Time	: 1 study period.
Materials	: • A chart with pie graph/an Power Point Slides of the same • A class worksheet to work alongside the discussion.

Procedure

Tell students to undertake a project, suggest some topics and explain what a project is and how to do it? All the students can do one project in small groups, or, different groups can do different projects. Give them a complete plan of the project. For example the following work plan could be prepared (in consultation with the students) for project '**Making Bio-Fertilizer for School Plants.**

- I. Preparation of the Schedule of work for the Project
 - 1.1 conducting research - collecting relevant literature - 1 week
 - 1.2 reading literature and writing down posters and exchanging - material.-1 week
 - 1.3 talking to the gardeners and school Principal - one day during off time.
 - 1.4 working hours - S.U.P.W. periods.
 - 1.5 starting the work - digging the pits - 4 groups in 4 places (10x4) 40 students.
 - 1.6 2 weeks for digging the pit - after which
 - 1.7 starting to put leaves, biodegradable waste from canteen etc.
 - 1.8 every day 10-15 minutes of working; checking the venues.
 - 1.9 work continues for 3-4 months.
 - 1.10 digging out the manure.

- II. Putting up the plan of work, duty schedule, every day progress and report preparation
- III. A class discussion on how manure can be made by households, plus report presentation
- IV. Evaluation

Instructional Strategy - 1.7

- Activity : Analysis of trends through data charts / Power Point Slides.
- Teaching points : (a) Structural composition of GDP;
(b) Occupational structure of Indian's population
- Specific objective : To do a comparative analysis of the changes in sectoral contribution to GDP and the occupational structure of India's population.
- Time : 1 study period and 1 hour at home
- Materials : • A chart with pie graph/an Power Point Slides of the same
• A class worksheet to work alongside the discussion.

Procedure

Present the data and analyse the trends as depicted in the graph. Refer Textbook page 28, also, 'work these out' activities.

Distribute the students' handout for reference, and the worksheet for simultaneous working

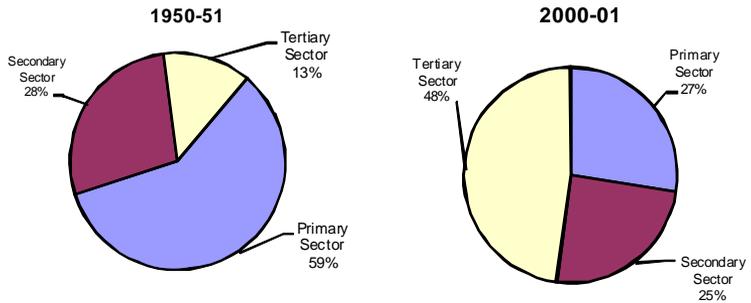
Students' Handout (Class task)

A Contribution of different sectors to Gross Domestic Product at Constant Prices of 1993-94 (in percentage)

Sector of Activity	1950-51	2000-01
Primary Sector	59	28
Secondary Sector	28	25
Tertiary Sector	13	47
G.D.P.	100	100

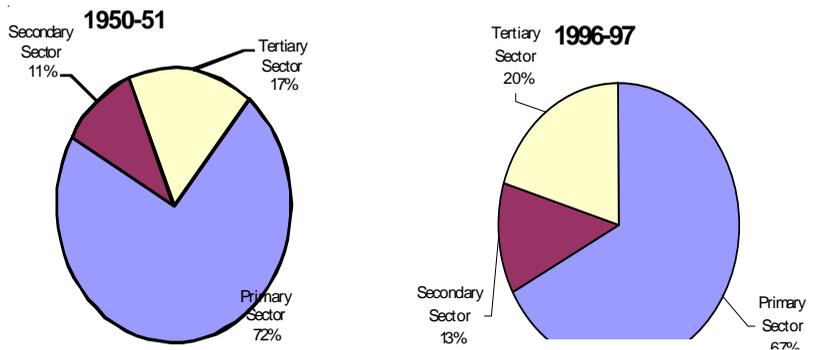
Pie Graph showing the contribution of different sectors to GDP

Pie graph showing occupational structure of Indian Population.



Sector	1950-51	1996-97
Primary Sector	72.1	67.7
Secondary Sector	10.6	12.7
Tertiary Sector	7.3	20.6

Evaluation : Besides the worksheets which will contain questions based on the activities done by



students and the textbook exercises a specific strategy to evaluate the learners' performance is suggested as under:

A self evaluation programme for the students

Please fill in the following proforma to help us know your learning outcomes.

1. I was asked to collect study material on the topic.....
2. I looked up the following sources to participate in the class discussion and do a presentation.
1. 2. 3.
3. My views on the agricultural subsidies (any other topic covered in the class) were as following:

.....

.....

.....

4. I consulted my parents / my friends / other teachers / some experts on this topic, and their views were:

.....

.....

.....

5. I visited the following places to collect information
Places

Information collected

*
*
*

6. My group members were -
 - Happy / not happy
 - Cooperative / not co-operative
 - The ideas I contributed towards my group work were-

(i)

(ii)

(iii)

7. I am better informed about the following topics / subtopics in economics after the group discussion.

.....

.....

.....

8. I learnt the following new points as a result of my own research on the topic (mention the topic you wish to ask the learners)

.....

.....

.....

9. I have not understood the following points very well

.....

.....

.....

10. I need to improve my skills of -

- Listening patiently and then responding
- How to be precise while explaining my points.
- How to present myself comfortably.

11. I am still very confused about:

.....

.....

.....

.....

.....

.....

[Let the teacher write down the topic and the expected confusions of the students].

12. Mention some of your other achievements / weaknesses, you discovered your plans to improve your work.

.....

.....

.....

This exercise may not directly cater to the needs of the examination but can surely help the learners and teachers in a variety of ways for example -

- will allow them do a soul searching.
- will allow them to think critically on the teaching points covered as a part of various activities.
- will help them develop their own perspectives.
- will help them work perspectives towards building self confidence.
- will evaluate themselves about what they've learnt by revising the content areas covered

- during the activities and also, what they couldn't.
- in doing self retrospection
- It will also help the teacher to know each learner from his/her angle and evaluates objectively, assess her own teaching, redefine and redesign her developmental tasks, enrich her knowledge and expectations of her learners more methodically objectively and pleasantly.

Brief guidelines to prepare the unit plans covering the objectives, suggested methodology, teacher preparations of the three other content areas i.e., II, III and IV of the sample unit are given in the following pages. The teachers can prepare detailed plans by referring these, the textbook and the sources mentioned on their own.

Content	Objectives	Suggested Methodology	Teacher preparations and sources
Content area-II Demographic conditions before and after independence	<ul style="list-style-type: none"> • To give a comparative picture of the demographic situation in the country - before and after independence • To help them read the data tables meaningfully, elicit the trends and correlate them with the economic development of the country 	A set of Power Point Slides or a chart depicting the data related to the demographic indicators can be used. The students can be provided with a similar worksheet where in they can fill in the causes for a trend noticed. The Power Point Slides will have only the population statistics and the worksheet will have the space for the causes too.	(i) A Power Point Slides or a chart with population statistics (ii) A worksheet for students for working in the class.
Content Area III • Agricultural sector- growth pattern before and after independence.	<ul style="list-style-type: none"> • To present a statistical and factual summary of India's agriculture, a review of 	<ul style="list-style-type: none"> • Some stories / case studies related to landless labourer, barren lands, of a middle man and of a village where land reforms were not effective, could be distributed to the children in groups to analyse the +ve and -ve 	(i) Look up the case studies related to land reforms and

<ul style="list-style-type: none"> • Characteristics of Indian agriculture • Agricultural production – problems, policies and achievements • Land reforms • Green revolution 	<p>success and failure of policies, excessive dependence, and its effect on economic development.</p> <ul style="list-style-type: none"> • To develop reading habits and critical thinking among the students. 	<p>effects of land reforms. (Refer textbook page 6; guidelines in the box and page 23 Box 2.5: ownership and incentives).</p> <ul style="list-style-type: none"> • A table / graph could be shown to explain the benefits of land reforms and also the losses to agriculture, due to commercialization of agriculture during British regime. • A 'worksheet' can be prepared to elicit the important concepts and trends in the growth of agricultural production since independence (Refer Textbook page 24, 25, to incorporate the terms and concepts in the worksheet). • A special class on the Green Revolution, its need after effects should be organized. Some <i>clippings from magazines and articles from agriculture journal</i> should be provided for reading and group discussion on various aspects of Green Revolution could be done. Or A discussion debate on how to have sustainable agricultural growth. Let the students reason out the following points in a brain storming sessions. <ul style="list-style-type: none"> (i) Is it viable to shift population from agriculture? (ii) Problems of migrant labourers of urban areas. (iii) Divesification of agriculture (iv) Subsidising farmers (v) Utilization of marketable surplus (Relevant articles from magazines could be provided for reading and reflection (Also refer text Box 2.6 page 27) 	<p>get them ready for reading.</p> <p>(ii) Graph showing the benefits of land reforms.</p> <p>(iii) A worksheet to elicit the trends in the agricultural growth. (Source: Textbook, Magazines, Journals)</p>
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<p>Content area-IV Industry and Trade</p> <ul style="list-style-type: none"> - The process of de-industrialization of Indian economy during British rule. - Industrial Policy Resolution of 1956, basic tenets of the policy. - Growth of Indian industry before 1991, production, problems and achievements. - Achievements of Indian industry after economic reforms. - Impact of economic reforms on agriculture, industry, services. 	<ul style="list-style-type: none"> • To develop an indepth understanding of the functioning of an economic system and the macro level indicators of economic growth. • To trace the pattern of growth of Indian industry and trade, before and during the post-independence era. • To compare and contrast the different phases of industrial growth, argue for and against the policies adopted by the government from time to time. • Analyse the growth and contribution of private sector in India during the post-reform period. • To enhance the analytical powers, and the skill of critical thinking through reading, reflection and peer interaction. 	<ul style="list-style-type: none"> • Begin the topic by organizing a discussion debate by dividing the class in four groups. The topics could be "controlling and regulating the economy hampered the growth and development of the country" <li style="text-align: center;">Or "The growth policy of mixed economic system, government regulation, huge investments in public sector enterprises has resulted in a diversified industrial sector, a sustained expansion of agricultural output and stable growth in several other areas. "Provide articles from the latest issues of magazines <ul style="list-style-type: none"> • Strengthen the arguments given by both the sides by presenting a systematic summary of the condition 	<ul style="list-style-type: none"> • Articles from latest magazines. <p>Source : Yojana, Kurukshetra and Economic & Political Weekly</p> <ul style="list-style-type: none"> • A flow chart to explain the process of de-industrializa-
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		<p>of Indian industry and trade during the British. Prepare a flow chart to depict the process of deindustrialization and then explain the features of the Industrial Policy Resolution of 1956 and trade policy. This could be done through a set Power Point Slides accompanied by students handout.</p> <ul style="list-style-type: none"> • The growth of public and private sector can be taught by showing the investment patterns through bar graphs. Students can be asked to construct bar graphs be helping them to build a case for private sector. A discussion – debate can be organized as suggested in the textbook page 254, Suggested Activities, 1, 2 and 3, and also the hints given in the box on page. 31. 	<p>tion of Indian economy during British rule.</p> <ul style="list-style-type: none"> • A Power Point Slides to briefly explain the industrial policy Resolution of 1956, accompanied by a students' handout of the same for students to refer. • A graph to show the % growth of industrial production till 1991 and during the post-reform period accompanied by a <i>students' handout</i> (of the same) and a worksheet for simultaneous working • A pie chart / bar graph to show the investments by the private and public sector. Teacher to prepare the data table and distribute as handout for the preparation of graphs
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		<ul style="list-style-type: none"> • Develop a worksheet covering the growth of industrial sector in India. Situational questions can be framed and given as home task. • A survey could be planned for electricity services in the capital/ states provided by private and public sector enterprises e.g. DESU and NDPL. Refer Textbook, page 54 activity 1 Case studies could be developed/ prepared after the survey and presentations can be done. Students can look up the websites of some companies and find out their investment patterns, turnovers, sales etc. for guidelines (Refer 2, 4 activities on page 55) • The meaning of the following macro level concepts should be explained stepwise with illustrations, to help the students understand the economic implications of the various policies of the government. Foreign exchange reserves and foreign exchange markets • balance of payments, relevance of exports • surplus, export duties, import licensing • tariffs, quotas • quantitative restrictions • stock exchange operations • role of direct and indirect taxes • foreign direct investment • disinvestment, • outsourcing • RBI and its role in controlling and regulating the financial institutions in an economy • devaluation of a currency • privatization • liberalization and • globalization. • There after the teacher prepare flow charts on the adverse effects of economic reforms on agriculture, industry infrastructure, employment and fiscal management could be used to illustrate the above. (as explained in the textbook page 49). These flow 	<p>by the students. Source: Textbook</p> <ul style="list-style-type: none"> • To prepare the worksheet for home task <p>Source: Websites of the respective companies Textbooks.</p> <ul style="list-style-type: none"> • Teacher prepared flow charts
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		<p>charts will highlight the foul play of various economic forces in the economy. This exercise can be accompanied with the additional case studies similar to the one given in the Textbook boxes on pages 49, 50. Different case studies could be given to students in groups for reading and reflection.</p>	
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Guidelines for using the sample unit Plan

The plan of teaching unit presented here is suggestive only. Teachers should feel free to conduct any other activities, which they think would gel with the school they are working with, type of learners, and so on. For most teachers and learners, the activity-oriented approaches to learning will be a novel experience. Therefore, several cautions will have to be taken to make sure, that the purpose of organising activity based learning is not defeated.

- Every such activity that a teacher chooses for her learners must be thoroughly organised : taking care of the class room management, design of the furniture, no. of children in the class, availability of the material aids, the researcher needed for enriching the content, time planning, and so on.
- The learners must be repeatedly taken into confidence that they ought to be serious about their tasks; as, what they do is what they learn! The teacher is a facilitator and a support to them rather than a spoon feeder: that there is some part of the syllabus behind an activity and the fun part of learning is to generate interest and involvement. It is a serious lesson through experiential learning rather than the lesson being just explained or taught by the teacher. However, the teacher will narrate, explain, clarify the doubts, elaborate upon the facts, illustrate and give all the details wherever necessary. Hence,

direct teaching is not completely eliminated.

- Since the students have to take a public examination, the preparation for the same cannot be ignored; rather, it should be integrated with the work which is planned. The activities and the tasks performed by the learners can in no way be besides the syllabus and the examinations.
- Everytime children are performing out of class tasks, notes for the parents should go to apprise them of the tasks and the purpose. The gap between the school and the home should not exist. Often, children neglect the school work when they cannot directly relate it to the syllabus and the examination. The teachers need to be firm and serious.
- Material aid production will have to be taken up in an on-going basis. Suitable and timely preparation of material aids will not only facilitate learning but teaching as well. The materials used in economics classes at this level must be content based and developmental in nature to sustain the interest of the students. Preparation of the teaching - learning material is a painstaking task. With large number of students in a class, photocopying handouts, work sheets, reference material for all learners might be expensive - especially if the schools don't sanction the funds. We submit here that alternatives will have to be thought of! The schools will have to be sensitised towards the needs of the teacher and learners if the teaching methodology is to change. There is no choice. One big reason for the learning to be monotonous is, the total dependence on the textbooks. Some teachers do use outside reading materials, but they are very few. Teacher made materials which suit the local needs and facilitate well directed interactions could only be of actual help. Interested teachers will have to work out viable

solutions. Often the data supplied by the Public Reports, newspapers, magazines are either not sufficient, is incomplete, not updated, or messed up with the unrequired data. Such data needs to be sorted out, made complete or reprocessed to suit the needs of expected content analysis, interpretation and other learning outcomes possible.

- Whenever learners are put in working mode through a story, question answer session, news item or a case study, it is very important for the teacher to decide, how would this material be used? For example, if it is a case study, the teacher has to decide whether she would read it out to the class, the class would read it on its own and react immediately, or, would read at home and come prepared to reflect. How and in what manner would the learners respond? The teacher wants some selective students to speak or, when there are 50 learners in a class, how would the teacher make sure that every one reads, thinks and reacts in some or the other way? These questions need to be answered and practical decision ought to be taken before the class commences. After all learning is every one's right and not the privilege of some only. If some fieldwork/out of class activity is performed by 50 learners, it is to be understood clearly, that all 50 must have done some work or, to say it more clearly that each one must have done the work in one's own way and as per one's own ability. Therefore the teacher must strategies the feedback session in a manner to not to neglect any learner. Remember, large numbers and individual differences are inevitable; and there are no choices. Your strategies must be in accordance to the size of the class and individual differences amongst the learners. It is wiser to accept your learners as your strength rather than a road block.

- Guidelines given in the sample unit plan should be understood and followed along with the guidelines given in the textbook at various places. An effort is made here to give the pedagogical guidelines and the classroom organisation strategy with regard to the 'suggested activity' or a 'work these out' suggestions of the textbook.

Lectures, Discussions and Story Telling

"Some people talk in their sleep. Lecturers talk while other people sleep"

Albert Camus

Although lectures are ridiculed as the least preferred method for disseminating ideas and knowledge and for guiding and motivating students, it is the most common classroom practice all over the world. Sloman and Mitchell (2002) define lecture as the "delivery of a course through a series of presentations by academic staff members to a group of students usually with visual prompts and aids" (p.2). The Oxford Advanced Learners' Dictionary refers this term as "a talk that is given to a group of people to teach them about a particular subject, often as part of a university or college course". Over the years, there has been a change in the delivery of lectures from mere talk or one-way teachers' transmission of the course content to the use of a variety of methods.

Factors such as (a) non-availability of support materials, (b) the nature of syllabus (crowding of syllabus without deleting the outdated ones), (c) lack of knowledge and interest among teachers in experimenting with new ways of disseminating the course content, (d) lack of incentives for teachers, (e) examination system not permitting teachers to follow flexible classroom practices and (f) high pupil-teacher ratio (large number of students in each class) cause

lecture-based classroom practices resistant to change.

However, perception about lectures have changed from providing merely information of the course to as an important source to motivate, challenge students and enable them get insights from what is transmitted. In this chapter, we will examine how and why lectures are still important method to teach economics and how economics teachers can improve their lectures by incorporating discussions and story-telling methods.

Why lectures?

Suppose students are expected to learn, for example, the theory of consumer behaviour in Introductory Microeconomics course. This theory has been approached by various schools of thought differently. Not all the vast amount of knowledge generated on this topic can be introduced to students. Textbooks due to their own limitations may provide content materials in a highly condensed way. When the same information is presented by a teacher, students get the opportunity to clear their doubts which may not be possible by use of textbooks by self. We as economics teachers take notes using prescribed textbooks, other graduate level books and from a variety of study materials. We prioritise information about the topic before presentation in a condensed format. In lectures, we give contextualised examples to illustrate a point. For educational administrators also, lectures are considered as best and efficient use of their resources. A large number of students can be taught using this approach.

One of the major requisites for the economics teachers in most schools is the completing the syllabus before the stipulated date. The problem is acute particularly for those who teach classes X and XII. Even though in most states, examinations are conducted in March, teachers of these two classes are expected to complete the syllabus by the end of December of the previous year. This means a syllabus which is supposed to be taught for the whole academic year - 10 months need to be completed in 7 months only. This reality forces the teachers to do injustice in economics classrooms.

Though lectures depend on many aspects, two issues receive major attention - the maturity level of students and time required to process the information supplied during lectures. One reason why educationists suggest avoiding lectures in lower classes is that students may not be able to understand what is communicated in lectures. The amount of information young learners can keep in their short-term memory is very less. Continuous flow of information in lectures may lead to loss of information kept in the memory of students or may not be absorbed by them at all. Moreover, young learners learn when they are regularly engaged in the learning process through activities.

Even the argument that lectures can convey all the information that the students are expected to know is based on the assumption that students are mere recipients of the information and there is no need for other modes of engagement. One of the reasons why teachers use lectures is the overcrowded syllabus. Teachers view that they may not be able to complete the syllabus "in time" if they experiment any other mode of classroom engagement.

Preparing students

Before taking up a particular topic for lectures, students may be asked to do some preparatory activities. Some of the ways through which this can be done are the following.

1. *Students may be asked to collect and read background information about the topic.* Although most students in economics classroom may find it difficult to collect information from internet, teachers can ask those who can access internet and school library to get the details of the topic the teacher is planning to teach through lectures.
2. *If the topic is in the middle of the course, teachers can ask students to revise what was learnt earlier regarding the topic.* Suppose the teacher is planning to teach the topic,

liberalisation and globalisation in class XI. Since a topic similar to this was studied by the students in class X, students may be asked to revise what they learnt in the class X chapter. Teachers can also conduct a mini quiz competition before the beginning of the lecture on class XI topic.

3. *Ask students to raise questions on the topic to be taught:* this will help students to contextualise the topic and its relevance. Students can be asked to read newspapers and develop questions on the topic which can be displayed as small posters.
4. *Assign students to read the contents from various textbooks.* Most teachers inform students to go through their textbook chapters for the next day's lecture. In order to know whether students read their textbooks, quiz competition can be conducted on what content is available on the same topic in different textbooks. If only one textbook is used by all the students, students may be asked to visit school library for reading about the topic.

Effective Lectures

Two important attributes of a lecture are: (i) preparation of content structure - all the information we wish to cover in a class needs to be structured in the logical fashion and (ii) the content needs to be well presented. It is commonly believed that teachers need to have charismatic personality to deliver the lecture. This is not always true. If a teacher has given sufficient attention on the structure and method of presentation, she can make the students participate in the lecture and make the lecture an effective learning experience for students. John Sloman, Chris Mitchell and Peter Davies find teachers to focus on four issues associated with the planning the structure of classroom lectures:

- (i) *Familiarise students with course syllabus and learning objectives and remind them regularly*

in each classroom lecture: In the beginning of the course lectures, teachers can inform students what they are expected to learn in the lecture classes in a student-friendly manner. For example, if the objective of the lecture topic is to teach a particular economic theory say theory of income determination, its properties, how the theory works and how it can be applied, she can state as they are. It may not be necessary to inform about skills such as development of cognitive and analytical skills. In the beginning of each lecture, its objectives with reference to the content need to be clearly spelt out to the students.

- (ii) *Use of contextual examples either from day-to-day life or from media:* Even though a few economics textbooks provide examples to illustrate a particular concept, it is necessary for the economics teachers to keep in stock various up-to-date and historical examples. Glancing through a variety of textbooks, reading news papers and searching in the internet will help them to get good examples. To be specific, real life - context specific examples make not only make students showing interest but also can help them to see the relevance of what they are learning as economic theories. The number of examples needs to be appropriate - neither more nor less. These have to be planned and worked out ones.
- (iii) *Manage the lecture pace:* Since economics teachers like others are expected to complete the syllabus in the stipulated time, they can plan to use classroom lectures efficiently. Teachers use various ways: a few select topics and sub-topics (i) to be lectured, (ii) to be used for self-study and presentation; (iii) as project work - done either individually or in groups. When the number of topics is more given the

limited time, dividing the topics would help in preparing for the lectures.

Some teachers also circulate notes they prepared for a particular topic after it got completed among students so that they can be made available when the students are listening to lectures. It will help students to concentrate on what we say in the lectures.

Some scholars suggest that it will be better to circulate the notes after completing the entire topic. Sometimes, if the notes are circulated before the beginning of lecture, students do not attend classes for which teacher notes is available to them. We also have to decide what we want students to do in lectures. If one of the purposes of lecture is to enable students to acquire the skills of rapid note taking, then specific instruction can be given to the students on those occasions. When a teacher use lecture as a method of teaching a topic, she has to balance her pace of presentation on the basis of writing speed of students, their abilities and interest in listening, watching and understanding in the classroom.

It is necessary to understand the attention span - how much time students are able to concentrate continuously from the beginning of a class. Students may find it difficult to continue after 20 minutes. They may listen to teachers beyond this time period, when they are so fascinated or excited by what teacher is saying. Sometimes teacher gives an example in between the lecture or use some anecdotes to bring back the students to the attention.

Some teachers also use various other techniques. For example, one teacher says that the use of black board during the lecture itself is a natural break for students to process the information presented in the class lectures. This may be true for topics particularly in statistics, microeconomics and macroeconomics, in which various diagrams, flow charts, mathematical derivations and arithmetic calculations are used.

Using black board during the class lectures require some attention. When a teacher talk while writing, students will find it difficult to listen to what she says, copy what she writes on the blackboard and

simultaneously notes on what she is saying. Also, some students may find difficulty in reading teachers' handwriting, or in hearing what a teacher say if her back is turned while writing.

Activities in class lectures

In most schools about 40-50 minutes is allocated for each session. Within this time period, the teacher has to recall what was taught previous day, lecture in the classroom, taking attendance, if she happened to be class teacher, giving notes, if not for all the topics, at least for important topics and assignments to the students. As pointed out earlier, students are able to concentrate only for about 20 minutes continuously at one point of time, teachers are required to make student learning not only active but also efficient. In each session / period, students are required to (i) identify important points; (ii) distinguish them from others; (iii) identify when the same point is being presented in different ways; (iv) perceive connections between one theory and the other or from one part of a theory and another (v) relate examples given to illustrate a concept and theory and think of more examples from their own knowledge.

Teachers find students doing these processes provided they are also assisted by them. Before beginning to lecture, asking a few questions on the topic would help students is drawing attention and bringing them back to the topic. The questions may be of the general type. Suppose we wish to lecture on monopoly, asking students to list out some monopoly firms and why do they consider them as monopoly will draw their attention. In this process, students can grasp the theoretical points the teacher is making, having first considered some examples and being able to relate your arguments to them. Asking simple questions two or three times in during the class lecture can help to provide a break in pace, an opportunity for reflection and reinforcement, and a check on students' understanding.

Some teachers also suggest giving questions in the end of session / lecture period. This helps students to know whether they understood the key points of the class lecture. Teachers then asked students to write down their answers and pass them to their neighbour to mark. When students see what their neighbour has written, they can learn from each other as well as from the teacher, especially if they are asked to spend a couple of minutes justifying their answer to their neighbour.

Besides asking questions, teachers also draw diagrams on the black board with some portions blank expecting the students to fill in or ask students to raise questions on the topic about which teacher is supposed to lecture. For example, if the teacher is supposed to speak on Balance of Payments, students are asked to raise questions based on what they saw in news papers or television. They were also asked to list out their suggestions on a topic related to policy issues such as poverty, employment and rural development. In class lecture, they can be given 5-10 minutes, to prepare such lists with their neighboring students. A few enthusiastic teachers also collect news clippings on selected topics and sub-topics and raise questions. These activities help students to understand how economics curriculum is connected to real life.

Since students tend to lose attention after 15-20 minutes, giving students a break during the period become essential. Even though short breaks help teachers to bring students back to original or near original level, they can also be used effectively linking the contents. Students can be asked to reflect on what they listened to so far in the class. They can be asked to refer to their notes. Using their notes, they can also develop mind-map diagrams. Some teachers simply ask student to keep quiet or chat with their fellow students. A few others assign students to read out some entertaining news / jokes related to the subject every day.

Use of Discussions in Economics Classrooms

It was pointed out earlier that there is a possibility that all the topics of a course may not be possible for the

teacher to cover within the stipulated time / periods. To tackle this, teachers can prepare a list of topics which require teacher support and topics which students can make self study and use discussion mode. Although teachers use sometime within the lecture classes for discussion, they are spontaneous. There is scope to give students opportunity for planned discussion as well. They are of various types. Important ones which can be used in economics classrooms are (i) teacher initiated (ii) student initiated and (iii) small group discussions.

(i) Teacher Initiated Discussion

The teacher organizes discussions on certain topics, which are found difficult by the students even after lectures. It requires the feedback of students so that teachers put some additional effort to explain students. The basic aim of organizing this kind of discussion is to accomplish the needs of a variety of students. In the beginning it may be difficult to get enough students' participation. As discussion continues, other students will also voluntarily participate. Teachers need to be patient enough to give opportunities for all students to participate irrespective of their ability to communicate.

(ii) Student Initiated Discussion

Students initiated discussions is encouraged to know their socialized learning interests. In order to understand their ability to lead a group for discussion, leadership skills could be integrated during the course of discussion. Students may come out with a topic for discussion, which would informally a process of seeking clarifications with their teacher. Instead of seeking clarifications, teacher can motivate his students to organize their course of discussion and the choice of topics-requiring much of the discussion. The role of the teacher in this type of discussion is to organize collaborative learning by the students themselves and if it is found not satisfactory, necessary discussions could be organized by the teacher.

In this process all the students may not expect the same level of discussion; depending upon their ability,

a group leader can be nominated to receive and to respond to the sub-groups if time is found as a constraint of opportunity for all students. It requires the implementation of democratic discussion bound by the discipline when the decorum of discussion is allowed to develop their innate potentialities.

(iii) Small Group Discussion

This kind of discussion takes place in many classes particularly when teacher wish to give a break from lectures. If a teacher wishes students to come out with important points, she asks students to conduct small group discussions. Since there will be many groups, teachers have to give some attention on each group so that the groups are balanced having mixed group of students. In peer group discussions, the students are subjected to group comparisons and competition. They are encouraged to speak freely, frankly and openly to the entire group. The group provides necessary feedback to them regarding their level of development. To develop the ability to suggest and convincing skills small group discussions are encouraged. This will help students to face large gathering or develop courage to talk in stages.

Role of the Teacher in Discussion

Regardless of the category, teachers play crucial role in classroom discussions. She has to plan from scratch - forming groups, selecting the coordinators / leaders of each group, choosing topics or helping students to select topics, and so on. She has to facilitate discussion, boost up each discussing member's morale. Sometimes, the discussion may turn into a debate, due to argument. The teacher must make better preparation and plan for knowing when and how to stop the discussion.

Each student has a point of view. Each has his or her ideas on the topic of discussion. Therefore, the teacher must have a broad background on the topic discussed. Sometimes, some members of the group may dominate in the discussion. Teachers are also expected to clarify doubts in the middle of the discussion, if any.

In discussions teacher help students to acquire socializing skills. Teachers are to encourage impartially, manage time and physical resources required for group discussions, and at the same time play the role of academic leader for all groups in the class.

Stories and Economics Teaching

Although textbooks form an important tool to teach economics, some exceptional teachers use a variety of other materials to make the economics classrooms interesting. Some of them propose story telling as a method to teach economics.

Professor Wong Wei Kang, teaching in Department of Economics, National University of Singapore argues that story telling as an approach can provide intuitive understanding of economic principles and can engage students' interest before they are fully committed to learn economics in the higher classes. "A carefully constructed story brings out the 'flavour' of economic arguments and enables students to grasp the ideas behind economic arguments better."

According to Kang, storytelling method is based on the principle of analogy which means that economic principles can also be seen in domains that are not generally considered as economics. This approach help students to see the connections between arguments based on economic theories and concepts in situations which people generally do not associate with economics.

According to the protagonists of this approach, stories used in economics classrooms can be categorised into three (a) a real world application of economic concepts or theories, (b) examples from everyday real life and (c) various fictions including novels, short stories, fables, panchatantra and Jataka stories.

This approach is not new. Since the birth of modern economics, economists used various stories to illustrate a particular economic principle or theory. For instance, Adam Smith used pin factory to explain the division of labour in his book, *An Inquiry into the Nature and Causes of the Wealth of Nations*. Ricardo in his work,

On the Principles of Political Economy and Taxation, used a story about production of wine in Portugal and England to explain the principles of comparative advantage. These examples are still used by economics teachers when we refer the economic theories of Adam Smith and Ricardo (Boettke, 2005).

Economics textbooks brought out by NCERT on the basis of National Curriculum Framework 2005 provide us with many real life examples to explain the economic concepts. For example, in class XI Economics Textbook, Indian Economic Development, a fictional story of Anu and Sudha (see page 61) is provided to enable students to develop criteria of identifying the poor. Economics textbooks meant for classes IX (Economics) and X (Understanding Economic Development) contain so many imaginary stories and real life incidences.

One may tend to think that it may not be possible to use fiction to teach economic concepts. However, plenty of evidence is available in the internet show teachers using children's literature, novels such as Robinson Crusoe, Atlas Shrugged Ayn Randam by Daniel Defoe, and etc. In the 1970s and 1980s, there was a craze among economics teachers to use mystery stories as supplement to economics textbooks (Margaret G. O' Donnell, 1989). Professor Daniel McFadden use classic novel Robinson Crusoe, to teach production possibility curve and other economic concepts.

Teacher needs to be aware of the entire story or novel selected to teach and concepts she expects students to learn while listening to the story / reading the novel. The teacher is also expected to know the background - economic and social scenario in which the novel was written. We are required to list out each plot in the story where there is scope for learning the particular economic concept. Teachers expert in story telling suggest many techniques to tell effectively, using pause, using eye contact, telling a story slowly and bringing one's own self into the task. If required, teachers also engage students in classrooms. For example, students can be asked to bring or develop a fictional story and explain clearly how their stories illustrate a particular economic

principle or concept. The teacher can collect all the stories students have developed and choose the best ones for the presentation in the classroom.

(Note: Many sections of this chapter are based on a chapter in the Handbook for Economics Lecturers, an online material available freely and can be downloaded from website: www.economicsnetwork.ac.uk. The writers wish to place on record due acknowledgement to the website operators).

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ANNEXURE

This is internet era. Suppose we want materials on a specific topic, internet is the best source available. When one of the writers of this chapter browsed through various websites, one drew his attention. A teacher who lost his job because students did not find his teaching was forced to undergo training on teaching methods.

He provided his ideas on different types of lectures in high school classes as follows. What do you think of his suggestions?

1. *Feedback Lecture*

- o Assign reading and provide students with an outline of the lecture notes prior to the lecture.
- o Lecture for 10-15 minutes.
- o Divide students into groups for 15-20 minutes.
- o Assign each group a discussion question related to the material.
- o Continue the lecture.
- o Discuss the groups' answers as a class.
- o Repeat, if necessary.

2. *Guided Lecture*

- o Provide students with a list of lecture objectives (copying them makes a good warm up activity.).
- o Instruct students to put away their writing instruments and listen.
- o After 15-20 minutes of lecturing, instruct students to write down everything they remembered,
- o After 5-minutes, put them in groups of 3-4 and have them discuss what they remembered.
- o Help students fill in missing notes.

3. *Responsive Lecture: Devote a class period to answering student-generated questions.*

- o The questions must be open ended.
- o They must be related to the unit of study.
- o Students must specify why they think the question is important.
- o The teacher answers as many questions as possible.
- o Another option includes the use of white

boards.

4. *Pause Procedure Lecture*

- o Deliver a 20-minute lecture.
- o Stop.
- o Have students exchange notes with another student.
- o Fill in missing information (on their own notes).
- o Instruct students to stand up and face a partner.
- o Students quiz each other for one minute.

Teaching Economics Through Problems

INTRODUCTION

In recent times, economics teachers pose problems to students and facilitate them to find solutions. The solutions that they come out with and all the steps and processes they undergo becomes the part of their learning. In this approach, students take an active role in their learning as they discuss and decide on problem-solving strategies, divide research and other responsibilities among group members, communicate the results of their research back to the group, and finally craft a problem solution, which is often presented to students outside their group. This instructional strategy is known as problem-based-learning (PBL) or problem solving method (PSM). In this chapter, we will look at the scope for using PBL in economics classrooms in Indian schools.

Lectures - Some Limitations

Lectures are major instructional strategy, teachers adopt in most higher-secondary economics classrooms in India. A few enthusiastic teachers carry with them Economic Survey, graduation level textbooks and Reports to classrooms. Yet a few others sit with students on Internet and help them to source a variety of materials required for project work or to clarify economic

concepts. It has been said that for many teachers, lectures are the only option available, as their schools lack sufficient materials or Internet facilities.

Studies show that lectures have many limitations: (i) less time is devoted for personalized teaching; (ii) in lectures, emphasis is more on giving information rather than learning. The lecture-based classrooms represent what teachers do and not necessarily what learners need; (iii) students failed to develop confidence to participate effectively in lecture-based-discussions. Lectures are also seen as teacher- dominated environment in which students are spoon-fed. They are also being looked upon as struggling environment for both teachers (students neither show interest nor talk) and students (classes are boring) and there is little scope to develop confidence and independent learning abilities or to stimulate those who become disinterested. In lecture-based instructions, students are content to adopt a passive rather than an active role in the learning process.

Problems and Learning

In psychology a "problem" usually means 'a task that can be defined external to the individual in which an observable or openly stated solution is provided.' Mazes, puzzles and anagrams are examples of problems. We solve these problems using our memory, past experience and training. For example, if we want the solution for a problem - to find out the sum of 3 and 7, we need to know how to add two numbers. Once we know, we provide solution to this problem as 10. While solving each problem, we produce 'responses, which are already in our repertory through memory or use of training. The past experience supplies the requisite information or skill to find solutions'. However, problems may be of different types. We may not know solutions to many problems in advance or that there may be more than one solution to a problem. Let us consider this: how to arrive at the number 8 by addition. We all know that we can arrive at 8 by (i) 4+4; (ii) 5+3; (iii) 2+6 and (iv) 1+7.

Hence we can arrive at four solutions to one problem.

Problems are generally solved by (i) *trial-and-error*: Grick and Mc Garry (1992) have drawn attention to the way in which the ability to transfer what is learned in one problem situation to another problem situation depends on making mistakes in the first situation. They compared situations in which students first solved a problem with situations in which they initially failed to solve a problem. They found that failure to solve the first problem led to more solutions of a second, similar problem. It is with the benefit of correcting errors, they solved the problems; (ii) *insights* - by discovering general rules, pattern of relationships, principles: Metcalfe and Wiebe (1987) point out that one of the essential characteristics of an insight problem is that the solution appears suddenly, without warning and (iii) *analysis* - analysis of the problem and a step-by-step working of the stages toward a solution.

In the formal schooling, we tend to assume that if a person is able to arrive at solutions for problems associated with an issue, she is considered as learned or acquired knowledge (about issues). In order to arrive at a solution or set of solutions, we take many strategies and involve ourselves in a variety of activities. Each of these activities also forms the part of learning. This led some psychologists to consider problem-solving as "complex learning."

Problem-Based Learning and Economics Classrooms

As pointed out earlier, in PBL, teachers pose a set of problems associated with a particular curricular area - subject, topics to be covered in the syllabus and seek students to provide solutions by following teachers guidance. All the processes students undergo and the solutions they arrive at form part of learning. The origin of PBL can be traced from medical and health care education in the 1960s and has now been used as an classroom organisation or teaching strategy in many subject areas.

Economics is one subject in which a variety of real-life issues are studied and solutions are explored. We know that in real life situations, economists working in various enterprises, large companies, banks and financial institutions and government departments use economic theories for finding solutions to various economic problems their enterprise face. A large number of teachers in schools and colleges find that using simulated problem-situations, there is greater scope to use PBL as a major instructional approach in their classrooms. To quote a study of economics classrooms in select high schools in United States of America:

"the PBL macroeconomics unit incorporates multiple collaborative discussions in which students work to frame the problem, decide on a solution, revise the solution on the basis of a new information, and, finally, prepare a speech describing their solution. The teacher coaches students through this process by challenging their inquiry to stimulate knowledge gain (p.326)."

In the PBL environment, teachers facilitate students to research materials related to appropriate topics and sources, guide them to develop appropriate "lines of enquiry" so that they can evolve various economic solutions to the problems posed. Also a successful creation of PBL environment requires teachers to possess sufficient knowledge of economics subject and the ability to manage students to develop focussed inquiry.

Researchers observe a variety of advantages of this approach viz., (i) learners achieve concept attainment through self learning; (ii) it facilitates peer-group discussions among students and they learn to make decisions and; (iii) it is particularly suitable for creative tasks where more than one answer / solution is expected; (iv) learners come together to solve problems collectively by considering various or joint solutions; (v) opportunities for teacher-student and student-student interactions are greater; (vi) develop confidence and independence learning skills in students; (vii) students learn to search information through various sources;

(viii) students are able to manage time to research, use the time effectively - non-teaching hours in schools; (ix) they develop responsibility to contribute to team effort.

Although teachers use a variety of strategies to create PBL environment in economics classrooms, most of them take six steps: (i) determine the form of PBL environment - either fully which means the entire course can be taught using PBL strategy or partially - which means only part or parts of course syllabus units / topics / chapters can be taught through PBL strategy. This decision is taken by teachers depends on the ability of the students, nature of the course contents, their own ability and enthusiasm and so on.; (ii) focus on target learning outcomes - subject-specific skills such as use of statistical tools - tables, graphs, analyse the economic data and infer from the economic information and transferable skills such as time management, teamwork, independent learning, decision taking, problem solving, communicating ideas and so on; (iii) determine the learning activities associated with the task - those tasks which promote subject specific skills and those which promote transferable skills (iv) presenting the task to students; (v) set up mechanisms to facilitate the work of students to lead, record and monitor themselves; (vi) assessment.

Bouhuijs and Gijsselaers (1993) suggest the following steps one can take to create PBL environment in the classroom:

- (i) Students can be organised as small groups each of which work independently from other groups (6-8 members)
- (ii) Every group needs to be given a set of problems related to the chapter/topic unit as decided by the teacher
- (iii) In the first meeting, each PBL group may discuss the problem for the first time - first impression' views of the problem
- (iv) Organising brainstorming sessions for each group in the entire classroom or separately to identify relevant issues and essential information required to "solve" or respond to the problem
- (v) Identification of specific study tasks (library research, etc.) to be undertaken by group

members before the next meeting: While designing a task, teachers need to be (i) aware of the learning activities students will be required to perform when tackling the task - design tasks that are consistent with learning objectives / outcomes specified in the unit / chapter (poor problem design may result in wider differences in intended and actual learning outcomes) and (ii) try to visualise the difficulties that may arise in the process - computer facilities, internet, general library resources, access to newspaper articles and magazines, graduation level textbooks and other book materials - with a limited time frame students may be expected to collect the information. There is no point in having large numbers of students trying to access one book / one computer - internet facility within a limited time frame.

- (vi) Allocation of study tasks to individual group members (the number of students working on a particular task can also be determined at this stage)
- (vii) For each task, the team can select a task 'leader' and 'recorder'. The task leader is responsible for keeping the discussion going and ensuring that all members participate in team discussions. The task recorder will be responsible for recording the research responsibilities delegated to members during the first meeting and for reading out this information at the start of the every subsequent meeting. The students are expected to be responsible for all decisions arising from the above activities. The teacher should not interfere with the governance of group procedures.
- (viii) In the second (and) subsequent meetings, group members are expected to undertake the study task allocated to them at the first meeting. Tasks include: (i) providing a summary and assessment of relevant

newspaper clippings, magazine and journal articles, (ii) searching for materials through internet; (iii) acquiring and tabulating relevant statistical information. Sufficient time may be required to facilitate research.

At this stage, members can report back the results of their research activity to the group (after the task recorder has reminded the group of individual responsibilities). Using this information, the group formulates an agreed response to the problem.

- (ix) Presentation of group responses and assessment: a formal presentation in the class or a written report. Teachers may require some form of response so that formative feedback can be provided. Assessment may also be summative, in that the response is graded and contributes to "internal marks" of the course work.

An Illustrative example of Course Design in a Problem-Based Learning Mode

"Indian Economic Development" is an economics course taught in schools affiliated to Central Board of Secondary Education and many state Boards at the higher secondary stage. This course has four units and one of which deals with "Current Challenges Facing Indian Economy". Issues are covered in one unit viz., poverty, human capital formation, rural development, employment, infrastructure and environment. Since we have a large number of students in each class, a partial problem-based learning environment can be created for this course. This means all the three units can be taught in other instructional strategies.

The Central Board of Secondary Education suggests teachers to use 60 periods to teach this unit. This means roughly about 10 periods may be required for each issue. Assume that there are about 36 students in a

class. This class can be divided into 6 groups. Each group can be asked to take up problems associated to one issue. For each issue, the following needs to be done:

(i) *List out the expected outcomes:* For example, in poverty chapter, the following are expected learning outcomes: (a) understand the various attributes of poverty; (b) comprehend the diverse dimensions relating to the concept of poverty; (c) critically appreciate the way poverty is estimated; (d) appreciate and be able to assess existing poverty alleviation programmes.

(ii) *Raising questions associated with different sub-topics:* At this stage, teachers need to formulate a few appropriate questions, which form as problems. For instance, in the case of poverty chapter, questions need to be raised by the teacher and posed to the children for finding out solutions. Some sample questions are viz., (a) how poverty is defined? Do you think, the way official documents identify a person affected by poverty is appropriate? Use real life examples from your surroundings to argue the case. (ii) Examine the changes in the magnitude of poverty in India since independence; (iii) What are the steps we may have to take to alleviate poverty in India? Do you think only the government has the responsibility to address poverty? How we as citizens of this country can reduce poverty in India?

While posing the questions, it is necessary for the teacher to understand clearly, what would be tentative answers, what are the materials children may be required to collect and whether the learning objectives can be achieved using these materials and what are the other transferable skills students may be able to acquire in the process.

- (iii) *List out the tasks:* In order to answer questions taken up in the previous paragraph, the teacher may have to list out what are the activities students have to take up. In the case of present illustrative example, all the students in the group may be required to do the following activities:
- (a) Search for materials in terms of books, magazines, journals available in the school library on poverty
 - (b) Search in the Internet through GOOGLE or any other search engine (there will be hundreds of materials through this source). It may take a few hours for students to look at each material. When they search, there will be a lot of materials, which may not be useful to the task. They have to first look at them, if they are useful to provide answers to the problems posed, they can download them and print those materials.
 - (c) After collecting the materials through various sources, they can read and summarise and / or take important notes. They should discuss among themselves what is there in those materials and whether they are sufficient to find solutions to the problems posed by the teacher. They can discuss among themselves.
 - (d) They can decide how and who do the presentation of the problem assigned to each group in the class. This can be through Power Point slides presentation and / or written report.

In case there is a limitation that each group is familiar with only one topic, teachers may require to pose the problem differently. Suppose there are 36 students, one group will be assigned the role of collecting the materials; another group can be asked to read the materials collected and take down notes. There are some students who may be good in presenting / articulating the points from the notes. Then there are some students who may be good at using computers, making power

point presentations or preparing graphs, tables. They can be asked to do those tasks.

Limitations of PBL

- (i) Indian classrooms generally contain large number of students in every class. So a partial PBL environment may enable only a section of students to participate actively. Students in each group may become well-versed with only those topics assigned to them. There may be little scope for other students to understand very well the contents or curricular materials prepared by other groups' units. Hence, besides students' groups presentations teacher may be required to supplement with additional lectures which teachers may tend to think as double work given the limited number of periods.
- (ii) When students are in the first year of economics course, they may not be in a position to employ economic theories and tools such as demand and supply or any methodology approach specific to economics at this stage. Higher secondary students are not exposed to such curricular knowledge. At best, students may use some statistical tools to describe / present the issues. They can use simple reasoning or common sense to find out solutions to the problems posed by the teachers to each group. Also many economic problems require understanding of socio-historical and geographical issues for providing tentative solutions. However, this could be taken as an additional opportunity of learning about integrated nature of social sciences, provided teachers motivate them to discuss these issues in classroom discussions.
- (iii) If PBL is taken as a method to teach a part of Indian Economic Development course meant for class XI, there is already another course -

statistics for economics which contains one chapter on doing a project using statistical tools learned in the course. The PBL environment may require knowledge and understanding of statistical tools but goes beyond merely using the tools as students are expected to provide solutions to the problems posed by the teacher. It is necessary to differentiate the problem-based learning and doing a project using statistical tools. In other words, the statistics for economics portion expects students only to use the process whereas the PBL activities enable students to learn both (economics) content-related skills and processes (transferable skills) through activities.

- (iv) There is some scope for apprehension that this approach may be suited to situations where there is no readymade textbooks available. In India, textbooks and guidebooks are brought out by both public and private sector publishers. There is a chance that children may just write what is already there in textbooks and submit as the completed task. Hence, PBL environment requires teachers' careful observation of all the activities of each group and go through the written report carefully.

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Simulation Games and Teaching Economics

INTRODUCTION

This chapter deals with a few basic aspects of simulation games as a method to teach economics at higher secondary level. In this chapter we first discuss the need and significance of simulation games as a method to teach economics. We then detail the advantages of this method, essential steps to be followed while designing and organising a simulation game. This is followed by a suggested list of economics topics and conclusion.

Need and significance of simulation games

The scope of economics is increasing. It has been introduced at the upper primary level as a part of social science course and offered as an optional subject at higher secondary level. It has been observed that the achievement of learners in economics is poor. One of the important factors responsible for poor performance of learners is our methodology. Most of the teachers use traditional approaches like chalk and talk depend on textbooks, question-answers, lecture etc. in teaching economics. Teaching practices, which rely heavily on the lecture format are not doing enough to develop the cognitive learning skills in students and do not even motivate them. Consequently, it limits learner's

performance up to knowledge level and does not develop understanding and application abilities in them. Their participation in teaching learning process is poor. Their motivational level remains low in learning concepts. So, their performance level is poor.

It has therefore become necessary for educationists to find some innovative approaches teach to economics, which create interest in learning economic concepts, increase students' motivational level and increase their participation in learning tasks set for them by the teacher. The recommendation in many economics studies is to adopt more active and collaborative learning methodologies. Simulation game is a new technique of teaching. Its use in education is increasing. Research studies have shown that simulation games create interest in concept learning, increase active participation of learners in learning tasks, increase their achievement levels and enhance the concept retention. Before to discuss this approach in detail, let us first understand the concept of simulation game.

Concept of Simulation Games

The concept of 'simulation game' is based on the concepts 'simulation' and 'games'. Bob Wilson (1987) defines simulation as "an imitation of reality." "It is a smaller scale imitation of the 'real thing' where participants carry through an exercise, which represents a real system, or a process, or a procedure, or parts of them. The simulation may involve either physical or mental skills or both". J. Megarry (1989) adds that "A simulation is a working model of reality". Educational simulations are often simplified or accelerated representations which allow student to explore situations." These definitions highlight the following as the attributes of simulation: (i) It is an artificial situation based on reality or some of the components of reality; (ii) it provides a learning environment; (iii) it involves students actively in learning process.

The concept of a game needs no introduction. Games are competitive activities with an element of fun.

According to Bob Wilson (1987) "A game is a competition, or exercise, played by adversaries, with the objective of winning within the rules". J.Megarry (1989) says that a game is played by one or more players, competing and/or cooperating towards a definite objective according to an agreed set of rules. These specify procedures for attaining the objectives from the materials provided, and indicate a scoring system or method for identifying winners and losers".

The attributes of a game are the following:

- (i) *contain a set of objectives*: Game is a purposeful activity. It is carried by the participants to achieve the predetermined objectives;
- (ii) *Rules*: The game has certain rules which are followed by the participants during the activity;
- (iii) *Time bound*: A game has a time limit. It is played within the specified time;
- (iv) *Cooperation*: The game is played with the active participation and cooperation of the participants of the group;
- (v) *Competition*: The feel of competition is always present in the participants who compete against each other;
- (vi) *Scoring System*: There is a scoring system in game which helps in declaration of results of each group.

Simulation Games

A simulation game is an educational activity which combines the features of both of a simulation (working model of reality and active participation) and of a game (rules, cooperation and competition). According to Bob Wilson (1987), a simulation game is "an activity which combines the qualities of a game (players, rules, competition) with those of a simulation (an imitation of reality)". J.Megarry (1989), adds that it "combines the features of a game (players, rules, and competition/cooperation) with that of a simulation (working model of reality)." Simulation game is a group-oriented approach to teaching. The role of the learning is active

and the role of the teacher is that of a guide or a facilitator.

Role Play

Role play refers to one type of a simulation in which the dominant feature is the relatively open-ended interaction among people. In a role-play game, participants need to assume realistic social roles based on a common situation, which forms the basis of interaction with one another. In the words of J.Megarry (1989), "Role play refers to a group of techniques in which the participants are asked to accept a different identity, to try to think their way into someone else's situation and perhaps into their mind as well. Simulation game often allocates different roles to the participants by issuing them with role cards bearing the name, age and occupation of the person they are to represent." Role play games usually require (i) profiles, which describes the role behavior to be performed during the game; (ii) a scenario or case study which describes the situation in terms of which the roles are to be performed; (iii) rules, which specify the conditions under which the game is to be played and which indicate how the winning and losing is to be determined.

Advantages of Teaching through Simulation Games

- (i) *Motivation*: Simulation games have resulted in increased pupil motivation to learn, particularly where pupil motivation may be very low because of socio-cultural factors, and where students find much of their curriculum irrelevant to their own life experiences. In such situation, simulation games make study material interesting and fascinating. The learners are motivated by dividing them into groups, by assigning roles and by stating rules of the activity. They become more eager in finding themselves in the activity of

- learning. The level of interest increases because they have a natural urge to play and it is in their instinct.
- (ii) *Active Participation and Intense Involvement*: This method leads to maximum involvement of the learners and their participation in the teaching learning process. So it is helpful for the average and learners having learning.
 - (iii) *Increase in Achievement*: The learner's level of motivation and the active involvement in learning process help in learning concepts effectively which further increase their achievement. Research studies have shown that pupils who were taught economics through simulation games at higher secondary level scored more than pupils who were taught through traditional methods of teaching.
 - (iv) *Retention of Learning*: As pupils learn concepts with motivation and are involved in the learning process, it helps in enhancing the retention level of learners. Research studies have shown that the pupils who were taught through simulation games had high levels of retention in comparison to those pupils who were taught through the traditional methods of teaching.
 - (v) *Development of human traits*: Teaching through simulation games promotes certain human values like co-operation, team spirit, respect for peers etc. They come close to each other and their social relationship gets strengthened. Group work provides the benefit of sharing knowledge.
 - (vi) *Increase in confidence*: Students who are taught through simulation games are more confident in expressing their views. Clarity of concepts, increased interest towards the subject and being exposed to simulations make them more confident in dealing with real life situations.
 - (vii) *Development of Skills*: It leads to the development of various skills like problem solving, communication and negotiations, decision-making etc.

- (viii) *Learning as a by-Product*: The pupils participate in the activity with interests but the purpose of activity is to learn concepts.

Steps for Designing a Simulation Game Based Exercise

- (i) *Formulation of Instructional Objectives*: It is one of the most important steps for designing a simulation game based exercise. Objectives of the concept, which are to be taught must be written in behavioral form for their effective attainment.
- (ii) *Identification of Simulation Game*: After the objectives, an appropriate simulation game exercise is identified. The components of a concept help the teacher to identify the most suitable exercise in this regard.
- (iii) *Preparation of Simulation Game*: At this stage, work related to rules of exercise, groups, number of participants in each group, roles, material required, arrangement of furniture etc. is completed.
- (iv) *Assigning Roles*: The teacher assigns the roles to the participants in such a way that the activity goes on smoothly until it is properly concluded. There are two types of roles, key role and supporting roles, whereby key roles have main and greater performance than the supporting roles.
- (v) *Observers*: It is the group of those students who do not participate in the activity but assist as timekeeper, writing scores, distribution and collection of material etc. Research studies have shown that the observers also learn equally with those who were involved in activity.
- (vi) *Organization of Simulation Game*: This is situation when the whole plan of work is put into action. The simulation game is played after the introduction of rules.

- (vii) *Intervention*: The teacher can provide some feedback in the progress of the activity if it is required, but teacher intervention should be minimum.
- (viii) *Debriefing*: This is a post game general class room discussion situation in which the pupils generalize the outcomes and the teacher matches the outcomes with the objectives of the lesson. The purpose of the activity is expressed as not to entertain but to learn concepts through it.

An Illustration of a Simulation Game in Microeconomics

Topic : Monopolistic Competition

Class : XII

Time : 35 Minutes

Nature of simulation game: Role Play

Components of Monopolistic Competition

- Many firms
- Closely related but differentiated product
- Free entry and exit of firms
- Selling costs

Instructional Objectives

After going through this activity you should be able to

- State the meaning of Monopolistic Competition.
- List the features of Monopolistic Competition.
- Explain the features of Monopolistic Competition.
- Describe the terms "Product Differentiation" and "Selling Costs".
- Understand the rationale of a firm in differentiating its product.

Rules

- Divide the whole class into five equal groups.
- There would be six students in each group.

- There would be four firms which will be selling their product "Toothpaste".
- One group shall be consumers.

Procedure

- Four students of first four groups will act as a seller of different firms which are selling their product toothpaste, remaining two students of each group will perform promotional activities like advertisement on news paper, T.V. and Radio, Free Sampling, etc. to sell their products. Their description is given below.

Table 1. Roles of students

Groups	Roles	No. of Students	Students Engaged in Promotional Activities	Total
Group1	Firm A Colgate	04	02	06
Group2	Firm B Pepsodent	04	02	06
Group3	Firm C Close up	04	02	06
Group4	Firm D Babool	04	02	06
Total		16	08	24

It is clear from the above table that there are six students in each group engaged in performing roles of firms and engaged in promotional activities.

- The fifth group will act as consumers which wish to purchase a product "toothpaste" and for this they visit and interact with the members of each firm and observe all the promotional activities. The group of consumers will get information related to price, quantity, quality, brand name, colors, type of service etc. about the products.

Debriefing

After the activity has been conducted, the groups would share their experiences and explain the purpose of the activity. At this stage, the teacher needs to match the

outcomes of the activity with the objectives of the lesson and describe that there are a number of firms selling a similar product and thus, each firm supply a certain percentage of the total supply of the product. Competition prevails in the market because there are many firms. Products of different firms are close substitutes of one another. They can be differentiated from each other on the basis of brand name, colors, shape, quality, the expenditure incurred in promoting sales of a firm etc. Finally, the meaning of monopolistic competition is derived with the help of students as it refers to a market situation in which there are many firms which sell closely related but differentiated products.

HOMEWORK

- Q1. Give examples of any five consumer goods industries where product differentiation is prevalent.
- Q2. Find the basis of differentiation of the product "Washing powder" of 1 kg.

Another illustration of a simulation game in Macroeconomics

Topic: Circular Flow of Income in a Simple Economy

Class: XII

Time: 35 Minutes

Components

- Households
- Firms
- Factor Services
- Factor Payments
- Goods and Services
- Payments for Goods and Services

Instructional Objectives

Pupils should be able to:

- Give examples of factor services and factor payments.
- Explain the relationship between Households and Firms.
- List the features of a simple economy.
- Estimate the aggregate value of goods and services produced during a year through expenditure, product and income methods.

Rules

- There will be two leading groups Group A and Group B comprising of 20 pupils in each group.
- Group A will demonstrate the roles of a households and Group B will demonstrate the roles of a firms
- There will be four sub-groups in each group comprising five students in each sub-group.

These rules can be explained with the help of the following table:

Group A	Group B
A1.Human Labour (5 students)	B1.Engage Factor Services (5 students)
A2. Capitalists (5 students)	B2.Makes Factor Payments (5 students)
A3. Entrepreneurs (5 students)	B3.Selling Goods& Services (5 students)
A4.Landlords (5 students)	B4.Receives Value of Goods & Services (5 students)
Total (20 students)	Total (20 students)

Procedures

Round-1

- Sub-groups of group A will approach sub-group B1 for producing factor services.
- Sub-group B2 will make payments in the forms of wages (A1), interest (A2), profit (A3), rent (A4).
- Sub-group B3 will sell final goods and services to the group A.
- Sub-group B4 will receive value of goods and services from group A.

Round-2

- ❑ Roles of Group A and Group B will be interchanged.

Debriefing

The teacher would draw and complete the following diagram on the basis of students' experiences which they have learnt through the exercise:

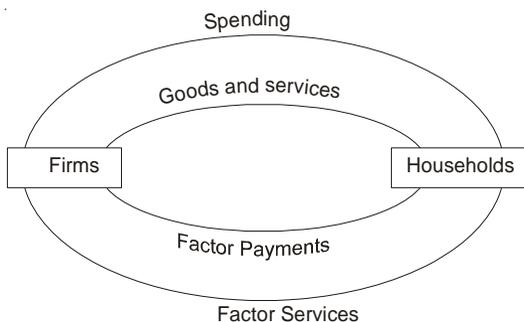


Fig. 7.1 Circular Flow of Income in a Simple Economy

The teacher can focus the explanation on the following as well:

The households receive their payments from the firms for productive activities. There may fundamentally be four kinds of contributions that are made during the production of goods and services:

- Contribution made by human labour, remuneration for which is called Wage.
- Contribution made by capital, remuneration for which is called Interest.
- Contribution made by entrepreneurship, remuneration for which is called Profit.
- Contribution made by fixed natural resources called "land", remuneration for which is called Rent.

Features of a Simple Economy

- ❑ There is only one way in which the households

may dispose off their earnings.

- ❑ Households do not save.
- ❑ Households do not pay taxes to the government.
- ❑ There is no external trade.

Estimation of aggregate value of goods and services through

- ❑ Production Method (aggregate value of final goods and services produced by all the firms).
- ❑ Income Method (the sum total of all factor payments).
- ❑ Expenditure Method (aggregate value of spending on final goods and services that the firms receive).

Many topics can be taught through simulation game. Some of them are, (i) Fixed cost and Variable cost (game); (ii) Perfect Competition (Role play); (iii) Price Elasticity of Demand (game); (iv) Concept of Aggregate Demand (game); (v) Value Added (Role play)

Conclusion

In simulation games, learning become entertaining and made relevant to the pupil's life experiences. Learning is achieved by exploratory problem solving simulation games involving role play, with self-directed pupil participation. Although, many concepts in micro and macro economics can be taught using games, it has a few limitations such as (i) teachers have to plan in advance the execution of the complete game as the process of teaching through simulation gaming requires a proper preparation and (ii) all the concepts of economics cannot be taught through simulation games, which means the teachers are required to identify only topics which can be taught through simulation games.

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WEBSITE

www.expernomics.com

Using Media and Technology in Teaching Economics

INTRODUCTION

Economics is a subject that every individual encounters in his / her daily life. From a simple decision that a child needs to make when choosing between the purchase of an ice-cream versus sweets to the more complex issues of inflation and unemployment, economics touches each one of us everyday. Irrespective of the profession, we constantly come across statistics, economic statements and government policies which need to be understood and analysed. Thus, we as teachers of economics play a vital role in developing a keen interest in our students to explore, discover, think and deliberate on different economic issues, ideas and thoughts.

Lectures, the traditional teaching methodology, are important for children to learn economic concepts. However, it has its limitations in making the teaching learning process teacher centric. As students are not actively involved in the process of learning, it reduces their interest in the subject which consequently impacts their performance. In order to make children 'think like economists' a vast number of activities need to be undertaken beyond the traditional chalk and talk methodology. Children need to be engaged in the curriculum rather than teachers limiting the transaction via a textbook and black board. Media and technology

thus become effective teaching aids that enhance the teaching learning process and equip learners to understand, interpret and analyse what they read, hear and view about economics.

A teacher's role today goes beyond being a giver of instruction to a mentor, guide and facilitator. A teacher needs to nurture her students' skills and attitudes for them to be able to face the challenges of life. By using media and technology in our teaching, teachers can achieve a variety of objectives that go beyond the basic cognitive domain of knowledge and conceptual understanding. Some of the other objectives that teachers can achieve through these aids include:

- Awareness of ideas and concepts that are beyond the academic curriculum
- Development of higher order thinking skills, including problem solving, critical thinking, creative thinking
- Development of interest in the subject
- Development of life skills that shall be used by students later in their lives
 - ◆ Communication skills - including reading, writing, listening, speaking
 - ◆ Team spirit
 - ◆ Respect for others views and thoughts
 - ◆ Accepting and appreciating diversity
- Development of research skills

In this chapter, we discuss the various types of media and technology that can be used to enhance the learning experience of our students of economics. Along with discussing the key advantages of using a particular medium, extensive suggestions have been given to the teacher how to use that medium. It should, however, be noted that only a few suggestions have been made with the hope that teachers will take the ideas forward and develop their own activities and assignments using media and technology.

USING DIFFERENT TYPES OF MEDIA AND TECHNOLOGY IN TEACHING

A wide variety of media and technology are available to supplement our lectures and lessons. These range from newspapers to the internet. Let us discuss in detail how these different forms could be used to enhance classroom teaching in order to improve the learning outcomes for our students.

Print Media

Print media includes a wide range of sources including newspapers, magazines, fliers, bill boards, letters and mailers to name a few. In this section we shall focus on how to use newspapers and magazines to achieve some of the objectives that we have stated in the previous section.

Many a times students feel that topics are being taught in a vacuum, without any relevance to their lives. Articles demonstrate the relevance of these topics and ideas to what is happening in the world or India. They help students understand how concepts learnt in the classroom get translated into everyday life. The significance of Economics is suddenly made alive for a student who reads newspapers and magazines regularly. In addition, when a student reads an article (s)he is exposed to different perspectives on an issue which can help the student frame her own views. This is especially true of 'Editorialas' and letters to the Editor. In addition, statistical data and surveys conducted by mazazines often relate to course content and make interesting points for discussion.

Beyond the content advantage, newspapers and magazines also help teachers to achieve some of the general objectives of skill and attitude development. To begin with students develop a habit of reading newspapers and magazines more regularly. They become more aware of what is going on around them and the world. They are also able to apply their knowledge to real world situations.

Use of articles in classroom teaching gives opportunities to teachers to organize discussions and group work. These activities help children develop communication skills ranging from listening to speaking. Group work also makes them respect the views of others whilst putting forward their own ideas. They develop better team spirit and take responsibility for their contributions to the overall group work.

However, there is a note of caution in using articles and other newspaper clippings for curriculum related class discussions. Teachers need to be focused and guide the discussion in the direction of the topic on hand. Many a times it has been observed that unstructured, unprepared or random discussions take class discussions towards 'unwanted territory' and lead to wastage of classroom time. Teachers, thus need to gently but firmly ensure that there is not too much digression from the main topic.

A wide variety of newspapers and magazines are available in the market that could be used for classroom teaching. Whilst it is not possible to provide a comprehensive list of newspapers and magazines available due to regional and linguistic constraints a few examples of English newspapers would be The Times of India, Hindustan Times, Economics Times, Business Standard, Financial Express, The Hindu Mint etc and business and economics magazines such as Business Week, Business Today, Economist, Outlook, Economic and Political Weekly etc. However, a teacher could use an article from any local daily or magazine that she may deem fit for the purpose of enhancing the learning experience of her students.

Let us now see how newspapers and magazines can be used practically to ensure that the learner is more engaged and interested in the subject.

SAMPLE ACTIVITY 1

The following activity helps students to collect information from newspapers and discuss it in relation to what they shall study in the classroom.

Class: XII

Topic: Foreign Exchange Rate Determination

General Objectives:

- Understanding of Foreign Exchange Rate markets
- Exposure to information available in newspapers
- Development of research skills

Resources required:

- Newspapers that carry the daily foreign exchange rate movements

Method:

- Conduct the exercise at least one week before teaching foreign exchange rate determination.
- Ask students to maintain a record of how the rupee- dollar exchange rate moves everyday for a week and bring their findings to class.
- Through the data collected by the students, a teacher could explain the following:
 - ◆ The exchange varies on a daily basis as exchange rates in India are market determined.
 - ◆ Concepts of depreciation and appreciation.
 - ◆ How the exchange rate would have been under a fixed exchange rate regime.
 - ◆ Role of RBI in managing the exchange rate.

SAMPLE ACTIVITY 2

This activity is to be conducted once the topic has been completed and allows students to see the practicality of the topic that has been studied in the classroom

Class: XI

Topic: Presentation of data

General Objectives:

- Understanding of presentation of data
- Exposure to information available in newspapers and magazines
- Development of research skills
- Interpretation of presented data

Method:

- Give students a few days to cut and paste in their notebooks different types of data presentation that are available in newspapers and magazines. These would include:
 - ◆ Pie chart

- ◆ Bar diagram
- ◆ Time series chart
- ◆ Percentage bar chart
- ◆ Histogram
- ◆ Tables
- On a designated day in the classroom, ask children to select one of the diagrams that they have pasted and explain it in their own words. This could be either a written presentation or an oral presentation.

This exercise will highlight to the students that tables, graphs and diagrams are used to depict a myriad of information and is not only limited to economics. When students articulate what the diagram represents, they understand the language of diagrams and data presentation.

Newspapers and magazines are particularly relevant when teaching Indian economics in Class XI. Newspaper and magazine articles make very good case studies. Articles that list out facts, events or government policies without any analytical description can provide the basis for an active and lively discussion on a topic that a teacher wants to teach.

Sample Activity 3 below discusses how a newspaper article could be used to not only to cover the course content but also make students work in groups.

SAMPLE ACTIVITY 3

This activity could be conducted before the problems of Indian agriculture are explained by the teacher. This will help the teacher to assess the level of prior knowledge that children have and help fill the gaps in the student's knowledge.

Topic: Indian Agriculture

Total Time for activity: 35 - 40 minutes

General Objectives:

- Understanding of problems and issues faced by Indian agriculture
- Development of higher order thinking skills
- Development of team spirit
- Development of communication skills

- Development of interest in the subject of Economics

Resources required:

- Newspaper article given below
- Blackboard and chalk
- Classroom to be organized to hold a group discussion

Sample 1: Newspaper Article

“Nagpur: The economic distress driving a large number of farmers to commit suicide in Vidarbha has now attracted global attention. A two member team of the International Fund for Agricultural Development will visit the worst-affected revenue division of Amravati to find out how it can help the distressed people of the region to tide over the crisis.....”

In the survey of 17.8 lakh people in the six cotton growing districts of Yavatmal, Amravati, Akola, Washim, Buldhana and Wardha, report had identified four lakh people living in acute distress. It had pointed out that 12 lakh people were reeling under debt burden. The most shocking finding was that nearly a lakh people were in urgent need of medical help and over three lakh families had marriageable daughters. Health care and marriages cause a big drain in farmers’ families.

While the Prime Minister as well as the state government have together earmarked relief under special packages for farmers in the six districts totaling Rs 5,000 crore, the distress levels seem to be far from diminishing in the last one year.” Source :Times of India

Method:

- Divide the class into groups of 4 to 6 students.
- Distribute the article given above from the Times of India.
- Give the children 5-7 minutes to read the article individually.
- Whilst the children are reading the article write the following questions on the blackboard:
 - ◆ Why are farmers committing suicides?
 - ◆ What are the primary causes for debt burden?
 - ◆ What do you think are the other issues Indian farmers face?

- ◆ Discuss the social issues highlighted in the article or any other social issues that are very relevant to Indian agriculture.
- ◆ The article suggests government relief packages for farmers. Can you suggest any solutions to the problems that are faced by Indian agriculture?
- After reading the article, give the children 10 minutes to discuss the key questions that are put up on the black board.
- After the individual group discussion, one representative of each group can give a summary of their discussions (maximum time of 2 minutes per group). (This representative could be chosen by the group or the teacher)
- The teacher writes the main findings on the blackboard. The teacher can club the points under the following headings:
 - ◆ The main features of Indian agriculture
 - ◆ Problems of Indian agriculture
 - ◆ Solutions to the problems faced by Indian agriculture
- As a home task, the teacher could ask the students to write an essay on the main problems of Indian agriculture.

The above activity helps students to cover not only the topic of features and problems faced by Indian agriculture (course content) but also make them aware of the current happenings of the Indian economy (farmer suicides due to debt burden). It helps them relate what they are learning in the classroom to real life situations. Through the activity, we are also able to achieve some of our wider objectives of development of communication skills and including all students in group work. They also learn to think laterally and articulate their views. By asking students to think of possible solutions to the problem, we expose them to critical thinking skills. Students also realize that problems can have different solutions and as long as they are able to justify their stand adequately there is no one correct answer to the problem.

SAMPLE ACTIVITY 4

Another example where newspapers and magazines can become an effective learning resource is when their articles are used as a comprehension passage. Articles allow a teacher to introduce her students to the world of news and information that are related to the course topics but are beyond the basic text book. Let us see how this can be done for an article that based on an employment survey.

Topic: Employment

Total Time for activity: 35 - 40 minutes

General Objectives:

- Understanding of employment surveys
- Show students the relevance of economics in everyday life
- Development of communication skills – comprehension and writing
- Enhancing time management skills

Resources required:

- Magazine article given below - one for each student
- Worksheet 1 - one for each student
- Classroom to be organized so that children can work individually

Method:

- Distribute a copy of the article to all students.
- Give the children 10 minutes to read the article individually.
- Distribute a copy of Worksheet 1 to each student.
- Ask students to fill the worksheet once they have finished reading the article. (give the students 20 - 25 minutes to complete the worksheet).
- The worksheet must be completed and handed over at the end of the class.

Taken from India Today Magazine - April 16, 2001

McJobs Are Expanding

The latest employment survey throws up both disquieting and encouraging trends.

By Jairam Ramesh

Hardly has the dust settled on the controversy over poverty numbers in the 1990s generated by the surveys of the Central government's National Sample Survey Organisation (NSSO) than the agency's numbers on unemployment are kicking up a storm. The census done once every 10 years provides reliable data on employment. But the NSSO surveys carried out once every five years are the ones that are more frequently used. The NSSO's most recent survey was for July 1999 to June 2000. The first detailed analysis of the survey's data has been done by India's pre-eminent scholar on employment K. Sundaram of the Delhi School of Economics and was published in the *Economic and Political Weekly* three weeks back. His main conclusions are that in the 1990s:

using the most comprehensive measure, the overall unemployment rate-that is, proportion of the labour force unemployed-worsened;

population ratios -that is, the proportion of the population which is working-reduced sharply, implying that the labour force's growth rate was lower than the population's growth rate.

age-specific worker-population ratios also fell considerably in the 5-9, 10-14, 15-19 and 20-24 age groups, indicating that school and college enrolment is up in substantial measure;

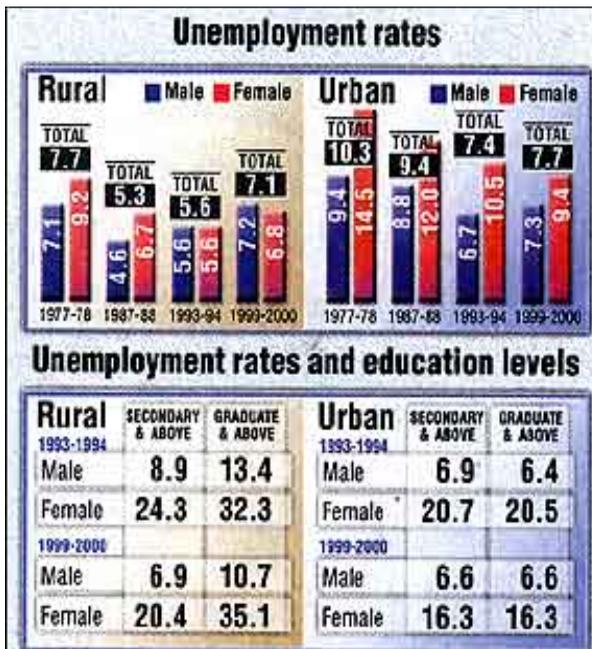
for the first time since Independence, the absolute number of workers in agriculture declined, although its share in total employment is just below 60 per cent;

barring construction, labour productivity grew significantly, translating into a growth of over 3.2-3.6 per cent a year in average inflation-adjusted wage earnings per worker both in urban and rural India;

two sectors, (i) construction and (ii) trade, hotels and restaurants, increased their respective shares in the workforce with the latter emerging as the third largest employer, after agriculture and manufacturing.

In India, there is an inverse relationship between poverty and unemployment. The poorest states-Bihar, Uttar Pradesh, Rajasthan and Madhya Pradesh-have the lowest unemployment rates while the relatively better-off and unionised states like Kerala, Tamil Nadu and West Bengal have the highest unemployment rates. This is not surprising for two reasons. First, the poor just cannot afford to remain unemployed for long. Second, the more educated you are, the more choosy you get about the type of employment you want.

Undoubtedly, we can expect to see Sundaram giving



more insights as he engages himself in more data-bashing, particularly at the state-level. In addition, the Centre's Task Force on Employment chaired by Planning Commission member Montek Singh Ahluwalia is expected to submit its report by the end of this month. Given the intellectual prowess of its chairman, the task force's report would definitely be authoritative and will certainly generate much discussion. What it has to say on organised-sector employment will be of special significance. These are jobs that are sought after by all but actually gained by a tiny few—only 7 to 8 per cent of total employment in India is in the organised sector but the pay, privileges and perquisites of this minuscule minority occupies centre-stage of policy and politics.

The task force's calculations reveal that organised-sector employment grew by 1.59 per cent per year in the 1980s but fell steeply to 0.86 per cent between 1991 and 1997. The task force attributes this deceleration to the sharp fall in the growth rate in public-sector employment from 2.22 per cent in the 1980s to 0.38 per cent in the 1990s; the growth rate of private-sector employment actually went up from 0.16 per cent to 2 per cent during the same period. The fall in public-sector employment was not compensated by the growth in private-sector employment since the private sector's share in organised-sector employment was only a third. Even so, the experience of the 1990s is reassuring and if rigid labour regulations and laws are liberalised and we put in place a pro-labour exit policy, the growth in organised private sector jobs will be even more impressive. The lack of a timely and humane exit policy has actually hurt labour and only benefited industrialists—hence, the paradox of a lot of sick industry but no sick industrialist in India.

SAMPLE WORKSHEET

Time: 25 minutes

Name:

WORKSHEET 1

Mc Jobs are Expanding

- After reading the article titled 'McJobs are Expanding' by Jairam Ramesh, answer the following questions:
- All questions must be attempted on the sheet itself. Use the back of the sheet, incase extra space is required for the answers.

1. Which are the two organizations that collect data on employment?

2. Give the main findings of the NSSO survey on employment in 1990s.

3. Does India have higher rates of poverty linked to higher rates of unemployment? Justify your answer.

4. Why has the employment rate of growth in the organized sector fallen sharply in the 1990s?

5. What has been suggested by the author to improve employment opportunities in India?

The above activity takes the students beyond the realm of textbooks. It makes the topic more interesting and students learn information that is relevant and yet not part of the curriculum. It also improves reading, writing and analytical skills of the students.

SAMPLE ACTIVITY 5

Teachers could also use newspaper articles to test how students apply the knowledge they learn in the classroom. See the following example on how a teacher could observe whether her students have understood the concept of 'market equilibrium' in class XII.

Topic: Market Equilibrium

Total Time for Activity: 20 minutes

General Objectives:

- Understanding market equilibrium
- Show students the relevance of economics in everyday life
- Development of analytical skills

Resources required:

- Magazine article given below - one for each student
- Classroom to be organized so that children can work individually

Vegetable prices rise as monsoon plays truant

L.N. Revathy

Traders sorting cabbage at the Mettupalayam vegetable market in Coimbatore.

COIMBATORE, Aug. 7, 2002

With the southwest monsoon playing truant, arrival of vegetables, both grown in the hills and plains, in the main Mettupalayam vegetable market in Coimbatore district of Tamil Nadu has started dwindling, leading to price spiral in the last one week. Business Line

Method:

- Distribute a copy of the article to all students.
- Write the task that the children need to complete on the blackboard.
- Give the children 10 minutes to complete the task.
- Ask a few students to come up on the blackboard and explain what they have done.

Have a discussion keeping the following points in mind:

- ◆ Show the initial equilibrium price and quantity of vegetables based on a given demand and supply curve.
- ◆ Will the supply or demand curve for vegetables get impacted? And why?
- ◆ The economic process through which the new equilibrium price and quantity are achieved.
- ◆ Accuracy of diagram in terms of labeling axes, points etc.

The short exercise described above is a simple way for a teacher to assess whether students have understood how market price changes due to shifts in demand and supply curves.

Cinema & Television

Cinema and television provide an innovative method of imparting economic knowledge. Whilst the traditional chalk and talk methodology caters to students with good listening abilities, using cinema and television to teach caters to different learning styles, i.e, audio and visual. Movies and television can concretize abstract concepts for children as they are a powerful and engaging medium for transmitting information. Research shows that children tend to learn better and retain longer what they have seen a concept rather than when it is rote learnt. Using cinema in the teaching learning process breaks the monotony of lectures and makes the subject more interesting and lively. It also helps students hone their analytical skills. Teachers can choose from a wide selection of Hindi, English and local dialect films that

highlight economic concepts. It is suggested that contemporary or "popular" films be used in classroom teaching rather than "educational" ones as they would engage the students' interest a lot more.

Cinema can be used in two ways:

1. *Introduce topics:* Here short excerpts from films can be shown that highlight the topic that the teacher wishes to introduce in the class. For example, students could be made to watch *Pather Parjali*, a movie by Satyajit Ray. This movie depicts the status of poverty in India. After viewing this movie, students could discuss their understanding of poverty and why poverty is still prevalent in society today. Students could also be asked to think on how poverty levels can be reduced in India. After the initial discussion, the teacher could then go into the details of the topic. Thus, the movie acts an introduction to an abstract topic of poverty and it helps students think through various aspects of poverty. It also helps in developing good communication and critical thinking skills. Other suggested movies include *Swades*, when doing rural development, *Do Bhiga Zameen* to show India at the time of independence.
2. *Reinforce concepts:* Films could also be used at the end of a lesson to reinforce the concepts that have been discussed in the classroom. Let us take the example of the film *Guru*. Excerpts from this film, especially the scene wherein Gurubhai gives his speech in court could be shown to the students after discussing the New Economic Policy. In his speech, Guru summarizes the anomalies of the pre-liberalization Indian business situation - how "Licence Raj", market imperfections, corruption, excise duties, import-export regulations etc. troubled the businessmen and hindered the growth of the Indian economy. Other suggested movies include, *Tucker: The Man and His Dream*. This movie could be shown after completing different forms of markets as it

highlights oligopolies and barriers to entry and long run costs.

A drawback of showing movies to students is that it requires time which extends beyond the stipulated economics class. Thus teachers would need to request colleagues for classes to be able to undertake film based activities.

A more realistic resource that is widely available to students is the television. Television offers a large range of news channels that students should be encouraged to watch. These channels have a variety of programmes that relate to the Indian and world economy, including business. Channels such as CNBC, NDTV Profit, Zee Business, DD News, CNN- IBN, NDTV 24x7, NDTV India, CNBC Awaz are a few channels that teachers could ask their students to watch.

There are several ways in which a teacher could channelise her students' television viewing.

1. *News based activities:* A teacher could depute at least one period a week to discuss what students have watched on the television. By doing this the teacher will allow students to clarify doubts and seek clarifications on concepts, ideas and views that they may have heard. As students share information it also gives them a feeling of being involved in the learning process. Alternatively, a teacher could prepare a quiz based on the business and economics news. This could be played in teams. Such an activity would break the monotony of lecture based teaching, motivate and encourage students to listen to the news and hence, become more aware of current economic and business affairs.
2. *Programme based activities:* For this to be a success a teacher would need to research on the programmes that are telecasted at different times. She would need to select an appropriate programme for her students to watch based on which an assignment could be set. For example, when the budget is presented by the

Finance Minister in February, there are many programmes that analyse the budget. Here the teacher could ask her Class XI students to watch one such programme so they can identify what the budget has in store for some specific sectors of the economy:

- a. Agriculture, rural economy
- b. Industry
- c. Services
- d. Infrastructure

The following day the teacher should hold a small group discussion (see Sample Activity 3 above for methodology) wherein students analyse the impact of the budget on the different sectors of the economy. This activity would help students reflect on and correlate what they have learnt in Indian economics through the year. It shall also be useful for them to recall later in the year when they reach Class XII and study the different components and objectives of a budget.

3. *Other activities:* Teachers should also try and to develop creative activities that allow students to watch television and enhance learning. For example, in class XII after teaching the features of an oligopotent, especially the use of selling costs, a teacher could undertake the following activity:

Ask every student to:

- Choose any one commodity of their choice
- Watch the advertisements of different brands of this commodity
- Make a chart that compares and contrasts the different features of the advertisements
- Choose one particular brand based on the advertisements watched and explain why the brand has been chosen.

So, if a student chooses washing detergents as her product then she should closely watch the advertisements of brands such as Tide, Surf Excel, Ariel,

Rin, Nirma etc. She will then need to make notes on what are the common features of all these advertisements and in what respect do they differ. Things that could be included in the table would be price, packaging, any promotional schemes or freebees, tag line, visual appeal, length of advertisement, time of day at which advertisement is telecasted. Based on her chart and visual impact of the advertisement the student should be able to explain to the class the brand of detergent she would select. This activity will help students understand concepts such as non-price competition and persuasive advertisements. It also improves their powers of observation (as they compare subtle differences in advertising).

Internet

In a knowledge based world, where there is a deluge of information, it is important to teach our students how to sift, sort and cull out information that can be used effectively. Research skills, an important aspect, need to be developed in our students as they cannot know or learn all available information. They need to learn from where relevant information can be obtained and then how to use it. The internet is a resource that provides just this opportunity. The internet can be used effectively in the following different ways.

1. *Information collection:* The internet is a goldmine of information that can be tapped by students with a click of a mouse. This information could be used to enhance knowledge on a topic or used for projects and assignments. While surfing the net in search for what the teacher has asked for, a student could also stumble onto a myriad of other related information that would enrich his/her knowledge.

An example wherein 'information collection' from the internet could become an interesting and enriching experience for both students and teachers is discussed below:

Class: XI

Topic: Goals of Five Year Plans

General Objectives:

- Understanding the objectives and challenges of the 12th Five Year Plan
- Enhance research skills
- Exposure to ideas beyond the academic curriculum
- Developing an interest in Indian economics

Resources required:

- Internet availability
- Bulletin board with thumb pins
- Quiz to be prepared by the teacher once the bulletin board is ready

Method:

- Divide the class into groups of 6 students each
- Each group would be given one week to surf the internet to find information on a particular topic related to the 12th Five Year Plan. These could include:
 - ◆ Salient objectives
 - ◆ Challenges faced
 - ◆ Sector -wise proposals
 - ⇒ Agriculture
 - ⇒ Industry
 - ⇒ Social sectors
 - ⇒ Economic infrastructure
- Each group would need to put up their findings on a well presented chart on the bulletin board.
- Students would be given a week to read the different groups' findings on the board (during their leisure time).
- A quiz on the 12th Five Year Plan could be held to assess the students understanding of what they have read.

When such internet based activities are given, it is suggested that the teacher give a few recommended sites that students could look at. In the case of plans the following websites could be suggested:

- <http://www.planningcommission.nic.in>
- <http://www.developednations.org>

When the internet is used a source of information for a larger project, students need

to be guided on where and how to find relevant information. Students need to learn how to find, sift and analyse the information and determine whether it is applicable to the assignment, task or project on hand. Typically students just download information without understanding or analyzing it. They cut and paste information that is available on the internet instead of understanding the information and writing it in their own words. One way in which teachers could overcome this problem is by asking students to give an oral presentation or viva on what they have written in their projects. Also, when students are asked to source information from the internet for projects and presentations, they need to be made aware of the issues of copyright and plagiarism.

2. *Completing Internet based Assignments:* The internet is a wonderful resource that teachers can tap to create assignments. When children work on internet based assignments it increases their motivation to learn as they become more active in the learning process. Teachers have the option of developing tutorials, assignments or worksheets.

SAMPLE ASSIGNMENT USING INTERNET

An internet based worksheet could be prepared for comparing the development of India, Pakistan and China. It is suggested that this worksheet be done as a classroom activity in order to ensure that children work independently and do not cross check with each other.

Class: XI

Time: 1 hour

Topic: Comparative Development Experiences of India and its Neighbours

Method:

- Divide the students in pairs
- Distribute a copy of the sample worksheet to each pair.

- Visit the suggested websites to gather the data on India, China and Pakistan.
- Based on the data collected answer the questions.

INTERNET BASED WORKSHEET

Comparative Development Experiences of India and its Neighbours

Instructions:

Visit the site: http://hdr.undp.org/en/media/hdr_20072008_en_complete.pdf

From the tables given in the website, complete the table given below for India, China and Pakistan.

Parameter	India	China	Pakistan
Life expectancy at birth (yrs)			
Adult literacy rate (% above 15 years)			
Combined Gross Enrolment Ratio (%)			
Life Expectancy Index			
Educational Attainment Index			
Gross Domestic Product Index			
HDI Index			
HDI Rank			
Total Population			
Population growth			
% of urban population in 1975			
% of urban population in 2005			
% of population under 15 years of age in 2005			
% of population over 65 years of age in 2005			
Per capita expenditure on health by the public sector			

Per capita expenditure on health by the private sector			
One year old fully immunized against TB			
One year old fully immunized against measles			
Population with sustainable access to improved sanitation			
Population with sustainable access to improved water source			
Public expenditure on education as a % of GDP			
Public expenditure on education as a % of government expenditure			
Gross Domestic Product (\$PPP)			
Gross Domestic Product per capita (\$PPP)			
Annual growth rate of Gross Domestic Product			

Based on the figures written by you, answer the questions.

1. How does India compare with China in terms of overall human development?
2. Has Pakistan achieved high / middle / low level of human development?
3. Compare the urbanization of population in the three countries.
4. How does the percentage of working population of India compare to that of China and Pakistan?
5. What is the percentage of Education Attainment that India has achieved?
6. Have the HDI for India, China and Pakistan improved over time? Justify your answer through figures.
7. What should India do to enhance its education attainment and make it comparable to the more advanced nations?
8. What kind of correlation, if any, do you find between life expectancy and human

- development across the three countries?
9. Analyse the causes for this correlation.
 10. What kind of correlation, if any, do you find between education and human development?
 11. Analyse the causes for this correlation.
 12. What is the significance of including per capita GDP in the human development index?

Using Music and Internet based assignments:

The internet offers another innovative method of developing critical thinking skills of students of economics. This method involves the use of music in teaching economics. The lyrics chosen reflect economic concepts and ideas. The students can listen to the song as well as read the lyrics. At the end of the lyrics there is a short assignment which makes students think and reflect on economics. Whilst some websites require registration and payment, there are a few websites that are freely accessible. One such website is <http://divisionoflabour.com/music>. This website offers a wide range of English popular songs that reflect a wide range of concepts including those of opportunity cost, scarcity, utility, profit. An example of one of the assignments that uses song lyrics to make students think like economists is given below:

**EXAMPLE OF USING MUSIC TO TEACH
ECONOMICS**

Money, Money, Money - ABBA
Work all night, I work all day, to pay the bills I have to
pay
Aint it sad
And still there never seems to be a single penny left for
me
That's too bad
In my dreams I have a plan
If I got me a wealthy man
I wouldn't have to work at all, I'd fool around and have
a ball...
*Money, money, money
Must be funny
In the rich mans world*

*Money, money, money
Always sunny
In the rich mans world*

Assignment:

Economists often use supply and demand curves to illustrate markets. Changes in income, preferences, and the price of a substitute or complement shift demand curves to the left and right. In the lyrics above, lead singer Anni-Frid Lyngstad is tired of the hard work life requires and plans to marry a wealthy man. If successful, how would this marriage change the artist's demand for goods? How would it change her supply of labor? Illustrate both changes with supply and demand curves. Be sure to explain what is happening in the diagrams.

SOURCE: <http://divisionoflabour.com/music>

A teacher need not be restrained by the assignment given in the website. She could develop her own assignment based on the lyrics.

An internet based task makes the subject come alive for students. They are actively engaged in the learning process and it helps them crystallize nebulous and abstract ideas and concepts. This leads to increased levels of interest and motivation in the subject, which positively impacts the students' performance. However, a drawback of making internet based activities is that the internet may not be accessible to all students at home.

3. *Internet for teachers:* Internet is also a great resource for teachers. Teachers can use the internet for a wide spectrum of reasons spanning from improving their own knowledge and downloading games and simulations to developing websites, blogs etc. for the students.

Many a times as teachers we are not sure of the correct meaning or definitions of certain economics terms. The internet offers several economic dictionaries where such concepts and terms are very well explained. These websites could be tapped to clarify subject content. A teacher needs to 'google' search for the word, concept or idea for which a clarification or

definition is sought and the internet would give her several options, which she could read.

The internet is also storehouse of resource materials that can be used effectively for classroom teaching. We have already discussed above how internet based assignments can be developed. In addition, statistical data and extra information in the form of facts, anecdotes and views on different topics are available. These can be used by teachers to make their interactive lectures more interesting and meaningful. Also, several games and simulations are also available on the internet which can enhance the teaching of micro and macro topics. However, the games as suggested on the internet may not be usable by the teachers. Teachers may need to adapt and/or modify these games to make them more relevant to their classroom context.

As mentioned earlier, the internet is a resource bank for teachers. Here we have been able to highlight only a few of the resources that can be found on the internet. Though several websites require teachers to pay a subscription fee, there are a large number of websites that allow teachers to download resources without any cost. Teachers are strongly urged to surf the internet to explore and discover what resources are available so that they can make the teaching learning process more interesting and stimulating for the students.

Teachers who are more comfortable with the internet could also develop their own websites or blogs etc. that would allow for collaborative learning.

Computer Aided Instruction and / or OHP

Several schools today have access to computers. In case computers are unavailable similar activities can be done by students by using simple charts. The idea of computer aided instruction could be at two levels:

- a. Teacher based: Here the teacher presents a topic through a power point presentation or OHP. This makes lectures more visual, colourful and interesting for students. For example, a teacher could prepare flowcharts or diagrams on a chart powerpoint presentation and use these aids to enhance the learning experience of the students. For example, the circular flow of income and national income aggregates could be made lively and interesting through the use of flowcharts on transparencies or powerpoint presentations. (please refer to the chapter on concept mapping in this book on how to make flow charts)
- b. Student based: Here children research on a topic and present their viewpoints through power point or multi media presentation. In this way there is peer teaching-learning and students improve research skills, presentation skills, communication skills, enhance team work and overall confidence levels. A word of caution in this activity is that students may need to stay back after school hours or meet outside of school to develop their presentations. We shall discuss an activity where children use computers for peer learning.

SAMPLE ACTIVITY ON COMPUTER AIDED INSTRUCTION

Any topic could be used for computer aided instruction. As an example we shall take the topic of 'Infrastructure' that could be taught through this method.

Class: XI

Time: 6-8 teaching periods

Topic: Infrastructure & Human Capital Development

Method:

- Divide the children of a class into groups of 4-6 students each.
- Allow each group to select one type of infrastructure that they would like to research and present. This would include topics such as

energy, transport, housing, health, education etc.

- Give each group at least two weeks to prepare their presentation.
- Each presentation should not be more than 15 minutes, which shall be followed by a question and answer session.
- Clarify the order in which the presentations shall be made.
- At the beginning of the lesson the teacher should give an overview of the significance and types of infrastructure (in case no student group is covering this aspect).

A teacher would also need to plan for the students to be able to make their presentations. This would include the arrangement of the computer system with the LCD projector. In case students are using transparencies, the teacher would need to ensure the availability of the OHP.

When teachers use peer learning the role of the teacher shifts from becoming an information provider to a facilitator, consolidator and a discussion guide. The teacher needs to provide a holistic perspective of the topic that the students are presenting. She also becomes a learner, as children always find some information that we teachers are unaware of.

RATIONALE FOR USING MEDIA & TECHNOLOGY

The advantages of using media and technology as a tool to enrich the teaching learning process are clear in the discussion so far. Let us however, summarise below the advantages of using media and technology as tools to direct learning:

- Making learning more child-centric and engaging the learner actively in the learning process.
- Knowledge beyond the textbook, thus taking the student towards beyond being a 'bookworm'.

- Enhanced motivation levels of students, which leads to increased levels of interest in the subject.
- Enhanced retention of knowledge as the subject becomes more interesting and engaging.
- Application of knowledge to real world situations and everyday life.
- Development of research skills and ability to process information in a knowledge based world.
- Development of critical thinking and communication skills as students engage in discussing, deliberating and presenting their views and ideas.
- Development of collaborative learning processes when group and team work is undertaken.
- Enhanced confidence levels as collaborative learning processes are undertaken.

Limitations of using media and technology in teaching

It is important to remember that using media and technology only enhances and enriches the teaching learning process. Whilst it provides an innovative, interesting and engaging way to help students learn concepts, it cannot be a substitute to interactive lectures. Teachers also need to feel comfortable with the use of media and technology as a teaching aid. They could start with simple activities such as data collection and articles initially and then move to more complex activities such as multimedia presentation and simulations and games. However, there are some limitations in using media in the teaching learning process. Some of the issues that teachers need to keep in mind when using media and technology to teach are as follows:

- *Changing role of the teacher:* Role of teacher changes from an instructor or information provider to a guide and facilitator. Hence, teachers need to give students the chance to think, talk, discuss, debate and deliberate before summarizing and giving their own views. Teachers must be open-minded to ideas and

views of students. They must realize that when open ended or grey areas are being discussed, there may not always be a straight jacketed answer.

- *Detailed planning of activities:* When teachers go in for media and technology based activities, they need to ensure that these activities or assignments are prepared and planned meticulously to achieve the desired results. In order to develop a good activity, a teacher must:
 - o Have a set of clear objectives that need to be achieved.
 - o Determine whether the activity will be individualistic (eg: newspaper article) or grouped (eg: powerpoint presentations)
 - o Give specific and clear-cut instructions. Many a times it has been observed that when instructions to students are vague, then despite having a good activity the impact of the activity on learning is lost.
 - o *Provide an assessment matrix, if the activity is going to be marked.* This helps students to realize the critical areas on which they will be evaluated. For example, when students are asked to make power point presentations, then the teacher could inform students that they shall be judged on parameters including, content, presentation, ability to answer questions etc.
- *Be a firm facilitator:* When engaging students in discussions teachers should not lose perspective of the topic. Teachers need to be firm facilitators. They should navigate the discussion into areas that are relevant to the topic on hand.
- *Have a contingency plan:* Many a times there are Problems as technology failures may occur. It may problems that just when there is the Economics class where the teacher has planned to show a movie, there is no electricity. Or, the computer system may fail, when the teacher wants to discuss a topic through a power point presentation. In these cases, the teacher must

have a back up plan ready so that teaching time is not wasted.

- *Don't overdo the usage of media and technology:* Teachers should use their discretion to the extent media and technology should be integrated into their classroom teaching. Do not let it over power and become the all-important facet of the teaching learning process and forget the actual curriculum that needs to be completed. The idea is to have a right balance of media and technology that is integrated into lesson plans rather than use them as independent activities.

To conclude, whilst there are limitations and challenges when using media and technology in teaching Economics, the advantages of integrating them are far greater. This chapter only gives samples of what can be achieved by using media and technology. The ideas presented here are by no means exhaustive. They are indicative, in the hope that teachers shall take these forward and experiment. Every teacher is encouraged to use media and technology in her classroom teaching, because unless one doesn't use it one will never know the advantages. So teachers, open the world of innovative learning experiences for the students!

Importance of Mathematics in Teaching Economics

Economics being a living subject deals with current and future problems touching all our lives intimately. There has been significant change in its character and is undergoing continuous development. One of the major revolutions in the subject area is the use of Mathematical expressions in Economics. Mathematics acting as a language parsimoniously and prolifically helps in meeting the purpose of economics. In doing so it provides concrete form to economic laws and relationships, and makes it more precise and practical. The formal mathematical expression of economic ideas enables to give the loose economic intuition a coherent and logical meaning and in derivation of certain results, which would either be impossible through verbal logic or would involve clumsy, complex and circular process. Economics is often concerned with variables, which are measurable and involve relationships between them that can be expressed by means of functions and curves for a convenient understanding of the underlying concepts. This necessitates as well as facilitates the use of mathematical techniques.

The students need to be shown how economics can help in understanding what goes on in the world and how it can be used as a practical tool for decision making. They need to have a good understanding of how learning can actually be used outside the classroom.

To respond to these needs, the new textbooks of class XII, *Introductory Microeconomics* and *Introductory Macroeconomics*, prepared by NCERT on the basis of the recommendations of NCF 2005 have incorporated the recent developments in the theory aided by a mathematical treatment of the issues involved. The NCF 2005 recommends for change in perceptions in the nature of social science curricula including economics in such a manner that it becomes an intellectual and professionally challenging subject of study. Reorganisation of the pattern calls for the restructuring of many traditional ideas.

At the higher secondary stage, the learners are in a position to understand abstract ideas, exercise the power of thinkers and to develop their own perceptions. It is at this stage, the learners are exposed to the rigours of the discipline of economics in a systematic way. The economics courses are introduced in such a way that on the initial stages, the learners are introduced to economic realities that the nation is facing today along with some basic statistical tools to understand these broader economic realities. In the later stage, the learners are introduced to economics as a theoretical course. The treatment of these issues involves the use of mathematical tools and statistical techniques. The mathematical tools with which school students are already familiar, such as algebra and solutions of simultaneous equation have been attempted in the textbooks. As a result, it should be suitable for students with a broad range of backgrounds. The inclusion of the recent developments in the theory and the introduction of simple mathematical expressions into the economics curricular materials will provide the student with the necessary modern tools and enable them to approach and analyse with more realism the economic problems that they will confront in their day to day life.

The students of the course are very heterogeneous with respect to their mathematical abilities and prior knowledge of economic concepts and ideas. The teacher has to address to this problem by initially making them

equipped with the fundamentals of mathematical tools that are covered in the text. The teachers themselves might feel that, this alternative of introducing mathematical language to communicate economic theories is not essential as they are coping perfectly satisfactorily with the verbal presentation. Here it is to be stressed that **mathematics is not a substitute for economic ideas, it is a precise form of presenting some of them.** The mathematical presentation of theories does not mean that we should be discarding verbal approach. Learning basic mathematical methods has become indispensable for a proper understanding of the current economic literature. The challenge is to understand economics, the mathematics being only a means to an end.

The 'math anxiety' of the students has come into existence largely because of the inappropriate manner in which the subject is often presented to the students. Mathematics is presented to them in an overly formal style, not accompanied by any intuitive illustrations or demonstrations. This impairs the motivation and makes the topics appear more difficult than they actually are. The teacher may have to make a serious effort to minimise these anxiety causing features and explain why it is worth tackling economics mathematically at all. The challenges that the teachers might face include low levels of confidence with respect to mathematical ability, limited fluency in algebra, limited understanding of the usefulness of mathematical principles in economic argument and difficulties in recognising the mathematical representation of a problem within economic theory. However, disdainful and painful it turns out to be, we cannot dispense the use of mathematics in economics, which makes it a real social 'science' subject. Students should be not only enabled to solve mathematical problems but also should understand how to convert, a verbal description of an economic model into mathematical form. She should be able to mathematically explain the theory. For example, when she states the formulae of price elasticity as

$$Ed = \frac{p}{x} \cdot \frac{\Delta x}{\Delta p}$$

She should also be able to state what the concept means. After learning the subject she should have learned to assimilate data, investigate hypothesis, deal with uncertainty and complexity and ultimately come to a decision. They have to learn how to read a mathematical expression in words, and to convert words into the language of maths. Often a problem can be solved graphically- the solution can then be replicated algebraically. The graphical illustrations give visual reinforcement to algebraic results.

Illustrations of the use of mathematics in economics are varied and are not far to seek.

The ideas or theorems in economics can be expressed mathematically- e.g.

- (i) Quantity demanded depends on price or that consumption depends upon level of income can be mathematically expressed in the form of functional relationships. $Q = f(P)$, $C = f(Y)$, read as 'quantity is a function of price' and 'consumption is a function of income'.
- (ii) Economics is the science of choice making and involve the use of mathematics ranging from geometry to calculus. The consumer equilibrium is studied in the context of given income and prices and involves solving of simultaneous equations for unknowns. Equilibrium itself is a mathematical concept derived from statics and dynamics.
- (iii) Consumer equilibrium and equilibrium of the firm involve decisions at the margin and mathematically turns out to be the first derivative of the relevant function.
- (iv) The change in price on account of the change in output depends upon elasticity of demand and supply and 'elasticity' is, in fact, a mathematical concept.
- (v) The maximisation and minimisation of variables like profit, cost, revenue, utility etc obviously

involves mathematical expression and can be solved with the help of differential calculus, linear programming or theory of games.

We can see that the basic relationships in Microeconomics and Macroeconomics can be put in the form of functions and equations thereby making it easy, smooth and systematic. Mathematical analysis of the sort just described has been used to study how firms react to changes in their revenue or cost, how consumers react to changes in the price of goods they purchase, helps to guide the work of regulatory agencies and so on.

The formal proofs of some of the propositions used in the Microeconomics and Macroeconomics textbook developed by NCERT is attempted here. No mathematics other than elementary algebra and solutions of simultaneous equations is required to deal with the textbook. Mathematical tool kit that clearly explains its principles is also attached wherever necessary. These will help to overcome the fears and prejudices about the use of mathematics in economic theory and handling the textbook.

Chapter II in the Microeconomics textbook deals with the theory of consumer behaviour where we see how consumers make decisions, how their budget constraints and preferences determine their demands for various goods and why different goods have different demand characteristics. The chapter begins with the budget set, which is expressed in the form of budget constraint that consumers face as a result of their limited incomes. To see how budget constraint limits consumer's choices, let us consider a situation in which a consumer has a fixed income, M , that can be spend on 2 commodities say, good 1 and good 2. Let x_1 be the amount of good 1 purchased and x_2 be the amount of good 2 purchased, the prices being p_1 and p_2 respectively. In that case p_1x_1 , (i.e. price of good 1 times the quantity) is the amount of money spent on good 1 and p_2x_2 the amount of money spent on good 2.

The budget line shows all combinations of good 1 and good 2 for which the total amount of money spent

is equal to income. As a result, the combinations of good 1 and good 2 that the consumer can buy will be on this line, which gives us derive the budget line equation as $p_1x_1 + p_2x_2 = M$. The consumer has to restrict his expenditure up to the level of M. So we use inequality sign to represent his budget constraint. Therefore the budget constraint becomes $p_1x_1 + p_2x_2 \leq M$. This means that the total expenditure of the consumer on the two goods with its prices as p_1 and p_2 , can only be less than or equal to M. The budget line will be a straight line intersecting the x-axis and y axis, OA & OE in the fig (i). The point A (where the budget line intersects x axis) measures the quantity of good 1 only and the point E (where budget line intersects y axis) measures the quantity of good 2 that can be purchased using her entire income. So these points will measure M/p_1 and M/p_2 respectively. The concepts of slope and intercepts is to be introduced here for a better understanding of the budget constraint and its changes, with respect to change in income of the consumer as well as changes in prices of commodity.

Slope: The slope is used to tell us how much one variable 'Y' changes in relation to the change in another variable 'X'.

$$\text{Slope} = \frac{\text{change in } Y}{\text{change in } X}$$

For a linear function given as $y = a + bx$, b measures the slope i.e the steepness or incline of the line. This means that a unit increase in x will result in an increment in y in the amount of 'b'. When $b > 0$, the line will be positively sloped and when $b < 0$, the line will be negatively sloped.

The equation of a budget line is given as

$$p_1x_1 + p_2x_2 = M$$

This has to be converted into slope form i.e.,

$$x_2 = \frac{M}{p_2} - \frac{p_1}{p_2} x_1$$

p_1x_1	p_2x_2	M
p_2x_2	M	p_1x_1
x_2	$\frac{M}{p_2}$	$\frac{p_1x_1}{p_2}$

The slope here is $-\frac{p_1}{p_2}$. It can also be derived from the equation. Let the change in x_1 and x_2 , be Δx_1 and Δx_2 respectively.

The budget equation now becomes:

$$p_1 x_1 + p_2 x_2 = M \dots\dots\dots(1)$$

$$p_1 \Delta x_1 + p_2 \Delta x_2 = 0 \dots\dots\dots(2)$$

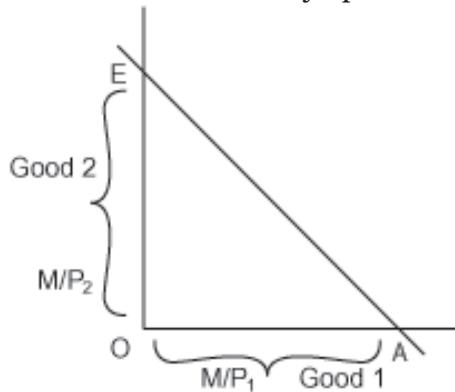
$$(2) - (1) \quad p_1 \Delta x_1 + p_2 \Delta x_2 - M = 0$$

$$p_2 \Delta x_2 - p_1 \Delta x_1 = 0$$

$$\frac{\Delta x_2}{\Delta x_1} = \frac{p_1}{p_2}$$

$$\text{Slope} = \frac{\text{change in } x_2}{\text{change in } x_1} = -\frac{p_1}{p_2}$$

The negative sign shows that the line slopes downward. The absolute value of the slope is the rate of substitution. The slope of the budget line, $-\frac{p_1}{p_2}$ is the negative of the ratio of the prices of the two goods. The magnitude of the slope tells us the rate at which the two goods can be substituted without changing the total amount of money spent.



The points A and E are the two intercepts of the budget line. The y intercept is distance from the origin

to the point at which the line intersects the y axis and the x intercept is the distance from the origin to the point at which the line intersects x axis. Here it being M/p_2 and M/p_1 respectively. Therefore we can see that the vertical intercept M/p_2 represents the maximum amount of good 2 that can be purchased with the income M and the horizontal intercept M/p_1 tells us the maximum amount of good 1 that can be purchased.

In the linear function $y = a + bx$, the constant labeled 'a' is the y intercept. It is the value of y when x is equal to zero. It is the point where the line intersects the y axis.

Effects of changes in Income and Prices:

The budget line depends both on income and the prices of the goods. But of course prices and income often change. Let us see how such changes affect the budget line.

Change in Income: Suppose there is a change in M , say to M' . Then the equation of the budget line will be $p_1x_1 + p_2x_2 = M'$. Now let us convert this budget equation to find out the slope and y intercept.

$$p_1x_1 + p_2x_2 = M'$$

$$x_2 = \frac{M'}{p_2} - \frac{p_1}{p_2}x_1$$

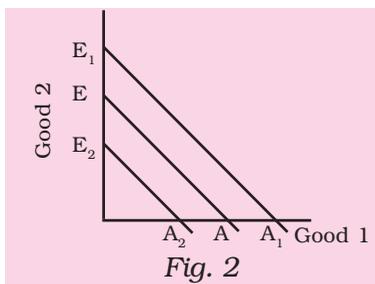
$$p_1x_1 + p_2x_2 = M'$$

$$p_2x_2 = M' - p_1x_1$$

$$x_2 = \frac{M'}{p_2} - \frac{p_1x_1}{p_2}$$

From the equation in the slope form, we can see that a change in income alters the vertical intercept of

the budget line $\frac{M'}{p_2}$, but does not change the slope $-\frac{p_1}{p_2}$



(because the prices of neither good changed). The budget line will shift parallel inward or outward depending on the change in income. (Fig 2). When $M' > M$ then the

shift will be outward (A_1E_1) and if $M' < M$ then budget line shifts inward. (A_2E_2)

Change in Prices: Now let us see what happens to the budget line if the price of one good changes but the price of the other does not. Suppose the price of good 1 changes from p_1 to p_1' then the budget line equation will be

$$p_1'x_1 + p_2x_2 = M$$

$$p_2x_2 = M - p_1'x_1$$

$$x_2 = \frac{M}{p_2} - \frac{p_1'}{p_2}x_1$$

In that case the vertical intercept remains unchanged

although the slope now has changed to $-\frac{p_1'}{p_2}$.

Because of the decline in the price of good 1 the maximum amount of good 1 that can be purchased increases leading to a change in the slope of the line keeping the vertical intercept constant. (the maximum quantity of good 2 that can be consumed using whole of the income does not change i.e. M/p_2)

Here using simple mathematical equation and notations we have explained succinctly and precisely the form of budget set, how it changes in different situations and also tells us something about the determinants of a consumer, purchasing power.

The structure of an economic model consists of a set of equations when it is explained in mathematical form. These equations are constructed by relating a number of variables to one another. A variable is something that can take on different values. e.g. price, revenue, cost etc. In economic applications we use three type of equations namely definitional equation e.g. $\pi \equiv R - C$, behavioral equation e.g. $C = 20 + 5Q$ and equilibrium condition e.g. $Q_d + Q_s$. The important thing about variable is the way in which different variables are related to one another.

Functions are used to describe and symbolize relationship between variables. The idea of a function not only involves the concepts of a relation between the values of two variables but also shows the dependence of one

variable on the other. e.g. $D = f(P)$ Here demand is a function of price meaning that the quantity demanded is dependent on the price of the commodity.

It is through application of the relevant mathematical operations to these equations, we seek to derive a set of conclusions.

We have the equation of the linear demand curve given as $q = a - bp$. We can derive a set of conclusions from this equation, which states the relationship between quantity demanded and price.

- (i) The slope of this demand curve is $-b$ which shows that the change in demand per unit

$$\text{change in the price i.e. } \frac{\Delta q}{\Delta p} = -b$$

Let us suppose that the change in quantity demanded is Δq and change in price is Δp . Then the equation becomes

$$q - \Delta q = a - b(p - \Delta p)$$

$$-\Delta q = a - bp + b\Delta p - q$$

$$\Delta q = -a + bp - b\Delta p + q$$

$$\Delta q = -a + bp - b\Delta p + a - bp \quad (\text{as } q = a - bp)$$

$$\Delta q = -b\Delta p$$

$$\frac{\Delta q}{\Delta p} = -b$$

The negative sign of the slope clearly shows that the demand curve is sloping downwards and the demand function show demand as a monotonic decreasing function of the price of the commodity. This proves the law of demand.

- (ii) Applying to the formulae for elasticity of demand we obtain the elasticity of a linear demand curve at various levels of price.

$$E_d = \frac{\Delta q}{\Delta p} \cdot \frac{p}{q}$$

$$= -b \frac{p}{q} \quad (\text{as } \frac{\Delta q}{\Delta p} = -b)$$

$$\therefore Ed = - \frac{bp}{a-bp} \quad (\text{as } q = a-bp)$$

Now to find the elasticity at various levels of prices, let us take price at three levels namely $p=0$, $p=\frac{a}{2b}$

and $p = \frac{a}{b}$.

When $p = 0$

$$Ed = - \frac{b \cdot 0}{a - b \cdot 0} = 0 \quad (\text{Substituting } 0 \text{ in place of } p)$$

When $p = \frac{a}{2b}$

$$Ed = \frac{b \frac{a}{2b}}{a - b \frac{a}{2b}} = \frac{a}{2} \times \frac{2}{a} = 1$$

When $p = \frac{a}{b}$

$$Ed = \frac{b \frac{a}{b}}{a - b \frac{a}{b}} = \frac{1}{0} = \infty$$

This helps to precisely state that the price elasticity of demand is different at different points on the linear demand curve.

It follows that there can be no doubt that mathematical methods are possible in economics and that it can be used to make the economic relations more expressible and clear. Thus mathematical approach is rightly considered as a quick mode of transportation but all the same, a theorist must accustom himself with mathematical techniques and their applications which driving lessons to elucidate the problems of economic theory. As in words of Prof. Samuelson, mathematics is neither necessary nor a sufficient condition. It can help...

Chapter 10

Basic Mathematical Tools for Introductory Economics

This chapter is designed to set out some of the basic mathematical tools needed to effectively transact/learn the economics at higher secondary level. It is odd, that still in this era, mathematics as a subject evokes fear & awe. Majority of the hue and cry on the new economics textbooks introduced by NCERT have been on the mathematical expressions used. Even though high order mathematics is not attempted in the introductory textbooks, still teachers and students are finding it difficult in coping with content. Therefore here the attempt is to give an introduction to basic mathematics capable of providing tools for use in economic theory which shall initiate the process of learning economics better. Graphical illustrations have also been used to give visual reinforcement to algebraic results. The users, even if they don't have any elementary knowledge of mathematics will be able to go through this chapter as it is done without presuming any elementary knowledge of mathematics. As a result, it should be suitable for students and teachers with a broad range of backgrounds.

Let us now go back and remind our selves some of the very basics involved in dealing with mathematics. All these have already been covered in our mathematics curriculum, but most of us might have been 'taught to the test' and may not have intuitive grasp of the subject and how it works. In economics we take the help of

mathematics to express the real life situations and solve the problems. We have already discussed the relevance of mathematical treatment of economics in the previous chapter.

Some Real Basics

Wherever we deal with economics we will come across variables which have some relationship with each other and can also evolve set of equations. Take the case of two variables quantity demanded and price. Both the variables are related and their relationship can be expressed in the form of equation. Suppose say the relationship is expressed as $Q_d = 40 - 3p$. In essence, this is an equation that says that one side of the equals sign represents a value that is exactly the same as the value on the other side of the equation. By substituting different values for p , the quantity demanded at that particular price can be derived. We can derive at many conclusions, like, price and quantity demanded are inversely related and that for one unit change in price the quantity changes by 3 units and so on. Before moving on to equations in details lets learn certain basics related to it.

Negative numbers:

In economics while dealing with equations or otherwise we come across numbers with negative signs attached. The rules of addition , subtraction , multiplication and division involving the negative numbers should be understood before proceeding further.

- (i) *Addition of two negative numbers:* We add the quantities and affix the negative sign. Eg $- 2 + - 4 = - 6$
- (ii) *Addition of 2 numbers have unlike signs* i.e when one is positive and the other is a negative number, we take the difference between the two quantities. i.e. subtract bigger quantity from the smaller quantity and then affix the sign of the bigger quantity. eg (i) $- 2 + 4 = 2$, eg (ii) $2 - 4 = -2$

- (iii) Subtraction of a negative number from another: When a negative number is to be subtracted from another number we change the sign of the 'subtrahend'(the number to the right or below). Then the operation to be done turns out to be addition. The two minus signs "cancel" the effect of each other..

Eg (i) $2 - -4 = 2 + 4 = 6$

Eg (ii) $4 - -2 = 4 + 2 = 6$

Eg (iii) $-2 - -4 = -2 + 4 = 2$

- (iv) Product of two numbers with like algebraic signs will be positive and when numbers have unlike algebraic signs then the product will be negative.

Eg (i) $-2 \times -4 = 8$

(ii) $-2 \times 4 = -8$

(iii) $2 \times -4 = -8$

- (v) Similar is the case in division also.

Eg (i) $-4 \div -2 = 2$

(ii) $-4 \div 2 = -2$

(iii) $4 \div -2 = -2$

Review test:

(i) $-6 - 2 = ?$

(ii) $4 - (-6) = ?$

(iii) $-3 + (-5) = ?$

(iv) $5 \times -6 = ?$

(v) $-30 \div -5 = ?$

Fractions:

The operations are found difficult when fractions are involved. A fraction is a part of a whole, the numerator denoting the size of the fraction and the denominator denoting the size of the whole being referred to.

- (i) When the fractions have the same denominator the operations of addition and subtraction can be done by simply adding or subtracting the numerators, the denominator being the same.

Eg: $\frac{1}{2} + \frac{3}{2} = \frac{4}{2} = 2$

$\frac{1}{2} - \frac{3}{2} = \frac{-2}{2} = -1$

$\frac{2}{4} + \frac{3}{2} = \frac{1}{2} + \frac{3}{2} = \frac{4}{2} = 2$

- (ii) When the numbers have different denominators,

the operations of addition and subtraction can be done only after applying multipliers to one or both of the fractions so that they will have a common denominator. For eg, we cannot perform the operation $3/6 + 2/5$ directly. By multiplying both the numerator and denominator of $3/6$ by 5, we obtain the equivalent fraction

$$\frac{3 \times 5}{6 \times 5} = \frac{15}{30}$$

Likewise, multiplying the numerator and denominator of $2/5$ by 6, we obtain the equivalent fraction

$$\frac{2 \times 6}{5 \times 6} = \frac{12}{30}$$

Now we have the common denominator for both the fractions and therefore their sum can be obtained simply by adding the two numerators and retaining the common denominator. An analogous procedure can be used to subtract fractions.

Eg: $\frac{1}{2} + \frac{3}{5}$

Here multiply numerator denominator of $\frac{1}{2}$ by

5 and $\frac{3}{5}$ by 2. It becomes $\frac{5}{10} + \frac{6}{10}$. The answer

is $\frac{11}{10}$.

- (iii) When the product of two fractions have to be found out, we just have to multiply the numerators, which will be the numerator of the product and multiply the denominators to get the denominator of the product.

Eg: $\frac{1}{2} \times \frac{3}{2} = \frac{3}{4}$

$\frac{1}{2} \times \frac{3}{5} = \frac{3}{10}$

- (iv) Division is the inverse of multiplication and therefore to divide one fraction from the other, we have to inverse the divisor (the second fraction in sequence) and multiply.

Eg: $\frac{1}{2} \div \frac{3}{2} = \frac{1}{2} \times \frac{2}{3} = \frac{2}{6} = \frac{1}{3}$

$\frac{1}{2} \div \frac{3}{5} = \frac{1}{2} \times \frac{5}{3} = \frac{5}{6}$

Review test:

(i) $\frac{4}{6} - \frac{3}{6} = ?$

(ii) $\frac{7}{8} + \frac{9}{7} = ?$

(iii) $\frac{6}{10} + \frac{2}{3} = ?$

(iv) $\frac{8}{6} \times \frac{2}{3}$

(v) $\frac{7}{5} \div \frac{3}{4}$

Indices:

In economics we come across many relationship which involve numbers and variables raised to a power. The indices or power show how many times a number is multiplied by itself. A number expressed as 5^3 means $5 \times 5 \times 5$. Here 5 is the base and 3 is the power. Certain rules are to be known to carry out the operations when numbers are raised to a power, but do have the same base.

(i) $a^m \times a^n = a^{m+n}$
eg: $3^2 \times 3^4 = 3^{2+4} = 3^6$

(ii) $a^m \div a^n = a^{m-n}$
eg: $3^2 \div 3^4 = 3^{2-4} = 3^{-2}$

(iii) $(ab)^n = a^n \cdot b^n$
eg: $(3 \times 2)^2 = 3^2 \times 2^2$

(iv) $1 / a^n = a^{-n}$
eg: $1 / 3^2 = 3^{-2}$

(v) $(a/b)^n = a^n / b^n$
eg: $(3/2)^2 = 3^2 / 2^2$

In case of negative numbers raised to power, the negative sign will be attached depending on whether the power is an odd number or even number. If the power is an odd number then the number will be negative and if it is even then it will be positive. Eg: -4^2

$$= -4^2 = -4 \times -4 = 16$$

$$-4^3 = -4 \times -4 \times -4 = -64$$

Review test:

(i) $3^2 \times 3^3 =$

(ii) $4^2 \times \left(\frac{1}{4}\right)^2 =$

(iii) $\left(\frac{6}{2}\right)^2 - 3^2 =$

(iv) $\left(\frac{7}{5}\right)^3 =$

Operations

The four basic operations addition, subtraction, multiplication & division can be carried out on the equations. These operations are obvious to all. The skill is in knowing when to do which operation and why we are doing it. There are rules that should be followed while carrying out multiple operations which most of you might be familiar with. (Remembered easily through the acronym BODMAS.)

- (i) Anything within BRACKET is to be done first.
- (ii) Then comes ORDER, i.e anything that is raised to a power
- (iii) Next carry out DIVISION operations
- (iv) Next is the turn of MULTIPLICATION. Here remember that multiplication operations need not always be denoted using ' X ', sometimes it will just be '.' or nothing at all.
- (v) Then ADDITION
- (vi) Then finally SUBTRACTION

Eg (i) $6 (5 - 3)2 \times 30/6 + 4 - 2$
 $= 6 (2)2 \times 30/6 + 4 - 2$
 $= 6 \times 4 \times 30/6 + 4 - 2$
 $= 6 \times 4 \times 5 + 4 - 2$
 $= 120 + 4 - 2$
 $= 124 - 2$
 $= 122$

Review test:

- (i) $40/2 [8-4] + 3/5 [6-2]2 - 9$
- (ii) $3/9 [\frac{3}{4} - 2/3]2$
- (iii) $62 \times 7/4$

Algebra:

Basic operations being discussed, now let us move on to the algebraic expressions. Algebra is the central element of an economist's tool kit and they should be able to use it rather than simply learn it. The concept of algebra is a familiar one, but the challenge is to show how it can be used and to build in the competency and confidence to use algebra independently to solve economic and business problems.

Constants and Variables: Mathematical problems involve two kinds of quantities, constants and variables. Constants is a magnitude that does not change. It retains the same value all through the mathematical operations. When a constant is joined to a variable it is termed as co-efficient of that variable. For eg: Given the equation $Q_d = 2P - 3$, here Q_d is dependent on P and the constants here are 2 and 3. 2 may be referred as coefficient of the variable P . A quantity which can assume different values is called a variable. In economics we deal with many variables like price, income, profit, production, cost, revenue etc which can assume many values.

Exogenous and Endogenous variables: Given any equation we should be able to identify the Exogenous and Endogenous variables. Exogenous variables are independent variables that are not influenced by the other factors in the equation. The Endogenous variables are dependent and are determined from within. In the above example, P is the exogenous variable while Q_d which is dependent on P is the endogenous variable.

Functions:

We are, in fact, not interested in variables for their own sake. In economics we come across relationship between different variables which can take different values that can be expressed by means of functions. Here we relate one attribute or variable to the other. The manner in

which one variable changes in relation to changes in other related variables is described by means of a function.

Eg: When we write $Q_d = f(P)$, where Q_d is the Quantity demanded and P is the Price, this equation represents the demand function, which shows the relationship between two economic variables, quantity demanded and Price. Here 'f' is a convenient way of expressing the phrase "a function of". The quantity demanded is function of Price i.e. Q_d here is dependent on the independent variable P .

Notations:

We come across many notations while expressing the relationship between variables in the form of equations like, $\equiv, <, >, \geq$ etc.

(i) Summation:

The symbol Σ is used to denote the sum of the terms. Given the value of x variable to be 3,2,4,6 then Σx will be $3+2+4+6=15$. Now suppose we have to represent the summation of n number of terms i.e. $x_1 + x_2 + x_3 + \dots +$

x_n we express it as $\sum_{i=1}^n x_i$, which simply means that

it is the sum of all terms as i ranges from 1 to n . This is to read as sum of x as i ranges from 1 to n . While dealing with National Income Accounting we have expressed

the sum of various variables in the manner $\sum_{i=1}^n x_i$ to

represent the total number of firms and households in the economy.

(ii) Equations and Identities:

An equation is the statement of equality between one or more variables and numbers. It is expressed using '=' sign. The parts of an equation to the right and left of the sign of the equality are the sides of the equation distinguished as the right hand side and left hand side.

When the equation holds good for all values of the variable it is called an identity expressed using ' \equiv ' sign. Eg $GDP \equiv C + I + G$ or $P \equiv R - C$ etc.

While working with the equations certain rules have to be kept in mind like, balance of equation is to be maintained, i.e. whatever is done to the right hand side (RHS) has to be done with the left hand side (LHS) also. Any number can be added, subtracted or divided or multiplied to one side, provided the same is done to the other side.

(iii) Inequalities

There are two inequality signs '<' denoting that the LHS is less than the RHS and '>' denoting that the LHS is greater than the RHS. There are weak inequalities also which appear with \leq or \geq sign meaning less than or equal to and greater than or equal to respectively.

(iv) Absolute Value: |I|

The notation '|I|' is used to denote the absolute value. In absolute value we discard the signs attached to it. For eg if suppose $x = -6$ then absolute x will be written as $|x| = 6$

Linear Equations, Quadratic or Second Degree Equations & Simultaneous Equations

Equations in which maximum power of the unknowns is only one are called linear equations. These equations when plotted on a graph give straight line. Generally it is stated as $y = mx + c$. Here m and c are constants while y and x are variables.

Eg :-

(i) $2x + 3 = 4x - 2$

(ii) $5x + 1 = 2$

(iii) $\frac{x + 2}{4} = 6$

If the power of the unknowns is 2, it becomes a quadratic equation or second-degree equation. Eg

(i) $x^2 + 2x + 4 = 0$.

(ii) $2x^2 = 100$

(iii) $x^2 - 9 = 4x$

Simultaneous equations are set of equations that are satisfied by the same value of the variables. As we deal in Economics more often with relationship between different variables, we will have to learn the rules of

solving equations. Suppose we have two equations, one for demand and other for supply. Both are satisfied by the same value of the variable P.

$$Q_d = 100 - 10P \quad Q_s = 80 + 10P$$

We know that at equilibrium $Q_d = Q_s$. So to find the Price at the point of equilibrium we have to solve the simultaneous equations.

As $Q_d = Q_s$, we can write the two equations as,

$$\begin{aligned} 80 + 10P &= 100 - 10P \\ 10P + 10P &= 100 - 80 \\ 20P &= 20 \\ P &= 20/20 = 1 \end{aligned}$$

We have just now found out that the equilibrium price is 1, now to get the equilibrium Quantity demanded and supplied we have to substitute the value of P in any of the two equations.

$$\begin{aligned} Q_d &= 100 - 10P & Q_s &= 80 + 10P \\ &= 100 - 10 \times 1 & &= 80 + 10 \times 1 \\ &= 90 & &= 90 \end{aligned} \quad (\text{or})$$

Solution of Linear Equations:

By solving an equation we mean the determination of the particular value of the unknown which satisfies the given equation. The process of finding its value is called solving the equation and value so found is called the root or the solution of the equation. To solve linear equations in one unknown we have to first move all terms involving the unknown to the left hand side of the equation. Here we have to remember that a term may be transposed from one side of an equation to the other if its algebraic sign is reversed. That means if it is addition it becomes subtraction and if it is multiplication it becomes division or vice versa when it moves from one side of the equation to the other.

$$\begin{aligned} \text{Eg: (i)} \quad 4x - 10 &= 2x + 2 \\ 4x - 2x &= 2 + 10 \\ 2x &= 12 \end{aligned}$$

Then divide both sides by the coefficient of the unknown quantity, and the value required is obtained.

$$x = 12/2 = 6$$

Here the coefficient of x which is in the numerator when it moves to the RHS will go as denominator.

$$\text{Eg (ii) } \frac{x}{4} + 2 = \frac{3}{2}$$

In this case first all the fractions have to be cleared. If we multiply both sides of the equation by 4, then the equation becomes

$$\begin{aligned} 4\left(\frac{x}{4} + 2\right) &= \left(\frac{3}{2}\right) \times 4 \\ &= \frac{4x}{4} + 8 = \frac{12}{2} \end{aligned}$$

After clearing the fractions, now transpose the term containing the unknown quantity to one side of the equation, and the known quantities to the other.

$$\begin{aligned} x &= 6 - 8 \\ x &= -2. \end{aligned}$$

This answer can also be verified. In the case of simple equations we have only to show that when we substitute the value of x in both sides of the equation we obtain the same result. In our example lets check whether x =

-2 is a correct solutio or not $\frac{x}{4} + 2 = \frac{3}{2}$ substuting $x = -2$ we get

$$\begin{aligned} &= \frac{-2}{4} + 2 = \frac{3}{2} \\ &= \frac{-2 + 8}{4} = \frac{6}{4} \\ &= \frac{6}{4} = \frac{6}{4} \end{aligned}$$

Review test:

(i) Given $5x + 12 = 10$, $x = ?$

$$(ii) \text{ Given } \frac{5P}{3} + 10 = \frac{2P}{7} - 3 \quad P = ?$$

Solution of Quadratic Equations:

The general form of quadratic equation is $ax^2+bx+c=0$, where a, b, c are constants. Here the unknown 'x' is of second degree. The solutions can be derived by applying

the formulae, $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ where, 'a' is the coefficient

of x^2 , 'b' is the coefficient of x and 'c' is the constant quantity in the equation. This formulae has to be memorized.

Eg : $x^2 + 6x + 5 = 0$

Here a =1, b = -6 and c = 5. Substituting these values in the formulae,

$$\begin{aligned} &= \frac{-6 \pm \sqrt{6^2 - 4 \times 1 \times 5}}{2} \\ &= \frac{-6 \pm \sqrt{36 - 20}}{2} = \frac{-6 \pm \sqrt{16}}{2} = \frac{-6 \pm 4}{2} \end{aligned}$$

There will be two solutions in case of the Quadratic

equations. The solutions are $\frac{-6+4}{2}$ and $\frac{-6-4}{2}$ ie -1

and -5

Review test:

Solve:

(i) $3x + 2 = x + 6$

(ii) $13x - 4(5x - 8) + 17 = 0$

(iii) $4x^2 - 37x - 7 = 0$

(iv) $x-2 + x+2 = 0$

$x-1 \quad x+1$

Solution of Simultaneous Equations:

The solution to simultaneous equations can be found out only if we have the same number of distinct and independent equations as there are unknowns to be found. In case when there are 2 unknowns, we have to

have 2 equations. We shall confine to simpler cases in which the unknown quantities are only two and both in the first degree.

Eg: Solve $3x + 7y = 27$ (1)

$$5x + 2y = 16$$
..... (2)

For solving firstly we have to eliminate one of the unknowns. So for that lets multiply both the equations by a number, so that the terms in x will be the same in both the equations. Multiply first equation by 5 and second equation by 3. The equations now become

$$15x + 35y = 135$$

$$15x + 6y = 48$$

Now subtract 4th equation from the 3rd to eliminate the terms in x. We get,

$$15x + 35y = 135$$

$$15x + 6y = 48$$

$$29y = 87$$

$$y = 87/29 = 3$$

Substitute this value of y in either of the equations to get the value of x. Suppose we put it in equation 1 we get the value of x as

$$3x + 21 = 27$$

$$3x = 27-21$$

$$3x = 6$$

$$x = 6/3 = 2$$

Therefore, the required solution of the equation is $x=2$ and $y= 3$

Tip: If the coefficients of one unknown have the same absolute value, eliminate that unknown by addition or subtraction. If necessary multiply one or both equations by such numbers that will make the coefficients of one unknown have the same absolute value. Add when the coefficients of one unknown are equal and unlike in sign, subtract when the coefficients are equal and like in sign.

Review test:

Solve: (i) $x + y = 19$

$$x - y = 7$$

(ii) $x - y = 6$

$$x + y = 0$$

(iii) $x + 5y = 18$

$$3x + 2y = 41$$

Graphing functions:

A graph consists of an x-axis (horizontal axis) and y-axis (vertical axis) and a particular point on the graph is identified by its co-ordinates (x,y)

Plotting points on a graph;

We have two axis, x and y which intersect at the origin, 'O'. The 1st quadrant will have both x and y coordinates positive while y coordinate will be negative. The 3rd quadrant has points where both the x and y coordinates are negative and the 4th quadrant will have x coordinate negative and y coordinate positive.

As more details on basics of coordinate geometry like, drawing of graphs and its importance are provided in a separate chapter we would be skipping that section and will move on to the basics of analytical geometry.

Analytical Geometry:

One of the most important thing to be remembered while drawing graphs and diagrams is that we have to make sure that we have labelled both the axis and also have titled the graphs. Too often we see unlabelled graphs without titles which make no sense at all!

The Straight lines & Curves

It can be seen that after plotting the points on a graph when we join these points it might be a straight line or a curve. The plotted points may join together to form a curve or straight line depending on the degree of the equation. If the equation is a first-degree equation (where the power of the unknown variable is equal to 1) then the plotted points will join together to form a straight line. Eg (i) $2x + 3 = Y$, (ii) $Q = 18 - 3P$ etc. The straight line may either be upward sloping or downward sloping. Eg (i) will give an upward sloping line while eg (ii) will plot a downward sloping line.

If the equations are second degree equations (quadratic equation) then the plotted points join together to form curves. The curves may be convex to the origin or concave.

The slope or gradient of a straight line:

A very often used term in economics is slope and it is

very essential to understand this concept as many of the theories in economics are related to it. To make a child relate this concept with real life, talk to her about the steepness of a hill. When you say the steepness of a hill is one in four, it means that when we move up the hill we rise one meter for every four meters. The slope of the hill here is $\frac{1}{4}$. Now if we say the steepness of the hill is one to one then it means that when we move up by two meter we rise one meter i.e. it is a highly steep hill. The slope here is $\frac{1}{2}$.

Now lets try to relate it to the concept of slope. Slope is the value got by dividing the vertical distance by horizontal distance. The slope of the line connecting the two points on a graph (x_1, y_1) and (x_2, y_2) is given by $y_2 - y_1 / x_2 - x_1$ where, $y_2 - y_1$ is the vertical difference between the two points and $x_2 - x_1$ is the horizontal difference. It is provided by measuring the amount of rise (or fall) per unit horizontal distance.

The slope of a straight line depends only on its inclination and will be same at any point. The lines drawn parallel to the straight line AB will also have the same slope.

The slope is positive for an upward sloping line and negative for a downward sloping line.

Let us observe the relation between the magnitude of the slope and steepness of a line. The slope of the line increases with the increasing steepness. (As shown in our earlier example of hill) when the slope is negative, it increases in absolute terms as the line becomes steeper. Now if the line is a horizontal straight line parallel to x axis then $y_2 - y_1$ will be zero, i.e the numerator will be zero. The slope will now be $0/x_2 - x_1 = 0$. In case the line is a vertical straight line parallel to y axis then $x_2 - x_1$ will be 0 and therefore slope will be $y_2 - y_1 / 0 = \alpha$.

Intercepts:

The straight lines when extended will intersect the coordinates at two points, one on the x-axis and other on y axis. The distant from the orgin to the point where the line intersects the x-axis (horizontal axis) is called the horizontal intercept (x intercept) and the distance from the point where it intersects the y-axis (vertical axis) is called the vertical intercept (y intercept).

The slopes and intercepts in the equation of a line:

The equation of a straight line is generally denoted as $y = a + bx$. Given such a straight line equation the parameter that comes along with the variable x is the slope of the line. Here it is 'b'. The vertical intercept here is 'a'. Let us look at a demand function given as $Q_d = 40 - 4P$. this equation shows the relationship between demand and price. If we draw a straight line using this equation, it will cut the y axis at 40, which means that the vertical intercept is 40. The rate of change of demand when price changes depends on the coefficient of P . In the above equation the slope is 4, meaning that for every one unit change in price demand will rise/fall by 4 units. The negative sign here shows the relationship between demand and price, i.e it has an inverse relationship.

Even though these are not very 'hard tools', teachers will have to ensure that all students are able to make the intellectual jump by setting aside more time to brief through these basics before proceeding further. All these basic mathematical tools will provide a solid foundation for learning introductory economics and will also be of value to the many who would like to pursue the learning of the subject. It has to be kept in mind that learning mathematics is best accomplished by doing it and so working through the problems and review test are essential. The pressure on the teachers to cover the curriculum content might reduce the scope of briefing through mathematical tools but still , they have to design certain practical strategies to help students achieve at economics by improving their grasp and appreciation of mathematics.

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Use of Algebraic Equations and Graphs in Economics

Use of mathematics in economics started with the mathematical presentation of the conditions for a successful coordination of market exchange by Leon Walras. The 'Marginal Revolution' was the mathematical exposition of marginal conditions for market equilibrium. Alfred Marshall, though well trained in mathematics, used in footnotes in his 'Principles of Economics'. But almost all the neo-classical economists used sophisticated mathematical techniques in the construction of economic theories. They presumed that all the microeconomic theories can be explained using mathematics.

John Maynard Keynes started the new research agenda - the aggregate economics, but he too used mathematics to a limited extent. The continuous debate between neoclassicals and Keynesians include extensive use of mathematics in macroeconomics as well.

Consequent to these developments, major textbooks at graduate level in West European and North American universities presented economic theories by using mathematical notations and equations. As economic theories basically establish cause - effect relationship between economic variables, use of mathematics in economics is widely prevalent. The availability of large sets of time series and cross-section data on major economic variables facilitated growth of econometrics

as a discipline, and this reinforced the use of mathematics in economics textbooks.

For the last several decades, basic economics textbooks in India, have been extensively using graphs. But in the last one decade, all premier higher educational institutions teach mathematical economics as a core paper in undergraduate economics courses. Hence, the NCERT textbooks on microeconomics and macroeconomics use mathematics and graphical illustrations in the explanation of economic theories. This chapter gives a preliminary exposition to fundamental mathematics and graphical techniques that are used in the NCERT textbooks.

ECONOMIC MODEL

An Economic model shows relationship between two or more economic variables. The nature of relationship includes the cause-effect relationship and the type of relationship expressed in mathematical forms such as linear or non-linear algebraic equations. Some of the basic concepts are explained using the simple demand model given in the microeconomics textbook.

A demand function is given as

$$Q=d(p) \quad (1)$$

Here, Q is the variable representing quantity demanded and p is the variable representing price per unit.

A variable is a quantifiable entity, whose value will change either over time and or across space. For example, price changes with quantity demanded and vice versa. Temperature changes with time and is different in different places.

In the equation (1), the value of q is functionally dependent on the value of p . Here, p is an independent variable, and q is a dependent variable. An algebraic equation can have only one dependent variable and more than one dependent variable. For example, if demand is dependent on price of the commodity and income of the consumer, then 'demand' is dependent variable, and 'price' and 'income' are independent variables. The demand function is written as

$$Q = d(p, y) \quad (2)$$

Equation (1) implies that change in price is the cause and change in demand is the effect. Here the change in demand is dependent on the change in price, and change in price is assumed to be independent. Therefore price is the independent variable, and demand is the dependent variable.

The equation (1) does not give other specifications in the relationship between q and p . The law of demand says that there is an inverse relation between q and p . If we assume that for every one unit change in p , the level of change in q is also a constant, then we can write the specific relation between p and q as a linear algebraic equation.

$$Q = a - b p \quad (3)$$

Here, if p changes by one unit, then q decreases by b percent, the negative sign attached to b implies the inverse relation between p and q . If $p=0$, $q=a$, which implies that the consumer consumes 'a' amount if the commodity is given free.

If you plot equation (3) in a graph sheet, you will get a downward sloping straight line. The slope of such a line is b , and the y intercept is a . This is shown in figure 11.1.

If the demand curve is non-linear, then the algebraic equation will take different forms such as

$$Q = a^{-p}$$

Similar to the demand curve, we can get algebraic equations for other economic functions. For instance a short run production function representing the law of variable proportions can be given as follows:

Here if y is the output and x is the variable factor input. If you plot this equation in a graph you will get total product of variable factor whose (Tp_x). If we divide equation (4) by x , you get average product of x (APx) and plot this in a graph sheet to APx curve. The first order derivative of equation (4) is

$$d/dx(y) =$$

This is the marginal product of x (MPx) and the corresponding curve is MPx curve. The plotting of a graph is discussed in detail in the next section.

In economics, algebraic equations are used to illustrate the relationship between two or more than two variables. In the previous chapter, it was shown how an the previous equation is useful than the verbal description of the economic relationships. In this chapter, we will look at data relating to some economic indicators given in algebraic equations. We will also learn how they are converted into graphs which help in learning economics concepts better.

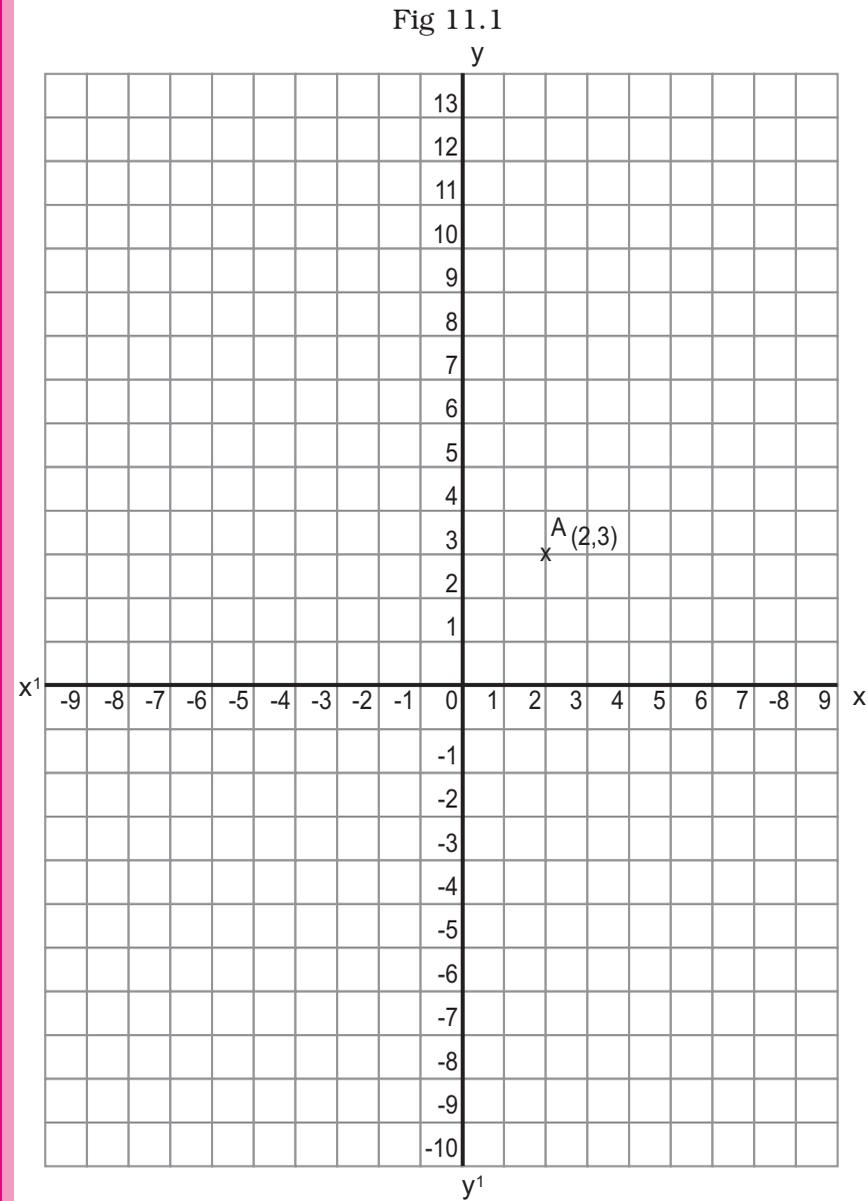
The graphs we use may be referred to as analytical, as opposed to empirical or data graphs. Analytical graphs illustrate the relationship between two or more variables based on the concepts, variables and assumptions of economic theories. In a very direct sense, these graphs are illustrations of economic theory and their assumptions about the relationship among variables. What is most important about these graphs to economics is what they mean *economically* and **not** mathematically. What is most important in reading graphs is to understand the relationship between what you see on the graph and the underlying economic theory, its concepts and assumptions.

Graph and Graph Sheet – An Introduction

Graph is the most widely used tool to represent relationship between two economic variables. A graph is a diagram that shows how two variables are related. Though computers are used to draw graphs in recent times, traditionally graph sheets were used. A graph sheet that we normally use is a centimeter graph sheet, where the divisions are in millimeters and centimeters. Each centimeter denotes a unit of a variable. Each millimeter denotes a fraction of the unit of the variable. See the graph sheet given in the previous page.

A graph sheet has two axes- X-axis and Y-axis. Each axis represents the number line from -ve £ (negative infinity) to +ve £ (positive infinity). The intersection of the two axes is the origin “0”. The two axes divide the

graph sheet into four quadrants. In the top right, Quadrant I, both X and Y values are positive, hence, it is called positive quadrant. In the top left quadrant, Quadrant II, X values are negative and Y values are



positive. In the bottom left quadrant, Quadrant III, X and Y values are negative; hence, it is called negative quadrant. In the bottom right quadrant, Quadrant IV, X values are positive and Y values are negative.

Most of the graphs that represent economic data and relationships are in the positive quadrant, as most of the economic variables do not take negative values. For example, price, income, savings, investment, quantity demanded and supplied take only positive values. Very rarely, we get economic variables with negative values like disutility, depreciation and disinvestments.

A graph sheet is used to represent two-dimensional figures-points and lines. Every point in a graph sheet is denoted by a coordinate and every line in a graph sheet is denoted by an algebraic equation.

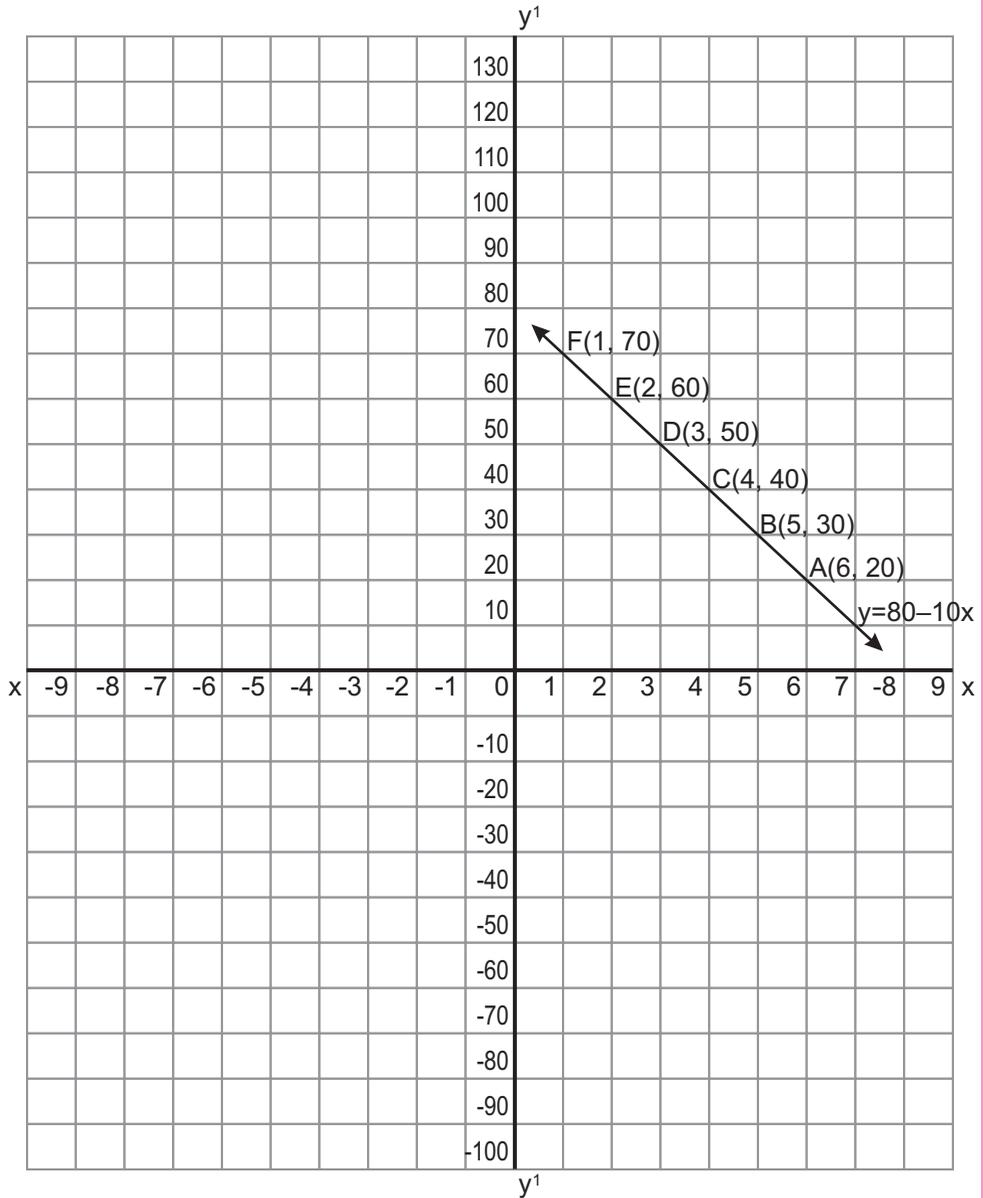
Point A in the Fig 11.1 is denoted by the coordinate (2,3). Here the first number represents the X value and second number represents the Y value. The coordinates should always be written in the same order i.e., the first number representing the X value and second number representing the Y value.

The straight line DD in the Fig 11.2 is denoted by the equation $Y = 80 - 10X$. Let us see how this algebraic equation is converted into a straight line in a graph sheet. Given various values for X and calculate corresponding values for Y using the equation $Y = 80 - 10X$.

X value	Calculation	Y value
6	$Y = 80 - 10 * 6 = 80 - 60 = 20$	20
5	$Y = 80 - 10 * 5 = 80 - 50 = 30$	30
4	$Y = 80 - 10 * 4 = 80 - 40 = 40$	40
3	$Y = 80 - 10 * 3 = 80 - 30 = 50$	50
2	$Y = 80 - 10 * 2 = 80 - 20 = 60$	60
1	$Y = 80 - 10 * 1 ==> 80 - 10 ==> 70$	70

Each pair of values of X and Y represents a coordinate in the graph and connecting the points so

Fig 11.2



plotted generates a straight line representing equation $Y = 80 - 10X$. The coordinates are given below:

Coordinates	A	B	C	D	E	F
X values	6	5	4	3	2	1
Y values	20	30	40	50	60	70

In the equation $Y = 80 - 10X$, 80 is called the Y-intercept, that is, the value of Y if the value of X is zero.

In the equation $Y = 80 - 10X$, -10 is called the coefficient of X. The negative sign represents the inverse relationship between the X and Y. The number 10 represents the intensity of the relation, that is, for every one unit change (increase) in X, the value of Y changes (decrease) by 10 units.

For easy understanding, most graphs in economics textbooks are given as straight lines and simple curves. Such lines are only approximations and the actual behaviour of an economic variable is usually complex requiring very complex graphical representation.

Individual Demand Curve

Let the individual demand function for commodity X be

$$QD_x = 8 - P_x$$

By substituting various prices of X in this demand function, we get the following individual demand schedule:

P_x (Rs)	8	7	6	5	4	3	2	1	0
QD_x	0	1	2	3	4	5	6	7	8

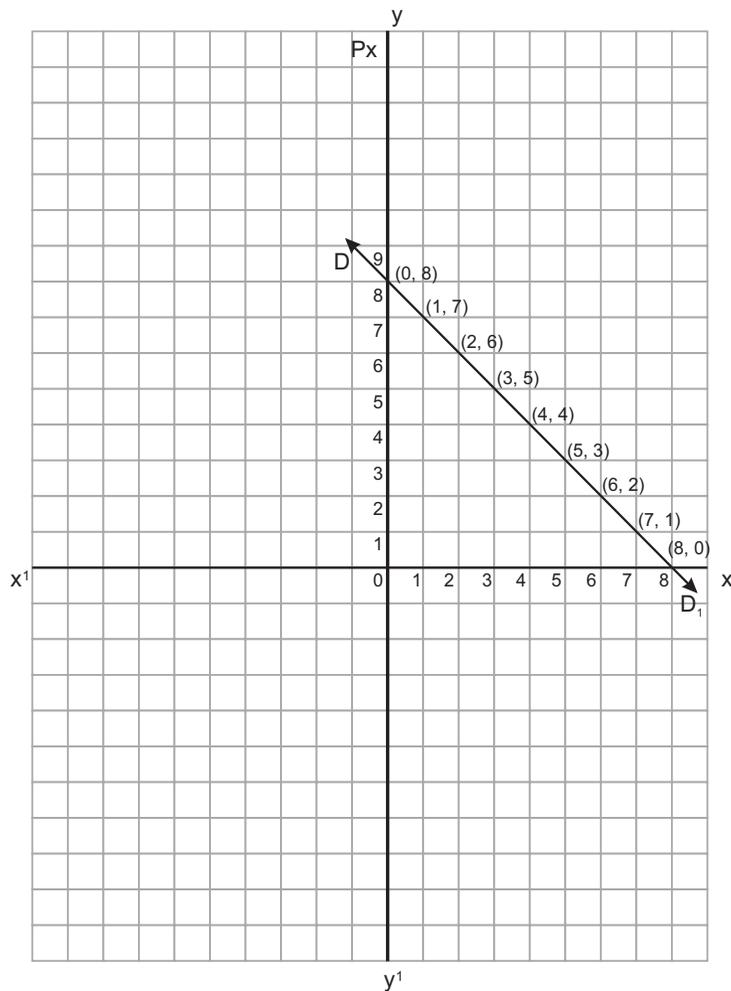
Each pair of price (P_x) and Quantity demanded (QD_x) values such as (8,0) or (7,1) is a coordinate. Thus, there are nine coordinates. Plotting the coordinates in the Fig 11.3, we get the individual demand curve D'D'.

The demand curve shows that at a particular point of time, if the price of X is Rs. 7, the individual is willing to purchase one unit of X over the period of time

specified. Thus, the points on the demand curve represent alternatives as seen by the individual at a particular point of time.

In the demand schedule given above, we see that the lower the price of X, the greater the quantity of X demanded by the individual. This inverse relationship between the price and quantity is reflected in the negative slope of the demand curve in the graph sheet.

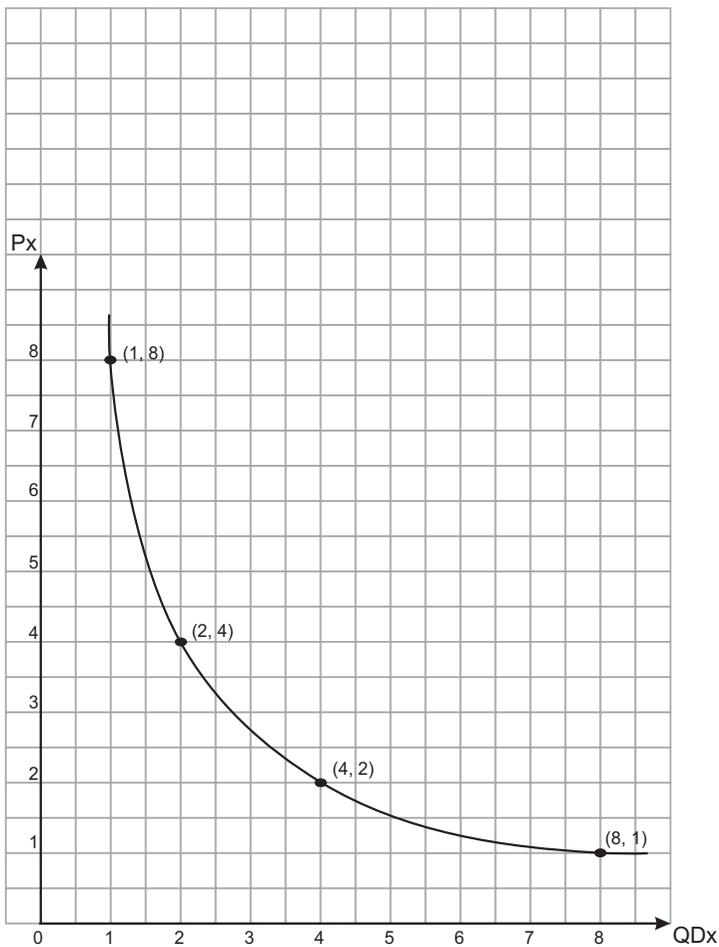
Fig 11.3



A nonlinear demand function can be represented by the quadratic function say $Q_{dx} = 8/P_x$. The corresponding demand schedule is given below and the graphical representation in Fig 11.4 shows a perfect rectangular hyperbolic demand curve.

Price P_x (Rs)	1	2	4	8
Q_{dx}	8	4	2	1

Fig 11.4



Market Demand Curve

Market demand curve is the horizontal summation of all the individual's demand curves for the commodity. The market demand curve shows the alternative amounts of the commodity demanded for specific time period at various alternative prices, by all the individuals in the market.

Two individuals have the same demand function say,
 $Q_{dx} = 8 - P_x$

The two demand schedules and the summation are given below and the corresponding demand curves are given in the Fig 11.5.

Price P_x (Rs)	Q_{dx1}	Q_{dx2}	Q_{dm}
8	0	0	0
4	4	4	8
0	8	8	16

Individual Producer's Supply Curve

Let a producer's supply function for commodity X be

$$Q_{sx} = -40 + 20P_x$$

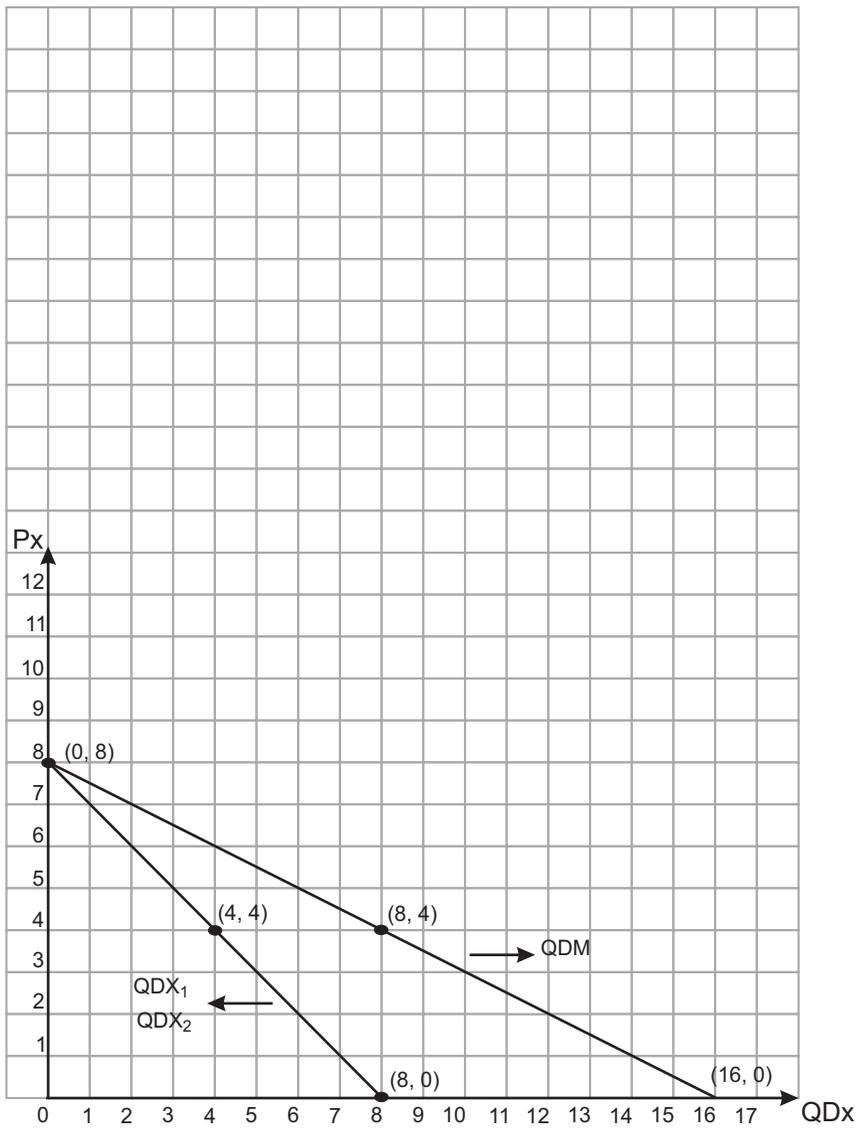
By substituting various prices of X in this supply function, we get the following supply schedule of the producer.

P_x (Rs)	6	5	4	3	2
Q_{sx}	80	60	40	20	0

Each pair of Price and Quantity Supplied value is a coordinate. Thus there are five coordinates; plotting these coordinates in the Fig 11.6 we get the supply curve of the producer.

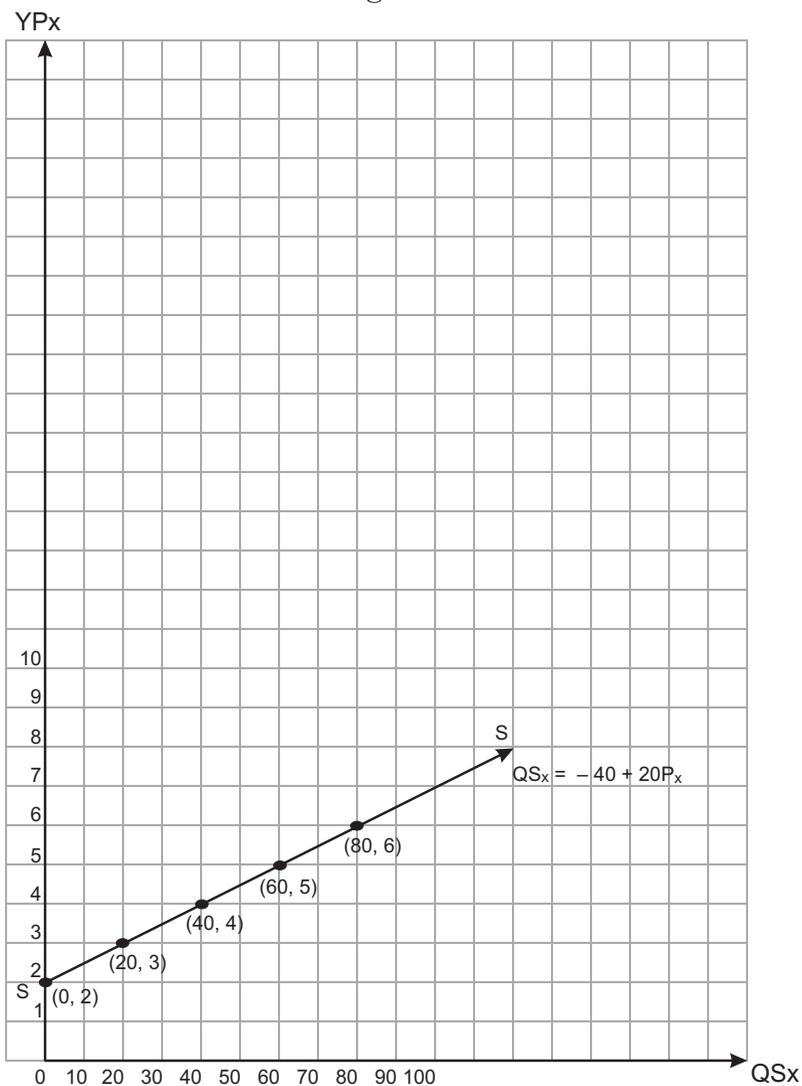
The supply curve shows that at a particular point in time, if the price is Rs. 6, the producer is willing to supply 80 units of x over the period of time specified. Thus, the points on the supply curve represent alternatives as seen by the producer at a particular point of time.

Fig 11.5



In the supply schedule given above, we see that the higher the price of X, the greater the quantity of X is supplied by the producer. This direct relationship between the price and quantity supplied is reflected in the positive slope of the supply curve in Fig 11.6.

Fig 11.6



Market Supply Curve

Market supply curve is the horizontal summation of all the producers' supply curves for the commodity. The market supply curve shows the alternative amounts of the commodity supplied per time period at various alternative prices by all the producers in the market.

The supply schedules of three producers and the summation are given below and the corresponding supply curves are given in the Fig 11.7.

Price (Rs) P_x	Quantity supplied per unit of time			
	Producer	Producer	Producer	Market supply
6	22	42	53	117
5	20	40	50	110
4	16	36	46	98
3	10	30	42	82
2	0	20	35	55
1	0	0	25	25

The supply schedule given below will give a non-linear supply curve for producer II if plotted in a graph sheet (See Fig 11.8).

P_x (Rs)	6	5	4	3	2	1
Q_{sx}	42	40	36	30	20	0

Market Equilibrium

Market equilibrium is a condition from which neither the consumer nor the producer would tend to change, unless some external forces move them from the equilibrium position. Market equilibrium occurs when the quantity of a commodity demanded in the market per unit of time equals the quantity of the commodity supplied to the market over the same time period. Geometrically, equilibrium occurs at the intersection

Fig 11.7

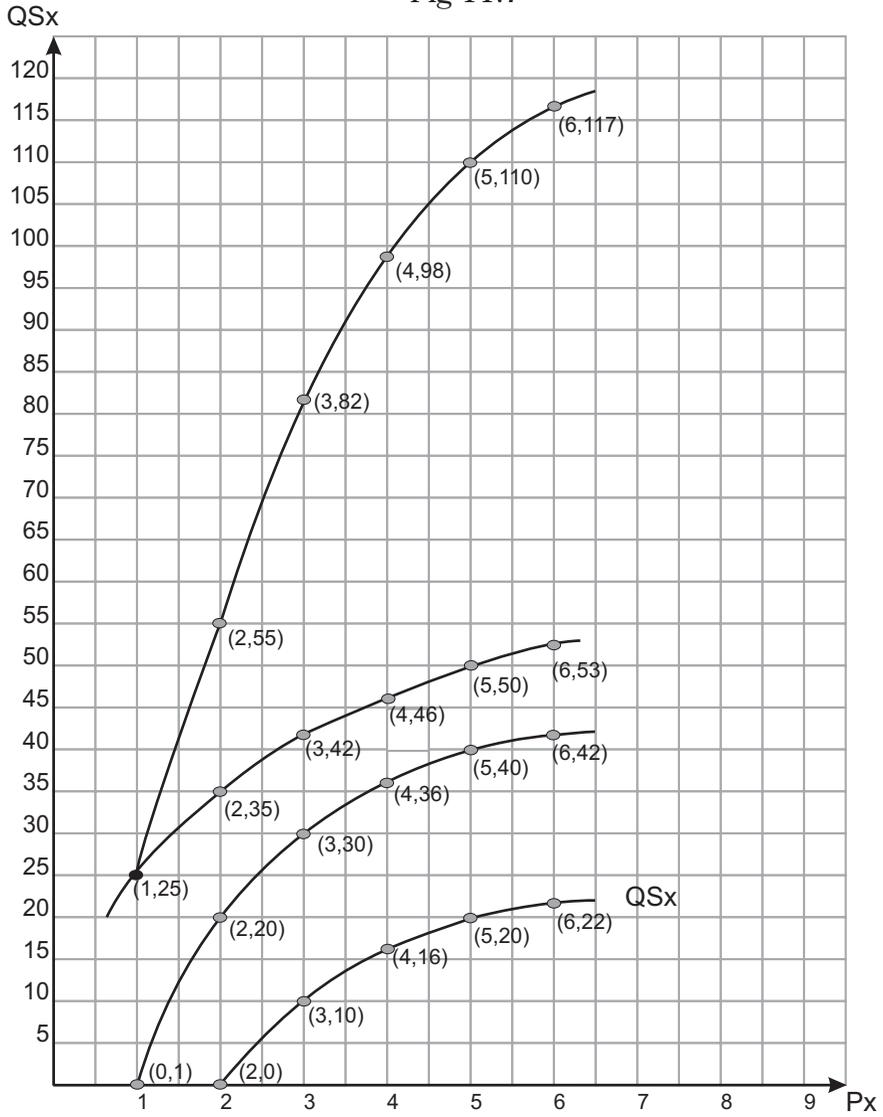
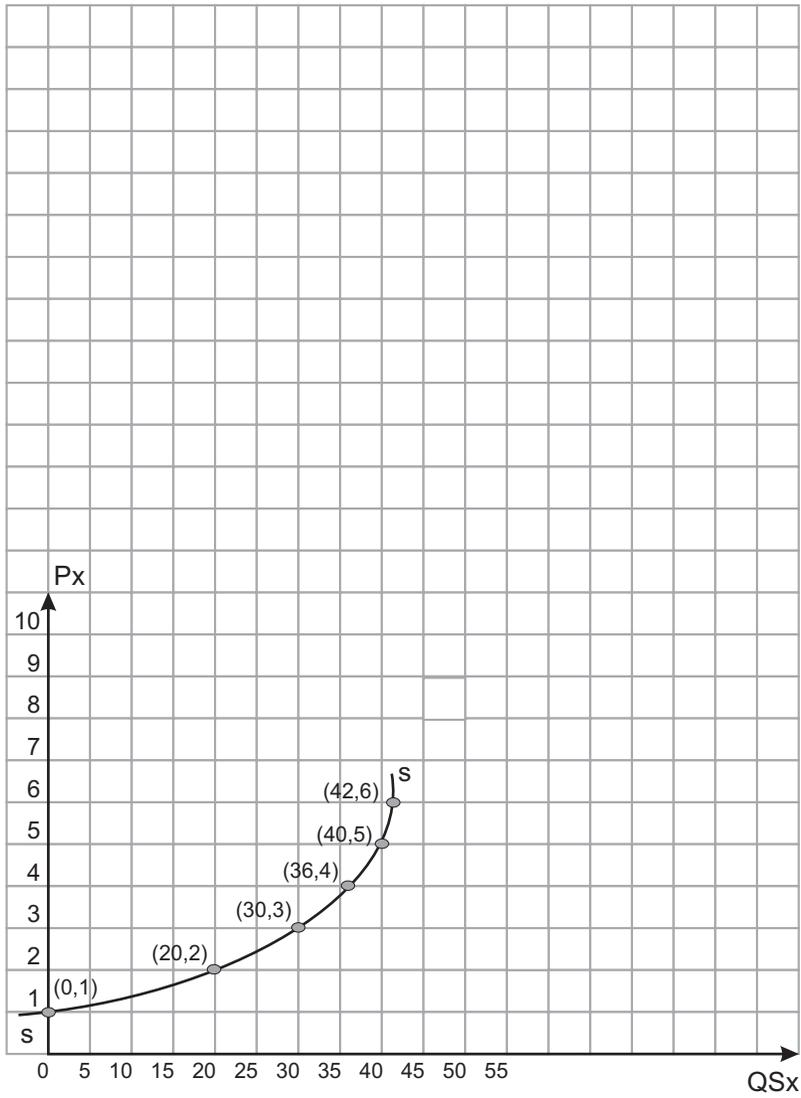


Fig 11.8



of the commodity's market demand curve and market supply curve. At the equilibrium point, the price and quantity are called as equilibrium price and equilibrium quantity respectively.

Two sets of demand and supply schedules are given below and the corresponding graphical representations are given in Figures 11.9 & 11.10.

Price of (P_x) commodity X (Rs)	Quantity demanded (Q_{dx})	Quantity supplied (Q_{sx})
6	2000	8000
5	3000	6000
4	4000	4000
3	5000	2000
2	6000	0
Price of (P_x) commodity Y (Rs)	Quantity demanded (Q_{dx})	Quantity supplied (Q_{sx})
6	0	120000
5	20000	100000
4	40000	80000
3	60000	60000
2	80000	40000
1	100000	20000

Market Equilibrium and Shift in Demand and Supply Curves

The demand curve shows the relationship between price and quantity demanded of a commodity, when all other things like consumer's income, prices of related commodities, tastes and preferences remain constant. If any one or all of these factors change, say, if there is an increase in consumer's income, then the demand curve shifts to the right implying at the same price more quantity of the commodity is demanded by the consumer.

Fig 11.9

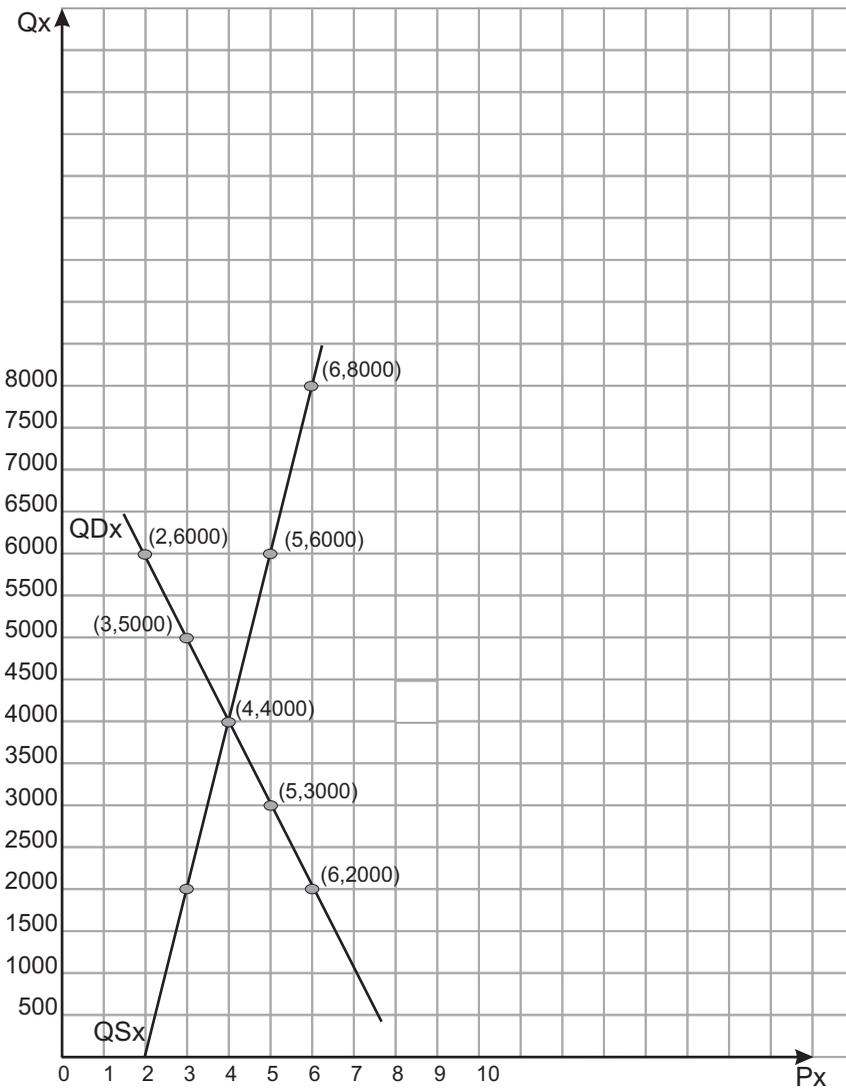
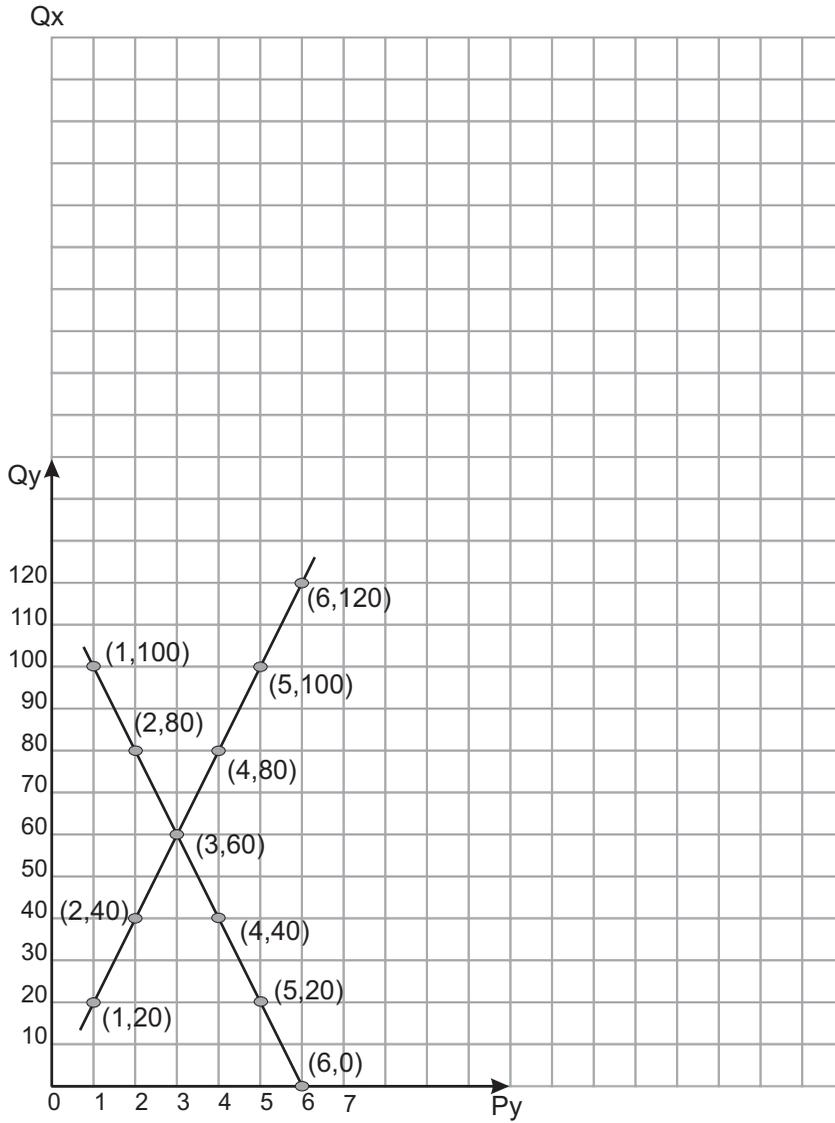


Fig. 11.10



Similarly, the supply curve shows the relationship between price and quantity supplied of a commodity when all other things like technology and costs of inputs remain constant. If any one or all of these factors change, then, the supply curve shifts. For instance, if there is improvement in technology so that the cost of production comes down, then the supply curve shifts to the right implying that the same price more quantity of the commodity is supplied by the producers.

The shifts in the demand curve and supply curve and the consequent changes in the market equilibrium are shown in the schedules given below and corresponding graphical representations in the Fig 11.11.

Price Px (Rs)	Qdx 1	Qdx 2	Qdx 1	Qdx 2
1	100000	20000	60000	120000
2	80000	40000	80000	100000
3	60000	60000	100000	80000
4	40000	80000	120000	60000
5	20000	100000	140000	40000
6	0	120000	160000	20000

Price Elasticity of Demand

The value of price elasticity of demand of a commodity shows responsiveness of quantity demanded for a given change in price at a particular price-quantity combination.

The coefficient of price elasticity of demand of a commodity (E_p) is the ratio of percentage change in quantity demanded per unit of time to a given percentage in price of the commodity.

Since there is an inverse relationship between price and quantity demanded of a commodity, the E_p is negative and it is treated as a positive value by introducing a negative value in the formula.

$$E_p = \frac{-\Delta Q/Q * p}{\Delta P/P * Q} = \frac{-\Delta Q * p}{\Delta P * Q}$$

Fig 11.11

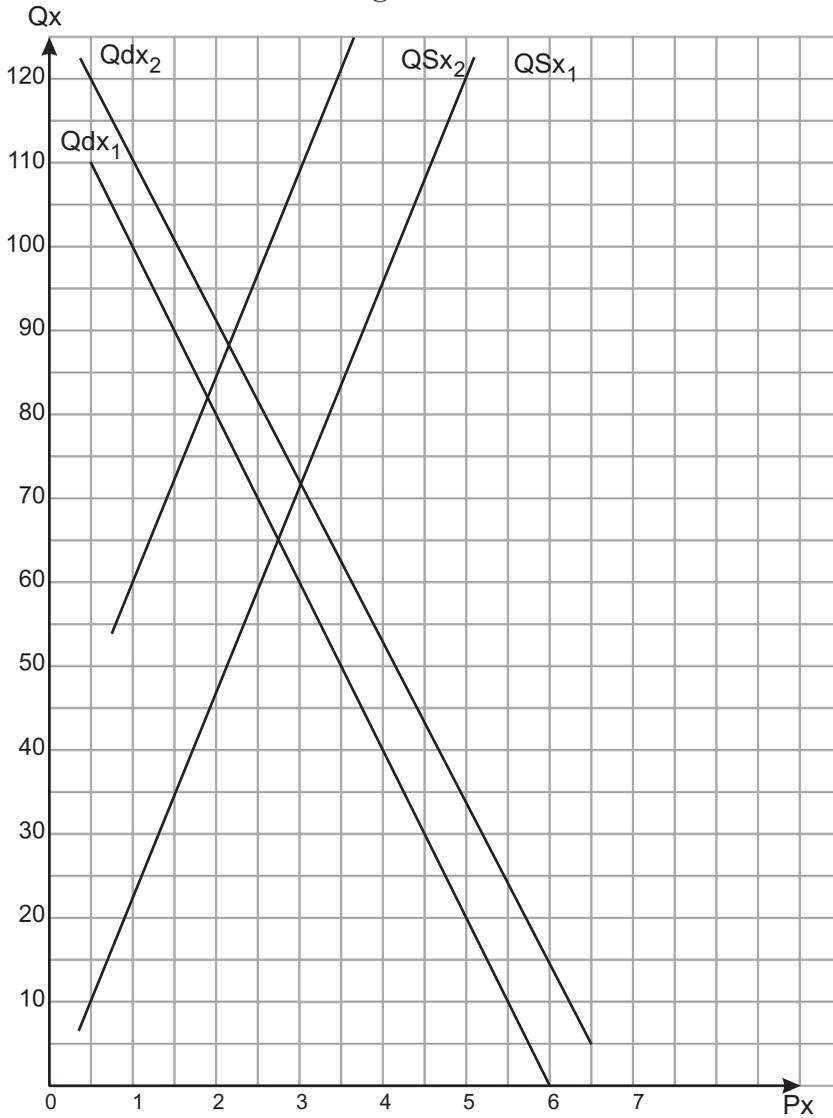
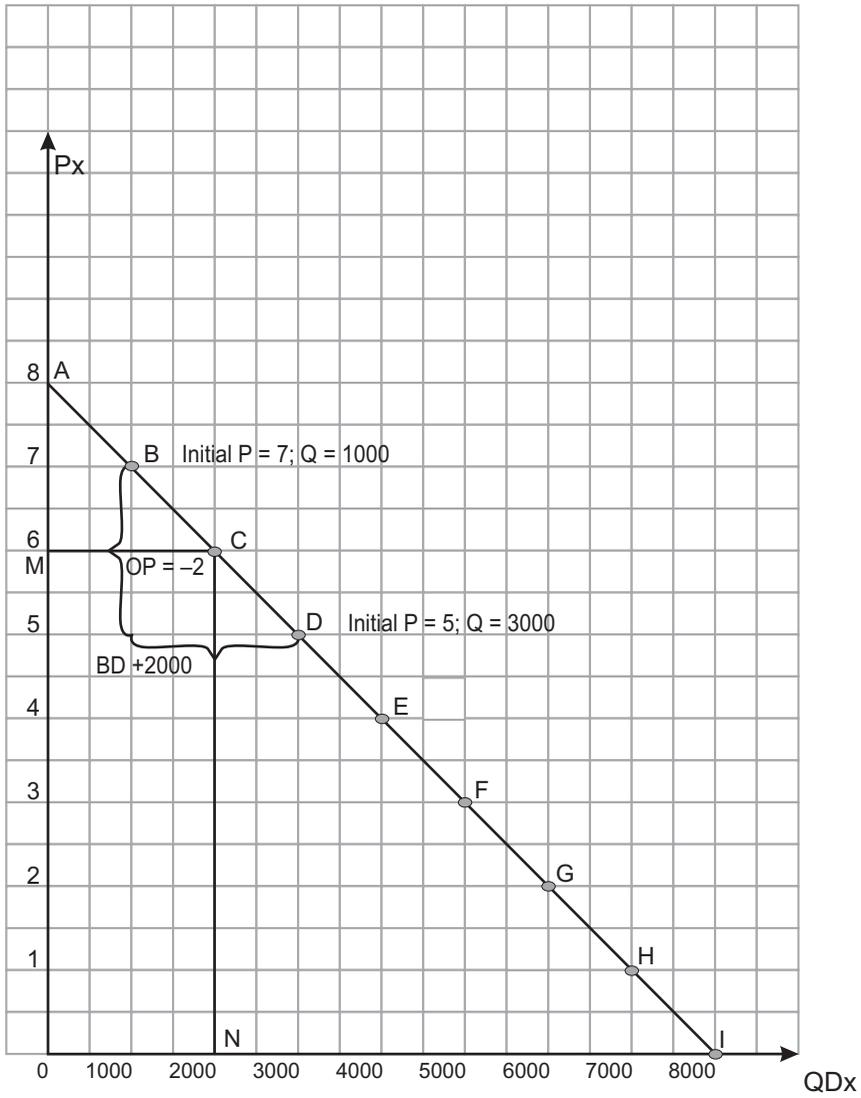


Fig 11.12



If $E_p > 1$, the commodity is price elastic; if $E_p < 1$, it is inelastic and if $E_p = 1$ it is unitary elastic.

Calculation of price elasticity of demand

Example:

A market demand schedule is given below and the demand curve is given in Fig 11.12. The calculation of price elasticity of demand is also given here.

Point	Price P_x (Rs)	Quantity demanded- Q_{dx}
A	8	0
B	7	1000
C	6	2000
D	5	3000
E	4	4000
F	3	5000
G	2	6000
H	1	7000
I	0	8000

The price elasticity from B to D

$$EP = \frac{-[2000] * 7}{[-2] * 1000} = \frac{-14000}{-2000} = 7$$

The price elasticity from D to B

$$EP = \frac{-[2000] * 5}{[-2] * 3000} = \frac{-10000}{-6000} = 1.67$$

Thus, we get a different value for elasticity if we move from B to D than if we move from D to B. This difference results because we used a different base in computing the percentage changes in each case.

We can avoid getting different results by using the average of the two prices and the average of two quantities instead of either of the two price or quantity values. Thus the new formula for the calculation of the price elasticity will be

$$E_p = \frac{-\Delta Q * [P_1 + P_2]}{\Delta P * [Q_1 + Q_2]}$$

Applying this modified formula to find price elasticity for the movement from B to D or for a movement from D to B, we get

$$E_p = \frac{-[2000] * 12}{[-2] * 4000} = \frac{-24000}{-8000} = 3$$

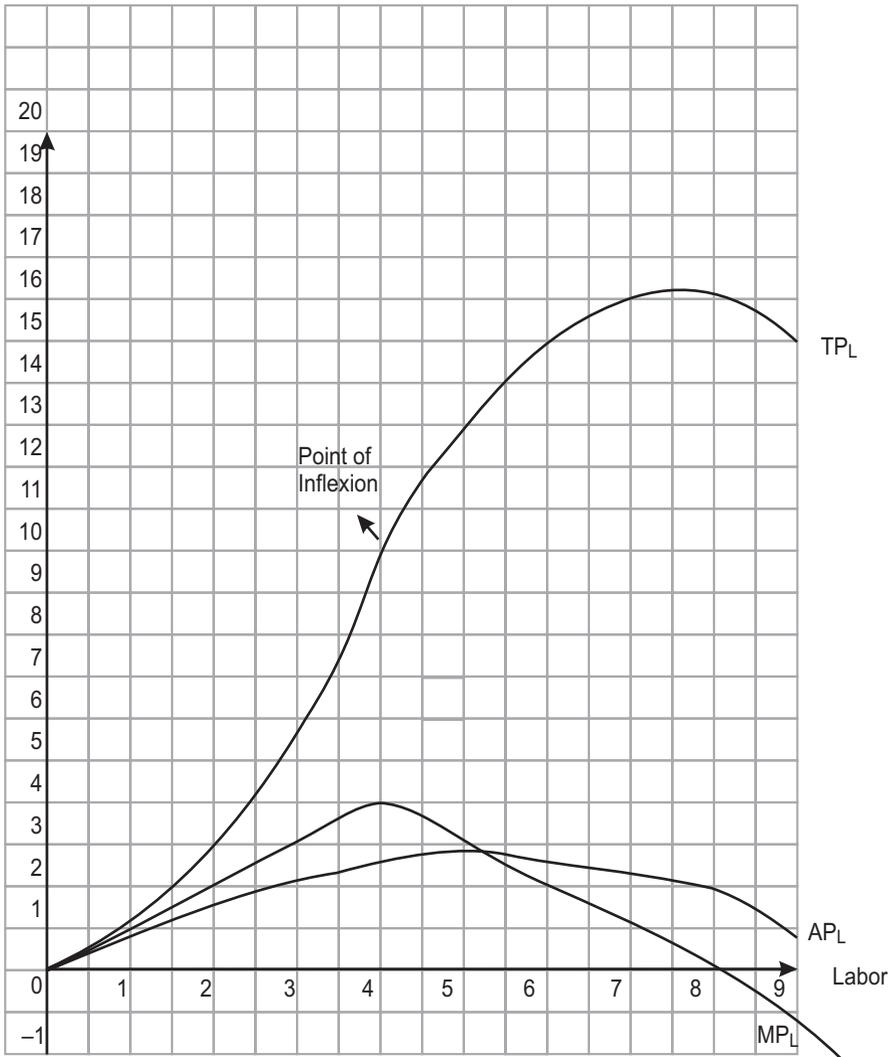
This is equivalent of finding price elasticity at the point midway between B and D, that is, at C.

Law of variable Proportions

This law analyses the short run production function of a commodity. The production function shows the relationship between inputs and outputs. The simple way to generate a schedule for the short run production function is to start with the marginal product of the variable, say labour. Given an ascending order of numbers like 1,2,3 and 4 and then a descending order of numbers like 4,3,2,1,0 and -1 for the Marginal Product of Labour (MPL). Assume capital is a fixed factor with ten units. From the MPL create cumulative column which is the TPL and APL is calculated in the usual way. The schedule is plotted in Fig 11.13.

Capital (K)	Labour (L)	TPL	APL	MPL
10	0	0	0	0
10	1	1	1	1
10	2	3	1.5	2
10	3	6	2	3
10	4	10	2.5	4
10	5	13	2.6	3
10	6	15	2.5	2
10	7	16	2.28	1
10	8	15	2	0
10	9	15	1.6	-1

Fig 11.13



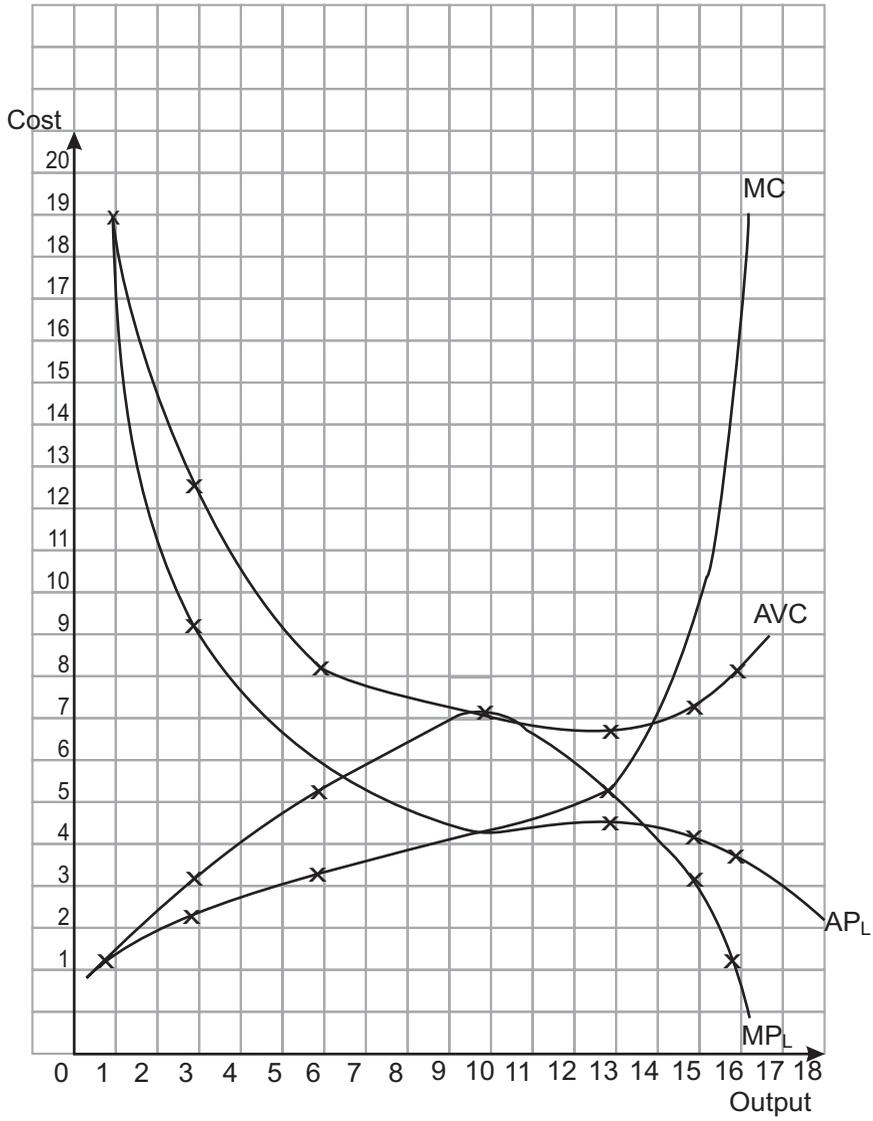
Short run cost functions

The short run cost functions show the relationship between output and cost. The average and marginal cost functions show the relationship between average cost and marginal cost of one hand and the output on the other. The average cost curve is the inverse of average product curve and marginal cost curve is the inverse of marginal product curve. (see Fig 11.14)

From the short run production schedule the corresponding cost schedules can be generated and it helps the students to understand the relationship between cost and productivity of a factor. Assume cost of one unit of capital is Rs. 100 and cost of one unit of labour is Rs. 10.

Capital (K)	Labour (L)	TPL	APL	MPL	Total Cost	Average VarCost	Marginal Cost
10	0	0	0	0	100	0	–
10	1	1	1	1	110	10	10
10	2	3	1.5	2	120	6.7	50
10	3	6	2	3	130	5	3.3
10	4	10	2.5	4	140	4	2.5
10	5	13	2.6	3	150	3.8	3.3
10	6	15	2.5	2	160	4	5
10	7	16	2.28	1	170	4.4	10
10	8	16	2	0	180	5	–
10	9	15	1.6	-1	190	6	–

Fig 11.14



Concept Mapping and Flow Charts in Economics

What is Concept Mapping?

Concept mapping is a technique of linking different concepts to visualise the relationship between them. Here different concepts are shown by means of suitable figures and then they are joined with arrows or lines. The lines can also be associated with suitable phrases like 'goes to', 'comes out', 'added to', etc. However, it is not compulsory to associate the lines with such phrases. The main idea is to make the reader understand what a particular line means. According to Wikipedia, "Concept maps have their origin in the learning movement called constructivism. In particular, constructivists hold that learners actively construct knowledge." In fact, it is a very good way of learning by doing. However, the theoretical foundation of concept mapping as a great learning tool has been first given by Joseph D. Novok and his research team at Cornell University in the 1970s.

Psychological foundations of concept mapping

It has been well established by the psychologists that our real learning does not mean filling up the storehouse of brain by more and more information, as is the case

of rote learning. In fact, learning takes place by interaction of information inputs through different systems between different parts of the brain i.e. short-term memory, working memory and long-term memory and integrating those information inputs with the existing knowledge. While constructing a concept map the learner has to activate the function of the brain in such a way that the different small concepts of the map are related to each other. Psychologically concept mapping facilitates learning in two ways, firstly acquiring the related images faster and secondly retaining them for longer period.

Different researches have established that learning of related concepts become much easier than that of non-related concepts. It has been nicely explained by Novak, J. D. & A. J. Cañas in a paper, 'The Theory Underlying Concept Maps and How to Construct Them' : "..... if a person is presented with a list of 10-12 letters or numbers to memorize in a few seconds, most will recall only 5 to 9 of these. However, if the letters can be grouped to form a known word, or word-like unit, or the numbers can be related to a phone number or something known, then 10 or more letters or numbers can be recalled. In a related test, if we give learners 10-12 familiar but unrelated words to memorize in a few seconds, most will recall only 5-9 words. If the words are unfamiliar, such as technical terms introduced for the first time, the learner may do well to recall correctly two or three of these. Conversely, if the words are familiar and can be related to knowledge the learner has in her/his cognitive structure, e.g. months of the year, 12 or more may be easily recalled."

Retention of visual images also becomes longer. It has been established in different studies that human beings have a good ability to remember images. For example, instead of telling students with the help of language how the different sectors of an economy are interrelated, if we show them this relation by drawing visual images of different things going from one sector to another, it will be easier to recall it afterwards; it will be much easier to recall, even after longer period, if we tell them to draw the figures by themselves.

Use of concept mapping in teaching Economics

Economics is a subject in which the students have to understand the relationship between abstract concepts. Especially for many a young learner who is studying the subject for the first time it becomes very difficult to build up a concrete knowledge of abstract concepts and also to understand the relationship between them. Concept mapping has proved to be one of the good tools in achieving this objective.

How to develop a concept map?

- i) The first step to develop a good concept map is to decide about the domain. One has to decide about what should be the subject matter of the concept map which is going to be created.
- ii) The next step is to set a good focus question. Here it should be decided what one is going to establish or show by means of the concept map.
- iii) After this it is better to have a rough sketch showing how the different key concepts are to be placed and related.
- iv) Then the different key concepts are to be labeled at different places with different symbols or figures.
- iv) Those concepts are then linked with arrows and/or linking words or phrases.
- v) For good understanding of the relationships between the sub-domains of the map, it may be necessary to crosslink different concepts.
- vi) Finally, the concept map should be revised to be given a better look and to be made better meaningful. Selection of proper colour combination and figure is also a very important aspect. It is better to give different colours for the concepts of different categories

but same colour for the concepts of same category.

Types of concept map

Different types of concepts maps have been discussed by different researchers like, hierarchical, cyclical, chain, spider-map or network. There are differences of opinion too on what type of concept map is more beneficial for learning. For example, at the initial stage some of the researchers strongly advocated for hierarchical concept map (Novak,1998). Hibberd, Jones and Morris (2002) and some others could not support this opinion. Safayeni, Derbentseba and Canas (2003), on the other hand, argued in favour of cyclical type of concept map. Thus the researchers differ in their opinions as to which type of concept map is better than the others. However, it is widely accepted that the type of a concept map doesn't matter. What is important is that it should be suitable to the subject matter on which we are going to construct it.

Advantages of concept mapping

- i) A well constructed concept map with good colour combination in meaningful figures attracts a new learner, at the first instance itself, towards the concept map and, for that matter, to understand the relation depicted in it.
- ii) Concept mapping organises the knowledge systematically. The learner becomes able to define and explain different concepts or the relationship amongst them without rote learning. The whole subject matter becomes like a picture to her. As a result, retention of learning also easy for longer period.
- iii) As the learner gets the joy of creativity, learning no longer becomes boring to her. She gets immense interest in the subject matter.

- iv) Concept maps also help the teacher to identify where her student's concept is not clear. A wrong arrow or a wrong phrase easily reflects the problem area of the learner.
- v) According to some researchers concept maps also help in evaluation of a learner's level of learning. But researches are still required before it can be utilized as a powerful tool of evaluation free from subjectivity.

Use of Computer in constructing concept map

It should, however, be remembered that the construction of a concept map never ends. The more we look at it or revise it, the more we can make it attractive and meaningful. The use of computer software, like PowerPoint, therefore, helps us a lot in this field.

However, a note of caution is to be mentioned for the teachers. While constructing the concept map a student can easily forget the objective of such activity and as a result by losing her path she may get involved in useless drawing. The teacher should, therefore, develop an idea beforehand about what she expects from her students and remain vigilant in the class to guide and facilitate her students so that the right objective is achieved within stipulated time.

Let us see a few flow charts developed on the basis of concept mapping of strategies. Such charts along with necessary discussion will help not only the teachers to teach but also the young learners to learn some difficult topics better. The teachers can prepare these maps in PowerPoint presentation and show the students with the help of LCD projector. These can also be prepared as classroom charts for ready reference. But it will be even better to let the students prepare these charts in computer by themselves. They can prepare even better charts on the same topic and on other topics too. It will make their concepts clear. They will also get more interest in the subject. However, due to limitation in the use of colour in the book these maps have been

shown in bi-colour. But more the use of colour is done, especially different colour for different groups, better a map will look and more interesting it will be to the learners.

What do we study in economics?

When a student is going to study Economics for the first time he should be curious about what he is going to study in the subject. Consumer Behaviour Theory, Production Theory, Theory of Market and Equilibrium Price Determination, Theory of Distribution, etc. are some samples of theories in economics. But little importance is given on the discussion on the origin or relevance of these theories. Wherefrom these theories have come? Have they fallen from the sky? What is the relation between these theories? Why should we study these? These are the questions normally remain unanswered to the young minds and that's why they normally face difficulty in understanding the subject. So what is required is to correlate the different theories of Economics and to show students where a particular theory belongs in the subject matter or what the importance of that particular theory is. The following figure 12.1 will be helpful in correlating the different theories. But to introduce the figure we can go through the following question-answer method where the answers to the questions are expected from the students in the classroom.

Teacher: Why do we study Economics?

Students: To know how we can earn money; to know how we can develop our economy; to know how to keep accounts of a company, etc.

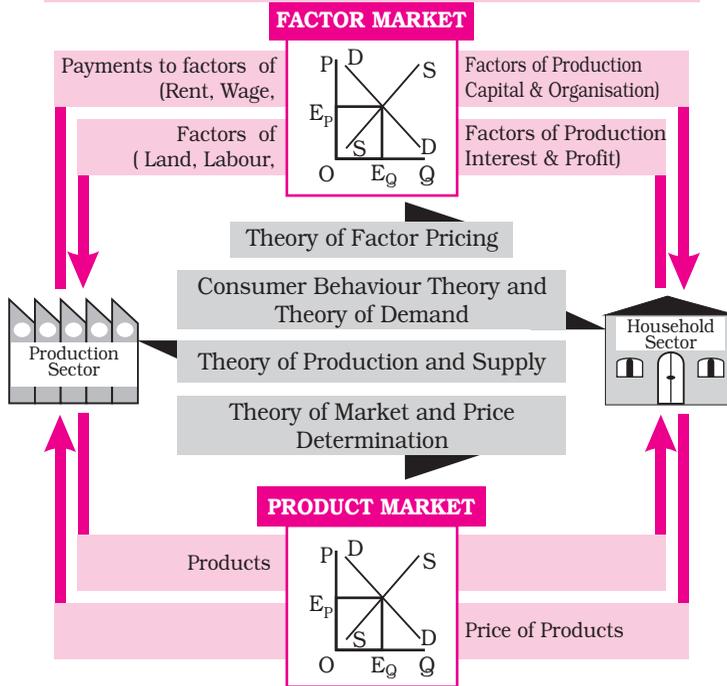
Teacher: O.K. Can you tell, what are our basic needs to live in this world?

Students: Food, clothing and shelter.

Teacher: Good. Now suppose Mahesh (take the name of any student in the class) has completed his graduation and his father tells him to maintain his own livelihood by earning for himself. So he moves on to a town and look

Fig. 12.1 What Do We Study In Economics?

How To Solve The Problem Of Unlimited Demand With Limited Resources Which Have Alternative Uses
By Creating More Utility To The Existing Resources I.e. By Production



for a job. He gets a job of, say, Rs.7000/-. Suppose with this he takes a rented room; spends certain amount on food, clothing and further education; buys a bicycle and a tape recorder for amusement. Will he be satisfied with this?

Students: No, sir.

Teacher: O.K. So now he wants to shift to a better house, to get better food, clothing and education. Now he doesn't want to ride a bicycle. He wants to have a motor bike. At least a colour T.V. set he wants to have for amusement. So he tries for a job of better salary. Yes, he gets one of Rs.12,000/-. Will he be satisfied with these?

Students: No.

Teachers: Well. Now again he wants to buy many other things. Now in place of a motor bike he wants to have a car. In place of an ordinary colour T.V. he wants to have a home theatre. So again he tries for a better opportunity and gets one of Rs.22,000/-. Will he be satisfied with these?

Students: No sir.

Teacher: So, what do we find? Is there any limit of our demand?

Students: No sir. It is unlimited.

Teacher: Very good. But to meet this unlimited demand does Mahesh has unlimited resource or income?

Students: No sir. It is limited.

Teacher: So what is our problem?

Students: How to meet unlimited demands with limited resources.

Teacher: How can we meet unlimited demands with limited resources?

The teacher should try to get the answer 'by production'. If the students can give it, it's good. Otherwise he can start another story.

Teacher: Suppose a farmer has 100 quintal of rice by which he has to meet all his expenses for the whole year. Will he finish the whole amount of rice just to meet his expenses for the year?

Students: No sir. He will utilise some amount for further production.

Teacher: Very good. But why will he go for further production?

Students: To meet his expenses on future demand.

Teacher: Excellent! So what is the solution to meet more and more demands with limited resources?

Students: Production.

Teacher: Yes, production. So now we will see the basic things required for production. Can you tell first and foremost what do you require to conduct a production?

Students: Land.

Teacher: Yes, a place where you can conduct the production process. Next?

Students: Labour.

Teacher: Well, the man power who will actually produce the things. Next?

Students: Capital.

Teacher: Good, the machinery, the infrastructure, the stock of raw materials and, of course, money, all these things are included in capital. Now suppose a piece of land is lying somewhere, capital is lying somewhere else and some labourers are also sitting somewhere else. Will there be automatic production?

Students: No, someone is required to organise the production process.

Teacher: So we require some organiser.

Remember, answers in the classroom may not come as expected above. But we have to get these answers by proper questioning and directing their thought process in the desired way. Now refer to the chart.

Teacher: Now let us look at the chart 'WHAT DO WE STUDY IN ECONOMICS?'

Here we can see that the 'PRODUCTION SECTOR' is conducting the production process with the help of the four 'Factors of Production' i.e. Land, Labour, Capital and Organisation. But wherefrom are they getting these?

Students: From 'HOUSEHOLD SECTOR'.

Teacher: Good, after conducting the production what are they doing with it?

Students: They are selling it to the 'HOUSEHOLD SECTOR' through the 'MARKET'.

Teachers: What are they getting in return?

Students: They are getting 'Prices of Products'.

Teachers: Well, what are they doing with it?

Students: They are distributing it as the 'Prices of Factors of Production'

Teacher: So we can now have a concise idea about what we are going to study in Economics.

Basically the subject matter of Economics can be studied in two ways. Either we can discuss about the individual economic units or we can also discuss the economy as a whole. Now what is another name of small?

Students: Tiny, micro.

Teacher: Yes. So that part of Economics which studies about individual economic units or economic units in small scale is called Microeconomics. And that part of Economics which studies about the economy as a whole is known as

Students: Macroeconomics.

Teacher: Good. Now, so far as Microeconomics is concerned, in a free market economy the most important place is the market where the price is determined by the market forces of DEMAND and SUPPLY. Now who is demanding for products in the market?

Students: The CONSUMERS.

Teacher: Well, so to get the demand curve what we have to study is the 'CONSUMER BEHAVIOUR THEORY AND THE THEORY OF DEMAND'. Now, who are the suppliers in the market?

Students: The PRODUCERS.

Teacher: Good, so to get the supply curve we have to study the 'THEORY OF PRODUCTION AND SUPPLY'. Now, once we get the DEMAND and SUPPLY curve we have to study the characteristics of different MARKETS and then we can see how price of a commodity is determined in the market. The price determination in the FACTOR MARKET, however, has got a separate importance because of certain reasons. And that's why it is discussed under a separate heading i.e. THEORY OF FACTOR PRICING or the THEORY OF DISTRIBUTION. However, it is not in your syllabus.

So far as Macroeconomics is concerned, we will learn how national income or employment or general

price level is determined in an economy. We will also learn how we can solve challenges like unemployment or deflation or inflation with the help of fiscal or monetary or any other policy. For that matter, we will also study what fiscal or monetary policy is. But in order to do all these first of all we have to study how we can measure national income of a country. And finally, since no economy can stay isolated from the rest of the world, we need to have some idea about how economic transactions of a country are recorded. This is what we are going to study in Economics, as far as your Senior Secondary syllabus is concerned.

How to calculate national income?

National Income Accounting is one chapter where the students face maximum difficulty. The difficulty arises especially when they have to calculate national income aggregates. In most cases students prefer to memorise the formula. Students are expected to understand many concepts and estimate numerical values of these conceptual estimates.

Here we will see how concept mapping helps students to understand the concepts well and also to correlate those concepts so that need not have to mug up lifeless formula anymore and they will be able to prepare concept map required to solve any problem. The concepts as well as the concept map will then become lively to the learners.

Here we are having total three concept maps, titled 'HOW TO CALCULATE NATIONAL INCOME : PRODUCT METHOD & INCOME METHOD', 'HOW TO CALCULATE NATIONAL INCOME : EXPENDITURE METHOD', and 'NATIONAL INCOME ACCOUNTING — THE IDENTITY'. The first two concept maps help in developing the clear understanding items and the third one correlates the concepts and helps students to understand the relation between concepts. The students also can prepare can develop similar ones by themselves.

In the first concept map, titled 'HOW TO CALCULATE NATIONAL INCOME : PRODUCT METHOD & INCOME METHOD', we see that the circular flow of income itself gives us the Domestic Product or Domestic Income. Domestic Product is nothing but the sum total of SALES of final output and CHANGE IN STOCK (which is lying unsold with the production sector itself). To get the Net Domestic Product (NDP) DEPRECIATION (which is again lying within the Production Sector) is going out of the circular flow. To get the Net Domestic Product at Factor Cost (NDP at FC) INDIRECT TAX is going out of the circular flow to the Government Sector and SUBSIDY is joining the circular flow from the GOVERNMENT SECTOR. Again NET FACTOR INCOME FROM ABROAD is coming from the FOREIGN SECTOR to join NDP at FC to give us Net National Product at Factor Cost (NNP at FC) or Net National Income at Factor Cost (NNI at FC) or National Income (NI).

In the second concept map, titled 'HOW TO CALCULATE NATIONAL INCOME : EXPENDITURE METHOD', we can see how expenditure meted out by different sectors and the estimates on Gross Domestic Product at Market Price (GDP at MP), coming out of the PRODUCTION SECTOR. So the sum total of all these expenditures and INCREASE IN STOCK gives us GDP at MP. So from GDP at MP we get the National Income in the same way as it has been explained in the previous paragraph.

Fig. 12.2. How to Calculate National Income?

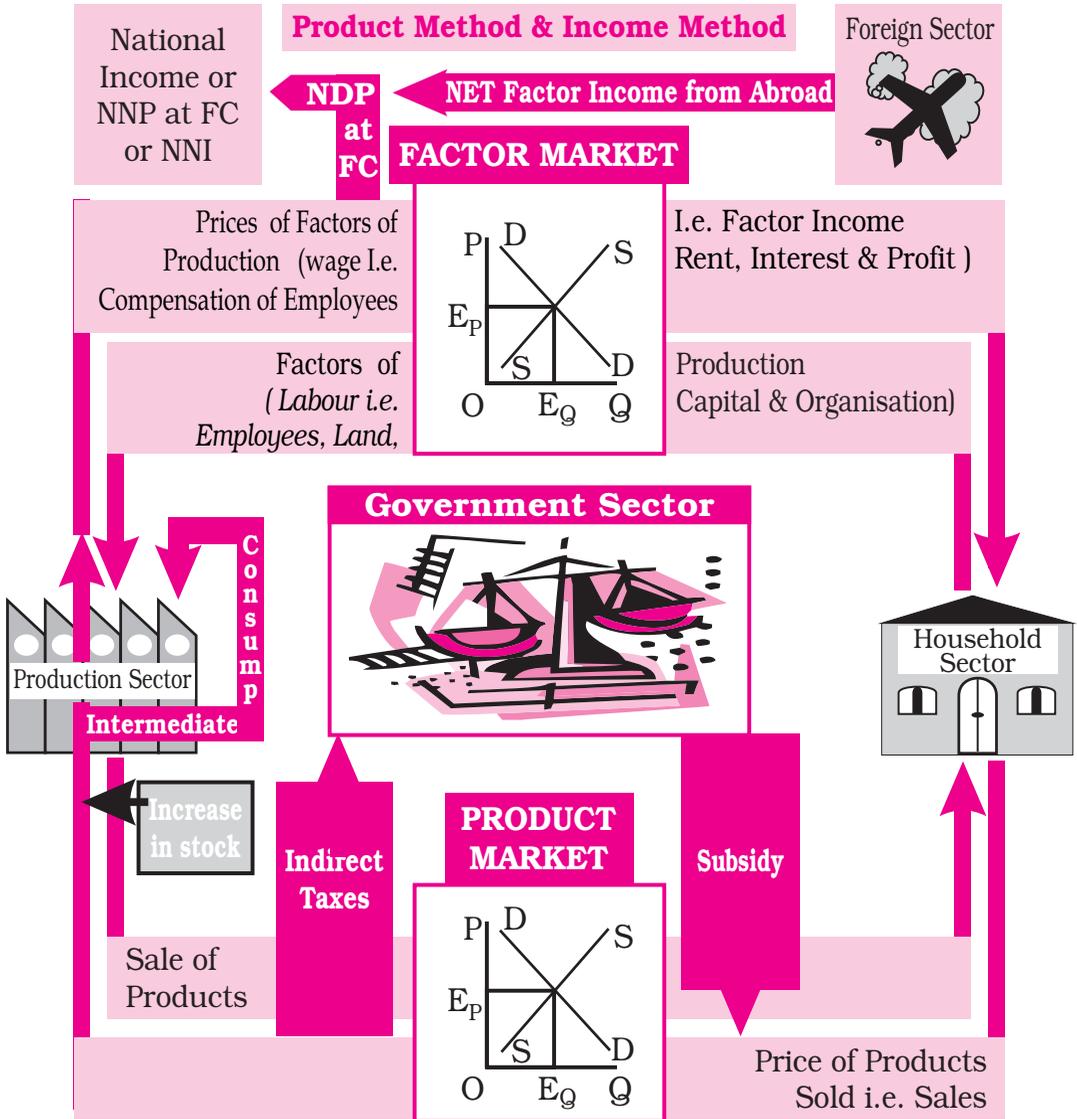


Fig. 12.3 How to Calculate National Income

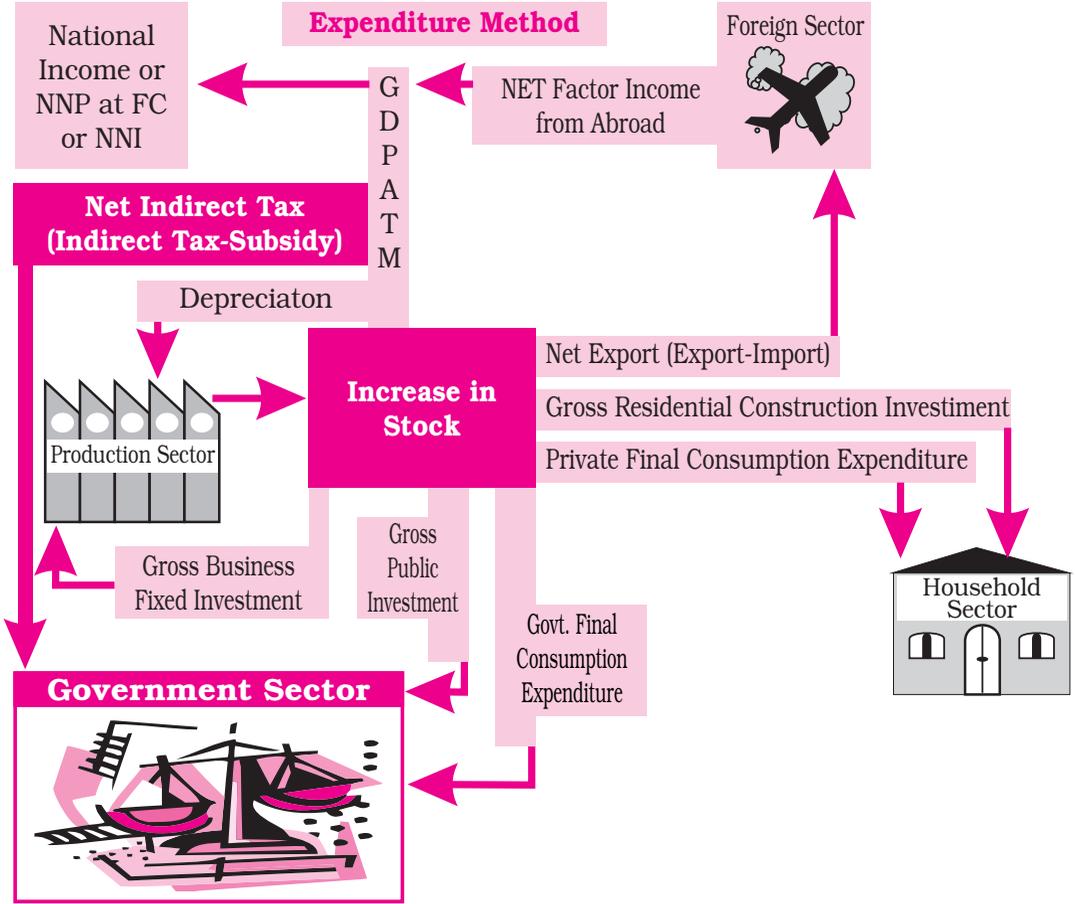
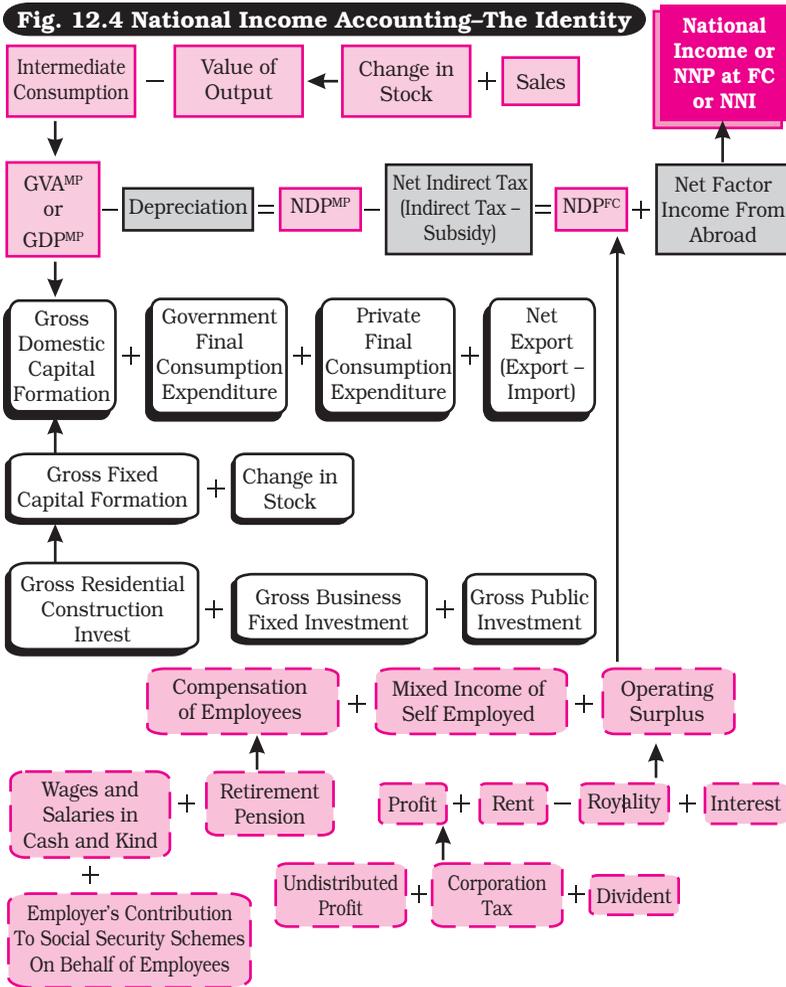


Fig. 12.4 National Income Accounting-The Identity



The following guidance will help students to use map and solve the problems better.

The Method

- Product Method Or (Final) Output Method Or Value Added Method
- Expenditure Method
- Income Method

NOTE : GDPMP means [Gross Domestic Product at Market Price]

Here we have three terms: (i) G [GROSS], (ii) DP [DOMESTIC PRODUCT] and (iii) MP [MARKET PRICE]

To be changed into other three terms: (i) N [NET], (ii) NP [NATIONAL PRODUCT], and (iii) FC [FACTOR COST] respectively

With the help of three instruments: (i) DEPRECIATION, (ii) NFIA [NET FACTOR INCOME FROM ABROAD] and (iii) NIT [NET INDIRECT TAX] respectively.

THE TECHNIQUE :

GROSS - DEPRECIATION = NET ==> NET + DEPRECIATION = GROSS

DOMESTIC PRODUCT + NFIA = NATIONAL PRODUCT ==> NATIONAL PRODUCT - NFIA = DOMESTIC PRODUCT

MARKET PRICE - NIT = FACTOR COST ==> FACTOR COST + NIT = MARKET PRICE

For example :

GDPMP + NFIA = GNPMP; GDPFC + NIT = GDPMP;
GDPMP - DEPRECIATION = NDPMP

NOTE :

To change from one aggregate to another aggregate we should see out of three terms how many we have to change and what are those. Utilise only those relevant instruments for addition or subtraction as the case may be.

For example :

We have to change from GDPFC to NDPMP. As we have to change only two terms G(Gross) to N(Net) and FC(Factor Cost) to MP(Market Price), we have to subtract DEPRECIATION and add NIT with GDPFC . As DP(Domestic Product) remains same we have nothing to do with NFIA.

Chapter 13

Assessment and Framing Quality Questions in Economics

INTRODUCTION

Assessment - a regular element in most economics classroom work holds the key to better learning. It is an important component of formal education system. It is expected to help teachers and school managers to understand what students learn in the classroom, identifying the challenges faced by them in learning (economics) curricular contents or achieving (economics) curricular objectives and provide remedial measures for better learning. Examinations are conducted by government-run boards through schools affiliated to them to certify students that they have achieved the required curricular objectives in the subject or group of subjects. The school managers use tests and examinations as a tool to assess the performance of teachers as well.

Economics is taught as a part of part of social sciences / social studies course in classes 6-10. The importance in terms of marks allotted to this subject varies from board to board. At the secondary stage, a few boards give less emphasise whereas a few others such as CBSE allot 16-20 per cent of social science course marks to economics. At higher secondary stage, economics is taught as one of the four elective courses.

Curricular Objectives and Assessment

The first and important step in designing assessment is to identify and evaluate the learning objectives i.e., knowledge and key skills that curriculum developers expect learners to acquire from a particular course. It is not an easy task as the nature of students are mixed group. Traditionally the knowledge dimension has been given greater emphasise as opposed to transferable skills – those skills which are required while learning the contents of the subject but also useful in the day-to-day life and in many service sector jobs such as ability to communicate, negotiate, make effective use of information technology and other resources. We may find the course objective has already incorporated these goals. The modern approach to assessment is expected to promote both skills and knowledge dimension of the subject. However we need to ask whether or the existing assessment practices which are mainly directed by government agencies such as Examination Boards have any scope for assessing various dimensions of the course objectives.

In Indian schools, economics students generally have exams – quarterly, half yearly, mid-term examinations, monthly examinations, revision tests, pre-board examinations – almost all of them test the individual knowledge base but questions are often relatively predictable, and in assessment, as Miller (2006) points out, it is difficult to distinguish between surface learning and deep learning. In some Boards, project work is included in class XI and 5-10 marks are allotted. In class XII, no mark is allotted for project work / activities. So all the marks are allotted to year-end examinations. The IB and ISCE allot 20-25 marks for internal assesment. What we find is rather a continuum – ranging from full marks to year-end examination and one-fourth is allotted for project-work and school-based

activities. NCERT recommends 60 per cent marks to be allotted for year-end examinations and 40 per cent for school-based activities. Why no examination board follow this principle?

Every course whether history, geography or economics taught in schools has specific objectives. Through classroom practices and other experiences, schools and teachers are expected to achieve these objectives. It is a common practice among teachers to plan their classes using lesson plans to organise classroom and guide students to carry out activities or projects. Tests and examinations (t & e) both written or projects and activities enable teachers to come to know how and whether or not students succeeded in achieving the curricular objectives of the economics course, diagnose difficulties pupils face while learning and provide remedial measures. The assessment is also expected to improve the quality of learning not merely to measure it.

DO IT YOURSELF - 1

The following table provides the objectives of teaching economics at higher secondary level. These are given in the Senior Secondary School Curriculum. Look 10 questions in give on page 204 and mark the question numbers which fulfil the specific curricular objective.

Table 13.1: Course Objectives in Economics

S. No.	Course Objectives	Which subject (s) /topic (s) would be is intended to more appropriate/has greater scope to achieve the course objective?	Which question achieve the objective? (Write the question nos.)
1.	Understanding basic economic concepts		
2.	Developing economic reasoning which the learners can apply in their day-to-day life as citizens, workers and consumers.		
3.	Sensitise learners' role in nation building		
4.	Make learners to be sensitive to the economic issues that India is facing today		

5.	Equipping learners with basic tools of economics to analyse economic issues		
6.	Equipping learners with basic statistical tools to analyse economic issues		
7.	Make learners to understand that there can be more than one view on any economic issue and it is necessary to acquire skills to argue logically with reasoning		

Assessment in Economics – An Overview

There is an old saying - the more things change, the more remains the same. The examination system in India is a clear example of this phenomenon. Even though a considerable change has taken place in assesment, there is no change in the fundamental (narrow) objective of conducting examinations.

Tests and examinations can be broadly categorized into four: (i) entrance tests (assessing the knowledge and competency before taking up a course), (ii) formative assessment (tests providing continuous feedback to learners and teachers about the process of learning during the course), (iii) diagnostic tests (to determine learning difficulties faced by the learners) and (iv) summative assessment (tests to determine the extent to which objectives of the course is achieved). Each one of them serves different purpose. While the diagnostic tests are conducted to organize remedial measures, summative assessment tests are used to assign grades or for certifying the level of mastery achieved by a learner in a particular course.

In 1950-60s, only essay questions were asked in Board examination. Students were given the option to attempt 50-60 per cent of the given questions according to their own choice. Students had to take two examinations – half yearly and end of the year / annually and weights given to end of the year examinations was high as compared to half yearly examinations. This system was found defective in many ways. Since the

number of essay type questions that can be set in a course is limited, the questions tend to get repeated over the years. The content coverage was poor with students relied upon guess work and selective study of the textbook contents. The options given to the students also promoted the selective study of the contents. Questions were defective, containing ambiguity in language. They were set without taking into account the curricular objectives – objectives of teaching economics. Overall marks assigned to a question were stated but the marks assigned to the parts of the question were not specified which led to difficulty on the part of students in understanding emphasise in a question and also promoted subjective marking of the answers by examiners. Both inter-examiner and intra-examiner reliability were very low.

All these defects called for changes in the examination system. The present assessment in most examination boards is based on the Bloom's taxonomy of educational goals.

Bloom's Taxonomy and Teaching Economics

In 1956, Benjamin Bloom and his collaborators published a framework for categorizing educational goals. This is popularly known as Bloom's Taxonomy. This framework has been mostly used by school and college teachers for planning their classroom activities. Bloom's taxonomy consist six major categories: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation. While each category contained sub-categories, by its structure, the taxonomy is hierarchical (levels increase in difficulty/sophistication) and cumulative (each level builds on and subsumes the ones below). This also indicates a continuum from simple to complex and concrete to abstract (see Box 1).

Six Categories of Bloom's Taxonomy Defined

(i) Knowledge: This "involves the recall of specifics and universals, the recall of methods and processes, or the recall of a pattern, structure, or setting."

Questions in this category contain terms such as: arrange, define, duplicate, label, list, memorize, name, order, recognize, relate, recall, repeat, reproduce, state and so on.

Example: Define poverty line.

(ii) Comprehension "refers to a type of understanding or apprehension such that the individual knows what is being communicated and can make use of the material or idea being communicated without necessarily relating it to other material or seeing its fullest implications."

Teachers ask questions containing words such as classify, describe, discuss, explain, express, identify, indicate, locate, recognize, report, restate, review, select, translate.

Example: How is the price elasticity of demand of a commodity affected by the number of its substitutes? Explain.

(iii) Application refers to the "use of abstractions in particular and concrete situations."

Verbs normally used to develop questions are: apply, choose, demonstrate, calculate, employ, illustrate, interpret, operate, practice, schedule, sketch, solve, use and write.

Example: The price elasticity of supply of commodity X and Y are equal. The price of X falls from Rs.10 to Rs.8 per unit and its quantity supplied falls by 16 per cent. The price of Y rises by 10 per cent. Calculate the percentage increase in supply.

(iv) Analysis represents the "breakdown of a communication into its constituent elements or parts such that the relative hierarchy of ideas is made clear and/or the relations between ideas expressed are made explicit."

Verbs used to test this goal are, calculate, categorize, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, question, test and so on.

Example: Distinguish between intermediate products and final products. Give example.

(v) Synthesis involves the "putting together of elements and parts so as to form a whole."

A few examples of verbs used to test this goal are: arrange, assemble, collect, compose, construct, create, develop, formulate, manage, organize, plan, prepare, set up and write.

Example: Explain the circular flow of income.

(vi) Evaluation engenders "judgments about the value of material and methods for given purposes."

A few verbs used to test this goal are: appraise, argue, assess, attach, choose, compare, defend, estimate, predict, rate, core, select, support, value, evaluate.

Example: How will you treat the following while estimating national income in India? Give reasons for your answer.

- 1
- 2
- 3
- 4
- 5

■ Organising economics curriculum and classroom activities as suggested in the taxonomy can help (i) both students and teachers to come to know why economics is taught; (ii) teachers to organise objectives of each chapter of the textbook / syllabus as suggested in the framework so that they can clarify objectives for themselves and for students; (iii) organising set of objectives so that economics teachers can (a) plan classroom teaching and other activities; (b) design valid assessment tasks and strategies and (c) ensure that what they teach and assess are aligned with the objectives of teaching economics. However, due to various reasons, Bloom's hierarchical taxonomy is mostly used for setting question papers to ensure that 'students progress to the highest level of understanding'. In Indian board examinations, these six categories are reduced to four (by clubbing the last three categories under one category called "skills" or "skills and abilities").

Many of you would have set question papers for annual Board examinations. As pointed out earlier, most of us tend to give emphasise on knowledge recall and to a certain extent on understanding. Questions testing application and skills are given third and least priority.

DO IT YOURSELF - 2

The following table contains some questions asked in higher secondary board examinations in India. Classify them into six categories in column 2 (Type I) and give the codes given in brackets (Knowledge - K; Comprehension - C; Application- A; Analysis - AN; Synthesis - S and Evaluation - E).

Table 13.2: Bloom's Taxonomic and Economics Question

S. No.	Question	Type I	Type II
1.	What is a demand schedule?		
2.	What is commercial bank?		
3.	Distinguish between balance of trade and balance of current account.		
4.	Explain what happens to losses if the firms are free to leave the country.		
5.	The concept of equilibrium is always explained with reference to a) price b) supply c) demand d) time		
6.	Explain the meaning and objectives of monetary policy.		
7.	Distinguish between a normal good and an inferior good. Give example in each case.		
8.	What causes a downward movement of along a supply curve?		
9.	Enlist the internal and external diseconomies of scale.		
10.	Calculate the net value added at factor cost from the following data (in Rs. lakhs.). (i) Depreciation – 20; (ii) intermediate cost – 90; (iii) Subsidy – 5; (iv) Sales – 140; (v) Exports – 7; (vi) Change in Stock – (-) 10; (vii) Imports of raw materials – 3.		

Limitations of using Bloom's taxonomy

Studies show that examination system based on Bloom's taxonomy in India is stressful experience for children and questions asked in the board examinations are highly biased towards knowledge recall. To quote from a Report of the National Advisory Committee popularly known as Yashpal Committee Report on Learning Without Burden,

"Children have no choice but to memorise all the 'names' in order to 'prove' in an examination that they have 'understood' a phenomenon. Despite all kinds of claims that examinations have been reformed, they continue to focus on testing the possession of 'correct' information (i.e., the names of things, definitions, examples, etc.). Recall-type questions outnumber the questions that test the child's capacity to speculate, evaluate or judge, and to apply an idea in an unfamiliar context. Board examinations, taken at the end of class X and class XII, have remained rigid, bureaucratic and essentially uneducative (as the child never sees why he or she was marked in a certain way), and mainly a

source of awe because of the amount of information they demand in a manner ready for instant recall. Such a system obviously influences the tests and annual examinations taken by schools in earlier classes as well as the daily pedagogy practised in classrooms." (NCERT, 1993, p.17)

The examination system is common to all subjects and economics courses are not exception to this general pattern. Memory recall and rote memorisation are given more importance and a very little attention is drawn on developing questions that tests economics students' higher mental abilities. Economics is a social science having potential for developing more than one perspective and method to understand any economic phenomenon, questions are not asked to test whether children develop these perspectives. Since greater emphasis is laid on memory recall, textbooks produced by most textbook publishing agencies both in public and private sectors present content materials that promote rote memorisation rather than a pedagogical instrument for understanding economic concepts.

The National Curriculum Framework (NCF) 2005 recommends schools to (i) shift learning away from rote methods and (ii) making examinations more flexible and integrated into classroom life. The National Focus Group on Examination Reforms set up by National Council of Educational Research and Training, New Delhi stated in its Position Paper that the present examination system is inappropriate for the "knowledge society of the 21st century" which requires "innovative problem solvers". Also the examination system does not serve the needs of social justice. Questions asked in the Board examinations encourage rote memorisation and fail to test higher order skills like reasoning and analysis, lateral thinking, creativity and judgement. It does not recognise differentiation among learners and their environment rather they induce unnecessary anxiety and stress which lead students risking their lives. Economics questions are exception to this trend.

More recently, emphasis has shifted from instructional objectives, which describe what instructors do and the content of material presented during classroom instruction, to student learning indicators,

which describe what students can do as a result of their educational experiences.

Revision of Bloom's Taxonomy

In 2000, a group of cognitive psychologists, curriculum theorists and instructional researchers, and testing and assessment specialists came out with a revised version of Bloom's Taxonomy (Anderson and Krathwohl, 2000). The revised taxonomy has been recognised as "more dynamic" conception of classification. While the original taxonomy used nouns, the revised taxonomy contains verbs and gerunds to label their categories and subcategories.

The "action words" which describe the cognitive processes by which thinkers encounter and work with knowledge are: (i) Remember (Recognizing and Recalling); (ii) Understand (Interpreting, Exemplifying, Classifying, Summarizing, Inferring, Comparing, Explaining, Apply, Executing, and Implementing); (iii) Analyze (Differentiating, Organizing and Attributing); (iv) Evaluate (Checking and Critiquing); (v) Create (Generating, Planning and Producing).

DO IT YOURSELF -3

Classify the questions given in the above table in the column 3 (Type II). You can code them into the following: (i) Remember - R; (ii) Understand - I; (iii) Analyse - A; (iv) Evaluate - E and (v) Create - C.

Do you think the revised taxonomy is better than the original one? How?

In the revised taxonomy, knowledge is at the basis of these six cognitive processes, but its authors created a separate taxonomy of the types of knowledge used in cognition (i) Factual Knowledge (Knowledge of terminology and knowledge of specific details and elements), (ii) Conceptual Knowledge (Knowledge of classifications and categories, Knowledge of principles and generalizations and knowledge of theories, models, and structures) and (iii) Procedural Knowledge (Knowledge of subject-specific skills and algorithms, Knowledge of subject-specific techniques and methods,

and Knowledge of criteria for determining when to use appropriate procedures); (iv) Metacognitive Knowledge (Strategic Knowledge, Knowledge about cognitive tasks, including appropriate contextual and conditional knowledge and Self-knowledge).

Skills and competencies in Economics

The second important aspect economics teachers keep in mind the skills and competencies imparted to economics students. Look at the following questions:

- (i) How are price and output determined under conditions of perfect competition in the short run and long run? Give suitable diagram.
- (ii) Explain consumer's equilibrium in case of a single commodity with the help of a utility schedule.
- (iii) Do you think outsourcing is good for India? Why are developed countries opposing it?
- (iv) Describe development goals of your area as visualised by you.

The above questions are some examples of questions asked in the board examinations or given in economics textbooks. You will find that these questions not only test the knowledge aspect of the topics but also test a variety of skills acquired by the learners. For example, the first two questions test whether the economics students are able to draw diagrams and the last two questions test the ability of students to analyse and argue with evidence on the topic and at the same time make judgements while answering the questions. The last question also requires students to be aware of the area in which she resides.

Students taking economics as a course are expected to achieve the course objectives by studying the courses and carry out all the course-related activities given by the course teachers. In this process learners not only develop an understanding of course contents but also acquire skills and competencies, also called as transferable skills. These skills are recognised as generic skills students can use in their workplace and in their day-to-day lives even if they do not pursue higher

studies. Even though there is a greater demand from educationists, teachers and students, hands-on activities or doing a project in yet to the required receive sufficient attention in the economics education in India.

Graph skills and data analysis - are not only necessary for the economics student to draw a chart using the economic data but also are useful to analyse, draw conclusions from the economic data. Graph skills are also used for a variety of other purposes - in microeconomics and macroeconomics, economics students are trying to understand the principle behind some decisions - taken by individual or the country. They are expected to illustrate and explain graphically, mathematically or verbally, how and why such and such decisions are taken.

DO IT YOURSELF - 4

As a teacher, we know that students learn various skills which they may use when they join the labour market. They may become a professor in a university, sales executive in a company, economist in a bank, for the government or private organisation, or as an administrator or as clerical staff. What are the skills they learn while they study economics? You may also

Sl. No.	Details of textbook and chapter	Details of contents	Skills students expected to acquire
1	Indian Economic Development (Economics textbook for class XI, NCERT)	Chapter 2: Indian Economy 1950-1990, pages 28 and 31.	Analytical skills - use statistics knowledge to draw pie charts and interpret the data; (ii) communication skills – presenting the analysis in the classroom
2			
3			
4			
5			
6			

have witnessed demonstration of their skills in the classroom and in various occasions. List five such skills they acquired and the basis, i.e., which part of the chapter / sections of economics texts students learn such skills.

Conclusion

In the post-independent India, knowledge – based or memory recall questions required to help to assess learners' ability to understand concepts and issues in a similar pattern or whether they are able to answer in the same way and identify the expected one "correct" answer. Students who have acquired such skills are required for industrialisation and for working in factories. This understanding has undergone in the early 1990s as the developmental path of India's economy moved from manufacturing to service-driven. Now, the kind of skills required is different – employers require one who is able to answer differently. To quote from the Position Paper of the National Focus Group on Examination Reforms brought out by NCERT,

"if standardisation is the key to success in manufacturing, differentiation is the key to success in the service sector. If consistency is a key quality of an industrial worker, problem solving and lateral thinking are key qualities in a service provider...."

This shows the need for changing the way questions are asked and answers expected. Rather expecting a similar answer, examiners are expected to look for uniqueness in every answer for questions asked in the examinations.

Exposure to various evaluation and assessment patterns even if they are non-evaluative, is essential for achieving the curricular objective or economic education and help learners to order the world of work.

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Appendix: Assessment for Learning: ARG Pamphlet

Assessment is an important area among educational researchers all over the world. In the late 1990s, Assessment Reform Group in United Kingdom conducted a review of research on the impact of classroom assessment on learning. Since some of its findings are important for classroom practitioners all over the world, they are given below.

- There is no evidence that increasing the amount of testing will enhance learning.
- Successful learning occurs when learners have ownership of their learning; when they

understand the goals they are aiming for; when, crucially, they are motivated and have the skills to achieve success. Not only are these essential features of effective day-to-day learning in the classroom, they are key ingredients of successful lifelong learning.

- Assessment which is explicitly designed to promote learning is the single most powerful tool we have for both raising standards and empowering lifelong learners.
- Assessment can be used effectively to raise standards when teachers (a) decide how and when to assess pupils' attainment at the same time as they plan the work; (b) are proficient in using a range of assessment techniques in the classroom; (c) prepare and make use of manageable systems for recording the progress of individual pupils.
- Assessment for learning is different from teacher assessment or formative assessment. Some characteristics of assessment that promotes learning are: (a) it is embedded in a view of teaching and learning of which it is an essential part; (b) it involves sharing learning goals with pupils; (c) it aims to help pupils to know and to recognise the standards they are aiming for; (d) it involves pupils in self-assessment; (e) it provides feedback which leads to pupils recognising their next steps and how to take them; (f) it is underpinned by confidence that every student can improve; (g) it involves both teacher and pupils reviewing and reflecting on assessment data. This contrasts with assessment that simply adds procedures or tests to existing work and is separated from teaching, or on-going assessment that involves only marking and feeding back grades or marks to pupils. Even though carried out wholly by teachers such assessment has increasingly been used to sum up learning, that is, it has a summative rather than a formative purpose.

- Current thinking about learning acknowledges that learners must ultimately be responsible for their learning since no one else can do it for them. Thus assessment for learning involves pupils, so as to provide them with information about how well they are doing and guide their subsequent efforts. Much of this information will come as feedback from the teachers, but some will be through their direct involvement in assessing their own work. The awareness of learning and ability of learning to direct it for themselves is of increasing importance in the context of encouraging lifelong learning.
- In order to use assessment helping in learning, teachers must be involved in gathering information about pupils' learning and encouraging pupils to review their work critically and constructively. The methods for gaining such information are: (a) observing pupils - this includes listening to how they describe work and their reasoning; (b) questioning, using open questions, phrased to invite pupils to explore their ideas and reasoning; (c) setting tasks in a way which requires pupils to use certain skills or apply ideas; (d) asking pupils to communicate their thinking through drawings, artefacts, actions, role play, concept mapping, as well as writing; (e) discussing words and how they are being used.
- Teachers may, of course, collect information in these ways but yet not use the information in a way that increases learning. Use by the teacher involves decisions and action -decisions about the next steps in learning and action in helping pupils take these steps. But it is important to remember that it is the pupils who will take the next steps and the more they are involved in the process, the greater will be their understanding of how to extend their learning. Thus action that is most likely to raise standards will follow when pupils are involved in decisions about their work

rather than being passive recipients of teachers' judgements of it.

- Involving pupils in this way gives a fresh meaning to 'feedback' in the assessment process. What teachers will be feeding back to pupils is a view of what they should be aiming for: the standard against which pupils can compare their own work. At the same time, the teacher's role - and what is at the heart of teaching - is to provide pupils with the skills and strategies for taking the next steps in their learning.

Hence assessment for learning depends on what teachers do in classrooms and how they see their role.

Reference Materials for Teachers and Students

I REFERENCE BOOKS

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II ONLINE RESOURCES

IIa. Web pages

1. Every student and teacher of economics will find a good reference work invaluable. Fortunately, an excellent reference work is available online.

The Concise Encyclopedia of Economics:
<http://www.econlib.org/library/CEE.html>

This is probably one of the best economics encyclopedias available in the market, with the full text online. You can search the site either alphabetically or topically (Principles of economics, schools

of economic thought, etc). The section on the biographies of great economists is worth reading in full. Contributors to this encyclopedia include several outstanding economists including Nobel Laureates Gary Becker and Joseph Stiglitz. You will find this reference work useful even if you do not approve of its free-market orientation.

2. There are good entries on economics topics in Wikipedia, a free online encyclopedia. You can also contribute, either by writing an entry on a subject not found in the encyclopedia or by helping to improve existing entries.
http://en.wikipedia.org/wiki/Main_Page

II B JOURNALS

The best economics journals are available online. That is the good news. The bad news is that you have to pay for them. However some kind souls take the trouble of collecting good freely available economics material and supplying it to us through

1. Pluralist Economics Review.
<http://pluralisteconomicsreview.net/>
This monthly compendium of economics papers can be accessed through the above URL and is also delivered free to your email id on registration.
2. Real-World Economics Review
<http://www.paecon.net/PAEReview/>
Formerly called Post-Autistic Economics Review, this on-line journal was the outcome of a letter of protest against mainstream economics issued by some economics students in France. The

common denominator of the papers published appears to be dissatisfaction with at least some aspects of neoclassical economics but beyond that no particular theoretical or ideological viewpoint is excluded. The journal is also delivered free by email on registration.

3. e Social Sciences
<http://www.esocialsciences.com/essResearchPapersessResearchPapers.asp>
Edited by Padma Prakash who was formally the Deputy editor of EPW, the papers published in this journal are of high quality.
4. Economic and Political Weekly:
The current issue of EPW can be accessed free online at
<http://epw.in/epw/user/userindex.jsp>
To access the archives you have to be a paid subscriber.
5. If you are keen to sharpen your pedagogical skills you should regularly read
The Journal of Economic Education
<http://www.indiana.edu/~econed/>
This journal publishes excellent material on how economics can be taught effectively.

An interesting site which publishes comments on papers appearing in economics journals is
6. Econ Journal Watch
<http://www.econjournalwatch.org/main/index.php?c=1>

IIc ONLINE ECONOMICS BOOKS

There is nothing like reading real books sitting in a room full of real books. Many book lovers fear that digital books will rob us of this wonderful experience. But we cannot stop progress. And digital books do have some advantages. They do not occupy shelf space, freeing us of the dilemma of deciding what books to discard when we acquire new ones. And hardcopy books cannot have animated figures!

While the best economics textbooks are available only in hardcopy, there are good digital textbooks.

1. You will find lots of textbooks on economics, econometrics, game theory and statistical techniques in this website
Online Economics Textbooks
<http://www.oswego.edu/~economic/newbooks.htm>
2. The "Economics Web Institute" website has textbooks which are unique in that
a) they present both the mainstream, neoclassical ideas as well as ideas deviating from the mainstream theory ;
b) they address economic issues with reference to different "geopolitical areas" (Africa, Asia, etc) ; and c) The material is presented to suit different audiences (Policy makers, managers, teachers, researchers, students and a category termed "absolute beginners".) Some of the material is interactive and animated. The URL is
<http://www.economicwebinstitute.org/books.htm>
3. An easy to understand Microeconomics textbook and a Macroeconomics textbook are available at
<http://economics.about.com/od/>

freeeconomicstextbooks /
Free_Economics_Textbooks.htm

4. If you think it worth spending time and effort reading the great economics classics like Adam Smith's Wealth of Nations or Marx's Capital ... that is, if you are a nerd ... there are two websites for you
Library of Economics and Liberty
<http://www.econlib.org/library/classics.html>

and

The Online Books Page, Economics section
<http://onlinebooks.library.upenn.edu/webbin/book/browse?type=lcsbuc&key=Economics>

5. David Newlands (ed), The Handbook for Economics Lecturers. This book is available freely through online in the website:
<http://www.economics.lstn.ac.uk>

IID ONLINE RESOURCES ON INDIAN ECONOMY

Gone are the days when students had to spend half their lives traveling to research institutes for obtaining secondary data. Now all the information you need on the Indian economy is just a mouse click away.

National Sample Survey Reports
http://www.mospi.gov.in/mospi_nssorept_pubn.htm
Census
<http://www.censusindia.gov.in/>
RBI Database on Indian Economy
<http://www.rbi.org.in/scripts/Statistics.aspx>

Ministry of Finance Publications

<http://finmin.nic.in/WorkingPaper/index.html>

This site has full texts of many important reports, such as the Kelkar report and the Raghuram Rajan report.

Union Planning Commission Homepage

<http://planningcommission.nic.in/>

Has all the publications of the Union Planning Commission, including the full text of the Five-Year Plans.

National Family Health Survey

<http://www.nfhsindia.org/>

"The survey provides state and national information for India on fertility, infant and child mortality, the practice of family planning, maternal and child health, reproductive health, nutrition, anaemia, utilization and quality of health and family planning services."

Central Statistical Organization (CSO)

http://mospi.nic.in/cso_test1.htm

Has data on National Income Accounting, Index of Industrial Production, Wholesale and Consumer Price Indices for Urban Non-Manual Employees, Human Development Statistics, Gender Statistics, Environment and Energy statistics.

National Institute for Public Finance and Policy (NIPFP)

<http://www.nipfp.org.in/workingpaper.asp>

An independent institution under the ministry of finance, the NIPFP is one of the preeminent economics research institutes in India publishing world-class

material related to public finance.

National Council of Applied Economic
Research (NCAER)

<http://www.ncaer.org/activities.html>

NCAER "has done pioneering research work in areas of applied economics with an emphasis on policy analysis and application of modern quantitative techniques to development issues, regional development and planning, household income, consumption, savings /investment and energy." The full text of the working papers published by NCAER are available on this site.

Macroscan

www.macroscan.com

A column in Business Line daily, one of the best sources of education on the Indian Economy from a left perspective.

IIe WEBSITES OF INTERNATIONAL ORGANIZATIONS

World Bank (International Bank for Reconstruction and Development), World Development Reports

[http://econ.worldbank.org/WBSITE/
EXTERNAL/EXTDEC/EXTRESEARCH/
EXTWDRSO,,](http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/EXTWDRSO,,)

contentMDK:20227703~pagePK:
478093~piPK:477627~theSitePK:
477624,00.html

This has the full text of the World Development Reports published annually by the World Bank.

United Nations Development Programme,

Human Development Reports
<http://hdr.undp.org/en/reports/>
The full texts of the Human Development Reports, published annually by the UNDP.

World Health Organisation
<http://www.who.int/publications/en/>
The site has the full text of World Health Reports and health Statistics.

United Nations Environment Programme
<http://www.unep.org/publications/>

OTHER GENERAL WEBSITES

If you are looking for websites not confined to any particular topic but covering a wide range of economic issues the following websites are for you.

Vox
<http://www.voxeu.org/>

This site is mostly focused on the E.U but there is plenty of material here of immense use to economics students and teachers in India. For this website hat tip to I should acknowledge S.Subramanian, professor MIDS.

Economics Essays
<http://www.economicshelp.org/econ.html>

This site is meant for Economics students in Britain but quite a few of the "essays" are useful for our students also.

National Bureau of Economic Research (NBER)
NBER is "a private, nonprofit, nonpartisan research organization dedicated to promoting a greater understanding of how the economy works. The NBER is

committed to undertaking and disseminating unbiased economic research among public policymakers, business professionals, and the academic community." Although focused mostly on the U.S economy, economists in India will also find wealth of information in the NBER working papers. The latest working papers will be sent to you by email on registration.

The working papers published by NBER can be accessed at
<http://www.nber.org/papers/>

The NBER Digest presents a summary of some of the working papers in a "digested" form.

<http://www.nber.org/digest/>

The full text of some NBER books can be accessed through the NBER homepage.

Third World Network
www.networkideas.org

"Its mission is to bring about a greater articulation of the needs and rights of peoples in the Third World, a fair distribution of world resources, and forms of development which are ecologically sustainable and fulfill human needs."

International Development Economics
Associates (IDEAs)

www.twinside.org.sg

"IDEAs has been established with the purpose of building a pluralist network of heterodox economists engaged in the teaching, research and application of critical analyses of economic development."

(For the above two web sites hat tip to
Dr.Venkatesh Athreya, of
M.S.Swaminathan Research Foundation.)

II_F ECONOMICS BLOGS

If you want to be up to speed about the great conversation called economics, and also contribute to it, you should read ECONOMICS BLOGS, such as those listed below.

An Awkward Corner http://blogs.livemint.com/blogs/an_awkward_corner/archive/tags/Mint/default.aspx

One of the best economics blogs, it has in-depth discussions mostly on the Indian economy by Niranjana Rajadhyaksha, an economist who is at home both with advanced theory and empirical literature, and has the gift of articulating complex economics concepts in simple English.

The Indian Economy Blog
<http://indianeconomy.org/>

Marginal Revolution
<http://www.marginalrevolution.com/>
This blog is written by Tyler Cowen and Alex Tabarrok, economists at the George Mason University in the U.S. It advocates the free market viewpoint.

Dani Rodrik's Weblog
<http://rodrik.typepad.com/>
Rodrik is a professor at Harvard. The blog claims to present "Unconventional thoughts on economic development and globalization". Unconventional because it is skeptical about the arguments favouring globalization and privatization.

Greg Mankiw's Blog
<http://gregmankiw.blogspot.com/>

Mankiw is a distinguished macroeconomist teaching at Harvard. This blog is closely followed by other blog writers.

Undercover Economist

<http://blogs.ft.com/undercover/>

Written by Tim Harford, a British economist, the blog explains how economic reasoning can be used to understand society. Harford compiled some of this material in a book also entitled Undercover Economist.

Brad DeLong's Blog

http://www.j-bradford-delong.net/movable_type/

DeLong is an economics professor at the University of California at Berkeley. The blog deals with a wide variety of economics issues from a Keynesian viewpoint.

Becker-Posner Blog

<http://www.becker-posner-blog.com/index.html>

Written by the economist Gary Becker and Richard Posner, a judge as well as a faculty member at the university of Chicago Law School and one of the founders of Law and Economics discourse.

Paul Krugman, the 2008 Economics Nobel winner, has an official and an unofficial web page. The official one is <http://web.mit.edu/krugman/www/>

11G STATISTICAL TECHNIQUES RESOURCES

You have the data. But contrary to popular belief, the data do not "speak for themselves"; we have to make them speak through interpretation. There are websites which provide tools to enable you to make sense of the data. Here are some of the websites:

<http://statpages.org/>

<http://isi.cbs.nl/FreeTools.htm>

<http://www.uni-koblenz.de/~kgt/SICSS/StatIM/main.pdf>

But these tools cannot do the thinking for you. For that there is no substitute to using your gray cells.

IIIh ECONOMICS HUMOR

If you want to relax, there is a website devoted to economics jokes
<http://netec.mcc.ac.uk/JokEc.html>

My favorite economics jokes are:

Why did Marx abandon teaching? Because he found every class a struggle!

How many monetarists does it take to change a light bulb? None. The free market will do it automatically.

Economics Twitter

Most of you will have heard of Twitter and many of you are probably already using the micro-blogging service. Twitter is a great way to keep up-to-date with

breaking Economics stories, and to engage directly with Economics teachers, journalists, broadcasters and others who like to share their enthusiasm for the subject.

Listed below are some suggested "follows" for Economics on Twitter. If you are using Twitter then please share a connection with us on the site, perhaps by following Geoff and I (we'll follow you too) or by joining the Economics Teacher Twibe:

<http://www.twibes.com/group/economicsteacher>

Economists on Twitter:

Geoff Riley (tutor2u) http://twitter.com/tutor2u_econ

Jim Riley (tutor2u) <http://twitter.com/tutor2u>

Tim Harford: <http://twitter.com/TimHarford>

Paul Krugman: <http://twitter.com/NYtimesKrugman>

Edmund Conway (Telegraph): <http://twitter.com/Edmundo>

Philip Thornton (Clarity Economics) <http://twitter.com/Clarityeconomic>

The Economist: <http://twitter.com/theeconomist>

Tyler Cowen (Marginal Revolution) <http://twitter.com/tylercowaen>

Freakonomics <http://twitter.com/freakonomics>