

11

Innovations in Instructional Design of Certificate in Craft and Design (Pottery)

Ajit Kumar

Introduction

Craft and Design Programme in Pottery was conceived as an empowerment and income generation programme for the rural masses and unemployed youth in general and artisans in particular. The beginning of the programme in March 2003 was marked with the signing of an MoU between IGNOU and Khadi and Village Industries Commission (KVIC). KVIC, which is a field organisation working for more than 65 years in the area of Khadi and Village industries joined hands with IGNOU for the purpose of training and upgrading the skills and empowerment of the artisans through certification and to provide a teaching learning environment in the area.

A Certificate in Craft and Design (Pottery) programme was designed, developed and launched (Jan'2005). The programme is being offered at various centres in the country. The Programme Study Centres are having production facilities for pottery. Since the Programme was developed for the rural masses and the lower strata of the society, no formal entry qualification is required.

Programme Description

The Certificate in Craft and Design (Pottery) programme and its print and video materials have been designed and developed for the rural artisans, unemployed rural youth and interested persons in pottery.

The materials are linked with societal development. There are 20-30 millions traditional artisans in India. Though they have exhibited their exceptional talents at the national and international levels in the past, their socio-economic status is quite low. Most of them are unable to sustain their family with their earnings and are living in unhygienic and miserable conditions. The reasons behind such a scenario are lack of design and marketing skills in artisans to suit the current demand and taste of people, stagnation in the R&D activities and no opportunity for exposure to new trends and technologies. This programme aims to remove the shortcomings of the artisans and enhance their socio-economic status. The programme has been found to be successful in transmitting the desired skills to the learners.

The goal of the programme is to develop and upgrade the various required skills and knowledge to learners, which will help them in getting self employment, improving their craft business, empowerment and providing social status to the rural artisans and creating interest of youth in the craft. The course materials focus on the four types of required skills and related knowledge for the artisans in India, which are (i) Technical (Pottery) skills, (ii) Design skills, (iii) Marketing skills and (iv) Communication skills.

This 18 credits programme comprises four courses:

- i) **World of Clay** – A six credit theory course outlining related knowledge and description of the pottery craft.

- ii) **Static Clay Forms** – A four credit practical course covering Home Practice Sessions on Hand Built Pottery and Lab Practical Sessions on Decoration, Colouring, Glazing and Firing and Field Practical Sessions on Raw Material Preparation.
- iii) **Dynamic Clay Forms** – A four credit practical course covering Home Practice Sessions on Hand Built Pottery and Lab Practical Sessions on Decoration, Colouring, Glazing and Firing and Field Practical Sessions on Raw Material Preparation.
- iv) **Understanding Design and Marketing** – A four credit project course having Home Practice Sessions and Project on Design and Field Projects in Marketing.

The Programme was first launched in January 2005. It has a minimum duration of six months and maximum duration of two years.

Significant Characteristics of the Programme

1) Fitness for need and purpose

The materials aim to develop technical, design, marketing and communication skills in the learners.

The target audiences are the rural artisans, unemployed and interested persons. The materials have been designed for the beginners assuming zero prior knowledge or skill level because the target group is heterogeneous having vast differences in their skills, knowledge and regional biases.

The artisans mostly work with the red clay, abundantly available in India. Therefore the technical skills cover most of the processes of craft in red clay. Apart from pottery skills design, marketing and communication skills in theory and practice have been included.

The pictorial and stepwise explanation, interactive story format, instructions in small steps, listing of dos and don'ts, performance standards, self assessment questions, and observation tables format to be filled up, etc., have been the basic framework of the printed self instructional materials to suit the neo-literates or less educated rural artisans. Video films, radio and tele-counselling have also been used.

The content of pottery craft is easier to teach, transmit and grasp through pictures, images, sketches, demonstrations, discussions and films to such a heterogeneous target group. Apart from these, the most effective is their home, lab and field practical.

Samples of study materials are shown below in Figs. 11.1 to 11.12.



Fig. 11.1: Cover Design of the Course Material

खोलना
Opening



3.1 परिचय

शंकु के आकार में बंद मिट्टी को बीच में अंगूठे के दबाव से चलती चाक पर खोला जाता है। यह क्रिया शंकु बनाने की प्रक्रिया के बाद होती है। मिट्टी को ऊपर उठाने से पहले उसे खोलना आवश्यक है।

3.2 आज हम क्या सीखें ?

☞ मिट्टी खोलने का तरीका

3.1 Introduction

Opening is a process where a coned clay lump is opened using the thumb as braces. It is done after coning of the clay. Opening of clay is necessary for raising the clay up.

3.2 Skill to be learnt today

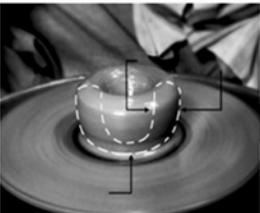
☞ The process of opening the clay

गतिक आकार के आधार
Basics of Dynamic For

Fig. 11.2: Course Material



क्रम
Step 1



क्रम
Step 2

चाक को रोक लें तथा एक सूई की मदद से मिट्टी के तल तथा दीवार की मोटाई मापें। इसे अवलोकन तालिका में लिखें।

Stop the wheel and measure the bottom thickness and the wall thickness using a needle. Enter the readings into the observation table.

देखें कि मिट्टी के तल एवं दीवार की मोटाई का अनुपात कितना है। यह प्रारंभ में 1 : 3 होना चाहिए।
अर्थात्
तल : दीवार की मुटाई :: 1 : 3

Check if the ratio of bottom to the walls of the pot is 1 : 3, i.e.
Bottom : wall : : 1 : 3 initially.

गतिक आकार के आधार
Basics of Dynamic For

Fig. 11.3: Course Material

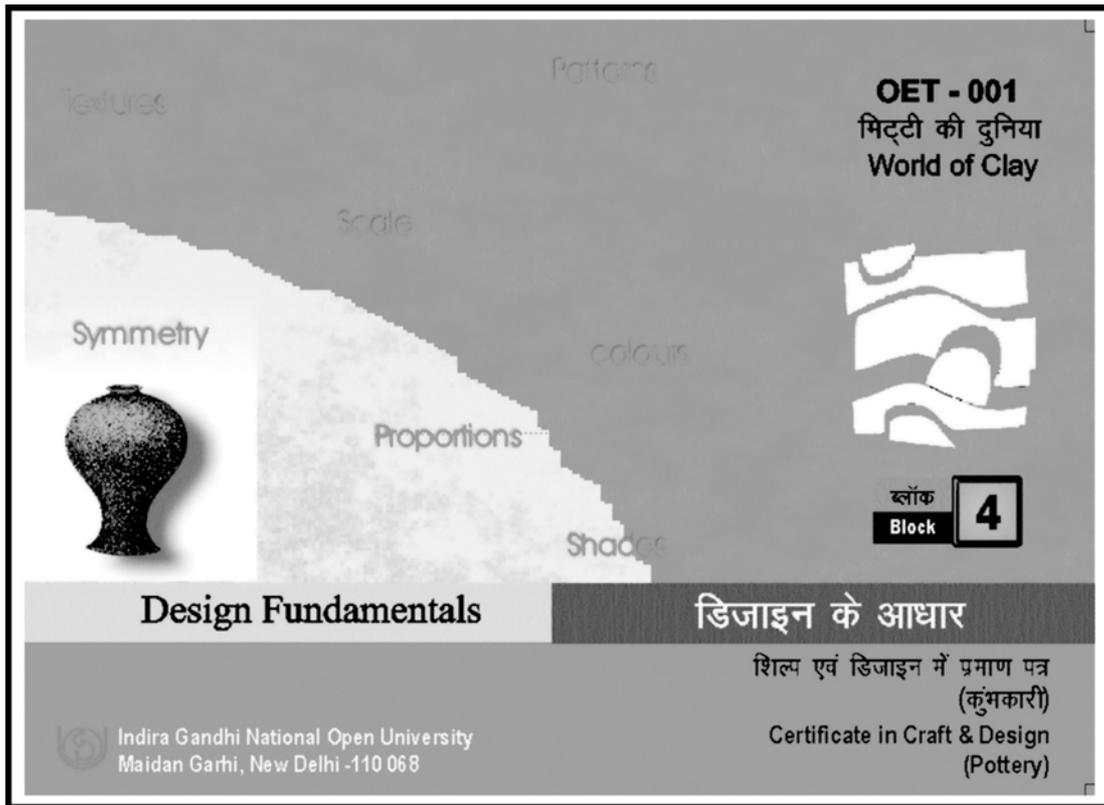


Fig. 11.4: Course Material

डिजाइन के आधार

12.4 डिजाइन का तरीका
 डिजाइन करने के कई तरीके हो सकते हैं। हर व्यक्ति के डिजाइन का तरीका अलग हो सकता है। यहाँ पर संक्षेप में उन मोटी बातों को बताया गया है जिनका ध्यान डिजाइन करते वक्त रखना चाहिए।

1. उद्देश्य : आप डिजाइन किस कार्य या उद्देश्य की पूर्ति के लिए करना चाहते हैं ? उन्हें प्राथमिकता क्रम में लिखना चाहिए जैसे यदि खिलौना बनाना है तो उसका उद्देश्य हो सकता है

- बच्चों का मनोरंजन
- बच्चों को शिक्षा देना
- बच्चों के लिए सुरक्षित होना
- सुंदर लगना
- जल्दी खराब न होना
- बच्चों को उलझा कर रखना।

12.4 Design Methodology

There can be different methods to approach design. Every person can have a different methodology to design. Here are some basic points to keep in mind while designing any object.

1. Objective : What is your aim of designing or what are the objectives? You need to write them down as per your priority. e.g. if you want to design a toy objectives can be

- To entertain children
- To educate children
- To be safe to play
- To look attractive
- To be durable
- To keep children engaged etc.





डिजाइन के आधार

Fig. 11.5: Course Material

डिजाइन

2. लक्ष्य समूह : जिनके लिए आप डिजाइन कर रहे हैं उनका ठीक दंग से निर्धारण होना चाहिए। जैसेकि खिलौना किनके लिए बनाया जाए ?

- 5 से 8 वर्ष की आयु के बच्चे
- मध्यम आयु वर्ग के बच्चे
- शहरी बच्चे

3. माध्यम : आप डिजाइन में किन वस्तुओं या माध्यमों का प्रयोग कर सकते हैं। जैसे खिलौने के लिए मिट्टी, वॉस, लकड़ी, धातु, फाइबर या इनको मिलाकर इत्यादि।

4. कीमत : आप डिजाइन के लिए चुने गए आयु वर्ग के अनुसार अपनी चीजों की कितनी कीमत रख सकते हैं जैसे शहरी एवं मध्यम आयु वर्ग के बच्चों के खिलौने 50 से 100 रु. तक हो सकते हैं।

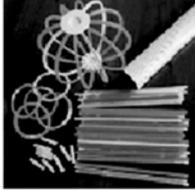
2. User Group : Analyzing & deciding the user of the product e.g. the toy is designed for

- Children age group 5 to 8 years
- Income group Middle class
- Zone City

3. Medium : What type of materials or media you can use in your product, e.g. for toys clay, bamboo, wood, metals, fiber or other mixed media etc.

4. Costing : You can decide the price of the item according to the income group you are targeting e.g. for a toy consider the factors: middle income group and urban habitation
The price range can be Rs.50 - Rs.100.






डिजाइन के आधार

Fig. 11.6: Course Material

Shades and Shadows

Proportions

Organic Forms

Geometric Forms

Form and function

Symmetry

Textures

Drawing from Memory

OETL - 004

डिजाइन एवं बाजार की समझ
Understanding Design and Marketing



ब्लॉक
Block **1**

Design Practical

प्रायोगिक डिजाइन

 Indira Gandhi National Open University
Maidan Garhi, New Delhi -110 068

शिल्प एवं डिजाइन में प्रमाण पत्र
(कुंमकारी)
Certificate in Craft & Design
(Pottery)

Fig. 11.7: Course Material

आकृति और कार्य

UNIT 6 : Forms and Function

6.1 Task 9 : Forms and Function of Tools

6.1.1 Objectives
In this task, you will understand the following

1. Form of an object in relation to the function it has to perform.
2. Balancing Form and Function
3. Understanding the user of the object

6.1.2 Introduction
Tools are very common in our country and are used by artisans, farmers, mechanics, housewives etc. Various types of tools are used for different functions. For instance a knife for cutting vegetables are different from the scissors used for cutting cloth and *Hasua* used for cutting grass.

6.1.3 Observe and Analyse
Collect a khurpi, a knife, a farsaa, a gandasa, a sword and a screw driver.
What are these tools used for?
Note that all these tools are made of two components, the working edge and a handle. Both of these components have different material colour and texture.

Design Practicals

इकाई 6 : आकृति और कार्य

6.1 कार्य 9 : औजारों के आकार और कार्य

6.1.1 उद्देश्य
इस कार्य में आप निम्न बातों को समझेंगे:

1. किसी वस्तु के कार्य के अनुसार उसकी आकृति
2. आकृति एवं कार्य में संतुलन
3. वस्तु के उपभोक्ता को समझना

6.1.2 परिचय
अपने देश में औजारों के प्रयोग का काफी चलन है। कृषीगर, किसान, मैकेनिक, गृहिणियाँ तथा अन्य सभी किसी न किसी प्रकार के औजार का उपयोग करते हैं। विभिन्न प्रकार के कार्यों के लिए अलग-अलग तरह के औजारों का उपयोग किया जाता है। जैसे कि सब्जी काटने के लिए चाकू, कपड़ा या कागज काटने के लिए कैंची तथा घास काटने के लिए हसुआ का उपयोग होता है।

6.1.3 ध्यानपूर्वक देखें और विश्लेषण करें
खुरपी, चाकू, फरसा, गंडासा, तलवार तथा स्कूझाइवर इत्यादि इकट्ठा करें। इन औजारों के क्या उपयोग हैं ?
इन सभी औजारों के दो मुख्य हिस्से होते हैं। एक हिस्सा मुख्य काम करने के लिए है तथा दूसरा उसे पकड़ने के लिए है। दोनों भागों की निर्माण सामग्री, उसकी संरचना तथा रंग रूप इत्यादि भिन्न हैं।





Fig. 11.8: Course Material

आकृति और कार्य

The handle holds the working edge and the working edge has to perform the function. They both have a relation with each other. The function that you perform with the working edge determines the size and shape of the handle.

Collect these tools and look at them one by one. Look at the knife and the sword. Notice how the shape and size of the handles are different. Also see the texture and the materials of the components.

6.1.4 Draw and Analyse
Draw the cutting edge of the knife as you see it. With this cutting edge of the knife, draw the handle of the sword.
Can you use this knife for cutting vegetables?
By changing the form, you have changed the function of the tool. Can you still work with the tool?
Now do the same with the screw driver. Draw the screw driver with the handle of the knife.

Do you see the difference the form of any object can make to the usage of that object?

Design Practicals

हथ्वा काम करने वाले हिस्से को पकड़ कर रखता है और दूसरा हिस्सा वह प्रमुख काम करता जिसके लिए उसे बनाया गया है।

इन दोनों हिस्सों का आपस में संबंध है। काम वाले हिस्से से जिस तरह का काम किया जा सकता है उस काम के अनुरूप हथ्वा की आकृति और आकार तय होता है। इन औजारों को जमा करें और एक-एक करके उनका विश्लेषण करें। चाकू और तलवार को देखें। दोनों के हथ्वा की आकृति और आकार में अन्तर को देखें। उनकी संरचना और पैटर्न पर भी ध्यान दें।

6.1.4 चित्र बनाएँ और विश्लेषण करें
चाकू के काटने वाले हिस्से को जैसा आप देख रहे हैं वैसा ही चित्र बनाएँ। अब इस हिस्से के साथ तलवार का मूठ वाला हिस्सा बनाएँ।
क्या आप सब्जी काटने के लिए इसका उपयोग कर सकते हैं?
आकृति में परिवर्तन करके आपने उसके कार्य को बदल दिया है।
अब यही प्रक्रिया स्कूझाइवर के साथ दोहरायें। चाकू के हथ्वा के साथ स्कूझाइवर का चित्र बनाएँ। आकृति में परिवर्तन के साथ उसके उपयोग में परिवर्तन को आप देख सकते हैं।




Fig. 11.9: Course Material

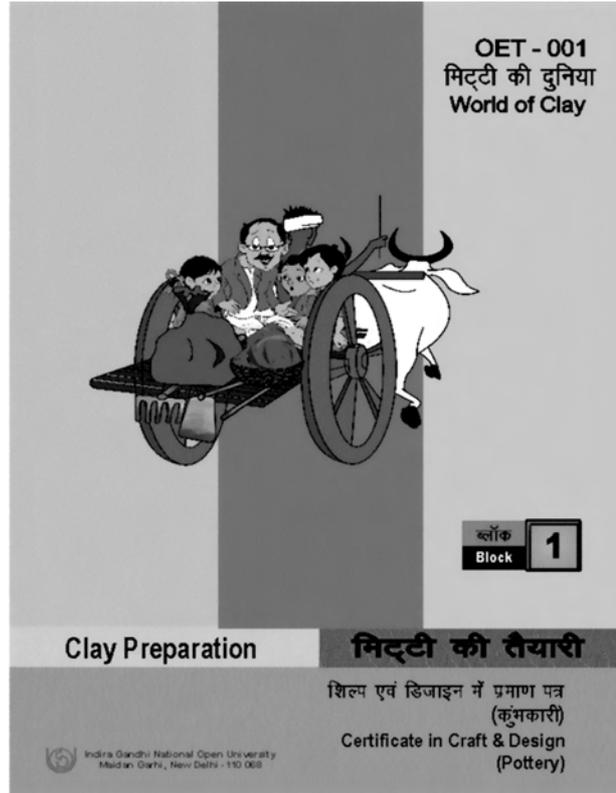


Fig. 11.10: Course Material

मिट्टी को पहचानना और इकट्ठा करना

<div style="background-color: #cccccc; padding: 5px; margin-bottom: 10px;">1.1 Introduction</div> <p>Mansukh and his friends have been waiting for Deenu Kaka to come out from his hut where he has his pottery workshop. Today is Sunday and all the Kaka's pupils are going to a nearby area on the outskirts of the village. Deenu Kaka is taking them for a picnic where they would have fun and in the process they are going to learn about the methods of identifying and collecting different clays. Kaka had asked them to come early in the morning so that they can have the whole day for fun and frolic. Deenu Kaka is a master in his field. He knows how to disseminate the knowledge that he has acquired from his forefathers to these kids. Picnic is a cheese for these kids, which would keep them motivated.</p> 	<div style="background-color: #cccccc; padding: 5px; margin-bottom: 10px;">1.1 परिचय</div> <p>मनसुख और उसके दोस्त दीनू काका का इंतजार कर रहे हैं। वे अभी तक अपनी झोंपड़ी से बाहर नहीं निकले हैं। इसी झोंपड़ी में उनकी मिट्टी के बर्तन बनाने की कार्यशाला भी है। आज रविवार का दिन है और दीनू काका अपने सभी छात्रों के साथ गाँव के बाहर घूमने-फिरने जा रहे हैं। वे उन्हें खूब घुमाएंगे और मजे कराएंगे। खेलते-कूदते वे उन्हें अलग-अलग तरह की मिट्टियों की पहचान भी कराएंगे और उन्हें किस तरह इकट्ठा किया जाता है, इसकी विधि भी बताएंगे। दीनू काका ने सभी बच्चों को सुबह-सुबह बुलाया था ताकि वे पूरा दिन मौज-मस्ती में गुजार सकें। काका अपने काम में माहिर हैं। वे यह भी जानते हैं कि जो कुछ उन्होंने अपने पूर्वजों से सीखा है, उसे बच्चों को कैसे बताया जाए। घूमना-फिरना तो एक बहाना है, वे इस बहाने बच्चों को इस कला से परिचित कराना चाहते हैं।</p>
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Fig. 11: Course Material

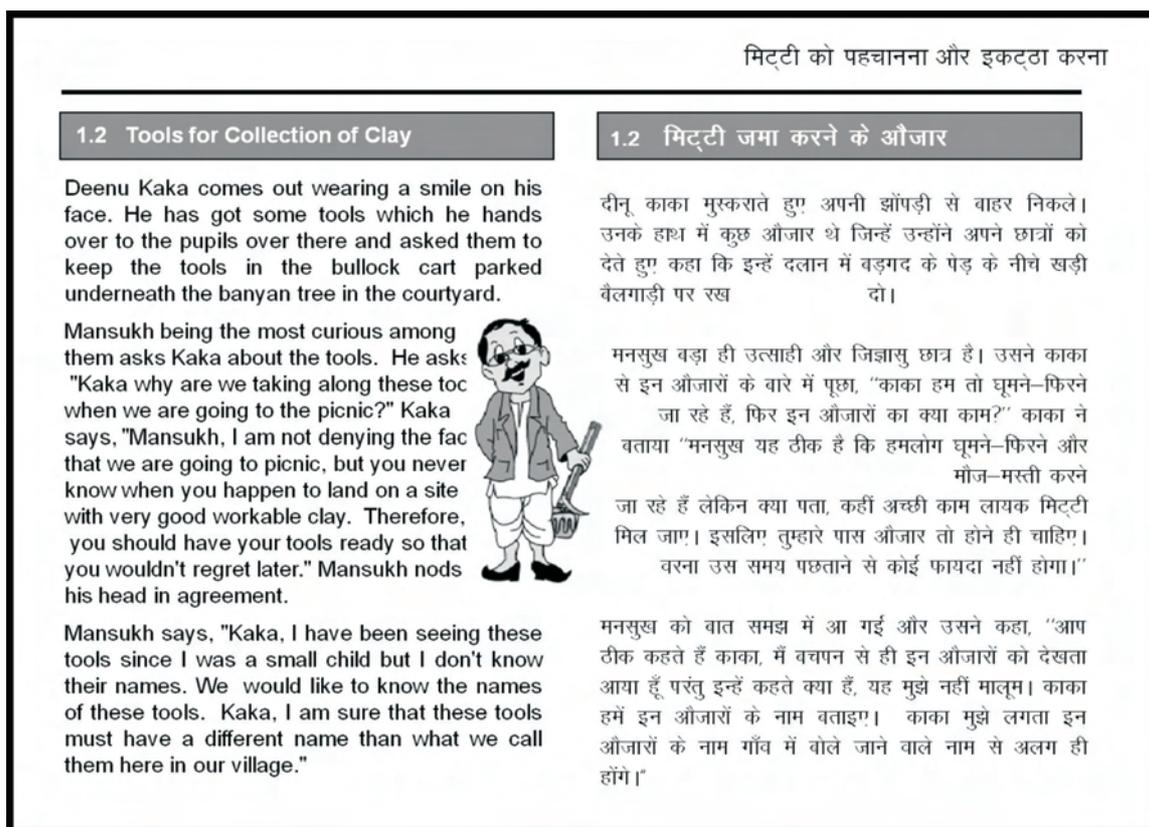


Fig. 11.12: Course Material

2) Innovation and creativity in the design and presentation of high quality content appropriate to suit open, distance learning.

The following exercises were done to prepare the relevant and comprehensive syllabus and content in the series of interactive workshops (six) at various places of the country with the experts, academicians, media persons and awarded artisans for extensive discussion on their work, opportunities, difficulties, processes and challenges along with the video shooting of their work.

- Job profile of potters
- Identification of tasks to be done for each job
- Listing of activities to be done to accomplish each task
- Skills required to perform each activity - locomoter learning
- Knowledge required for performing each activity –cognitive learning

The contents have been written and edited by the experts on the basis of the output of the workshop and relevant books in the field which ensures for their accuracy and free of all gender, race, class, caste, ethnic bias.

The outstanding features and elements used in the design of materials for increasing interactivity and ease in teaching-learning for the diverse learner groups are as follows:

- Pictorial
- In small steps
- Stepwise explanation

- Story form
- Interactive dialogue
- Simple language
- Observation tables format
- Self assessment questions with answers provided at the end
- Exercises and tasks
- Video films
- Slide presentations
- Radio counselling
- Tele counselling
- Home, lab and field practical

3) Use of systematic materials/multi-media product development process

The steps and processes involved in developing the print and video materials are:

i) **Materials designing process:** This involves the activities mentioned below.

- Formulating structure
- Preparing syllabus
- Identifying media and IT components
- Research- field activities in the craft programme – *Unique Process*
- Finalizing unit wise course outlines
- Identifying themes for audio & video programs
- Evaluation system

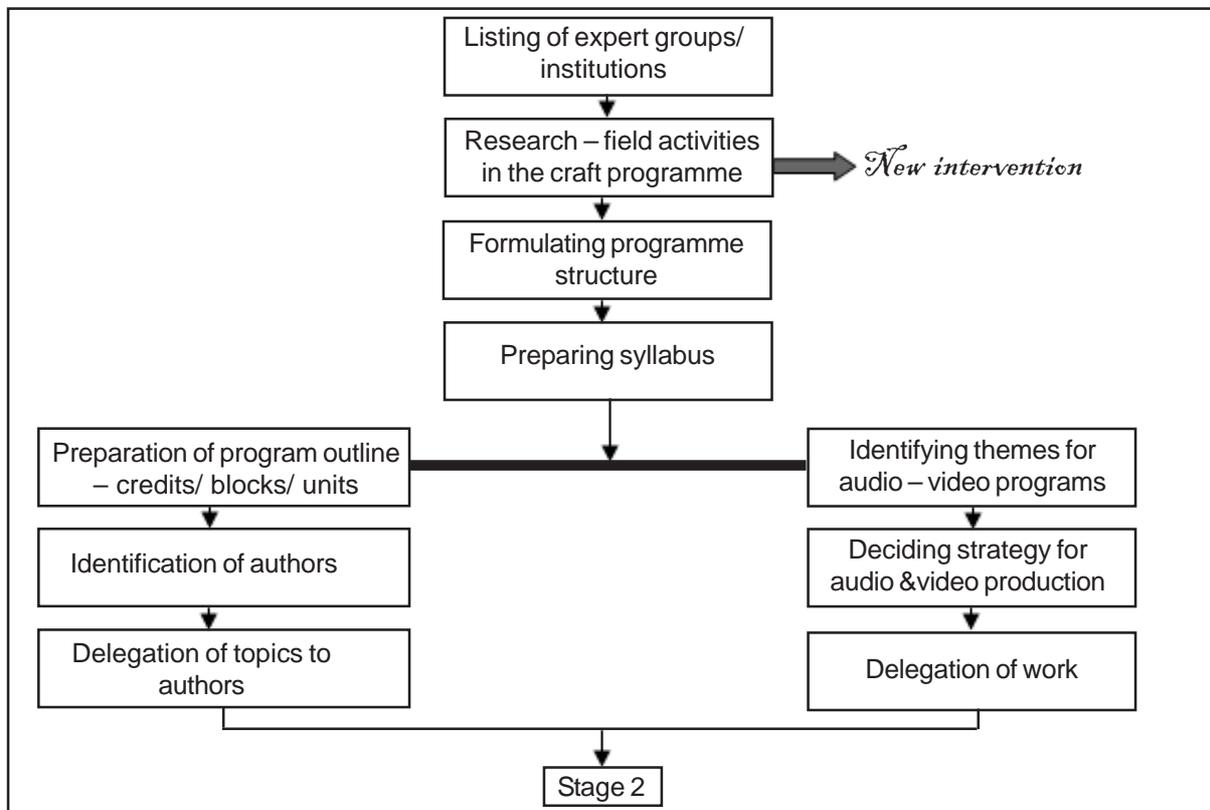


Fig. 11.13: Flowchart on Stage 1 – Planning and Research

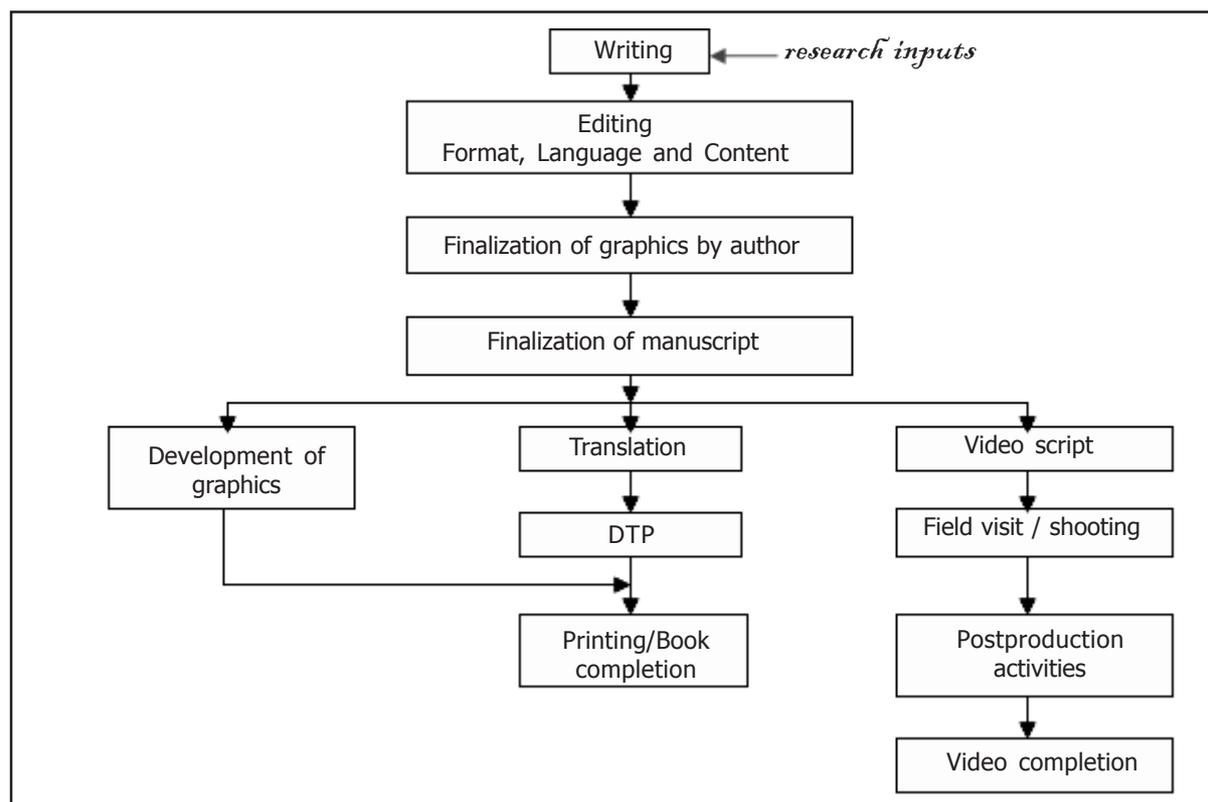


Fig. 11.14: Flowchart on Stage 2 – Development

ii) Research-field activities in the craft programme (New Intervention)

Interaction workshops with the experts and awarded artisans for extensive discussion on their work, opportunities, difficulties, processes and challenges alongwith the video shooting of their work was done for preparation of syllabus and courseware.

The project team involved for the development work (engaged full time) are mostly engineers and architects with specialisation in design and pottery expert (MFA). The national and state awarded artisans, pottery experts participated in the workshops. Technical experts in design and kiln from IIT, Delhi; and drawing artist and other pottery experts participated in editing, writing workshop and tele-counseling sessions.

4) Coherence and integration of media and technology in the study materials

To cater the diverse target group of neo-literates and less educated rural artisans conversant with different regional languages of India on one hand and educated urban youth interested in the craft on the other, the following issues were addressed and then strategy was decided which have been quite effective.

Issues/Considerations

- To address multilingual and highly diverse educational levels
- Transaction of technical, conceptual, procedural and artistic content
- Pedagogical issue specially for neo-literates
- Cost-effectiveness

Strategy/Media used

Print materials: Theory books, practical guide and manuals and work book based on

- Use of pictures, photographs, sketches to explain the processes

- Simple language, small steps and stepwise explanation
- Use of access devices such as objectives, performance standards, dos and don'ts, self assessment questions, etc.
- Interaction using dialogues and story

Interactive Tele and Radio counselling sessions regularly conducted through EDUSAT and FM Channels

- Live demonstrations
- Slide presentations
- Discussions
- Answers to the queries of the learners
- Video films on pottery processes

Practical and projects

- Lab practicals on wheel, glazing, firing and decoration
- Home practicals in Design and Hand built pottery
- Field practical on preparation of clay at site
- Field projects on marketing

5) Learner support provided in the course beyond the actual materials

A collaboration for the programme development and delivery was made with the KVIC, a field based government organisation in the area of Khadi and Village Industries.

Considering the inhibition of the rural artisans in coming to the formal institutions, the study centres for the programme were made at the work places of pottery in rural and urban areas either at KVIC training centres or the production centres run by the NGOs/private institutions.

A flexible approach was taken for the teachers and counsellors. For practicals identified where supervision required (Lab practicals), an awarded or KVIC/IGNOU certified potter may be the teacher.

A seven day trainers' training programme for lab practical teachers was conducted at IGNOU headquarters with the help of the eminent experts in pottery and design.

Orientation programmes at the centres were done for induction of the programme for learners, theory and practical counsellors and Programme Incharges.

Regular feedback and advice to the study centres were given and taken by the project team through radio and telecounselling and visits to the centres.

Learning outcomes assessed on the basis of performance of learners in theory and practical examinations that have been excellent and appreciated by the examiners and experts.

6) Evidence of impacts and benefits derived from an evaluation of the materials

The use and utility of the materials have been evaluated on the basis of the oral feedback from the learners and their performance in the theory and practical examinations.

The materials have been quite successful in transmitting the knowledge and skills to the learners. The photographs of the pots made by the learners in practicals and examinations show its quality and extent of learning. More than 80 % candidates appeared in the first cycle of examination have scored 'A' grade (>80 %) in the theory and practical examination. The materials were found useful even to the artisans of other language because of the extensive use of graphics, film, demonstrations etc.

In the light of the language problem faced by the regional artisans the following decisions were taken. For giving freedom in the medium of expression the theory paper will have mostly questions asking the processes and methods to be explained through the sketches and multiple choice objective type. This also helps us in evaluation. Use of sketches as a language is an innovative concept which is quite extensively being taught in the programme and also very helpful in the design of the craft.

Interactive tele and radio counselling sessions used for demonstrations, discussions, clarifying doubts of learners and supplementing the knowledge and skills. For instance, the glazing in red clay is not done by the artisans because of the lack of technical know-how and limitation of low temperature attainable in the traditional kilns. Glazing of red clay at around 1000 C and its other finer details have been included in the materials. The research work done at IIT, Delhi to improve traditional potters' kiln for fuel efficiency and attaining higher temperature for glazing has been included in one of our telecounseling sessions.

Examples of some of the pots made by the novice learners in the practical examination are given below through Figs. 11.15 and 11.16.



Fig. 11.15: Pots Made by Novice Learners



Fig. 11.16: by Novice Learners Making Pots

12

Case Studies of Innovations in Online Learning

Rakesh Khurana

Introduction

In this article four case studies of innovations in online learning have figured. These case studies are recent and have been taken up not on the basis of any scientific survey, but pure observation. The article will also discuss certain aspects related to these cases such as what is the innovation involved, what can be learnt from these examples and what can be applied. Lots of innovations have taken place at the Indira Gandhi National Open University (IGNOU), which is the national resource centre for Open and Distance Learning. The University is a world leader in distance education. The system followed is referred to as Open and Distance Learning (ODL). As per the recommendations of the UNESCO Commission for the nature of education in the 21st Century, there has been a paradigm shift from 'teaching' to 'learning'. So the expression 'Open and Distance Learning' (not 'Teaching' or 'Education') was coined. But with phenomenal advancement in the online mode of education, ODL is also being referred to as online in distance learning as most of the innovations in distance education are e-learning applications. These can be effected both online or offline. Even in case of classroom learning many elements of open learning and e-learning are being brought out quite regularly today.

Open and Distance Education: An Innovation

Innovation is a new way of doing something. It also refers to the 'new stuff that is made useful'. The term innovation may refer to incremental and emergent or radical and revolutionary changes in thinking, products, processes or organisations. Many times perceptual changes appear to be radical in nature but very few innovations are radical changes for example the World Wide Web. The World Wide Web began in the late 80s and it has come to play a very substantial role in today's world. Many other developments got added to it. Few innovations are also revolutionary in nature.

Innovation can be in philosophy, concepts or nomenclature. For example, the name *IGNOU* comes from Indira Gandhi who had a philosophy of making education available for people who did not have it. The mission statement of the University is to take education to the unreached. 'Reaching the unreached' has been the guiding slogan. Other significant features are national spirit, free thinking, no discrimination and a wider reach. In the Indian education scenario there was dominance of teachers in curriculum planning and design. IGNOU could break that, and was therefore able to remove the shackles on thinking, in terms of what programmes to offer, how to offer, the medium of instruction and so on.

IGNOU was called an Open University (OU) and not a distance education based university. The difference between correspondence and distance education has been debated for decades. Originally, correspondence education involved sending of the study material through post. The name *Indira Gandhi National Open University (IGNOU)* is a combination of the words *Open University, National* and the name of *Indira Gandhi*. This was inspired by Mr. Rajiv Gandhi, who guided by a positive approach took deep personal interest in the setting up of the University. The former Vice-Chancellor of UK Open University, Lord

Perry was appointed as his personal advisor, to make sure that the University is build on a strong foundation. The University was established with this kind of vision and support. Today IGNOU has become a kind of brand name in the area of a Distance Education and is well known in about in 45 different countries of the world. This in itself can be considered an innovation.

The naming of Electronic Media Production Centre (EMPC) at IGNOU is also an innovation. Many discussions were held in order to find a suitable and appropriate name for this facility. In the eighties a university was provided funds for setting up an audio production centre or a video production centre only. At that time there were only four Audio-Video Production Centres or rather Audio-Video Studios. There were deliberations on naming it as audio-video studio or Air studio (with the name 'A First'). It was initially given a name – Communication Division or *Sanchar Kendra* but finally it was changed to *EMPC*. Producers weren't sure if they would be called audio producers, video producers or electronic media producers. But today they are happy to be called electronic media producers. The name being *Electronic Media Production Centre*, it could accommodate all kinds of e-learning materials, online courses, webcasting and so on, which are common today, but were non-existent in the year 2000. Today EMPC is broadcasting as well as webcasting. The work involves using simultaneous edits, utilizing various tools and technologies available today, making the content available on Facebook or YouTube - all these methods are open. Therefore, the philosophy, which is embedded in the name itself, is an innovation.

Innovation can be in methods, pedagogy, technology, and systems. There is also a bit of risk involved in this as most of time the innovation is considered only technological. It is very important to see the implications of the innovation. What actually matters in the end is if it improves learning or not. There is no point in being excited for a technology per se unless it helps in doing the job better, in training the people and the teachers, in providing them better service, and in creating more efficient and effective system. IGNOU serves the educational aspirations of about three million students and to deal with such huge strength its system must be strong and efficient otherwise everything will slow down. It is important to look for various available technologies and use them for better delivery of education to make it happen.

Distance Education and Online Learning

There are many definitions of distance education, however to put it in context of online learning and e-learning, and for a general understanding of it some brief definitions are given. Distance education or distance learning is a field of education where students study from home, are provided with specially prepared learning materials often in the form of correspondence materials, audio-video cassettes or CD ROMs. Open learning is a teaching method that is facilitated with content matter experts, or subject matter experts, online and paper based course content, FAQ databases, online libraries, presentation rooms, virtual classrooms, where learners can study at their own pace. While distance education enables the learners to study at their own pace, online learning perhaps offers more opportunities. There is a lot of flexibility - exams can be taken more often and assignments can be submitted online. Thus the online methodologies can facilitate the students in different ways.

The student can also access the resources from all over the world. A large number of digital libraries are available online. The student can access educational materials provided by

various other universities such as MIT, UKOU, etc. A student can also subscribe to online databases and access resources from all over the world. A large number of valuable lectures are available as audio, video, podcasts, etc. IGNOU is also making available a large number of videos through YouTube. The relationship between teachers and learners can be facilitated in a far better way through technology. The learning spectrum, of today consists of Correspondence, and classrooms (onsite). Many academic institutions, in India or abroad, are utilizing some or all of the elements of e-learning. IITs have put up the lectures of teachers on the internet. IIMs along with the Usenet have created an online Executive Development Programme.

Studies have shown that enrolment is going down in the US Business Schools especially in the top ten Business Schools. However, the enrolment in the executive development programmes and other e-learning programmes is rising. The Harvard Business School also offers online courses. Some of the e-learning technologies deployed by Harvard Business School are – online simulations, multimedia cases, online tutorials, video supplements and various online tools for collaborative learning. Apart from business cases, articles, books, guides, and course planning tools, the Harvard Business School also provides custom made ‘Class Books’ to educators. These ‘Class Books’ comprise e-learning materials, case studies and chapters from books written by the HBS faculty for any educator anywhere in the world. There are online courses, video supplements, online tutorials and teaching notes for all the cases in all forms. These are put together to prepare customised class books for the educator. The name of the institution is provided on top followed by the name of the teacher along with the educational material which includes the required printed cases and chapters from different books, published by the Harvard Publishing. This is supplied to an educator anywhere in the world. The educator can order the required numbers of copies for the students. Here, certain learning resources developed by educators over a period of time were made available to the Harvard students. It was felt that if the same learning material is used by students and teachers elsewhere in the world, it will not only facilitate learning but also enable the teachers to create much better learning materials aimed at a global audience. Feedback received from different parts of the world such as India, Brazil, Thailand, etc. will lead to further enrichment of the content. This is an innovation. It is not a new technology, but a pedagogical innovation involving better use of the available technologies.

Use of Mobiles for Learning

Where there are no roads and books cannot be provided mobile phones can be used to teach. Mobile phones can be used to reach people who can not read or write properly but want to learn something. For example, in Kenya mobile phones have reached most parts and their use has become widespread. The real breakthrough in Kenya has been in people’s ability to send and receive money through a mobile phone. A large number of financial transactions are done through mobile phones leaving even the banks surprised. People don’t know how to read and write, but they do the financial transactions on the mobile. This revolution has been brought about by *M-Pesa*, a mobile based money-transfer system pioneered by Safaricom, a leading Kenyan operator. Through its easy-to-use simple interface, which works on any phone, it has brought services to Kenya’s poor majority, facilitating the transfer of million dollars in financial services.

Now let us take example of organisations which are working on utilization of mobiles for education. Apart from *Knowledge Network India*, *IL&FS* is a large Indian organisation dealing

in infrastructure, leasing and finance with various other subsidiary companies. ILFSETS, which stands for the education and technology services, is one of them. One of the first New Media products in education was launched by IL&FS Education. Phone based tutor is another innovative media product launched by them. It is titled 'English Seekho' and is about basics of Spoken English skills. The training module includes recorded audio lessons of about five minutes each for teaching of English. There are other features such as interactive multiple choice questions on the IVR and advanced speech recognition engine for pronunciation mistakes. The summary of each lesson is sent through SMS and there is a facility to download free practice tests from the website. In case somebody wants to actually certify then there is a provision of taking an online exam through the mobile. The course is fee based and is available in India. About one and a half lakh people have already registered for this course in just two months. If it were a proper certificate based programme one can easily guess that registration would have been in millions. The entire training course is being made available through mobile phones.

It is a new way of reaching out to the learners and instead of charging the telecom operator would pay you for creating a new subscriber base. As the course is basically on Spoken English, lots of drivers, waiters, people in the tourism industry, etc. have taken admission. Lots of people have bought the subscription for their maids and so on, so that they learn to communicate in English. This can be considered as an example of innovation in the use of technology. Innovative use of pedagogy is also involved in this.

Google Knol

The example of Google Knol can be mentioned here. Google Knol is an innovative wiki based article writing platform launched in July, 2008 worldwide. Different categories are created for health, business, education, entertainment, etc. in different languages such as English, Arabic, Spanish, French, German, etc. Google defined *knol* as a unit of knowledge. Knols are authoritative articles on a wide range of topics, written by people who know about those subjects. Interaction is a vital component of the learning process whether it is conventional system or distance education systems. Knols include strong community tools which allow for many modes of interaction between readers and authors. People can submit comments, rate, or write a review of a knol. Google Knol is an attempt at leveraging ICT to enhance the quality of learning and promote collaborative learning.

The unique features of Knol were put to good use at NITIE, Mumbai, India by Prof Narayana Rao, Prof T. Prasad and Prof S.M. Dhume. They built communities of learning in their subjects. The learners liked the initiative and involved themselves enthusiastically in posting their assignments on knol and in participating in the online discussions. So there are course knols by faculty and assignment knols by students, basically emphasizing collaboration between teachers and students. NITIE is using Google Knol in subjects of marketing, industrial engineering, principles of organisation, and management.

NITIE is a regular organisation also providing online learning. The objective is to create an open knowledge repository, to achieve higher level learning (Level 3 to 6 of Blooms' Taxonomy). The belief is that learning can be opened to the whole world. Effective learning, lesser cost and wider reach are the potential benefits of this approach. It is not possible to invite the experts to the classrooms everyday, moreover, recorded lectures lack interactivity. Knols provide various tools for increased interactivity among students and teachers. There is a spiral learning impact because teachers and students can post comments, rate, or review a learning content thus ensuring interactivity, total transparency and convenience.

Other engineering colleges also showed interest and around six from Maharashtra have become involved in this innovative initiative. It is a voluntary phenomena led by the teacher in which they can participate without disturbing regular classroom teaching. It is just like an online add-on. The outcome is that the total number of Knols written by faculty is 1200, and by students is 3000. Students from other engineering colleges are also participating in these courses.

Kampus Online by Knowledge Network India

The Kampus Online by Knowledge Network India which was started in 2000 was also known as the *e-learning providers*. The main focus was on the training and learning requirements of the corporates. The target group was a dozen insurance companies, banks and assets management companies. This particular group was targeted because it becomes difficult to work with many people with varied learning requirements. It is also one of the first institutes to launch online training in Insurance in 2002. This developed as a pure model of online learning as everything was delivered online — study material, assessment, etc. Till 2005 there were no takers, but in 2006 around 0.5 million people became part of it. The company trained more than half million candidates in online mode with effect from 2006-07. The company developed an online course which was available in different Indian languages.

The company is also one of the first education providers of Financial Planning Standards Board India (FPSBI) to offer Associate Financial Planner (AFP)/ Certified Financial Planner (CFP) certification in online mode. An LMS, testing engines and mobile platforms were developed for offering e-learning services to corporates. An integrated platform for learning management, testing engine and mobile applications was developed for enabling learning and assessment on the mobile. Correspondingly a free to use portal for investment, awareness and education was also developed. It is an innovation in the form of the system which was developed and used. This small private organisation developed systems to handle half a million learners where server-up time is 100% and there is not a single movement of interruption of services. Moreover, the online exam is available 24x7, 365 days of a year for two years without a glitch. It is an innovation in system and also includes the Indian *Jugaad* system. The softwares are expensive and the corresponding hardware such as servers and so on are also costly. Here the target was that, ultimately the learning cost has to be brought to one rupee per hour per person. It started with 25 rupees and was brought down to one rupee per hour cost of learning.

E-learning

E-learning is the use of technology to enable people to learn anytime and anywhere. E-learning refers to formal and non-formal education that uses the electronic delivery methods such as internet based learning delivery packages, CD-ROMs, online video conferencing collaborative tools like e-mails, chats and forums to manage the relationship between teachers and learners. As compared to distance education or online learning, development of an e-learning course requires far more different sets of skills. Much more integration is also required. In distance education the relationship between teachers and learners is limited and is only sometimes in the form of face-to-face. E-learning methodologies provide the option of 24x7 connectivity and interaction. The student can chat, send e-mail and receive reply.

A large number of e-learning Platforms/Tools are available. These are the web portals, Learning Management System (LMS), Learning Content Management System (LCMS), assessment engine and diagnostics. Just assessing is not good enough. It is possible to build softwares for doing all kind of diagnostics along with assessment. This provides lots of ideas about further learning and so on. Some of the components of e-learning are web-servers, internet/bandwidth, browsers (IE, Netscape, Mozilla, Chrome, etc.), PCs or laptops at the client end and mobiles or iPods. Some other platforms and tools which can be used in developing e-learning programmes or courses are – mobile platform, blog/wiki/discussion forum/e-mails/chat/podcasts, virtual classrooms/web meeting tools, and CDs/DVDs.

Technology has enabled us to provide solutions as per user needs, thus providing more options to an organisation. Whatever is available at the student or learner end is not a constraint anymore. An organisation can have web servers, or it can go for cloud computing. No matter how small or big an organisation' it can not suffer any further from financial constraints. A university cannot give the excuse that it does not have funds to procure a server, or that it cannot have a studio like the. Technology has made things simple and cheap. For example, a video lecture for webcasting can be recorded in a small room with a table lamp to throw light on the face of the speaker. However, materials can be provided depending on the available bandwidth. That is why we continue to use the *Jugaad* methods to make things work in the available bandwidth. Most of the material provided online is in the form of audio and video files. However, audio/video files were provided separately so that depending on the bandwidth – the learner could listen to the audio in case the video can not be accessed or played because of the problems with the bandwidth and network. The developments in technology have led to a reduction in the costs and various technology products and devices are now within the reach of middle or lower middle class. PCs are now available in India at a reasonable cost. The mobiles devices, i-pads, tablets and i-pods are now emerging as technologies with great potential for use in education. New features are being added and even the mobile screens are becoming bigger. With promising applications the mobile devices can serve as an effective medium for imparting education.

Manpower required to support e-learning are Project Manager, Programmers, Graphic Designers, Web Designers and Animators, Subject Matter Experts, Instructional Designers, Voice Artists and Quality Controllers. Instructional designers have to keep in mind that only good subject content is not enough because the whole methodology of putting up together the entire instructional material for distance learning or e-Learning is quite different. Moreover, a Quality Controller is required at every stage to ensure that the quality of work being done is right. Innovation is required here. So the subject matter experts themselves will have to acquire some of these required capabilities. For example, at the School of Management Studies, IGNOU, things were very tight as the timelines for the launch of the programme was quite stringent. As a matter of fact at IGNOU several steps are followed towards preparation of course material. The draft prepared by the course writers is edited by subject experts which is followed by format editing by experts in distance education and then language editing. But due to constraints of time, subject matter experts did the content as well as distance education format editing themselves. Again, nobody was available for language editing and so the task was undertaken by the faculty members. Now, similar situation was faced by the web-developers. For developing effective e-learning innovation is required in terms of how to manage it. Raw content is required, storyboarding is used, creation of images, slide presentations, development of audio/video lectures, texts,

animations, glossary simulations, and finally all these have to be put together, to develop an effective course in SCORM complying format. SCORM format, i.e. Sharable Content Object Reference Model, is a collection of technical standards and specifications for e-learning. SCORM allows instructional components to be integrated into multiple applications. It thus enables you to create a standardised system that can be used in different programmes across different platforms or LMSs. Other benefits of SCORM are accessibility, adaptability, affordability, inoperability and durability.

Corporates are using e-learning to a great extent. People need to be adequately trained to get used to this mode. IGNOU can play a pioneering role in this area as it has the required knowledge base, experience base and most importantly the skill base. Learning management involves competency management, content management, knowledge management, performance management, testing and assessment, and collaboration. Similar developments are taking place in the school education system. There is a demand for the learning management system to be connected to the ERP database. The corporates want the LMS to be tied-up with the HRIS (Human Resource Information System) and other portals. This provides information in respect of linkages between training programmes and the required competencies, in terms of their learning requirements. Various organisations such as ICICI Bank, HDFC Bank, Airtel, Reliance, etc. need not only an LMS or knowledge management, but they want such kind of integrations. Such work is expected from IGNOU also as it is supposed to provide leadership in online learning and e-learning. While technologies, pedagogies, etc. will keep on emerging, what matters is the end result. It is important to see that they provide enrichment in learning along with increased accessibility and cost effectiveness.

Online Learning at IGNOU

Online learning should be customised for providing access to learning resources such as project reports, research studies, etc. Moreover, assessment, counselling sessions, effective interaction are significant components of a successful online programme. One of the major drivers of innovation in online learning is the learner preference. The learner should be at the centre of it. At IGNOU, for example, the learner profile varies widely across programmes, regions, geographical locations, family and social background. Therefore, the extent of online component should be determined by making an assessment as to how much the learners are open to that. It should also be analysed if the required manpower support system is there or not as it could be a barrier. But if the learners are ready, it should be given a try. Again online instruction design remains a challenge that needs to be faced.

IGNOU has experimented with and implemented several new practices such as course-wise registration, modular structure, lateral entry in the management programme, and so on. All these innovations were done very methodically and all this is a part of IGNOU's glorious history. When 'online' or 'online education' were only buzzwords, IGNOU had the courage of ushering in a technology enabled management programme, where but for the course content every other service was online. When the word 'collaboration' was still an unknown identity, IGNOU steered collaboration with the Indian Institute of Bankers and started a programme which is today a steady state MBA Banking and Finance Programme. Entering into this kind of collaboration is one of the many such innovations in distance learning. Now-a-days there is a classroom version of educational delivery which is so richly supported by e-learning content that it is very difficult to distinguish between a distance education programme which is technology supported and a classroom based teaching

programme. While ODL has been adopting some of the features of classroom teaching in the form of interactivity that is being brought in, classroom teaching is getting used to some formats that are synonymous with open distance learning in the form of out-of-class access to students, that is being built up through e-learning. In this scenario one of the issues in the current Indian situation, as far as higher education is concerned, is if the distinction between classroom teaching and ODL will continue to exist.

Wawasan University Online Model

Wawasan is a small country and the number of learners is not very large. The online model was adopted because of good internet penetration and internet speed in the remote parts of Malaysia. The University thought that putting or dumping the material on the website is a sort of misuse of the internet space; therefore the material was made available as interactive CDs as well as in print form, depending on the student requirement. But all the services, including student interaction, online tutorials, interaction with tutors, were available online. A very robust learning management system has been put in place, which is a Moodle based system adapted to their requirements. The LMS as well as the library is available 24x7.

The online assignment system, an internal application, has been developed as a very efficient system. The students were only supposed to post their assignments online, the tutor had to assess the assignments online and put the comments on the portal itself and the assignments were to be returned to the students in 15 days. The students for the undergraduate programme are required to submit three assignments, and there are two assignments for the post graduate programme. Post graduate assignments are mostly case study based and therefore require more time. Only the Course Co-ordinator can declare the results. The tutor posts the results on the portal accessible by the Course Co-ordinator, who then moderates the assignment online and then declares the results. The Dean has access to all the Course Co-ordinator portals. There is a built-in faculty evaluation system.

Similarly, there is the public forum on the LMS and every faculty member is supposed to check if the students have raised any queries on the LMS. The general understanding is, especially for the Executive Management Programme, is that a large part of learning takes place only through peers and therefore the public forum, where the peers could interact with each other. It is very dynamic, full of information and discussions. The course coordinators are supposed to post a new thread every week, and see the kind of responses received and how students interact with each other. The response time or the turn around time for the faculty is 24 hrs; if it is not adhered to then the Dean has a right to question the faculty concerned. The annual performance evaluation of the faculty is done on the basis of the participation on the LMS. Similarly video conference is available on a web based portal. The issue of Instructional Design is extremely important as it is being realised that the quality of instructional design is the hallmark of any good ODL system.

In Wawasan University individual faculty uploaded dynamic content into the portal and it was noticed that different faculty members followed different practices and it became an issue. When the faculty is trained on the print based instructional design, it becomes difficult for them to switch on to online, especially the dynamic content. One of the newer trends in terms of online instruction is the availability of the OER that are now available especially for management and technology. The Dean who was with the visiting team from Athabasca University stated that in today's time it is pointless to develop your own content

as there is so much available on the internet. There is no need for reinventing the wheel. The only sacrifice that one has to make is that once the required course content is ready it has to be made available on the OER portal. But that is a very small act of sacrifice, as one can put together a course along with case studies, instructions, and course guides for learners in a very short time.

Teaching-learning is largely a narrowcasting situation where mediation is required in a small classroom, at the same time online learning has a lot to do with scalability so that a large number of people join in. Technology can be used as an enabler in such times when the interaction increases. Sometimes a set of hierarchy of response systems can also be worked in. For example, in Wawasan University system the students are divided into tutorial groups and the first responsibility of answering a subject based query lies with the tutor. So, one tutor is responsible only for 30 students. If tutor is not able to respond then the Course Co-ordinator comes in. The question is of availability of time and if practicable the tutor can interact in a synchronous or asynchronous mode. The tutor can set up chat in synchronous mode and interact with the students for an hour at discretion. The Course Coordinator is responsible for 500 students but all the basic queries framed by the tutor themselves are actually responded to within 24 hrs. So, only the remaining queries come to the Course Coordinators.

Conclusion

The use of mobiles phones initially meant for communication and staying connected, for education is an innovation in itself. At the Allama Iqbal University in Pakistan SMS is used to stay connected with the learners. It is a one way SMS service from the tutor to learners. In the Athabasca University mobile learning was initiated by David Porter. The Pricewater House Cooper study of ICT in South Asian Learning mentions that while e-learning is more popular but looking at India's situation where mobile penetration is much higher than internet penetration and PC ownership; should mobile learning be taken up for the great proportion of Indian higher education than merely banking upon e-learning. Since terrestrial television and cable TV penetration is also good and audiovisuals are more accessible mode it can be used for imparting education. So, India should be looking at more innovative measure of packaging its higher learning instead of just using internet based/web-based models!

13

GIScience: Its Relevance to Society and Future Challenges

M.S. Nathawat

Introduction

What is GIS? This is one of the questions which is most frequently posed to those in the Geographic Information Systems (GIS) field and is probably the hardest to answer in a concise and clear manner. GIS is a technological field that incorporates geographical features with tabular data (known as attribute data) in order to map, analyse, and evaluate real-world problems. The fundamental element of this technology is Geography – this means that some portion of the data is spatial, which is in some way referenced to locations on the earth. Attribute data can be generally defined as additional information about each of the spatial features. These two data types enable GIS to be such an effective problem solving tool through spatial analysis. Thus GIS and spatial analysis methods are powerful tools for the analysis and synthesis of geographically distributed phenomena, and form a critical component of the information infrastructure for science. Such systems are applicable to a wide variety of problems, including many areas of basic and applied research.

Geographic Information Science (GIScience) is an inherently multidisciplinary field that supports GIS and seeks to understand the nature of geographic phenomena and geospatial information. It provides theoretical foundations for GIS and the rationale for research and development in GIS and its applications.

This article presents an analysis about the role of GIScience as a common denominator of various disciplines, highlighting how it acts as a facilitator for interdisciplinary research. It also briefly explores its future prospects.

Geographic Information Science

Geographic Information Science (GIScience) is a relatively new interdisciplinary field of education and applied research. It is primarily based upon the understanding that basic and applied research must be reflected within the arena of societal benefits. This is strongly advocated by scholars like Goodchild, Craglia, Mark, Longley, Wright, etc. New areas of research for GIScience and GIScience related technology have arisen in environmental management, landscape ecology, and health care sector concerning epidemiology. Various other interdisciplinary domains such as computer science, surveying, or image processing, and other applied fields such as forestry, geology, spatial planning, hydrology, or utility management have come to play an important role in the technical realm of GIScience.

A growing number of characteristics have made GIS a mainstream technology and many standard approaches have been adopted. There are many reasons for treating geographic information from a 'special', and certainly fruitful perspective (Goodchild, 1992; 2005; Longley et al, 2010; Torrens, 2010). This also created the need for educating specialists in GIS concepts, principles, and uses (Bednarz, 2000; Goodchild, 1992; Craglia et al, 2008;).

Explosive growth of geospatial technologies and its invasive spread throughout the science discipline is an evidence of its acceptance as a value added technological requirement. However, Geography and Geographic Information Science form only one part of the story.

Change can be noticed in several other disciplines built on ideas strongly associated with Geography. For example, Paul Krugman's 2008 Nobel Prize in Economics was based on his reintroduction of the importance of location and geographical factors, in understanding economic activity. Space has found new theoretical significance in 'spatial ecology' (Zimmerer, 2007) as well as in applied disciplines like geomarketing.

GIS is fast becoming a crucial tool in environmental management, retail, military, police, tourism, and so on. It is a significant element of various spheres touching our lives. If you use a computer or a cell phone, you would have probably used a GIS in some form without even realising it. May be it was a map on a website such as Google Earth, an information booth or your cell phone telling you where you are.

The Development of GIS

One of the earliest examples of spatial analysis can be traced back to London in the year 1854 when Dr. John Snow predicted the outbreak of cholera. His study helped the government officials in determining the actual cause of the disease, which was a contaminated water pump. The map devised by Snow enabled in the analysis of the phenomena in relation to the geographical positions. The Snow map was unique in the use of cartographic methods not only to depict but also to analyze clusters of geographically dependent phenomena. This was the first time that such a concept was used in the world. The development of photo zincography in the early 1900s enabled maps to be divided into different layers as required. In the initial stages, the process of drawing such maps was lengthy since it involved free hand drawing but this changed with the introduction of the computer.

The first operational GIS was developed by Dr. Roger Tomlinson in the year 1960 in Canada. The system named Canada Geographic Information System (CGIS) was meant to collect, store and analyse the data related to land use in rural areas. The purpose was to determine the capability and potential of land in rural Canada by mapping information about soils, agriculture, recreation, wildlife, waterfowl, forestry and land use. Prior to this, developments in computer hardware and software led to the use of computers in mapping. By the end of 1980s, the use of GIS became popular in other related fields and led to a spur in the industrial growth. Now, open source software for GIS has been developed so that this brilliant technology can be enhanced in a simple manner while being made available to all.

Components of GIS

For better understanding of GIS it is essential to look at different components and their working. These components are Hardware, Software, Data and People.

i) Hardware

Hardware comprises the equipment required to support the various activities related to geospatial analysis ranging from data collection to data analysis. The main component is the workstation, which runs the GIS software and other ancillary equipment is connected to it. For data collection, digitizer/scanner is used for conversion of hard copy data to digital data and a data logger is required to collect data in the field.

The use of handheld field technology called Global Positioning System (GPS) is also becoming an important data collection tool in GIS. With the advent of web mapping, web servers have also become an integral part of the system.

ii) Software

Different types of software are important for GIS. Central to this is the GIS application package. Such software is essential for creating, editing and analysing spatial and attributes data; therefore these packages contain a myriad of geospatial functions inherent to them.

iii) Data

Data is the core of any GIS. There are two primary types of data that are used in GIS - vector and raster data. A geodatabase is a database that is in some way referenced to locations on the earth. Geodatabases are further grouped into two different types - vector and raster. Vector data is spatial data represented as points, lines and polygons. Raster data is cell-based data such as aerial imagery and digital elevation models. Coupled with this data is usually the data known as attribute data. Attribute data is generally defined as additional information about each spatial feature housed in tabular format.

iv) People

Well-trained GIS professionals knowledgeable in spatial analysis and skilled in using GIS software are essential to the GIS process. There are three important factors related to the people component - education, career path and networking. The right education involves taking the right combination of courses. Selecting the right type of GIS job is also important. Finally, continuous networking with other GIS professionals is essential for the exchange of ideas as well as community support.

GIS operates on many levels. On the most basic level, geographic information systems technology is used as computer cartography, which is for straightforward mapping. The real power of GIS is reflected through the use of spatial and statistical methods to analyse, attribute and geographic information. The end result of the analysis can be derivative information, interpolated information or prioritised information.

Definitions of GIS

Some popular definitions of GIS are mentioned below:

In the strictest sense, a GIS is a computer system capable of assembling, storing, manipulating, and displaying geographically referenced information, i.e. data identified according to their locations. Practitioners also regard the total GIS as including operating personnel and the data that go into the system (USGS).

GIS is an integrated system of computer hardware, software, and trained personnel, linking topographic, demographic utility, facility, image, and other resource data, that is geographically referenced (NASA).

A geographic information system (GIS) is a computer-based tool for mapping and analyzing things that exist and events that happen on earth. GIS technology integrates common database operations such as query and statistical analysis with the unique visualization and geographic analysis benefits offered by maps (ESRI).

A geographic information system is a special case of information systems where the database consists of observations on spatially distributed features, activities or events, which are definable

in space as points, lines, or areas. A geographic information system manipulates data about these points, lines, and areas to retrieve data for ad hoc queries and analyses (Kenneth Dueker, 1979).

A full definition of GIScience was provided in a report on a workshop held in January 1999 at the National Science Foundation, Geographic Information Science.

Geographic Information Science (GIScience) is the basic research field that seeks to redefine geographic concepts and their use in the context of geographic information systems. GIScience also examines the impacts of GIS on individuals and society, and the influences of society on GIS. GIScience re-examines some of the most fundamental themes in traditional spatially oriented fields such as geography, cartography, and geodesy, while incorporating more recent developments in cognitive and information science. It also overlaps with and draws from more specialized research fields such as computer science, statistics, mathematics, and psychology, and contributes to progress in those fields. It supports research in political science and anthropology, and draws on those fields in studies of geographic information and society (Mark, 2000).

GIS has affected most of us in some way without our even realising it. If you have used an Internet mapping program to find directions you have probably used GIS. The new supermarket chain in your locality was probably located using GIS to determine the most effective place to meet customer demand.

Uses of GIS

There are numerous ways in which this technology can be used. The most common ones are:

- Management of resources
- Investigations of the earth's surface that is scientific in nature
- Archeological uses
- Locations based planning and management of assets
- Urban and rural planning
- Crime analysis
- Impact assessment of the environment
- Assessment and eventual development of infrastructure
- Studies of the demographics of an area plus its population
- Analysis in relation to engineering projects
- Used by emergency response teams for collecting logistics about their movement in times of natural disasters.
- Used by disaster management personnel to locate areas that are prone to catastrophes.
- Protection and monitoring of natural environments such as wetland and natural reserves from the harmful effects of pollution and encroachments.
- Choosing a strategic market location that has not yet been saturated by other competitors in any particular niche industry.
- Prediction of potential spread of diseases and epidemics and adoption of required preventive measures.

The Potential of GIS

GIS applications are largely used within the government, transportation and utilities sectors. GIS also has significant usage in the worlds of business and commerce and natural resources. It is valuable for the government as it has to undertake adequate analysis of data to target scarce resources most effectively.

Some key industry uses for GIS include:

- **Government** – GIS applications are used by the government at the national, regional or local to plan services. The ability to update a profile rapidly enables the government to engage with local people in the planning process. Computer models can be designed for involving the community in the consultation processes thus providing the stakeholders an opportunity to see specifically how their thoughts and ideas can impact any given plan.
- **Electoral Services** – The recording and registration of voters is a fundamental aspect of the one man-one vote democratic process. Apart from organising the logistics of the democratic process, GIS applications can also be used to identify key areas where voter registration is inadequate. Proper analysis enables the political press to stimulate debates for maintaining interest in the entire democratic process.
- **Public Works** – The public works departments have to plan transportation links and utility provisions across urban and rural areas. The GIS applications help in modeling the current provision that can be used to predict future requirements given population churn and growth.
- **Schools** – GIS tools are important in the education sector for planning purposes and as tools for delivering education. Detailed analysis of population profiles can be recorded in geospatial GIS applications that can then model current education provision against the shape it will take in future. This helps the educators in appropriate location of new provision. It further enables them to judge more effectively what services are required in those facilities.
- **Public Health** – The Public Health Services rely heavily on the outputs provided by GIS applications. Socio-economic data can be modelled by a GIS application to profile health needs across local and regional communities. This is an effective tool in determining how you locate health centres and exactly what services those health centres provide.
- **Surveying** – The surveying function of any local government team is critical to the maintenance of roads, utilities and many public services. A GIS application allows the use of standard geospatial layers to ensure that local planning and execution of maintenance activities is effective.
- **Economic Development** – Economic development is increasingly influenced by government policy. GIS applications provide a detailed analysis of all the social, economic and topographical features that affect the economy of a given area. They can be used to model the effect of different types of policy implementations on local economy.
- **Urban and Regional Planning** – GIS applications can be useful in urban and regional planning as they allow greater transparency and stakeholder involvement in the entire planning process. Spatial data are at the core of all planning processes. Various local, regional and national indicators can be plotted to see the extent of their influence on local planning requirements.

- **Emergency and Disaster Management** – These services, by their very nature, are unique to any given location. A GIS application allows the addition of layers of physical data in order to predict the risk of disaster and catastrophes. For example, data about forestation and wind prevalence can be layered in order to predict the risk of forest fires. Similarly, data about wind and tide can help to predict the occurrence of floods. The data layered into an application further helps to propose disaster avoidance mechanisms. The real time data can also be added as a way of managing an unfolding disaster.
- **Law Enforcement** – Modern societies require effective law enforcement, and the use of GIS technology enables to make sure that various decisions about the deployment of resources at street level are made effectively. Techniques like hot spot analysis help law enforcement officials to make informed decisions about proper allocation of police assets in order to reduce crimes.
- **Oil and Gas** – GIS provides an effective reliable mapping system for the energy and mining sources around the planet. This helps to manage different aspects of the business such as logistics, energy saving, planning, engineering, etc. GIS applications are used to design, plan, implement and manage million miles of oil and gas pipelines. GIS systems are also used to assess the risk of natural disasters such as hurricanes, or other disasters such as oil spills. Such systems help to build plans to overcome the crisis and minimise losses.
- **Electricity** – The electricity supply industry has two segments, generation and distribution. The GIS applications effectively support both the sides of the industry. GIS applications help in power systems analyses (fault analysis, optimisation of networks, load forecasting, etc.). GIS also helps to manage and predict supply requirements so that the demand is matched to supply. GIS is useful in the selection of suitable areas for setting of distribution towers, the optimum path finding, the engineering design of towers and wires, and the cost estimation. GIS is also used in effective management of infrastructure, scheduling planned maintenance and identification of potential trouble spots.
- **Roads and Highways** – GIS applications are used in the planning of new roads and the maintenance schedules of existing roads. Designing new road networks requires a topographical analysis of the landscape as well as predicted movement patterns across local and regional levels. GIS can also be used to carry out impact analysis as part of the decision making process for developing new roads.

We have witnessed massive progress in the development of Geospatial Information Science, popularly known as GIScience, over the past four decades. It provides information related to specific locations on Earth's surface by using tools that acquire, store, analyze, and share geographic information. Over the past few decades, geographical information systems (GIS) has emerged as an innovative tool that is now becoming ubiquitous. Examples of its application include virtual earth systems such as Google Earth, and satellite-based navigation systems such as global positioning systems (GPSs).

Certain Aspects Relocated to Geospatial Research

Technological trends suggest that the world of the scientist will be very different a decade from now. Information technology, communications infrastructure, microelectronics, and related technologies would enable unprecedented opportunities for discovery, and new

ways to do research. To make this more concrete, here are some visions of certain aspects of the practice of geospatial research in future.

Information has always been the cornerstone of effective decisions. Spatial information is particularly complex as it requires two descriptors—*Where* and *What*. For thousands of years the link between the two descriptors has been the traditional, manually drafted map involving pens, rub-on shading, rulers, planimeters, dot grids, and acetate sheets. Its historical use was for navigation through unfamiliar terrain and seas, emphasising the accurate location of physical features.

More recently, analysis of mapped data has become an important part of understanding and managing geographic space. This new perspective marks a turning point in the use of maps from emphasising physical description of geographic space, to one of interpreting mapped data, combining map layers, and finally to spatially characterising and communicating complex spatial relationships. This movement from '*where is what*' (descriptive) to '*so what and why*' (prescriptive) has set the stage for entirely new geospatial concepts and tools.

Since the 1960's, the decision-making process has become increasingly quantitative, and mathematical models have become routine. Prior to the computerised map, most spatial analyses were severely limited by their manual processing procedures. The computer has provided the means for both efficient handling of voluminous data and effective spatial analysis capabilities. From this perspective, all geographic information systems are rooted in the digital nature of the computerised map. This change in emphasis can be noticed in Fig. 13.1 below.

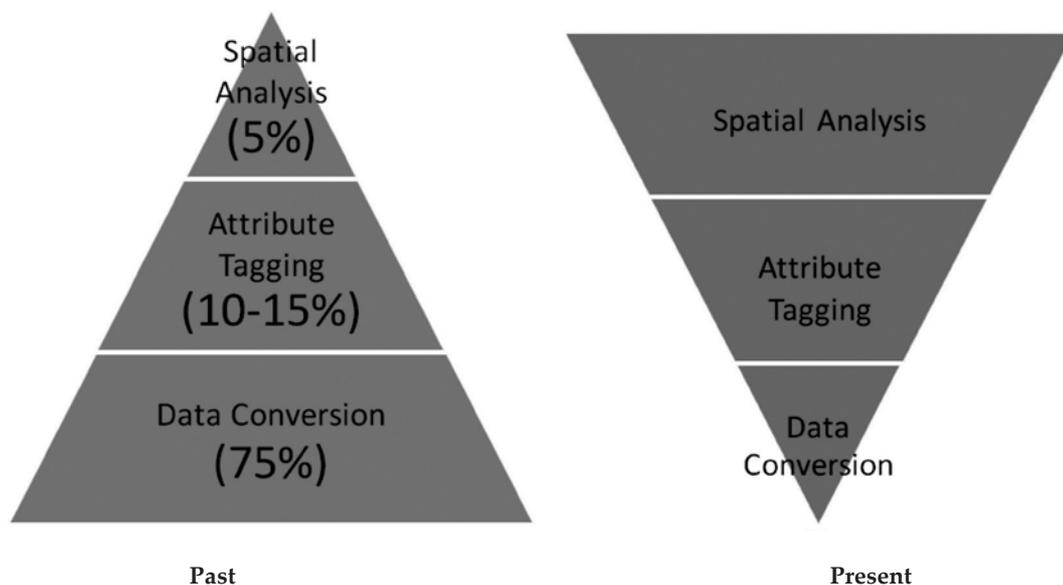


Fig. 13.1: Changing Emphasis in GIS: From Data to Analysis

The previous section focused on early GIS technology and its expression in three evolutionary phases — Computer Mapping (70s), Spatial Database Management (80s) and Map Analysis/Modeling (90s). These efforts established the underlying concepts, structures and tools supporting modern geotechnology. What is radically different today is the broad adoption of GIS and its new map forms, as shown in Fig. 13.2.

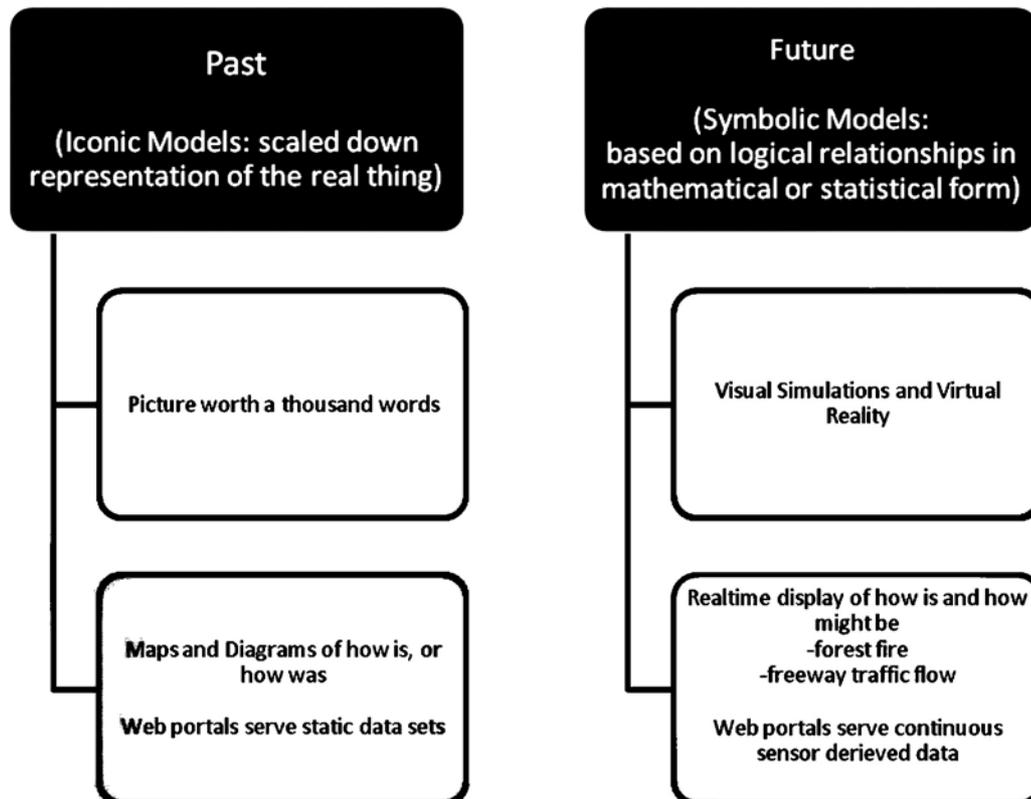


Fig. 13.2: GIS Past and Future

Futuristic GIS Applications

In the early years, GIS was considered the domain of a relatively few techno geeks. Today, it is on everyone’s desk, PDA and cell phone. In just four decades it has evolved from an emerging science to a fabric of society that depends on its products from getting driving directions to sharing interactive maps of the family vacation.

Geotechnology is termed as one of the three ‘mega-technologies’ of the 21st century— other two being Nanotechnology and Biotechnology. This broad acceptance and impact is largely the result of a general wave of computer universality in modern society. We expect information to be just a click away and spatial information is no exception.

However, societal acceptance is also the result of the new map forms and processing environments. Flagship GIS systems, once heralded as ‘toolboxes’, are giving way to web services and tailored application solutions. There is a growing number of websites with extensive sets of map layers that enable users to mix and match their own custom views. Data exchange and interoperability standards are being used to extend this flexibility to multiple nodes on the web, with some data from here, analytic tools from there and display capabilities from somewhere else. The results are high level applications that speak in user’s idiom and hide the complexity of data manipulation and obscure command sequences. In this new environment, the user focuses on the spatial logic of a solution and is hardly aware that GIS is involved.

Another characteristic of the new processing environment is full integration of the GPS and remote sensing imagery with GIS. GPS and the digital map bring geographic positioning to the palm of your hand. Toggling on and off an aerial photograph provides reality as a backdrop to information, summarized and modeled using GIS. When ancillary systems, such as robotics, are added to the mix, new automated procedures for data collection and on-the-fly applications arise.

In addition to the changes in the processing environment, contemporary maps have new forms of display radically beyond the historical 2D planimetric paper map. Today one can even drape spatial information on a 3D view of the terrain. Virtual reality can transform information from pastel polygons to rendered objects of trees, lakes and buildings for near-photographic realism. Embedded hyperlinks provide access to actual photos, video, audio, text and data associated with map locations. Immersive imaging enables the user to interactively pan and zoom in all directions within a display.

4D GIS (XYZ and time) is the next major frontier. At present, time is handled as a series of stored map layers that can be animated to view changes on the landscape. In addition to predictive modeling, management actions (e.g., timber harvesting and subsequent vegetation growth) can be introduced to look into the future. In future data structures will accommodate time as a stored dimension and completely change the conventional mapping paradigm.

The future will also build on the cognitive basis, as well as the databases, of GIS technology. Information systems are at a threshold that is pushing well beyond mapping, management, modeling, and multimedia to spatial reasoning and dialogue. In the past, analytical models have focused on management options that are technically optimal and form the scientific solution. In reality, there is another set of perspectives that must be considered, which form the social solution. It is this final sieve of management alternatives that most often confounds geographic location based decisions. It uses indefinable measures, such as human values, attitudes, beliefs, judgment, trust and understanding. These are not the usual quantitative measures amenable to computer algorithms and traditional decision-making models.

The technical hurdles surrounding GIS have been aggressively tackled over the past four decades. Comprehensive spatial databases are taking form, GIS applications are accelerating and even office automation packages include a 'mapping button'. Let us come to the most pressing issue confronting GIS in the next millennium.

The development of GIS has been more evolutionary, than revolutionary. It has been influenced by contemporary needs and the various technical breakthroughs. Planning and management have always required information as the cornerstone. Early information systems relied on physical storage of data and manual processing. With the advent of the computer, most of these data and procedures have been automated. As a result, the focus of GIS has expanded from descriptive inventories to entirely new applications involving prescriptive analysis. In this transition, map analysis has become more quantitative. This wealth of new processing capabilities provides an opportunity to address complex spatial issues in entirely new ways.

The growth of GIScience has led to an increased interest in form, leaving inference about the process entirely outside the system. The need is to provide more effective support in GIS for studies aimed at understanding the earth system science process.

It is also felt that more progress is required in representing time in GIS, and in the development of methods for the analysis of spatio-temporal data across the discipline. Process is much easier to infer from longitudinal data, with its representation of the sequence of events, than from cross-sectional data. Valiant efforts have been made, of course, towards maximum possible use of cross-sectional data when no other data are available. The cross-sectional data can be used to falsify hypotheses about process, even if they cannot often be used to confirm them (Goodchild et al., 2000).

According to Goodchild, GIS and GIScience have quite logically led to a renewed interest in form, but this has moved the field away from the core disciplinary concern with process. He has also suggested three ways in which GIS might evolve to provide better support for inference about process. He has proposed three related items for the GIScience research agenda –

- i) better representation of dynamics, and associated improvements in the supply of data and relevant methods of analysis and visualisation;
- ii) a closer coupling between analysis and the conceptualisation of process, facilitated by integrated methods of massive simulation; and
- iii) the development of an infrastructure for sharing digital representations of process.

None of these seem particularly difficult, but taken together they should ensure that the relationship between GIScience and geography remains strong and vital in the coming decades.

The Future Challenges of GIScience

While it is easy to imagine scenarios mentioned earlier, all of them raise issues that will require solutions through GIScience research, so in this section such issues are briefly highlighted.

Representation: Despite much recent progress, we still do not have the means to represent the full range of conditions and phenomena on a dynamic and complex Earth. This will require fully 4D data models that include all three spatial dimensions and time.

Simulations: Limited computing power and storage capacity still place constraints on the reliability of models of real processes. All too often we must work at coarse resolutions in space and time, missing the detail that is often essential in the modeling of complex non-linear phenomena.

Communicating uncertainty: While there has been excellent research on the visualisation of uncertainty, the problem remains hard because of the importance of covariance in geographic phenomena. Covariance is a binary property and thus is not easily portrayed in map form.

Data search and discovery: One of the goals of Digital Earth is to enable efficient search over a distributed, global data resource through a single access mechanism. The current generation of geoportals achieves this to some degree, but much remains to be done for the sub achieving of their main goal.

Archiving: While our ability to produce geospatial data in vast quantities is now uncontested, we have no feasible solutions to long term preservation. It is possible that in the year 2030 and beyond it will be easier to discover the state of the world as it looked in 1960, than as it looked in 2012-13.

Conclusion

Geospatial technology continues to expand and develop at an apparently accelerating rate. GIScience has always been driven in part by technology, and there appears to be no end in sight to that process. It is important to anticipate developments and to think clearly about their implications, not only in providing new capabilities but also in prompting social and institutional change. Geospatial technology raises many fundamental questions, providing a rich agenda for GIScience. These questions touch on many traditional disciplines, including statistics, mathematics, computer science, and geography, but also cognitive psychology, political science, and many other social sciences. Many of these questions pose fundamental challenges, and will require substantial investment if they are to be addressed thus enabling the geospatial technology industry to continue to flourish.

One of the more profound effects of these changes lies in their likely impact on education. For the past several decades it has been standard practice to think of GIS education as a process of training professionals.

We started from the vision that Geographic Information Science is developing into an interdisciplinary research field or even a discipline of its own, at least not simply being part of Geography, Computer Science or the intersection of both. GIS emerged in the 1960s, and has in essence always been a set of tools designed for processing, analysis, modeling, and storage of spatial data. It now constitutes a large and growing industrial sector. More recently, it has become apparent that geospatial technologies are based on, and in turn raise issues of fundamental significance, and that these issues form a domain of science whose discoveries provide the basis for the technologies (Goodchild, 2009). This science is known as Geographic Information Science (Goodchild, 1992) or GIScience in short but also referred to as geospatial science, geoinformatics, geomatics, and spatial science. This may partly be owing to the fact that the interdisciplinarity inextricably linked to GIScience spans from (hard) sciences to engineering to social sciences.

This lecture is based on concepts and notes taken from the references mentioned below and I duly acknowledge the same.

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14

ICT Enabled Training Model for Health Professionals in Integrated Management of Neonatal and Childhood Illness

T.K. Jena and Jyotsna Dikshit

Introduction

According to a document developed by Ministry of Health and Family Welfare, Government of India (GOI), the MHFW is implementing the Integrated Management of Neonatal and Childhood Illness (IMNCI) as a key child health strategy within the National Reproductive Child Health Programme II and the National Rural Health Mission. Keeping this in view the School of Health Sciences (SOHS) of the Indira Gandhi National Open University (IGNOU) introduced IMNCI as a part of Post Graduate Diploma in Maternal and Child Health (PGDMCH) in 2003. Providing effective practical training through open and distance mode by maintaining a perfect balance vis-à-vis the theory had always been an intriguing issue. The solution lies in undertaking an innovative approach. Thus it became quite imperative on the part of SOHS to collaborate with the National Centre for Innovations in Distance Education (NCIDE) of IGNOU.

This article discusses the introduction of innovative practices in the field of medical education and training by NCIDE which in effect aims to change the traditional mode of training of MBBS doctors at the grassroots levels. This was made possible by introducing a highly innovative ICT enabled mechanism for providing a quality assured, dynamic, cost effective and accessible training through trainee-centric pedagogic approach, and simple platform independent technology. NCIDE and SOHS collaborated towards integrating the IMNCI training component (except bed side teaching) into a digital interactive multimedia package for all health professionals who are involved in the care of children.

The Problem

The IMCNI strategy is a clinical guideline whereby health professionals use a series of algorithms to assess and manage a sick young infant and sick child, and give counselling to the mother or the caregiver. IMNCI is taught using a structured 8-days training course as a part of 11-days F-IMNCI training that combines classroom work with clinical practice. The challenges and issues of IMNCI/F-IMNCI training in India are as under:

- Access of the IMNCI training programme for the health professionals and health workers at the grassroots
- Quality of the IMNCI training commensurate with the need of people
- Timelines
- Cost of training
- Follow-up mechanisms for the training conducted
- Periodical updates of training content

Notwithstanding the fact that the training programme has been designed reasonably well, the above mentioned issues are not to be lost sight of.

Innovative solution

We designed and developed a long-term innovative ICT enabled mechanism for providing a quality assured, dynamic, cost effective and accessible training through a trainee centric model by integrating the IMNCI training components (except bedside teaching) into a pedagogically sound, technologically accessible digital package which can be delivered both online and offline and even on other embedded systems like IPTV, android supported mobile phones, palmtops and tablets for all health professionals who are involved in the care of children. The content of the package includes the IMNCI training modules followed for training the physicians. Self-training and learning are inbuilt in the multimedia content, which is engaging and interactive, simulation-based and ensures that the trainees learn exactly as per their need. Each trainee has the same level of participation in the learning process. Participants are active rather than passive, and assume greater responsibility for their own learning. Trainees can obtain information and update or revise skills when they need them.

Conceptual Framework

In our case finalisation of the prototype resulted in the evolution of a conceptual framework as mentioned in Fig. 14.1. The components of the conceptual framework are explained below.

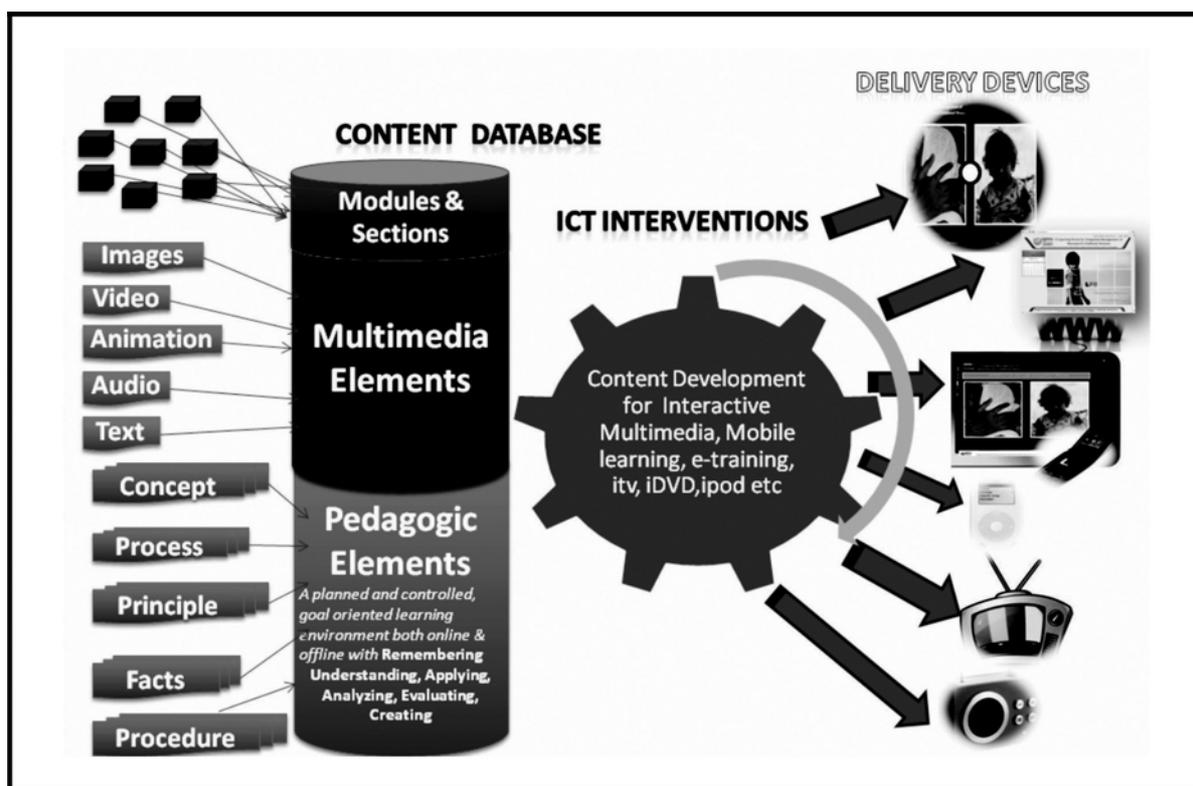


Fig. 14.1: Conceptual Framework

The Content Database

A learning material is of more value if it can be re-used for different type of learning as much as possible. Since the content which we wanted to re-use had almost same context it was bit easy for us to re-use the content for different media type and presentation type.

Re-using content lets you reduce the workload for content development while simultaneously improving the quality of the information. For example, a section of the multimedia package is a sequence of introduction, explanation of the concept, procedure, process, demonstration of a procedure, followed by learning activities and evaluation. Thus on the basis of the content of the modules, we developed the multimedia contents. In our situation, we have the set of nine modules of content, with minimum of 20 sections in each module, comprising at least 20 multimedia elements per section that makes 3600 multimedia elements of the content. Then, the content is produced in five delivery formats. That makes 18000 uses of the same content. We did not want our team to create this content 18,000 times. Keeping in view of the different delivery mediums of the content it was even not possible for our team to create a single content object and then refer to multiple times. The purpose of developing a content database was to facilitate the designers and programmers for consulting pedagogic elements, multimedia contents present in the content database so as they could fit them and re-use them into various scenarios, learning technologies, and delivery medium.

Basic Modules: The IMNCI training is a component of the Facility based IMNCI training. As mentioned in the operational guidelines of the F- IMNCI training package, IMNCI component consists of the following:

- Set of nine IMNCI modules for physicians
- IMNCI Physician chart book
- IMNCI photo book for Physicians
- IMNCI facilitator guide
- IMNCI indoor and out-patient guide
- IMNCI video CDs

The prime focus of the IMNCI training is the case management process. Thus the main objective of developing the training material was on improving the Case Management skills of the health professionals. For all sick children of age up to five years, who are brought to health facility, the steps of Case Management Process are depicted in flowchart form in Fig. 14.2.

i) Pedagogic Elements: With the structured basic module with us our next job was to identify the pedagogic treatment which we will give to the basic module so as to make them accessible to learners. The basic nature of the IMNCI training programme as mentioned above is on improving the Case Management skills of the health professionals. This required us to develop:

- cognitive skills, which involved understanding of concepts like age group in which sick young infant or sick child is grouped, following procedural skills, for example, assessment of disease, as well as applying methods in field situations, i.e. thinking or mental skills;
- interpersonal skills for counselling the mother; and
- psychomotor skills, involving assessing, classifying and treating the sick children.

We applied the revised version of Bloom's taxonomy of Remembering, Understanding, Applying, Analyzing, Evaluating and Creating for the pedagogic design of the multimedia content.

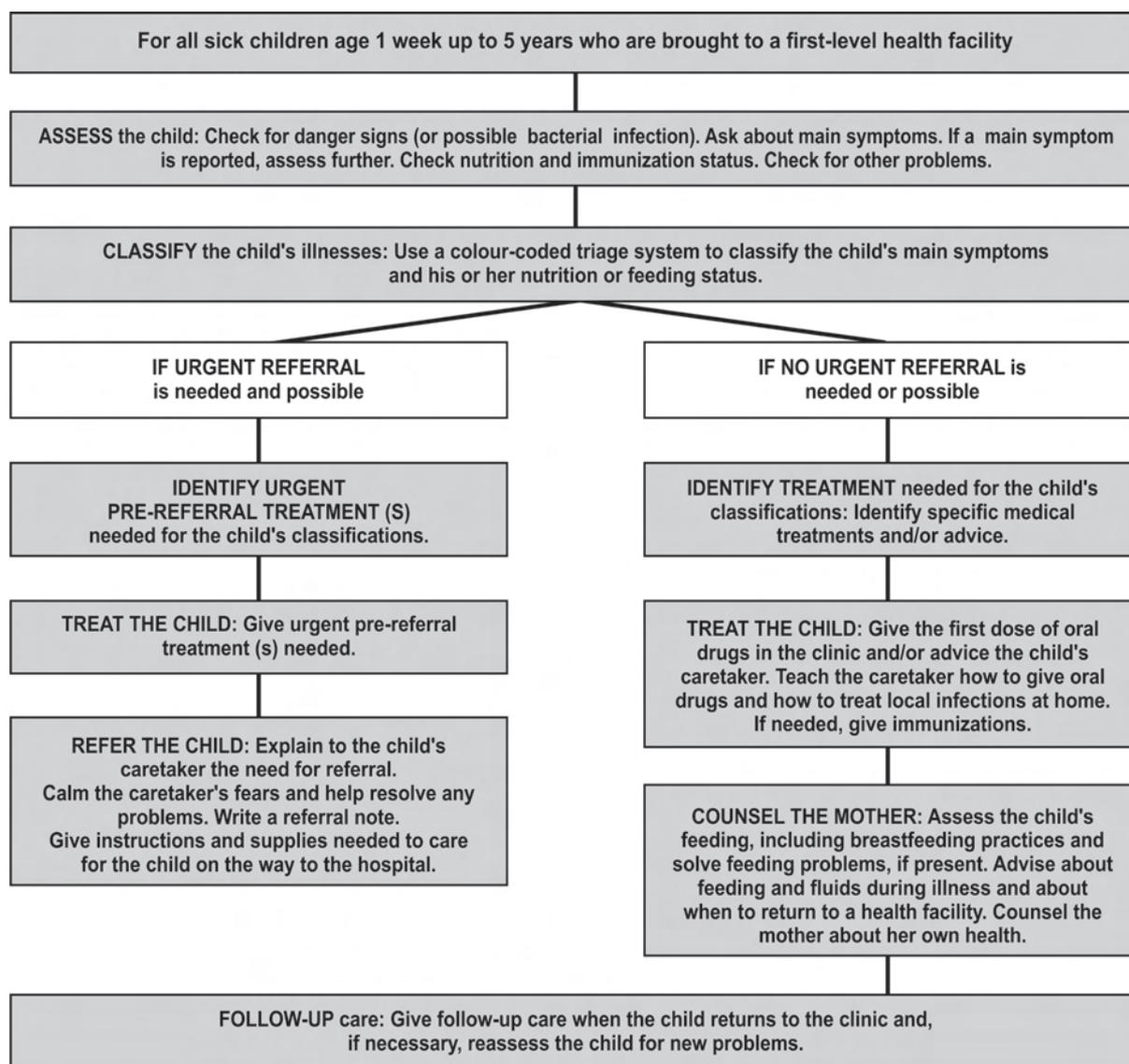


Fig. 14.2: Case Management Process

ii) **Multimedia elements:** Interactive multimedia courseware in particular, developed on a CD is adding a new and interesting dimension to both teaching and learning. This new approach can effectively complement the conventional methods of learning and teaching (Reddy, Mishra, 2003). Based on the Case Management Process where the professionals are required to improve their skills in assessing, classifying, identifying treatment, treating the sick children and follow up care, it was decided to develop engaging and interactive, simulation-based multimedia content with textual descriptions, images, animations, and videos. Text was planned to be used for explaining the learning objectives of a module/sub-module, in emphasising on an important point or concept for the learner to remember, while emphasising the process of giving antibiotic therapy, and to emphasise on a mnemonic ALPAC. Images were used to reinforce text, supplement text, to create impact and to replace long textual descriptions. Animation was planned to be used to explain concepts, procedures, processes, and classification of problems in children under five. Videos were planned to be used in improving the assessment skills of the health professionals for Role Plays where animations cannot replace human feelings and emotions.

Once the multimedia elements are developed then the structural integration of multimedia elements at different levels of granularity takes place what we call modules, sections even a single page.

iii) Delivery Devices: To make the IMNCI training reach all the health professionals it was decided to develop the interactive IMNCI training package which could run both online and off line on computers, tablets, and could be played on TV and Radio without interaction. The requirement of content, multimedia element and delivery devices resulted in the development of a conceptual framework (See Fig.30). The pedagogic elements, viz. remembering, understanding, applying, analysing, evaluating, and creating were applied in designing the scripts on concepts, processes, principles, facts, and procedures. This resulted in the module and sub-module wise development of multimedia elements, viz. textual descriptions, images, animations, audio and videos. It was also planned to design multimedia contents like text, animations, graphics, and audio-video in such a way that they could be re-used according to the ICT intervention and delivery devices.

The following three products were developed while the usability of the package for radio broadcasting and TV telecasting was prototyped.

- Interactive Multimedia Enabled IMNCI Training Package
- E-IMNCI training portal for online learning
- Interactive IMNCI package accessible through tablets with flash player

Interactive multimedia enabled IMNCI package

This multimedia package helps in training the medical practitioners, to manage sick children rationally using the Integrated Management of Neonatal and Childhood Illness that is (IMNCI) approach. The package is designed to allow users to work at their own pace. Each section has a large number of structured components with inbuilt textual descriptions, images, videos, learning opportunities and self evaluations. The package provides flexibility to skip between the sections for any review or recall during learning. One has to remember to refer the chart book whenever required.

Components of the Multimedia Package

Now we will discuss about the various components as shown in Fig. 14.3 of the interactive multimedia IMNCI package.



Fig. 14.3: Virtual Scenario with Trainer



Fig. 14.4: Trainee Discussing a Problem

- i) **Virtual Training Scenario:** In this package we have simulated the face-to-face training scenario (Fig. 14.3) into virtual training with animated characters of master trainers and trainees. The goal behind this is to make trainees get a look and feel of the training session where the trainer like a guide and facilitator is built in the virtual environment. It also helps the trainee practice specific scenarios as well as to help them effectively transfer the acquired skills to the real world. Environment is comprised of multimedia components like text, audio, still graphics, animations, and video with user control in the form of interactivity. The Virtual training comprises animated master trainers, male and female, taking the training sessions. The trainer-trainee interaction has also been animated (Fig. 14.4). The trainees ask questions related to the topic and the trainer replies to the question in the animated environment.

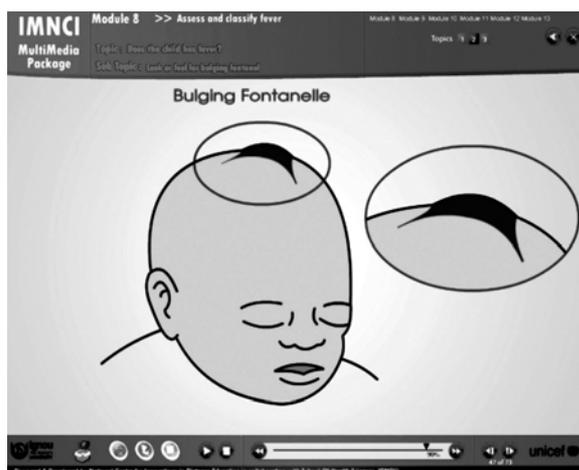


Fig. 14.5: Multimedia Rich Course Material

Any general danger sign or • Chest indrawing or • Soreful in calm child	SEVERE PNEUMONIA OR VERY SEVERE DISEASE
Fast breathing	PNEUMONIA
No signs of pneumonia or very severe disease	NO PNEUMONIA, COUGH OR COLD

Feedback
Read the case study and fill the form. Click OK to start.

MANAGEMENT OF THE SICK CHILD AGE 2 MONTHS UP TO 3 YEARS
Name: Ben Age: 12 months Sex: M Weight: 8 kg Temperature: 38.5°C Date: / /
ASK: What are the child's problems? Cough for 2 weeks Initial visit: Follow-up Visit:
ASSESS (Circle all signs present)

CHECK FOR GENERAL DANGER SIGNS NOT ABLE TO DRINK OR BREASTFEED HORRIBLE SLEETHING CONVULSIONS	LETHARGIC OR UNCONSCIOUS	General danger signs present Yes ___ No ___
DOES THE CHILD HAVE COUGH OR DIFFICULT BREATHING? *Has been long? ___ Days *Cough the breath in one breath *Breaths per minute. Fast breathing? ___ *Look for chest indrawing *Look and listen for wheeze		Remember to use danger sign when selecting classification Yes ___ No ___

Fig. 14.6: Filling the Recording Form Quiz

- ii) **Self Paced Learning:** The multimedia content is engaging and interactive (Fig. 14.5), simulation-based and ensures that the trainees learn exactly what they need. Training through the interactive multimedia approach, allows the learner to make many of the decisions about when, where, what and how quickly to learn. Each trainee has the same level of participation in the learning process. Participants are active rather than passive, and assume greater responsibility for their own learning. This interactive multimedia enabled training programme allows participants to begin and end a segment of the training course at any time, it is an efficient use of training time and resources. The multimedia rich course materials in the virtual training environment mode enables the learners to understand difficult concepts in a self-paced, flexible learning environment.
- iii) **Self Evaluation through Interactivity:** Trainees are provided instant feedback about their performance in order to stay motivated and involved. Instant feedback allows the trainees to know where they went wrong as well as what they did well at the precise moment the information is required. In an interactive multimedia enabled training environment, feedback is provided using quizzes or problem solving activities where the trainees are informed of how well they performed or if they answered questions correctly.



Fig. 14.7: Glossary



Fig. 14.8: Resources

Interactivity gives control to the trainees to take initiative and choose how, what and when they learn, making the learning more relevant to them. Self Assessment, Multiple Choice Quiz, Picture Quiz, Video Quiz, Filling Recording Forms (Fig. 14.6), True/False Quiz, Fill in the Blank (Drag and Drop), Drag and Drop Quiz, Arranging Steps in Sequence, Yes/No Quiz, Case Analysis, Assessment, and Classification through Simulations.

- iv) **Glossary:** The glossary (Fig. 14.7) is an alphabetised collection of computer related terms with their meanings. This will help the learner to understand other computer terms while going through the course material.
- v) **Resources:** This component consists of various resources like free software, articles, ready reference training materials, PowerPoint presentations, and video material for reference (Fig. 14.8).
- vi) **Quiz-bank:** This component consists of multiple choice questions, true false, drag-drop, video exercise, photo exercise and simulation based questions to help the learner evaluate himself/herself.



Fig.14.9: E-IMNCI training portal

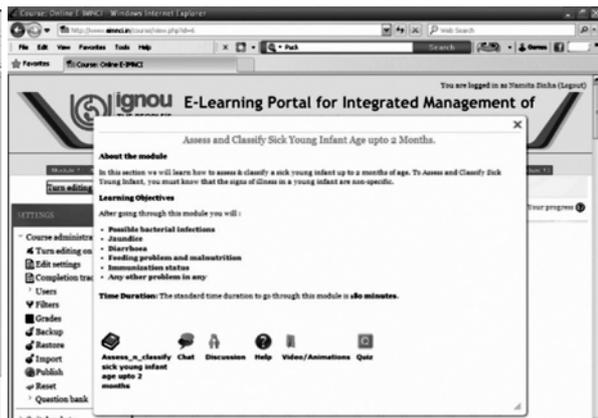


Fig. 14.10: Brief of each module

E-IMNCI Training Portal for Online Learning

In reply to this need, IMNCI online portal has been developed with the latest web 2.0 technologies, accessible from desktop computers to hand held devices including mobile

devices. Such kind of Online Learning Platform (Fig. 14.9) (www.eimnci.in) will facilitate the fresh trainees as well as master trainers, where apart from bedside teaching, rest all can be taken care of by the Online Learning System which will help the master trainees and trainees to share, collaborate, and learn under a web-based (online/offline) integrated environment anytime, anywhere. IMNCI online portal has been developed with the latest web technologies and is a responsive website. It is accessible from desktop computers to hand held devices including mobile devices. This platform facilitates the fresh trainees as well as master trainers. It has various modules for complete management of courses (Fig. 34a) and learners like site management, user management, enrolment, roles, course management, assignment module, chat module, choice module, forum module, glossary module, lesson module, quiz module, workshop module, wiki module, survey module, resource module etc. The System is ready for use for the IMNCI master trainers and trainees to undergo training virtually. This system can also be used as an Online Certification System for providing training and certification to the IMNCI trainees.

Some important features of the E-IMNCI training portal for online learning are:

- i) Online access to e-training IMNCI Modules with text, animations, graphics, embedded you tube video (Fig. 14.11).



Fig. 14.11: e-lessons

- ii) Synchronous interactions between the trainee and trainers through private, group chat forums.
- iii) Trainees and trainers interact asynchronously through discussion boards, and Blogs.
 - Easy Authoring Tool for trainers with remote content authoring over the web or intranet
 - Interactive Resource Management

- iv) Trainee Management
- v) User Authentication- Free and Paid
- vi) Evaluation Management

In order to sensitise the programme manager and professional bodies, this material could be made available on the website under the partnership of IGNOU, UNICEF, and Ministry of Health. A strong need is also felt to provide an online certification system for the IMNCI training programme.

IMNCI Mobilets for Android Based Tablets

The availability of user friendly, cost-effective tablets for learners has opened a plethora of opportunities for us to design learning opportunities for mobile devices like palmtops and tablets. As mentioned by (Park, 2011) as mobile devices are becoming increasingly ubiquitous, many researchers and practitioners have incorporated the technology into their teaching and learning environments. We have customised an innovative mechanism to distribute interactive multimedia rich IMNCI training on android, windows and other flash supported tablets through mobilets a word coined by us. A Mobilet (mobile enabled learnlet) consists of tailor-made useful and important concepts and theories related to a topic explained in a simple way using rich media resources like animations, sounds, images, videos etc. which makes learning on mobile devices interesting. It also includes Scenario based Mobi-learning: This component of the mobilet, gives a situation to the learner outlined in the form of a scenario which the learner go through on their mobile devices. Every mobilet also includes quizzes to evaluate the learners.

Blended IMNCI Training Model

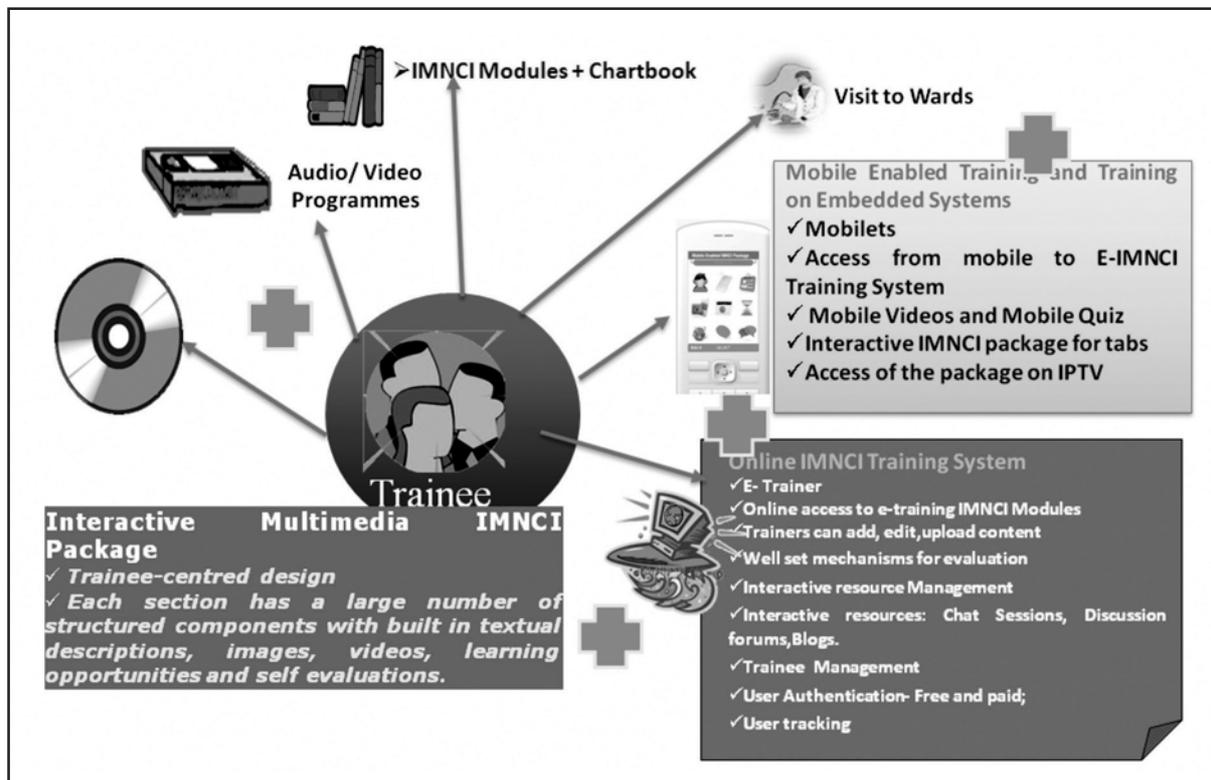


Fig. 14.12: Blended IMNCI Training Model

As shown in Fig.14.12, in the blended IMNCI training model the trainee goes through the interactive multimedia IMNCI package which has large number of structured components with inbuilt textual descriptions, images, videos, learning opportunities and self evaluations. The training of the trainee through interactive multimedia IMNCI training will be supported with collaborative learning, sharing of video and learning materials and accessing useful web resources for the training. Accessing e-mails and messages regarding the training will be supported on their mobile. They can also use their mobile for synchronous and asynchronous learning. All this is supported by trainees visiting wards at the district hospital for classification of problem (disease), its assessment and treatment of children under five year age.

Conclusion

The Blended IMNCI training model which has now become an innovative ICT enabled mechanism for providing a quality assured, dynamic, cost effective and accessible training through a trainee centric approach is in process to be used by various state governments to train the health professionals. The pedagogically sound, technologically accessible digital package which is delivered both online and offline and on other embedded systems like IPTv, android supported mobile phones, palmtops and tablets can be looked upon as a role model for other distance learning programmes in general and health related and other training programmes, in particular.

15

Web Based Environment for Evaluation of Project Reports

G. Mythili

Introduction

Project happens to be a significant component of evaluation for many programmes of IGNOU. The basic idea is to give a real life experience to the learners and give them an opportunity to prepare themselves in a realistic manner for facing the job market. It is expected from the learners that they come out with something new, creative and innovative, may be to a nominal degree. The process of evaluation of the Project Reports is quite challenging and different from the same for the other components of evaluation. Here we shall present an innovative mechanism of evaluation of project reports through a web-based environment. It has been tried with the Master of Arts in Distance Education (MADE), which is a very coveted programme of IGNOU.

Background

The Project entitled 'Web-based Environment for Evaluation of Project Reports' (WBE-EPR) helps the learners to submit their reports online and enables evaluators to evaluate the reports online. The main focus of this system is to evaluate the project reports of ES-320 Course of Master of Arts in Distance Education (MADE).

This software tool has been designed as a user-friendly environment and developed using ASP 3.0 as front-end tool and MS Access as back-end database support.

The WBE-EPR system is intended to work as an automated system, to make the project report file submission and evaluation process more efficient. The application is hosted on the IGNOU server having a link <http://learnerprojects.ignou.ac.in> to access WBE-EPR by the student and evaluators of MADE programme. The user can invoke the application using this URL.

This WBE-EPR application will help to increase communication between student and the University. It also saves their cost and time by way of manual report preparations, printing cost, postage charge, delivery times, etc. This application also helps the evaluator to download the reports, evaluate the soft copy and upload the report with their critical comments. This application will help the University to develop an online repository of MADE project reports on distance education.

At present the application has been designed and developed for MADE project only, but the WBE-EPR code and data structure can be modified and used for other programmes also. The system developed has some inherent bugs that need to be sorted out before a full-scale implementation.

About the Project

Development of a web-based environment for evaluation of project reports would help the learners to submit their reports online, and enable evaluators to assess the reports online. As mentioned earlier, Projects form an important component of many programmes at

IGNOU. In all such cases reports are handled in an offline mode. The present system of operation, where the student submits a report, that is sent to an evaluator, who evaluates it and reports the grade to Student Evaluation Division (SED), has many problems, such as:

- Missing reports, loss in transit/post;
- Delay in evaluation and result declaration;
- Storage of large number of project reports; and
- Copying and plagiarism.

WBE-EPR intends to mitigate the above problems by creating a software solution that is web-based and operates in a distributed network environment.

Assessment of student performance is a central element of educational systems around the world. Due to this, there is a need for immediate attention to build up a web-based evaluation method which gives quick response to the students.

The objective of this system is to develop a software tool which is web based. This tool is meant to enable students to submit their project report online. The system would facilitate creation of a digital repository of project reports that can be used to check plagiarism and effectively support student learning from project experiences.

Literature Review

There have been a large number of Learning Management Systems (LMS) that include the capabilities of submission and online assessment of assignments/ students' work in various forms. The scope of this review is limited and excludes all LMSs applications as these are sophisticated. Moreover, the nature of this project being developmental in nature, a comprehensive literature review has been avoided to focus on the coding and software development.

Here it is relevant to talk about Jones *et al* (2005) report on the development of an Online Assignment Submission, Infocom System (OASIS) at the Central Queensland University. The system started as a manual e-mail based method and enabled the students to send assignments to lecturer for marking. The next stage of development was an automated email programme that received assignments, acknowledged submissions, maintained a web page, and forwarded to lecturer-marker. At the third stage, the system enabled uploading of the assignments through a webpage. At the fourth stage of development, OASIS was integrated into the enterprise system to link with student records. The system has been a success, and used by 6800 students by 2005 with over 20,000 assignment submission and marking by over 200 teachers spread across 65 courses. The success of OASIS has been attributed to the following characteristics:

- Staff can track the process of assignment submission and marking;
- Easily analyse results from assessment to track student progress;
- Online assignments can be run through for detection of plagiarism;
- Timely turn-around for students;
- Assignment submission gets easier for students; and
- It provides equality for students regardless of geographic position.

Tsang (2004) reported work related to e-submission of assignments at the Open University of Hong Kong. Managing online assignment submission via email is a real challenge particularly when the number is large (Mandal et al, 2004). Because of this a web-based system was developed at the Indian Institute of Technology, Kharagpur using distributed architecture for data storage and client server architecture for interface access (Mandal et al, 2004). The e-submission and e-return system developed at OUHK has the following advantages:

- Immediate confirmation and submission;
- No loss of tutor marked assignments by post or tutor;
- Submission, marking and tracking of assignments at a glance;
- Improvements in tutor monitoring;
- Improvements in turn-around time;
- Convenience of submitting via the web, rather than visiting the post office (Tsang, 2004).

Additional advantages noted are involvement of overseas tutors, enhancement of quality of feedback and improve in retention rates. This also leads us to offer distance students to submit assignments from anywhere in the world; and thus planning and development of a web-based project evaluation system is in line with the assignment submission and evaluation systems. However, Tsang (2004) also identified some problems in the effectiveness of the system:

- Slow download time (as most use 56K modems);
- Download of assignments by tutors;
- Limited screen size; and
- Limited computers work space at home.

The problems identified by Tsang indicate towards the need of training tutors to use the computer screen as MS-Word to evaluate and download/ upload assignments through a web-browser. Tsang (2004) also recommends the use of MS-Word as an annotation tool to provide comments and feedback to the learners because of the ease of MS-Word for the tutors and the students.

The web-based environment planned for evaluation of project reports of the Master of Arts in Distance Education (MADE) intends to take into account the findings of this short review in its development stage.

About Project Reports in MADE

Master of Arts in Distance Education (MADE) programme aims to develop human resources in various specialized and functional areas of distance education. This is a 30-credit programme consisting of five courses. The courses are:

- ES-315: Research for Distance Education
- ES-316: Curriculum Development for Distance Education
- ES-317: Distance Education: Economic Perspectives
- ES-319: Staff Development in Distance Education
- ES-320: Project Work

Except the project work (ES-320), the other four courses have five blocks of printed self-learning materials for study. Students also have to submit assignments and appear for term-end examination to complete the course. The project work is a practical course to provide the learners a small, but systematic experience of conducting research. The course aims to help learners: to critically examine problems and issues in both theoretical and practical perspectives; to reflect on the existing practices and describe phenomenon in their own words; and to develop problem solving skills and generate their own solutions to distance education problems. Normally, a learner is expected to read and work thoroughly on the course on ES-315: Research for Distance Education before attempting to start the project work. The first step in the project work is preparation of a project proposal, which needs an approval by the STRIDE faculty before the student can work on it. It may be noted that the project work is an unguided work, where the student works mostly in independent manner based on the suggestions given at the project proposal approval stage. After completion of the work, the student is expected to submit the project report to the Student Evaluation Division (SED) for evaluation and grading. A minimum of 'C' grade is required to complete the course. Students receiving lower grade are given detailed comments to re-do and re-submit their work.

Required Support Services from Computer Division

In order to develop the pilot project and its related tools, the following supports from Computer Division was requested:

- Web space in the IGNOU server (1 GB)
- Appropriate web address (<http://learnerprojects.ignou.ac.in>) with access to the folder for management
- Server access to Project Administrator (Ms. G. Mythili), who creates the learner and evaluator ID and password, and also undertake the project development.

System Design and Development

The system design and development of Web Based Environment for Evaluation of Project Reports (WBE-EPR) provides full description of software architecture, software components, interfaces and data necessary for the implementation phase. It is the blueprint, where each and every requirement is traced to one or more design entity. It is used for communicating software design information for developing codes.

System Design

The WEB-EPR provides an electronic system for MADE students and evaluators. The students can submit their project reports through this system. Also the evaluators can evaluate project reports through this system. The whole process can be tracked by sending mails and capturing status at various stages. The final result data is sent to SED for result declaration of the project report in MADE programme. The following figure (Fig. 15.1) shows the generic system design of web based environment of project reports.

The system design is divided into four major parts— Server, Student Access, Evaluator Access and Project Administrators. The following sub-sections provide details about each part.

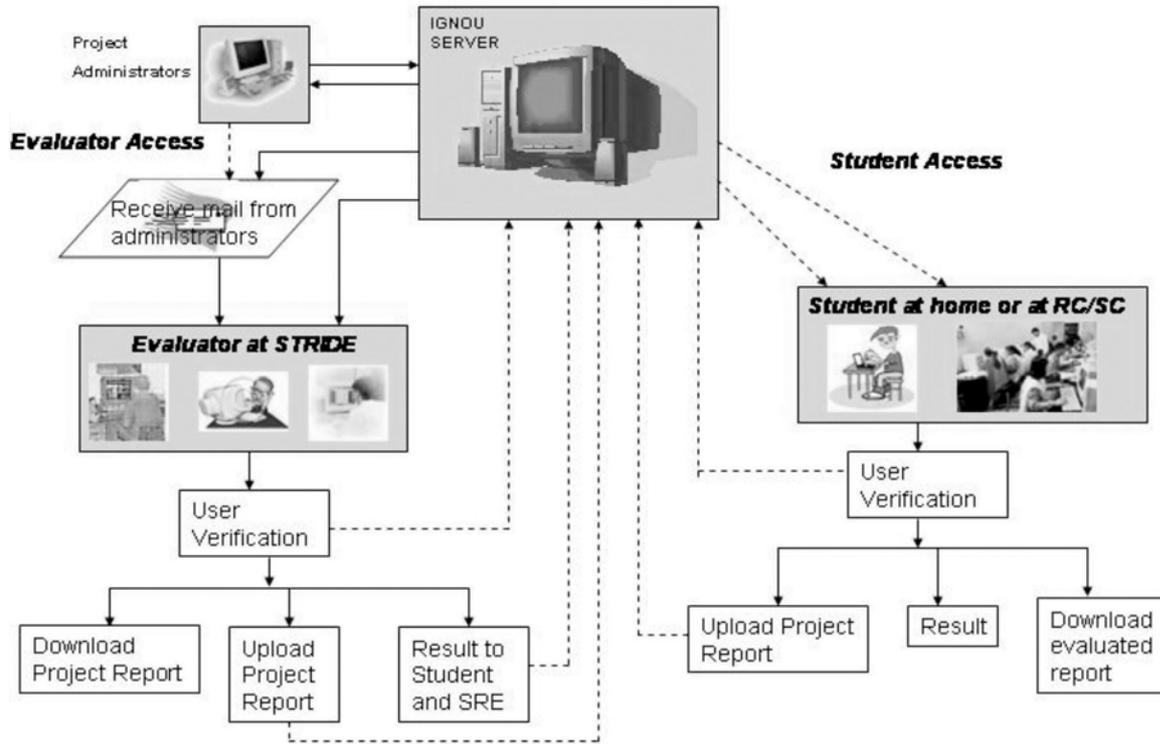


Fig. 15.1: System Design for WBE-EPR

Server

A server is a computer programme that provides services to other computer programmes (and their users) in the same or other computers. The server which is allocated to this application is located in Computer Division, IGNOU. The server is active through Internet Information Services (IIS). Using DNS services the Server is connected to IGNOU server and from there all can access the application.

Student Access

Students can submit their project report by availing themselves of the facilities of Internet technologies, i.e. anywhere from the world (e.g. at home or regional centers/study centers) using this system.

As part of student access, the *User Verification* helps to create the Login-ID and Password for the new users. The new user can enter the Enrolment Number, Programme and Date of Birth and submit the page for verification process. The same information will be verified at SRED-student database and subsequently the user needs to submit further details (like password, confirm password and Email address, etc).

The existing user can just enter the enrolment number and password only. The system takes care of the verification process from SED-student database. After getting login success the system allows the user to *Upload Project Report*, *View the Result* and *Download the Evaluated Report*. Whenever the student uploads the project report file, the system generates the automated e-mail intimation to respective evaluators based on the theme selected by the user.

Evaluator Access

Evaluators can login to the system at the home page. The evaluator's login and password details are created by Project Administrator through off line process. The project administrator is responsible to communicate these login and password details to respective evaluators as per organisation security and confidential ethics.

After getting login success the system allows the evaluator to download the project, upload the evaluated project, and communicate the result to student and SED.

Project Administrator

The Project Administer plays crucial roles for ensuring the followings:

- Administrator is responsible person to handle the Email box (*learnerprojects@ignou.ac.in*). The email address details are mentioned in the web pages. Users can send emails to *learnerprojects@ignou.ac.in* for further steps in case of problems and errors. So Administrator has to check the mail box on a daily basis to take care of user issues based on procedure.
- Administrator should know all the databases and their relations. This will help to provide the extended support of report making as per the needs of SED and STRIDE.
- At present the WBE-EPR fetches the SED-student data by offline feed process. These needs to be ensured periodically.
- Administrator should know about the updation/modification in the database regarding evaluators and other details related to theme.

Automated Feature in WBE-EPR

The system consists of the following automated features:

- Automation of all functions of the workflow pertaining to WBE-EPR.
- Automatic tracking between all stages of the workflow.
- Automatic mail generation at every submit point between the student and the evaluator to draw their attention.
- Endorsement of the approving authorities' name, time and date from the terminal.
- Reducing the time of submission and evaluation of Project Reports.
- Each transaction has a unique ID, which can be used for tracking and status viewing.
- The system automatically chooses the evaluator based on the theme area and expertise of the evaluator.

WBE-EPR Architecture

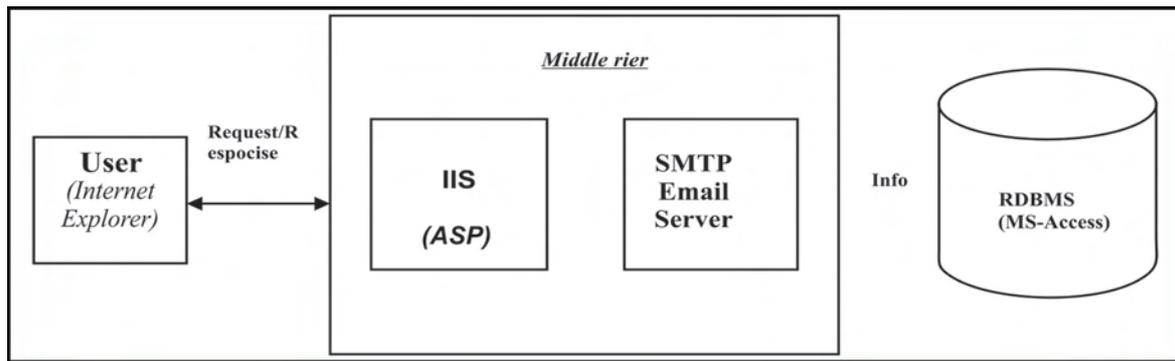


Fig. 15.2: N-tier architecture for WBE-EPR

The application has N-tier architecture as shown in Fig. 15.2. The servers used are Microsoft IIS (For ASP code processing), and SMTP email components are used for entire application flow. ASP/HTML is used as the front end. The ASP pages are used for establishing connection with the database, getting the input parameters from users, executing the validation, and processing the evaluation of Project reports.

Database Design

The MS-Access 2000 has been used as the back end system. The SRD admission data contains the full details about the students, like Name, Father's name, address, DOB, Qualification, etc. At present these details have been captured as Dbase IV (.dbf) and same has been converted into MS-Access format by manual feed process. There are four tables namely, Admission data, student, theme, and evaluators which have been effectively used for WBE-EPR application.

WBE-EPR Development

Each and every page of WBE-EPR application was developed using ASP. Using the URL <http://learnerprojects.ignou.ac.in> users can enter into the home page of WBE-EPR application (Fig. 15.3).

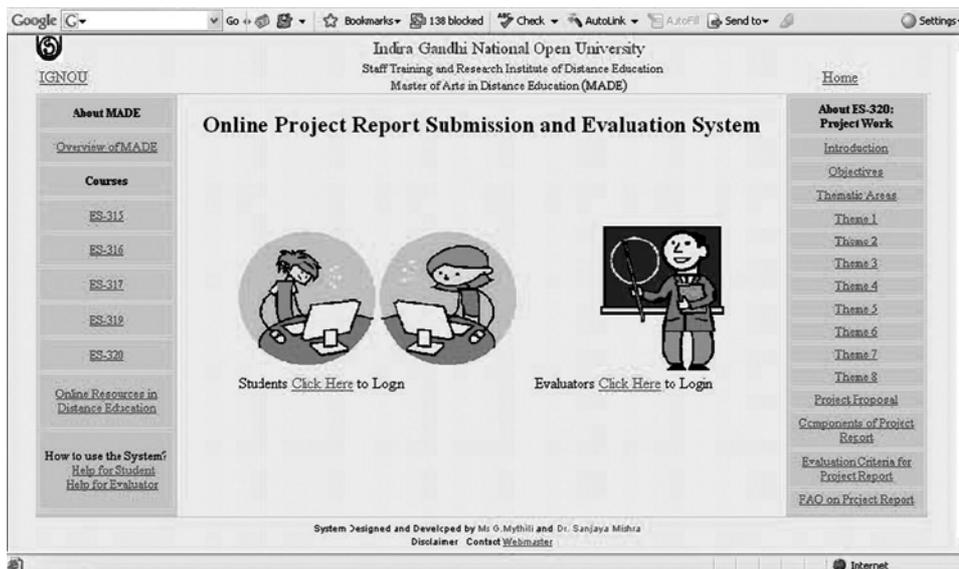


Fig. 15.3: Home page of WBE-EPR

In this screen user can access the brief information about the courses of MADE by using left side navigation. User can also use right side navigation buttons to access the information about the project work such as themes, components of project report, evaluation criteria, etc. The right side frame and left side frame are fixed for all the screens, so that the user can access the project related information from any of the screen. The following are different screens for different activity:

- **Student Registration Page:** This screen helps the student to login by using enrolment number as user ID and password. If the student uses this application first time, he/she should register the information by using signup button.
- **New user Registration form, Page1:** This screen helps the new student who has not registered earlier to register by providing the enrolment number and date of birth.
- **New user Registration form, Page2:** This screen helps the new student to select the theme and enter the password, email ID.
- **Successful Registration Page:** This screen appears only when student provides all valid information.
- **Error Page:** This screen appears only when student provides wrong information.
- **Successful Login Page:** On successful login the student will get into this page that will show enrolment number and name. Using this page, student can go to the upload page.
- **Upload Page:** Student uses this page to upload the project report file.
- **Evaluator Login Page:** This screen helps the evaluators to log in by using their user ID and password.
- **Download and Upload Page:** Based on the project theme the evaluators are pre-defined and the application automatically allocates the evaluator to evaluate the project report. Evaluator uses this page to download the student project report for evaluation and also upload the project report after completion of evaluation.
- **Download Page:** In this screen a list of project reports appears on the screen. Evaluator can download the student project report for evaluation.
- **Download Page Dialogue Box:** Evaluator can download the student project report for evaluation. Also he/she can save the report in the system for offline evaluation.
- **Upload Page:** Evaluator can upload the student project report after evaluation. Also he/she can also send the critical comments to students for their betterment. Evaluator also sends student grade to the Student Evaluation Division.

Limitations

- Automated Email task is working fine at the server end only, whereas it is not getting delivered at client side. This bug needs to be fixed and tested for all web pages. This could be due to some settings in the web server and/or SMTP mail server of the University.
- Security implementation: At present this application takes care of security on the basis of authentication based pages only. Whereas for the database part the encryption-decryption logics are not implemented.

- At present the Project Administrator has to involve offline feed process to get SED-student data. This may be implemented into an automated process by way of integration between this and SED database.
- This application avails itself of the MS-Access 2000 database on try-out basis. While considering the performance and security perspective, it is quite a slow system and the performance is not secured. This database is not much reliable when compared with SQL server 2000 and ORACLE database.
- The current application has been tested with Internet Explore 6.0 above, but not on other browser like Netscape, Mozilla, etc.

Recommendations

- MS-Access database performance is not much reliable when compared with SQL server 2000 and ORACLE database. So it is recommended to have an alternate database.
- The WBE-EPR application can be enhanced adding more security feature to avoid unfair means.
- The WBE-EPR architecture can be referred for implementation of other programmes too. But in this case the user interface and database scheme need to be revisited on the basis of Object Oriented Programming (OOPS) System components.
- Automated backup can be recommended because no hard copy is used in this application.
- The software system developed cannot be put to practice due to its inherent limitations at present. Further professional services may be used to debug the system so developed for implementation by the University.

Conclusion

This WBE-EPR application will help to increase communication between student and the university. Also it saves their cost and time by way of manual report preparations, printing cost, postage charge, delivery times, etc. This application also helps the evaluator to download the reports, evaluate the soft copy and upload the report with their critical comments. This application helps the University to develop an online repository of MADE project reports on distance education.

At present the application has been designed, developed and tested for MADE projects only. But the WBE-EPR code and data structure can be modified and used for other programmes also. We look forward to a scenario where this application can be used across the programmes/courses on offer by IGNOU which have project component.

16

Innovation in the Development of ELT Course Material

Anju Sahgal Gupta and Mridula Rashmi Kindo

Introduction

We at IGNOU are always innovating and finding ways to enrich our teaching-learning process. The main mode of delivery continues to be the print medium. To supplement its print material IGNOU uses audio-video programmes which are made available at the study centres. In the development of English proficiency courses these teaching methods are not always adequate because the skills of listening and speaking get neglected. Therefore, a CD was introduced for the recent course on Certificate Programme in Functional English. The increasing demand for Spoken English and the growth in enrolment each year in the ELT courses have proved to be a motivation to explore different ways to improve the language courses so as to make them more challenging and interactive.

To cater to this growing demand for English, a **Certificate Programme in Functional English** was envisaged, for not only the youth in India but also the Middle East and Africa as well. The aim of the Programme was to improve the proficiency in English in all the skills – listening, speaking, reading and writing. Speaking and listening, not being part of any exam system, are not taken seriously by the teachers or their students. This situation becomes even more alarming in the ODL system where there are no fellow students or teacher to talk to and help. The students are deprived of any model of English that they could follow. To offset this, for the first time in IGNOU a CD was prepared to be sent along with the print material to each student so that they would get exposure to correct pronunciation, stress and intonation and participate in the listening activities. The Programme has three courses – English in Daily Life, English at the University and Joining the Work force. All the contexts have been judiciously woven in the activities and tasks given in the print material to the students.

The Multimodal Approach

The primary mandate of IGNOU is to provide easy and cheap access to education to all sections of society living in the remotest of geographical locations. The student population catered to is highly heterogeneous, including not only the urban and rural youth but also the homemaker aspiring for greater social acceptability. Also such diversity inevitably suggests the differential learning styles of the students. To cater to such differences an attempt has been made to follow a multimodal approach in providing materials. This means that along with the print material and an integrated CD, mobile technology using the bilingual method is being utilised. An e-learning package is also being prepared. This fits in well with the theory of Multiple Intelligences of Gardner (1993) which emphasizes that there are ‘intelligences’, other than the linguistic and logical intelligences, used by learners in positive ways when they acquire knowledge and interact with the world. Learners who are not very comfortable with the print media get the option of learning through other means such as audio-visual components or mobile technology.

Using Mobile Technology

For learners belonging to the rural and remote parts, the mobile device is a handy tool that can be used to disseminate the required knowledge and information easily. Mobile learning is different from e-learning which delivers educational content through the medium of laptops and computers, hence is location bound. In mobile learning one can access learning anywhere and anytime, and the medium is mobile phone, smartphone and PDAs.

According to Telecom Regulatory Authority of India (TRAI) data, the existence of mobile phone users in June 2010 across India amounted to 635.51 million showing a phenomenal growth. Kurup and Tripathy (2010) reported for Reuters that according to researcher Gartner mobile users will grow to 993 million by the year 2014. Even in rural areas where people do not have easy access to education, most of them own mobile phones. The rural population with limited discretionary spending at their disposal can afford to possess a mobile phone or want to do so even more than a television set.

Mobile learning is a relatively new phenomenon in India. The popularity of mobile devices among people of all ages and all strata of society makes m-learning a very attractive and viable option for the education sector, especially the ODL system like IGNOU which is constantly searching for economic means to disseminate learning.

While the initial association of mobile phones with education is rather limited and restricted there are several advantages which educationists are hoping to leverage. The primary advantage of the mobile device is that information stored in it can be used anytime, anywhere; moreover, it can be used for retrieval and storage of information and sharing of multimedia information. Another favourable factor is that it enables learning at one's own convenience and pace. Learning through mobile device enables the learners to collaborate, create and evaluate their own learning process. M-Learning frees the learners from the constraints of time and space. The learning process shifts from a teacher centred education to a learner centred education.

IGNOU-Nokia (the giant telecom brand) collaboration was an attempt to fulfill the 11th five-year plan motto of 'Education for All.' The increasing penetration of mobile phones in semi-urban and rural India made it an important learning tool for the unreached. Aware of the vast potential that rural India can offer, the company Nokia, launched Nokia Life Tools as a pilot project in the districts of Maharashtra, Uttar Pradesh and Tamil Nadu to provide learning opportunities in the English language.

As part of the pilot project, customers buying NLT (Nokia Life Tools) enabled phones got an opportunity to enroll with IGNOU's Certificate Programme in Functional English (CFE). Those students who already had this application on their Nokia phone could subscribe to NLT application straightaway. Needless to say that the mobile phone on which the NLT application was made available was amongst Nokia's cheapest phones.

The student just had to key in the unique IGNOU registration number on the Nokia Life Tools application so as to receive all kinds of information about the course. The main mode was the print material which was supplemented with SMS alerts sent twice a day to the learners. The SMS alerts were in the bilingual mode, the other language being the local language of the state. Since the students were from the poorer sections of society, this strategy easily enabled them to understand the alerts which facilitated the learning of English, especially in the absence of a teacher.

The SMSs dealt with teaching-learning of vocabulary items, points of grammar, formulaic phrases, etc., with a test after each unit. Given below are examples of some alerts which were sent to the learners.

Day 1 Week 1	SMS 1	Type Greeting-work/ Meaning/Usage	(L1-B1-U1) शब्द: Hello; (हेलो); अर्थ: अनौपचारिक अभिवादन (Usage: Hello, Vijay. How are you? प्रयोग: हेलो विजय, कैसे हो तुम?
Day 1	SMS 2	Greetings Formal/ Informal Conversation	(L1-B1-U1) अनौपचारिक—Hi Jay, what's happening? हाय जय, क्या चल रहा है? औपचारिक—Good morning Sir, welcome. गुड़ मोर्निंग सर,आपका स्वागत है
Day 2	SMS 1	Greetings-word/ Meaning/Usage	(L1-B1-U1) शब्द: Health; (हेल्थ); अर्थ: तबीयत; Usage: Hello, Sunil. How is your health now?/How are you feeling now? प्रयोग: हेलो सुनिल,अब तुम्हारी तबीयत कैसी है?
Day 7	SMS 1	Test	इनमें से कौन सा शब्द अभिवादन का शब्द नहीं है? 1. Excuse me 2. Welcome 3. Good to see you again.
Day 7	SMS 2	Test	कौन सा वाक्य सही है? 1. Please to meet you 2. Pleased to meet you 3. Pleasing to meet you
Day 1 Week 2	SMS 1	Food Conversation	(L1-B1-U9) डाइअटशिन या आहार विशेषज्ञ के साथ बातचीत . If I skip meals. Will I lose weight? Exercise and a healthy diet will help you lose weight.
Day 1	SMS 2	Food vocab, work, usage	(L1-B1-U9) गलत उद्धारण— "Could you, please, take the order, said Lata to the waiter. सही उद्धारण— "Could you please take the order?" said Lata to the waiter.
Day 2	SMS 1	Food-Punctuation Marks	(L1-B1-U9) If you do not eat, you will feel weak. If you do not eat-Conditional clause भारत वाक्य खण्ड You will feel weak - consequent action परिणाम
Day 2	SMS 2	Food Grammar Clause	(L1-B1-U10) शब्द: Supple; (सपल); अर्थ: लचीला विरोधी शब्द: Stiff; (स्टिफ); अर्थ: कड़ा [2]
Day 3	SMS1	Health & Fitness Opposite Terms	(L1-B1-U10) अच्छी सेहत दर्शाने वाले मुहावरें Fit as a fiddle In the pink of health.

Day 3	SMS 2	Health & Fitness Idioms Related to Expressions	(L1-B1-U10) वाद विवाद का विषय – Should we exercise everyday? For (के लिए) Exercise keeps us healthy and fit. Against (प्रती) Its enough to have a healthy diet.
Day 4	SMS 1	Health & Fitness Debate	(L1-B1-U10) शरीर के हिस्सों से सम्बंधित कुछ वाक्यांश Jumped out of my skin Lend me a hand Racked my brain
Day 4	SMS 2	Health & Fitness Idioms Related to Body Parts	(L1-B1-U9) भोजन के विभिन्न खाद्य Starters – भोजन का पहला खाद्य Main Course – मुख्य भोजन Beverages – पेय Dessert – मिठाई
Day 5	SMS 1	Food – Vocab	(L1-B1-U9) “Warm up” के प्रयोग सँज्ञा–The players did their warm ups. खिलाड़ियों ने शरीर ढीला किया क्रिया–Warm up the food, please. खाना गर्म करो [3]
Day 5	SMS 2	Food-same Word, Diff Usage	(L1-B1-U10) गलत संबंधसूचक –There are many yoga schools over the country. सही संबंधसूचक – there are many yoga schools across the country.
Day 6	SMS 1	Health & Fitness- Grammar- Prepositions (correct-incorrect)	(L1-B1-U10) शरीर के हिस्सों से संबंधित कुछ वाक्यांश Pumping of heart Quickening of pulse Shortness of breath
Day 6	SMS 2	Health & Fitness - vocab	कौन सा शब्द भोजन का खाद्य नहीं? 1.Dessert 2.Starters 3.Recipe
Day 7	SMS 1	Test	कौन सा वाक्य सही है? 1. Drink water in an empty stomach. 2. Drink water on an empty stomach. 3. Drink water over an empty stomach. [4]
Day 7	SMS 2	Test	Vartmaan Kaal – I listen to the news Apoorv Vartmaan Kaal – I am listening to the news.
Day 2 Week 3	SMS	Grammar Present Cont. Tense	

Day 2 Week 3	SMS 2	Different Meanings of Same Word	“Channel” शब्द का प्रयोग Kriya- we need to channel the information to the users. Sangya- I like to watch the sports channel.
Day 2	SMS 2	Greetings-Time of the day	(L1-B1-U1) दोपहर से पहले का अभिवादन - Good morning. Where is the newspaper? शाम से पहले का अभिवादन - Good afternoon Uncle. Please have lunch with us.
Day 3	SMS 1	Introductions Word/ Meaning/Usage	(L1-B1-U1) शब्द: Delighted; (डिलाइटिड); अर्थ: प्रसन्न; Usage: I am delighted to meet you. प्रयोग: मैं तुम से मिलकर बहुत प्रसन्न हुआ
Day 3	SMS 2	Introductions- different forms of same sentence	(L1-B1-U1) दोस्त का परिचय कराने के विभिन्न तरीके This is my friend, Salil. I would like you to meet my friend, Salil

SMS Tests

शब्द: 1

Enquiry (इन्क्वायरी)

अर्थ:

पूछताछ

प्रयोग:

There was an enquiry into the missing files.

प्रयोग:

गायब हुई फाइलों के बारे में पूछताछ की गई।

प्रश्न 1

कौन से वाक्यांश का अर्थ है जैसे कानों में संगीत जैसे लगना?

- musical band
- music to my ears
- musical night

उत्तर चुनिये

- Musical band

उत्तर गलत है कृपया पुनः प्रयास करें

music to my ears

सही उत्तर

Block 004 The World Around Us

Day 2, Week 3	SMS1	Grammar Present Cont. Tense	Vartmaan Kaal – I listen to the news Apoorv Vartmaan Kaal – I am listening to the news.
Day 2, Week 3	SMS2	Different Meanings of Same Word	“Channel” Shabd Ka Prayog Kriya- we need to channel the information to the users. Sangya- I like to watch the sports channel.

The SMSs sent everyday help the learners to supplement what they learn through structured learning formats. Moreover, it encourages the student to use the item of the day in their daily life. The novelty of the new tool helps greatly to engage the student in the learning process. They could read it again and again, thus reinforcing learning. Students can assess their progress by periodic quizzes and weekly tests aiding self-evaluation to ensure their proficiency in English. According to Keegan (2007), the use of SMS messaging for tutoring is well established as a form of academic support that is successful in enabling students to focus on the academic content, to come better prepared for their tutorials and to be more ready to participate actively in discussions. In this Functional English course students got added information about the lesson, they had more time to reflect and react to the additional information they receive by SMS. This created an effective and efficient blended learning that formed an important part of academic support. SMS tutoring was well received by learners and was effective in achieving its intended purpose. It motivated the learners to persevere in the learning process.

Research shows that SMSs sent in a timely manner to remind learners about administrative matters such as examination dates, contact session dates and registration completion dates are successful in reducing the dropout rate of distance learners. (Ericsson global, n.d, Keegan, Kismihok, Mileva and Rekkedal, 2009). The other advantage is that the mobile device is cheaper than PC and Laptop, hence majority of learners afford and benefit from it. It does not need continuous supply of electricity that makes it easier to use it especially in rural areas where there is intermittent electricity. It is a more light weight device as compared to PCs and books and therefore easy to carry. One can utilise one's leisure time effectively.

Conclusion

In IGNOU mobile learning is in its infant stage, as we are still fumbling to make use of it in full scale. IGNOU already sends course details, examination information and other important dates the student needs to know through mass SMS for all its courses. By making the mobile device its learning tool in all its courses, IGNOU can reach the remotest places in India and improve the socio-economic condition of our vast population. As spelt out by Kwapong (2009) technology mediated learning has indeed the potential to cater to the education needs of the poor learners in developing countries.

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17

Innovations in Teaching of Nutrition Through ODL System

Deeksha Kapur

Introduction

Nutrition, the science of foods, has become extremely significant in today's world. The importance of nutrition is well recognized and supported by scientific evidence and now major public health organisations in the world are laying increased stress on it. The topic of nutrition is being given much greater attention in discussions about health, whether in rich societies or the developing world. Health problems associated with under nutrition are overwhelmingly concentrated in the developing world. There is strong need for creating awareness among the people and providing avenues for proper education and training in areas of nutrition and public health. Globally governmental organisations are working on nutrition literacy interventions in non-primary health care settings to address the nutrition information problem. In view of the changing nutritional scenario world over and the discipline of Nutritional Sciences, IGNOU has made significant efforts towards development of innovative programmes to provide a wide range of knowledge about nutrition and public health. These programmes aim to develop a knowledge base, promote awareness about concepts and their applications in nutrition and health education, and develop skills required for playing the role of nutrition/health educators in the community.

Nutrition – The Challenge

Nutrition is the science of foods, the nutrients and other substances therein; their action, interaction and balance in relationship to health and disease. Various disciplines of nutrition include Public Nutrition, Clinical and Therapeutic Nutrition, Food Service Management, Food Science and Technology, Food Safety and Quality Control, and Sports Nutrition.

Nutrition is the core pillar of human development. Globally there exist major challenges in the field of nutrition. In case of food and nutrition security there are around 790 million people in the developing countries, and 34 million in the developed countries who do not have enough to eat (FAO 1999). There is the problem of low birth weight, particularly in the developing countries, where 30 million infants are born each year with impaired growth due to poor nutrition. Globally, more than one third of child deaths are attributable to undernutrition. Reducing hunger and malnutrition remains a challenge. According to UNICEF the scope of undernutrition goes beyond the crises we see in the headlines. Undernutrition is devastating. It blunts the intellect, saps the productivity of everyone it touches and perpetuates poverty. Childhood undernutrition leading to Stunting, Underweight, Wasting, is a pervasive condition in many developing countries. Stunting affects 165 million children under five years old – one out of every four. Chronic energy deficiency is another area of major concern. Micronutrient deficiency disorders are also pandemic issues. These result in iron deficiency, anaemia, vitamin A deficiency, iodine deficiency disorders. On the other hand globalisation and rapid technological developments and innovations have resulted in remarkable changes in peoples' lifestyles, eating habits, bringing about 'nutrition transition' from slow foods to fast foods. This has led to an increase in non-communicable diseases such as obesity, diabetes, chronic heart diseases, etc.

In April 2006, the World Health Organisation (WHO) released the WHO Child Growth Standards to replace the widely used National Centre for Health Statistics (NCHS)/WHO reference population, which was based on a limited sample of children from the United States of America. The new standards are the result of an intensive project study involving more than 8,000 children from Brazil, Ghana, India, Norway, Oman and the United States. Overcoming the technical and biological drawbacks of the old reference population, the new standards confirm that children born anywhere in the world and given the optimum start in life have the potential to develop to within the same range of height and weight. This means that differences in children's growth up to age five are more influenced by nutrition, feeding practices, environment, and health care than by genetics or ethnicity.

Undernutrition greatly impedes countries' socio-economic development and the potential to reduce poverty. Many of the Millennium Development Goals (MDGs) – particularly MDG 1, to eradicate extreme poverty and hunger, and MDG 4, to reduce child mortality – can not be reached unless national development programmes and strategies give priority to the nutrition of women and children. With high levels of undernutrition persisting in the developing world, vital opportunities to save millions of lives are being lost, and many more children are not growing and thriving to their full potential.

Cost-effective programming strategies and interventions are available today that can make a significant difference in the health and lives of children and women. These interventions urgently require scaling up, a task that will entail the collective planning and resources of developing country governments at all levels and of the international development community as a whole.

These challenges can be addressed through capacity development, practical science support, and Research and Development. Capacity development programmes should be aimed at creating awareness, education and empowering community as part of the strategy of social intervention and community capacity building. Providing vocational skills/short-term training to upgrade specific skills of individuals should be given emphasis to enhance their capacity for both gainful employment and also to build up entrepreneurship. Training and developing professional skills of individuals are also extremely essential to enhance development of trained personnel in the area of nutrition, dietetics. The professional skill development innovative programmes can go a long way in achieving these goals.

Innovative Programmes at IGNOU

The Indira Gandhi National Open University (IGNOU), since its establishment in 1985, has contributed significantly to the development of higher education in the country through the open and the distance learning (ODL) mode. Considering the challenges that are being faced with respect to the nutritional scenario world over, the Discipline of Nutritional Sciences, IGNOU has coordinated and contributed towards focused education, skill development, training and capacity building activities in the area of nutrition at three levels:

- 1. Creating awareness, education and empowering community as part of the strategy of social intervention and community capacity building.**

As an initiative for individual and community capacity building in the area of nutrition, IGNOU has launched a post-literacy level *Certificate Programme in Food and Nutrition*. The

programme is basically an awareness level programme, of six months' duration, targeted at people with basic reading and writing skills and aims to acquaint the learner with the role of food in ensuring healthy living for the individual, family and community.

The Programme is offered in English, Hindi and nine regional languages. Recently the Programme has been offered to the learners in the gulf region.

Another innovative initiative in capacity building relates to a special project of *training grassroot level workers of the Integrated Child Development Scheme (ICDS)*, a unique child welfare programme launched by the Government of India (GOI). This pilot training project undertaken in 2008 emphasized on the capacity building and skill upgradation of Anganwadi workers, the grassroot level workers of the ICDS programme, who are involved with providing nutrition, health and child welfare services to the disadvantaged groups, particularly women and children within the community.

2. Providing vocational skills/short-term training to upgrade specific skills of individuals at the field level to enhance their capacity for both gainful employment and also to build up entrepreneurship.

Towards this endeavour, IGNOU has contributed by developing the following vocation oriented need based skill development programme(s):

i) Diploma in Nutrition and Health Education (DNHE)

The Diploma programme is a holistic package, which provides opportunities to the learner to gain knowledge about nutrition and public health. It also enables the learners to develop skills in communicating nutrition and health related information to community. The aim of the programme is to develop a knowledge base in areas of nutrition and public health, promote awareness about concepts and principles in communication and their application in nutrition and health education and develop skills in playing the role of nutrition/health educators in the community. People desirous of working in either government or non-governmental sectors in the role of nutrition/health educators have benefited from this Programme.

ii) Certificate Programme in Food Safety (CFS)

IGNOU in collaboration with the Ministry of Health and Family Welfare (MoHFW), Government of India has launched this professional and career up gradation online programme in the area of food safety and quality that integrates education and training and addresses the needs of training the workforce/developing manpower in this sector. The programme focuses on knowledge upgradation and enrichment in the area of food safety especially for government functionaries, food industry workers and catering industry workers.

iii) Certificate Programme in Nutrition and Child Care (CNCC)

This programme of study is of tremendous relevance and use to all those who need to have the knowledge, understanding and skills, both with regard to nutrition and child development. Combining knowledge and skill development in the areas of nutrition and early childhood care and education would make the learners uniquely qualified to take up

i) jobs as functionaries with government and non-government organisations working for women and children, ii) starting their own food service unit, or a preschool centre/crèche for children leading to entrepreneurship.

3. Training and developing professional skills of individuals to enhance development of a critical mass of trained personnel in the area of nutrition and dietetics.

IGNOU has strived to achieve inclusive and sustainable growth in education, P.S. professional skill development through the following programmes:

i) Master of Science in Dietetics and Food Service Management (MSc. (DFSM))

The (M.Sc. (DFSM)) Programme has been developed with a view to address the needs of training work force/ developing manpower (dietitians, nutrition counsellors, food service managers, etc.) for the emerging employment sector – hospital/ community dietetics, food service management. The Programme offers unique opportunity of higher education to learners to enrich their working lives by entering into the labour market and/ or starting their own food service unit, leading to entrepreneurship.

The Programme also focuses on upgrading the professional competencies of serving personnel in food service establishments, such as dietitians, diet technicians, counsellors, etc., upgrading their knowledge and equipping them with productive skills to enhance their career progression and employability.

Investigations, laboratory procedures and techniques, fieldwork, teacher demonstrations, surveys, internship are core activities which support the development of practical skills, and help to shape students' understanding of scientific concepts and phenomena. Practical courses constitute the backbone of the MSc(DFSM) Programme. Seven practical courses along with ten theory and two project courses constitute the MSc(DFSM) Programme. Special innovative self-instructional practical manual has been designed for each practical course, which along with theoretical concepts and principles include the tools and guidance to practically apply this information in the daily practice. The practical activities within the practical manuals have been so designed so as to support independent learning, experiential learning, and skill development. *Participation at the practical sessions is absolutely compulsory.* Hands-on training is provided through methods such as partnerships with industry/hospital and the use of facilities in institutions when students in traditional programmes are not using them.

ii) Postgraduate Certificate/Diploma in Pediatric Nutrition

An urgent need for a focused course design in the area of Pediatric Nutrition was felt to address the nutritional needs of children amongst health care providers - imparting knowledge, upgrading their knowledge, skills and improving their professional competencies. IGNOU has played an interventionist role, through development of an employment related modular online programme of study in the area of Pediatric Nutrition. The professional and career oriented modules prepared as part of this exercise have integrated education and training to upgrade knowledge of healthcare practitioners, nutritionist and other stakeholders. System design of web-based environment for Pediatric Nutrition Programme has been developed and used which makes the programme uniquely innovative.

Conclusion

At IGNOU the Programmes on nutrition have been developed to cater to learners at all levels. The programmes are designed to develop knowledge, understanding and skills with regard to nutrition and child development. This is an innovative attempt towards focused education, skill development, training and capacity building activities in the area of Nutrition. Some of the alarming disease trends directly related to nutrition that exist at the global level can be met by having more such initiatives.

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18

Inclusive Education for Children with Disabilities

Hemlata

Introduction

Inclusive education, as an approach, seeks to address the learning needs of all children, youth and adults with a specific focus on those who are vulnerable to marginalisation and exclusion. It implies all learners, young people - with or without disabilities being able to learn together through access to common pre-school provisions, schools and community educational setting with an appropriate network of support services. It aims at all stakeholders in the system such as learners, parents, community, teachers, administrators and policy makers to be comfortable with diversity and see it as a *challenge* rather than a *problem*.

Inclusive education means the education of all children, with and without disabilities together in regular schools. It is an approach, which takes into account unique characteristics, interests, abilities and learning needs of all children. All schools have to be inclusive in their approach, so that the children with disabilities have access to these schools that accommodate within them a child centred pedagogy capable of meeting the needs of all children.

Inclusion in education means that all students in a school, regardless of their strengths or weaknesses in any area, become part of the school community. They are included in the feeling of belonging among other students, teachers, and support staff.

It is an attempt to meet the unique needs of every child in a regular school setting. All children, in spite of their disability, try to participate in all facets of school life. So some changes might be made in the mainstream to make it more accommodating to all students' individual needs. The goal is to provide an accommodating, personalised education for all students, within the context of a general educational classroom.

Principles of Inclusive Education

Each children should have the opportunity to experience meaningful challenges, exercise choice and responsibility, interact collaboratively with others, and be actively engaged in developmental, academic, non-academic, inter and intra personal activities as part of the educational process. Implementation of the plans, programmes and actions depend upon continuous community support, broad planning, training and evaluation. An adapted school environment is needed to suit the needs of every child with disabilities. There is also a need for restructuring of the concept of special education and general education, as a dual system. Certain important principles of inclusion are:

- Sharing of responsibilities of functionaries working at different levels;
- Providing additional support to children;
- Development of a collaborative framework to meet the additional needs and interests of children;

- Implications for various types of disabilities;
- Knowledge about family and social environment children;
- Modifications in teaching-learning strategies/modalities;
- Improving professional competencies of teachers; and
- Ensuring community support and support of other functionaries working at different levels

The process of inclusion starts with the planning of education for all children under regular education in the classrooms, which is least restrictive. Children with disabilities need improvement in cognitive and social development and physical motor skills. All functionaries associated with school should share the responsibilities and support all children. Collaborative support of the school staff to meet the unique needs of all children is essential. Equality, sense of belongingness, respect for each other, need-based support, and diversity are some of the features of the inclusive schools (as shown in Fig. 18.1). Rights and needs of all children need to be considered in determining how and when to include children with disabilities in the school programmes. So far as the provision of individualised education programme is concerned, it is based on intensity of service required. Inclusive education strategies involve adaptations in strategic plans, policies, classroom management, teaching strategies and curricular transactions. Family and social circumstances of children are crucial to inclusion of children with disabilities.

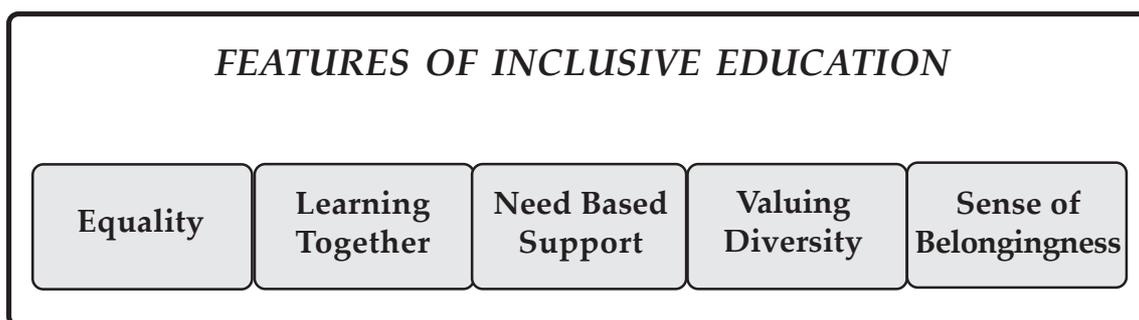


Fig. 18.1: Features of Inclusive Education

Models of Inclusive Education for Children with Disabilities

In an ideal situation of inclusive education, the general education itself makes the education of children with disabilities as its integral part. This implies that the teacher should be equipped with skills to address the educational needs of children with disabilities to a minimum extent at least. This calls for strengthening the pre-service teacher preparation programme with adequate component of inclusion of children with disabilities. Thus inclusive education creates effective classroom where the educational needs of all children are addressed irrespective of their ability. Total inclusion occurs when general classroom teachers take most of the responsibilities of the classroom. If a specialist takes care of the children with disabilities in a general classroom it is not total inclusion.

There is no clear consensus in the field about the models to be practiced in the educational institutions. Some educational thinkers and researchers are for the full inclusion model (Fuchs and Fuchs, 1994). A few others are in favour of partial inclusion (Hallahan and Kauffman 1991). Let us discuss these two models in detail.

Models of Full Inclusion

The strong movement towards inclusive education demands full time inclusion of children in regular education system. This model calls for providing support to every type and degree of disability in the regular classroom. Needless to say co-curricular activities also must be adapted to cater to the needs of all the children admitted in the school. Proper assessment and planning has to be made for every activity to be enjoyed by a child who may require special adaptation.

The following adaptations in the classroom functioning facilitate full inclusion.

i) Co-operative Learning

This is an effective way of including children with disabilities in a regular classroom. Here children in heterogeneous small groups work together towards a specific goal. Before making the groups, peers are deliberately trained to help a particular academic skill to children with disabilities.

ii) Instructional Adaptations and Accommodations

Instruction may be modified for learner with disabilities. Modifications usually take the form of modified assignments or modified instructional strategies. Children with disability feel comfortable in the group as the modification is made to suit them.

iii) Training General Education Teachers

General education teachers are content experts. But they are not well versed with the special needs of children with disabilities. Special education teachers usually lack expertise in teaching an individual subject. Keeping this in mind the general education teachers are given additional training in the area of specific disabilities and the special instructional needs.

iv) Practical Difficulties of Full Inclusion

- **Labeling** – There is a possibility that some children with disabilities feel inferior due to their deviant condition. This may lead to poor self-esteem in the child and hinder the child from taking part in other activities of the school.
- **Special instructional needs** – Few children with disabilities depending on the type and severity of their disability call for special material and method in the instructional setting. It may be feasible to provide those in a regular school. Thus regular schools may not be the ideal place for the practice of inclusiveness.
- **Stigma of groupism** – Children with disabilities may be viewed as a group and this will divert the attention from the individual. They may be treated as yet another minority group, adding to the already existing groups in the society.
- **Attitude of general educators** – Most teachers in the general stream feel that they are not capable of handling children with disabilities. Teachers already have a tedious job of catering to a huge number. Due to this over-burdening situation, they are unwilling to do extra work. It results in negative attitude of teachers and heads of institutes towards taking children with disability.

Conditions for Full Inclusion

It is clear now that full inclusion calls for total preparedness on the part of the school authorities. This model requires the classroom environment to be fully conducive for learning for all the children. The physical environment should be modified to suit the needs of children. For example in case of a child having hearing impairment there are certain prerequisites to be kept in mind while admitting the child to a regular education stream. Some of the crucial points are given below:

- Early intervention is important. It is essential that hearing impairment is identified and intervened before the age of six months.
- Suitable hearing device has to be used after proper diagnosis and medical intervention, if necessary.
- Training towards listening has to begin early to make up for the delay in auditory input.
- Development of age appropriate language and social skills.

Classroom Arrangement for Full Inclusion for a Child with Hearing Impairment

- Location – The school must be away from noisy locations like railway station, market place and industries.
- Noise levels – Within the classroom and outside the classroom the noise level must be controlled.
- Reverberation – The space for sound reflections must be minimized, as it affects speech perception.
- Visual aspects – The classroom must be well lit. Seating arrangement should facilitate maximum visibility of the teacher for every child.
- Classroom acoustics – The design of the room should avoid parallel walls. If it exists, it should be draped with thick curtains. The walls must be covered with charts.

Models of Partial Inclusion

These models came as a viable option to full inclusion. Some educators are in favour of these models as this is more practical. Unlike in case of full inclusion, here the system of education and the teachers adjust/prepare to handle the child with disability. The child is in the classroom throughout as per the ideology of inclusion. The partial inclusion models suggested by Hallahan, Kauffman and Pullen (2009) are given below.

i) Collaborative Consultation

In this approach a special educator and a general educator collaborate to identify teaching strategies for a student with disability. Regular meetings are scheduled between the two. The relationship between the two professionals is based on the premise of shared responsibility and equal authority. Special educator will see the child in a resource room or other setting. A change to the instruction is suggested to the regular classroom teacher, which is practiced in the classroom along with the regular plan of the teacher. Special educator helps the student to practice newly acquired skill and re-teach difficult skills. This model is suitable for an area where there is low incidence of students with special needs. If a school has got lesser number of students with special needs, this is a very useful model. In collaborative consultation a specialist will provide support to the general education teacher.

ii) Teaming Model

A team is assigned for each grade level. A period per week will be assigned to the team for planning. Team members meet with the special educators on a regular basis. In the meetings, the special educator provides information like the possible instructional strategies, modifications and ideas for assignments of students depending on the requirement of each team. This model is suitable when student to teacher ratio is high. But the special educator gets limited opportunities to work in general education classrooms for the children with disabilities.

iii) Cooperative Teaching (Collaborative Teaching)

A special educator and a general educator will teach the diverse group of students in the same classroom. Both educators are responsible for instructional planning and delivery, student achievements, assessment and discipline. Commonly it looks like one teacher is teaching and the other teacher assisting. In reality both of them would have worked together before the class, keeping in mind the requirement of the children who need special attention to learn the particular concept. Students receive age appropriate academic support service and possible modified instructions. There are minimum scheduling problems as general educators and special educators work together. This fosters continuous and ongoing communication between educators. This model is appropriate when the student to teacher ratio is small and this takes care of more number of children with disability included in a class.

The above models of inclusive education can be suitably implemented for education of children with hearing impairment keeping in view the severity of their impairments. As much as possible they are to be provided adequate environment for their learning and also for their social and emotional involvement with their age mates, keeping inclusive philosophy alive.

Challenges for Inclusion

Adequate academic as well as administrative support is the key for the success of inclusion of children with disabilities in general schools. The purpose of inclusion will not be served simply by enrolling these children. Respecting need of each child is a real challenge for the teachers and administrators. The basic challenges confronted by the stakeholders associated with inclusive education are:

- School reform
- Mind set of teachers, parents and community.
- Curricular adaptations for effective classroom processes.
- Capacity building of teachers and other functionaries
- Adapting need based instructional strategies
- Provision of adequate human resource and material resources
- Facilitating collaborative learning.
- Developing partnership with professionals and organisations

The various challenges of inclusion are being presented through a schematic diagram (Fig.18.2).



Fig. 18.2: Various Challenges of Inclusion

Innovations in Inclusive Education

Before concluding let us place a summary of innovation made in respect of inclusive education. Various innovations in inclusive education involve:

- initiating training programmes at various levels to accommodate the need of human resources,
- programmes ranging from certificate to doctoral degree covering variety of target groups,
- providing opportunity for cross disability approach,
- training in general education components,
- modifying training strategies, and
- use of technology in education of children in inclusive set-up.

Individual need based training components with stress on training on equipments related to disability can be a crucial component of the training curriculum. Strong emphasis is also required on group training components, general subject teaching components, and training components for inclusive classrooms. Modifications for co-curricular and extra-curricular activities can be made to suit the needs of all children. Project based training for society awareness is also important.

Certain modifications in classroom settings can be made in terms of sitting plan, easy accessibility, peer grouping and orientation of classroom settings. The content can be modified by simplifying, breaking it into small steps and further substitutions and deletion. Instructional methods should emphasize clarity in language and involve better use of body

language and gestures, stress on providing concrete experiences, use of suitable and variety of teaching learning materials and providing step by step instructions for better understanding.

Conclusion

In the model of inclusive education, it is not the child, but the education system, which is seen as a problem. Therefore, it is the system (with all its components) which should be changed, modified and made flexible enough to accommodate the diverse needs of all learners, including children with disabilities. The onus for success is therefore on the flexibility of the system. It focuses on the environment, as the disabling cause because it fails to provide appropriate access to equal opportunities for all persons to participate fully in social life.

It is essential to build an inclusive society through an inclusive approach. Success of inclusion demands effective collaboration and meaningful cooperation from all stakeholders associated with education of children.

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19

Innovations in Education of Marginalised Children

Vasu Dev Bhasin

Introduction

In India, children constitute about 46.2% of the total population, which is world's largest child population in any country. Millions of out-of-school children are left totally unserved by formal school system and only 40% of adolescents attend secondary school. India has more than 25 percent of the world's out-of-school children. Thus a large number of children are outside of any educational system. These children belong to disadvantaged or minority communities, migrant families, and the urban poor, or are working children, children with special needs, or children in difficult circumstances. Given the diversity of such groups across India, each group faces challenges that needed to be addressed with special initiatives. Malnutrition, child labour, and adult illiteracy all some of the factors that contribute to the number of Indian children out of school. Around 125 million children in India are chronically malnourished, and one in every six of them is engaged in child labour. Improving access, equity, and equality of educational services offered to children throughout India are some of the challenges for the existing educational system.

Education plays an important role in achieving sustainable all round growth and development of the society. The educational institutions are expected to equip children to the best of their ability for securing a meaningful place in the society and thus fostering a process of developing an egalitarian society (Bandyopadhyay, 2006). As mentioned above a large number of children in India are excluded from the educational system and this means that they cannot participate meaningfully in the economic, social, political and cultural life of their communities (Maheshwari, 2012).

Marginalised Groups

The concept of Deprived/ Marginalised Groups is generally used to analyse socio-economic, political, and cultural spheres, where disadvantaged people struggle to gain access to resources and have full participation in social life. In other words, marginalised people might be socially, economically, politically and legally ignored, excluded, or neglected, and, therefore vulnerable. People who are deprived/ marginalised are outside the existing systems of protection and integration. This limits their opportunities and means for survival. Marginalisation can be due to class, in relation to specific social, cultural, economic and political conditions, as well as ideological systems, social awareness, and human action (Maheshwari, 2012). Many communities, a result of colonisation, experience marginalisation and face discrimination.

The marginalised groups lack the required social and cultural capital to participate in the mainstream development processes. Their social networks are weak and vulnerable. They are deprived of access to resources, such as, economic, educational, cultural, and other support systems. This creates social isolation and limits their participation in the development process. The ability for many to find work or gain education in a suitable area has been hampered by physical, social, and economic barriers, marked by regional variations and socio-cultural biases.

Policies on various aspects of education (for example, teacher recruitment and qualifications) vary across states, as does the availability, quality, and efficiency of investment in education. The marginalised out-of-school children belong to disadvantaged or minority communities, migrant families, and the urban poor, or are working children, children with special needs, or children in difficult circumstances; a disproportionate number of them are girls. Given the diversity of such groups across India, these groups face challenges that needed to be addressed with special initiatives (World Bank).

Education for All

Efforts have been made to make education accessible to all. However, there is wastage and stagnation in education. There are economic, social and bureaucratic reasons that hinder the education of children coming from lower strata of society. Although India ranks a low fourth in South Asia in terms of both adult literacy rate and youth/child literacy, several achievements have been recorded according to the government data, in the field of education since independence. India has managed to reduce poverty from 46 percent in the mid-1980s to around 34 percent in 2004-05; this is still high and continuing this improvement trend poses a huge challenge. The average literacy rate was 65% in 2001 (up from 18% in 1951). The number of uneducated persons declined for the first time since Census 1951 by almost 32 million in absolute terms between 1991 and 2001. Illiteracy has come down from 35 percent to 26 percent between 2001 and 2011.

The passage of the Right to Education Bill in 2009 marked a major milestone in India's history. The Right to Education Act 2009 guarantees free and compulsory education to all children in the age group of 6-14 years. However, there are several stumbling blocks on the road towards achieving the goal of universal education in the country. It is believed that it would require massive mobilisation on an unprecedented scale and seamless collaboration between the government, businesses and social organisations to enroll every eligible child in school.

This makes the role of social non-profit organisations even more critical as they seek to supplement, complement or substitute the formal education system in the country and reach out to the excluded, underprivileged and challenged sections of society.

Under the aegis of the government's flagship *Sarva Shiksha Abhiyan* (SSA) programme, over 98% of children in India have access to schooling within one kilometre of their habitation and almost 92% to an upper primary school within three kilometres of their habitation. However, this is the only part of the story. Research indicates that learning outcomes in government primary schools in India are well below acceptable standards. Moreover, the quality of students across different states is varied. Evaluations by the government and NGOs across several districts highlight alarming deficiencies in children's learning per their stated grade level (CII, 2013). The Annual Status of Education Report (ASER), conducted each year since 2005 in all rural districts of the country, shows that in 2010, only 53% of grade 5 students in rural India could read a grade 2 level text, and only 36% could solve a three digit by one digit division problem. This indicates that a vast proportion of grade 5 students lack the very basic skills expected of them.

It is found that across different grade levels, a student's pace of learning is much lower than what is desired of them by textbooks and learning material. The quality of teaching also requires discernible improvements. Further, honing creative skills such as writing,

drawing, painting, etc., receive limited attention. Indian schools also lack an environment where students are encouraged to ask questions. On the contrary, India's education system places significant emphasis on learning by rote. The RTE is a step in the right direction as it aims to address several of these deficiencies. However, universalisation of education cannot be achieved unless there is intervention at the community, household as well as school level and it is only the NGOs which are equipped to work at all these levels. The Education for All (EFA) and SSA also make copious references to Education Guarantee Scheme and Innovative/ Alternative Education with extremely poor allocation/resources.

Role of NGOs in Education

NGOs innovate, fill part of the huge gaps (80 to 100 million out-of-school children) and compliment Government efforts towards EFA and make contribution to reach marginalised children. This makes community-based alternative education models all the more relevant.

A non-profit registered NGO based at Gurgaon was set up in 1996 as an endeavour to give a new lease of life to underprivileged children. It was when a group of like minded, concerned and committed citizens were driven by the wholehearted passion to better the conditions of the large number of children of construction workers and migratory labour in Gurgaon. Their zeal to make a difference resulted in Sankalp. The first school was started under a tree with 30 children, and now it has grown to being multi-functional and multi-locational reaching out to more than 900 beneficiaries.

The NGO is firmly committed to provide quality education and holistic development of marginalised children to enable them to reach their full potential and contribute to their community and world as responsible and productive individuals. The motto was a powerful equation that meant to make these children realize their dreams i.e *Sakar Hote Hain Sapney*.

Continuous improvements and innovations are being carried out in areas of managing and imparting quality education to marginalised children and the same are summarised below.

Mobilising Children from Street to School

Bringing street children to schools is a hard task and requires lot of persuasion of the marginalised community dwelling in slums for the reasons that their parents are mostly illiterate and struggling to meet two ends meet, have lost hope for future and resigned to their fate without any long term positive prospective of lives of their children. Certain innovative activities undertaken by the volunteers help in reaching out to the marginalised children. These are:

- Survey of slum areas and construction sites to gather data of kids, 4-16 years,
- Hold motivational talks with opinion leaders on importance of education,
- Hold street plays to glorify role and importance of education in one's life,
- Offer target linked incentive for kids enrolment for opinion leaders, and
- Bring a friend to school campaign with existing kids in school.

Lots of gaps exist in desired delivery of government lead programs to impart primary education to marginalised children, thus offering opportunities to NGO and community to fill these gaps. In a unique model under which any NGO can collaborate with government

schools to offer their underutilised infrastructure to operate schools for providing quality education to marginalised. Such an innovative initiative has been taken by Sankalp. Further a volunteer based management team comprising professionals and educationists coordinates with local community, individuals, corporates, foundations, and other NGO, to mobilise various resources required to operate the organisation effectively. From 30 children in 1996 under a tree, *Sankalp* has grown to three schools with over 900 beneficiaries after 16 years.

The students coming from nearby slums lack basic hygiene, manners, discipline and motivation to attend school regularly. Thus an introductory course is conducted for three months where basic manners are taught and basic education is provided with emphasis on games, drawing, painting and music. With the objective to provide right kind of education to the children any time at their pace admission is done throughout the year with no restriction on age. The children are helped to grow at their own individual pace ensuring holistic development of every child's personality. As the students cannot get any help in studies from their parents, the volunteers with the NGO help the weak students.

Proper care and guidance from parents is the birth right of every child. These children are deprived of even this basic right by their own illiterate and poor parents who are working late hours. Underprivileged children mostly suffer from emotional and psychological problem which affects their behavior, concentration and interest in studies. Teachers, volunteers and counsellors help them overcome their emotional problems.

Innovative Steps Taken

It is often difficult for education systems to reach and retain children from marginalised groups (both physically and metaphorically). These children are often out-of-school, at the bottom end of the distribution for years in basic education, and heavily under-represented in secondary education. Marginalised adults are often illiterate, and lacking in opportunities for skills development. In the area of learning achievement, children from marginalised social groups are more likely to experience poor quality education, and to leave school and enter adulthood with poor skills. Certain innovative steps can be taken to ensure that students find school interesting and do not drop out. In addition to this focus was on the overall personality development of the child. Some of the initiatives which can help in ensuring this are mentioned below:

Healthy mind in healthy body: As healthy body is essential for a healthy mind, annual medical checkup of the children can be made mandatory with provision for medical aid as and when required. NGO's and community welfare organisations working with marginalised children do take up various initiatives to ensure health of the marginalised children. For example, the NGO running *Sankalp* School has helped in carrying out over 20 cardiac surgeries for underprivileged. Schools for marginalised should also provide nutritious mid-day meal every day to all the students, with milk and fruits atleast once a week.

Developing self-confidence, leadership and sharing qualities: It is important to develop self esteem in the students from marginalised groups. Children from marginalised groups often have low self-esteem and leave school early. Many innovative steps can be taken to strengthen their self belief and inculcate leadership qualities in these children. Various efforts can be taken in this direction. At the NGO *Sankalp* every student is given a responsibility like Notebook Manager, Uniform Manager, Discipline in Class Manager,

Neat Classroom Manager and Joy of Giving Manager (one who helps weak students in class or anyone who needs any help) for a week. Students feel empowered and enjoy this activity.

Steps to reduce dropout rate in school: High dropout rate is a big challenge in schools dealing with marginalised children because the target group is slum children who have unstable life due to migratory nature of jobs of their parents. Most of the times due to poverty, children in the age group of 6-14 are put to work to earn some money by their own parents. Various steps can be initiated to reduce dropout rate with positive results like:

- Rewards for 85-100% attendance, regular work, punctuality, good behavior and creative activities in a month.
- Regular counselling of students and their parents to tackle high absenteeism.
- No bag day on every Saturday. This day can be devoted to skill development activities like games, dance, music, painting and mehendi on hands.
- Visits to corporate and public schools can be arranged to envision the possibilities that education can provide them. Students gain a lot of confidence from these visits.
- Computer education not only helps in reducing drop-out rate but also improves the attendance.

At the *Sankalp* School these steps have helped to reduce the dropout rate from 45% to 25%.

Girl child education and retention: There is a need for greater emphasis on motivating the girl child for education. Proper counselling of both the parents and the girls on Right to Education, Right to Equality, Right to Protection from Exploitation and Abuse helps in encouraging them. Special counselling can be given to girl students to make them aware of the importance of cleanliness. Sex education can also be provided to them. Various incentives given to the girl student at the completion of a particular class can go a long way in motivating them to continue with the studies. For example in case of *Sankalp* School, the prize of a bicycle to every girl student on completion of Class V has helped in making school and studies attractive to them, and the girl child ratio has improved from 15% to 40% over the period.

It is extremely important to inculcate secular values in the children. If the students get to participate in different festivals like Holi, Diwali or Christmas, it helps to develop secular culture and vision of national heritage.

Students take a lot of interest in learning computer. The incentive of computer education also attracts them to school. In case of *Sankalp* School it is found that there is 100% attendance on the days when computer classes are held. This school has taken help from the corporate sector in the endeavour to provide computer education to the marginalised children right from class 3. In order to make the learning process interesting to students, audio-video medium of instruction can be used effectively. Students enjoy and learn better in this manner. Therefore, DVDs on every subject can be shown as a medium of instruction.

Teachers form the most essential component of the entire system of providing education to the marginalised children. Proper training of the teachers helps in ensuring better education for the children. This should be an ongoing activity to enable them to handle underprivileged children in a better way. These children once out of school need continued help and guidance to carry on with the education. The coordinators can be so trained and instructed to keep track of these students, and help and guide them from time to time.

Conclusion

It is well known that education for underprivileged children is the key to the progress of the nation itself. However, the magnitude of efforts required to make every child in the country literate is very huge. This initiative is a small contribution for the betterment of marginalised children. It is a collaborative effort which encourages all individuals to come forward to participate in the process of nation building through education.

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20

Educating the Girl Child

Anil Tandon and Nirmala Tandon

Introduction

Education is extremely essential for the overall development of a child. It ensures knowledge, skills of a trade and makes one eligible for a job or a business. Education is also linked with a person's social status. However, the importance of education for girl child is often ignored. According to UNESCO there are around the 796 million adult illiterates in the world and two-thirds of the world's illiterate adults are women (UNESCO, 2010). From the year 1990 to 2000, the world literacy rate increased from 76 percent to about 82 percent. However, the progress has slowed down in the decade since then. In India alone there were 1.7 million out of school children by 2010 data (there is no new data for 2011). According to the World Bank, in 2010 India had the third highest number of out of school girls in the world. According to the United Nations, 'Women are over half of the world's population, yet they do two-thirds of the world's work, earn one-tenth of the world's income, and own less than one-hundredth of the world's property.' Statistics after statistics show the disparity in literacy rates between males and females around the world. In developing countries where the literacy rates are low in general, females dramatically lag behind males. The two major factors contributing to this disparity include cultural views on educating females and poverty.

Importance of Education for Girl Child

The role of women in society is extremely significant and cannot be overlooked. Lack of education denies the girl child, the knowledge and skills needed to advance their status. Education enables the child to realise her full potential, to think, question and judge independently; to be a wise decision maker, develop civic sense and learn to respect, love fellow human beings and to be a good citizen. Education is the single most powerful way to lift people out of poverty. Education empowers the girl child and helps to remove burden from poor families. In poor families in most Third World countries a girl child is usually seen as a bread winner and forced into child labour. Education helps in ensuring gender equality and the advancement of women. Education enables a person to claim his/her rights and realise one's potential in the economic, political and social arenas. Education plays an important role in enabling girls and women to secure other rights. Basic education provides girls and women with an understanding of basic health, nutrition and family planning, and empowers them to decide over their own lives. Education of girls directly leads to better family health, economic growth, for the family and for society, as well as lower rates of child mortality and malnutrition. Therefore, education should be an intrinsic part of any strategy to address the gender-based discrimination against women and girls that remains prevalent in many societies.

There are several issues related to the neglect of education of the girl child. Several problems persist: issues of 'social' distance – arising out of caste, class and gender differences – deny

children equal opportunities. Social traditions and deep rooted religious and cultural beliefs are most often the barriers to expanding girls' educational opportunities. Child labour in some parts of the country and resistance to sending girls to school remain real concerns. Girls belonging to marginalised social and economic groups are more likely to drop out of school at an early age. Several factors such as culture, religious beliefs, and economic situations contribute to the staggering global illiteracy rates among young girls and women. Some other factors are:

- Cultural and traditional values stand between girls and their prospects for education. Social beliefs, attitudes and practices do not let the girls benefit from educational opportunities to the same extent as boys. In most societies there exists a powerful economic and social rationale for investing in the education of sons rather than daughters.
- There exists indifference in attitudes and practices towards the health and well being of the girl child. There is also a lack of awareness about the importance of education for girl child, especially among illiterate parents and guardians. They do not see the value of sending their daughters to school and mostly poor learning outcomes are further instrumental in dissuading them from doing so.
- Low value is attached to education of girls and this reinforces early marriage. Too often marriage is seen as a higher priority than education, and the girls who are married (even if they have been forced into early marriages against their will) are excluded from schools.
- Mostly girls are burdened with various domestic responsibilities along with the necessity to earn money from 13-14 years of age. Thus crisis at home curbs the interest in study. Often there is no parental support leading to lack of aspiration. This leads to physical and mental fatigue, absenteeism and poor performance and thus affects their performance and attendance in schools.
- Various problems of rural isolation, migratory lifestyles, and lack of infrastructure pose additional challenges to the education of the girl child. Discrimination of different kinds also restrains the child from making use of the available educational opportunities.
- Often financial constraints of various types hamper the education of girls. In most countries education is not free and due to social and economic barriers parents choose to invest in education of the male child and not the girl child.
- Lack of schools (especially in interior villages, hamlets and disadvantaged areas), schools at large distances, poor infrastructure at schools and lack of basic facilities such as toilets and drinking water, violence against girls, fear of sexual assault, and limited number of female teachers are some other factors that keep girls away from school.

One reason for denying girls and women their right to education is rarely articulated by those at the helm of affairs: It is their fear of the power that girls may acquire through education. There is still some resistance to the idea that educated girls and women can be trusted. Education is also seen in some societies as a fear of change and now with globalisation, the fear becomes even greater — fear to lose the cultural identity or the fear of moving towards the unknown.

Girl Child Education in India

There has been a major improvement in literacy rates in India over the past decade, though the number of children who are not in school remains high. There exist gender disparities in education with far more girls than boys failing to complete primary school. The national literacy rate of girls over seven years is 54% against 75% for boys. In the Northern states of India, which are Hindi-speaking, literacy rates of girls are particularly low, ranging between 33-50%. The literacy rate jumped from 52 per cent in 1991 to 65 per cent in 2001. The absolute number of non-literates dropped for the first time and gross enrolment in Government-run primary schools increased from over 19 million in the 1950s to 114 million by 2001. Around 20 per cent of children aged 6 to 14 are still not in school and millions of women remain non-literate despite the spurt in female literacy in the 1990s.

Although lower primary schools are within one kilometre of 94 percent of India's population, on an average every second girl child in India has not got enrolled. While the enrolment rate is high in urban areas, it is conspicuously low in rural areas and so also among the backward and minority communities. The disparity is also regional with higher literacy rate across the Southern and North-Eastern states, but very low in some of the most densely populated Northern states. In Uttar Pradesh, the most populated state in India with a population of 172 million an average of only one out of four girls is enrolled in the upper primary school. Amongst the marginalised communities in the state of Bihar, the situation is far worse where only one out of every six girls is literate. The national average shows that there are twice as many illiterate women as there are men.

The Indian government has expressed a strong commitment towards 'Education For All'. It has taken certain active steps towards status and education of women. In 1994, the Government of India passed a universal female education bill that offers incentives to parents for access and gives punishment for keeping a girl out of school. In another important initiative, the government also announced free and reduced cost of education for girls. The programme has been designed with the aim to offer free education at high school level to all girls of single child families. There is a provision for fellowships to girls undertaking higher studies. The *Sarva Shiksha Abhiyan (SSA)* Programme for universalisation of primary education and the *Mahila Samakhya Programme (MSP)* which has set up alternative learning centres for imparting education and providing empowering skills to girls from disadvantaged communities are among the major initiatives to improve literacy levels. The *Kasturba Gandhi Balika Vidyalyaya Scheme (KGBV)* aims to provide education to girls at primary level. Under the scheme of National Programme for Education of Girls at Elementary Level (NPEGEL) 'Model Schools' have been set up to provide better opportunities to girls.

Other agencies and NGOs have also come together to ensure quality primary competency and education for the girl child drawn from poor and disadvantaged communities. A number of NGOs highlighting the importance of education for girl have been set up. The objective is to change the mindset of the society and stop discrimination against girls. IIMPACT is one such NGO with belief that when you educate a girl you educate generations to follow. The emphasis is on bringing 'never been to school' and 'school drop-out' girls in the age group of 6-14 years in the rural areas back in the fold of education with emphasis to provide them with life skills.

IIMPACT's Model

The issue of providing basic education to girls in India is faced with unique problems which need unique measures. IIMPACT, through its simple, scalable and innovative model, has demonstrated a solution involving rural out-of-school girls by effectively bringing them back in the fold of primary education. This model is centred on a Learning Centre or *Prashikshan Kendra* which is placed in a village with about 30 pre-teen out-of-school girls in them. One teacher is attached to each Learning Centre (LC). These LCs are established under complete support and watch of the parents and community members and cater only to out-of-school girls from the village. They are run for a period of 5-6 years during which the village community is sensitized enough to the value of education for the girls, thereby putting them firmly on the educational track. After 5-6 years of primary education and skill based training at the LCs, the girls are placed in formal government schools to continue their future education. Since the community stands sensitized, a trend is then set up for younger girls to also follow suit thereby reducing the need for the LC. Alternatively, the village community takes over charge of their LC as a matter of pride with background support of IIMPACT. In this entire model the role of teacher is extremely crucial and great value is placed on the teacher's competency to deliver. The teachers are all sourced locally from the community and then trained and re-trained to impart multi-level multi-grade teaching in four subjects Hindi, or the local language, English, Mathematics and Environmental Studies.

Starting in 2003 with 450 girls, IIMPACT currently has 25,000 previously out-of-school girls in its LCs in 760 villages. Till date, IIMPACT LCs have helped about 4,000 girls complete their primary competency and education and go beyond to government schools. 16 of these girls are currently doing their graduation in various colleges and universities.

The Learning Centre (or *Prashikshan Kendra*) approach has huge advantages for deprived communities. Parents and village community elders are directly involved in these learning centres thereby easing out any issues of educational content and its implementation. The continuous parental support and proximity to residential areas also leads to high enrolment and low dropout. These LCs are set up in villages and areas with low female child literacy rates. Increased focus on girls from the neglected and deprived communities helps in making the *Prashikshan Kendras* completely inclusive. The girls from illiterate families (85% of fathers and 95% of mothers) are benefitted with parental support and awareness thus breaking the cycle of illiteracy. The mechanism ensures that the girls get to study near the place of residence under watchful eyes of parents. This also enables the girls involved in domestic work, sibling care, and other activities get to avail themselves of educational opportunities. More trust is generated among the parents as only female teachers are employed. The emphasis is on quality demonstrated through learning outcomes, parental recognition and appreciation. A flexible and attractive curriculum is designed which is appealing to the children and every child is free to learn according to her own pace and capacity.

Lives of girls undergo tremendous transformation once they start coming to the LCs regularly. Parents get sensitized as they see learning outputs. They start treating girls at par with boys. The village community begins to respect girls and value them as they can read and write. Educated girls look after themselves better, and their chances of getting exploited

are reduced. This also has reduced the instances of child marriages as parents want to educate their daughters for more number of years. There is a marked improvement in health, hygiene and grooming among girls in the LCs. Learning outputs have tremendously improved as girls have access to quality methods and materials of teaching. There is continuity in education as around 50% of about 4,000 girls from IIMPACT who have passed the State Government's Class V exams went on to complete Class VIII and 35% pass Class X.

Innovative Techniques

Innovation lies in the simplicity with which an educational model addresses contentious issues and produces consistent quality results. The model should be scalable while preserving learning outcomes and quality parameters. Some other strategies and activities which can be successfully adopted include:

Proper Identification of Needy Areas and Beneficiaries: The data on out-of-school children in India is not completely reliable as compared to actual grassroots surveys. Moreover, while such available data may be a good indicator, proper details on out-of-school children is not available at the local level. A process of door-to-door surveys in the villages to identify out-of-school girls within the age-group of 6 to 14 years helps in creation of an authentic database of non-school going girls and enlisting reasons and issues for their present situation. Such a database helps not only in implementing the educational projects in deserving areas but also in assessing the awareness of the concerned stakeholders.

Mobilization of Volunteers and Civil Society Organizations: Social projects and schemes suffer largely because of lack of local community involvement. The educational model should be based on partnership and the village based learning centres should be jointly facilitated, conducted and monitored by local NGOs and the local community. Volunteers can be enlisted at the village level, to help right from the survey stage to project implementation and its continuous monitoring. Partnerships help in quick scaling up and also in reaching difficult areas.

Engaging Teachers from Local Areas: In the present primary education scenario in the country there is a huge paucity of qualified teachers. Various other teacher related issues are also well recognised. Village communities are more comfortable with teachers who are known to them. Teachers drawn from local areas also well understand their surroundings and are aware of local issues and ethos. A system of employing teachers from the village clusters in the project areas after proper training can be put in place. Students, preferably women, who have passed Class tenth or twelfth, are encouraged to join as teachers and are provided sustained training to be better equipped as quality teachers. This helps in preparing a cadre of teachers adept in non-formal teaching systems as well as community work, able to provide learning skills up to Grade 5 and life skills and other basic competencies.

The training of the teachers can be so designed that by the end of one primary school cycle, i.e. about 4-5 years, the teachers obtain excellent grasp over subjects, pedagogy, curriculum and innovative-teaching through trainings and practical work at the learning

centres. Many of them can then become resource persons for training other teachers. This provides a critical and scalable platform for expansion.

Focus on the Girl Child: Conventional village primary schools are pre-dominantly co-educational and cater to a large local population. The co-education system is not welcome or permissible within many communities thus affecting a large number of village girls. The need for separate learning institutions for women is felt at all levels of education and at all the times. Some developed communities also prefer separate educational institutions for boys and girls. This is an important cultural need for the village girl and therefore there is a need for learning centres exclusively for the out-of-school and never-been-to-school girl child. There are no exclusive spaces and services for women and girls in village areas. For thousands of girls who are denied education and the freedom which it brings, such educational centres can be places where they identify themselves and learn to express themselves.

Innovative and Effective Pedagogy: Poor educational achievements fail to motivate children and parents. Many a times they do not themselves know whether such achievements are good or bad due to lack of uniform comparison within their peers. In addition, lack of attractive and effective pedagogy, neglect in classroom, rote method and selective syllabi constitute poor learning outcomes. Therefore, teachers should be more adept at delivering the required information to the children in an interesting manner. Teachers should be trained in Multi-Level Multi-Grade teaching systems, curriculum division and planning, fun-induced teaching and CCE based evaluation systems that stand out in producing a higher impact from the same books and curriculum. Grouping of children as per their learning levels, learning abilities, pace and their individual learning plans, also helps. Each child receives equal learning space where he/she can create and learn. Children can be encouraged towards self learning and conceptual learning by questioning. Classrooms richly supplied with attractive and relevant teaching and learning aids, such as activity books, models, games, story books, picture cards, etc., help in drawing child to the school.

Focus on Key Subjects: Adherence to learning in mother tongue and state prescribed school books help to keep the girls abreast with their peers. The curriculum can include key subjects such as Language, Maths, English, Environment, Science and Computers. Special inputs in Maths and Science can be given through Mobile Science Van, whereas mathematical and scientific concepts can be explained simply through hands-on experiments and various problem solving techniques. Computer literacy using solar powered laptops and educational software can serve as a source of encouragement to the girls to learn faster than they normally would.

Recognising the challenges, IIMPACT, through its recently established Resource Centre, is working towards standardisation of delivery practices and learning outcomes across nine different states in the country, i.e. in linguistic regions as different as Odisha and Rajasthan, Uttar Pradesh and West Bengal, Uttarakhand and Jharkhand. The Resource Centre ensures equal quality in content and delivery of curriculum as well as comparable and measurable learning outcomes among children's groups belonging to these differential linguistic and cultural regions.

Empowering Girls through Life Skill Trainings: Cultural activities play an important role in the overall development of children. Many girls are deprived of this right, mostly due to religious reservations. The girls can be involved in meaningful cultural activities and life skills trainings that help them develop into better and more confident individuals. The training in arts and crafts can be made part of the curriculum. Avoiding the rigid path of confrontation and a mechanism of convincing the communities about the meaning and simplicity of each activity can be fruitfully adopted. It is noticed that parents are becoming relatively liberal in allowing their girls to uncover their heads, or wearing a uniform to the government school which they choose to go after Grade 5. Parents become unmindful of their daughters' involvement in educational games, sports and cultural programmes on stage. These changes are small but significantly vibrant as earlier the village communities were against their girls singing a song or dancing but now they understand that educational songs help their daughters learn faster and better.

Involvement of Parents, Community and Formal Schools: Ultimately it is these three i.e. the parents, community and formal schools, which shape the children's future. It is important to work with all the three entities closely to ensure the best possible education for out-of-school girls at the village and community level. Parents can be sensitised through PTAs (parent teacher meetings) in monitoring progress of their girls and facilitating their education and development at the village level. The community can be engaged to monitor the learning centres and local schools through School Management Committees or Village Education Committees. Formal schools can also be made accountable for out-of-school children by changing the present state of affairs and allowing admission of the eligible girls into the mainstream education.

Mainstreaming Girls into the Education System: The out-of-school girls can be involved in non-formal setting of the local learning centres for 4-5 years. The early mainstreaming of left-out and deprived girls who have been brought in the fold of education through non-formal educational efforts is not advisable. These are quick fix solutions which do not hit at the root cause of the problem which creates out-of-school and never-been-to-school girls. Children who are mainstreamed hurriedly again dropout due to weakness in their basic capabilities and an externally forced value of education, which is not intrinsically ingrained in their psyche. This is strengthened by the District Information System for Education (DISE) data on hurriedly mainstreamed children in 2002-03 under the SSA Programme of GOI. Over 80% of mainstreamed children during these two years had dropped out after 1-3 years of schooling (DISE data). However, it has been found that quality education at primary stage better prepares children for higher classes. Mainstreaming of girls after primary level is more meaningful as:-

- Well educated grown-up girls know much more and can carry themselves well, e.g. they can catch a bus if the school is far. They can also learn cycling.
- Older girls travel in groups, and if they are from same LC, they all go together.
- Educated grown-up girls have much greater convincing powers over their parents.
- Girls used to a good standard of teaching become change agents for better learning levels beyond primary schools.
- Girls exposed to self learning techniques and attaining high marks for five years at the LC will do the same in a formal setting also. Therefore liberating themselves forever.

Therefore, 4-5 years of high quality near-to-home education in a non formal setting of a *Prashikshan Kendra* or informal learning centre prepares pre-teen girls well for mainstreaming and continuity in higher education.

Conclusion

Better educational opportunities at grassroots can go a long way in helping pre-teen girls from disadvantaged communities with poor access to schooling gain high quality primary competency, education, and life skills. This in turn leads to a big change in their lives, and even those of their parents and those of their communities and their surroundings. It is essential to think of innovative strategies for reaching out to these girls and providing education.

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21

Emerging Further Education for Persons with Developmental Disabilities

Vikram Bhatt, Alok Bhuwan and Sangeeta

Introduction

The perception of people with disabilities has changed significantly over the years. Historically people with disability were kept away from the mainstream society and cared for separately. The term 'developmental disabilities' refers to people who have a long term disability such as Autism, Cerebral Palsy, Mental Retardation or Multiple Disabilities. These are neither diseases, nor are contagious or progressive. They cannot be cured by drugs or surgery but early detection and training improves outcome. Earlier in the society, disability was looked upon negatively and those who are developmentally delayed or mentally challenged were often rejected by the society. This was the case not only in India but it was a global phenomenon. People are known by what they do. People with developmental disabilities have a problem in giving a cogent answer to the question – what do you do? Education for people with disability evolved gradually with time, where they were initially educated separately – in self-care tasks and vocational tasks.

Models of Disability

The 'medical model' of disability has prevailed for many years – where people with disability were categorised by what is wrong with them, or how they are impaired. Disability is viewed by what the person is unable to do and by what diagnosis they have. There is an emphasis on the requirement for the individual to improve and to make oneself 'less disabled'. Alongside the medical model perspective of disability has been associated with the concept of 'tragedy' or 'charity'. This approach depicts disabled people as victims of circumstance, deserving pity, assistance and charity.

The social model of disability has been developed by disabled people in response to the medical model and the negative impact it has had on their lives. Under the social model, disability is caused by the society in which we live and is not the 'fault' of an individual disabled person, or an inevitable consequence of their limitations. Disability is the product of the physical, organisational and attitudinal barriers present within the society, which lead to discrimination. The social model considers disabled people as part of wider economic, environmental and cultural society. The barriers that prevent any individual from playing an active part in society are the problems of the society. The barriers that disabled people face are both physical (environmental) and social. Environments are often not physically accessible – for example for wheelchair users or for people with visual impairments. Attitudinal barriers are even more difficult to change. People have preconceived perceptions as to what people with disabilities are (or are not) able to achieve.

In partnership with the evolving social model there is 'rights based' vigour. The emphasis has shifted from dependence to independence, as people with disability have sought a political voice, and become politically active against social forces of disablism. Disability activists, by engaging in identity politics, have adopted the strategies used by other social movements commanding human and civil rights against phenomena such as sexism and racism.

Concept of Self Reliance for Developmentally Disabled

At a renowned educational institute, working with the developmentally delayed for more than 14 years, brainstorming was done to find out whether something could be done about this. In common parlance the ABC of rehabilitation is mentioned, as - A stands for Agarbati making, B stands for Broom making and C stands for Candle making. These things made by the mentally challenged are often sold at *Diwali Melas* to raise money. It was strongly felt that to be true to the mission of providing right kind of education to the developmentally delayed and making them self reliant, there was a strong need to add a D to this, the developmentally delayed doing great work. Various issues and problems related to the developmentally delayed were looked into and deliberated upon to find out innovative ways in which they can be made capable of contributing to the society. The service sector, i.e. retail sector and the hospitality sector was found to be most suitable for providing work opportunities to the disabled. People with disabilities can also be employed in the office environment as Office Assistants as they are good at doing tasks that follow a set procedure, are repetitive and easily understood and do not require spot decision making.

For any programme of study and training for the mentally challenged person the most crucial task is to design some course curriculum. This becomes all the more difficult when there are no university level recognised academic programmes especially for the person with developmental disabilities. The designing of the course starts with the *acceptance* of the abilities of the person with developmental disabilities as shown in Fig. 21.1. The faith that when entrusted with the work they will be able to do it, goes a long way in raising their self confidence in their own abilities.

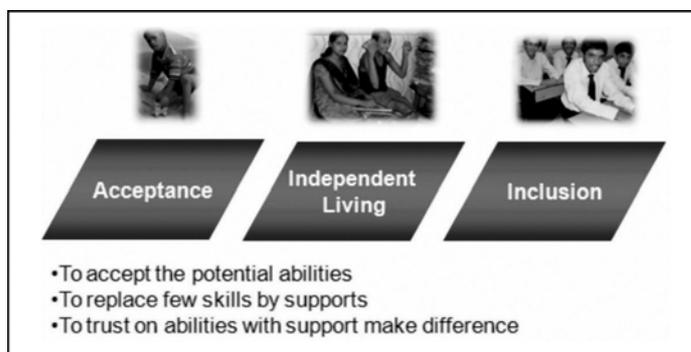


Fig. 21.1: Evolving Concept of Self Reliance

Persons with developmental disabilities have no communication skills, social skills, or functional skills. But the crucial aspect was to look for abilities that they have, so that those may be worked upon and further strengthened. There is a term called *independent living* as in the case of Stephen Hawking, British theoretical physicist, cosmologist, and author. Hawking was diagnosed with motor neurone disease and gradually his physical abilities declined. He is a great scientist but he needs somebody to take care of him because of his disabilities. Despite all odds he is carrying on with his research work and professional duties with quite a phenomenal zeal and enthusiasm. He is financially independent and he has others to take care of his daily requirements.

Inclusion is another significant aspect that needs to be considered (Fig. 21.1). The main emphasis should be on how people with developmental disabilities can be brought into the main stream through education and work leading to financial independence. The

programme concept was designed around these three basic aspects - acceptance, the independent living and inclusion. The concept evolved from the need to accept and trust the potential abilities of the person, and an educational framework was developed to replace the skills.

Education for Developmentally Disabled

As the perception of disability has changed – as outlined above, so have the thoughts about education for the developmentally delayed. Earlier it was felt that there was no purpose in providing education to the people with disabilities. This further evolved into the need to provide education so that people with disabilities could be empowered to undertake self-care and personal activities of daily life independently. At that time very few educational and professional opportunities were available to the mentally challenged children. Special schools were then created for children or persons with developmental disability. But once there, the grid was locked as to the educational possibilities for the child in future. This problem led to the idea of providing vocational training to the disabled. Vocational training programmes were started for persons with disabilities. They spent long time in such training centres but then again after spending a considerable part of their life in these centres, they were not able to become an earning member of the community. Then the concept of sheltered workshops evolved. The idea was to make such person work in a group. This was imparting of practical skills in workshop activities which often involved work within a sheltered workshop facility. However, there was no work or job satisfaction for them and this was also not leading them towards economic independence.

All of this happened in isolation from mainstream society, often in residential institutions. From this evolved the need and concept of a comprehensive academic education, provided to young people with disabilities in ‘special schools’. The concept of inclusive education was then introduced. In the recent years, there has been a drive to develop inclusive education – so that young people with and without disabilities are educated together. In India the Right to Education Act (2009) stipulates free and compulsory education to all children in the age group of 6 to 14, and education of those with disabilities in the mainstream schools. This, over the passage of time, will enable all children to be taught within their communities and peer groups. The main aim is to bring them to the mainstream and have college education just like normal persons so that they also feel inclined to think about career and future life. The emphasis is on providing the education and training to the mentally delayed person in the same manner as is given to a normal person. The scenario of education for mentally disabled is shown in Fig. 21.2. Education increases understanding and college education makes them into valuable citizens thus opening up avenues for further placement.

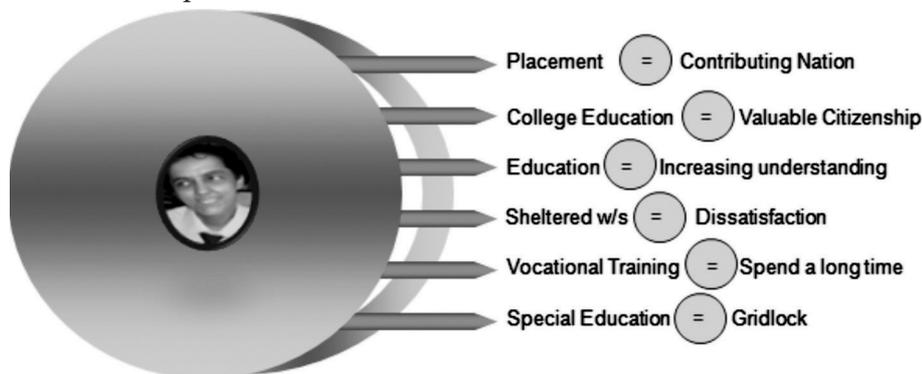


Fig. 21.2: Spinning of Further Education

Now the mindset of the society is changing. It has come to realise that although young people have a right to education till 14 years of age, there is little provision for young people with disabilities after fourteen years of age. So it is the need of the hour to impart education to students with developmental disabilities and to the adults who work with people with disabilities so that they can get equal opportunities and can work in the society and for the society.

Programmes for Developmentally Disabled

For students with development disabilities the emphasis should be on the programmes that provide skills and training for specific employment. By getting education the students will have a better understanding, so that they can approach a college for further studies, which in turn will provide students with employment and thus in a way ensure better growth prospects for the nation. The overall aim of these programmes is to enable students to obtain and sustain employment in the open market.

An educational institute for people with disabilities should be endowed with the spirit of innovation and should be capable of providing leadership in handling developmental disabilities in India. The mission should be to provide care and education, which enables a disabled person to become independent and capable of acquiring gainful employment. The emphasis should be on facilitating greater acceptance of children and adults with developmental disabilities in the society. The range of services and the number of young people being catered to has to be wider. The services may include - open basic education, a residential independent living facility, community based rehabilitation, education for the workforce working for people with disabilities and work skills education and job placements for persons with developmental disabilities. A renowned institute for education of people with disabilities has been quite innovative by way of providing education programmes. The institute also supports students with disabilities, including intellectual and developmental disabilities to pass Central Board of Secondary Education (CBSE) with the help of Skill Based Vocational Courses from Level I (i.e., Class IX) under the National Vocational Education Qualification Framework (NVEQF) from 2012-13 onwards. Some of the programmes designed by the institute are certificate based credit programmes providing knowledge and skills. Innovation was the key for identifying the skills which could be of interest and use to the disabled children. The emphasis was on finalising skill based programmes which could provide jobs in the industry. Service oriented sectors were chosen as the mentally delayed children take up these skills easily. Suitable training programmes and courses were created in hospitality, retail, office business, soft skills, information technology, health and beauty. Keeping in mind specific training requirements for different students, customised programmes and courses were developed in personnel management, basic arithmetic, writing and reading skills. While designing these programmes the focus was always on the specific training requirements of the children. Some of these programmes are mentioned below:

Certificated credit courses/programmes for knowledge and skills.

- **Hospitality:** necessary to work in hotels, restaurants and the tourism industry.
- **Retail Assistance:** essential for working in retail.
- **Basic Business:** required for self employment or to be an assistant to a manager.
- **Office Attendance:** important for employment supporting administrative and office staff.

- **Soft Skills:** develops self esteem, a sense of independence and improves communication skills.
- **Information technology:** teaches essential computer skills for modern employment.
- **Health and Beauty:** teaches basic health care, beauty culture and hygiene control.

Non-credit customised programmes/courses

- **Personnel Management:** the necessary foundation for independent living.
- **Peer Sexuality Tutor:** enables people with developmental disabilities to help others learn about sexuality.
- **Basic arithmetic, writing and reading skills:** helps students prepare for credit courses.

After completing these courses successful students gain employment or go for further education at many of the nation’s leading colleges and universities. An innovative management programme developed for children with disabilities is shown in Fig. 21.3.



Fig. 21.3: Programme Structure

The unique element of the training programmes is that at the completion of the taught programme, students are encouraged to complete an Internship. These internships can be arranged with local companies and students are provided with clear objectives and support whilst at the work placement. There is a provision for providing a stipend to the student interns for their work.

The innovative concept of providing the students with a mentor for work based support was introduced. These mentor relationships prove to be very significant for students with disabilities. Students are often educated within a ‘specialised’ environment and having someone as role models after whom they can pattern their own behaviour, is very important. In addition, having a mentor who can provide support in obtaining a job and then ongoing support in the initial phase of employment – to both the employee and employer is beneficial. People from the local community, some of whom are students in relevant fields are also encouraged to volunteer to be mentors. The institution provides the training

required for the role of a mentor. It also provides any other support to the mentors, as and when necessary. Collaborative partnerships with certain organisation were made to include them in the development and implementation of such programmes. The constant support of the partner organisations helps in proper establishment of these programmes.

Design of the Programme

The programmes should be designed keeping in mind the response of the students to the knowledge gained by them. The courses should aim to enable the students to gain a better and thorough understanding and help them in further defining their own ways for the future. Specific method of instruction well suited to the developmentally delayed should be adopted. Certain important aspects of any training programme for the mentally disabled are response of the children towards knowledge being imparted, teaching of mainstream concepts, use of specific instruction mechanisms, well-designed curriculum, proper training lab, and use of real life experiences in the teaching/training modules (Fig. 21.4).

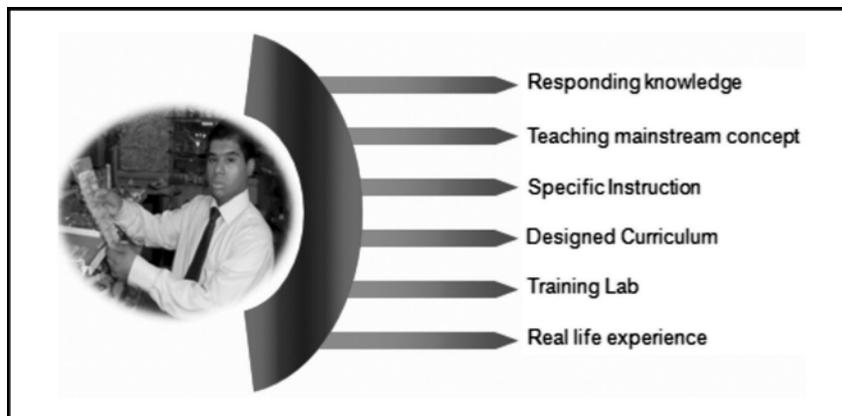


Fig. 21.4: Targeting the Programme

The nature of the training being similar to the one that is provided to normal children makes it more valuable. The encouragement and support for short term placement along with training adds relevance to the programmes. This experience gives rise to the feeling that - I am a contributing member of the society, I can contribute to my work, my family, I can earn, and I can do well in life. This serves as a morale boost for the mentally challenged person and aids them in becoming self-reliant. Some specific training programmes can be targeted. The students can be made to go and travel independently. An innovative way of imparting training is by setting up of training labs to give them hands-on training in work environment like settings. Involving experts from colleges and institutes in the course design work helps in ensuring the quality of the training programmes. The issue of the teachers to be involved in the training assignment also needs proper consideration. Teachers from the field of special education are good at teaching the mentally challenged person but are not well versed with areas such as management, business, hospitality or retail. Teachers from these specialised areas are experts in their own field but are not good at teaching the developmentally challenged persons. So keeping these constraints in mind an instructional curriculum designed for them can prove to be highly beneficial. This innovative intervention helps in ensuring that teachers and other educators understand the learning needs of disabled people. The curriculum for the instructors should be designed by involving the various experts and special educators, and keeping

in mind the various training needs. In addition to the programmes for people with developmental disabilities, some programmes can also be developed for staff working with people with developmental disabilities.

It is important to take care that the teaching strategy adopted is not that of a special school. If the courses and contents are similar to the mainstream courses meant for normal students it makes teaching more meaningful. However, different instructional mechanisms can be used to teach the developmentally challenged. It is extremely important to take into account the response of the mentally delayed students to the knowledge being imparted. The involvement of the parents and the community at large in the training programme increases its significance. The students can be made to work in real life situations so that they gain the required confidence.

In case of programmes provided by a renowned educational institute for disabled various industry partners helped in the development and implementation of the training programmes. Thus this became a unique model of collaborative effort towards education for the disabled. The knowledge partners such as *EMPI Business School* and *College of Business Studies* helped in the development of the courses; resource partners such as *Hans Foundation* provided the required funds and resources, certain overseas volunteers also joined as resource partners. Moreover, placement partners such as *SBI, Big Bazaar, Haldiram's, Barista, Cafe Coffee Day*, etc. helped by providing short term placements to the trainees. The students were provided with an opportunity to earn a handsome amount of salary with additional perks. After going through such a well designed training programme the students get the feeling that they are not going to the school but to an institution of higher learning. There is a change in perception at different levels as shown in Fig. 21.5. The awareness is created in the community that they are the productive members of the society. Through such an initiative the teachers learn that the developmentally challenged children can be taught just like the mainstream students and the only distinguishing factor is that they learn differently. The parents start believing in the abilities of their children. The employer starts having faith in their work. The belief of the developmentally delayed students in their own capabilities is strengthened. Therefore such an innovative effort can lead to a change in the mindset of all.

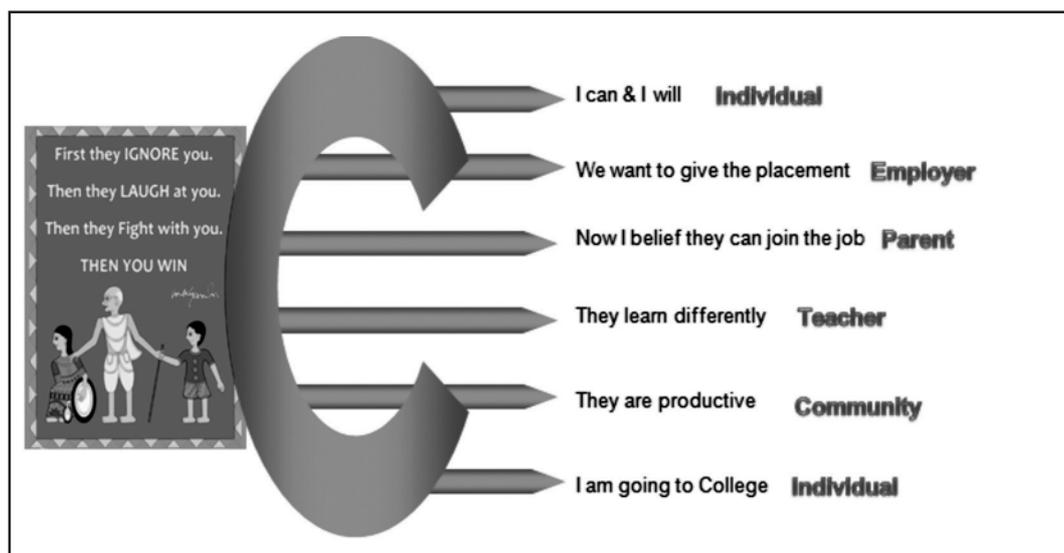


Fig. 21.5: Changes in Perception

Different levels of programmes can be designed. A personal management programme can be designed for persons who are severely challenged where they could learn the skills related to Activities of daily living (ADLs) also. They can be trained for the open job market like Malls, Banks, etc. Programmes can also be designed to enable them to start entrepreneurship activities like self employment. Foundation, core and application oriented courses form part of the programme design. Of the main course 60% is the practical part and the remaining 40% can be theory. Some enrichment programmes such as music, social skills can also be incorporated into the programme. Training programmes can be designed to target certain areas and the related skills as shown below:

- **Academic Growth:** Critical Thinking, Math Concepts, Reading/ Writing
- **Community Awareness:** Community Resources, Consumer Skills
- **Enrichment:** Music, Art, and Customs, Cultures and Holidays
- **Fitness:** Adult Fitness, Rhythmic Movement, Aerobics
- **Independent Living:** Applied, Food Preparation, Health Concepts
- **Social Skills:** Personal and Social Adjustment, Communication
- **Technology:** Introduction to Computers, Desktop Publishing

Internship can be provided at restaurants, hotels, public sector banks, book shops, community shops, manufacturing units, etc. Children can be given the required exposure so that they know how to use the public transport, ATM and other public amenities. The aim should be to improve their quality of life and enable them to get gain full employment.

Conclusion

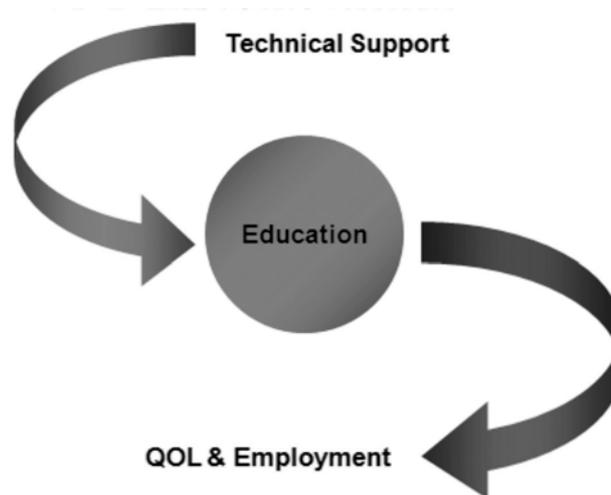


Fig. 21.6: Process for Maximum Outreach

Proper need analysis is essential before designing any such programme. A process for maximum outreach (shown in Fig. 21.6) involving the industry, educational experts helps in meeting the educational requirements as well as finding proper employment avenues for the students. The cause of empowering the developmentally challenged can be addressed by improving the quality of life and creating opportunities for gainful employment of the developmentally challenged through proper education and training.