EDITORIAL

We are glad to bring out June 2005 issue of Volume 22 of the Journal of Technical and Vocational Education with a number of interesting articles and research papers. In this issue we have included abstracts of two Ph.D thesis in technical and vocational education which will definitely add to the quality of this Journal.

Shri. Thoguluva R. Vijayram, a researcher from University Putra Malaysia has presented his ideas on Engineering Education System for the twenty first Century. His paper discusses on the efficient designing and implementing of an advanced engineering education system and also highlights the advantages and benefits of engineering education and research.

Dr. Rajarshi Roy and his colleagues have contributed their research work on gender, in relation to some selected psycho-educational attributes among the technical teachers. The paper attempted to explore the level of professional interest, individualism – collectivism trait and the level of self-esteem of teachers along with the impact of gender over these attributes.

Prof. G.B. Jaiprakash Narain has contributed his ideas on the Role of technical institutions in integrating Persons with Disabilities (PWDs) into the main stream of technical and vocational education. The article highlights the role of technical education for promoting sustainable development and improving the capacity of PWDs to live a relatively hassle free and independent life.

Shri. A.M. Saravanan and his associates in their paper have explained the emerging trends in providing quality technical education. They have also highlighted the need to consider several influencing functions of education and virtual reality.

The use of web based information system is becoming very popular. Shri. G. Kulanthaivel and Dr. G. Ravindran have contributed the article on Development of Web based Medical Information System. The paper describes the elements and process used in the development of web based medical information system.

Prof. E. Ilamathian in his article has overviewed the career development programme. Prof. Govindarajan in his article has suggested that we should put all our acts together-industries, governments and academics - to reap more benefits from the booming markets of ITES and IT. Prof. Ganesh has presented his observations on impact of socio-cultural factors on entrepreneurship development. These two career related articles will be of interest to our readers.

Shri J.G. Sheshsaayee along with others have contributed the article on user – defined interfaces for academic software. They have come with several important findings which might be useful to the readers.

In this volume we have received one research paper on Job satisfaction among Merchcant Navy, Indian Navy and Indian coastguard personnel contributed by Shri. D. Rajsekhar and Prof. T.J. Kamalanabhan. They observed in their study that the variables of company policy, pay and nature of work made greater contribution, in explaining job satisfaction.

Dr. (Mrs.) S. Renukadevi has come up with her research work on Projective technique based System for Career Exploration in Information Technology. This work is undoubtedly innovative because until now projective techniques have been used only for exploration of personality dimensions and this work has added a new dimension in projective technique.

Dr. R. Ravichandran has undertaken an unique study on analysis of the effectiveness of libraries and library services of polytechnic colleges in Tamil Nadu. Through his research work along with certain other objectives he has attempted to find out the factors which inhibit the effective use of libraries by the students of the polytechnic colleges of Tamil Nadu.

The research in technical and vocational education in India is still in its infancy and therefore all these studies bear lots of significance specially in paving the way for further research.

We acknowledge the contribution of the authors to the present volume. We welcome papers and research articles for our future issues. We thank Dr. S. Renukadevi for shouldering the responsibility of editing of the Journal.

– Editor

JOURNAL OF TECHNICAL AND VOCATIONAL EDUCATION

Page No.

CONTENTS

EDITORIAL

Designing and Implementing Advanced Engineering Education System for The Twenty First Century

THOGULUVA RAGHAVAN VIJAYARAM

ABSTRACT

The aim of this article is to articulate the role of engineering education in the early part of the 21st century and to establish design specifications that will enable the engineering institutions to be a leader and creating entrepreneurs in shaping the future of engineering education. We have an obligation to address the full range of higher education, namely teaching and learning, research, and service to the society by the research educational institute. We recognize that these elements must be totally integrated if we are to be effective in the pursuit of our vision and mission. The key message from these sources is that engineering education must evolve to keep pace with mighty changes occurring today in engineering business, industry, and technical society. This paper discusses on the efficient designing and implementing of an advanced engineering education system and also highlights about the advantages, benefits of the engineering education and research.

Key words: entrepreneurs, seasoned professionals, holistic engineering education and leadership core values

Introduction

Engineering Design leads to the manifestation of human intention and created interest in their minds to produce intricate components by new technologies. We live at a time when man believes himself fabulously capable of creation, but he does not know what to create. To the engineer, fundamental ideas and concepts of design and creation are intimately connected, perhaps to the point where we sometimes use the words interchangeably [1]. Indeed, in today's society the engineer is the focal point of the monumental level of human activity dealing with creation of wealth, improvement of the human condition through application of science via technology, and stewardship of the world's Resources. Engineering education must evolve to keep pace with mighty changes occurring today in business, industry and society. The following points are derived and form the crux of this evolution [2]. Engineers must examine curricular content and professional experiences. Engineering education must be designed to accommodate current trends and future needs. Engineering education must create stronger partnerships with the global society of universities, technical colleges and also with professional and scientific bodies.

Emphasis of advanced engineering education

Engineering and technology plays a dominant role in manufacturing or processing associated with the production of industrial based products. It is obvious that engineering

experts and technologists are major contributors for designing & construction of the equipments required for the manufacturing sectors. Any country's economy is based on the ability to use current technologies, on its ability to create new, innovative technologies and applied sciences. Use of current technologies and creation of new technologies are at the heart of the engineering profession. Designing our educational program toward these ends will have a tremendous impact on the viability of practice and society characterizes increasing rates of change and increasing complexity. The most successful commercial technologies have changed in one basic way over the past quarter century and they have become more complex. Nearly, most percentage of the world's top exports was simple products that could be designed and manufactured through relatively simple processes or methods. However, significant percentage of the top exports required complex design and manufacturing methods. It is these top exports that generate the most wealth for a country by gaining more revenues. The author's opinion is that the most successful enterprises in the future will be those that are successful in innovating complex technologies, creating complex products from conception, to design, to implementation. Once again, technology education must be familiar with the "business" of innovation. The important points outlined above apply more broadly than just to the engineering profession [3]. Consequently, another major element in our design of engineering education is teamwork and partnership. Science can be effective in the national welfare only as a member of a team. The team we now envision is a partnership of scientists, engineers, business people, and society's for new technology development. The information for engineering education

becomes: Be flexible in the face of rapid changes in society, science and technology. Encourage creative problem solving and facilitate the ability to integrate complex systems and technology. Seek partnerships with a variety of engineering and science disciplines, with business, with leaders in education, with government, and the greater community. Engineers must not only be the people who know how to do things right, but also those who know the right things to do.

Advantages of engineering education

Engineering institutions must determine its uniqueness in order to be an effective agent of change in engineering education. Our mission is defined as three-part: education, research, and service. Furthermore, the land grant deemed university tradition is one of inclusion and openness, both in the students we educate and the society we serve. This tradition embodies many of the characteristics of the engineering profession and is a tremendous source of strength for our efforts. Our faculty of engineering is committed to the fundamentals. This commitment is demonstrated by their outstanding concern for the intellectual and personal well being of our students [4]. Because we are a large and comprehensive college of engineering, we have a demonstrable impact on the technology and economic well being of the state and nation. Our programs range from basic professional degree education to advanced study leading to a Masters degree and future there is a proposal to include research programmes like Doctorate. One notable competitive advantage is the high-quality student population attracted to our institution. Because of our land grant university tradition, we can offer these students a comprehensive educational experience. And the industry and government agencies that hire our students receive the very best quality graduates. Our

2

contacts with industry, the large participation of students in professional organizations, are testimony to the breadth of our institution. The knowledge gained through research and service is then brought into the classroom where students of the college benefit as these experiences are incorporated into their courses. We must build on these competitive advantages as we design. Namely, we must hold to the land grant university three-part mission of education, research, and service [5]. We must look for more partners and partnerships, recognizing that local, state, regional, and national boundaries that for so long constrained our thinking are rapidly disappearing and we must be ready to continually redesign engineering education.

Design aspects of engineering education

Our design of engineering education for the future will be based on these fundamental requirements. They are Practice-oriented while firmly rooted in fundamentals. Learning-based and Integrative and holistic engineering education at engineering colleges will be Practice oriented while firmly rooted in fundamentals and Learning based and Integrative and holistic. It is the practical training that allows the engineer to "doctor" to the technical needs of society. Traditionally, we have left a good portion of the practical training of our profession to industry. Industry has taken our raw engineering graduates and given them the necessary training to accomplish the assigned job, and over time the engineer has become a "seasoned professional". The nature of the engineering profession revolves around the practice of engineering and is firmly rooted in fundamentals. To the engineer falls the job of clothing the bare bones of science with life, comfort and hope [5]. Engineering is a practical profession. Similarly, the engineer's education is firmly rooted in science,

engineering science and design, and the very necessary social sciences and humanities that define global competition is driving organizations to streamline their operations and education is a process not easily implemented in today's business. Second, education is the main business of the university, but it is not the main business of a highly competitive, for profit, technology-oriented enterprise. It is important to note that it is not the university alone that must shoulder the responsibility of the practical training of its graduates and the practical experience of its faculty. Industry must shift from being a customer only to being a partner in this practical education of the engineer. It is critically important for us to design an engineering education that is centered on the learner for at least two reasons. First, it is now impossible to teach in four or even five years all the information and skills required of engineers; and second, education based on the learner rather than the teacher is far more effective. The tremendous increase in the complexity of technologies and the enormously rapid increase in the knowledge base that supports technology guarantee that we cannot teach in our curricula all the facts required by the engineering graduate. Our goal in a learning-oriented education is to engender students with the ability to learn and grow as professionals. Instead of "covering all the required information" (an impossible task in today's world), let us focus on giving students the ability to learn what is needed independent of us. Traditionally, engineering education has been teaching-based. In the teaching-based mode, the instructor is all that really matters and the student takes a passive role. An extreme, negative aspect of the teaching-based philosophy of education shows up when the process acts as a filter of students rather than an educator of students. Ample evidence

exists that this form of education is at best inefficient and at worst ineffective. Many pieces of the engineering curricula are better learned than taught. In the learning approach, the instructor becomes more of a guide and the learner (the student) becomes the center of attention. Finally, our design of engineering education for the 21st century must emphasize the integrating or synthesizing nature of engineering. And, our design of engineering education must recognize the holistic nature of the synthesis [3, 4]. The essence of engineering is the process of integrating all knowledge to some purpose. A careful analysis of this requirement indicates that research and outreach are inextricably linked with the more formal aspects of education. Artificial barriers erected between the three parts of the great land grant university mission must and will disappear in the implementation of design of engineering education. Our educational programs must be viewed as continuing beyond the classroom or even the degree. These are but the starting point of life-long engineering learning.

Specifications for engineering education programs based on design considerations

Details of the curricula of each program will be the responsibility of the respective faculty. Engineering programs must demonstrate that their graduates should have the abilities to apply knowledge of mathematics, science, and engineering, potential to design and conduct experiments, as well as to analyze and interpret data, capabilities to design a system, component or process to meet desired needs primarily. They should also have abilities to function on multi-disciplinary teams, ability to identify, formulate, and solve engineering problems and also have a clear understanding of professional and ethical responsibility. They should able to communicate effectively. The broad education is necessary to understand the impact of engineering solutions in a global and societal context [5]. They are as follows: recognition of the need for, and an ability to engage in life-long learning, identifying the knowledge of contemporary issues and abilities to use the techniques, skills and modern engineering tools necessary for engineering practice. A major goal for the engineering institutions is to have graduates who have the above abilities and knowledge and know how to expand their knowledge and abilities.

Design Specifications for Engineering Graduate Education and Research Programs

Design specifications for the research part of our mission must allow agility and flexibility. The engineering institutions must be a participant in this vital activity for a variety of reasons mentioned here [1]. They are as follows: 1) Innovation and discovery are at the heart of engineering 2) in a practice-oriented profession we must include all practical aspects in our education 3) research is an explicit requirement of our land grant university mission and 4) research is a vital component of the education of graduate students, and it enriches the undergraduate program by introducing all students to the full spectrum of engineering activities. Innovation is interactive, non-linear, and concurrent. Its practice includes science, engineering science or fundamentals, technology, as well as social, economic, and political interactions. The pace of innovation is growing at a phenomenal rate and is largely driven by the evolutionary requirements of increasingly complex and Valuable technologies. Because of the increasing complexity of technology, and because of public and private budget constraints, collaborations between

universities, industry, and government laboratories will be strategically more important. Currently, nearly a remarkable percentage of journal articles published by researchers based in industry include a co-author from a university or government laboratory and from non-profit organizations. Universities are the key source of new information resulting in innovation. The time is right for joining collaborative efforts in our research agenda. The engineering institutions will continue to seek partnerships with government and industry that allow us to combine education, outreach, and research.

Design specifications for engineering outreach programs

Design for engineering education institutions in the 21st century will change and expand our working definition of outreach. In our design, outreach will include much more than the very important interactions with small industry and the public. These alliances will require new thinking on our part as well as our partners'. For example, jurisdictional boundaries at the university may become more fluid. Intellectual property agreements with industry must allow both sides to receive value. Reward structures within the college and departments must be reexamined. A critical area for us to focus attention on is use of technology in learning situations both off and on campus.

Engineering institution leadership core values

The administration of engineering institutions holds the following as core values: Higher education at a land grant university requires teaching AND research AND service. Universities are the key source of new information resulting in innovation. Research is the genesis of new knowledge. It keeps our curricula current and relevant [4]. The teaching aspect of our mission produces engineering graduates who create value, solve technical problems, elevate the standard of living, and put into practice the promises of science. Our outreach program provides new knowledge and engineering methods to those away from campus. It establishes vital links among faculty and those who can effectively use the product of their efforts. Because in engineering practice a natural coupling of the three aspects of our mission exists, we will endeavor to create an environment where teaching, research, and service are integrated, mutually supporting, and rewarded. We will forge new partnerships and alliances with major industry, government agencies, community colleges, collaborations with other universities, and also with both private and public laboratories. In addition to that, we will seek partners at the international level, with other globally reputed colleges and universities and other well established-administrative units.

Discussions and conclusions

Based on the research analysis on this problem, some refined operational principles for efficient administration of engineering institutions and thereby sound engineering methods are pointed out. They are as follows: embrace technology as it applies to our business, evaluate progress toward goals using meaningful measurements of out comes, continually improve our methods of operation and function with an understanding of the importance of timely and thoughtful actions. Administrators in the colleges will supply leadership at all levels of engineering education, both inside the university and in the larger context of our professions. It is also concluded that the advanced engineering education system can be designed and implemented only based on the above factors and principles mentioned in this research paper.

References

1. George S Emmerson, "Engineering Education: A social history", New Abbot (eng), David and Charles, New York, Crane, Russak (1973)

2. Ray Palmer and Baker, Engineering Education: Essays for English selected and edited, First Edition, 1979, John Wiley and Sons Inc.

3. Green, G and Kennedy, P. "Redefining engineering education: the reflective practice of product design engineering, International Journal of Engineering Education, Volume: 17, Number: 1, 2001.

4. Badran, A "Globalization and higher engineering education", Global Journal of Engineering Education, Special Issue-1, and Volume Number: 1, 1997

5. Ahmad Ibrahim, Current issues in engineering education quality, Global journal of engineering education, Volume number: 3, 1999

Gender, in Relation to Some Selected Psychoeducational Attributes among the Technical Teachers

RAJARSHI ROY, SAILENDRA NATH MANDAL, NIRMAL KUMAR MANDAL, SUBRATA CHATTOPADHYAY and DIPANKAR BOSE.

ABSTRACT

The paper attempts to explore the level of professional interest, individualism-collectivism trait and the level of self-esteem of the teachers, teaching in the polytechnics of West Bengal, apart from the impact of gender over these attributes. Interrelationship of these psychoeducational attributes has also been explored for the very sample group, which goes against the preconceived notion of close association of the attributes. Gender of the teacher, as the study observed, does not appear as a significant factor over the attributes considered in the study.

1.0 INTRODUCTION

Irrespective of levels and types of education, teachers play a pivotal role in the process of implementation of the policies, formulated to achieve the desired goal in the qualitative improvement of education.

In educational scenario, teachers act as a 'pivot' on which the entire process of education rests on. In fact the quality and psychological makeup of the teacher possess tremendous impact over the process of teaching, which spreads among the 'level of acquisition of knowledge and skill' of the student too.

Effectiveness and performance of the teachers depend upon a sequel of factors and variables, some of which can be grouped under psychoeducational attributes. Teachers' interest towards teaching is one such major psychosocial factor, which possessed a tremendous impact over the entire process of teaching-learning.

2.0 PROFESSIONAL INTEREST

Interest, according to Vernon (1967), is just a complex like an amalgam of subjective feelings and objective behaviour - the tendencies, which vary in intensity and from object to object. It has close relationship with culture and effort. As the important component of psychoeducational attributes, interest is an established set of dispositions, resulting from experience and it determines resulting behaviour. In this sense, interest is a tendency to behaviour, oriented towards creating objects, activities or experience which varies in intensity and generally from individual to individual. Factor analytical studies of interest have shown about fifteen independent dimensions. Some of those dimensions are technology, music, art, politics, economics, etc.

While Vernon (op. cit.) suggests that it is difficult to specify certain fixed number of dimensions of interest, according to Crow and

Crow, interest may be reflected to the motivating force that compels us to attend a person, a thing or any given activity; or it may be the effective experience that has been stimulated by the activity itself. In other words, interest can be the cause of an activity and the result of participation in the activity.

According to the Penguin Dictionary of Psychology, the term "interest" is employed in the following two senses.

➤ The functional interest: It designates a type of feeling, earned by experience, which might be called 'worthwhileness' - and associated with attention to an object or course of action.

➤ The Structural interests: It indicates an element or item in an individual's makeup, either congenital or acquired, because of which individual ends to have his feeling of 'worthwhileness' in connection with certain objects or matters relating to a particular subject or a particular field of knowledge.

Professional interest indicates the feeling of an individual or a group towards the very profession in which (s)he/they is/are absorbed. Studies in western countries reveal close association of professional interest with working condition, respect, status, salary, age, habitation, gender and similar other psychosocial and socioeconomic factors. However, a close look over the dissertation abstracts makes it clear that not even a single study has yet been taken up in India incorporating sample group of teachers serving in technical education system in India.

The present investigation used the term 'professional interest' so as to find out the tendency of technical teachers towards their profession (i.e., teaching) - that is, whether they feel any urge towards their profession - which may be positive or negative.

Until and unless a person is having positive interest towards his/her profession, it is difficult for the individual to do well in profession. Therefore, as in the profession, it is essential for the teachers to enhance the level of interest towards their profession ie., teaching. In the changing socioeconomic fabric, it is often observed that joining the teaching profession, especially for a section of the technocrats, after completion of their course of study becomes a compulsion. In other words, an individual, in some cases, opt for certain profession merely out of some socioeconomic compulsion. In such cases, it is for the individual, who joined in profession primarily due to certain compulsion, to decide whether (s)he will try to enhance his/her professional interest or not.

3.0 INDIVIDUALISM-COLLECTIVISM

Collectivism is defined as a human (and also non-human) propensity, which guides the organism to follow the principle of extending priority over group that of an individual. Individualism is just the reverse principle where the group that priority is dominated by individual priority. However in psychopedagogy, individualism is perceived as a trait, (which in course becomes habit) of being independent and self-reliant. Individualism is also perceived as a brewing factor of egoism.

For the present study individualism-collectivism is considered as a trait-continuum, which is reflected through the persons' positional existence in the trait (measuring) scale.

Technical education system, by virtue of its nature, differs to some extent from rest of the segments of education in terms of its

8

emphasis and affinity towards psychomotor domain. It is not merely the individual-effort, but rather group-effort, which is much more essential, both for the teachers and taught, especially when some group-project is taken up. In most of the cases, group-projects require an integrated group-approach.

Project, in technical education, is defined as a purposeful wholehearted activity completed in cooperation in educational setup. As technical education depends much on imbibing manipulative, drawing and observational skill, therefore team-effort is an important consideration in technical education. It is often quoted that success of technical education hinges on 'learning by doing' principle. In this very spectrum, most of the practical works and laboratory activities need collective effort; and at times, nature of skill needs (and therefore is planned) to be transmitted among the students also demanding collective effort.

It is an age-old axiom that in educational setup, teacher is viewed as a role model for the students. Personal qualities of the teacher often disseminates among the students. As such, the importance of collectivism among the teachers is a truly supportive factor in the process of acquiring skill. If the students are taught by the teachers, having a higher level of collective attribute, students, as it is expected, will also be influenced by the very characteristic of the teacher.

4.0   SELF-ESTEEM

Among various psychoeducational needs, self-esteem is considered as one of the higher order needs of the individual, furthered by self-actualization. The underlining motive of self-esteem is related to the individuals' developed potentiality; in other words, it is that what individual perceives about self. Therefore, self-esteem refers to some group of specific needs, which includes need for prestige, success, self-respect and the like. Even being a psychoeducational attribute, self-esteem poses significant influence over the level of interest in educational situation and is considered as an individual's typical respect and admiration towards self.

Within the technical education spectrum, apart from the two important psychoeducational attributes, viz., professionalism and collectivism of a teacher, the level of self esteem also matters a lot to find the success of the system, as reflected through the outputs of the system. Now-a-days it is often argued that engineers of the day need to have in their possession, the most important skill, i.e., the soft skill, which includes the entire attitudinal domain of the personality, interaction pattern and expression of feelings towards situation - all of which possess a close relationship with the social adjustment and success in the profession.

In this scenario, as it is theoretically explained, the above specified psychoeducational factors viz., professional interest of the technical teachers, their individualism-collectivism attribute and self esteem possess significant impact over the broader gamut of pedagogy. With a view to exploring the real situation, the present study was taken up.

5.0   OBJECTIVE OF THE STUDY

The underlining objectives of the present investigation was to:

5.1   Explore the level of professional interest, collectivism and self-esteem of the lecturers working in technical institutions

5.2   Explore the interrelationship of these three psychoeducational attributes - viz.,

    5.2.1   Correlation between professional interest and collectivism

RAJARSHI ROY, SAILENDRA NATH MANDAL, NIRMAL KUMAR MANDAL, SUBRATA
CHATTOPADHYAY and DIPANKAR BOSE.

5.2.2 Correlation between professional interest and self-esteem

5.2.3 Correlation between collectivism and self-esteem.

5.3 Explore the effect of gender over the psychoeducational factors under study.

6.0 METHODOLOGY OF THE STUDY

Methodology adopted to carry out the project is as follows.

6.1 SAMPLE

The sample for the present investigation incorporates fifty (50) lecturers teaching in three polytechnics of West Bengal, situated in urban, suburban and rural area (one each). Sampling for the present study followed a random technique.

6.2 TOOLS

To explore the psychoeducational attributes of the respondents, three standardized scales, developed by the investigator, were used, which include a professional interest scale for technical teachers, an individualism-collectivism scale and a self-esteem scale.

Professional interest scale used for the study incorporates thirty (30) items, with proportionate positive and negative ratio, placed in a five point Likert's scale, with a scale ranging from 30 to 50 and a scale mid point of 90.

With a view to measuring individuality-collectivity attribute of the respondents, an individualism-collectivism scale was administered. The scale was a seven point Likert's scale, incorporating sixteen items with proportionate positive and negative ratio, placed haphazardly on the scale. Scale range varied from 16 to 112, with a midpoint of 64.

To ascertain the level of self-esteem of the respondents, a self-esteem scale was administered over the respondents. The scale was four point Likert's scale, including ten items, with a scale range 10 to 40 and a midpoint of 25.

6.3 DATA:

Data were collected from the respondents by administering the scales. By nature, collected data were quantitative; and were analyzed through appropriate statistical techniques such as descriptive statistics, correlation and 't' test.

7.0 FINDINGS:

Analysis and interpretation of data for the present investigation reveals that:

7.1 Cent percent of the respondent teachers possess interest towards their profession.

7.2 While grand majority of the respondents (92%) possess collectivist trait, only a very few (8%) exhibit an individualistic trait.

7.3 Majority (84%) of the respondents possess high self-esteem, followed by 6% of the respondents who possess a low level of self-esteem and just only 2% of the respondents stands on the neutral point in the self-esteem scale.

7.4 As apparent from Table 1 as shown below, it may be interpreted that the total group of respondents possess significantly positive interest towards their profession - teaching [114.02 > 90], in terms of the mean professional interest score of the group.

7.5 In terms of the collectivism, the group is more akin to collectivism, as compared to individualism [74.92>64]. In other words, the group possess collective trait.

Table: 1 Basic Data

Attributes	N	Summated score	Scale range	Mid Point	M	σ	Direction	S/NS
Professional Interest	50	5710	30-150	90	114.02	7.69	Positive	S
Individualism-Collectivism	50	3746	16-112	64	74.92	6.45	Collective	S
Self-Esteem	50	1617	10-40	25	32.34	4.16	Positive	S

7.6 Group analysis in relation to the trait self-esteem reveals that on an average, the group possess moderately high level of self-esteem with a mean score 32.34, which is greater than the midpoint (25) of the scale.

7.7 Table 2 reveals that there remains significantly high positive correlation between the two psychoeducational attributes viz., professional interest and collectivism (r = 0.6533749).

7.8 However, there remain highly significant negative correlation between the psycho-educational factors viz., professional interest and self-esteem (r =− 0.5004565).

7.9 Negative correlation exists between the psychoeducational factors viz., professional interest and self-esteem (r =− 0.4136115).

7.10 Analysis of data further reveals that income does not appear as an influential factor over the psycho education attributes considered under study.

Analysis of data as appears from correlation matrix partially goes against the preconceived notion of close association among the three psychoeducational factors considered under the study. Rather, the study advocates a negative relation between professional interest and self esteem. This

indicates that the teachers, possessing higher degree of self-esteem are not interested towards profession to that extent. Therefore, while selecting teachers for technical education system, individuals with comparatively lower or moderate level of self-esteem might be the better choice compared to those who possess higher level of self-esteem. Because a higher level of collectivism is also expected from those teachers, obviously this may contribute a lot for the development of the students' soft skill, which in its turn, will make them more acceptable in the job-market.

Table: 2 Correlation Matrix for the Psychoeducational attributes

Correlation	Professional Interest	Collectivism	Self-Esteem
Professional Interest	1.00	0.6533749	-0.500565
Collectivism	0.6533749	1.00	-0.4136115
Self-esteem	-0.5004565	-0.4136115	1.00

Table 3 reveals that both the gender-groups possess interest towards teaching, but the female group possesses comparatively higher degree of interest towards profession as compared to their male counter-group (114.25 > 113.61). However,

the mean difference between the two groups is not significant at any standard level.

7.11 Therefore, it may be interpreted that gender of the technical teachers doesn't appear to be a significant factor, insofar their level of interest towards profession is concerned

7.12 It is prominent from Table 4 that as like the professional interest, female group is more akin to collectivism than that of the male group. Both the groups exhibit collectivism as the group trait; and their remains no significant difference between the two groups, so far as the very trait is concerned.

7.13 As apparent from Table 5, it is clear that in terms of self-esteem, male group is marginally superior, as compared to that of the female counter group. However, the difference is not significant at any standard level.

7.14 Analysis of data as shown in Tables 3,4 and 5 establishes the face that the gender of the teachers, serving in technical

institutes, does not appear as a distinguishing factor, so far as the psychoeducational traits considered under the study (viz., professional interest, collectivism and self-esteem) are concerned.

8.0 CONCLUSION

Irrespective of having too meager size of sample, the uniqueness of the present investigation remains in its nature of sample. Probably this is the first attempt to explore the psychographic status of teachers engaged in technical institution, especially at diploma level. Therefore the finding of this study will be helpful to initiate further research and in such case, findings of the present study may act as a guide to deduce hypotheses for such future studies which are expected to address the psychoeducational attributes of the teachers in technical education system and thereby will contribute to enhance the effectiveness and efficacy of technical education spectrum as a whole.

Table: 3 Professional Interest (Juxtaposed in relation to gender)

Groups under Comparison	Factor	N	Mean	σ	D	σ_D	df	t	S/NS
Male	Professional interest	18	113.61	7.03	0.64	2.0123911	48	0.3180914	NS
Female		32	114.25	6.46					

Table: 4 Individualism-collectivism (Juxtaposed in relation to gender)

Groups under Comparison	Factor	N	Mean	σ	D	σ_D	df	t	S/NS
Male	Individualism-collectivism	18	74.33	6.29	0.92	1.6604693	48	0.5540602	NS
Female		32	75.25	4.23					

Table: 5 Self-Esteem (Juxtaposed in relation to gender)

Groups under Comparison	Factor	N	Mean	σ	D	σ_D	df	t	S/NS
Male	Self-esteem	18	32.50	2.35	0.25	0.8985042	48	0.2782407	NS
Female		32	32.25	4.02					

References

Aiken, L.R. (1984) Psychological Testing and Assessment (4thed.). Boston: Allyn & Bacon.

Anastasi, A. (1988) Psychological Testing (6thed.). New York: Mecmillan.

Bloom, B.B.(ed). (1956): Taxonomy of Educational Objectives: The classification of educational goals ...(1sted). New York: Longmans.

Garrett, H.E. (2004) Statistics in Psychology and Education, New Delhi: Paragon International Publishers,

Kelly, G. (1951) The Psychology of Personal Contracts. New York: Norton.

Kaul, L. (2003) Methodology of Educational research, New Delhi: Vikas Publishing.

Maslow, A.H. (1968) Towards a Psychology of Being New York: Van Nostrand.

Mc. Dougall, W. (1908) An Introduction to Social Psychology London: Methuen.

Vernon, P.E. (1967): Personality tests and Assessment (rev.ed.). London: Methuen.

Role of Technical Institutions in Integrating Persons with Disabilities (PWDs) into the Main Stream of Technical and Vocational Education

G.B. JAIPRAKASH NARAIN

1.0 INTRODUCTION

The challenge of integrating and including Persons with Disabilities (PWDs) in the economic mainstream has not been met. Despite international standards and the implementation of exemplary training and employment legislation, policies and practices in some countries, persons with disabilities, and especially women, youth and those in rural areas, remain disproportionately undereducated, untrained, unemployed, underemployed, and poor.

According to the definition of United Nations (UN), the PWDs are those who are unable to ensure wholly or partly, the necessities of normal individuals as a result of deficiency in their physical or mental capabilities.

Though the PWDs may be deficient in certain physical or mental functions, yet most of the times he/she may be intelligent and capable of receiving technical and vocational education, which may help him/her to become self-dependent and a useful member of the society. However, providing technical education and training to the persons with disabilities is not a simple task but a great challenge and new avenues and methods will have to be developed to achieve this very difficult task.

The problem is very complex due to the fact that about 95 per cent of the adults with disability are illiterate and 78 per cent of them live in rural areas. Therefore, imparting technical and vocational education particularly to such a large illiterate population is a huge task. Hence it demands that new avenues of providing technical and vocational education and skill development programmes for the disabled should be properly explored to supplement the currently available meager facilities. Accordingly in 50 existing polytechnics of the country, the Ministry of Human Resource Development, Government of India, introduced the scheme of Integrating PWDs into the mainstream of Technical and Vocational Education.

2.0 BARRIERS IN THE EDUCATION AND TRAINING

The noted inter-related barriers in the way of persons with disabilities are: architectural, attitudinal, occupational, legal, personal and educational.

2.1 Architectural Barriers

These barriers refer to such obstacles as kerbs, stairs, toilets and narrow doorways. Basic changes are required in the existing polytechnic buildings for Footway, Ramps, Access, Corridor, Handrails, Doors, Latrines, Lighting and Acoustics.

2.2 Attitudinal Barriers

Historically, attitudes toward persons with disabilities have been shaped by a wide spectrum of beliefs. In developed countries, ignorant or negative attitudes towards PWDs have been changed for better. The change is partly due to legislation forbidding the exclusion of qualified handicapped persons from employment by reason of their handicap; and partly due to strides toward their rehabilitation made by the medical profession. We can overcome attitudinal barriers by sensitizing the community through mass media as well as legislation for rehabilitation of PWDs.

2.3 Occupational Barriers

In developing countries the occupation problems of the PWDs relate to difficulties in obtaining employment, underemployment, seasonal employment, part-time employment and minimum wages with little security and high turnover.

2.4 Legal Barriers

Although legislation has greatly helped the legal position of PWDs with respect to access to buildings, transportation, civil rights, housing and education, many laws in developing countries are symbolic and are not adequately enforced. Also, PWDs are often poorly informed about the legal protection available to them, because of discrimination. For example, public service announcements frequently do not convey specific information about the PWDs and their rights.

2.5 Personal Barriers

Inferior education or training and low incomes pose restrictions for most of the PWDs. Often these restrictions, combined with the disability induce a low self-concept, which further hinders them in their search for satisfying activity. They try to hide disabilities and suffer anxiety in the process, or they withdraw from society. Disabled adults are vulnerable to attacks by unscrupulous elements.

2.6 Educational Barriers

A major educational problem with PWDs rises from the fact that their early education was restricted or interrupted because of their disabilities. These circumstances have limited their ability, to take advantage of opportunities to continue learning.

3.0 EDUCATIONAL MODES AND FACILITIES

The educational modes for the PWDs will contain two channels namely: the **formal and the non-formal**. The formal education shall consist of diploma programmes. The students with disabilities who follow these programmes shall be integrated with the normal students in the regular classrooms of the polytechnics. However, additional facilities such as barrier free environment, note taking and writing assistance, adaptation equipment and extra tutoring etc. may be required in order that the PWDs may undertake these programmes. It is important to develop suitable resource material and educational technology to teach them, wherever necessary.

Only about 5 per cent of the PWDs have facilities for school education and about 95 per cent of the PWDs are mostly illiterate, majority of them being rural based. To make them self-dependent in life, it is, therefore, essential that non-formal skill development training programmes be arranged for such individuals. Non-formal programmes for skill development, particularly for self-employment shall be of great value in this context. However, the programmes to be identified under the non-formal mode should be

need-based with regard to the place to which a particular individual belongs so that after the training he/she is not dislodged from his/her native place and keeps on staying in the company of his/her parents and relations, as far as possible. While taking decisions about the vocations/trades, consideration should also be given for the aptitude and residual potential of an individual and possibility of wage and self-employment. Such programmes should also contain a component of imparting short-term minimum basic education to make them to learn counting, money handling and suitable communication skills etc. Nonformal

programmes, by and large, should be need and competency based and flexible (with respect to time, place, entry-level, etc.). Further, to make the programmes effective, modern educational technologies must be developed and used, including multimedia techniques, which can add special value in training of the PWDs. It is very important to note that for the success of the scheme, greater emphasis will have to be laid on non-formal training programmes as about 95 per cent of the disabled adults can be rehabilitated only through this mode. The flow chart for educational modes is shown in *Figure 1.*
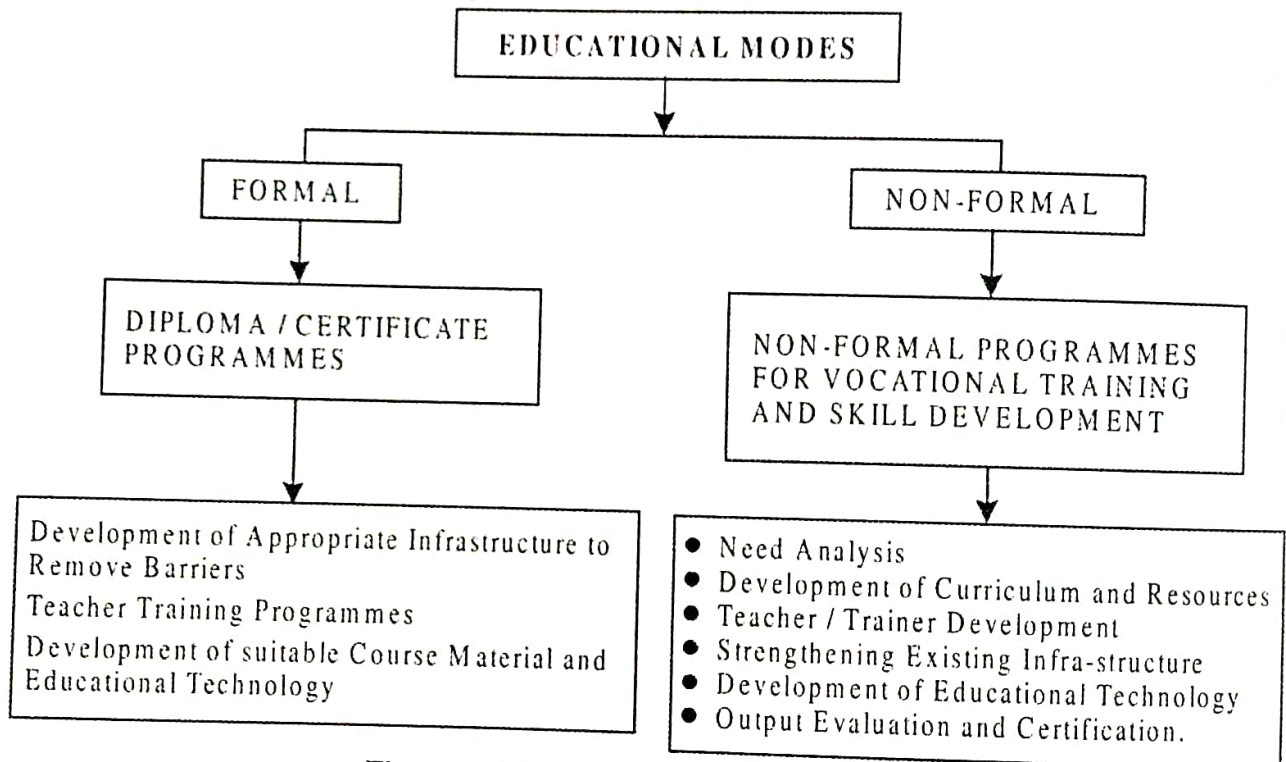
Figure 1: Flow Chart for Educational Modes

4.0 NEED ANALYSIS

Need Analysis is the most important step for systematic design of education and training programme and forms the basis for identification of courses / programmes, selection of content, training methods, media and evaluation techniques, amount and type of resources required.

Need Analysis Survey has to be conducted which will include steps viz. understanding specific objectives, identifying target population, developing necessary tools for collection of data, identifying surveyors,

Training of Surveyors, collecting data, analyzing data and report preparation for implementation.

5.0 IDENTIFICATION OF PROGRAMMES

For identification of viable programmes, it is essential to explore employment potential in the organized and unorganized sectors of economy, keeping in view the nature and extent of disability of persons and their place of residence. For this purpose, polytechnics should constitute an expert group or consultants for determining technical / vocational manpower needs. The procedure to be adopted for this purpose include:

➤ Holding of brainstorming sessions with experts from various sectors of employment market for identifying non-formal courses.

➤ Preparation of list of user organizations for collecting information regarding employment opportunities.

➤ Design of tools for collecting information on employment opportunities for PWDs at different levels, competency / job profile of disabled in functional areas of work and special training requirements for PWDs for effective functioning in the world of work.

6.0 DESIGN OF CURRICULUM

6.1 Formal Programmes

The curriculum for offering diploma courses to persons with disabilities will be the same as those meant for normal students but the instructional materials, delivery system and the media may have to be modified. Infrastructural facilities need to be upgraded to overcome the barriers in the way of persons

with disabilities and to take care of the special needs of persons with disabilities.

6.2 Non-formal training programmes

With a view to improving the employability of persons with disabilities and equipping them with skills for wage and self-employment, short duration non-formal training programmes are to be identified and offered.

The help of resource institutes like the National Institutes of Technical Teachers Training and Research and other resource institutions / organizations may be taken for designing the curricula of such courses. Curriculum design methodology comprises of the following:

➠ Need assessment and analysis phase

➠ Planning, design and development phase

➠ Tryout and review phase

➠ Implementation phase

➠ Evaluation and review phase

➠ Improvement phase

These phases are sequential and interdependent. While taking decision in one phase, requirement and expectation of the other phases should be taken into account.

7.0 INSTRUCTIONAL RESOURCES AND TRAINING

For vocational training / skill devlopment programmes where the PWDs belong to different socio-economic and literacy backgrounds, learning material for the trainee and the trainer have to be prepared in different forms. Multimedia learning packages, video programmes, models and competency based training material are to be used. The

polytechnics should procure already available resources for training of the PWDs.

The trainers have to be knowledgeable and aware of:

➤ Persons with Disability Act; Government efforts and initiatives as well as the constitutional provisions

➤ Areas of disability

➤ Gender sensitivity

➤ Organization of different type of activities

➤ Cooperative process of teaching and learning, individualized instruction

➤ Special communication aspects

➤ Teaching aids, appliances, media, etc.

➤ Parental and community mobilization

➤ Utility and nature of Institutional Environment

➤ Optimal infrastructural facilities for barrier-free environment

➤ Counsellors' and resource persons' requirement.

8.0 PLACEMENT

The Placement Officer of the polytechnic will help the students with disabilities who complete their diploma courses in their placement. For this purpose, Placement Officer of the polytechnic will establish liaison with various employers and help in the placement of these students.

Students undergoing non-formal training programmes are also to be helped for placement, either for wage or self-employment opportunities. As most of trainees after their training will go for self-employment, Placement Officer will help in getting financial support from suitable agencies to start self-employment ventures.

9.0 GUIDANCE AND COUNSELLING

Guidance and counselling play an important role in helping the Students with Disabilities in selection of appropriate courses and in explaining the scope of wage and self-employment opportunities in the chosen vocation depending upon the disability which a person has. Therefore, the guidance and counselling cover all aspects, may it be professional, medical and placement-oriented.

Each polytechnic offering programmes for the Persons with Disabilities will have to engage the services of a trained consultant-cum-counsellor who will advise the students on all the above aspects on a continuous basis. In the case of non-availability of such counsellor(s), a couple of senior faculty members of the polytechnic will have to be trained to provide guidance and counselling services. For this purpose, assistance of resource institutes may be sought.

Post-employment counselling and counselling of employers may also be necessary for providing appropriate employment as well as enhanced retention of persons with disabilities. Special attention needs to be given on individual basis till the time of rehabilitation including wage/ self-employment has been achieved. This will be the sole responsibility of the counsellor specially employed for the persons with disabilities.

For each trade / vocation, the candidates should be provided appropriate guidance and counselling regarding the scope, employment potential, and other needed information. Guidance and counselling team for selection of students and for providing assistance to students on a continuous basis should comprise teachers, local medical practitioners (experts) and psychologists. For this purpose,

18

identification of teacher counsellor should be made keeping in view their personality profiles. On selection, they will have to undergo counsellor's orientation programmes. For this purpose placement cells in the polytechnics implementing the scheme may need strengthening.

10.0 CONCLUSION

The issue of PWD is no more to be considered a medical care issue. It is a social issue. Integration of PWDs into the main stream of social living can be achieved only through the medium of education and training. Education and training of high quality are major instruments to improve the overall socio-economic conditions and to prevent and combat social exclusion and discrimination. Education is recognized as a process through which PWDs can reach their fullest potential. Education is critical for promoting sustainable development and improving the capacity of PWDs to live and lead a relatively hassle free independent life. For generations, society has viewed PWD as people in need of charity. They have been sympathized. There is no more need for sympathy, for sympathy alone will not enable them to live the life of a normal and abled would live. Technical Institutions must strive to immediately remove all types of barriers in order to create a healthy, friendly, caring and involving environment. Priority be given for training of staff to equip them with skills to educate, train and guide PWDs. Education and training are a right for all. Institutions must ensure that this right is accessible by all PWDs. The extent to which it succeeds depends upon the commitment, dedication and whole-hearted involvement of technical institutions.

Multi Function approach for Technical Teachers in the Engineering Education

A.M. SARAVANAN, S. SUNDARAM, VEMURI LAKSHMINARAYANA, and C. KARTHIKEYAN

ABSTRACT

This paper explains the emerging trends in providing quality technical education and the model which constitutes essential components of future quality technical education system. It also highlights the need to consider several influencing functions of education and Virtual reality.

Introduction

In the conventional technical education process, operational skill development is imparted to less qualified people like technicians (ITI certificate programs). Supervisory skills are provided to relatively more qualified people (Diploma level). To get more command and to bring out the innovations in different fields, research activity is being encouraged at graduate and above levels. Due to the evolution of new technologies and development of new industrial zones demand for qualified people was increasing day by day.

Trends in Providing Quality Education

A fast growth in electronics and computer software has generated new trends in technologies such as satellite communication systems, Internet working of computers throughout the world and extending this technology to the business in all fields of activities through Internet. Communication satellites made it possible to extend basic communication throughout the country or region, including the most remote islands and villages. In the Caribbean islands, for instance, the University of West Indies has established a teleconferencing network called 'UWIDITE' to link its campuses in Barbados, Jamaica and Trinidad with extension centers throughout the region. During the 1980s internationally two ambitious initiatives were undertaken to encourage the use of satellite technology for development. The rural satellite program, AID (Agency for International Development) sponsored by the US, was designed to help countries to use satellites to help in solving the problems. Pilot projects were carried out in Indonesia, Peru and West Indies. China developed a project called 'SHARE' as the first step in implementing a national television university, whose goal is to deliver instructions at the work place to the students who are spread through out the country. Video conferencing is playing an important role in making the medical students of developing countries aware about the new trends and diagnostic procedures being practiced in advanced countries without going to the place of actual operation.

Indira Gandhi National Open University (IGNOU) has been striving to impart the

high-end knowledge of various subjects to whole country through television network. This method is really useful for large number of people to understand the application concepts, mechanism and procedures and encourages many people to do further research in that field. At present as part of the global information revolution, VSNL (Videsh Sanchar Nigam Limited) has put India on the information highway map of the world. Internet, the world wide electronic network is being brought to computer terminals in Indian homes and institutions.

Components of Future Quality Technical Education System

Vemuri and AMS model of quality technical education system constitutes components such as Implementing quality procedures, Need-based technical education, Providing advanced technologies, Modeling and Simulation, Development of Interactive models, MOU with Industries and Institution, Computer tower concept, Computer based teaching, Technology transfer, Continuous training programmes, Compulsory training for technical students, Video conferencing facilities.

Implementing quality procedures

Due to globalization, all the sectors of society including technical education has started realizing the need for quality in education and the need for producing more and more scholars in various areas of technology. This can be achieved by implementing accreditation standards prescribed by NBA and other accreditation
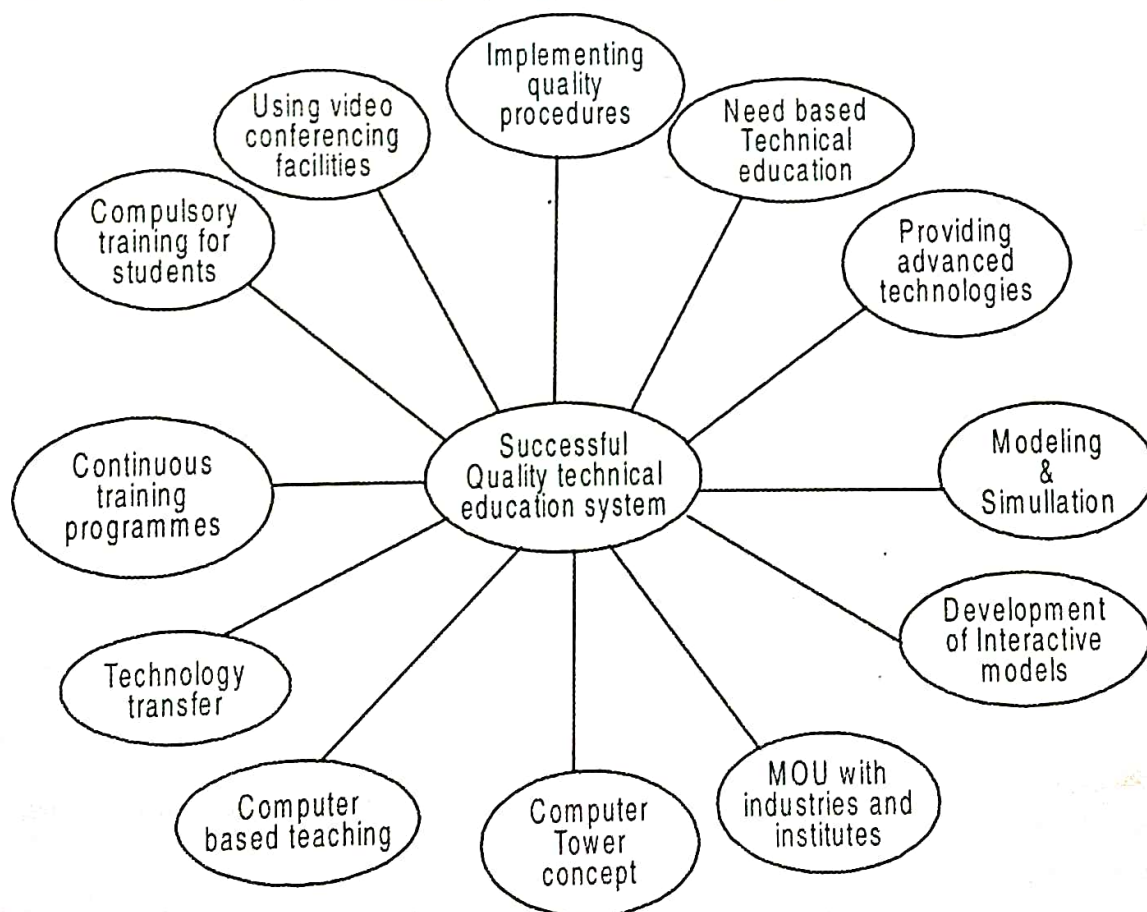

Fig 1. Vemur's and AMS model of quality technical education system

bodies and quality procedures such as following ISO 9002 procedures.

Need Based Technical Education

The difference between theoretical studies and practical skills is increasing and emphasis should be given to bridge this gap by introducing new rational courses such as information technology, e-business and other specialized courses, that have highest demand in the international employment market.

Providing Advanced Technologies

Advanced concepts such as computer aided design, manufacturing, robotics and so on will make the learner more adaptable and acceptable to the high-tech industries.

Simulation

Because of these facilities students will be able to understand the effect of various variables on a modeled system both mathematically and graphically so that the concepts can be clearly understood.

Development of Interactive Models

By developing interactive models user can interact with the software system and get the output for varied set of inputs. That will increase the level of understanding the concepts.

MOU with industries and other institutes

This improves the interaction between industry and institute. Students will be exposed to practical problems of the industry and the practical application of theory that they are studying. Students as well as industry can get benefit out of these MOUs.

Computer Tower Concept

As it is the era of information technology, it is necessary to give computer education to all the students irrespective of

their branch of specialization beyond the university curriculum which are having demand in education and jobs (for example programming in Java, e-commerce, ERP and so on) in the regular curriculum so that they will be motivated to use them.

Computer Based Teaching (CBT)

In all field of teaching, CBT is rapidly gaining popularity because of its non-recurring initial investment and its effective use by many people at a time. Here the services of highly experienced people in any particular field of specialization are used to develop a technical manual on the computer about the subject and the case studies related to the subject are also added. In the coming decade, this technology is likely to dominate the conventional text book system.

Technology transfer

Perhaps this is the shortcut method to obtain the state of the art technology from the developed countries to the under developed and under privileged societies. This is very essential in high tech areas such as defense and space technologies.

Continuous Training Programs

An academician who joins a technical institute should be very cautious in upgrading his knowledge regularly too meet the varying demands of the future. Hence the administration must pay special attention to conduct seminars or workshops on the new trends in the technology, which will help in upgrading the knowledge of the teaching staff.

Compulsory Training for the Engineering Students

As the medical students undergo compulsory hands on training during their house surgery period, all the engineering

students must also be made to undergo compulsory training in a generalized manner.

Video conferencing

This sort of nascent technologies will enhance the knowledge transfer rate from the teacher to the student by virtue of more time available for individuals to get their doubts clarified in the off-the-sight model also.

Concept and Scope of Virtual Reality

Virtual reality is a latest approach, in which various technologies such as electronics, engineering graphics, animation etc, have come to unison so that a large number of people can be trained with a real life like system. For example understanding chemical reaction in nuclear power plant, control of process variables in unsteady state is very dangerous and practically impossible providing a medical student the exposure to a complicated surgery which may not be possible at all and providing training in the manufacture of a complicated turbine blade profile. In all these cases, a three dimensional model can be developed by using computer graphics on computers which supports animation capabilities. That model will be able to develop the real life like simulated situations. In this method the learner can interact with the system in different simulated operating conditions and will have the feeling of personalized practical experience. Now the virtual reality system developed by several companies are providing a special set of electronic gadgets. By wearing these gadgets the nervous system of the user will be stimulated and can be felt that one has really involved in the operation.

The major advantage of these virtual reality systems is that they are much cheaper compared to the original systems and they occupy very less space unlike the original systems and these can be repeatedly used practically with no running cost

CONCLUSIONS

The teachers working in engineering colleges should have multifunction approach to provide quality education to the students. After critical analysis of the present technical educational scenario around the world, the various parameters that can influence the technical education is represented by means of a model. By means of virtual reality, the students throughout the world will be able to access the state of the art technologies and attain perfection in implementing it and also the knowledge base can be developed with lowers cost.

References

Narayana, V.L. and Sankar, V.R. (2001) "Multi – function approach to the management of technical education" Journal of Institution of Engineers (I), Vol.82, May 2001.

Chandrakant, L.S. (1963) "Technical Education in India Today", 1963.

Saravanan, A.M. Anbalagan, K. Kathir Viswalingam, (2004). 'Teaching in Enginering Institutions', Journal of Technical and Vocational Education, Vol.21, Dec. 2004 pp.36-40.

Nagarajan, R. (1997). 'Nature and Scope of Quality in Engineering Education', Indian journal of Tehcnical Education, Vol.20.

Development of Web Based Medical Information System

G. KULANTHAIVEL and G. RAVINDRAN

Abstract

For more than 3 decades, clinicians, health service researchers, and others have been investigating the use of advanced telecommunications and information technologies to improve health care. At the intersection of many of these efforts lies information system – a combination of innovative and mainstream technologies. Web based information system is the use of electronic information and communications technologies to provide and support health care when distance separates the participants. Web based medical information system has a variety of applications in patient care, education, research, administration, and public health

1.0 Introduction

Information system is nothing but a formatted database, which contains almost all the latest information about the system. Similarly online information system is a collective and useful set of information in a database. Now a days, lots of information systems are available in the web and some of the most popular information systems in the web are, Management Information system (MIS), Medical Information System (MIS), Hospital Information System (HIS), Tourist Information System (TIS), Social Information System (SIS) and Geographical Information System (GIS). Web based information has been developed for users to get access to information from their desk. Online Information System is usually implemented using a layered design in which data is stored in the database and accessed by using a web browser, for example Internet explorer, Netscape navigator and other third party web browsers. The Data Base Management System (DBMS) provides a data query language (for example, SQL) to store, modify and extract information from databases. Application software connects to the DBMS via some programming language interface and submits queries as requests for information from the DBMS. The application software then processes the data and sends the computation results to the end-users, typically bundled as HTML with VBScript and ASP. Also Relational Database Management System such as MySQL are used as DBMSs and web scripting languages such as PHP and Java Script are used for developing web application software.

2.0 Elements of Web Based Medical Information System

The main elements to create web based information system are given below:

A. *The storage part:*

Storage Part or Database plays a vital role in developing web based information system that stores and manages confidential

and trustworthy data using database schemas, tables, views and queries.

B. The access control part:

Query interface language controls the release and update of information in the database. A query interface provides means to access the database, but also specifies language level information flow policies on the interface. By using queries, records can be stored, retrieved, modified, restored and deleted.

C. The presentation part:

Web scripting language that executes the queries, manipulate the results and generate web pages for end users. Scripting is an interesting part of web-based development to design and implement in any style. The information flow policies from the query interfaces are enforced in the web scripting language.

3.0 Medical Information System

Medical Information System has a wide range of database for the people those who belong to medical field (e.g: students, doctors, researchers). Medical electronics and computers have now come into use in virtually every aspect of modern medicine. Computers are used widely in medical research, where an important need is for better Medical electronics for data acquisition. In medical practice, data acquisition from patients as well as subsequent storage, retrieval and manipulation of data are enhanced by the computer. In medical decision-making computers improve accuracy, increase cost-efficiency and advance the understanding of the structure of medical knowledge and of the decision-making process itself. Powerful, new non-invasive diagnostic instruments including x-ray, computerized topographic scanners and ultrasonic imaging systems are based on computers. The efficiency and scope of clinical laboratory procedures and advanced analytical instruments are greatly increased by computerization. Careful application of computers has improved the interpretation of diagnostic tests, such as the electrocardiogram and monitoring of critically ill patients. The powerful sensory, computational, memory and display capabilities of computer systems and their compact size offer new opportunities to relieve functional deficiencies associated with loss of limbs, paralysis, speech impediments, deafness and blindness. Finally, in the era of information explosion, the computer's capacity for data storage and retrieval has become a boon. It is therefore, essential that the medical profession becomes 'computer literate'.

4.0 Web Based Medical Information System

The Web Based Medical Information System is receiving the attention now because of increasing availability of Telecommunication infrastructure, problem in retaining doctors as well as the educated and non educated patients in rural areas where they are required most widespread health awareness through media and high cost health care. The Development of Web Based Medical Information System's aim is to provide quality health care services to persons whose access is otherwise restricted by geography or environment. Web Based Medical Information System encompasses the diagnosis, treatment, monitoring, and education of patients and provides convenient, site-independent access to expert advice and patient information. The application of electronics in the area of medicine and health care has become an important phenomenon all over the world.

The major areas that Web Based Medical Information System technology should address for a viable solution are

- ➤ Web Based consultation (Doctor-patient, Specialist- Doctor interaction for patient health care and second opinion)

- ➤ Web Based diagnosis (Facilities of various diagnostic equipment can be extended to remote areas)

- ➤ Web Based education (Distance learning, health awareness programmes and epidemic management)

- ➤ Web Based training (Training of primary health care workers, para medical persons, nurses etc)

- ➤ Web Based monitoring (Monitoring of ICU & other critical patients)

- ➤ Web Based support (Medical equipment support and maintenance).

4.1 Role of Multimedia

As people know the combination of different medias like Audio, Text and Video is called multimedia. To enhance the quality of the information system and for the effective web based information system, multimedia can be used. Now a days, Flash, Director, Dream Weaver became the famous multimedia development package and are used in the development of web based applications. Multimedia gives an effective training to the people through the web.

5.0 Benefits of web-based MIS

- ➤ To promote medical and bio-information system in health care, medical research and education;

- ➤ To disseminate and exchange information through networking, viz. the interaction between functional heads for control and planning;

- ➤ To co-operate and advance knowledge with universities and corporate houses at local, regional, national and international level;

- ➤ To develop medical applications;

- ➤ To attain significant cost control and inventory management as a significant share of the revenue is spent on material supplies;

- ➤ To improve service and administrative efficiency at the patient's point of contact;

- ➤ To utilize resources in the best possible manner;

- ➤ To provide up-to-date and web-based information to the management and control of information dissemination;

- ➤ To improve the handling of healthcare information on which volumes of data being processed; and

- ➤ To provide efficient and instant inter-departmental communication.

6.0 Implementation of the System

The feasibility of Web Based Medical Information System is using the existing Web Based infrastructure suitably modified for medical application. An end-to-end digital connection can be aimed in the following ways.

- ➤ Leased lines from M/s BSNL, 64/128/256/384 Kbps bandwidth.

- ➤ Satcom links for closed user groups (CUG) (SCPC/MCPC) 64 - 384 Kbps.

- ➤ Integrated Services Digital Network (ISDN) service of M/s BSNL (Single ISDN of 128 Kbps or Triple ISDN of 384 Kbps)

- ➤ LAN connectivity (Networking of computers if Online Medical Information System is required within the same hospital) etc.,

The web based system options are so many for web based Medical Information System and the choice mainly ends on
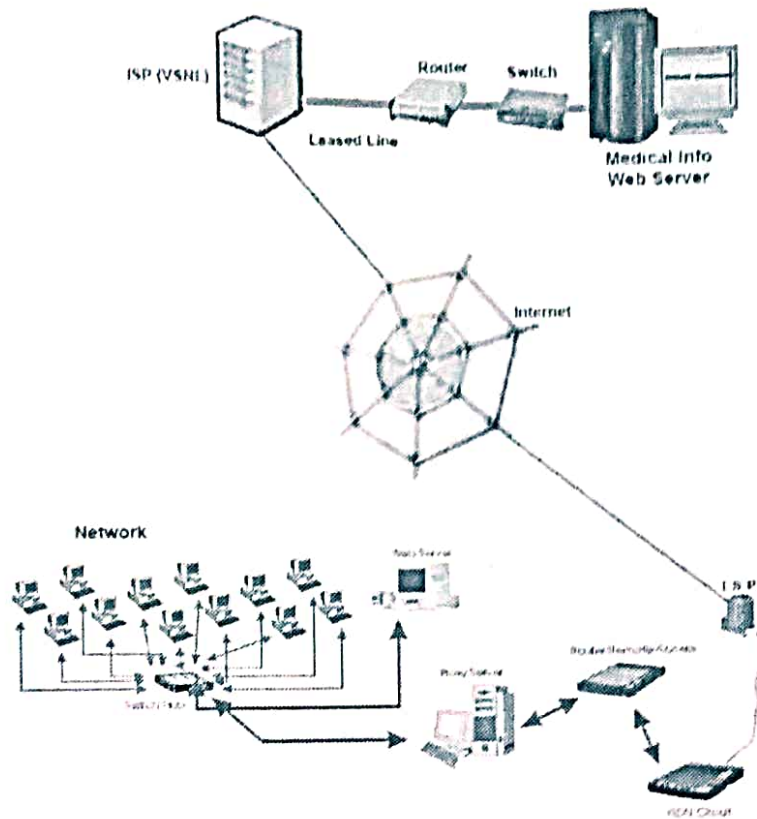
Fig 1. Web server Implementation

program, current and projected needs, finances and availability.

A digital connectivity media option brings out the fact that ISDN lines are most economical and flexible. The biggest advantage is that ISDN lines are switchable and like a dial-up online phone line, call can be established with any other ISDN subscriber. The leased lines are point to point only whereas VSAT is for closed user groups (CUG) and operational costs are very high. The developed web server is connected to 256 Kbps leased line using VSNL/BSNL connectivity which can be accessed through Internet anytime as shown in Figure 1. The services of the medical fraternity can be extended to the rural sector through Online Medical Information System. The advent of "Client Server Technology" has made integration of systems easy in the development Online-Medical Server.

7.0 Development of Web Based Medical Renal Information System

The medical information system to be developed will be having the information of different modules of anatomy. The Renal Information system developed as a first process, will be useful for students, faculty, Doctors, Patients and people who are living in the rural area also.

There is no any separate language for creating web pages and also for writing text. Selecting languages and other tools to develop web pages depend on the requirement and compatibility of the structure of the system.

We have selected the following tools for developing the web based medical information system.

Hyper Text Markup Language (HTML): This is text-oriented language used for writing

programs to create web sites. There is no need for compiling or doing anything else as you would do in any other programming language.

Cascading Style Sheet (CSS): This is used to make the web page interactively such as changing the default color scheme of the scroll bars to our style.

Adobe Photoshop: This is used to create and edit images used in the web pages. It is very easy to create and edit interactive images.

Adobe Image Ready: This is used to create animations like GIF (Graphic Interchange Format) to make the web page attractive. Generally animation is one of the ways to attract user attention and to make clear about certain object in 3D (three dimension) form.

Nero Wave Editor: This is a very easiest tool to edit the sounds and music used in the web pages. Using this we can record the voice and make it as waveform to apply in the web. Many users are attracted by hearing voice instead of reading text.

Microsoft Visual Basic Script (VBS): Scripting Language, like JavaScript and VBScript, are designed as an extension to HTML. The web browser receives scripts along with the rest of the web document. It is the browser's responsibility to parse and process the scripts.

Active Server Pages (ASP): It is a server-side scripting environment used to create dynamic web pages or build powerful web applications. ASP pages are files that contain HTML tags, texts, and script commands. ASP pages can call ActiveX components to perform tasks, such as connecting to a database or performing a business calculation. It is also used to add interactive content to the web pages or build entire web applications that use HTML pages as the interface to the customer.

Microsoft Front Page: This is the user-friendly web page editor and creator. It is used to edit both the HTML code and ASP code. It also used for colouring and linking, internally and externally. Colour assigning by the editor. It has a tab named Preview tab used to execute immediately corresponding to the code typed in the HTML tab.

The Figure 2 shows the web page of developed web based medical information system available in the implemented web server.
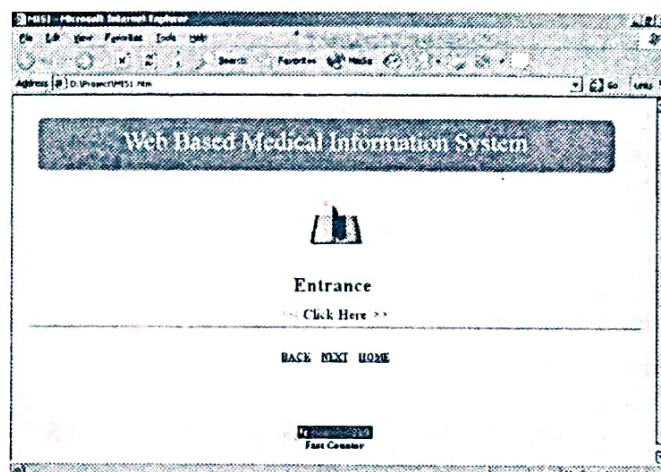
Fig: 2. Screen Shot of Web Based MIS

The developed web based renal information is totally free to access and people get updated with it.

Any remote user can get information from the developed medical information server using internet facilities from their desk.

CONCLUSION

The use of web based medical information system to provide medical and health services at a distance is rapidly becoming very popular. The number of clinical and medical applications performed through web based information system has increased manifold. Technical infrastructure

such as computer hardware and software, and telecommunication systems must be designed in such a way that they meet the required clinical need of the centers. The personnel involved in the development, implementation, maintenance and operation such as doctors, paramedical staff, IT and telecommunication suppliers as well as patients should be very clear in their minds regarding the objectives, benefits, requirements and problems of tele-medicine particularly tele-education.

References

Delamothe-T 1995 BMJ on the Internet [editorial]. BMJ 310(6991): 1343 – 1344. Available online at: http://bmj.com

Epidemiology, the internet and global health: http://www.pitt.edu/~super1/

Humphreys BL, McCutcheon DE 1994 Growth patterns in the National Library of Nedcube's serials collection and in Index Medicus journals, 1996-1985. Bulletin of the Medical Library Association . http://jiscmail.ac.uk

Interactive Surgical Patient: http://cybermed.ucsd.edu/surgery/index.html

IOWA State University. *Advantages and Disadvantages of e-learing.* www.wlwarner.com

Kulanthaivel G "Information Technology and its Impact on Research in Engineering Education", International Journal of Engineering Education 2002, Vol.XV. No.3, pp66-72.

Kulanthaivel G and Ravindran G, "Development of Web based M I S and E-Education" in Meditel 2002, Proceedings of the National Conference on Medical Informatics and Telemedicine, Chennai, Chennai, 2002

Kulanthaivel G, "Establishment of campus intranet with Internet connectivity for e-learning, International Journal of Technical and Vocational Education 2003, Vol.20. No.1, pp67-71.

PubMed: http://www.ncbi.nlm.nh.gov

Virtual Hospital: http://www.vh.org/providers/textbooks/multimediatextbooks.html

WebMDHealth http://my.webmd.com/my_health_record

Worldwide learn: http://www.worldwidelearn.com

Career Development Programme (CDP) - An Over view

E. ILAMATHIAN

The career Development programme (CDP) is one of the tools to describe the career goals, assess career development actions and to choose appropriate career avenues to accomplish the life ambition of the candidates. No doubt, the basic aim of Education is all round harmonious development of an individual in physical, emotional, psychological, spiritual and intellectual aspects. In western countries the CDP is considered as an inevitable sub-system, more particularly at the college final level to mould the candidates to fit into the operatives of employment system. In this changing scenario, neither the curriculum and syllabi of education system nor the need of the candidates are matched to fit into the Indian industrial system. It has created a 'vacuum' in Indian job-market, as a result - 'Brain Drain'. It could be filled in only through CDP.

CDP is a 'hot-button' to influence the urge of an individual who aspires for a challenging career. The CDP aims at identifying the need of an individual, what information he wants to fulfill his life - ambitions, what are his strengths and weaknesses, how to match the need of an individual with the available opportunities, using the strength to cope up with threats or to avoid threats.

Though, career information are available in the web-sites, the overall ways of becoming informed about careers are extensive often, the candidate could not arrive at a career decisions, may be due to the failure of personalised career information to a specific situation, or may also be due to unrealistic aspirations - goals beyond an individuals capabilities.

The CDP is therefore a vital process to provide qualitative and quantitative career information to the students who are in the final year of the study. It is an enabling process to the final year students who are deciding about their careers.

'SIGI-Plus' and 'Discover' are the two top programmes used in the United States. The 'Discover' programme envisages four components, viz,

1. Self - assessment (self information)

2. Identification of occupational alternatives (Strategies for identifying occupations),

3. Reviewing occupational information and

4. Search for educational alternatives (for further studies like, Ph.D or D.Lit., etc)

But the components of the discover may not be suitable to Indian culture. Hence, the other operative system of "SIGI-Plus" followed in United states had been slightly modified to suit the Indian Educational socio-cultural system and termed as "SIGI-Extra".

"SIGI" - It is system of Interactive Guidance and Information - "Extra" is the refinement of the tool to mach the current need of the day in the Indian scenario. The SIGI-Extra conations five Dimensions

Dimension 1	Self-assessment (Values)
Dimension 2	Identification of Occupational alternative (Locate)
Dimension 3	Reviewing Occupational Information (Compare)
Dimension 4	Reviewing Informations on preparation programmes (Planning)
Dimension 5	Making tentative occupational choices (Strategy)

Values, (V), Locate (L), Compare [C], Planning (P) and Strategy (S) are the key factors to decide the career avenues in line with 'Extra' the situational need of the Day.

$$\therefore CDP = V+L+C+P+S+Extra.$$

The self - assessment (Values) of the candidature would help us to match him with a job-area of specialization eg; Finance, Marketing, HR&IR etc. The Trait - factor approaches assume that the candidate abilities and traits could be measured objectively and quantified.

Personality types such as realistic, artistic, investigative, social, enterprising and conventional are inter dependent with job career. For an instance, an artistic person will probably not fit well into a conventional job environment, such as that of Head or Administrator. At times economic, Social and cultural influences account for accepting such career.

Some psychologists who advocated psychodynamic theories opined that the career choices reflect the desire to satisfy needs not met by parents in childhood. The unconscious motivation from the child-hood are primarily responsible for shaping the pattern of life - career.

Candidates who belong to these pattern usually seek career that balance the personal and non-personal aspects of life, eg. teaching.

Development theorists advocate the longitudinal expression of career behaviors and give importance for "self-concept". As we have seen earlier, CDP is based on the self-Assessment (Values), I feel it is pertinent to have a cursory glance over the self concept development stages:

I State: (from birth to 14 years - "Child Stage")

(Sub-Stages)	(i) Fantasy state	(4-10 years)	General orientation
	(ii) Interest state	(11-12 years)	treads career
	(iii) Capacity stage	(13-14 years)	

II State: (ages between 15-24 - "Exploration")

(Sub-stages)	(i) tentative	(15-17 years)	General exposure to
	(ii) transition	(18-21 years)	Job-Market and Specification on CDP
	(iii) trail	(22-24 years)	

III State (ages between 25-44 - "Establishment")

| (Sub-Stages) | (i) Trial | (25-30 years) | Becoming established |
| | (ii) Advancement | (41-44 years) | in a preferred career and advancement to reach the top |

IV State: (45-64 years - "Maintenance")

In this stage the major task would be to preserve the one what has already achieved.

V Stage: (Final - age 65 to Death - "Declining")

| (sub-States | (i) Deceleration | (65-70) | Disengage-ment from the career and settle with some other sources of satisfaction. |
| | (ii) Retirement | (71-death) | |

It may be inferred from the developmental theorists view, CDP is an inevitable exercise required at the II State of your life journey. (Perhaps most of you would fall in this state).

Further, the cognitive and social - learning theorists suggest seven states of development such as;

(i)	exploration stage	(age 14 - 18)
(ii)	crystallisation stage	(age 18 - 21)
(iii)	choice stage	(age 18 - 25)
(iv)	clarification stage	(age 18 - 25)
(v)	induction stage	(age 21 - 20)
(vi)	reformation stage	(age 21 - 30)
(vii)	integration stage	(age 30 - 40)

However, we may observe some overlapping among the stages, but it requires the individual to take a decision. Here, it warrants the (CDP at stage iii and iv) to clarify the career issues with cognitive re-structuring.

The CDP not only explore the internal factors such as your urge - motivations, but also provide strong emphasis upon the external factors. Fig. 1 would give you an idea on the SWOT (Strength, Weakness, Opportunities and Threats) analysis, which is self explanatory.

Internal Factors / External Factors	Internal Strengths (S) Eg., strength in subjects practical orientation CDP (Training)	Internal Weaknesses (W) weaknesses in areas shown in the box of strengths
External Opportunities (O) (Consider risks also) e.g. current and future economic condition political and social technol ogical in employment system	**SO Strategy** (Maxi - Maxi) Potentially the most successful strategy	**WO Strategy:** (mini Maxi) eg., develop-mental strategy to overcome weakness inorder to take ad-vantage of opportunities
External threats (T) e.g. lack of energy, competition and areas similar to those shown in the opportunities box	**ST Strategy** (Mini - Mini) e.g., use of strengths to cope with threats to avoid threats	**WT Strategy** (Mini-Mini) e.g. retrenchment, liquidation of joint venture-Exit policy etc. reduce the job-opportunities.

Fig. 1

SWOT is a situational analysis and a systematic process to enhance the strategic fit between external opportunities and internal strength of the candidates who aspire for positive career growth. The SIGI would enable them to identify the external threats and internal weakness in the light of 'EXTRA' - the current situational need of the Day. The data collected from the candidates by and large will be useful in identification of the capacities and competencies which are available in the educational services of your institution and to relate their strength in terms of external threats, by 'Maxi-Mini' - 'Mini' -'Mini' approaches besides exploring the available, opportunities in the job market.

Career Development in general is an outline of the actions of an individuals' career plan. The outcomes pursued may be based on the needs of an organization and or the individual. At the outset, the organizations are becoming more aware of how the basic beliefs and values of the individual influences the organizational activities. They are over cautions in selecting a right candidate to fit into their requirements. Integrating the organizational needs with the career need of an individual is the ultimate reach of the CDP. The total success of the programme depends upon **Involvement, Interaction commitment and Feed Back**, of the individual.

In an organizational context, the employer prefers a candidate with a right blend of subject knowledge coupled with sociability and good personality.

BOOMING IteS/IT MARKERS
– An Approach to TAP more gains for INDIA

GOVINDARAJAN

1.0 GLOBAL TRENDS

Business intelligence major International Data Corporation (IDC) has predicted that the IT-enabled services market (ITeS) globally will account for revenues of US$ 1.2 trillion by 2006. With growth projected at 11 percent annually, the ITES/BPO segment will be one of the most significant business opportunities for the Indian software and services industry. IT players from few countries (S'pore, Philipines, China & India) have in fact already made great strides in the ITES/BPO market. What began as an activity that was confined to MNCs that set up captive ITES facilities in the country, India today has a large base of third party ITES/BPO companies that are bagging prestigious remote services projects from leading global organizations. The ITES-BPO market remained a high growth segment for the Indian software and services industry during 2002-03&03-04. Despite the adverse global economic conditions, Indian players in this space, logged in high growth rates. Overall this sector grew at over 65 percent revenues from Rs.71 billion in 2001-02 to touch Rs. 117 billion in 2002-03.

In terms of geographies, the following trends are apparent

The US will continue to lead in terms of ITES/BPO spending and it accounts for over 59 percent of total worldwide spend. Europe is the second largest market for ITES/BPO services, accounting for 22 percent of the market (as per IDC estimates). The region however with the maximum ITES/BPO growth is Asia Pacific, which accounts for 15 percent of the global BPO spend The Human Resources activity is expected to represent the highest revenue opportunity for Indian companies going ahead. It will account for a turnover of around US$ 25,555 million in 2006, up from US$ 7,373 million in 2001 (IDC estimates). The other hot growth markets within ITES/BPO & IT are logistics, purchasing, engineering, marketing, sales, FOM, administration, legal, and finance/accounting.

2.0 EMERGING OPPORTUNITIES in INDIA (2003-05)

A number of leading software services companies made a foray into the ITES/BPO domain, either directly, or through the mergers and acquisitions route. Most Indian IT leaders today have a presence in this market A number of new investments (of the order of US$ 800 million) were made in this sector during 2003, Both MNCs and third party providers scaled capacity during the year.

The segments within ITES that showed the maximum growth (over 75 percent) were customer care and administration. The regions that provided the most ITES/BPO business for India were the US and UK markets. Convinced about the benefits (in terms of cost

cutting) BPO brought in, leading global customers scaled their requirements to Indian vendors. A large number of Fortune 100 companies are now exploring ITES/BPO from India. Within the ITES market, some of the new opportunity areas that emerged during 2003 were engineering design, biotech research, research outsourcing, customer analytics, market research, equity research, etc. The ITES/BPO spread across India's key metros and beyond. At least nine Indian cities witnessed high ITES/BPO business penetration, with NCR (the National Capital Region) drawing the largest number of players. Some of the other ITES/BPO hubs included Mumbai, Bangalore, Chennai, Kolkata, Hyderabad, Kochi, Ahmedabad and Pune

Apart from the traditional markets where Indian IT software and services players have a strong presence, it is also important to focus on emerging areas, where the future opportunities lie. The Indian software industry needs to develop a strong strategy for some of these segments and based on current trends, build skill sets that will be relevant for these upcoming markets. According to NASSCOM studies, one of the emerging sectors where Indian IT software and services companies can make a tremendous impact, is the software products segment, which encompasses the embedded software, offshore product development, Research and Development.

Software product development (Part of IT-segment): Software product development is a market that has remained open for the Indian software and services players, until recently. During 2002-03, the Indian packaged software market totaled Rs.1,000 crore, accounting for 0.2 percent of the overall global software products opportunity. Clearly, a massive untapped potential exists for software companies eyeing this segment. Another development that is creating a push for the software products industry among Indian software majors is offshore outsourcing of software development by large global IT companies to Indian shores.

INDIAN IT SECTOR: KNOWLEDGE PROFESSIONALS EMPLOYED

Category	1996-97	1999-00	2000-01	2001-02E	2006-2009
Software Exports Sector		110000	162000	170000	240000
Software Domestic Sector		17000	20000	22000	40000
Software Captive in User Organisations		115000	178114	224250	330000
IT Enabled Services		42000	70000	106000	510000
Total	160000	284000	430114	522250	1120000

INDIA'S NEW IT LABOUR

CATEGORY	2000-01	2001-02	2002-03	2003-04	2004-05
IT Professionals From Degree and Diploma Colleges	74364	90867	99959	110459	115533
Non-IT Professionals From Degree and Diploma Colleges	32025	35612	38423	43261	55877
IT Labour from Non-engineering Fields	26597	31620	34595	38439	42853
New IT Labour	132986	158099	172977	192194	214263
Total Number of Engineering Seats	290088	333094	361076	401791	464743
IT Professionals from Degree and Diploma	26	27	28	28	25
IT Graduates as a Proportion of Engineering Graduates	33	35	35	35	31

In the past two years, more and more software giants, including Microsoft, CA, Oracle and Adobe have set up captive back-end development centers in India with the hope of gaining leverage from the country's low-cost, high quality and high skill sets value proposition. Some of the key trends defining this market during 2002-03, included the following: The global packaged software market touched revenues of US$ 200 billion during 2002 The Indian packaged software industry notched up sales of Rs.1000 crore during 2002-03, with exports accounting for Rs.600 crore of the total revenues. Of this figure, around two percent was contributed by package software product exports. Around 40 percent of the turnover was realized from the domestic market. The large Indian Software players contributed around 63 percent of the total software product revenues for 002-03 The packaged software market in India touched Rs. 1996 crore during 2002-03, with Indian products accounting for around 8.7 percent of the overall market. Within the software products marketplace, the key high-potential segments include embedded software, shrink wrapped software and offshore product development.

Embedded software: Considering the high growth expected from the global embedded software solutions market, Indian companies would do well to tap into this rapidly expanding opportunity. The embedded software solutions market touched US$ 21 billion in 2003 and is estimated to grow at 16 percent over the next year. Telecommunications, computing and data communications applications account for 34 percent of the global embedded software market. Embedded system solutions are being used in verticals such as telecom, data communications, consumer electronics, automotive and avionics segment integration, device driver development, Point of Sales (PoS) terminals, kiosks, Windows-Based Terminals (WBTs) and Smart card-based solutions. A number of

global semiconductor manufacturers including Texas Instruments, ST Microelectronics, Motorola, Intel, Cadence Design, Synopsys, Analog Devices and National Semiconductor have set up design facilities in India to access the country's skilled scientific manpower and its low-cost infrastructure.

Offshore product development: With India emerging as a global hub for offshore outsourcing, a number of internationally-known companies are outsourcing their product development and R&D services. While some companies including Microsoft, IBM, Texas Instruments, Adobe, Novell, SAP, Intel, and Cisco have taken the direct route and set up captive development centers in India, other have collaborated with Indian companies for these projects. The market for outsourced R&D touched US$800 million - US$ 1 billion during 2003 and is estimated to grow to US$ 11 billion by 2008.

Software products markets: Currently, there are a few pure product play companies in India. Most companies active in this market are also offering a gamut of other services including IT services and ITES-BPO solutions. Some of the Indian players making headway in the highly competitive global shrink wrapped software market, with their high-investment and other infrastructures.

3.0 Current Manpower challenges for INDIA

One of the hottest career destinations, the ITES-BPO industry is already creating jobs for thousands of young Indians. The sector, which is rapidly opening up, is expected to employ over 1.2 million Indians by 2008. The ITES-BPO "people's opportunity" will be driven by the following facts:

1. Inflow of investments by large foreign companies such as Reuters, to set up large, captive ITES-BPO facilities across India.

2. Expansion and scaling up by existing ITES-BPO centres of leading companies to cater to requirements of overseas customers. India's top 20 ITES-BPO majors have all announced some form of expansion and are in the process of hiring manpower to fill the additional seats.

3. Entry of Indian IT industry majors into the ITES-BPO domain

While India, with its vast base of English-speaking, Graduate-level people, is geared up in terms of manpower for the ITES-BPO industry, much more needs to be done. With outsourcing/ off shoring of processes becoming the name of the game, a very large pool of skilled professionals are going to be needed to cater to the immense requirements of this sector. The challenges that this industry faces in terms of talent include the following:

1. Paucity of "industry-ready," "industry relevant" manpower, which goes beyond an English speaking workforce

2. Scarcity of professional who are equipped with the necessary "domain" knowledge to cater to specific verticals such as banking, insurance, telecom, retail, manufacturing, etc.

3. Paucity of personnel equipped with foreign language skills such as fluency in French, Spanish, Mandarin, Japanese, Italian, etc.-which offer huge outsourcing potential high rates of attrition.

According to recent NASSCOM estimates, the Indian S/W industry will contribute 7 percent of the, country's GDP by 2009, providing direct employment to more than 2.2 million people and indirect employment to nearly twice that number.

The Indian IT software and services market is expected to grow to US$ 50 billion by 2009, recording a CAGR of 27 percent. However, NASSCOM estimates suggest that the supply of skilled IT manpower may fall short of requirements by 2009, if specific

IT manpower gap (2009)

Number (000s)	
IT services exports	460
Domestic IT services	520
Products and Technology services	140
Total demand (2009)	1,120
Current pool	360
Supply expected based on current trends	525
Total supply (2009)	885
Shortfall	235
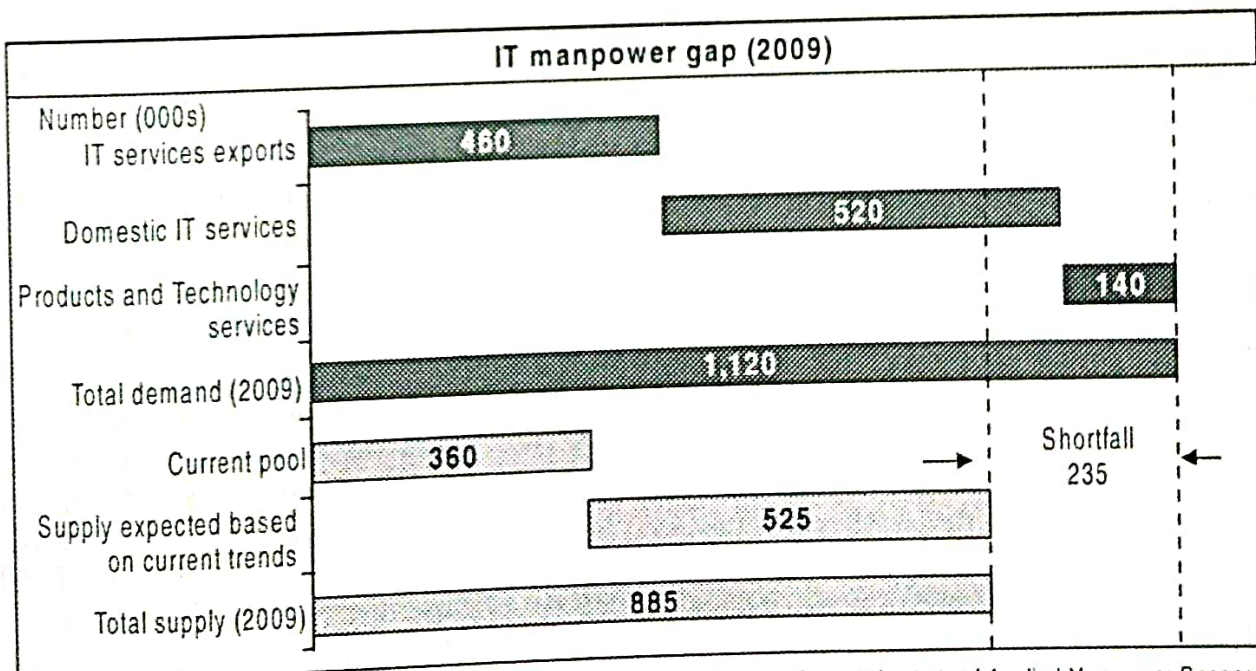
Note: Manpower supply numbers are based on extrapolation of current trends related to growth in educational institutions, attendance rates out-terms and labour participation as well as employment preferences

Source: Institute of Applied Manpower Research.
NSSO NASSCOM KPMG 2003

issues are not addressed and India's HR challenges successfully met.

4.0 RECOMMENDED APPROACH TO GRAB MORE SHARE

The current system of education does not provide some of the necessary skills for ITES/IT, even at the graduate/post-graduate level. Resources produced may have a strong conceptual/theoretical background but often lack communication and vocation-specific skills and the creative drive or specific regulatory certifications required by clients in foreign countries.

This could be addressed through specific modules integrated into the current system of education, right from the primary/secondary education level. For example, a strong focus on Computer literacy could be established at the primary/secondary level, followed by a focus on customer service related skills (team-work, time management) at the higher secondary levels.

Moreover in today scenario, there is a phenomenal growth in number of engineering institutions. One of the states in India (Tamilnadu), which has around 12 colleges 15 years ago, today has over 250 colleges. Most of these colleges offer computer courses in B.E computer science, Information Technology, hardware engineering and post graduate courses including M.S., M.E., M.Tech and M.S.C. (IT) and therefore more than 2,00,000 engineering graduates per year are produced from a single state like TN OR A.P. One of the major reasons for unemployment among the fresh graduates in software industries is huge-gap prevailing in their current curriculum and practical requirement in the software industries. In fact the vice chancellors from number of universities started emphasizing the immediate need to address this HUGE-GAP through proper industry-Alignment-Programs as a part of curriculum.

5.0 EARLY SOLUTION (PATH) FINDERS

A. SPICY SUPER SOLUTION FROM SPICE BOARD

Spice Board, a kochi based government organization has thrown open opportunities for training and placement even for chemistry graduates and vocational students. The tissue lab of Spice Board has designed some programmes for hands-on-training in Spice product, which has led to placements of students in leading companies with the world going increasingly organic and the fixation for strict quality standards by countries such as the US and European union have created a demand for chemical analysts and the opportunities are on the rise as is evident from the increasing workload, says senior scientists of Spice Board.

The quality evaluation lab selects a batch of 25 to 30 chemistry graduates from three colleges in the city every year, who will be initially given two weeks training. Those, who have the aptitude, are directed to any of the departments of chemical, microbiology or residual analysis, where they undergo one month intensive training.

The successful candidates are allowed to assist Spice Board in the laboratory for one year. With the hands-on training, the trainees immediately get placement in reputed companies. The tissue culture laboratory of the board is associating with the self-help group kudumba shree, which has specialized in empowering below poverty line families (BPL) through micro-credit programmes.

The laboratory also conducts courses for training in production of Bio-fungicides-pseudomonas and trichoderma and another for Good Agriculture Practices (GAP) again for

the plus-two or VHS students from the BPL families. For the GAP, it is taking batches of 30 students from southern states as well as from north east and quipping them with communication skills particularly in English and taking them to spices board research stations.

On completion of training, they are well equipped to take up jobs in the industry or to become a farm consultant, points out senior scientist of tissue culture lab. The course at tissue culture laboratory, are the brain child of Spice Board chairman, who said that a Japanese team on a recent visit was impressed by the facilities in the laboratory.]

B. UGC-NASSCOM too shows the Direction

The UGC-NASCOM tie up also underscores the necessity of having well-trained faculty to help the country move towards becoming a knowledge hub. The collaboration focuses on faculty development and training in the are of information technology by way of paid sabbaticals into the industry. The project aims at upgrading the skills and knowledge base of the existing technical faculty in middle ranking universities and colleges in partnership with the IT industry. The UGC is initially rolling out with a pilot project targeting a break through in ITES/IT sectors.

6.0 CONCLUSION

At one end, the number of unemployed graduates are increasing exponentially as more and more college churn out graduates every year and at the other end, our Nation is unable to grab more pie from the available opportunities, due to paucity of right manpower. To bridge this GAP, all of us (professionals from industry and academy) should think and devise right strategies immediately. UGC-Nasscom, Spice Board & few others are already showing us the clear path indicating our immediate Action Items (i.e On-Job Training at industries as referred above). If required this training may be extended by a year (in similar line with the One-year House-Surgeon practice applicable to M.B.B.S, Medical profession), as ITES requires not only the tech-know-how, but also the core-Domain knowledge of different industrial sectors.

It is right time, we should put all our acts together (both the industries, government and academics) to reap more benefits from the BOOMING markers of ITES/IT!

Reference

Dr.APJ ABDUL KALAM - Vision India 2020

NASSCOM Reports and Data projections.

IT/ITES'S Forecast Requirement from US/Europe.

Report Items on UGC-NASSCOM Tie-up from THE HINDU on 11th April 2005. and INDIAN EXPRESS on 'Spice Board' article dated 11th May 2005.

Impact of Socio-Cultural Factors on Entrepreneurship Development

N. GANESH

ABSTRACT

Socio-cultural factors drive social behaviour of an individual and thus contribute to the thinking patterns, which determine entrepreneurial activity. The factors not only have a direct impact on the attitudes, values, practices, patterns and behaviour of an entrepreneur but also have indirect influence through their impact on socio-political as well as economic systems, legal structure, public administration and so on. To what extent, then, socio-cultural factors determine the entrepreneurial activity in a given environment? To what extent training and other methods can be used to overcome the limitations of cultural weaknesses? What parameters influence entrepreneurship within a given culture? These are some of the important questions that need to be understood while discussing entrepreneurship development.

Introduction

Cultural factors that inhibit change can be found both at individual level and at societal level. Entrepreneurship development is thus not universal or uniform across cultures. In fact, *" Culture is more often a source of conflict than of synergy. Cultural differences are a nuisance at best and often a disaster"*, according to Prof. Geert Hofstede, Emeritus Professor, Maastricht University, who is an authority on the subject of cultural variations across societies.

Many researchers have studied patterns of cultural systems and some findings have come to light.

The Paradigm of Entrepreneurship

Entrepreneurship, in its broader sense, is the act of creating value by seizing opportunity through risk taking and mobilisation of human, social, financial and physical capital.

Hofstede investigated workers of IBM in over 70 different countries for a period of time and came to some important conclusions. He found highly significant differences in the behaviour and attitudes of employees and managers from different countries that worked for this multinational corporation. He also found that these differences did not change over time. His comparison between the different cultures is plotted across five dimensions, largely independent of each other

The Five Dimensions

1. **POWER DISTANCE:** the distance between individuals at different levels of a hierarchy or the degree of inequality among people, which the population of a country considers as normal. The Power Distance Index (PDI) focuses on the degree of equality, or inequality, between people in a society. A High PDI indicates that inequalities of power

and wealth have been allowed to grow within the society. These societies are more likely to follow a caste system that does not allow significant upward mobility of its citizens. On the other hand, a Low PDI indicates the society de-emphasizes the differences between citizen's power and wealth. In these societies equality and opportunity for everyone is stressed.

2. **UNCERTAINTY AVOIDANCE:** more or less need to avoid uncertainty about the future or the degree to which people in a country prefer structured to unstructured situations. Uncertainty Avoidance Index (UAI) focuses on the level of tolerance for uncertainty and ambiguity within the society - i.e. unstructured situations. A High UAI ranking indicates the country has a low tolerance for uncertainty and ambiguity. This creates a rule-oriented society that institutes laws, rules, regulations, and controls in order to reduce the amount of uncertainty. A Low UAI ranking indicates the country has less concern about ambiguity and uncertainty and has more tolerance for a variety of opinions. This is reflected in a society that is less rule-oriented, more readily accepts change, and takes more and greater risks.

3. **INDIVIDUALISM   versus COLLECTIVISM:** the relations between the individual and his/her fellows; that is, the extent to which people feel they are supposed to take care for, or to be cared for by themselves, their families or organizations they belong to. Individualism (IDV) focuses on the degree the society reinforces individual or collective achievement and interpersonal relationships. A High IDV indicates that individuality and individual rights are paramount within the society. Individuals in these societies may tend to form a larger number of looser relationships. A Low IDV

typifies societies of a more collectivist nature with close ties between individuals. These cultures reinforce extended families and collectives where everyone takes responsibility for fellow members of their group.

4. **MASCULINITY   versus FEMININITY:** the division of roles and values in society; the extent to which a culture is conducive to dominance, assertiveness and acquisition of things versus a culture, which is more conducive to people, feelings and the quality of life. Masculinity (MAS) focuses on the degree the society reinforces, or does not reinforce, the traditional masculine work role model of male achievement, control, and power. A High MAS indicates the country experiences a high degree of gender differentiation. In these cultures, males dominate a significant portion of the society and power structure, with females being controlled by male domination. A Low MAS indicates the country has a low level of differentiation and discrimination between genders. In these cultures, females are treated equally to males in all aspects of the society.

5. **LONG-TERM   versus SHORT-TERM   ORIENTATION:** Long-term: values oriented towards the future, like saving and persistence. Short-term: values oriented towards the past and present, like respect for tradition and fulfilling social obligations. Long-Term Orientation (LTO) focuses on the degree the society embraces, or does not embrace, long-term devotion to traditional, forward thinking values. High Long-Term Orientation ranking indicates the country prescribes to the values of long-term commitments and respect for tradition. This is thought to support a strong work ethic where long-term rewards are expected as a result of today's hard work. However, business may take longer to develop in this society,

particularly for an "outsider". A Low Long-Term Orientation ranking indicates the country does not reinforce the concept of long-term, traditional orientation. In this culture, change can occur more rapidly as long-term traditions and commitments do not become impediments to change.

Hofstede also indicated that societies, which score high on individualism and low on the power dimension, have a higher economic growth and a greater tendency to innovate. High individualism combined with the low power distance and weak uncertainty avoidance would encourage pro-innovative culture and entrepreneurship.

As cultures become less individualistic and more collectivist, people are more likely to identify with the group to which they belong, diminishing the degree of control that they feel over their environments, but not necessarily diminishing their entrepreneurial propensity. In high individualism cultures, having autonomy is more important, individual decisions are considered superior, and individual initiative is socially encouraged. In collectivistic cultures, security is rated as more important, group decisions are considered better than individual ones, and individual initiative is discouraged.

Universality of Entrepreneurship

There are persuasive arguments for a universal as well as a contingency approach to defining entrepreneurship. On one hand, the task of entrepreneurship seems to pose similar challenges across different contexts. To form new ventures, entrepreneurs require foresight and energy, passion and perseverance, initiative and drive. Indeed there is some research that suggests that entrepreneurs across various cultures are more similar than their non-entrepreneurial counterparts across various national and cultural boundaries. For example,

Baum et al. found that differences between Israeli entrepreneurs and non-entrepreneurs in their attitudes toward achievement, affiliation, autonomy, and dominance were greater than between Israeli and American entrepreneurs. Similarly, McGrath, et al. found support for their hypothesis that entrepreneurs, regardless of nationality or cultural background, share a predictable set of values when compared with individuals who have followed a non-entrepreneurial trajectory.

Despite the seemingly universal distinctiveness of entrepreneurs in comparison to non-entrepreneurs, it is reasonable to expect an association between culture and level of entrepreneurial activity. Weber argued that at the society level, differences in entrepreneurial activity can be explained by cultural and religious factors, specifically a society's acceptance of the Protestant work ethic. Building on this idea, McClelland theorized that socialization factors such as parental influences determine the need for achievement, which in turn generates an entrepreneurial propensity or predisposition within a society. Culture is a powerful force in shaping personality and behavior patterns within a group or society, and to assume that entrepreneurs and the defining characteristics of their behavior are universal would be unwarranted. For example, unlike their American counterparts who are characterized with a rugged individualism, there is growing evidence that Asian entrepreneurs rely on familial ties in developing their business. Therefore, the use of individualism to distinguish entrepreneurs in an Asian context may not be appropriate.

Therefore we may conclude that the factors that determine entrepreneurship do vary with environments and hence entrepreneurial spirit is thus not uniform

across societies. Hofstede lists a comparative list of factors for various countries. Table below shows some of the implications of the Hofstede factors:

Hofstede Dimensions

Long-term Orientation		Individualism		Power Distance		Uncertainty Avoidance		Masculinity		
High	Low	High	Low	High	Low	High	Low	High	Low	
		*			*					-Higher Economic Growth -Greater Innovation
		*			*	*				-Pro-innovative culture -Entrepreneurship
		*								-Autonomy
*										-Respect for tradition
										-Slow to develop
				*						-Social imbalance
										-Law of might
						*				-Strict Rule Orientation
							*			-Rule is not important
								*		-Women subjugation
									*	-Empowerment of women
	*	*		*			*		*	Ideal Entrepreneurship Development
*			*		*	*		*		Poor entrepreneurship

Requirements of Entrepreneurship Development

Despite the complexity of socio-cultural factors across cultures, there is an accepted list of conditions that are the basic requirements of successful Entrepreneurship Development in a given environment, which is given below:

(a) recognition of the state of the economic development in the country or region;

(b) a regulatory structure and tax system which is "friendly" to private sector business activity and new venture creation;

(c) access to small business financing mechanisms;

(d) an organization which can collect and report data on new and existing business;

(e) a network of small business support organizations which reaches into a number of communities;

(f) government policies which distinguish between and support both the development of new entrepreneurs and the growth of existing business;

(g) understanding the needs of identified sub-groups within the population of latent entrepreneurs;

(h) a patient and committed government which is willing to wait for measurable results from Entrepreneurship Development activity.

Some of these requirements are naturally culture-bound and the degree to which suitable conditions can be created for entrepreneurship development is dependent on the prevailing socio-cultural environment.

Overcoming Cultural Limitations:

Entrepreneurship development depends not only on economic factors but also on socio-cultural factors. Among socio-cultural factors, education particularly technical education is one of the predominant factors that influence the entrepreneurship development. In general, better education may be expected to yield better results in entrepreneurial performance.

Some cultural values are hard to let go and cannot be modified to an acceptable extent in one generation while education and training and other inputs will help in surmounting the problems of cultural limitations. Some of the tools are given below:

1. Education, especially technical education
2. Training and exposure to other cultures
3. Social participation, in which a mixed group of members from society participate towards a common goal
4. Changing mindsets of people and large groups by information exchange
5. Governmental support in the form of incentives and recognitions, approvals, participation etc
6. Cultural exchange programmes aimed at business promotional strategies

Indian Cultural Ethos:

India has Power Distance (PDI) as the highest Hofstede Dimension for the culture, with a ranking of 77 compared to a world average of 56.5, indicating a high level of inequality of power and wealth within the society. This condition is not necessarily subverted upon the population, but rather accepted by the population as a cultural norm
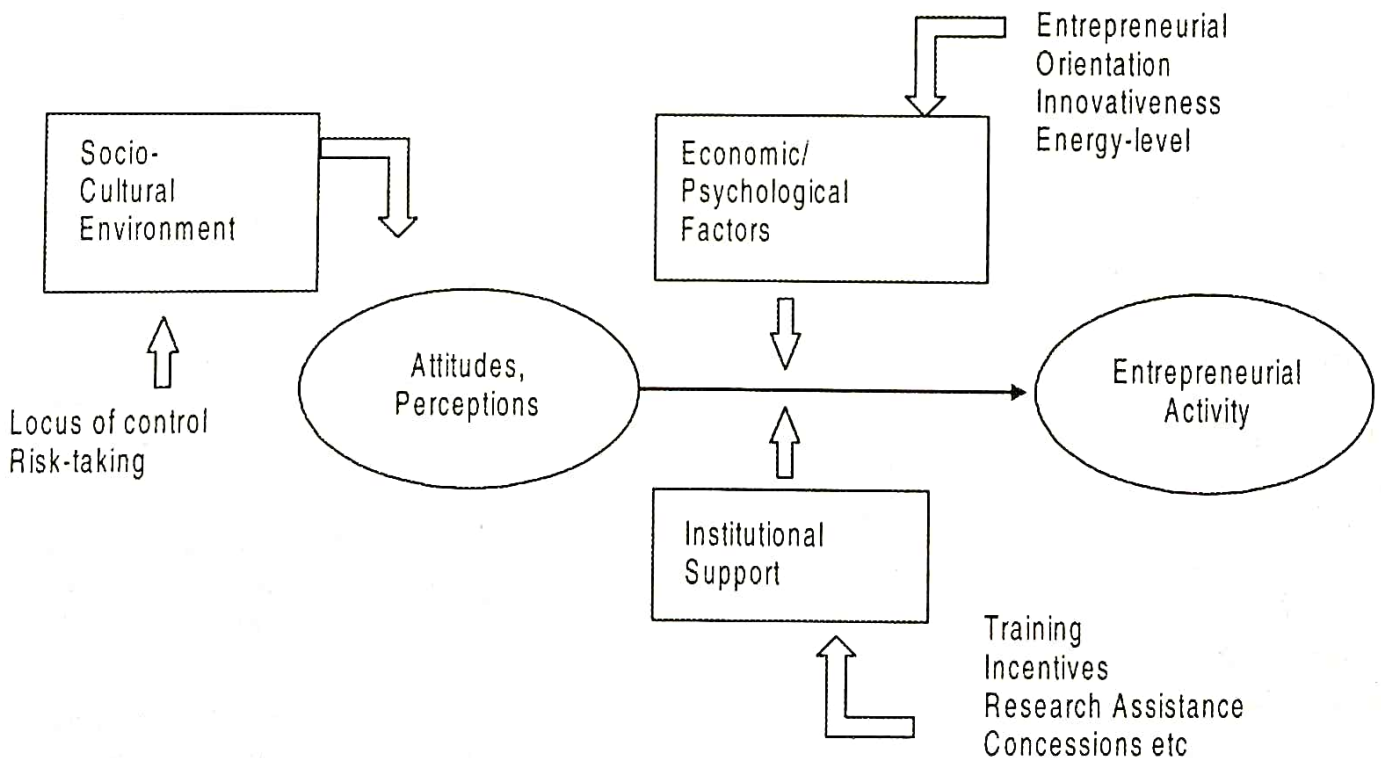

Fig. A model of Entrepreneurship Development

(due to traditional value system). India's Long Term Orientation (LTO) Dimension rank is 61 (world average is 48), indicating a culture that is perseverant and parsimonious. The Masculinity as the third highest-ranking Hofstede Dimension at 56 (world average being 51) implies that there is no significant gap between values of men and women compared to world average. It may also generate a more competitive and assertive female population, although still less than the male population. The Uncertainty Avoidance (UAI) at 40 (world average is 65) indicates that the culture may be more open to unstructured ideas and situations. The population may have fewer rules and regulations with which to attempt control of every unknown and unexpected event or situation, as is the case in high Uncertainty Avoidance countries.

Hofstede opines that the high PDI is an indicator of the Hindu mindset, comparable to Atheists in China and Muslims. The overall implication is that while favourable conditions for an ideal entrepreneurship development scenario exist in India, the traditional mindset, tolerance to social imbalance and long-term thinking are impeding factors that constrain speedy economic development.

Conclusion:

Rules and conventions of a society create cultural symbols for communication, which can mean different things in different environments. While communicational barriers can be overcome across cultures by understanding and training, certain deep-rooted cultural values affecting Entrepreneurship Development exist in every social environment. Many researchers, notably Hofstede, have studied the extent to which they impact on Entrepreneurship Development; however, there is no clear demarcation of factors and their exact impact on Entrepreneurship Development, which makes prediction of behaviour difficult. Conclusive studies across nations in varying business contexts need to be carried out and a dynamic model representing the parameters in some quantifiable terms need to be experimented with.

References:

"Modification of entrepreneurial behaviour by cultural factors in emerging economy", Sanja Pfeifer, was presented at ICSB 48th World Conference - Advancing, Entrepreneurship and Small Business held on 15-18 June 2003 in Belfast

"The Implementation of an Entrepreneurship Development Strategy in Canada: The Case of the Atlantic Region", Organisation for Economic Cooperation and Development in cooperation with Atlantic Canada Opportunities Agency, Paris, 1996

"Are Entrepreneurs The Same Across Cultures?", Anisya S. Thomas And Stephen L. Mueller, Florida International University

"Does Education Matter in Entrepreneurship Development?", V. Murugesan and C. Thangamuthu, EDI

Geert Hofstede's Cultural Dimensions, http://www.geert-hofstede.com/

Efficacy in User-defined Interfaces of Academic Software

J.G. SHESHASAAYEE, T.G. SAMBANTHAN and ANANTHI SHESHASAAYEE

INTRODUCTION

Whenever a demand is to be created for any academic software (s/w), the first consideration should be to ensure that it is appealing to users viz., students and teachers. One aspect of that appeal is usability - the ease with which users can learn and use the s/w. During the s/w development usability goals are set, designs are tested out with end users, and further they are kept redesigning and testing until the expected goals are met.

The two components, Interface design and user experience in developing software, should focus on the user as a core more than the system. This philosophy, termed as the user-centered design, incorporates user concerns and encouragement from the beginning of the design decisions. This holds good for any academic s/w viz., from a simple office automation s/w to a complex design/drawing s/w.

User-defined Interfaces

Interfaces can be defined to be the common edge between the system and the user. The common base on which the edge is applied on the underlying software. Effective interfaces do not concern the user with the inner workings of the system[1]. Effective applications and services perform a maximum of work, while requiring a minimum of information from users. Using a definition of the computer screen as the communication channel between the user and the functional elements of the computer (Furnes & Barfield, 1995; Marchionini, 1991; Waterworth, 1992), human-computer interaction can be termed as a system with three components: a computer/application, an interface, and a human user subsystems[2]. This is very common in academic usage of s/w.

The function of the interface subsystem (which is generally the computer screen) is to assign user input to internal architecture of the application s/w. These internal representations of the application which output that would be comprehensible to the user. Any text-based system uses only the written verbal communication mode, whereas a direct manipulation system allows the user to manipulate objects and use visual, verbal, and auditory representations of the system state. Effective interfaces are visually noticeable and would; induce the users with a sense of control.

It is reported that the current trend in many web applications reflect a lack of understanding of many of these principles of interaction design. The following principles are fundamental to the design and

[1] 'The usability world according to Tog', Larry Leob, 2001
[2] 'Human-computer interface design guidelines', Brown, C.M., 1988

implementation of effective interfaces that can be applied to the traditional Graphical User Interface (GUI) environments or the web based screen designs.

1. Understanding the user's profile

Any design that is appreciated by a technically skilled user might not be good for a non-technical businessman or an artist. One way of approach towards this issue would be to induce user models by creating "profiles" of possible users[3]. The result of this process is a detailed description of one or more "average" users, with specific details such as:

➢ Knowledge on User's goals

➢ Knowledge on User's skills and experience

➢ Knowledge on User's needs

2. Gaining from other's perception

Some of the most valuable insights can be gained by watching other people attempt to use the software or by listening to their opinions about the product. The user opinions can be appended to the existing insights as a developer and then reduce them into an elegant and seamless design which, though it may not satisfy everyone, will satisfy the greatest needs of the greatest number of end user viz., students and teachers.

3. Providing the safety measures

It is quite important to make the new users understand and feel that they are safe in using the software and that the risk rate is low. They do not trust themselves or their skills to do the right thing. the designer should ensure that the lack of skills of novice users should be taken care of and be protected. If the designer overlooks the interest of the novice users, they would tend to lose interest and neglect the programs. The confirmation dialog boxes and undo features are examples of essentiality.

4. Matching between system and the real world

The system should be able to speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. It would be better to follow real-world conventions, making information appear in a natural and logical order. This is termed as the principle of metaphors. Frequently a complex software system can be understood more early if the user interface is depicted in a way that resembles some commonplace system. This is more essential in Indian education systems, where both teachers and students use same language (say Indian English)

5. Providing On-line help when required

There are five basic types of help that users generally ask while using software[4].

➢ Goal-oriented: "Actions that could be performed using this software"

➢ Descriptive: "What purpose this software is used?"

➢ Procedural: "How to perform the task?"

➢ Interpretive: "Reason for a particular action"

➢ Navigational: "Where is the control?"

Based upon the above questions, solutions can be provided as follows:

➢ The pop-up type "about boxes" is one way of addressing the needs of goal-oriented questions.

---

[3]'Ask Tog: First Principles of Interaction design'. Bruce Tognazinni,
[4]'The Art of Human Computer Interface Design', Brenda Laurel, 1991

➤ Descriptive Questions can be answered with a standard "help browser", "tool tips" or other kinds of context-sensitive help.

➤ A help browser can also be useful in responding to procedural questions or can be handled more efficiently by using "cue cards", interactive "guides", or "wizards" which guide the user through the process step-by-step.

➤ The interpretive questions are program oriented and are more towards current applications, but can be helped with well-written error messages

➤ Navigational questions which can be answered by proper overall interface design, or by creating an application "roadmap".

None of the solutions listed above are final or ideal but are the ones which are in common use by many applications today.

6. Allowing explicit exposures

According to Myers-Briggs classifications such as "Intuitive" and "Sensible" are the two types of personalities who can be equally intelligent, but focus on different aspects of life. "Intuitive" prefer user interfaces that utilize the power of abstract models like command lines, scripts, plug-ins, macros, etc. "Sensible" prefer user interfaces that utilize their perceptual abilities. These types of personalities are attracted towards interfaces where the features are "up front" and "in their face". Toolbars and dialog boxes are examples of interfaces to this personality type.

7. Understanding the System State Visualization

Every change in the behavior of the program should be accompanied by a corresponding change in the appearance of the interface. Similarly, when there is a change in the appearance of a software program, it should be in reaction with a behavior change. A program that constantly changes its appearance for invalid reasons will quickly teach the user not to depend on appearances for clues as to the program's state.

8. Providing various short-cut techniques

Pre-memorized "shortcuts" can be provided to allow rapid access to more powerful functions. There are various levels of shortcuts, each one more abstract than its predecessor. For example, the "Emacs" editor command can be invoked directly by name, menu bar, a modified keystroke combination, or by a single keystroke.

9. Guiding through focus

The human eye is a non-linear device and has motion-detection hardware, which helps the eyes to be drawn to, animated areas of the display more readily than static areas. For instance, the mouse cursor is the most strongly observed object on the screen compared to the text cursor. Most often, global state changes are often signaled by changes to the appearance of the cursor, such as the well-known "hourglass cursor".

10. Introducing grammatical rules

Almost all the operations performed within a user interface require both a subject and a verb. This implies that actions performed in the user interface form a kind of grammar. The grammatical metaphor can be extended, in these cases, and elements of some programs can be identified as adverbs, adjectives, phrase and clauses.

11. Checking for consistency

An interface should be designed to be coherent in addition to be logical, consistent, and easy to use. Internal consistency is required to understand the program's behavior

to make "sense" with respect to other parts of the program. External consistency is required for the program to be consistent with the environment in which it runs. Therefore, consistency with both the operating system and the suite of applications that run within that operating system are both essential.

12. Applying the context

The current document, the current selection and the current dialog box are the major criteria for the user action to take place within a given context. A set of operations that is valid in one context may not be valid in another. The better solution to a good interface would be to avoid mixing these levels. The exact solution chosen depends on the nature of the application and the relationship between the contexts.

The relationship between contexts also plays a vital role. As an example, "Are you sure?" confirmation would be more attractive to the user with "There are unsaved documents, Do you want to save or quit? and would help to keep the user anchored in their current context.

13. Application of Visual Effects

As quoted by the famous writer, William Rotsler: "Never do anything that looks to someone else like a mistake". Any interface is more in demand, when the effect of the visual design is explicitly attractive. Though each program may not be a visual work of art, at least, some basic graphic principles are required. Most users do not tend towards using programs that feel sluggish or slow and hence, temporal dimension is also essential in beautification of the software.

14. User testing methodologies

Specific techniques that can be used to maximize the effectiveness of end-user testing have been outlined and can be summarized[5] in the following steps:

➤ Describe the tasks that can be performed by the software and then introduce the interface.

➤ Design realistic tasks for the end-users, and then recruit experienced end-users as users of the software.

➤ Design the purpose of the testing to the end-user to observe his thoughts.

➤ Respect the thoughts of the end-user and show the applicability of the same in redesigning the product if necessary.

User testing can be done at anytime during the project but is more efficient to build a mock-up or prototype of the application and test that before building the real program. Students and teachers who use s/w for day-to-day work would be very useful for this purpose.

15. Accepting and Implementing Opinions

A single designer's intuition about the positive and negative aspects of an application is insufficient. As program creators are a small subject of the general computing population, more advantageous insights can be gained by watching and listening to the other people attempting to use the software. User Opinion and the insights as a developer can eventually result in a design which, though it may not satisfy everyone, will satisfy the greatest needs of the greatest number of academic people.

---

[5]'Designing and writing online documentations', Horton, W.K., 1990.

Conclusion

A few of the important points for user-interface designers to ponder while designing academic software would be:

➢ Do not completely rely upon the design as foreseen by a single user.

➢ Identify end-users with core competency, which can be expected to perform well within that domain.

➢ As a high proportion of programmers are introverts, compared to the general population, the general academic s/w users may lack social skills, and retreat into the world of logic and programming as an escape. So designing should be done with these users in mind

➢ The best way to avoid misconceptions about academic s/w users is to spend some time with them and understand their perceptions and ideas and implement the same in the software.

References

Bleser, T.W. (1994). Human-computer interface guidelines evaluation. Laurel, MD: Century Computing.

Brown, C.M. (1988). Human-computer interface design guidelines. Norwood, NJ: Ablex.

Dwyer, F. (1978). Strategies for improving visual learning. State College, PA: Learning Services.

Guri-Rozenblit, S. (1988a) Impact of diagrams on recalling sequential elements in expository texts. Reading Psychology. 9,121-139.

Guri-Rozenblit, S. (1988b). The interrelationships between diagrammatic representations and verbal explanations in learning from social science texts. Instructional Science. 17, 219-234.

Jonaseen, D., & Hawk, P. (1984). Using graphic organizers in instruction. Information Design Journal. 4,58-68.

Horton, W.K.(1990). Designing and writing online documentation. New York: John Wiley.

Jonaseen, D., & Hawk, P. (1984). Using graphic organizers in instruction. Information Design Journal. 4,58-68.

King, W.A. (1975). a comparison of three combinations of text and graphics for concept learning. (Report No. NPRDC-TR-76-16). San Diego, CA: Navy Personnel Research and Development Center. (ERIC Document Reproduction Service No. ED 112 936)

Tog On INterface, Bruce Tognazzini, Addison-Wesley, 1991, ISBN 0-201-60842-1

The Art of Human Computer Interface Design, Brenda Laurel, Addison-Wesley, 1991, ISBN 0-201-51797-3

The Psychology of Everyday Things, Don Norman, Harper-Collins 1988, ISBN 0-465-06709-3

The Macintosh Human Interface Guidelines, Apple Computer Staff, Addison-Wesley 1993, ISBN 0-2-1-62216-5

The Amiga User Interface Style Guide, Commodore-Amiga, Addison-Wesley 1991, ISBN 0-2-1-57757-7

Job satisfaction among Merchant Navy, Indian Navy and Indian Coastguard Personnel - A Comparative Study

D. RAJASEKHAR and T.J. KAMALANABHAN

ABSTRACT

This study was conducted to find out job satisfaction among Merchant Navy, Indian Navy and Indian Coastguard personnel. Data was obtained using a structured questionnaire to examine the relative effect of family and career variables on Job satisfaction among Merchant Navy, Indian Navy and Indian Coast Guard personnel. The variables of company policy, pay and the nature of work made greater contribution, in explaining Job satisfaction.

The relationship between man and work has always attracted the attention of psychologists and sociologists. A major part of man's life is spent on work. Work is a social reality and social expectation to which men seem to confirm. As a matter of fact, by working in a job, most men gratify many of their needs. Work in this regard, is a source of need gratification of all types such as physical, security, social and ego needs.

Job satisfaction is derived from being engaged in work, which is essentially related to human needs and their fulfillment. It is generated by the individual's perception of how well his job satisfies his needs. However, job satisfaction cannot be confused with employee's attitude to specific job factors or with industrial morale. The behavior of an individual within the organization is a result of interaction between the situation and personality. In other words, both individual and environment related factors contribute significantly to determine the attitude of the workers. Shipboard life contains a number of elements of particular interest to the research psychologists. these include isolation from friends, and family, intermittent danger, boredom, forced contact with others and the inescapability of the environment. In each of these settings there is a possibility of catastrophic results from human failure and a high potential payoff for selecting individuals and organizing the environment to maximize performance and participant satisfaction. It is, of course, axiomatic that an unhappy crew member is unlikely to deliver outstanding performance and may adversely affect the performance and adjustment of co-workers.

The sample for this study was drawn from Merchant Navy, Indian Navy and Indian Coast guard personnel. The variables under study were pay, company policy, working conditions, promotion growth, nature of work and other work related attributes. The questionnaire was developed using the inputs from dimensions of job satisfaction, human resource policy and behavioral aspects. The motivational scale developed by Helmreich & Spence (1978) was used. The questionnaire was pre tested with a sample of 30. Factor analysis was done on all items to determine

the underlying dimensions. Based on the factor loadings, the variables were subsequently identified and Cronbach's alpha values for each of these factors were estimated. The alpha values for the factors varied from 0.68 to 0.91. Face validity was established by verifying with experts. For the final study a total 297 usable responses were received from officers / sailors serving onboard.

The results showed that the sample consisted of middle-aged personnel (average 36) with the youngest group being junior artificers and the oldest, captains / chief engineers with considerable experience. As a whole the sample is an educated group with the average attainment being under graduation and the majority are married.

Mean values for job satisfaction measures are shown in Table-1

Although they are frequently significant, the differences between various job classifications are not large. However, the differences that do occur appear to be theoretically meaningful. Captains/Masters/ Executive Officers / Chief engineers generally show the most favorable constellations of attributes. Hack man and Oldham (1976) proposed that job attitudes and behavior are affected by five core objective job characteristics. Employees who are more satisfied with their jobs and who are absent less often perceive their jobs as being higher on the characteristics delineated by Hack man and Oldham (1976). This study tested job Characteristics theory using data from three

sources: 1. Incumbents provided questionnaire data about their jobs and their reactions to their jobs 2. Job analysis techniques were used to generate more objective data about job independent of the job incumbent. 3. Independent raters also provided a measurement of job characteristics and overall complexity from the job description. Employee outcomes were job satisfaction, absence, and intention of quitting, job frustration, anxiety at work, health symptoms and frequency of doctor visits. Increasing job satisfaction is important for its humanitarian value and for its financial benefit (due to its effect on employee behavior).

The Table No.1 indicates the level of job satisfaction is higher in Merchant Navy and significantly low between Indian Navy and India Coastguard Personnel. Among the central measures that were taken were ratings of job satisfaction with pay, working condition, company policy and the nature of work. Correlations among these measures in the whole sample are shown in table 2 and table 3.

Job satisfaction was significantly related to pay in Merchant navy while in Indian Navy / Indian Coastguard company Policy was significant. However, an interesting observation can be made where in, job satisfaction was significantly related to the nature of work in Indian Coastguard where as pay was relatively minimum significant. Daniel (1996) explains that main criteria for higher Job Satisfaction as pay, working conditions and work itself. People are unique

Table-1

		Minimum	Maximum	Mean
Merchant Navy	Job satisfaction	105.00	214.00	123.47
Indian Coastguard	Job satisfaction	162.00	216.00	201.95
Indian Navy	Job satisfaction	128.00	193.00	157.23

Table - 2 (VARIABLES RAKING)

	M.Navy	Rank	C.Guard	Rank	Navy	Rank
Work Itself	134.217	6	3724.913	1	1.391	8
Motivation	750.955	2	1153.828	2	67.728	3
Org Longevity	69.497	8	8.409	8	.950	10
Security	16.934	9	.000	10	5.483	7
Pay	1928.07	1	479.115	3	80.349	2
Working Conditions	1.449	10	.424	9	1.354	9
Growth	193.121	5	40.68	7	27.732	6
Responsibility	709.741	4	138.778	6	57.644	4
Co Policy	709.843	3	208.206	4	100.782	1
Promotions	126.956	7	162.207	5	37.456	5

and have different needs, and so they differ in what satisfies them in their work. Some people like jobs that don't involve or tax them; others want to be challenged and committed. People need an adequate pay if they are to be satisfied with their jobs. Pay enables them to support their families' sign of recognition and worth. It is usually not actual levels of pay that account for job satisfaction but relative levels. People judge how well or poorly they're paid by comparison with their peers. If they feel they're underpaid compared to their colleagues, they'll probably be dissatisfied with their income no matter what it is. Researches like Porter and Lawler (2000) define job satisfaction as one-dimensional construct; that is, you are generally satisfied or dissatisfied with your job. In contrast, Smith, Kendall, and Hulin (1979) argue that job satisfaction multidimensional; that is, you may be more or less satisfied with your job, your supervisor, your pay, your workplace, etc. Desire to stay with an organization is not a symptom of job satisfaction; it is a consequence of job satisfaction. As an independent factor, desire to stay is also affected by other factors such as employee's job security, expectations about their future success in the organization.

The research identified three factors that influenced job satisfaction.

Growth and responsibility: Employees are more satisfied when they have challenging opportunities at work. This includes chances to participate in interesting projects, jobs with a satisfying degree of challenge and opportunities for increased responsibility.

Work itself: Employees are more satisfied when their entire work group takes pride in the quality of its work.

Fair Rewards: Employees are more satisfied when they feel they are rewarded fairly for the work they do. employees, who are rewarded fairly, experience less stress.

Katz ell and Thompson (2000) look at major theories of motivation in the workplace, as it is currently the biggest issue in the field of organizational psychology. Their look at current theories of motivation to improve upon simplistic motivation theories such as scientific management and the human relations movement, which were based on the idea that " happy worker is a good worker". Levin and stokes (1989) examines the role of negative affectivity (NA) as a determinant of job satisfaction. NA is an individual difference variable characterized by a disposition to

experience aversive emotional states. According to this idea it is believed that people with a high NA are generally more distressed, agitated, pessimistic and dissatisfied. Levin and Stokes (1989) carried out two main studies that aim to investigate the relationship between NA and job satisfaction. Explanation on job satisfaction relate mainly to situational determinants involving measures of characteristics such as supervision, pay, promotional opportunities and workspace. Recent interests have directed attention towards dispositional explanations of job satisfaction. This area investigates individual traits that may contribute to job satisfaction. Stew, Bell and Clarkson (2001) found a relationship between individual affect and job satisfaction for 17 characteristics ranging from distrustful, irritable and hostile to cheerful, warm and satisfied.

There is a significant difference in the measure for all the factors among Merchant Navy, Indian Navy and Indian Coastguard as shown in table 3 and 4.

Table - 3 (MEAN TABLE)

Work Itself	Merchant Navy	97	34.0000
	Indian Coast Guard	98	58.2449
	Indian Navy	101	39.6337
	Total	296	43.9493
Motivation	Merchant Navy	97	16.1134
	Indian Coast Guard	98	25.2755
	Indian Navy	101	20.0594
	Total	296	20.4932
Org Longevity	Merchant Navy	97	6.9897
	Indian Coast Guard	98	6.0000
	Indian Navy	101	5.6337
	Total	296	6.1993
Security	Merchant Navy	97	4.1031

	Indian Coast Guard	98	2.0000
	Indian Navy	101	3.1287
	Total	296	3.0743
Pay	Merchant Navy	97	8.1134
	Indian Coast Guard	98	21.5714
	Indian Navy	101	16.9802
	Total	296	15.5946
Working Conditions	Merchant Navy	97	7.9175
	Indian Coast Guard	98	6.9082
	Indian Navy	101	5.2574
	Total	296	6.6757
Growth	Merchant Navy	97	5.8144
	Indian Coast Guard	98	11.8878
	Indian Navy	101	7.6040
	Total	296	8.4358
Responsibility	Indian Coast Guard	98	7.5000
	Indian Navy	101	5.1782
	Total	296	5.6351
Co Policy	Merchant Navy	97	25.5773
	Indian Coast Guard	98	47.4694
	Indian Navy	101	41.7129
	Total	296	38.331
Promotions	Merchant Navy	97	6.8557
	Indian Coast Guard	98	8.0000
	Indian Navy	101	6.0594

The table 3 indicates the mean values of all the variables. The mean values of work itself (nature of work), motivation, pay and company policy were significantly different among the three groups. This clearly reflects that the job satisfaction is highly influenced by the pay, company policy and the nature of work. The level of job satisfaction is high in Merchant Navy because the personnel are well paid. The other variables security, growth, responsibility and promotion were significantly minimum. The large difference in mean values

between the groups for the variable Pay is an indicator of huge influence of this variable on job satisfaction.

Fiona Alpars (2003) explains that quality of life in Indian Navy/ Indian Coastguard will have to be improved by offering lucrative pay packets thereby Job Satisfaction can be elevated to higher degrees. Pfeiffer (1998) explored the relationship between work and satisfaction and found that employees with higher job satisfaction

➢ believe that the organization will be satisfying in the long run

➢ care about the quality of their work

➢ have higher retention rates, and

➢ are more productive.

The careers in Indian Navy / Indian coastguard would find it difficult to compete with careers in Merchant Navy in terms of pay packets. Policies of Indian Navy and Indian Coastguard seem to value and support their personnel and special attention is paid to promotion prospects to ensure that stagnation and consequent frustration does not take place. Personnel at sea, perform better if the security of their families is ensured. Personalized attention is given to the quality of housing, education, medical care, work opportunities for spouses and elder children, and all the other tangible and intangible factors that lead families to feel satisfied or dissatisfied with their daily lives. To summarize, the shipboard job evaluation was influenced by several factors, most importantly, the pay. The job satisfaction was substantially significant to pay in Merchant Navy and strongly related to satisfaction among different groups within Merchant Navy. Not surprisingly, captain and chief engineers report the highest level of job satisfaction with their work.

The crew surveyed in the present study are, as a whole, psychologically healthy, well motivated, and anxious to be challenged by their work. They also show a high level of employment stability. The data reported here suggest strongly, however, that the present shipboard organization at least in the fleets studied, is not responsive to the needs and capabilities of many crew members. There is an uneven distribution of workload of the challenge involved in work and in resultant job satisfaction across departments and ranks. Especially in small, self-contained environments such situational inequality is potentially threatening to overall productivity and morale. One could, of course, attempt to solve the problem by selecting less motivated and qualified personnel for the more mundane and less challenging shipboard roles, but such a procedure is hardly likely to improve the overall effectiveness or emotional climate of a ship.

The best approach to the problem would appear to be to restructure shipboard organization to provide job enrichment and more equality of challenge and utilization of abilities. The type of change most likely to produce the desired outcome would not be a minor alteration of current roles but a thorough redefinition of shipboard responsibilities and the interface of the ship with shore - based management. It should be acknowledged at the outset that change is not easy to implement and that attempts at change will usually encounter massive resistance. This is particularly like to be the case in the maritime industry because of inertia from long - standing nautical tradition., powerful organizational pressures for the status quo and the fact that shipping is massively, regulated by the government.

However, the emerging profile of individuals in Indian Coastguard and Indian Navy value challenging work and utilization of their abilities. It is also observed from this survey that under the traditional organizations like Indian Navy and Indian Coastguard the perceived workload of senior officers is much lower than that of Junior officers and interestingly some of the junior officers questioned the desirability of senior officers' billets onboard ships. From a motivational perspective, leaders who are under employed and work less relative to their subordinates are hardly ideal role models.

References

Daniel S Robert (1996) "Valuing Job Satisfaction over six figure salary" USA American Shipping Journal, vol 9 pp 96, 98

Fiona k Alpars., (1997) "Job Satisfaction in Defence Services" Boston, HBS press

Hackman., and Oldham., (1976) "Managing Job Satisfaction" Austin, University of Texas press

Helmreioch R L and Spence J T., (1978) "Masculinity and femininity and psychological dimensions, antecedents, and correlates" Austin, University of Texas Press

Herzberg Frederick Fiona., (2003) "How Do You Motivate Employees" UK, Harvard Business Review

Katz ell., and Thompson., (2000) "Job Satisfaction" USA CNN Publication

Levin., and stokes., (1989) "Joint and Integrated logistics systems for defence services" USA, ABS Publication

Neil f Arms., (1999) "Advanced Search on Job Satisfaction" UK, Oxford Press

Norwin David Goll., (2000) "Effective manning of Merchant Naval fleet" UK, IMO Publication.

Pfeiffer J., (1998) "The human Equation" Boston, HBS Press.

Philip J Andrew., (1995) "Managing Job Satisfaction" UK, Oxford Press

Porter., and Lawler., (2000) "Dimensions Of Job Satisfaction" UK, OXford Press

Smith M H., Kendell., and Hulin., (1979) "Emerging organizational values in shipping Maritime Policy Management", American shipping Journal vol 6, No.1 pp 129-156.

Spence J T., and Helmreioch R L., (1978) "Masculinity and femininity and psychological dimensions, antecedents, and correlates" Austin, University of Texas Press

Stew., Bell., and clarkson., (2001 "Job Satisfaction among individuals" UK, Oxford Press

William K Robert., (2003) "Increasing Employee Satisfaction" Austin, University of Texas Press

Research Study on Projective Technique Based System for Career Exploration in Information Technology

S.RENUKADEVI

Introduction

Information Technology (IT) is an area where a vast number of professions and jobs are available for all most all engineering graduates. Thus, due to variety of careers available in Indian and multinational IT companies there is a great need that career counseling programmes in engineering colleges take into account the vital aspect of Career Exploration with respect to IT industries.

Need for the Study

A very limited number of interest inventories and aptitude tests are available to be used for career exploration in IT industries and Institutions. But these personality tests as such cannot help in exploring the interest, motive and deep aspirations of the individual with respect to a particular career. Thus a test on career exploration will be of great use for career guidance. It will be more useful if such career exploration inventory or test can take into account the individual's hidden aspirations and motives.

The Problem

Chatterji (1960) developed a Non language preference record form (From 962) which helps to choose an educational or vocational field. Atkinson (1958) developed a test of imagery to unfold the motive pattern of an individual. Therefore it is assumed that a technique in the line of Atkinson (1958) with a large number of multimedia graphics pertaining to various career fields, may reveal individual's choice of a career based on his interests, attitudes, feelings, needs, experiences, prior conditioning and thought processes. This technique will take into consideration to the extent possible the other factor such as covert interests, aspirations and motives which are not considered much in the existing psychometric devices. Thus the problem of the research study emerged as "A STUDY ON PROJECTIVE TECHNIQUE BASED SYSTEM FOR CAREER EXPLORATION IN INFORMATION TECHNOLOGY"

Objectives

1. To develop a projective technique based system for career exploration in Information Technology

2. To find out the distribution of responses of the subjects with respect to careers in Information Technology

3. To find out the differences in responses of Male and Female Subjects with respect to Careers in Information Technology.

4. To find out the differences in the pattern of responses between the subjects studying Information Technology and

Computer Science & Engineering programmes.

Methodology

The main objective of the present study was to develop a Projective Technique Based System For Career Exploration In Information Technology. A series of situational frames in the form of Multimedia Projective Graphics containing a combination of occupations, by using paired comparisons method, were developed for this purpose.

Hypotheses

For developing a projective technique, formulation of the projective hypothesis is the prerequisite. For the present study two **projective hypotheses** and three general hypotheses were formulated. They are listed below:

1. The Projective technique based system in the form of multimedia graphics has inbuilt capacity to help the subject to explore his or her career preferences in Information Technology.

2. Career preferences thus explored by administering the Projective technique Based System are distributed over the identified careers due to individual differences.

3. There is significant difference in responses of the subjects with respect to each of the 36 pairs of 9 careers in information technology.

4. There is significant difference in responses of male and female subjects with respect to each of the 9 careers in information technology.

5. There is significant difference in responses between the subject studying Information Technology (IT) and Computer Science and Engineering

(CSE) with respect to 9 careers in Information Technology.

Sample

The try out of the device was done on 30 fifth semester CSE and IT students. The final test was administered on 400 students from 8 engineering colleges in Tamil Nadu undergoing IT and CSE programmes. In terms of the programme of study, 195 (48.75%) students were studying IT programme and 205 (51.25) students were studying CSE programme.

Too construction

The projective Technique Based Career Exploration Systems was developed containing 36 Multimedia Graphics, representing 9 career areas in Information Technology. These areas are

1. Programming

2. Networking

3. Computer Hardware & Software Support

4. Internet Technologies & Web Design

5. Database Design & Administration

6. Education & Training

7. Sales & marketing

8. IT Research

9. Graphics & Multimedia

This device was validated through 18 Information Technology professionals working in the above areas. Further the reliability of this instrument was established by administering the tool on 30 subjects by using test-retest reliability method. Further, the reliability coefficient Alpha (α) was also found out for 400 subjects.

Data Analysis

The testing of projective hypotheses were done with the help of frequency distribution tables and bar diagrams. To test the level of significance, t-test and F-test were used for other hypotheses. To determine content validity, percentages of inter judge agreements were calculated. To determine reliability coefficients, Cronbach's Alpha and test-retest reliability coefficients were calculated.

Major Findings

1. The career profile of each subject clearly shows the preference of a Subject with respect to careers in Information Technology and their preferences are based on the covert and overt interest and their motives.

2. From the responses of the subjects it has been observed that the highest preference opted is for IT Research. The rank order of preferences for careers in Information Technology found out is as follows

   (i) IT Research

   (ii) Networking

   (iii) Education and Training

   (iv) Computer Hardware & Software Support

   (v) Internet Technologies & Web Design

   (vi) Sales & Marketing

   (vii) Database Design & Administration

   (vii) Graphics & Multimedia

   (ix) Programming

3. It is interesting to note that the creative art of Programming has found to be in last place.

4. It has been observed that the responses of the 400 subjects were marked by spontaneously and interests.

5. There is no difference between Male and Female Subjects with respect to preference for careers in

   (i) Programming

   (ii) Education & Training

   (iii) Graphics & Multimedia

6. It may be inferred that there is not much difference in the career preferences of IT and CSE Subjects. It may be assumed that either curriculum of IT or CSE do not play a role in career selection or there are no differences in the curriculum which play considerable amount of role in selection of career.

7. The developed PTBCES device can be used to explore the career preferences of Engineering College students scientifically in 9 different career areas in Information Technology.

8. The present Projective Technique Based Career Exploration System appear to be an unique device which can be used extensively by Teacher Counsellors, and Career Counsellors in helping their students to explore their career in Information Technology and, IT industries to recruit IT professionals and in career development in IT.

9. The present study opens a new dimension in career exploration with the use of projective hypotheses and the projective technique, to help the individual explore his/her career preference in IT in a novel way.

Recommendations

Based on the findings of the study, recommendations were framed for:

- Institutions
- Directorate of Technical Education and AICTE
- Industries
- Parents
- Student Counsellors
- Future Researchers

Conclusion

Projective Technique Based Career Exploration System (PTBCES) Software was developed. The PTBCES was administered to 400 Subjects studying undergraduate degree programmes in Information Technology and Computer Science and Engineering. Career Profiles generated out of the study clearly showed the specific preferences of the subjects with reference to particular careers in IT. All the objectives of the study have been fully achieved. A Projective Technique Based Career Exploration System Software has emerged out of the study. The study will help future researchers in developing projective technique based systems for career exploration in other areas of Engineering.

References

Atkinson, J.W.. (1958). Motives in fantasy, action and society(Ed.). New Jersey: Van Nostrand Co, Inc.

Atkinson, J.W. (1964). An Introduction to motivation. NJ: Van Nostrand Co, Inc.

Balakrishnan, R. (1979). The Vocational Preference Inventory (VPI). Coimbatore: Dept of Psychology, PSG College of Arts and Science.

Chatterji, S. (1960). Development of a Non-Verbal Interest Inventory based on the adaptation of certain aspects of the Kuder Performance Record. D.Phil Thesis, Calcutta University, Calcutta.

Chowdhry, U. (1967). An Indian modification of Thematic Apperception Test (TAT). Calcutta: Dipak Printing and Type Foundry.

Freud, S. (1894). The justification of detaching from Neurasthenia: A particular syndrome. The Anxiety Neurosis in collected papers, Vol I. Ernest Jones (Ed.). The International Psycho-analytic library. Vienna: The Hogarth Press, 1959, p.449.

Murray, H.A. (1971). Thematic Appreciation Test Manual. MA: Harvard College.

NIIT. (1999). Career Development Manual - I. Okhla: Sona Printers.

Rorschach, H. (1942). Psychodiagnostics. Berne: Verlag Hans Huber Publisher.

An Analysis of the Effectiveness of Libraries and Library Services of Polytechnic Colleges in Tamil Nadu

R. RAVICHANDRAN

1. Introduction

Technician education is one of the essential inputs for strengthening industry, economy and the growth of manpower. Soon after independence, in 1947, the Government of India recognised the importance of technician manpower for the economic development of the country and initiated steps to expand facilities for technician education in a big way. The polytechnic system is geared to enable students acquire competencies and skills to become gainfully employed as middle level technician and supervisor. The library forms one of the most important component of the polytechnic system, as it is the treasure house of books and reference materials. It offers large volume of materials for students to supplement classroom teaching. It also offers reference materials to teachers.

The Damodaran Committee (1971) realising the importance of the libraries in polytechnics in aiding the teaching learning process made the following observations

➤ Self study techniques involves assignments which require reference in the library is essential for improving the standards of polytechnic students.

➤ The self study technique develops proper attitude and confidence in the polytechnic students.

➤ The self-study technique raises the level of student's participation in the classroom.

The recommendations of the Damodaran Committee call for "a high degree of integration of library services and resources with the instructional programme". Despite its importance, the library still receives low attention and the various efforts taken by the Central and State Governments for qualitative improvement of technical education has not brought the desirable improvements in the library facilities.

It is therefore felt that a study on the effectiveness of libraries and library services of polytechnic colleges is required, to find out whether the polytechnics are really prepared to meet the current needs of offering a library oriented curriculum, so that the study could lead to some strategies and act as a guideline for setting up an effective library and library service system. Therefore the problem *"An Analysis of the Effectiveness of Libraries and Library Services of Polytechnic Colleges in Tamil Nadu"* emerged.

2. Objectives of the Study

The main purpose of the study is to analyse the effectiveness of libraries and library services of polytechnic colleges in Tamil Nadu. The objectives are:

➤ To study the state-of-the-art of libraries and their functions in Polytechnic Colleges in Tamil Nadu;

➤ To examine the library infracture in the Polytechnic Colleges in Tamil Nadu:

➤ To study the extent of use of the libraries of the Polytechnic Colleges in Tamil Nadu by the students:

➤ To study the extent of the financial utilization of libraries of Polytechnic Colleges in Tamil Nadu:

➤ To determine the factors which facilitate the effective use of libraries by the students of the Polytechnic Colleges of Tamil Nadu; and

➤ To determine the factors which inhibit the effective use of libraries by the students of the Polytechnic Colleges of Tamil Nadu

3. Research Questions

The following issues arising out of the spelt objectives have been addressed in the current study:

1. What is the state-of-art of the Polytechnic libraries in the state of Tamil Nadu in respect of staff strength, working hours, book access, classification and cataloguing system used, book collections, computerisation of libraries, lending services to the users, books procurement and stock verification?

2. What is the infrastructure of polytechnic libraries regarding stack room, space available for stocking books, reading areas, and furniture in the three categories of polytechnic colleges in Tamil Nadu?

3. What is the expenditure for libraries in the three categories of polytechnics viz.,

Government, Government aided and Self-financing polytechnics?

4. What is the extent of use of the polytechnic libraries by the students, among the three categories of polytechnics with regard to periodicity of visits to the library, purpose of visit, frequency of borrowing books and the number of books borrowed?

5. What are the facilitating factors in the use of libraries by the students and compare in the three categories of polytechnics?

6. What are the inhibiting factors in the use of libraries by the students and compare in the three categories of polytechnics?

4. Sampling

For the conduct of the study, 50 % of the polytechnic institutions was selected out of 196 polytechnics in Tamil Nadu. This constituted 73 self-financing, 17 Government-aided and 9 Government polytechnics, which are scattered throughout the state of Tamilnadu giving a representative coverage of the area served by them. Thus a total of 99 libraries were chosen as the sample base. One librarian each for a library was chosen as the sample and hence 99 librarians constituted the selection for samples. The faculty members chosen for the study were 520, comprising of 350 from self-financing, 100 from Government-aided and 70 from Government. This meant that ten faculty members each to a polytechnic were chosen as samples. The students of 2nd year and 3rd year chosen as samples numbered 1,400 from self-financing, 400 from Government-aided and 280 from Government polytechnics, totalling 2,080. From each polytechnic 40 students were chosen as samples.

5. Instrumental Used and Administration

Three separate questionnaires have been formulated in consulation with experts in library and library services.

The Questionnaires are

   (i) Questionnaire for librarians

   (ii) Questionnaire for Teachers

   (iii) Questionnaire for students

The questionnaires intended for librarians were mailed to 99 librarians but the ones received duly filled in was 52, which is almost 52 per cent of chosen sample of librarians. Further, the 52 librarians, responding to questionnaire survey, were contacted to assist in filing the faculty and student questionnaires and on their compliance to the request, the questionnaires were mailed to them, to be administered to the faculty members and students. Fifty-two librarians, comprising of 35 from self-financing, 10 from Government aided and 7 from Government polytechnic libraries, had returned 484 teacher-filled and 2020 student-filled questionnaires. Teachers who returned the questionnaires accounted for 93% of the samples chosen and the students who returned the filled in questionnaires accounted for 97.1% of the total student samples chosen. The number and percentages of questionnaires returned from the three categories of polytechnics in terms teaches and students (users of libraries) are as follows:

> As for faculty members, 323 from self-financing (92.3%), 95 from Government-aided (95.0%) and 66 from Government polytechnics (94.3%) returned the filled in questionnaires.

> For students, the returned questionnaires filled-in duly were 1,347 for self-financing (96.2%), 398 for Government-aided (99.5%) and 275 for Government polytechnics (98.2%).

> In all, the returned questionnaires for librarians were 52, for teachers 484 and for students 2,020.

6. Findings and Conclusions

The Salient findings and conclusions of the study are:

> All polytechnics have on its roll a duly qualified librarian. The staff strength in the polytechnic libraries is short of the norms prescribed by the All India Council for Technical education for the library staff.

> Polytechnic libraries work during the working hours of the polytechnics only. There are a few polytechnics where libraries are kept open beyond the working hours of the polytechnics.

> None of the polytechnics libraries have adequate space for the users requirement as well as for stocking the books.

> Government and Self-financing polytechnics do not have adequate furniture.

> Although the open book access system is preferred and is in use in several polytechnics, the Self-financing polytechnics continue to use the closed system, although the system has several defects.

> All polytechnic libraries provide only book lending and reference services to the users. No other service is rendered by polytechnic libraries.

> Although polytechnics add books to their libraries every year, the number of books on stack in different subjects is far less than the norms prescribed by the AICTE. The self-financing polytechnic

libraries have far less number of books than the Government and the Government aided polytechnic libraries. The Government polytechnic have 30 books to every student, the Government aided polytechnics have 22 books per student and the Self-financing polytechnics have 17 books per student.

➤ Cataloguing services have been compurterised in all Government and Government aided polytechnic libraries.

➤ Very few polytechnic libraries plan and organise library orientation programme to students at the beginning of an academic year to orient students for effective utilisation of the libraries.

➤ Government and Government aided polytechnics spend more money to buy books than the Self-financing polytechnic libraries.

➤ The students do not find library working hours convenient to them. According to them the working hours do clash with the class hours.

➤ Less than half of the teachers guide their students in using the library resources and introduce books in the class for motivating the students to use the library.

➤ One third of the polytechnic faculty members are satisfied with the extent of library use by their students.

➤ Polytechnic teachers indicate that the class notes given by them are enough for students to pass in their examinations.

➤ Teachers of self-financing polytechnics and Government aided polytechnics primarily visit the library for taking lecture notes. This reason is however secondary for the teachers of Government polytechnics.

➤ The resources available in the library are not adequate for supporting preparations for lectures, for setting assignments to the students, for guiding the students in their regular studies, for guiding the students for preparation of seminars, for guiding the students in projects and update them professionally.

➤ A majority of the teachers and students consider that the libraries pose problems in their use.

➤ Students say that adequate number of books are not available. There is difficulty for students in accessing the books available in the library.

➤ Better lighting and seating should be provided in the libraries for making them more useful is the opinion of a considerable number of students.

➤ A majority of the polytechnic teachers are not satisfied with the availability of audiocassettes, videocassettes and CDROM resources available in their library.

Recommendations

Arising out of the study the following recommendations are made for enhancing the effectiveness of library utilisation.

1. Organising orientation programmes for using library services must be made mandatory. The user orientation programme includes the following aspects: Library timings, lay out of the library, rules and regulations, procedures, the availability of text and reference books specified in the curriculum, classification used, cataloguing system, shelf arrangements and physical facilities in the library. The orientation programme should be offered at the beginning of the academic year.

In the first week of admission, students may be grouped branch wise. For each group a half-day lecture on the above mentioned aspects followed by conducted tour of the library be arranged.

2. The method of teaching followed by polytechnic faculty does not demand or stimulate the student for further reference of the library resources. The teachers should make an attempt to integrate the use of library in the teaching learning process. For some of the selected topics of the curriculum the teachers can give library-based assignments. The teachers may organise seminars and quiz on specific topics which would require extensive reference to be done by the students in the library. The teachers may also encourage review of books to be done to the students. The students be asked to review and collect specifications on products described or advertised in the periodicals.

3. Apart from the lending and reference services the polytechnic libraries should also introduce Current Awareness Services (CAS) . Under CA, the resources are to be displayed prominently so that the faculty members and students get to know and become aware of the new resources. The resources that will be displayed are newly acquired books and periodicals procured through the library budget. In addition the news clippings related to science and technology taken out of the subscribed newspapers are to be put up in the notice board.

4. Computerised library services should be introduced in all polytechnic libraries.

5. The access system which is currently followed in the polytechnic libraries (Self-financing) appears to be detrimental for optimal utilisation of the library. It is necessary for all polytechnic libraries to switch over to the open access system at the earliest. It is desirable that All India Council for Technical Education and State Directorate of Technical Education to make the open book access system mandatory for all polytechnics.

6. The library hours has to be made an integral part of the time table. Two periods be included in the time table wherein every student would go to the library and their activities during these periods be monitored and supervised. Such periods could also be used for writing the library based assignments. Book issue to students also could be undertaken.

7. Non-book materials such as audiocassettes, videocassettes, compact discs and multimedia discs may be procured and used to provide for information needs of the faculty and students.

8. The need to adequately staff the polytechnic libraries requires no discussion. The need would be for implementing the norms laid by the All India Council for Technical Education in respect of the staff position for every polytechnic. Steps therefore need to be taken on priority basis to fill up the vacant library positions. However, till such time that positions are filled up, it is suggested that the polytechnic libraries may request the services of apprentice trainees on an annual basis. These trainees should posses a degree in library and information science. As per the

Apprenticeship Act the Board of Apprenticeship and the college share the stipend of the trainees. Hence, there will not be a financial commitment to the college towards the remuneration of these trainees. These trainees may be provided intensive training immediately after selection in areas such as circulation, classification, cataloguing, and replacing the documents, so that they can be effectively made use of in these areas of service.

References

Alemna, A.A. (1999): Library Evaluation: Some Options for Academic Libraries. *ASLIB Proceedings.* Vol 51 (7): 243-246

Best, J.W. (1977): *Research in Education.* New Delhi: Prentice Hall of India P. Ltd.

Biradar, B.S. and Sampthkumar, B.T (2000): Evaluation of Information Services and Facilities offered by DVS Polytechnic College Library: A Case Study. *Library Herald.* Vol 38(2): 112-120.

Case, D.O. (2002): *Looking for Information: A survey of Research on Information Seeking, Needs and Behaviour.* San Diego, CA: Academic Press.

Crawford, S. (1986): Information Needs and Uses, In *Annual Review of Information Science and Technology.* ed by Martha E. Williams. White Plains, N.Y.: Knowledge Industry.

Dalai, B.K. and Ramesh, D.B. (1994): User Studies: A Tool for Evaluation of a Special library: A Case Study. *Annals of Library Science and Documentation.* Vol.41(3): 116-120.

Government of India. (1985-86): Ministry of Human Resource Development, *"National Policy of Library and Information System"* New Delhi.

Koenig, S.A (1986): A study of the Evaluation of Academic LIbrary Services in Institutions Accredited by the Southern Association of Colleges and *Schools. (Doctoral dissertation. Ann Arbor. UMI Dissertation Service)*

Kumar, K. (1968): User's Survey Concerning Teachers and Research Scholars in Department of Chemistry, University of Delhi. *Annals of Library Science and Documentation,* Vol. 15: 175-209.

Padmamma, S., Vijayakumar, M., Ishwari, J.S and Walmiki, R.H (2002): Utilisation of News Papers and Magazines by the U.G. College Teachers in Shimoga City: A Case Study. *Annals of Library and Information Studies,* Vol. 49(3): 89-98.

ABOUT OUR CONTRIBUTORS

Ananthi Sheshasaayee, Lecturer & Head, Dept. of Computer Science, Quaid – E – Millath Govt. College for Women. Chennai.

Dipankar Bose, Asst.Professor, Dept. Mechanical Engineering , NITTTR, Kolkata.

Ganesh N. Lecturer, Dept. of Management Studies, Sathyabama Institute of Science and Technology, Chennai.

Govindarajan S. Research Scholar, NITTTR, Chennai.

Illamathian E. Director, Academic Staff College, University of Madras, Chennai.

Jaiprakash Narain G.B. Director, National Institute of Technical Teachers Training and Research (NITTTR), Ministry of Human Resource Development, Govt. of India, Chennai.

Kamalanabhan T.J. Professor, IIT, Madras.

Karthikeyan C. Asst. Professor, Dept. of Chemical Engineering, Annamalai University, Chidambaram – 608 002.

Kulanthaivel G. Asst. Professor in Electronics Engineering, NITTTR, Chennai.

Lakshminarayana Vemuri, Principal, Jeppiar Engineering College, Chennai.

Nirmal Kumar Mandal, Sr. Lecturer, Dept. of Mechanical Engg, NITTTR, Kolkata.

Rajarshi Roy, Assistant Professor, Dept.of Education, NITTTR, Kolkata.

Rajasekhar D, M.S. Scholar, Dept. of Management Studies, IIT, Madras

Ravichandran R. Senior Librarian, NITTTR, Chennai.

Ravindran G. Director, Centre for Medical Electronics, Anna University, Chennai.

Renukadevi S. Asst. Professor of Education, NITTTR, Chennai.

Sailendra Nath Mandal, Senior Lecturer, Department of Science, NITTTR, Kolkata.

Sambanthan T.G. E.D.P Manager & Head, Computer Center, NITTTR, Chennai .

Saravanan A.M, Senior Lecturer, Department of Biotechnology, Jeppiar Engineering College, Chennai.

Sheshasaayee J.G. Research Scholar, NITTTR, Chennai.

Subrata Chattopadhyay, Asst. Professor , Dept. of Electrical Engg, NITTTR, Kolkata.

Sundaram S. Professor and Head, Dept of Chemical Engg, National Institute of Technology, Trichy - 15.

Thogulva Raghavan Vijayaram, Research Scholar, Department of Mechanical and Manufacturing Engineering. Faculty of Engineering, Universiti Putra Malaysia, Malaysia.

CALL FOR CONTRIBUTIONS

Contributors are invited to send their papers for publication in the next issue Vol. 22, No.2 / December 2005 before 15 November 2005.

This journal is priced as follows:

	India	Other Countries
Subscription for One Number	Rs.50/-	10 US $
For Five Numbers	Rs.200/-	40 US $
Month of Publication		Every June/December

Subscription to be paid through Demand Draft favouring "The Director, N.I.T.T.T.R.", payable at Chennai.

Please write to the Editor, if you do not get subscriber's copy within two months of the publication of the Journal.