CHAPTER - I

INTRODUCTION

1.1 IMPORTANCE OF CAREER EXPLORATION

In the context of globalization, liberalization and privatization, the job market is becoming highly competitive day by day. India being one of the important players in the global market has developed a huge infrastructure in the engineering and technical education sector with 1265 engineering colleges and Institutes of higher technological learning all over the country (AICTE, 2004)\(^1\). About four lakh graduates are passing out from these colleges and job placement of these graduates poses a big problem. While there is shortage of job placement for these graduates in the country, many are looking forward for jobs in other countries and in the age of globalization where the entire world is considered as a global village, the qualified engineering graduates and technicians need to look for jobs beyond the boundary of the country. This process needs to be strengthened by producing qualified employable graduates and continuous career guidance is one of the most important interventions of producing employable graduates. Thus, the aspiration of National Policy on Education (Government of India, 1986) that it should be possible to intensify the nation wide effort in Human Resource Development with Education playing its multifaced role, can be met.

\(^1\) http://www.aicte.ernet.in/aicte/engg.htm
http://www.aicte.ernet.in/aicte/enggdiploma.htm [accessed on 2\(^{nd}\) January 2004]
Career guidance as such has several components. One of these components is career exploration where students are provided with the opportunities to explore their career, mostly with the help of psychological tests and inventories. Once they are aware and convinced about their career they can develop their career according to their potentialities. This type of approach further gives them edge over others in placement according to their aptitude and interest in the job market. Therefore, career exploration during the period of graduation is one of the prerequisites of producing employable graduate engineers.

Information Technology (IT) is an area where vast number of professions and jobs are available for all engineering graduates, in various disciplines such as Production Engineering, Material Science and Computer science. Graduates have a variety of choices of professions in IT irrespective of recession in IT industries. In the existing practice most of the time students are exposed only to the application oriented software development companies through campus interviews and newspaper advertisements, instead of helping them to explore a variety of careers in IT. Once students are aware of a variety of careers in IT industries, by selecting and preparing for a particular career during the period of graduation, the mismatch between the students' interest and the needs of the Indian and multinational IT companies and job placement is bound to reduce. Thus, due to variety of careers offered by Indian and multinational IT companies there is a great need that career counselling programmes in engineering colleges take into account the vital aspect of career exploration with respect to IT industries.
1.2 NEED FOR THE STUDY

The importance of using psychological tests and inventories in occupational adjustment was felt by psychologists as long back as the beginning of the past century when Parson (1909) hypothesized that occupational adjustment was enhanced if an individual's psychological characteristics and interests match the requirement of the occupation. Strong Jr (1943) emphasized the importance of interests for making certain career decisions. He assigned more importance to interest over abilities and aptitudes. According to Strong Jr.(1943) additional information provided by interests cannot be made available from analysis of abilities and aptitudes.

The importance of interest in job selection and occupational adjustment got momentum with the work of Hansen (1990). Industries started to give more importance to interest in job selection in the 1990s. A good number of vocational interest schedules, vocational preference Inventory, career assessment inventory, occupational preference scales are available which can be used for general purpose.

A very limited number of interest inventories and aptitude tests are available to be used for career exploration and recruitment in IT industries. Again these tests are mostly developed by respective IT industries for recruitment purpose, and may not be available to other industrial organizations and career counsellors in the engineering colleges. On the other hand, a variety of personality tests are in existence and the personnel departments of industrial organizations and career counsellors of certain engineering colleges use some of these instruments to
explore certain personality traits which they believe as basic attributes of an individual to become successful in a career. These tests and inventories can help to explore clues to an individual's value, his emotional reaction and maturity, his ability to adjust himself to the stress of everyday life and self-image. But these personality tests as such cannot help in exploring the interest, motive and deep aspiration of the individual with respect to a particular career.

Thus any test on career exploration will be of great use provided one of such kind is available in the career guidance scenario. It will be more useful if such career exploration inventory or test can take into account the individual's hidden aspiration and motives.

This career exploration device can be either a projective type of test or a non-projective type. If it is projective type, Murray's (1943) type of approach or Atkinson's (1958) six picture techniques could be useful. On the other hand to develop a non projective type test, the work of Crites (1973), Roe (1969) and Holland (1985) could be useful.

Projective tests always remain superior to usual psychometric devices as it can unfold and assess the covert behaviour of an individual. Very few attempts have been made to develop semi projective tests for identifying individuals interest and motives. Chatterji(1960) developed a non verbal interest inventory which helps to identify educational and vocational field of training which is of interest to an individual. The final version of the inventory contains 150 picture sets, each set containing three small stick figures depicting some educational or vocational activity.
Balakrishnan (1979) developed Vocational Preference Inventory which can measure six occupational personality dimensions and can be used for High schools, Colleges, Professional colleges, University students as well as adults of both the sexes. This is a semi projective inventory and based on the rationale that for each item the subjects react on the basis of his/her strong feelings and attitude on many kinds of occupations.

The inventory developed by Chatterji (1960) and Balakrishnan (1979) though have some use in high school setting, they do not have much relevance in Engineering colleges and technological institutions. Thus if it is possible to develop a projective test which can meet the need of students in career exploration in Information Technology, it is envisaged that it will serve a great purpose in existing high technology era. Therefore, the purpose of the present study will fulfill one of the felt needs of the present millennium.

1.3 THEORETICAL FORMULATION

Psychological tests and inventories are being used largely for selection of career of an individual. The first step in the identification of an appropriate career path is the evaluation of interests (Saccuzzo and Kaplan, 1984). Today there are more than 80 interest inventories in use and the Strong Campbell Inventory (Strong and Campbell, 1974) remains the most widely used test in research and practice. These Interest Inventories contains a series of items related to occupations and, subjects respond in the form of likes and dislikes. To avoid the complexity of interpretation, towards a professional or computer automated scoring, Holland
developed the Self Directed Search (SDS) which can be self administered and self interpreted. SDS may be considered a step forward in the aid of career selection as it stimulates the counselling process by allowing the respondent to list occupational aspirations, indicate occupational preferences in six areas and to rate abilities and skills in these areas.

Extensive research on interest inventories lead to the conclusion that they do measure interests but they do not measure the chances of success of individuals in the jobs that they find interesting. The degree of success cannot be assessed by administering interest inventories (Kaplan, 1993).

Psychologists and career guidance specialists look job placement from different perspectives. Some emphasise on the person and his/her skills i.e. job aptitudes, others focus on work environment, and still others consider a unique combination of persons and situations.

Psychologists who give emphasis on person, talk about trait factor approach (Osipow, 1983). In this approach the results from a large battery of tests were factor analyzed to find common factors or traits that characterize different occupational groups. The career counsellor matches the individual traits to the traits that characterize different occupations.

Super (1953) came with the five steps of career development and according to him individuals go through these five developmental stages that are relevant to their career choices and aspirations. In the given portion of the life cycle, the developmental steps indicate the vocational behavior of an individual. The
correspondence between vocational behavior and the expected behavior for the age period is known as vocational maturity which can be found out by Career Maturity Inventory (Crites, 1973). The inventory provides scores for vocational maturity, attitude, self-knowledge, choosing a job, problem solving, occupational information and looking ahead. Though psychometric data on the CMI are impressive, unfortunately some problems with the CMI still remains unresolved (Crites, 1973).

Roe (1969) another major theorist in counseling psychology came with the proposition that career choice is the result of the type of the relationship a person had with his/her family during childhood. The California Occupational Preference Survey was developed on the basis of this proposition, which gives scores in six different fields. These scales however are not free from certain limitations. Michael (1984) has shown that personality traits are simply not good predictors of how people will behave in a particular work situation.

How do different environment affect our behavior, a question for which several researches were conducted. The classification system created by Moos (1973) includes six characteristics of environment that affect individual or group behavior. This study is important in the field of vocational psychology. This demonstrates how personal characteristics in the work environment affect job choice and job satisfaction. Behavioural settings and social environments are now recognized as important factors in job and personal satisfaction.

It can be assumed that behavior is a joint function of characteristics of the person and the uniqueness of the situation. Bowers (1973) attempted to explain the
proposition of variation of behavior accounted for by the trait, situation and interaction between the trait and the situation. He found that the interaction is greater than either of the other two sources of influence. It is interesting to note that the unexplained or other factors exert much greater influence. The question arises, under this findings is it possible to develop some instrument for career identification which is presumed to take care of the unexplained facts? Certain projective techniques can answer these unexplained facts to some extent.

Exner (1976) expressed that Leonardo Da Vinci used ambiguous figures to evaluate young art students. This is one form of projective technique. The rationale underlying projective tests is the projective hypotheses. Frank (1939) stated projective hypotheses which proposes that when individuals attempt to understand an ambiguous or vague stimulus, their interpretation of that stimulus reflects their needs, feelings, experiences, prior conditioning, thought processes and so forth.

Freud’s (1938) discovery of Psychoanalytic theory became the basis of all projective methods. In his theory importance has been given to study the inner life of an individual through their behaviour manifestation which led ultimately to the development of projective techniques. The term projection was used by Freud in 1894, in his paper on “Anxiety Neurosis”, where he stated that the psyche developed the neurosis of anxiety when it found itself unable to master excitation arising endogenously. It had then to act as if it had projected this excitation into the outer world. The projection of inner perceptions to the outside is a primitive mechanism, which for instance also influences our sense perception, so that it normally has the greatest share, in shaping our outer world.
Production of imaginative responses in Projective Test Situation depend solely on the concept of nature and function of ego, particularly from the standpoint of ego strength. The term "Projection" has been in use for a long time. The expression "Projective technique" first made its appearance in a paper by Frank (1939). Accordingly, it really means the inclusion of a series of psychological mechanisms through which free response to, more or less, unstructured or semi-structured stimuli are noted.

Projective techniques allow the individual to respond in an unrestricted manner to unstructured or ambiguous objects or situations (Reber, 1995) and all such techniques can be grouped in to three types on the basis of their underlying assumptions. Accordingly,

1. there are deeply repressed, unconscious factors rooted in personality which can be revealed through projection on to highly ambiguous stimuli (Rorschach, 1942),

2. underlying patterns of needs are revealed by interpretations of stories or pictures (Murray 1943),

3. some ego defenses, either momentary or firmly established, is blocking awareness and a projective procedure is suitable to circumvent it. (Rosenzweig 1950).

Murray's technique provides a forum where individual's psychological make-up such as needs, desires, beliefs and attitudes can be unearthed and the technique has in-built scope for use to appraise different types of motives (Atkinson 1958). Therefore, in the existing situation of non availability of a suitable career
exploration device in the Information technology field, an attempt can be made to
develop projective technique based system for career exploration in Information
Technology.

Chatterji's (1960) contribution in developing a non verbal interest inventory made
a breakthrough in the field of interest inventory and interest exploration. He has
used 150 picture sets, each set contains three small stick figures depicting some
educational or vocational activities. The inventory has been found to discriminate
between Arts and Science Students on the relevant scales. The items of the
Chatterji's Non-language Preference Record (CPR) identify a person's interests
in terms of active participation in the activity. In the present study situational
frames (Multimedia Projective Graphics) containing a combination of occupations
will be developed in such a way so that they can elicit individual's active
participation in the activity and thus the career exploration becomes more
scientific.

Long back Thurstone (1947) has developed Thurstone Interest Schedule which
gives profile of ten scores related to vocational interest. In presenting test items,
Thurstone used paired comparison method where each occupational field is
compared with each of the other fields and in this manner the ten scores are
directly comparable. In the present study on Projective Technique based System
for career Exploration, the presentation of each career in IT can be put two at a
time taking into consideration of all probable combinations of careers so as to
derive the benefit of paired comparison method.
1.4 THE PROBLEM

Chatterji (1960) developed a Non language preference record form (Form 962) which helps to choose an educational or vocational field. Though this is not a projective test but the pictures used in this test are cartoon like and thus give the scope of vagueness. This test further paves the way of developing projective technique for career identification.

Atkinson (1958) developed a Test of Imagery to unfold the motive pattern of an individual. The test consists of six picture cards and each card depicting some unstructured situation is a projective test like TAT. It can measure the motive pattern of an individual, i.e achievement motive, power motive and affiliative motive.

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 also take into consideration the other factors and errors (Bowers, 1973) which are not considered much in the existing psychometric devices.

Thus the problem of the present research study emerged as “A STUDY ON PROJECTIVE TECHNIQUE BASED SYSTEM FOR CAREER EXPLORATION IN INFORMATION TECHNOLOGY”
1.5 DEFINITION OF TERMS

The key terms considered in this study are defined as follows:

**Projective Techniques**

Projective techniques are a group of psychological techniques and procedures that claim to disclose the basic (underlying, hidden) personality structure and motivation of a subject by having him organise, respond to, or deal with materials or stimuli in a free, unlimited way without reference to a preconceived system of correct or incorrect answers (Eysenck, Arnold and Meili, 1972). In projective tests examinees are expected to project into inkblots, ambiguous pictures, or other stimuli, their needs, wants, desires, aversions, fears, anxieties, and so on (Hopkins, Stanley and Hopkins 1990).

**Career**

Career is a job or series of related jobs that a person does, especially a profession that a person spends a lot of his/her working life in (Macmillan, 2002). A career is all the things you are doing at any given point of time to create a satisfying life while setting and working toward goals (NIIT, 1999). Thus, a career is a profession that ought to provide — Economic independence, Opportunities to learn, Potential for growth, Job satisfaction and Clear objectives.
Information Technology (IT)

Information Technology being a highly valued emerging area covers almost all the areas of computer science and communication technology. It includes all matters concerned with the furtherance of computer science and technology and with the design, development, installation, and implementation of information systems and applications. (Hutchinson and Sawyer, 1996).

Computer Science & Engineering

Computer Science & Engineering is the study of computers which includes their design, operation and use in processing information. It combines both theoretical and practical aspects of engineering, electronics, information theory, mathematics, logic and human behaviour. The aspects included range from programming and computer architecture to artificial intelligence and Robotics.

System

A System is an organised set of related components established to accomplish a certain task. Many systems have been planned, developed and put into place by people. A Computer System is a System that has Computer as one of its components. (Capron, 1996).
1.6 OBJECTIVES

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

   The enabling objectives are

   1.1. To identify the major careers in Information Technology

   1.2. To develop a series of situational frames (Multimedia Projective Graphics) containing a combination of occupations

   1.3. To try out the projective frames on specified samples for their career exploration by paired comparison method

   1.4. To standardize the frames

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
1.7 HYPOTHESES

The primary objective of the present study is to develop a projective technique based system for career exploration in Information technology. For developing a projective technique, formulation of the projective hypothesis is the prerequisite.

The primary rationale underlying projective test is known as projective hypothesis. Frank (1939) has given the most complete analysis of the projective hypothesis. Projective hypothesis proposes that when an individual attempts to understand an ambiguous, vague or unstructured stimulus, his/her interpretation of that stimulus reflects his/her needs, desires, feelings, experiences, prior conditioning, thought processes, and so forth. When an adolescent in the night time looks into a piece of floating dark cloud in the sky, he interprets it as a monster swimming in the sky, he is projecting his fear onto the cloud. The piece of floating cloud itself is neutral – neither good nor bad, neither fearsome nor pretty. What the adolescent really sees is a reflection of the inner working of his mind.

In the present study a series of situational frames on careers in Information Technology were developed. These frames are unstructured and partly ambiguous. The paired comparison technique was used to stimulate thoughts and add ambiguity to each frame. Career exploration by the subjects in Information Technology through effective use of each situational frame is the projective hypothesis. The result intends to find out the distribution of responses of the subjects with respect to careers in Information Technology which in turn is the testing of the projective hypothesis.
Thus, for the present study the projective hypotheses are formulated as

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.

Apart from the primary projective hypothesis, for the present study three general hypotheses have been formulated. These General Hypotheses are presented below:

1.7.1 Hypotheses relating to the difference in the responses of subjects with respect to careers in Information Technology.

There is significant difference in responses of the subjects with respect to each of the following pairs of careers in information technology:

1. Programming and Networking
2. Programming and Computer Hardware & Software Support
3. Programming and Internet Technologies & Web Design
4. Programming and Database Design & Administration
5. Programming and Education & Training
6. Programming and Sales & marketing
7. Programming and IT Research
8. Programming and Graphics & Multimedia
9. Networking and Computer Hardware & Software Support
10. Networking and Internet Technologies & Web Design
11. Networking and Database Design & Administration
12. Networking and Education & Training
13. Networking and Sales & marketing
14. Networking and IT Research
15. Networking and Graphics & Multimedia
16. Computer Hardware & Software Support and Internet Technologies & Web Design
17. Computer Hardware & Software Support and Database Design & Administration
18. Computer Hardware & Software Support and Education & Training
19. Computer Hardware & Software Support and Sales & marketing
20. Computer Hardware & Software Support and IT Research
22. Internet Technologies & Web Design and Database Design & Administration
23. Internet Technologies & Web Design and Education & Training
24. Internet Technologies & Web Design and Sales & marketing
25. Internet Technologies & Web Design and IT Research
26. Internet Technologies & Web Design and Graphics & Multimedia
27. Database Design & Administration and Education & Training
28. Database Design & Administration and Sales & marketing
29. Database Design & Administration and IT Research
30. Database Design & Administration and Graphics & Multimedia
31. Education & Training and Sales & marketing
32. Education & Training and IT Research
33. Education & Training and Graphics & Multimedia
34. Sales & marketing and IT Research
35. Sales & marketing and Graphics & Multimedia
36. IT Research and Graphics & Multimedia

1.7.2 Hypotheses relating to the difference in the responses of Male and Female subjects with respect to careers in Information Technology.

There is significant difference in responses of male and female subjects with respect to each of the following careers in information technology:

1. Programming
2. Networking
3. Computer Hardware & Software Support
4. Internet Technologies & Web Design
5. Database Design and Administration
6. Education & Training
7. Sales & marketing
8. IT Research
9. Graphics & Multimedia
1.7.3 Hypotheses relating to the difference in the responses of subjects studying Information Technology (IT) and Computer Science & Engineering (CSE) with respect to careers in Information Technology.

There is significant difference in responses between the subjects studying Information Technology (IT) and Computer Science & Engineering (CSE) with respect to each of the following careers in Information Technology:

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

1.8 SIGNIFICANCE OF THE PROBLEM

Until now no attempt has been made to explore the possibility of projective techniques in career identification. Since the projective technique has some in-built advantages, the present study will not only have greater usage but also will pave the way for further research.
Information technology is a vast area where number of careers is available. It is difficult for prospective graduates in this area as to which area he most fits in. Similarly for the employees it becomes difficult to select specific person for specific jobs. Thus the output of the present study will be useful for HRD managers in Information technology not only in selection of personnel but also for their training purposes. In addition the system will drastically reduce the administration and scoring time of the technique and therefore will prove to be much useful.

1.9 SCOPE AND DELIMITATIONS OF THE STUDY

The present study aimed at developing a projective technique based System for career Exploration in Information Technology. The scope of the study is delimited by the following aspects:

1. There are numerous careers in Information Technology out of which nine careers listed below were identified in consultation with the professionals in IT industries and through review of IT publications. Hence the study is delimited to these nine careers in IT.

   1. Programming
   2. Networking
   3. Computer Hardware & Software Support
   4. Internet Technologies & Web Design
   5. Database Design & Administration
   6. Education & Training
2. The study is delimited to the students studying undergraduate degree programmes in the Engineering Colleges. The scope does not include students studying Diploma programmes in Polytechnics.

3. Further the study is delimited to the subjects studying Information Technology (IT) and Computer Science and Engineering (CSE) programmes only.

1.10 STRUCTURE OF THE REPORT

The report of the research study is presented in five chapters.

Chapter 1 is the introductory chapter, describing the need for the study, theoretical formulation, problem, scope and delimitations of the study, objectives and the hypotheses formulated. The review of literature related to the study is presented in chapter 2. Chapter 3 presents the Design of the research study. Chapter 4 deals with the analysis of data and findings. Chapter 5 consists of a summary of the research study, findings, recommendations, and suggestions for further research and conclusion.