ASSESSMENT OF CAREER SELECTION PROBLEMS IN DEVELOPING COUNTRIES: A MCDM APPROACH

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ABSTRACT

Career selection is one of the most vital and challenging decisions in the life of an individual. In many cases, the individual is not solely responsible for their career choice. In order to address this problem and provide remedial measures, a sample of engineering students was taken from different institutions in Pakistan. Based on the student's current and previous academic performance and interest in their projects, a weighted index was constructed with empirical evidence. This index reflects the overall comprehensiveness of the career decision. The study revealed that 57.4% of the students are enrolled because of self-interest, while the remaining have other reasons. Furthermore, it was found that a significant number of students experience poor outcomes because of bad decisions in relation to how they choose their career. Data analysis suggests that the majority of the students who choose their career due to the influence of others show poor performance on the index rating. The reason for the career choice of the students indicates a highly significant ((p-value = 0.003) association. A gamma test is used to determine the direction of the

association. The results also indicate a negative trend when there is a shift of career choice from one due to self-interest to one based on the outlook of the career. This research takes into account all of the important factors in career choice, and is particularly useful for guidance counselors of high schools and colleges as it provides a framework for career choice decisions for students. Finally, the researchers propose a decision making criteria and a numerical model for guiding counselors and students.

Keywords: p-value; AHP; goodness of the career decision; guidance counselor; Gamma test

1. Introduction

Choice of career is not only central to one's lifestyle, but is also a vital aspect of the physical and emotional well-being of individuals and their families. Choosing a career is a crucial problem for any student. Most students face questions such as, what am I really going to do?, can I really get there?, am I sure of the path?, what are the risks?, and if I don't make it, do I have any other options? Traditional factors that influence a student's career choice decision include the following: mark obtained in the annual examination, choice made by parents, and advice of teachers, friends and others.

In-depth observations were made in this study to reveal that these determinants of choice are not at all the objectives in nature. Some ambitious parents dictate their own unfulfilled career aspirations to their children and compel them to choose a course which perhaps the child does not like or does not have aptitude for. On the other hand, some students have parents who are aware of psychometric testing and career counseling sessions and are able to help their children select a proper career with these tools. Similarly, friends and colleagues also persuade students to adopt certain professional careers.

With advancements in technology and the emergence of new fields of study, more complexities in career selection for students have been created. Many students are attracted by the outlook a certain career offers such as job opportunities, salary and career advancement (Oh, 2007). Career selection based on an individual's own choice or even due to an external agent can lead to drastically adverse outcomes. Thus, this study looks at the significant effect of all the above mentioned factors on the career choice of an individual and which factors are more important than the rest.

In order to eliminate any chances of regret, students should begin the process of career decision making in a rational manner. Guidance from trained career counselors at a proper time can significantly reduce disappointment and waste of time and energy.

In Pakistan, career selection choice is an important issue because the proportion of illiteracy is higher than in other countries. Students who are enrolled in school are receiving inadequate guidance and not receiving counselling which is essential for them to excel in their field of choice and perform to their utmost potential. There is no proper arrangement of guidance counselors or a decision making criteria for them, which leaves them with vague, incomplete and unfocused advice. Therefore, we have constructed a decision making criteria for guidance counselors. Using this decision-making criterion, a numerical method for estimation of a good decision is constructed in order to help students select a better alternative in career selection.

2. Literature review

The researchers deploy the AHP method to evaluate a good career selection criterion (Ozgar C. , 1999). Many students in their final year of college remain unclear and indecisive about choosing their career. There are many factors which affect their selection of choosing a career, for example, Fizer (2013) determined those factors which affect agriculture student's choice of career path. College Career Centers are stocked with instruments (both computerized and pencil/paper) which test student's interests and abilities. These instruments are designed to help students determine, understand and comprehend which careers/majors they are most suited for. Earlier researchers found that student's interests as determined by the Campbell Interest and Skill Survey (CISS) correlated well with student's majors (Hensen, Joalda and Neuman, 1999). Professors were found to be most influential in helping students choose a major (Kaynama, Shohreh, & Louis, 1996). Kark & James (1990) determined that students select majors based on the quality of the program and career opportunities. Whereas, Tame (1996) explored the factors affecting students who become math/science majors, specifically looking at self-efficacy and vocational interests. The study found that extrovert students and those with artistic skills were less likely to become math/science majors. With the large amount of choices that are available, one must make compromises about outcomes (Liberatore & Miller, 1995). Certain majors can be of maximal interest to a student, however not offer enough potential economic payback. A student might sense pressure from parents to

select one choice, but is certain that he will make another choice. The decision-making process is complex and judgment and instinct only will not always be enough to respond to the several compromises that must be chosen from among the results.

Saaty created a decision-making approach called the Analytic Hierarchy Process (AHP), that he claims is, "…natural to our intuition and general thinking" (Saaty, 1994). By breaking the problem down into numerous minor, simpler decisions, and then requesting that respondents rank them, the AHP provides decision makers with a structural tool which can help them solve bigger problems. The aim of this research is to improve a choice support model using the AHP in order to help students select a career. A comprehensive survey was conducted to develop a model to guide and evaluate career choice selection among students. The AHP model, which comprises the criteria, is shown in the following section.

In order to create the model, a survey was organized by distributing questionnaires to dual sections of the senior capstone strategic management class, and dual sections of the sophomore business statistics class. Sixty students from the strategic management class and 57 students from the business statistics class responded to the survey. The survey asked the students to list the influences which played a central role in their career choice selection. They arranged and examined the replies and made a list of the top 15 influences of their career choice. Once this list was constructed, they gathered similar or connected influences into 3 groups. The 3 groups were called interest in subject, influence of others and career. After grouping of the influences, hierarchical relations inside each group were considered. The interest in subject and influence of others clusters were only one level of hierarchy, however the career cluster consisted of three sub-criteria including compensation, job availability and growth and job requirements. The job requirements criterion included two sub-criteria, computer usage and interpersonal skills. (Swann & Henderson, 1998). Finally, a computerized data entry database was created in order to ask the students a sequence of inquiries. The major set of questions will be used to create the pairwise comparison matrices. The first criteria pairwise comparison matrix will be used to create the comparative importance of the 3 main criteria. (Saaty, 2008). The second pairwise comparison matrix will be used to create the comparative importance of the 3 sub-criteria of the career criterion (compensation, job availability and growth and job requirements). The third and final criteria pairwise comparison matrix will be used to compare the two sub-criteria of the job requirements (computer usage and interpersonal skills) (Gibney &

Shang, 2007). For example, in developing the first criteria pairwise comparison matrix, the computerized data entry program will ask the students their relative judgment of the importance of interest in subject in comparison to influence of others. After that, weight is assigned to each criteria ranging from 1 to 1/9.

The outcomes of the AHP model that is created will explore some different areas of information. First, the constancy of student verdicts will be investigated by creating several correlated pairwise comparison matrices. However, if the level of variation is great (consistency ratio is greater than 10%), the outcomes may be unfair and the pair wise comparisons will be reviewed. AHP not only recognizes wherever the major inconsistencies are, but also proposes reviews in the pairwise comparisons to increase the consistency. After achieving a suitable level of consistency, researchers may continue with the rest of the analysis. Our objective will be to prioritize the criteria in terms of importance. Establishing the relative importance of the factors will hopefully lead to a higher level of understanding of the criteria and the interaction between them. Then, we will utilize this knowledge and understand how to better assist the students in selecting their majors. In addition, the results may assist college admissions and recruiting departments to target their efforts based on student characteristics and profile. Targeting and preparation of college promotional materials may also be affected. For example, if a student possesses certain characteristics and interests, the college admissions/recruiting department may decide to use certain promotional materials related to majors the student may identify with and/or has high likelihood of success (Jones & Ewell. T. (1987).

3. Methodology

3.1 Data collection

Data is collected through a survey questionnaire that was developed and distributed among engineering students[1]. The data is based on 94 responses from various universities across Pakistan such as Ghulam Ishaq Khan Institute of Engineering Sciences and Technology (GIKI), National University of Sciences and Technology (NUST), University of Engineering and Technology Peshawar (UETP) and various faculties such as mechanical engineering, material engineering, computer engineering, electrical engineering etc.

[1] For more details see Appendix D

3.2 Data analysis

The data obtained from the questionnaire was analyzed using SPSS and MATLAB software[2]. Career selection analysis reflects various factors which will lead to a determination of the goodness of their choice. Each of these factors is linked to questions in the questionnaire. These various factors include student's satisfaction level, grade point average, project interest level, reason for doing a Master's of Science (MS) and not doing a MS, subjects in which they performed better in the past versus current engineering discipline chosen, field related extracurricular activities in the past and if the student thinks he/she would perform better if he/she choose another career. The multiple choices in the questionnaire (corresponding to each of the factors) were assigned relative weights. One example of relative weights of the satisfaction level is given below.

Table 1
Relative weights for satisfaction level

Factor: Satisfaction level	
Multiple choice options	**Weights**
a) Extremely Dissatisfied	1
b) Dissatisfied	2
c) Satisfied	3
d) Extremely satisfied	4

The responses were obtained and weights were given to each factor. All these factors were combined to quantify a variable termed 'goodness of the decision' denoted by D to obtain a value for the decision of an individual. This decision variable D is given by the following formula:

$$D = 3\,SL + 5\,GPA + 5\,PI + RFDM + 2\,RFNDM + WAC + 2\,WECA + 5\,SCSVF \quad (1)$$

Where,

- SL stands for Satisfaction level (weight obtained from question 3 in the questionnaire)
- GPA stands for Grade Point Average (weight obtained from question 4 in the questionnaire)

[2] Matlab code is available in Appendix A

- PI stands for project interest (weight obtained from question 6 in the questionnaire)
- RFDM stands for reason for doing MS
- RFNDM stands for reason for not doing MS,
- WAC stands for weight for another career (student's opinion about his performance if he choose another career),
- WECA variable weights are obtained from questions 7, 8, 9 and 12 in the questionnaire.

The relative weights of each of the variables are given according to the relative importance each factor has with respect to the other, which we get from logic and intuition. For example, satisfaction level is a relatively less important factor to consider when evaluating a good or bad decision made by a student. Consider that a student can be extremely satisfied (weight = 4), but his GPA is poor and he has no interest in field related projects, so his overall decision score should be negative even though his relative weight for satisfaction level is high. The overall weight of satisfaction level is 3 which is less than the overall weight for GPA and project interest which is 5 as they are relatively more important factors as compared to satisfaction level.

After importing our online data to SPSS, the decision score for each student was evaluated based on the multiple choices the participant selected in the questionnaire. The overall value obtained is then compared to a standard value for decision variable D. This value is obtained by putting the weights of all the variables beyond which a decision is considered good and below which a decision is considered bad. For example, to obtain a standard value we take the weight of the SL variable which stands for satisfaction level =3 (satisfied). This means if a person is dissatisfied the SL value should contribute to a bad decision in the overall decision variable D. Similarly other values are taken such as GPA=4 (between 2.5 to 3), PI=2 (interested), RFDM=3, RFNDM=4, WAC=2, WECA=3 and SCSVF=4. Therefore, the standard value for decision variable D comes out to be 78. This value 78 is the cut off value, which means any score above 78 is taken as a good decision.

For the SCSVF variable we linked a student's previous performance in a particular subject (questions 10 and 11) to their current faculty (question 1) via the MATLAB program (Appendix A). Each particular choice in faculty is given a value from 1 to 3, and similarly a value is given for each particular choice for the subjects that an individual was better at in school and at the college level. In case of a mismatch between the comparison in the numbers, we have assigned a lower weight i.e. 3, for example if a student was good at chemistry

(value assigned is 2) in college and school, and he has chosen computer science (value assigned is 3) as his faculty, he has made a bad decision and should have selected chemical or material engineering (value assigned is also 2). In the case the student has selected a subject other than anything engineering related, we have assigned an even lower weight of 1.

After calculating the D variable, a chi square and gamma test were used to evaluate the data and obtain the p value between decision variable D and the career choice selection factor (obtained from question 2). This enabled us to observe the level of significance between the career choice selection factor (self-interest, influence of others, career outlook) and a good career choice decision (D>78). Moreover, it also shows whether the individual whose choice was engineering due to self-interest has made a good career choice or not. Similarly, it provides insight on how many individuals chose engineering due to the influence of others, whether they made a good career choice and how many individuals chose engineering due to its career outlook (job opportunities, career advancement, salary etc.) and whether they made a good career choice. A gamma test is used to show the direction of association.

After assessment/evaluation of the problem we have to solve the problem by constructing a decision criteria for better career choice selection by Analytical Hierarchy Process (AHP) for various cases using the proposed indexation formula and taking into account the significant factors such as the grades of the students in their respective subjects, their field of interest, parental influence, peer pressure, career advancement, salaries and job opportunities. We have provided weights for each of the cases under consideration. These weights were calculated from the questionnaire (Questions 13, 14, 15, 16, 17, 18, and 19) where the students were asked about their preference for each criterion with respect to the other. The weights obtained from the AHP are then used to derive a numerical formula for career choice decision makers by taking into account all the factors. Using a preference scale for each factor, similar to the indexation formula used in AHP, any subject can put a relative preference value in the numerical model and evaluate a suitable career choice.

4. Findings and discussion

From the survey results given in the Appendix we found that about 57.9% people chose their career due to self-interest, 20.8% of people due to influence of others and an almost equal amount due to the

outlook of a career (job opportunities, salary etc.). The career choice of the students indicates a highly significant (p-value = 0.003) association. It is evident from the cross table that the percentages of scores greater than 78 are remarkably higher (79.4%) than those that got index scores less than 78 for self-interest, which means that if 100% people have made a good decision only 79.4% have selected a career due to self-interest. On the other hand, those choosing a career due to the influence of the others possess the least percentage possibility (5.9%) of making a good decision. While out of those choosing career on the basis of job opportunities, 14.7% have made a good decision. The direction of the association is assessed by making use of the Gamma test, which indicates that as we move from career due to self-interest to career on the basis of job opportunities the percentages of 78 scores decline significantly (p-value) .

Table 2
Index score versus Carrier Choice Selection Factor

Index score	Carrier Choice Selection Factor			Total
	Self interest	Influence of others	Career (job opportunities, salary)	
Less than 78	27	18	15	60
	45.0%	30.0%	25.0%	100.0%
78 to 100	27	2	5	34
	79.4%	5.9%	14.7%	100.0%
Total	54	20	20	94
	57.4%	21.3%	21.3%	100.0%

Table 3
Chi-Square Tests

	Value	Df	Sig.
Pearson Chi-Square	11.487	2	.003
N of Valid Cases	94		

Table 4
Symmetric Measures

		Value	Std. Error	Approx. T	Sig.
Ordinal by Ordinal	Gamma	-.535	.164	-3.029	.002
N of Valid Cases		94			

The findings of the report also show that about 63% of the people have chosen a bad career. Figure 1 shows the comparison between the number of individuals who have chosen a good career divided by the total number of people in that respective career choice factor and with respect to their career choice factor.

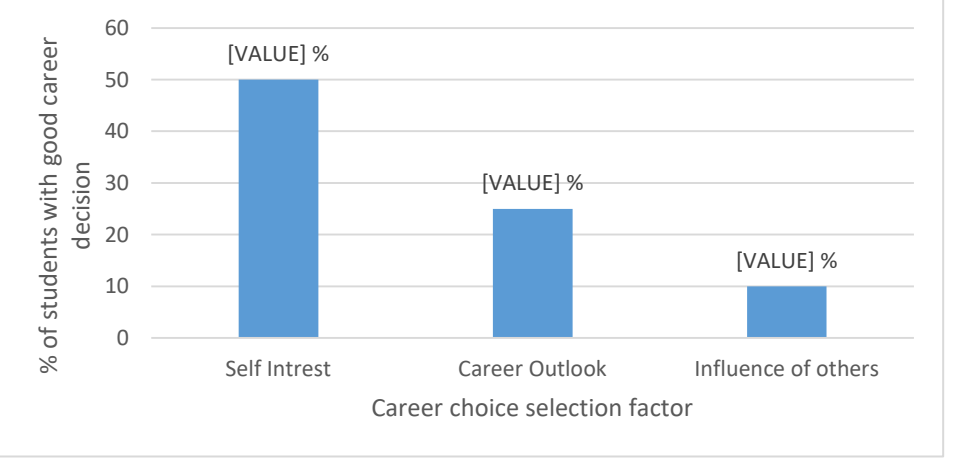

Figure 1. Percentage of students with good career decision with respect to career selection reason

Figure 1 shows that the percentage of people who have selected a viable and stable career option due to career outlook (job opportunities, salary, career advancement etc.) are significantly higher than those due to influence of others. Students who choose their career due to self-interest have the largest percentage of good decisions (50%). Figure 1 provides the evidence of a gamma test and a chi-square test as it shows that the direction of association is negative i.e. percentage of students with good career decision decreases significantly as career choice selection factors change from self-interest to influence of others.

In order to solve the problem, we construct a career selection criteria based upon the Analytical Hierarchy Process (AHP).We use several different criteria i.e. self-interest, career outlook, and influence of

others to evaluate a good career decision. These major criteria are then divided into sub criteria i.e. influence due to parents or peers, career outlook, career advancement and salary and job opportunities etc. The guidance counselor or a student who wishes to evaluate a good career decision needs to know which of the above mentioned criteria is more important than the other. For this purpose, through an extensive survey, we tried to understand which category people prefer, i.e. how much weight they assign to self-interest, career outlook, and influence of others with respect to each other. Those weights are then assigned a place in the AHP matrix in order to rank the criteria and calculate the preference weight for each criteria. Using these preference weights we have formed a career decision formula in which the guidance counselors can put in the perspective of a student in the respective category and get the right career decision.

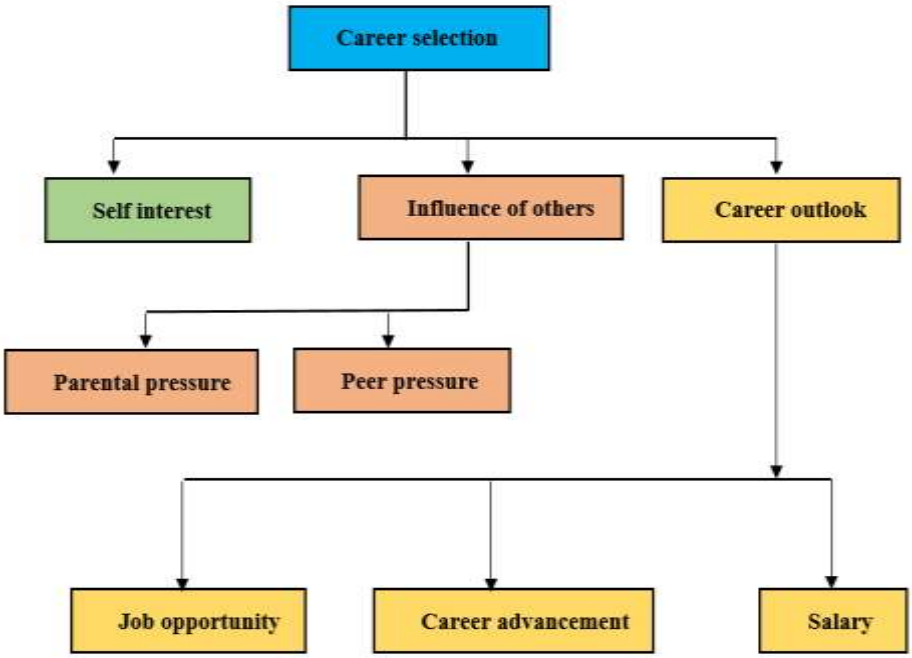

Figure 2. AHP model

The priority table in Appendix B illustrates the relative rating for importance of criteria. Based on the survey results given in the Appendix, the following results are obtained.

- Self-interest is extremely to very strongly more important as compared to influence of others

- Self-interest is strongly more important as compared to Career outlook
- Influence of others is moderately less important as compared to Career outlook
- Job opportunities is moderately to strongly less important as compared to Salary
- Job opportunities is extremely to very strongly less important as compared to Salary
- Salary is moderately to strongly less important as compared to Career advancement
- Parental pressure is moderately less important as compared to Peer pressure

Table 4 shows the priority matrix for criteria such as self-interest, influence of others and career outlook. The preference weights of these criteria, their ranks and their consistency ratio can be observed in Table 5. We found that the most important factor to consider is self-interest with a weight of 74.18%.

Table 5
AHP matrix for evaluating criteria, self-interest, influence of others and career outlook

	Self Interest	Influence of others	Career Outlook
Self Interest	1	8	5
Influence of others	2	1	1/3
Career Outlook	1/5	3	1

Table 6
Preference weights, ranks and consistency ratio for self-interest, influence of others and career outlook

Criterion	**Weights**	**Rank**
Self Interest	74.2 %	1
Influence of others	7.5 %	3
Career	18.3 %	2
Consistency ratio (CR) = 0.046 (4.6%)		

Table 6 shows the priority matrix for sub criteria in career outlook such as job opportunities, salary and career advancement. The preference weights of these criteria, their ranks and their consistency ratio (CR) are mentioned in Table 7. We found that the most important factor to consider is career advancement with a weighting of 70.71%.

Table 7
AHP matrix for evaluating criteria, job opportunities, salary and career advancement

	Job opportunities	Salary	Career advancement
Job opportunities	1	1/4	1/8
Salary	4	1	¼
Career advancement	8	4	1

Table 8
Preference weights, ranks and consistency ratio for Job opportunities, Salary and Career advancement

Criterion	**Weights**	**Rank**
Job opportunities	7.0 %	3
Salary	22.3 %	2
Career advancement	70.7 %	1
Consistency ratio (CR) = 0.056 (5.6%)		

Table 8 shows the priority matrix for sub criteria in influence of others such as parental pressure and peer pressure. The preference weights of these criteria, their ranks (Rk) and their consistency ratio (CR) can be observed in Table 9. We find that the most important factor to consider is parental pressure with a weight of 74.97%.

Table 9
AHP matrix for evaluating sub-criteria, Parental pressure and Peer pressure

	Parental Pressure	Peer Pressure
Parental Pressure	1	¼
Peer Pressure	4	1

Table 10
Preference weights, ranks and consistency ratio for parental pressure and peer pressure

Criterion	**Weights**	**Rank**
Parental Pressure	75 %	1
Peer Pressure	25 %	2
Consistency ratio (CR) = 0.001 (0.1%)		

The consistency ratio is less than 0.1 for all the above decision matrices, therefore, the degree of consistency is acceptable and the AHP results are meaningful. Based upon these weights, we calculated the following career selection formula for guidance counselors.

$$\mathrm{CDV(A)} = 0.74\ \mathrm{SI_A} + 0.183(0.707\ \mathrm{CA_A} + 0.223\ \mathrm{S_A} + 0.07\ \mathrm{JO_A}) + 0.075\ (0.75\ \mathrm{PP_A} + 0.25\ \mathrm{PRP_A}) \quad (2)$$

Where

- **A** represents alternative
- CDV (A) stands for Career Decision Value for alternative A
- SIA stands for Subject Interest in that particular priority
- CAA stands for Career advancement in that particular priority
- SA stands for Salary in that particular priority
- JOA stands for Job opportunities in that particular priority
- PPA stands for Parental pressure in that particular priority
- PRPA stands for Peer Pressure in that particular priority

The counselor or career choice decision maker has to weight each criteria with regard to a preference scale given in the Appendix C. For example, a student may prefer engineering extremely more as compared to business with respect to interest and prefer business more strongly as compared to engineering with respect to influence of

others such as his parents. While he/she is not limited by other preferences, for example he/she may not be influenced to a career due to its outlook.

So we put these values in Equation 1 to calculate a career decision value for both engineering preference and also business preference.
In this case as the decision is not based upon career outlook so:
$CA_A = S_A = JO_A = PRP_A = 0$ (no preference),
Let P = 1 for Engineering, then we have
$SI_1 = 9$ (extremely more preferred),
$PP_1 = 1/5$ (moderately less preferred),
So CDV (1) = 6.67
Now Let P = 2 for business, then we have
$SI_2 = 1/9$ (extremely less preferred),
$PP_2 = 5$ (moderately more preferred),
CDV (2) = 0.363
So as CDV (1) > CDV (2) which implies preference 1 is better, this means that engineering is a better decision than business in this case and the guidance counselor has to suggest engineering as a suitable career for the student.

Similarly, if there are three alternatives we first use this formula for two alternatives using the same procedure as mentioned above and then select the Career Choice Value for the alternative that is larger. Now this selected alternative is compared with the third alternative and again the same method is applied to select an optimal career choice.

5. Conclusion

The potential objective of this research was to investigate the effects of career choice selection on students based on survey data collection. It was found that a majority of the students selected their career choice due to self-interest. The ratio of students enrolled due to influence of others and students that enrolled due to career outlook (job opportunities, salary, career advancement etc.) was almost equal. Empirical data was used to obtain an overall career decision variable which shows how many students have made a poor decision and selected a bad career path. Career choice selection due to the influence of others quite often leads to a bad career choice for an individual. This is evident from the scope of study as p value hints that there is a significant difference between a good career selection and the reason for selecting a career choice. The results also suggest an alarming element that most of the students are not able to realize their full

potential, as 63% of the students surveyed have made a bad career choice. Furthermore, 50% of the people that have chosen their career due to self-interest have also selected the wrong career option. Therefore, this research indicates an urgent need for career guidance counselors in schools and colleges in order to help students select a suitable career for themselves. We present a robust 'Guidance-Counselor-Criteria' upon which suitable career choice selections could be effectively based. We have selected various career choice selection criteria and using AHP (Analytical Hierarchy Process) we assign weight to each criterion which shows which criteria is more important for selection of a good career. These weights are used to construct a formula to work on the basis of decision preferences of a respective student in various criteria. The overall score from this formula is used to compare various career preferences of a student. The preference with a higher score is selected as the best possible career choice for that particular student.

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APPENDIX A

MATLAB Program for SCSVF variable

```
for n=1:71
    if c(n)~=4 && s(n)~=4
        if c(n)~=0 && s(n)~=0
if b(n)==c(n)||b(n)==s(n)
    a(n,:)= 4
end
  if b(n)~=c(n)||b(n)~=s(n)
    a(n,:)= 2
end
  end
    end
if c(n)==4 && s(n)==4
       a(n,:)=1
end
 if c(n)==0 && s(n)==0
       a(n,:)=2
 end
end
```

APPENDIX B

Priority Table

Comparison Scale for the Importance of Criteria in AHP

Judgment	**Rating**
Extremely more important	9
	8
Very strongly more important	7
	6
Strongly more important	5
	4
Moderately more important	3
	2
Equally important	1
	1/2
Moderately less important	1/3
	1/4
Strongly less important	1/5
	1/6
Very strongly less important	1/7
	1/8
Extremely less important	1/9

APPENDIX C

Comparison scale for importance of alternatives using equation

Judgment	Rating
Extremely more preferred	9
	8
Very strongly more preferred	7
	6
Strongly more preferred	5
	4
Moderately more preferred	3
	2
Equally preferred	1
	1/2
Moderately less preferred	1/3
	1/4
Strongly less preferred	1/5
	1/6
Very strongly less preferred	1/7
	1/8
Extremely less preferred	1/9
No preference	0

APPENDIX D

Questionnaire for effects of career selection choice on students

1. Faculty :
   - ☐ Mechanical, Electrical, Electronics
   - ☐ Computer Science, Computer Engineering
   - ☐ Material, Chemical
2. How did you come about your career ?
   - ☐ Self interest
   - ☐ Influence of others (Parental pressure, Peer pressure)
   - ☐ Career (job opportunities, salary)

?

3. What is your satisfaction level regarding your career?
   - ☐ Extremely dissatisfied
   - ☐ Dissatisfied
   - ☐ Satisfied
   - ☐ Extremely satisfied
4. What is your GPA ?
   - ☐ below 2
   - ☐ between 2 and 2.2
   - ☐ between 2.2 and 2.5
   - ☐ between 2.5 and 3
   - ☐ above 3
5. How much interest do you take in your course/final year engineering projects ?
   - ☐ not interested
   - ☐ Interested
   - ☐ Very interested
6. Do you want to apply for MS after graduation ?
   - ☐ Yes
   - ☐ No
7. If yes, what is the reason ?
   - ☐ I can't get a job without MS
   - ☐ I don't want to go to an industry, I prefer teaching
   - ☐ I like to study Engineering further
   - ☐ Other:
8. If no, then what do you want to do after graduation ?
   - ☐ Apply for a job(Due to interest)
   - ☐ Apply for a job(Due to financial issues)

- I want to study something other than engineering(MBA, CSS etc)
- Start business or Start my own company(related to engineering)
- Start business or Start my own company(not related to engineering)
- Other: .....

9. If you were to choose another career would your performance be better?
   - Yes
   - No
   - Maybe
10. In which subject/course did you perform best during entire school period?
   - Maths or Physics
   - Chemistry
   - Computer Science
   - Other: .....
11. Which subject/course did you perform best during entire FSc/A-level?
   - Maths or Physics
   - Chemistry
   - Computer Science
   - Other .....
12. Which type extracurricular activities you participate in before entering university?
   - Related to engineering or science
   - Not related to engineering or science
   - Not involved in any extracurricular activities

For below questions, please give comparatively rating between given decision criteria i.e Which factor is more important in resulting to a bad the career choice decision for a student in your opinion

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13. Self-interest is _____ factor as compared to influence of others(Parental pressure, Peer pressure)
   - Extremely more important
   - Strongly more important
   - Moderately more important
   - Equally important
   - Moderately less important

- Strongly less important
- Extremely less important

14. Career (job opportunities, salary) is _____ factor as compared to influence of others(Parental pressure, Peer pressure)
    - Extremely more important
    - Strongly more important
    - Moderately more important
    - Equally important
    - Moderately less important
    - Strongly less important
    - Extremely less important
15. Self-interest is _____ factor as compared to Career (job opportunities, salary)
    - Extremely more important
    - Strongly more important
    - Moderately more important
    - Equally important
    - Moderately less important
    - Strongly less important
    - Extremely less important
16. Job opportunities is _____ factor as compared to salary
    - Extremely more important
    - Strongly more important
    - Moderately more important
    - Equally important
    - Moderately less important
    - Strongly less important
    - Extremely less important
17. Job opportunities is _____ factor as compared to career advancement
    - Extremely more important
    - Strongly more important
    - Moderately more important
    - Equally important
    - Moderately less important
    - Strongly less important

- ◯ Extremely less important

18. Salary is _____ factor as compared to career advancement
    - ◯ Extremely more important
    - ◯ Strongly more important
    - ◯ Moderately more important
    - ◯ Equally important
    - ◯ Moderately less important
    - ◯ Strongly less important
    - ◯ Extremely less important
19. Parental pressure is _____ factor as compared to Peer pressure
    - ◯ Extremely more important
    - ◯ Strongly more important
    - ◯ Moderately more important
    - ◯ Equally important
    - ◯ Moderately less important
    - ◯ Strongly less important
    - ◯ Extremely less important