ISSN (Print) : 2319-5940
ISSN (Online) : 2278-1021

International Journal of Advanced Research in Computer and Communication Engineering
Vol. 2, Issue 9, September 2013

An Assessment of Final Year project Using Fuzzy Logic

G.Meenakshi

Assistant Professor, Sree Dathha Institute of science &Engineering, Hyderabad, Andhra Pradesh, India

Abstract: This paper discusses the development of outcome based learning and quality assessment of final year projects for bachelor of engineering degree. This will ensure the objectives of the final year project which is aimed at enhancing the technical and soft skills knowledge in solving the problems through engineering and application of knowledge. The final year project in the college must be structured not only to address the issue of soft skills but at the same time to have an outcome based learning approach that in some way simulates the working world into a classroom scenario. The objectives of the project are1) the capability to complete the projects within the stipulated time 2)The capability to use and manage scientific knowledge to carry out engineering projects.3)the capability to think objectively, analytically, critically in identifying and solving problems in a systematic manner.4) the capability to deliver or present the project findings in oral and written form. The issues of objectives outcomes, assessment instruments and tools, marking criteria are discussed.

Keywords: project assessment, Final year project, Fuzzy membership function, degree of satisfaction

I. INTRODUCTION

The primary purpose of student project assessment system is to support student learning. By analyzing the results of assessment to determine which student project require further instruction and to reflect on their practice in order to improve student learning. An authentic assessment documents the learning that occurs during the project-building process and considers the real-world skills of collaboration, problem solving, decision making, and communication. Since project work requires students to apply knowledge and skills throughout the project-building process, you will have many opportunities to assess work quality, understanding, and participation from the moment students begin working. Assessment of final year projects requires a systematic aproach for these rubrics are becoming a standard for such assessment. Rubrics are defined for all presentations based on the rubrics students are awarded marks; once all assessments are completed projects are awarded marks.

II. GROUP PROJECTS ASSESSMENT

Assessment may be defined as "any method used to better understand the current knowledge that a student possesses." This implies that assessment can be as simple as a teacher's subjective judgment based on a single observation of student performance, or as complex as a five-hour standardized test. The idea of current knowledge implies that what a student knows is always changing and that we can make judgments about student achievement through comparisons over a period of time. An assessment rubric can be framed and used for student performance in projects at various stages and the project can be rated according to the scores obtained by the respective group/team of students.

The main purpose of assessment is to:

*Assign task
* Monitor student progress
* Carry out task/project evaluation and refinement
* Provide mastery/promotion/grading and other feedback
* Motivate students
* Determine grades and award marks.

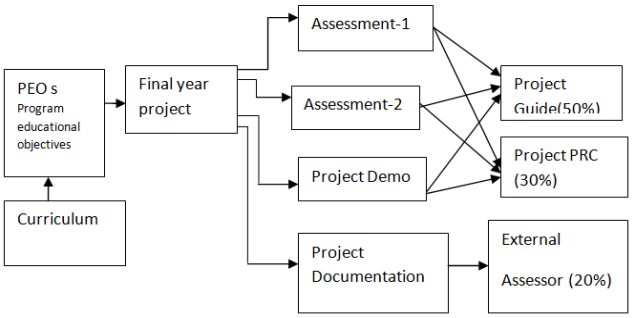

Fig: Final Project Assessment Process

III. PROPOSED METHODOLOGY

Nowadays, implementing Outcome Based Education (OBE) to evaluate course outcomes (CO) and program outcomes (PO) is a standard practice. This includes the evaluation of the final year degree project (FYP) since FYP is a major component of the undergraduate degree course in Engineering. The evaluation of FYP mainly consists of two stages. The first stage involves the evaluation of the project presentation by an allotted Guide or supervisor. The second stage involves the evaluation the progress by the respective Project Supervisor (PS). These procedures are inconsistent in nature as each stage involves many lecturers from different background of disciplines .Furthermore, there were no specific guidelines for the grading process and lecturers would rely on their

ISSN (Print) : 2319-5940
ISSN (Online) : 2278-1021

International Journal of Advanced Research in Computer and Communication Engineering
Vol. 2, Issue 9, September 2013

experiences, resulting large variance between the seniors and juniors judgments in giving the marks. To overcome such problem a rubric based assessment for every activity will be designed and distributed to the students so that they know the evaluation levels.

TABLE I
Normalized Values

Criteria	Total Marks	Marks Obtained	Normalized Value
Student assessment -1 (c1)	100	80	0.80
Student assessment -2 (c2)	100	70	0.70
Oral Presentation (c3)	100	75	0.75
SRS presentation (c4)	100	72	0.72
Analysis Design Presentation(c5)	100	69	0.69
Main project presentation(c6)	100	64	0.64
Project Demonstration(c7)	100	59	0.59
Project Report (c8)	100	55	0.55

Step 1*: Normalize the marks*

The marks obtained by each of the student have to be converted to the normalized values. Normalized value is referred to a value in a range of [0, 1]. It can be obtained by dividing the mark for each criterion with the total mark. This will be the input value of this evaluation. Table 1 tabulates the example marks and the normalized values obtained by a student for all the criteria..

Step 2: *Developed the graph of the Fuzzy Membership Function.*

The graph of membership function is developed in order to execute the fuzzification process. In this process, the input value is mapped into the graph of membership function to obtain the fuzzy membership value of that particular input value. Each membership value will represent the level of satisfaction.
Table 2 : shows five satisfaction levels that have proposed in this study. It is based on the linguistic term. The degree of satisfaction shows the range of marks for each satisfaction level which are based on some grading system. The maximum degree of satisfaction denoted by T(xi) describes the mapping function for corresponding satisfaction level where T(xi) ->[0,1]

Step 3: *Calculate the degree of satisfaction*

The degree of satisfaction of j th criteria which denoted by $D(c_j)$ is evaluated by x

$$D(Cj) = y1 * T(x1)y2 * T(x2) + \cdots .8 * T(x4)/y1+y2+\ldots\ldots y8 \quad [1]$$

Where y i = degree of membership value for each satisfaction level,y1

Step 4: Compute the final rank

TABLE III
Satisfaction Levels

Satisfaction Levels(Xi)	Degrees of Satisfaction	Maximum Degrees of Satisfaction T(xj)
BEST	84%-100%(0.84-1.0) 79%-83%(0.79-0.83) 75%-78%(0.75-0.78)	1.0 0.83 0.78
AVERAGE	70%-74% (0.70-0.74) 65%-69%(0.65-0.69) 60%-64%(0.60-0.64)	0.74 0.69 0.64
SATISFACTORY	54%-59% (0.54-059) 47%-53%(0.47-0.53) 40%-46%(0.40-0.46)	0.59 0.53 0.46
POOR	35%-39%	0.39

The final mark for kth student denoted by F(sk) is calculated using the formula below:

$$F(Sk) = w1 * D(C1) + w2 * D(C2) + \cdots .w5 * D(C8)/w1 + w2 + \cdots .. w8 \quad [2]$$

Where wi = the total marks of ith criteria for I = 1,2,…8

The result obtained is put into the fuzzy grade sheet (table 3) in the appropriate columns.

Final Marks of Student
Table III

Project	Criteria	FUZZY MEMBERSHIP VALUE										Degree of satisfaction	Final Mark
		A+	A	A-	B+	B	B-	C+	C	C-	D	F		
Group 1	C1	0.4	0	0	0.6	0	0	0	0	0	0	0	0.844	0.75
	C2	0	0	0	0.62	0	0	0.38	0	0	0	0	0.683	
	C3	0	0.4	0	0	0	0.6	0	0	0	0	0	0.746	
	C4	0.81	0	0	0.19	0	0	0	0	0	0	0	0.956	
	C5	0	0	0.38	0	0.62	0	0	0	0	0.8	0	0.724	
	C6	0	0	0	0	0,57	0	0.43	0	0	0	0	0.647	
	C7	0	0	0.4	0	0	0	0.6	0	0	0	0	0.666	
	C8	0.2	0	0	0	0	0.8	0	0	0	0	0	0.752	

NUMERICAL EXAMPLE: As an illustration, the example mark of a student is taken (as in table 1).The student is evaluated based on procedure mentioned earlier. The graph of membership function is generated to execute the fuzzification process in step 2 is shown in figure 5.

ISSN (Print) : 2319-5940
ISSN (Online) : 2278-1021

International Journal of Advanced Research in Computer and Communication Engineering
Vol. 2, Issue 9, September 2013

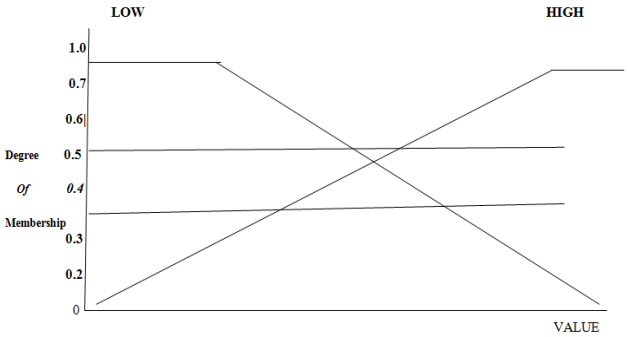

Fig: Graph of membership function

Based on the figure 1 we can see the satisfaction level of BEST and AVERAGE that represent the degree of membership 0.4 and 0.6 respectively. The degree of satisfaction regarding criterion 1 is calculated as follows:

D(Ci) = (0.4 *1.0+0.6 *0.74) / (0.4+0.6) = 0.844

The same procedure is applied for calculating the D(C1),D(C2) ….D(C8)

Finally, the final mark earned by the student for all criteria is computed using [2].

F(s1) = 100*0.844 +100 * 0.683+100 * 0.746 + 100 * 0.956 +100*0.724+100*0.647+100*0.666+100*0,752/800

= 0.752
=0.75

Based on the final mark obtained, the student is awarded by the fuzzy linguistic terms of Grades A+,A,A- ,B+ B B-,C+C,C-,D,F .The details of the fuzzy marks obtained from this evaluation procedure as shown in table 4

TABLE IV
MARKS & GRADES

MARK	GRADE
84-100	A+
79-83	A
75-78	A-
70-74	B+
65-69	B
60-64	B-
54-59	C+
47-53	C
40-46	C-
35-39	D
0-34	F

V CONCLUSION AND FUTURE DIRECTION

From the structure and the evaluation developed for the final year projects ,it can be concluded that not only are our students are exposed to intensive report writing and oral presentations ,they are also being trained to develop necessary skills such as project management, time management ability to think objectively, analytically and critically in identifying and solving the problems in a systematic manner. These are important elements needed when it comes to the real life working scenarios. The regular assessments and feedback can be used to advise the students of their progress at different levels throughout the project duration. At and end the Final assessment of the projects can be done as BEST AVERAGE POOR and SATISFACTORY.

ACKNOWLEDGEMENT

I am heartily thankful to Principal, Sri Dathha Engineering college Whose encouragement and support resulted in the preparation of paper.I am thankful to our Dept HOD &Vice Principal for his encouragement, guidance and support from the initial to the final level

REFERENCES

[1] Fuzzy Logic with Engineering Applications By Timothy J. Ross
[2] IEEE TRANSACTIONS ON EDUCATION, VOL. 43, NO. 2, MAY 2000 237
Fuzzy Set Approach to the Assessment of Student-Centered Learning Jian Ma and Duanning Zhou
[3] Fuzzy Logic - Lotfi A. Zadeh, Berkeley
[4] Chickering, Arthur W., and Zelda F. Gamson. March 1987. "Seven Principles of good practice *AAHE Bulletin* 39: 3-7. ED 282 491. 6 pp. MF-01; PC-01.
[5] Cochran, Leslie H. 1989. *Administrative Commitment to Teaching.* Cape Girardeau, Mo.: Step Up, Inc.
[6] Hyman, Ronald T. 1980. *Improving Discussion Leadership.* New York: Columbia Univ., Teachers College
[7] Lowman, Joseph. 1984. *Mastering the Techniques of Teaching.* San Francisco: Jossey-Bass.
[8] McKeachie, Wilbert J., Paul R. Pintrich, Yi-Guang Lin, and David A.F. Smith. 1986. *Teaching and Learning in the College Classroom: A Review of the Research Literature.* Ann Arbor: Regents of The Univ. of Michigan. ED 314 999. 124 pp. MF-01; PC-05.
[9] Penner, Jon G. 1984. *Why Many College Teachers Cannot Lecture.* Springfield, Ill.: Charles C. Thomas.
[10] University of Nottingham (1999), 'Faculty of Engineering Undergraduate Handbook 1999/2000', University of Nottingham, UK.
[11]PBLE Consortium (2001), 'Project Based Learning in Engineering – Good Practice Framework Document, Draft document 20th August 2001'.
[12]Proceedings of the 2005 Regional Conference on Engineering Education 336 December 12-13, 2005, Johor, Malaysia

BIOGRAPHY

G.Meenakshi received her M.C.A degree in 2001 and M.Tech degree in 2010 and presently working in the department of computer science as Asst.prof in Sri of Science and Engineering DathhateInstiturEngineering and Science College Hyderabad Andhra Pradesh.Her research area is Artificial Intelligence(Fuzzy logic).Have already published a paper titled "Multi source feedback based performance appraisal system using Fuzzy logic decision support system" in IJSC(International journal on Soft computing) February 2012 issue.

Second paperTitled "- A Rubric based Assessment of Student Performance Using Fuzzy Logic**.-presented in Proceedings of the Second International Conference on Soft Computing for Problem Solving (SocProS 2012), December 28-30, 2012 and published in SPRINGERISBN 978-81-322-1601-8.**

She is a professional member IEEE and IACSIT.