

# Effective Evaluation Methodology of Undergraduate Project

Mohammad Rashid Hussain, Mohammed Qayyum, Mohammad Ashiquee Rasool, Imran Hassan

**Abstract:** *The objective of the paper is, to propose one of the best approaches of quality assessment of undergraduate project. In introduced methodology, some criteria's and sub-criteria's have been proposed. The Examiners and Supervisor may use this approach for grading the level of students of a particular group (Project). The recommended approaches are mathematical, which are evaluating the weight-age, performance, and contribution of individual member in their respective group. To sort out the existing issues, Result has been collected in the form of passive observation. The supervisor has to observe an individual one based on different observation techniques. i.e. the process of questionnaire and task assigned to individual one for self-evaluation and maintain a log-book for future reference.*

**Index Terms:** *Project Assessment; Self-Assessment; Group-Evaluation; individual- weightage; passive-Observation; log-table.*

## I. INTRODUCTION

Introduced approach provides an effective result to develop the interest of every members of a particular project. To develop a project with the support of all the members which are involves in a particular project, their work dedication is required to achieve their work plan with excellent result. The aim of this approach to justify their grades based on their contribution on different stages of the development of project. The collaborative work creates interest between the group members to work with full dedication to achieve their goals. In this paper, the method which has been implemented to justify their work contribution, which helps to examiners and supervisor to justify them based on different scale. In some existing approach, there are only few criteria's to scale their performance, which does not differentiate their work exactly. The group members who just stand with other members is also get the same marks like deserving one. To avoid this drawback, we introduced criteria's and sub-criteria's of different levels, which help examiners and supervisor to scale their marks. The Study of introduced approach asks: How criteria's and sub-criteria's are helpful for grade allocation of individual one? Are introduced strategies being useful for the evaluators to justify the

performance of individual members?

## II. RELATED WORK

The group work increase the work efficiency and helps them to achieve their goals. It is effective at some instances, but there are some drawbacks for deserving candidates which cause de-motivation, because some of the member gets excellent grades like deserving one, only due to the member of group. Simon Williams 2016 Investigated individual grading concept [1], Mohammad Rashid Hussain 2017, introduced a method for Project Quality Assessment [2], Bryan W. Griffin 2016, introduced an instruction which is for motivation and rating of students [4], Ian Jones 2015, has introduced Peer assessment of comparative and absolute judgment [6], Stavroula Valiandes 2015, has evaluated the impact on different information on education and studying in mixed classroom environment.

### A. Group Assessment

The different studies have searched the Collaborative assessment; Simon Williams 2016 [1] and Mohammad Rashid Hussain 2017 [2] have introduced individual grading criteria based on project learning. The collected information which are useful for project developers to evaluate themselves on different scale of performance measurement. To achieve the goal under deadlines needs support of each other, sharing of ideas, listening to each other in a group, acceptance of individual ideas, everyone should respect the ideas of each other. There are two main concepts exist for the assessment, which have been introduced by Bryan W. Griffin 2016 [4] and Ian Jones 2015 [6] i.e. Egalitarian fair judgment. And equitable fair judgment.

### B. Data Collection

To judge and award the marks to individual member of a group, based on their performance. It is a big task for evaluators, especially for examiners to justify their grade based on their live performance of few minutes. The method which we have proposed made this task easy. To evaluate them individually and award them accordingly, there are certain scale have been defined based on different criteria's, which justify their marks distribution by examiners as well as supervisor. The supervisor of a particular group can maintain a wiki logs to write their regular contribution and performance through regular interaction, and scale their marks. To make a project effective with different performance level of students to work together in a small group towards a common goal is also a big task of supervisor. The collaborative and cooperation between them, helps to work better and enhance critical thinking achieve their goals, because success of one students helps other students to be successful.

**Manuscript published on 30 March 2019.**

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C. Research Design

Assessment framework for overall assessment approach have answered the research questions, which helps the examiners and supervisor to justify their individual grades based on continuous learning, Simon Williams [1] is a suitable example of assessment approach of project quality with different ways that have been introduced in our proposed approach.

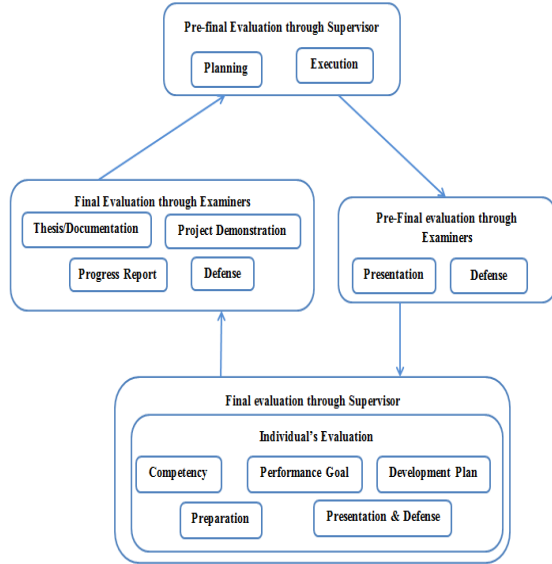


Figure 1 Assessment Framework for Overall Assessment approach

D. Codes

Table 1 Performance level awarded by supervisor

Performance Level (P <sub>i</sub> )	Excellent -Outstanding (9.00-9.99)	V. Good-Excellent (8-8.99)	Good – V. Good (7.00-7.99)	Satisfactory -Good (6.00-6.99)
Numeric value (N <sub>v</sub> )	α=9, α+=9.99	β=8, β+=8.99	γ=7, γ+=7.99	δ=6, δ+=6.99

Table 2 Range of weights with their respective weight codes

Range of weights	Codes	Weight code
0 to Φ <sub>1</sub>	C1	W1, W3 to W5, W7 to W17 and W20
0 to Φ <sub>2</sub>	C2	W18
0 to Φ <sub>3</sub>	C3	W2 and W21 to W24
0 to Φ <sub>4</sub>	C4	W19

$\Phi_1 = 0.50, \Phi_2 = 0.30, \Phi_3 = 0.25, \Phi_4 = 0.20$  (1)

Here, equation (1) indicates the weight of different sub-criteria's. Table-3 helps the evaluator to evaluate the performance of all group members at pre-final and final level.

Table 3 Assessment criteria, numeric weight codes & weights

Pre-final evaluation through Supervisor			
Criteria	Sub criteria	Weight(Φ <sub>y</sub> , j =	Weight code W <sub>i</sub> i = 1 to 6
Planning(P)	Project Plan and Team Roles	Φ <sub>1</sub>	W1
	Performance	Φ <sub>3</sub>	W2
Execution (E <sub>x</sub> )	Project initiative	Φ <sub>1</sub>	W3
	Logbook	Φ <sub>1</sub>	W4

	Attendance at both Lectures and Weekly meetings	Φ <sub>1</sub>	W5
	Attitude	Φ <sub>3</sub>	W6
Pre-final evaluation through examiners			
Criteria	Sub criteria	Weight(Φ <sub>y</sub> , j =	Weight code W <sub>i</sub> i = 7 to 11
Presentation (P <sub>i</sub> )	Contents, Structure, Clarity, Use of slides	Φ <sub>1</sub>	W7
	Flow and timing	Φ <sub>1</sub>	W8
	language and delivery	Φ <sub>1</sub>	W9
Defense (D <sub>ip</sub> )	Breadth and Depth of knowledge (Theoretical)	Φ <sub>1</sub>	W10
	Breadth and Depth of knowledge (Practical)	Φ <sub>1</sub>	W11
Final evaluation through Supervisor			
Criteria	Sub criteria	Weight(Φ <sub>y</sub> , j =	Weight code W <sub>i</sub> i = 12 to 16
Individuals Evaluation (I <sub>e</sub> )	Competency	Φ <sub>1</sub>	W12
	Performance goal	Φ <sub>1</sub>	W13
	Development Plan	Φ <sub>1</sub>	W14
	Preparation	Φ <sub>1</sub>	W15
	Presentation and defense	Φ <sub>1</sub>	W16
Final evaluation through examiners			
Criteria	Sub criteria	Weight(Φ <sub>y</sub> , j =	Weight code W <sub>i</sub> i = 17 to 24
Thesis/ Documentation (T <sub>h</sub> )	Work (originality, breadth and depth)	Φ <sub>1</sub>	W17
	Presentation and Structure	Φ <sub>2</sub>	W18
Project Demonstration (P <sub>d</sub> )	Clarity	Φ <sub>4</sub>	W19
	Quality and explanation of project software	Φ <sub>1</sub>	W20
Progress Report (R <sub>p</sub> )	Contents, Structure, Clarity, Use of slides	Φ <sub>3</sub>	W21
	Flow, Timing, Delivery	Φ <sub>3</sub>	W22
	Breadth and Depth of Knowledge (theoretical)	Φ <sub>3</sub>	W23
	Breadth and Depth of Knowledge (practical)	Φ <sub>3</sub>	W24

Table 4 Variables and its respective codes

Variables with its codes	Variables with its codes	Variables with its codes
Project's Title P <sub>t</sub>	Logbook L <sub>b</sub>	Development Plan D <sub>p</sub>
Supervisor's Name N <sub>s</sub>	Attendance at both Lectures and Weekly meetings A <sub>t</sub>	Preparation P <sub>n</sub>
Different section number S <sub>n</sub>	Attitude A <sub>id</sub>	Presentation and defense P <sub>d</sub>
University id's U <sub>id</sub>	Contents, Structure, Clarity, Use of slides C <sub>s</sub>	Work (originality, breadth and depth) W <sub>o</sub>
Student's Name N <sub>st</sub>	Flow, Timing & Delivery F <sub>id</sub>	Presentation and Structure P <sub>s</sub>
Examiners E <sub>s</sub>	language and delivery L <sub>d</sub>	Clarity C <sub>y</sub>

Project Plan and Team Roles	P <sub>p</sub> & T <sub>r</sub>	Breadth & Depth of knowledge (Theoretical)	K <sub>t</sub>	Quality and explanation of project s/w	Q <sub>ps</sub>
Performance goal	P <sub>g</sub>	Breadth & Depth of knowledge (Practical)	K <sub>p</sub>	Performance	P <sub>c</sub>
Project initiative	P <sub>i</sub>	Competency	C <sub>c</sub>		

$$\text{Sum of Weight Codes} = \sum_{i=0}^{1,2,\dots,24} W_i \quad (2)$$

Where, The weight code of different sub criteria is “W”. Mathematical symbols ( $\lambda, \lambda+, \delta, \delta+, \dots, \alpha+$ ) have coded for marks distribution, which helps the supervisor to evaluate individual performance with the help of numeric value (Nv).

$$\text{Performance measurement}(F_m) = Nv * \sum_{i=0}^{1,2,\dots,24} W_i \quad (3)$$

The overall performance of individual member of a particular group can be evaluated through equation (3).

### E. The Project

To reward individual members of a particular project based on their contribution over the development of project. The proposed approach has different perspective to evaluate their contributions because the quality of project in undergraduate education cannot differentiate the work of individual members. In our application, measuring the project quality of undergraduate education, we have proposed the following perspectives; Planning, Progress Report, Poster, Execution, Project Demonstration, Thesis, Presentation and Defense. These selected perspectives have given to the examiners to measure the performance and award the grades with respective weight code. The final perspective is quality measuring of undergraduate project of satisfaction level of students and graduates of the programs.

**Table 5 Individual-assessment of Group-Evaluation, Results from Table 1& 3**

P <sub>t</sub>		X			
N <sub>s</sub>		Y			
S <sub>n</sub>		Z			
U <sub>id</sub>		U <sub>id,1</sub>	U <sub>id,2</sub>	...	U <sub>id,n</sub>
N <sub>st</sub>		N <sub>st,1</sub>	N <sub>st,2</sub>	...	N <sub>st,m</sub>
E <sub>s</sub>		E <sub>s1 to m</sub>	E <sub>s1 to m</sub>	E <sub>s1 to m</sub>	E <sub>s1 to m</sub>
P	P <sub>p</sub> & T <sub>r</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>
	P <sub>g</sub>	C <sub>3</sub>	C <sub>3</sub>	C <sub>3</sub>	C <sub>3</sub>
	P <sub>i</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>
E <sub>x</sub>	L <sub>b</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>
	A <sub>t</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>
	A <sub>id</sub>	C <sub>3</sub>	C <sub>3</sub>	C <sub>3</sub>	C <sub>3</sub>
P <sub>r</sub>	C <sub>s</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>
	F <sub>id</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>
	L <sub>d</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>
D <sub>ip</sub>	K <sub>ip</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>
	K <sub>pp</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>
	C <sub>c</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>
I <sub>e</sub>	P <sub>c</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>
	D <sub>p</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>
	P <sub>n</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>
T <sub>h</sub>	P <sub>d</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>
	W <sub>o</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>

R <sub>p</sub>	P <sub>s</sub>	C <sub>2</sub>	C <sub>2</sub>	C <sub>2</sub>	C <sub>2</sub>
	C <sub>ty</sub>	C <sub>4</sub>	C <sub>4</sub>	C <sub>4</sub>	C <sub>4</sub>
	C <sub>s</sub>	C <sub>3</sub>	C <sub>3</sub>	C <sub>3</sub>	C <sub>3</sub>
D <sub>if</sub>	F <sub>id</sub>	C <sub>3</sub>	C <sub>3</sub>	C <sub>3</sub>	C <sub>3</sub>
	K <sub>tr</sub>	C <sub>3</sub>	C <sub>3</sub>	C <sub>3</sub>	C <sub>3</sub>
M <sub>o</sub>	K <sub>pf</sub>	C <sub>3</sub>	C <sub>3</sub>	C <sub>3</sub>	C <sub>3</sub>
	M <sub>o,1</sub>	M <sub>o,2</sub>	...	M <sub>o,n</sub>	M <sub>o,n</sub>

In table-5. All the variables are defined and their weight in table-3. Where, m and n represents number of examiners and number of students of groups.

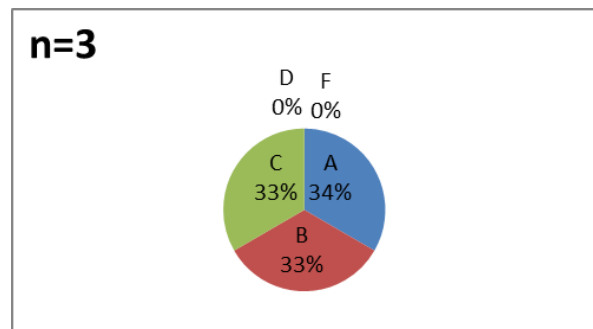
### III. TRUSTWORTHINESS

The Guba’s criteria’s represents the trustworthiness of data which is presented in this study (1. dependability, 2. transferability, 3. credibility, & 4. confirm- ability) with the Shenton, these four have been considered. Students fair assessment methodology which is trustworthiness are depends on introduced criterias, which have been introduced by Mohammad Rashid Hussain [2], the introduced methodology of trustworthiness of the data presented in nine criteria’s are 1. Planning, 2. Execution, 3. Presentation, 4. Defense (Pre-final), 5. Individual evaluation, 6. Thesis/ Documentations, 7. Project demonstration 8. Progress Report and 9. Defense (Final).

**Table 6 Result evaluation- Performance based**

Grade Range	Codes	Grades =>	A	B	C	D	F	Pass %	Fail %	
90≤(M <sub>o_100</sub> )≤100	R <sub>1</sub>	Range =>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	R <sub>5</sub>	R <sub>6</sub>	R <sub>7</sub>	
80≤(M <sub>o_100</sub> )≤89	R <sub>2</sub>	n=3 P <sub>i</sub> =x <sub>1</sub> N <sub>i</sub> =y <sub>1</sub> S <sub>n</sub> =z <sub>1</sub>	1	1	1	0	0	100%	0%	
70≤(M <sub>o_100</sub> )≤79	R <sub>3</sub>	Total no. of Students of indivi-dual Section =>	1	2	0	0	1	75%	25%	
60≤(M <sub>o_100</sub> )≤69	R <sub>4</sub>									n=4 P <sub>i</sub> =x <sub>2</sub> N <sub>i</sub> =y <sub>2</sub> S <sub>n</sub> =z <sub>2</sub>
0≤(M <sub>o_100</sub> )≤59	R <sub>5</sub>									n=3 P <sub>i</sub> =x <sub>3</sub> N <sub>i</sub> =y <sub>3</sub> S <sub>n</sub> =z <sub>3</sub>
60≤(M <sub>o_100</sub> )≤100	R <sub>6</sub>		0	0	0	0	3	0.00%	100%	
0≤(M <sub>o_100</sub> )≤59	R <sub>7</sub>									

Result based on performance, Pass % = 100-((No. of fail students/n)\*100).



**Figure 2 Result evaluation of different sections (n=3)**

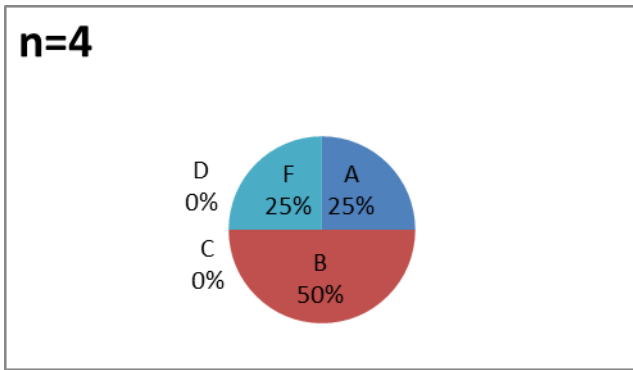


Figure 3 Result evaluation of different sections (n=4)

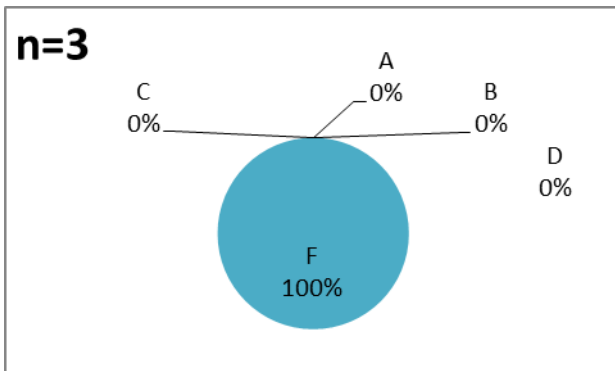


Figure 4 Result evaluation of different sections (n=3)

The above representation shows the result of different sections based performance of individual one. Here, A, B, C, D and F are showing the level of grades, where A is the higher grade and F is the grade of fail students.

## IV. CONCLUSION

In this Research, the methodology which have been introduced, Shows fair and justified approach to evaluate and award the grade to individual one based on work performance and their regular contribution over the project to reach up to the results, This approach is not only to justify their marks, it also helps to the examiners and Supervisor to judge them based on different levels of scales or Criteria's and its sub-criteria's, The assessment approach of Supervisor and examiners are different, Supervisor approaches are in regular basis and it is not difficult for him to justify but for the examiners, it's not easy to justify and award them based on their presentation and based on some certain criteria's, He needs different level of scale to judge them individually.

To create a group for a particular project, it is important to find the group members based on their respective fields (area of interest). They must be on similar fields to work together in comfort zone. Their regular assessment and fair judgments make them comfortable to work in collaborative environment. They must know the assessment process of supervisor and examiners. So, they may choose field of marks distribution to concentrate over selective area to achieve a good grade. Supervisor must use the wiki log to maintain the record of individual one on regular basis to reward their score. Marks awarded by supervisor and examiners in pre-final and final, makes students grade better. So, the judgment needs some proper instructions to award them on the basis of their contribution on project. In this paper, some criteria's have been defined for supervisor and

for examiners, which will help them to give fair assessment of individual one. At the end of the conclusion, we find this approach to reduce the complexity as compare to existing methodology which has less number of criteria's.

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