



Rubrics as an Analytical Tool for Indian Business Schools with conceptual model using SEM

Dibyendu Choudhury

Associate Professor,

Regional College of Management, Autonomous, Bhubaneswar India

***Abstract** Tremendous growth in higher education systems world over in the past two decades has brought to the fore issues of quality in curriculum design, delivery, assessment and overall learning. Innovative and new pedagogy have attracted a lot of attention, and conventional teaching methods such as lectures have been back-stage. Case based teaching is inherent in graduate level business programmes as it offers ample additional pedagogical opportunities. It also provides a comprehensive and holistic view of management. Although an effective teaching method, assessments in the case based approach presents several challenges to the instructor as the responses provided by the students cannot be evaluated objectively. This demands an assessment process that reduces subjectivity and standardizes the grading with a conceptual framework designing through proper modeling SEM.*

Rubrics are an objective assessment instrument that provides a framework for identifying various learning dimensions on a topic and stipulating a grading scale for each dimension including the part of education, we need to quantify both the impact in education and learning outcome through this model. This study presents the process of developing and applying rubrics to assess students' performance in a course taught using cases and development of conceptual framework. The results from the experience indicate that rubrics are not only an effective assessment tool but also provide a large amount of data that could be analyzed to provide appropriate feedback to students, moreover it would quantify the learning and academic outcome. Continuous improvements in curriculum and pedagogy are also supported by the data generated from such assessments. Also, effective use of rubrics facilitates instructors and administrators to know about the quality of the programme and the effectiveness of the course and its pedagogy. This reiterates that use of rubrics for grading cases enhances the potential of case based teaching.

Key Words: *Assessment, Rubrics, Higher Education, Case Method, Conceptual Model of Learning Outcome*

Introduction

Education aims at creation of teaching and learning environments not only to produce more knowledgeable, skilled individuals but also to bring about positive changes in the attitudes and values of learners. Higher education systems world over has seen tremendous growth in the past two decades and the recent five years has witnessed the entry of new types of institutions, forms of delivery and collaborative partnerships not only between institutions but also industry and professional associations (Altbach and Knight, 2007). The increasing demand for higher education coupled with its internationalization has brought to the fore issues of quality assurance in curriculum design, delivery, assessment and overall learning. Quality assurance for higher education programmes has assumed top priority as it is expected to create students with industry relevant skills, a broad knowledge base and a set of competencies that are required to enter the complex and interdependent world (Altbach et al., 2009). Quality is a multidimensional concept, the definition of which is constantly changing. Apart from the national level regulatory bodies, many private and public associations are involved in accrediting institutions of higher education to ensure quality. The increasing number of accrediting bodies and their ever changing standards (requirements) bear testimony to the fact that quality assurance is of paramount importance to educational institutions.

In addition to the several other requirements of accrediting bodies, assessment of learning outcomes has evolved as a major challenge to many institutions. The effectiveness of the teaching learning process is made evident through the assessment process and results. A well planned and executed assessment process aids to obtain information on the effectiveness of the learning environment and to diagnose strengths and weaknesses leading to remedial action (Atkins et al, 1993). Internationally, students are becoming more diverse due to their socio-economic, demographic and educational background that mandates an assessment method that is not faculty – led but student – centric (Brown, 2005). A standardized assessment package is one way of reducing the variations in the student learning outcomes (Gibson, 2011). This study presents the process of developing and applying rubrics, an objective assessment instrument to assess students' performance in a course taught using cases.

Process of Assessment

Assessment is defined as the systematic collection, review and use of information about educational programmes undertaken for the purpose of improving learning and development (Palomba & Banta, 1999). As assessment is one of the crucial elements of higher education making the educator more accountable in creating learning experiences and achieving significant outcome. 'Why' the assessment is done is more important than 'what' is being assessed and 'how' it is being assessed (Brown , 2005). The reason for assessment will determine the assessment instrument used and the context in which it is done. Student-centric assessments should focus on evidence of achievement (Brown, 2005) with greater emphasis on instruments to measure the students' ability to use the knowledge acquired in class to real life situations. The agents of assessment i.e., the faculty / teacher also determine the rigor & validity of the assessments.

The process of assessment involves gathering information from various sources to understand the extent of students' learning. This data generated from the process should also

help in providing feedback to the students and also to make continuous improvements in curriculum design and delivery. The conventional evaluation methods are not competent to capture qualitative performance and to provide feedback on the same to the students. This mandates an assessment method that is objective and capable of measuring both quantitative and qualitative learning (critical thinking skills, leadership, and communication).

Rubrics – An Alternative Assessment Tool for students grading systems

Rubrics are one such objective assessment / grading instrument that articulates the expectations by listing the criteria and describing levels of quality (Reddy & Andrade, 2010). It is a way of explicitly stating the criteria for student work, of what counts and describing levels of quality from excellent to poor (Andrade & Du, 2005).

The term “rubric” means a scoring sheet to evaluate responses that are given by students. It is used for activities/projects that do not have a right/wrong answer but have responses that are subjective. According to Popham (1997) a rubric has three indispensable features: evaluation criteria, quality definitions and a scoring strategy. Evaluation criteria distinguishes acceptable responses and unacceptable responses, quality definitions provide guidelines to assess the subjective responses of students and the scoring strategy for a rubric can be aggregative or criterion based.

Designing a rubric

Development of a rubric requires clarity in the objectives that are to be achieved at the course level and the programme level (Milbourn, 2012). The constructs that should be measured by the rubric should have a valid representation in it. The rubric should be designed so as to facilitate the instructor in the assessment process. This will ensure reliable, effortless scoring and the instructor will be left with ample time to provide feedback.

Huba & Freed (2000) have identified five essential elements for creating a rubric. They are,

- Levels of Mastery
- Dimensions of quality
- Organizational groupings
- Commentaries
- Description of consequences

Construction of a rubric with the above elements will follow a step by step approach commencing with identification of learning objectives relevant to the skill/knowledge expected from the student followed by fixing the levels of performance and scoring methodology and finally, the actual use of rubric (Reddy, 2011). A rubric thus developed to measure one/many objectives of a course will also be generic enough to measure similar objectives in a variety of courses (Reddy, 2011).

Objective and Methodology of the Study

This study proposes a methodology to design and use rubrics in evaluation of case analysis in a graduate level business programme. The study is about the use of rubrics in the Retail Management course taught as part of the MBA and PGDM programme (320 Students). The course is offered during the second year of the programme and employs the case based method to illustrate concepts and practice.

Case-Based Instruction

The case method is an excellent methodology as cases provide students a glimpse of reality that makes learning more practical and application-based (Dinur and Sherman, 2009). The case method of analysis enhances the problem-solving and analytical thinking skills of the students. Preparing for a case requires a student to explore in detail about the company, identify the issue/s presented, find appropriate data to solve the issue/s and to formulate solution/s to the issue/s identified. The case teaching notes that accompany most of the cases (made available only to the instructor) do not provide a precise answer. The grading of the case analysis is therefore subjective and presents several challenges to the instructor.

Case Analysis at RCMA

The case based method of instruction is employed extensively in the MBA and PGDM programmes of Regional College of Management. At the commencement of the Retail Management course, students were provided inputs to analyze the cases. The class is divided into groups consisting of 5-6 members. Each class is provided with one case per week for analysis and discussion. On a given day, all groups present the same case. Prior to the development of rubrics, the case analysis presentations were evaluated based on four criteria i.e. presentation skills, content/analysis, team coordination and discussion with equal weights to each criteria. The student had a chance to score a maximum of five marks in each criterion. As the marks awarded were subjective, the actual differences in the presentation and analysis of the student were not evident and hence the feedback process was not effective.

To overcome the difficulties in evaluations and feedback it was decided to develop an assessment instrument which can objectively assess the performance of students. Based on review of literature on the use of grading rubrics in assessment of case analysis, a faculty team comprising seven faculty members developed a rubric for assessing the analytical skills of students. The objectives of the Retail Management course were also taken into consideration for developing the rubrics. The Analytical Skills Rubric that was developed contained four criteria, namely, 'problem identification, data identification, tools selected & applied and recommendations'. The criteria were detailed on a five point scale with 'very good', 'good', 'average', 'poor' and 'very poor' levels that indicates the performance of a student in each of the four criteria.

The rubrics were presented to all faculty members and feedback was obtained. As some faculty members felt that the five-point scale was not descriptive and definite in distinguishing 'good' and 'average' levels of performance the scale was modified to a four-point scale. The levels of performance were also changed and were indicated as 'does not meet the criteria',

‘meets the criteria’, ‘accomplished’ and ‘outstanding’. The descriptions for the criteria at the four levels were also changed accordingly.

The revised rubric was presented to a set of students and feedback was sought. They suggested that the ordering of performance levels should start with the best rather than with the worst level of performance. These suggestions were incorporated and the final rubric was designed. The final rubric is presented in Figure 1 below,

Criteria	4 (Outstanding)	3 (Accomplished)	2 (Meets the criteria)	1 (Does not meet the criteria)	Points
Problem Identification	All problems stated clearly	Identifies all important problems	Atleast one problem identified and stated	Problem not related to the given question Recommendation stated as problem Gives only in bullets-not explained Not even 1 problem identified clearly	
Data Identification	Identifies clearly all required and relevant data. Rational segregation of relevant data for required objectives	Identifies data but no rational segregation	Does not distinguish between relevant and irrelevant data	Not able to identify required data	
Tools selected and applied	All problems analysed thoughtfully with atleast 1 tool applied in depth. Chosen correct appropriate tool.	Chosen the tool but not able to apply. (Problem in application)	Tools identified. Not able to segregate rationally. Some correct and some incorrect tools.	Not able to identify even 1 tool	
Recommendations	All problems are given alternative solutions	Few solutions related	Not all solutions related to the problems	No relevant / very few alternatives	
Total Points					

Figure: 1 Analytical Skills Rubric

Deployment of the Analytical Skills Rubric

The modified rubrics were used in assessing the performance of students in the Retail Management course. The course module consisted of 8 cases of which one case was dealt in a week. The rubric that was developed was provided to the students at the commencement of the course and the various criteria and the levels of assessment were explained. This was done to ensure that the scoring pattern was understood by the students and also to help them prepare appropriately for the class. Table 1 shows the assessment data for two cases, Case 1 that was administered in Week one of the course and Case 2 that was administered during the Week six of the course.

Criteria	Case 1			Case 2		
	Min	Max	Average	Min	Max	Average
Problem Identification	2.00	4.00	3.45	2.00	4.00	3.56
Data Identification	1.00	4.00	3.02	2.00	4.00	3.43
Tools selected and applied	1.00	4.00	2.76	1.00	4.00	3.18
Recommendations	1.00	4.00	2.45	1.00	4.00	2.96

Table: 1 Assessment data for Analytical Skills –Year 1

The average scores of Case 1 show that the ‘problem identification’ criteria had the maximum value and ‘recommendations’ had the least value. The average score of 3.45 in problem identification indicates that the students were able to identify the issues in the case and state the problems clearly. But the score for ‘recommendations’ indicates that the students were not able to recommend alternative solutions to the issues identified. Similarly the average score of ‘tools selected and applied’ indicated that the students were not able to apply the various strategic tools to analyze the case. The assessment scores of Case 1 was analyzed by the instructor and necessary conceptual inputs were provided to the students to enhance their ability to use strategic tools to arrive at alternative solutions.

The scores of Case 2 shows improved values that indicated the progress of the students in the various criteria and thereby the overall analytical skills. The result of the conceptual input provided on the strategic tools was evident as the score for the criteria had improved from 2.76 to 3.18. The ability of the students to identify relevant and irrelevant data had also improved (from 3.02 to 3.43) and this was attributed to the number of cases analyzed. The aggregate scores obtained by the teams at the end of the eight cases provided a clear indication of the strengths of each team. But differences in the presentation skills of the students

and nonverbal skills were not captured in the scores. This posed a challenge to the instructor as it was impossible to provide feedback at an individual student level.

Deployment of the Presentation Skills Rubric

Based on the suggestions from students, it was decided to incorporate criteria to assess the presentation skills in addition to assessing the analytical skills. A rubric to assess the presentation skills was developed which consisted of four criteria namely, movement and gestures, elocution, subject knowledge and professionalism of presentation. These criteria were detailed on a four point scale, similar to the Analytical Skills Rubric. The rubric is given below (Figure 2)

Criteria	4 (Outstanding)	3 (Accomplished)	2 (Meets the criteria)	1 (Does not meet the criteria)	Points
Movement and Gestures	Holds attention of entire audience with the use of direct eye contact, seldom looking at notes. Movements seem fluid & help the audience visualize	Consistent use of direct eye contact with audience, but still returns to notes. Made movements or gestures that enhances articulation	Displayed minimal eye contact with audience, while reading mostly from the notes. Very little movement or descriptive gestures.	No eye contact with audience, as entire report is read from notes. No movement or descriptive gestures	
Elocution	Student uses a clear voice and correct, precise pronunciation of terms so that all audience members can hear presentation.	Student's voice is clear. Student pronounces most words correctly. Most audience members can hear presentation.	Student's voice is low. Student incorrectly pronounces terms. Audience members have difficulty hearing presentation	Student mumbles, incorrectly pronounces terms, and speaks too quietly for a majority of students to hear.	
Subject Knowledge	Expresses the subject matter and answers all the questions displaying depth of knowledge	Expresses the subject matter clearly, Student is at ease with expected answers to all questions, without elaboration.	Student is uncomfortable with information and is able to answer only rudimentary questions.	Unable to express the subject matter, no clarity in the thought process; student cannot answer questions about subject.	
Professionalism of Presentation	Captures audience attention. Interesting facts, smooth flow.	Captures audience attention but no smooth flow	Audience has difficulty in following. No logical flow	Audience not drawn to the presentation; Facts and presenter not impressive	
Total					

Figure: 2 Presentation Skills Rubric

The instructor of the course decided to use the rubric for assessments during the subsequent academic year. Analogous to the previous year's process the rubrics were explained to the students prior to the assessments. The assessment data is shown in Table 2 and Table 3 below,

Analytical Skills Criteria	Case 1			Presentation Skills Criteria	Case 1		
	Min	Max	Average		Min	Max	Average
Problem Identification	1.00	4.00	3.05	Movement and Gestures	1.00	4.00	2.77
Data Identification	1.00	4.00	2.97	Elocution	1.00	4.00	2.32
Tools selected and applied	1.00	4.00	2.82	Subject Knowledge	1.00	4.00	2.93
Recommendations	1.00	4.00	2.59	Professionalism of Presentation	1.00	4.00	2.47

Table: 2 – Assessment of Analytical and Presentation Skills of Case 1– Year 2

Analytical Skills Criteria	Case 2			Presentation Skills Criteria	Case 2		
	Min	Max	Average		Min	Max	Average
Problem Identification	1.00	4.00	3.67	Movement and Gestures	2.00	4.00	3.54
Data Identification	1.00	4.00	3.48	Elocution	1.00	4.00	2.73
Tools selected and applied	1.00	4.00	3.39	Subject Knowledge	2.00	4.00	3.23
Recommendations	1.00	4.00	3.19	Professionalism of Presentation	1.00	4.00	3.02

Table: 3 – Assessment of Analytical and Presentation Skills of Case 2– Year 2

A comparison of data in Table 2 and Table 3 shows that the scores of the students have improved on analytical skills and presentation skills. The analytical skill scoring was done at the group level but the presentation skill was scored at an individual level. The learning outcomes achieved through the cases were apparent in the scores of Case 2 that was presented in Week 6. Individual feedback to the students was provided based on the scores obtained in both the skills. This feedback was more meaningful as it identified if the student required improvement in analytical skills or only in the presentation skills.

Formulation of Conceptual Model:

From the data we have certain observed data and few unobserved data. We conceptualize that, all these presentation and analytical skills and their corresponding factors ultimately yield to the education as well as the learning outcome. Hence, the model drawn below with the help of Amos 20.0 fig 1, where we can find that Chi-Square is 24.514 with the degree of freedom 6 and probability (p)= 0.00

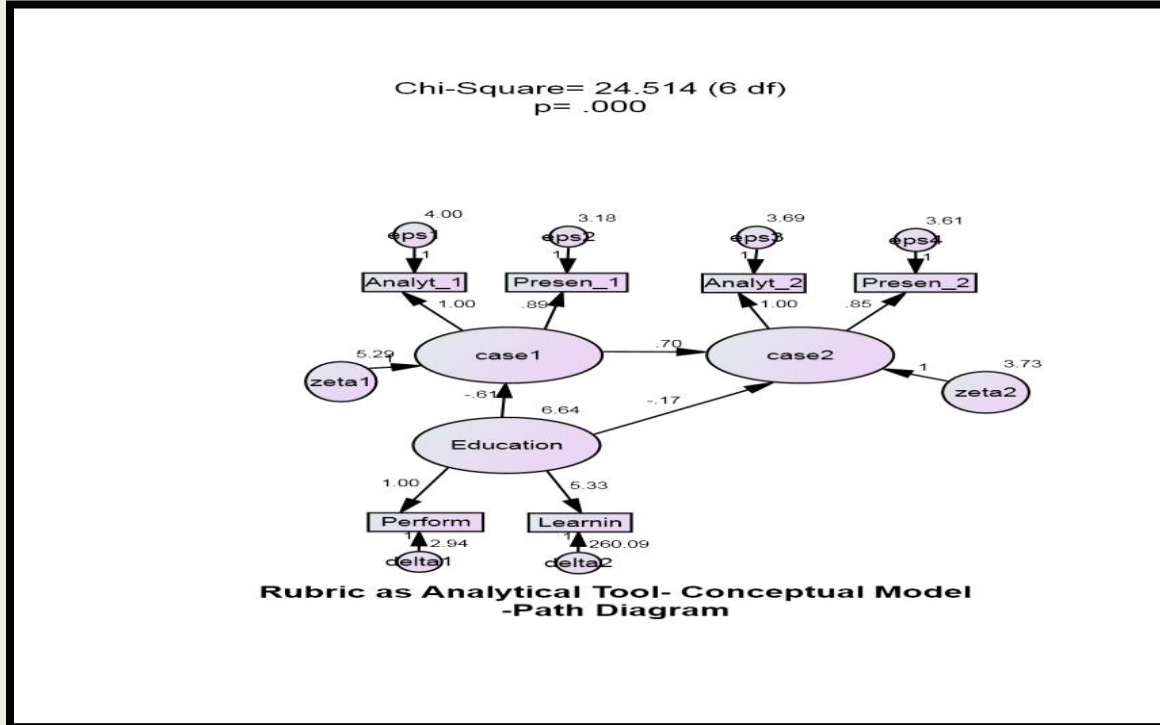


Figure: 3. The conceptual model is given below with its path diagram and Chi-Square

value. Fig-3. The Conceptual model with p (0.000) and higher root mean square (RMSQ). Table 4 shows the model might not be stable enough to support this study with the modification Index set as 4.

Computation of degrees of freedom (Default model)

Number of distinct sample moments:	21
Number of distinct parameters to be estimated:	15
Degrees of freedom (21 - 15):	6

Result (Default model)	
Minimum was achieved	
Chi-square = 24.514	
Degrees of freedom = 6	
Probability level = .000	

	M.I.	Par Change
eps2 <--> eps4	9.095	.823
eps2 <--> eps3	10.989	-.986
eps1 <--> eps4	12.118	-1.067
eps1 <--> eps3	14.018	1.250

Table: 4 Notes for Model (Default model)

Table. 5 shows below the modification indexes with Standardized regression weights.

Standardized Regression Weights: (Group number 1 - Default model)

	Estimate
case1 <--- Education	-.567
case2 <--- case1	.663
case2 <--- Education	-.151
Perform <--- Education	.833
Learnin <--- Education	.649
Analyt_1 <--- case1	.813
Presen_1 <--- case1	.812
Analyt_2 <--- case2	.840
Presen_2 <--- case2	.798

Table:5 Covariances: (Group number 1 - Default model)

The first modification index listed (9.095) is a conservative estimate of the decrease in Chi-Square that will occur if eps2 and eps4 are allowed to be correlated. The actual decrease of the chi-square statistics might be much larger than 9.095. Based on modification index, it does look as though much would be gained by allowing eps1 and eps3 to be correlated. Hence we need to be testing both the options is the following model and try to find the better fit index.(Model A & Model B)

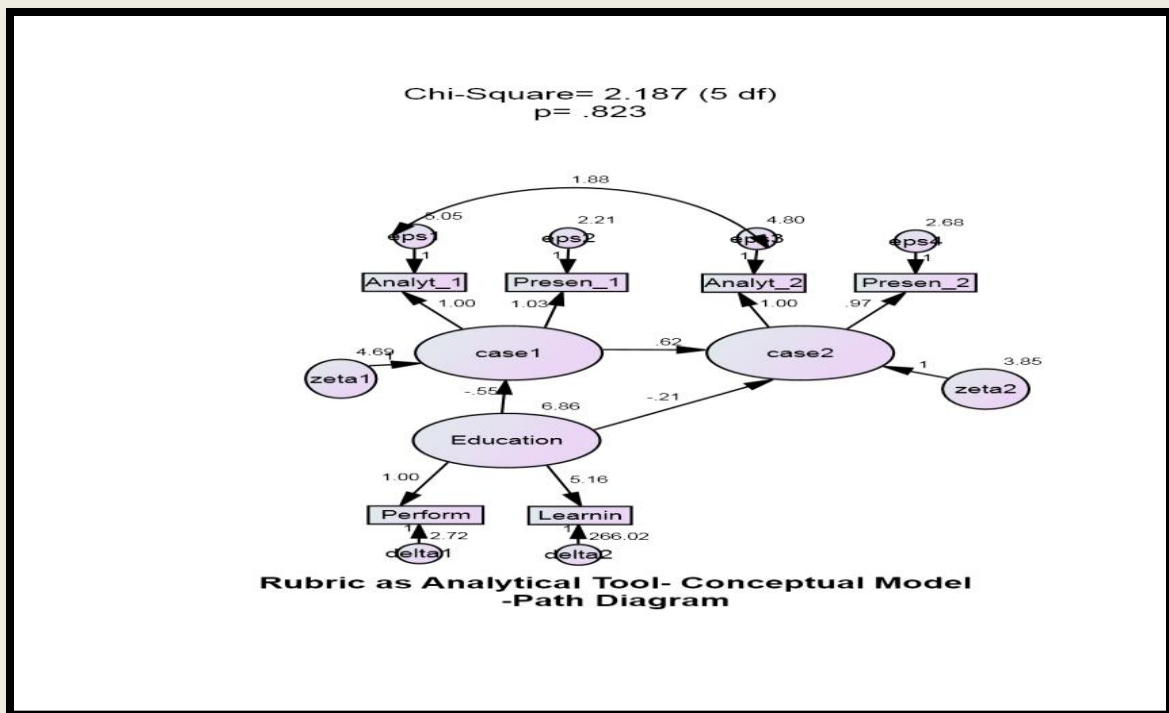


Figure: 4 Rubric as Analytical Tool- Model A, where eps1 and ep3 are correlated.

Where we get the table 6 given below with the Computation of degrees of freedom (Default model)

Number of distinct sample moments:	21	Chi-square = 2.187
Number of distinct parameters to be estimated:	16	Degrees of freedom = 5
Degrees of freedom (21 - 16):	5	Probability level = .823
Result (Default model)		
Minimum was achieved		

	Estimate	S.E.	C.R.	P	Label
case1 <--- Education	-.550	.091	-6.026	***	par_3
case2 <--- case1	.617	.085	7.271	***	par_1
case2 <--- Education	-.212	.084	-2.514	.012	par_2
Perform <--- Education	1.000				
Learmin <--- Education	5.164	.720	7.173	***	par_4
Analyt_1 <--- case1	1.000				
Presen_1 <--- case1	1.027	.091	11.310	***	par_5
Analyt_2 <--- case2	1.000				

Model- B	RMR	GFI	AGFI	PGFI	
Default model	.755	.998	.990	.238	
Saturated model	.000	1.000			
Independence model	12.317	.494	.292	.353	
Presen_2 <--- case2	.971	.084	11.502	***	par_6

Table: 6 The Analysis of Model A where eps1 and eps3 are correlated.

Model A cannot be rejected since the fit of the model is so good, still we will pursue with the possibilities of slowing eps2 and eps4 to be correlated in order to achieve a symmetry that is lacking in the Model A. The raw parameters estimates must be interpreted cautiously since they would have been different if different identification constraints had been imposed. The Chi-Square ratio had been decreased as per our assumption which is much more than 9.095 with the probability (P) = 0.823. The path diagram of Model B shows the standardized estimates and the squared multiple correlations. Because the error variables in the model represent more than just the measurement error the squared multiple correlations cannot be interpreted as estimates of reliabilities rather, each squared multiple correlation is an estimate of a lower bound on the corresponding reliability.

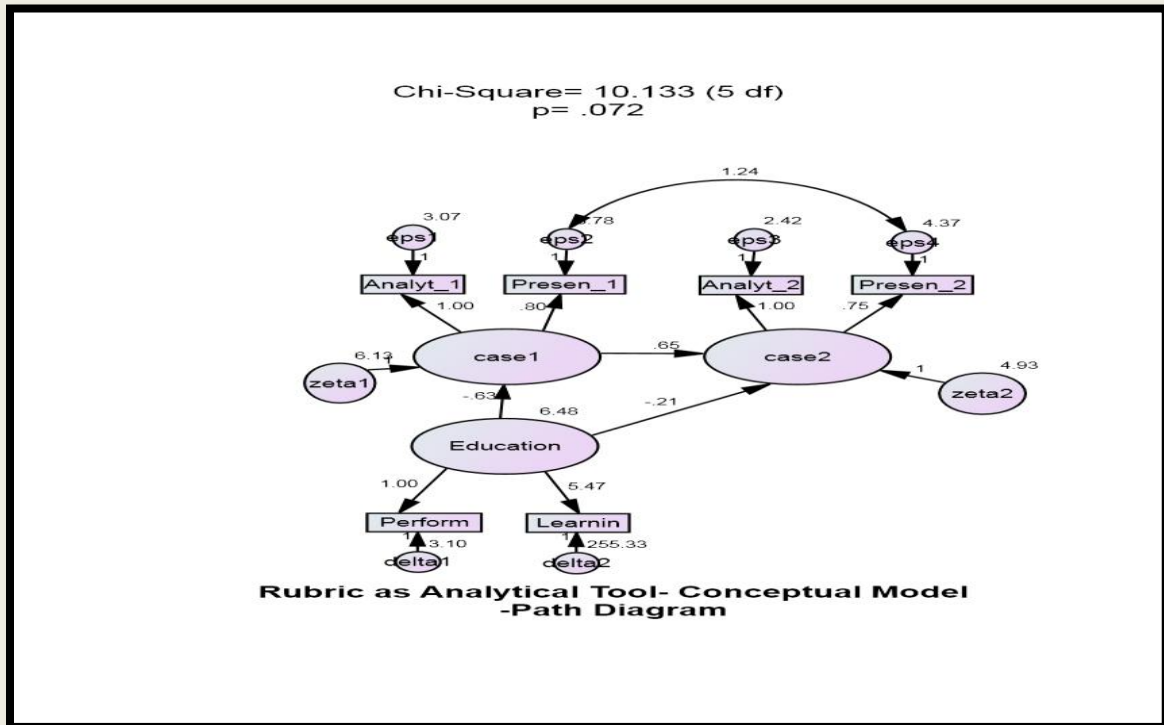


Figure: 5 Rubric as Analytical Tool- Model B, where eps2 and eps4 are correlated.

On the basis of the earlier discussion we reject the Model B because of low fitness index and higher chi-square.

Limitation of the Study: The study happened in a B-School situated in the eastern part of India and also the outcome is dependent upon the effectiveness of the person who dealt the case study methods and the learning outcome. The effectiveness of the instructor is not been measured and hence we may reserve the generalization of the results of this study across India.

This study to be replicated in other parts of India to find the justification of Model A and there to generalize Rubrics as an analytical tool further in Indian scenario.

Conclusion

The experience gained from the process provided a great learning to all the faculty members in developing, using and integrating rubrics into assessments. Although, developing and using rubrics consumed substantial time and efforts of the faculty, the benefits that accrued to the students and the faculty from its use were vast. The assessment data from the use of rubrics as better than the conventional evaluation methods as it revealed the competencies of students across a diverse portfolio of skill sets and to measure the educational outcome with the learning outcome. This provided an added advantage to the instructor as he/she can use a variety of activities specific to the learning objectives.

The study also shows that rubrics constructed for various skill sets can be combined to provide meaningful assessments and hence the need for course-specific rubrics does not arise. The

assessment data gathered from different courses at various stages of the programme also can be used to gauge the consistency of a student's performance during their tenure. For the instructor, the data and the feedback process provide an opportunity to relook and restructure the teaching pedagogy, teaching styles so as to make relevant improvements and adjustments to attain the objective of the course. Aggregate data gathered from assessments is a valuable input to understand the extent to which the learning outcomes of the programme were met. A well planned and implemented assessment process will provide valid input to bring in changes in curriculum design and delivery.

References

- [1] Altbach, P. G., Reisberg, L. and Rumbley, L.E. "Trends in Global Higher Education : Tracking an Academic Revolution", *A Report Prepared for the UNESCO 2009 World Conference on Higher Education*, available at <http://unesdoc.unesco.org/images/0018/001831/183168e.pdf> (accessed February 27, 2012)
- [2] Altbach, P. G. and Knight, J. (2007), "The Internationalization of Higher Education : Motivations and Realities", *Journal of Studies in International Education*, Vol.11, No.3/4, pp.290-305.
- [3] Andrade, H. and Du, Y. (2005), "Student perspectives on rubric-referenced assessment", *Practical Assessment, Research & Evaluation*, Vol. 10 No. 5, available at: <http://PAREonline.net/getvn.asp?v¼10&n¼3> (accessed December 14, 2006).
- [4] Atkins, M. J. and Others. (1993), "Assessment issues in Higher Education", available at: <http://eric.ed.gov/PDFS/ED369370.pdf>
- [5] Brown S, (2005), "Assessment for Learning", *Learning and Teaching in Higher Education*, Issue 1, pp. 81-89.
- [6] Dinur, A. and Sherman, H. (2009), "Incorporating Outcomes Assessment and Rubrics into Case Instruction", *Institute of Behavioral and Applied Management*, pp.291-311.
- [7] Gibson J W, (2011), "Measuring Course Competencies in a School of Business : The use of standardized curriculum and rubrics", *American Journal of Business Education*, Vol.4, No. 8, pp. 1-6.
- [8] Huba, M.E. and Freed, J.E. (2000), *Learner-Centered Assessment on College Campuses: Shifting the Focus from Teaching to Learning*, Allyn and Bacon, Boston, MA.
- [9] Milbourn, G. (2012), "Teaching Tip: Using Rubrics Across Multiple Business school Student Tasks: A Special Focus on Service", *The Journal of American Academy of Business, Cambridge*, Vol. 17, No. 2, pp.37-42.
- [10] Palomba, C.A. and Banta, T.W. (1999), *Assessment Essentials: Planning, Implementing, and Improving Assessment in Higher Education*, Jossey-Bass, San Francisco.
- [11] Popham, W. (1997), "What's Wrong—and what's Right—With Rubrics", *Educational Leadership*, Vol. 55, No. 2, pp.72-75.
- [12] Reddy, M.Y. (2011), "Design and development of rubrics to improve assessment outcomes : A pilot study in a Master's level business program in India", *Quality Assurance in Education*, Vol. 19 No. 1, pp. 84-10.
- [13] Reddy, Y. and Andrade, H. (2010), "A Review of Rubric Use in Higher Education", *Assessment & Evaluation in Higher Education*, Vol. 35, No. 4, pp.435-448.