



A Study of Implementation of Rubric Based Assessment of Automobile Technology Vocational Subjects under NSQF in the Selected School of Haryana and Himachal Pradesh

Tribodh Tripathi¹, Ravi Limaye², Saurabh Prakash³

¹Assistant Professor, DHSER, PSS Central Institute of Vocational Education, Bhopal, Madhya Pradesh, India

²Coordinator, Resource Convergence Foundation, Madhya Pradesh, Bhopal

³Professor, Department of Engineering & Technology, PSS Central Institute of Vocational Education, Bhopal, Madhya Pradesh, India

Abstract

Assessment at regular intervals in Make in India Initiatives is to create trained manpower in School/ Training center and to prepare student for world of work, school/ center is a very important aspect. Various commissions and committees have expressed their concern about the traditional approach of evaluation system. There is urgent need to resolve questions as what evaluation strategy should be adopted for vocational courses to keep such thing in mind present study have been taken.

In this study rubrics were developed for class 9th students of Automobile Technology, NSQF level 1 (L1). Four schools were identified for pilot tryout in Himachal Pradesh and Haryana. An attempt was made to evaluate the student's performance by using developed Rubrics (Criteria Based Assessment). Guidelines were also made for better implementation of the project.

In pilot tryout, it was observed that rubric based assessment helped student to improve their learning. It is strongly recommended to introduce rubrics-based Assessment in Academic. Vocational courses should be assessed by this relatively new concept, Rubric Based Assessment.

Keyword: Assessment, Competency, Rubrics

Introduction

Aim of vocational education is to develop competency (Knowledge, Skill, Attitude) among the students of vocational course. Successful development of knowledge, skill and attitude depends on timely assessing and evaluating the competencies acquired during the teaching learning process.

Various evaluation procedures are being adopted in the country for assessment of competencies of students. These evaluation methods are traditional in nature and competencies are not measured properly. To measure the competencies of the student, various innovative method of evaluation is being used. One of the important methods of evaluation is rubrics based assessment. Rubrics based assessment is latest method of evaluation. In this method, students are exposed about the evaluation procedure and criteria of testing of competency. Student will be able to understand and demonstrate the desired competencies as per criteria and standard given in rubrics.

Based on the curriculum and lesson plan, appropriate rubrics-based assessment was developed. Competencies were evaluated as per the developed rubrics. The aim of this method of assessment is to improve the acquired level of the competency of the students. Hence this study was proposed to study the implementation of rubric based assessment of automobile technology L1 vocational subjects under NSQF in the selected school of Haryana and Himachal Pradesh.

Objectives

1. To identify the indicators for assessing knowledge, skill and attitude of students of the automobile technology vocational subject (L-1, NSQF Level 1) in the selected school.
2. To design and develop the rubrics based assessment tools and portfolio to access the competency of the students of selected school.

Limitations of the study

- Proposed research work was limited only for one vocational course, automobile technology (L1)
- Study was indented to cover 2 states namely Himachal Pradesh and Haryana state. Study was limited to four schools.

Review of Literature

- **Azmanirah Ab Rahman, Jamil Ahmad, Ruhizan Muhammad Yasin**, Rubric in Vocational Education World Academy of Science, Engineering and Technology International Journal of Social, Behavioural, Educational, Economic, **Business and Industrial Engineering Vol:8, No:1, 2014**, Author described the importance of Rubric for teachers and students for a variety of purposes. Teachers use the rubric for evaluating student work while students use rubrics for self-assessment. Therefore, this paper was emphasized scoring rubric as a scoring tool for teachers in an environment of Competency Based Education and Training (CBET) in Malaysia Vocational College.
- **Anders Jonson, Gunilla Svingby, May 2007**, The use of scoring rubrics: Reliability, validity and educational consequences, In this research paper benefits of using scoring rubrics in performance assessments have been proposed, such as increased consistency of scoring, the possibility to facilitate valid judgment of complex competencies, and promotion of learning.
- The appropriateness of professional judgment to determine performance rubrics in a graded competency based assessment framework Andrea Bateman, The University of Ballarat Patrick Griffin, The University of Melbourne, Australia, **2003**. This study investigated the appropriateness of professional expertise in developing performance rubrics for competency as defined by the Public Services Training Package. The levels of performance were identified along a continuum for interpretive purposes and competency decision making.
- *Using rubrics to support graded assessment in a competency based environment* **Sherridan Maxwell RMIT University** NCVER Building Researcher Capacity Community of Practice Scholarship Programme **2008**, the study comprised mentoring a small group of teachers in developing their rubrics for assessment, as well as

interviewing these teachers to determine their thoughts on the use of rubrics. Overall, the teachers found rubrics to be a useful tool not only for assessment but also for informing students of the assessment expectations. The author also suggested the use of rubrics as a tool for assisting in articulation into higher education from the VET sector.

- **USING RUBRICS, Donna K. Korycinski**, This paper was completed and submitted in partial fulfillment of the Master Teacher Programme, a 2-year faculty professional development programme conducted by the Center for Teaching Excellence, United States Military Academy, West Point, NY, **2011**, this literature review explored the pros and cons of rubric use, how to construct a rubric properly, teacher's attitudes toward rubrics and lists some online resources. Rubrics have been used for years by educators to evaluate and to provide feedback on student performance.
- **Terry Sue Fanning, Kae Fleming, and Catherine Stephens** under the Direction of **Roger W. Wiemers**, Professor Lipscomb University, **2012**, The research effort considered quality and consistency of training provided to teachers as rubric users and teacher perceptions of the impact of the rubric on instruction and student proficiency.
- **Sebastian Barney, Mahvish Khurum, Kai Petersen, Michael Unterkalmsteiner, Ronald Jabangwe** supporting students improve with Rubric-Based Self-Assessment and Oral Feedback, IEEE TRANSACTIONS ON EDUCATION, this paper evaluates the effect of rubrics and oral feedback on student's learning outcomes. An experiment has been conducted in a software engineering course on requirements engineering, using the two approaches on assignments in the course. Both approaches led to statistically significant improvements, though no material improvement was achieved (i.e. a change by more than one grade). The rubrics led to a significant decrease in the number of complaints/questions regarding grades.
- Using Rubrics to grade, assess, and improve student learning strengthening our Roots: Quality, Opportunity & Success Professional Development Day Miami-Dade College, *March 7, 2014 Mary J. Allen, mallen@csu.edu. In this paper author discussed about criterion-referenced drafting a rubric with certain examples, grading author focused on effective designing of rubrics and its implication.*

Methodology

To carry out the proposed work, following activities were identified

1. Review of L1-L4 book and curriculum
2. Literature review on importance of rubrics based assessment in vocational education
3. Identification of knowledge, skill and attitude (KSA) in given curriculum of automobile sector.
4. Formation of rubrics
5. Validation of rubrics by conducting a work shop
6. Writing letter to state for selection of school for project
7. Visit NSQF funded schools of Haryana and Himachal Pradesh
8. Identification of schools for pilot tryout of projects
9. Conduction of session on importance of rubrics based assessment in vocational education
10. Collection of feedback from various teachers of Haryana and Himachal Pradesh about reliability of rubrics
11. Implementation of suggestion and recommendation provided by teacher

12. Interaction with students to aware them about rubrics.
13. Implementation of project on sample population
14. Data collection and interpretation
15. Result finding

Similarly Learning outcomes were identified as per the units of the class IX automobile technology L1 Course programme, analytical and holistic rubrics were developed on the basis of these learning outcomes.

Formation of rubrics

Analytical and Holistic Rubric were developed as per units of the textbook and curriculum. Here Analytical rubrics were developed to assess single attribute/skill (as a formative evaluation) and holistic rubrics were developed to assess Cluster of skills (as a summative evaluation).

Performa of Analytical and Holistic Rubric are given below:

Analytical rubric is based on formative evaluation. The purpose of this sheet (Analytical rubric) is to assess continuous progress/ performance of the student in automobile subject of class IX.

After assessing on given criteria and standards the duty of teacher is to provide feedback to among students and counsel them to attain desired competency level. Teacher has to decide what corrective measure or action plan required if students are not able to perform.

Students have to read the sheet carefully; students can discuss this sheet with peers for providing feedback to each other. In case student is facing the problem to understand predefined criteria and standard, please read the sheet again and discuss it with your teacher /assessor/ Instructor.

Here **Good** means achievement of student's learning / progress close to learning outcome.

Average means achievement of student's progress with certain deviation from learning outcome and needs to improvement **Poor** means not acceptable.

Analytical Rubric was designed as per unit wise for assessing the knowledge, skill and attitude. Small units of rubrics were merged for better assessment. These units were validated by experts in meeting. These rubrics are given below in Performa.

Knowledge Area

Activities were performed in Class Room

Criteria	Indicators for different level of performance		
	Good	Average	Poor
List the component of Chassis of a Vehicle	List 7-10 components of chassis of a Vehicle	List 2-6 components of chassis of a Vehicle	Not able to list component of chassis of a Vehicle

Contd..

Criteria	Indicators for different level of performance		
	Good	Average	Poor
List the component of IC (Internal combustion) engine	List 6-8 components of an engine	List 2-5 components of an engine	Not able to identify component of an engine
Discuss function of chassis frame	List all the function of chassis frame Speak confidently about function of chassis frame	List some function of chassis frame Speak confidently about function of chassis frame	Not able to list function of chassis frame Not able to speak about function of chassis frame
Identify engine and label its parts	Label all its parts	Label some of its parts	Not able to label parts of engine
Activity- Discuss the role of different component of engine	Write the role of different component of engine Speak confidently role of component of engine	Write some role of different component of engine Speak role of component of engine	Not able to Write the role of different component of engine Not able to Speak role of component of engine
Discuss water pump and water jacket used in radiator	Write the role of water pump and water jacket	Write some role of water pump and water jacket	Not able to Write role of water pump and water jacket
Activity- Discuss Importance of lubrication in engine	Speak confidently Importance of lubrication in engine	Speak less confidently Importance of lubrication in engine	Not able to list importance of lubrication Not able to Speak Importance of lubrication in engine

Skill Area

Activities were performed in Workshop

Criteria	Indicators for different level of performance		
	Good	Average	Poor
Identify components of a car	Observe car in work shop and identify it's 10-15 components	Observe car in work shop and identify 5-10 its components	Not able to identify components of a car
Identify components of Chassis of a Vehicle	Identify 5-7 components of chassis of vehicle in workshop	Identify 2-4 components of chassis of a vehicle	Not able to Identify components of chassis of a vehicle

Contd..

Criteria	Indicators for different level of performance		
	Good	Average	Poor
Identify components of IC (internal combustion)engine	Identify 6-8 components of an engine	Identify 2-5 components of an engine	Not able to identify components of an engine
Identify components of spark ignition engine	Identify 12-18 components of spark ignition engine	Identify 5-11 components of spark ignition engine	Not able to identify spark ignition engine
Identify components of diesel engine	Identify 6-8 components of diesel engine	Identify 2-5 components of diesel engine	Not able to identify components of diesel engine
Identify components of lubrication system	Identify 10-15 components of lubrication system	Identify 5-9 components of lubrication system	Not able to identify components of lubrication system
Number of attempt of work	Completed given task in first attempt Use proper sequence and procedure	Completed the task in more than 1 attempt Use hit and trial method	Completed the assignment more than two attempts
Speed of doing work	Complete the work in optimum time	Complete the work more than required time	Not able to complete the work

Attitude Area

Criteria	Good	Average	Poor
Safe handling of tools and equipment	Keep precaution in use of tool Use safety gadgets	Keep precaution in use of tool Don't use safety gadgets	Play with tool Don't use safety gadgets
Regularity	Attendance more than 75 %	Attendance 60-75 %	Bellow 60 %
Punctuality	Finish given assignment on time	Delayed in finished assignment	Not finished the assignment
Obedience	Follow all the instructions given by instructor	Follow some of the instructions given by instructor	Do not follow the instructions given by instructor
Housekeeping	Through wastage in dustbin	Through some wastage in dustbin	Do not through wastage in dustbin

Contd..

Criteria	Good	Average	Poor
Behavior with peers	Use good language with peers Share new ideas with friends	Use good language with peers Talkative but not share essential things with friends	Quarrel with friends Never share useful things with friends
Discipline	Turn off power supply after the work Keep raw material and tool in proper place	Turn off power supply after the work Do not Keep raw material and tool in proper place	Do not off power supply after the work Do not Keep raw material and tool in proper place
Care and economic use of material	Use all the tools and equipment carefully Optimum use of raw material	Use all the tools and equipment carefully Some wastage of raw material	Don't use tools and equipment carefully Wastage of raw material

Holistic rubric

A holistic rubric is based on summative evaluation. It is used by teacher/student at the end of semester. The purpose of this sheet (holistic rubric) is to assess Product/ overall performance of the student in automobile subject of class 9th

After assessing on given criteria and standards, the duty of teacher is to provide feedback to among students and counsel them to attain desired competency level
Teacher has to decide what corrective measure or action plan required if students are not able to perform.

Students have to read the sheet carefully; students can discuss this sheet with peers for providing feedback to each other. In case student is facing the problem to understand predefined criteria and standard please read the sheet again and discuss it with your teacher /assessor/ instructor.

Assessment sheet for Summative Evaluation

Criteria	Indicators for different level of performance		
	Good	Average	Poor
Identify major systems of car	1. Identify Chassis Frame and Auto Body 2. Identify Engine and its component 3. Identify Lubrication System Cooling System 4. Identify Fuel Supply 5. Identify Transmission system	Identify 7-9 systems correctly	Identify less than 7 systems

Contd..

Criteria	Indicators for different level of performance		
	Good	Average	Poor
Identify major systems of car	6. Identify Front and rear axle 7. Identify Steering 8. Identify Suspension system 9. Identify Brake 10. Identify Electrical and Electronic System 11. Identify Air conditioning system 12. Identify Active & Passive safety Identify 10-12 system correctly	Identify 7-9 systems correctly	Identify less than 7 systems
Change the oil of car	1. Place the vehicle on the lubrication bay with parking brakes on 2. Locate the dip stick, and remove it out from engine. 3. Check the level of lubricating oil and quality of oil. 4. Change the oil if the oil is dirty / or after certain KMS as recommended by the company 5. Drain the oil and change the fiber washer to avoid oil leakage. 6. Tight the drain plug with specified torque. 7. Add the lubricating oil with specific quantity and specific grade. 8. Run the engine and again verify the level of lubricating oil. All 8 steps of changing oil is correct	5-7 steps of changing oil is correct	Less than 5 steps of oil change is correct
Fill registration form	Understand required information to be filled in form 20 and attach the necessary documents. Fill The complete registration form Fill the form correctly	Understand required information to be filled in form 20 and attach the necessary documents. Fill the form with certain error	Not able to fill the form

Contd..

Criteria	Indicators for different level of performance		
	Good	Average	Poor
List vehicle service procedure	Major content of the service procedure: 1. Lubrication 2. Adjustments 3. Inspection 4. Test report 5. Service report Able to service the vehicle and all procedure followed correctly	Able to service the vehicle but all 5 procedure followed by students is not correct Deviation in test and service report	Not able to service the vehicle
Washing of a car	1. Place the vehicle on the level ground 2. Clean the interior of the vehicle with vacuum cleaner/ hand 3. Observe if all doors and windows are closed 4. Arrangement of material required for washing 5. Placement of vehicle on the ramp 6. Use of pressure to clean the exterior of the car 7. Take a soft cotton cloth and wipe the water from the vehicle 8. Economical use of water and electricity with time consumed Wash the car and follow all 8 steps correctly	Wash the car and Follow 4-6 steps correctly	Ineffective washing

Questionnaire to validate the rubrics

Rubrics are set of instruction and predefined criteria to assess individual skill in different domain of learning, rubrics are designed for assessment of self-learning based on formative assessment.

The purpose of rubric is different for teachers and students, for teacher it is used for assessing student work as well as outcome of instruction objectives, for students it is used for assessing self-learning.

The teacher would use rubrics for oral examination / written examination / observation of the student based on criteria good, average and poor, it would be decided which objectives were understood, partially understood or fully understood, teacher would also judge up to what extent he/she is able to achieve the instruction objectives.

For student rubrics would be used for self-assessment purpose. By the predefined criteria student can understand that what he /she have learnt, what he /she have to improve and how he / she can make this improvement.

In this course, Student will learn about various components and systems that makeup a complete automobile. Therefore you will be introduced to engine and its part, Body and chassis, Drive Transmission & Steering Parts, Suspension & Brake Parts, Electrical Parts and other systems that make it possible for running of an automobile.

Questionnaire

The above rubric covers all objectives of Specific Unit

- (a) All Objectives covered
- (b) Some Objectives not covered
- (c) No Objectives covered

The language used in Rubrics is

- (a) Fully Understood
- (b) Partly understood
- (c) Not understood

The above rubric covers will be able to assess student

- (a) Will be able to assess students
- (b) Will be able to assess students partially
- (c) Will not be able to assess students

The above rubric will help students in self-evaluation

- (a) Will help students in self-evaluation
- (b) Will Partly help students in self-evaluation

In above rubric there is clarity about criteria and standard

- (a) Fully clarity about criteria and standard
- (b) Partly clarity about criteria and standard
- (c) No clarity about criteria and standard

If objectives of unit 3 rubrics are not appropriate then kindly mention / modify it.

If language of rubric unit 3 is not simple and clear then kindly mention / modify it.

If criteria and standard of rubric of unit 3 are not relevant to curriculum then kindly mention/ modify it.

Experts were asked to respond on given questionnaire and suggestion /feedback was collected.

Guideline for Rubric Based Assessment

Concept of rubrics

Rubrics are designed to test knowledge, skill and attitude of the student. Knowledge level will be tested mainly in classroom, skill level will be tested mainly in workshop by using demonstration method and attitude will be tested in Classroom/ Workshop/ Field visit

Purpose of rubrics

The purpose of rubric is different for teachers and students, for teacher it is used for assessing student work as well as outcome of instruction objectives, for students it is used for assessing self learning

The teacher use rubrics for oral examination / written examination / observation of the student based on criteria good, average and poor, it can be decided which objectives were understood, partially understood or fully understood, teacher also judge up to what extent he/she is able to achieve the instruction objectives

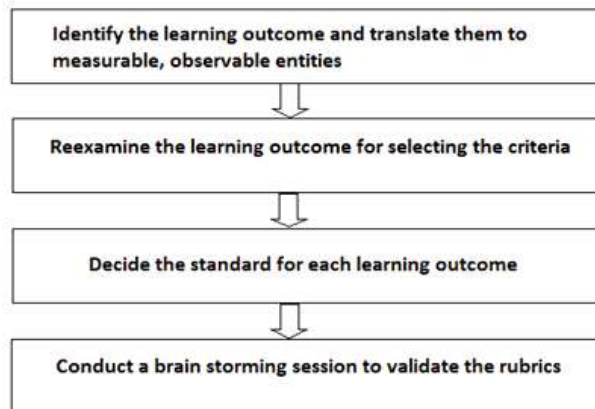
For student rubrics would be used for self-assessment purpose. By the predefined criteria student can understand that what he /she have learnt, what he /she have to improve and how he / she can make this improvement

For implementation of rubrics based assessment certain activities are given below

Conceptualization Phase

- KSA Assessment (Knowledge Skill and Attitude) should be integrated in a single rubric, if possible.
- Conduct orientation program for teacher to aware them about rubrics based assessment
- Present the draft rubrics to the teachers/ instructors / Assessors.
- Assessment of the teachers to check drafting skill of rubrics.
- Collect feedback from the teachers to draft effective rubrics in Automobile Technology

Designing Phase



Validation and Pilot Testing Phase

- Interaction with students to aware them about rubrics based assessment
- Clarify expectations of the course to the students so that they can perform well, teacher will clarify the criteria and standard in detail to the students.
- Give guidelines for use of rubrics and how assessment summary would be made

Implementation Phase

- Integration of rubrics based assessment in classroom activities and workshop
- Fix the day of assessment, select the learning outcomes to be assessed, select the place (Workshop/ classroom), select the students/ group, time required for assessment,
- Motivate the students to reach specified standard
- Motivate the students to provide peer feedback using rubrics
- Collect Data from Rubrics and Analyze
- Make report based on Rubrics giving Assessment of each student
- Counsel each student

Record Keeping

A variety of records and reports are required to be maintained systematically for continuous and effective evaluation. This includes student's profile, student's progress report, assessment plan, attendance and achievement record. These records should be precise, easy to follow and simple to maintain so that they may not consume the time of students and teachers in lengthy paper work. Records should be updated periodically till the completion of the course. Comparison of Student self-evaluation and teacher evaluation by rubrics sheet.

Feedback

Student will receive feedback in knowledge, skill and attitude area. After collecting student's data teacher should identify which learning outcome is achieved and which learning outcome students are not able to achieve, this allows the teacher to identify where he/ She has to focus more.

Key points

- Language of rubrics should be simple and clear
- Rubrics should be generated through micro level thinking
- Assessment through rubrics should be clearly planned
- Teacher should allow students to develop their own learning about rubrics-based assessment.

Conclusion

Learning outcomes of automobile L1 course were identified. The learning outcomes were modified as suggestion given by experts and teachers. Analytical rubrics were made to assess single attribute or continuous progress of students. Holistic rubrics were made to assess overall performance or product of the students. To implement project effectively assessment guideline and session plan were made and appreciated by the teacher of Haryana and Himachal Pradesh. An urgent need of teachers training felt in pedagogy/ assessment and evaluation / technical area.

Students were assessed by rubrics sheet and feedback was provided to students by teacher. It was found that rubrics were easy to implement and it helped teachers in goal oriented assessment. As rubrics based assessment is new for Indian context, effective evaluation is possible after integrating rubrics with curriculum.

- Teachers should focus on **competency** assessment rather than **score** of vocational student.
- Teacher should try to learn **pedagogy** himself/herself for competency based teaching and assessment.
- Assessment can be effective only if teachers are competent. Teacher must be trained in assessment and evaluation.
- Skill component should be evaluated throughout the session in the school for enhancing the skill level of students.

References

1. Azmanirah Ab Rahman, Jamil Ahmad, Ruhizan Muhammad Yasin, Rubric in Vocational Education World Academy of Science, Engineering and Technology International Journal of Social, Behavioural, Educational, Economic, Business and Industrial Engineering Vol:8, No:1, 2014
2. Anders Jonson, Gunilla Svingby, May 2007, The use of scoring rubrics: Reliability, validity and educational consequences
3. The appropriateness of professional judgment to determine performance rubrics in a graded competency based assessment framework Andrea Bateman, The University of Ballarat Patrick Griffin, The University of Melbourne, Australia, 2003
4. *Using rubrics to support graded assessment in a competency based environment* Sherridan Maxwell RMIT University NCVET Building Researcher Capacity Community of Practice Scholarship Program 2008
5. Muhamad Farid Bin Daud, Aston University, 2013 Birmingham and B4 7ET, United Kingdom
6. How effective is the assessment of generic skills gained by Technical Vocational Education and Training (TVET) of engineering students engaged in Problem-Based Learning
7. USING RUBRICS, Donna K. Korycinski, This paper was completed and submitted in partial fulfillment of the Master Teacher Program, a 2-year faculty professional development program conducted by the Center for Teaching Excellence, United States Military Academy, West Point, NY, 2011
8. The Effects of Professional Development on Tennessee Career & Technical Education Competency Attainment Rubric Implementation, Terry Sue Fanning, Kae Fleming, and Catherine Stephens under the Direction of Roger W. Wiemers, Professor Lipscomb University, 2012
9. Isebastian Barney, Mahvish Khurum, Kai Petersen, Michael Unterkalmsteiner, Ronald Jabangwe Supporting Students Improve with Rubric-Based Self-Assessment and Oral Feedback, IEEE TRANSACTIONS ON EDUCATION
10. Using Rubrics to Grade, Assess, and Improve Student Learning Strengthening Our Roots: Quality, Opportunity & Success Professional Development Day Miami-Dade College, March 7, 2014 Mary J. Allen mallen@csub.edu
11. Agarwal, P. (2006), "Higher Education in India: the need for Change" Working Paper no. 180, Indian Council for Research on International Economic Relations, New Delhi (June, 2006)
12. Andrade, H. and Du, Y. (2005) "Student perspectives on rubric-referenced assessment" Practical Assessment, Research and Evaluation, Online Journal Volume 10 Number 3, April 2005 ISSN 1531-7714
13. Arter, J., & McTighe, J. (2001). Scoring rubrics in the classroom: Using performance criteria for assessing and improving student performance. Thousand Oaks, CA: Corwin Press, Inc.

14. Azmanirah Ab Rahman, Jamil Ahmad, Ruhizan Muhammad Yasin, Rubric in Vocational Education, International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering Vol:8, No:1, 2014 World Academy of Science, Engineering and Technology, International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering.
15. Blom, A. and Saeki H. (2011), "Employability and Skill Set of Newly Graduated Engineers in India" Policy Research Working Paper No. WPS5640 of World Bank, South Asia Region (April, 2011)
16. Gough, J. (2006), Rubrics in assessment, Vinculum, vol. 43, no. 1, pp. 8-13
17. Gupta, S.K. (2006) "Understanding Effectiveness of Portfolio Supported
18. Learning and Assessment in the context of Post Graduate Medical Education at QSA" Ph.D. Dissertation, University of Newcastle Upon Tyne, UK
19. Greaves, J.D, and Gupta, S.K. (2003) "Portfolio can assist reflective practice and guide learning" Current Anesthesia and Critical Care(2003) 14, 173-177
20. Kuijs, L. (2012), "Economic Growth Patterns and Strategies in China and India: Past and Future" Working Paper, Fung Global Institute, Hongkong (September, 2012)
21. Raj Rajesh, S.N., (2011), "Structure, Employment and productivity Growth in the Indian Unorganized Manufacturing Sector: An Industry level Analysis." Singapore Economic Review, 56, 349 (2011), DOI:10
22. Stevens, D. D., & Levi, A. J. (2005). Introduction to rubrics: An assessment tool to save grading time, convey effective feedback, and promote student learning. Sterling, VA: Stylus.
23. Prof R. G. Chouksey, Dr S. K. Gupta, Tripathi Tribodh (2012). "Design and Development of Portfolio Based Assessment for Carpentry Trade" M.Tech. Ed. Dissertation, NITTTR, Bhopal
24. Wade, A., Abrami, P.C. and Sclater, J. (2005). "An Electronic Portfolio to Support Learning." Canadian Journal of Learning and Technology Volume 31(3) Fall / Autumn 2005
25. Wilbur, G., Marienau, C. and Fiddler M. (2012), "Authenticity for Assurance and Accountability: Reconnecting Standards and Qualities for PLA Competence