INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT

IJRCM

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

Indexed & Listed at:

Ulrich's Periodicals Directory ©, ProQuest, U.S.A., EBSCO Publishing, U.S.A., Cabell's Directories of Publishing Opportunities, U.S.A.,

Open J-Gage, India [link of the same is duly available at Inflibnet of University Grants Commission (U.G.C.)],

Index Copernicus Publishers Panel, Poland with IC Value of 5.09 & number of libraries all around the world.

Circulated all over the world & Google has verified that scholars of more than 1866 Cities in 152 countries/territories are visiting our journal on regular basis.

Ground Floor, Building No. 1041-C-1, Devi Bhawan Bazar, JAGADHRI – 135 003, Yamunanagar, Haryana, INDIA

http://ijrcm.org.in/

CONTENTS

CALL FOR MANUSCRIPTS

We invite unpublished novel, original, empirical and high quality research work pertaining to recent developments & practices in the area of Computer, Business, Finance, Marketing, Human Resource Management, General Management, Banking, Insurance, Corporate Governance and emerging paradigms in allied subjects like Accounting Education; Accounting Information Systems; Accounting Theory & Practice; Auditing; Behavioral Accounting; Behavioral Economics; Corporate Finance; Cost Accounting; Econometrics; Economic Development; Economic History; Financial Institutions & Markets; Financial Services; Fiscal Policy; Government & Non Profit Accounting; Industrial Organization; International Economics & Trade; International Finance; Macro Economics; Micro Economics; Monetary Policy; Portfolio & Security Analysis; Public Policy Economics; Real Estate; Regional Economics; Tax Accounting; Advertising & Promotion Management; Business Education; Management Information Systems (MIS); Business Law, Public Responsibility & Ethics; Communication; Direct Marketing; E-Commerce; Global Business; Health Care Administration; Labor Relations & Human Resource Management; Marketing Research; Marketing Theory & Applications; Non-Profit Organizations; Office Administration/Management; Operations Research/Statistics; Organizational Behavior & Theory; Organizational Development; Production/Operations; Public Administration; Purchasing/Materials Management; Retailing; Sales/Selling; Services; Small Business Entrepreneurship; Strategic Management Policy; Technology/Innovation; Tourism, Hospitality & Leisure; Transportation/Physical Distribution; Algorithms; Artificial Intelligence; Compilers & Translation; Computer Aided Design (CAD); Computer Aided Manufacturing; Computer Graphics; Computer Organization & Architecture; Database Structures & Systems; Digital Logic; Discrete Structures; Internet; Management Information Systems; Modeling & Simulation; Multimedia; Neural Systems/Neural Networks; Numerical Analysis/Scientific Computing; Object Oriented Programming; Operating Systems; Programming Languages; Robotics; Symbolic & Formal Logic and Web Design. The above mentioned tracks are only indicative, and not exhaustive.

Anybody can submit the soft copy of his/her manuscript **anytime** in M.S. Word format after preparing the same as per our submission guidelines duly available on our website under the heading guidelines for submission, at the email address: infoijrcm@gmail.com.

GUIDELINES FOR SUBMISSION OF MANUSCRIPT

1. **COVERING LETTER FOR SUBMISSION:**

DATED: _____

THE EDITOR
IJRCM

Subject: **SUBMISSION OF MANUSCRIPT IN THE AREA OF .**

(e.g. Finance/Marketing/HRM/General Management/Economics/Psychology/Law/Computer/IT/Engineering/Mathematics/other, please specify)

DEAR SIR/MADAM

Please find my submission of manuscript entitled '_____' for possible publication in your journals.

I hereby affirm that the contents of this manuscript are original. Furthermore, it has neither been published elsewhere in any language fully or partly, nor is it under review for publication elsewhere.

I affirm that all the author (s) have seen and agreed to the submitted version of the manuscript and their inclusion of name (s) as co-author (s).

Also, if my/our manuscript is accepted, I/We agree to comply with the formalities as given on the website of the journal & you are free to publish our contribution in any of your journals.

NAME OF CORRESPONDING AUTHOR:
Designation:
Affiliation with full address, contact numbers & Pin Code:
Residential address with Pin Code:
Mobile Number (s):
Landline Number (s):
E-mail Address:
Alternate E-mail Address:

NOTES:

a) The whole manuscript is required to be in ***ONE MS WORD FILE*** only (pdf. version is liable to be rejected without any consideration), which will start from the covering letter, inside the manuscript.
b) The sender is required to mention the following in the **SUBJECT COLUMN** of the mail:
New Manuscript for Review in the area of (Finance/Marketing/HRM/General Management/Economics/Psychology/Law/Computer/IT/ Engineering/Mathematics/other, please specify)
c) There is no need to give any text in the body of mail, except the cases where the author wishes to give any specific message w.r.t. to the manuscript.
d) The total size of the file containing the manuscript is required to be below **500 KB**.
e) Abstract alone will not be considered for review, and the author is required to submit the complete manuscript in the first instance.
f) The journal gives acknowledgement w.r.t. the receipt of every email and in case of non-receipt of acknowledgment from the journal, w.r.t. the submission of manuscript, within two days of submission, the corresponding author is required to demand for the same by sending separate mail to the journal.

2. **MANUSCRIPT TITLE:** The title of the paper should be in a 12 point Calibri Font. It should be bold typed, centered and fully capitalised.

3. **AUTHOR NAME (S) & AFFILIATIONS:** The author (s) **full name**, **designation**, **affiliation** (s), **address**, **mobile/landline numbers**, and **email/alternate email address** should be in italic & 11-point Calibri Font. It must be centered underneath the title.

4. **ABSTRACT:** Abstract should be in fully italicized text, not exceeding 250 words. The abstract must be informative and explain the background, aims, methods, results & conclusion in a single para. Abbreviations must be mentioned in full.

5. **KEYWORDS:** Abstract must be followed by a list of keywords, subject to the maximum of five. These should be arranged in alphabetic order separated by commas and full stops at the end.

6. **MANUSCRIPT:** Manuscript must be in ***BRITISH ENGLISH*** prepared on a standard A4 size ***PORTRAIT SETTING PAPER***. It must be prepared on a single space and single column with 1" margin set for top, bottom, left and right. It should be typed in 8 point Calibri Font with page numbers at the bottom and centre of every page. It should be free from grammatical, spelling and punctuation errors and must be thoroughly edited.

7. **HEADINGS:** All the headings should be in a 10 point Calibri Font. These must be bold-faced, aligned left and fully capitalised. Leave a blank line before each heading.

8. **SUB-HEADINGS:** All the sub-headings should be in a 8 point Calibri Font. These must be bold-faced, aligned left and fully capitalised.

9. **MAIN TEXT:** The main text should follow the following sequence:

INTRODUCTION

REVIEW OF LITERATURE

NEED/IMPORTANCE OF THE STUDY

STATEMENT OF THE PROBLEM

OBJECTIVES

HYPOTHESES

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

FINDINGS

RECOMMENDATIONS/SUGGESTIONS

CONCLUSIONS

SCOPE FOR FURTHER RESEARCH

ACKNOWLEDGMENTS

REFERENCES

APPENDIX/ANNEXURE

It should be in a 8 point Calibri Font, single spaced and justified. The manuscript should preferably not exceed ***5000 WORDS***.

10. **FIGURES & TABLES:** These should be simple, crystal clear, centered, separately numbered &self explained, and **titles must be above the table/figure**. **Sources of data should be mentioned below the table/figure**. It should be ensured that the tables/figures are referred to from the main text.

11. **EQUATIONS:**These should be consecutively numbered in parentheses, horizontally centered with equation number placed at the right.

12. **REFERENCES:** The list of all references should be alphabetically arranged. The author (s) should mention only the actually utilised references in the preparation of manuscript and they are supposed to follow **Harvard Style of Referencing**. The author (s) are supposed to follow the references as per the following:

- All works cited in the text (including sources for tables and figures) should be listed alphabetically.
- Use (**ed.**) for one editor, and (**ed.s)** for multiple editors.
- When listing two or more works by one author, use --- (20xx), such as after Kohl (1997), use --- (2001), etc, in chronologically ascending order.
- Indicate (opening and closing) page numbers for articles in journals and for chapters in books.
- The title of books and journals should be in italics. Double quotation marks are used for titles of journal articles, book chapters, dissertations, reports, working papers, unpublished material, etc.
- For titles in a language other than English, provide an English translation in parentheses.
- The location of endnotes within the text should be indicated by superscript numbers.

PLEASE USE THE FOLLOWING FOR STYLE AND PUNCTUATION IN REFERENCES:

BOOKS

- Bowersox, Donald J., Closs, David J., (1996), "Logistical Management." Tata McGraw, Hill, New Delhi.
- Hunker, H.L. and A.J. Wright (1963), "Factors of Industrial Location in Ohio" Ohio State University, Nigeria.

CONTRIBUTIONS TO BOOKS

- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

JOURNAL AND OTHER ARTICLES

- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

CONFERENCE PAPERS

- Garg, Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19–22 June.

UNPUBLISHED DISSERTATIONS AND THESES

- Kumar S. (2011): "Customer Value: A Comparative Study of Rural and Urban Customers," Thesis, KurukshetraUniversity, Kurukshetra.

ONLINE RESOURCES

- Always indicate the date that the source was accessed, as online resources are frequently updated or removed.

WEBSITES

- Garg, Bhavet (2011): Towards a New Natural Gas Policy, Political Weekly, Viewed on January 01, 2012 http://epw.in/user/viewabstract.jsp

PRACTICAL IMPLEMENTATION OF THE MODEL FOR 'ORGANIZING, MEASURING, ANALYZING STUDENTS' KNOWLEDGE AND PERFORMANCE'

ROY MATHEW
LECTURER
I.T. DEPARTMENT
BURAIMI UNIVERSITY COLLEGE
AL BURAIMI

ABSTRACT

Present work tries to offer a new view on the current, vastly discussed and successfully engaged concept of a Data Warehouse. This view presents it in the light of Knowledge Management that includes knowledge sharing and knowledge reuse. i.e., a Data Warehouse can serve as a storage medium for keeping the business memory, or at least involving certain varieties of data. It helps to get new knowledge by presenting well integrated data to analysis tools and then becomes an important part of Executive Information Systems or Decision Support Systems. Sharing and reuse of relevant knowledge during project could prove significant benefits. Data Warehouse by storing, managing and sharing data contributes to the growth of knowledge and may show the way to improve the institution's quality and success. Data mining can be used for the purpose of discovering new knowledge from large databases. New knowledge may be further managed by the applications of knowledge sharing and reuse. Data mining as a new technology allows the user to access or process large amount of information generated mainly from large databases using its latest database technologies. Thus the present work relates Data Warehousing and Data Mining to Knowledge Discovery and Knowledge Management including knowledge sharing and knowledge reuse. The intention is to apply this problem to the higher education sector and compare their results to diagnose pros and cons.

KEYWORDS
Achievement Measure, Course Objectives, Performance Analysis, Students' Assignments.

1. INTRODUCTION

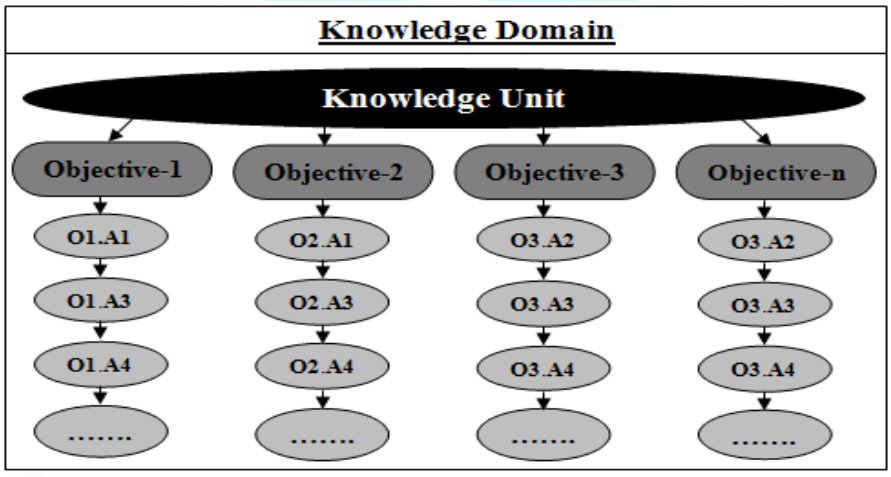
The suitability in systems of education requires detailed reports about students' performance to take appropriate actions. A well developed set of information regarding students' knowledge and their performances, helps to make a diagnosis with fair accuracy what the student knows and how much a student knows, in order to conclude what a student does not know i.e., a student's learning gaps. The set of information regarding students' knowledge and their performances obtained through an assessment process of their several assignments specify, with reasonable precision, whether the courses selected were appropriate for them or not. And if not, the areas for improvement have to be identified for its remedy, in case students decide to go ahead with their study in that field. This work presents an implementation of a model for organizing, measuring, analyzing students' knowledge and performance in systems of education with the support of Data Mining tools.

The continuous learning assessment process of different assignments in a course allows to have a better understanding of the students' knowledge in a particular course (current student knowledge), in order to guide the instruction in that area of the course. The phrase "current student knowledge" means that what someone knows is always changing.

The knowledge representation in a knowledge domain allows ontology knowledge units with many objectives and its measurements in a hierarchical way, through interconnections between the objectives and its measurements. The word ontology means a specialized type of knowledge that consists of definitions or descriptions of special kinds of things and it is frequently mystified with knowledge base. This corresponds roughly to Gruber's definition, which is: "a specification of a conceptualization: the objects and relations that exist for an agent" [13] [14].

The following figure shows an architecture of the Knowledge Unit with the hierarchical organization of the objectives and its various related assignments for a course. A course may have many objectives (n number of objectives: O1, O2, O3… On) and it could be measured using several assignments (A1, A2, A3… An).

FIGURE 1: KNOWLEDGE UNIT



According Self J. [31], a detailed student model preferably contains information about previous student knowledge prior to the application of educational system, like the student's interests, objectives, preferences, progress and all other information related to student. In addition to the Knowledge Unit of the knowledge organization, other important points are the Objective Units and Marks Units, i.e., the units to organize the way students' performances will be updated.

Brusilovsky [6] considered Student Knowledge Model as a part of the main model which symbolizes a manifestation of the student's mental state and level of knowledge and abilities in terms of a particular course and its output. The Assessments Unit could be configured with measurements from various assignments of the course. The process of acquiring knowledge from various such Assignments is done by its accumulation and dynamic updation in the Objectives Unit and Marks Unit. After organizing the Knowledge Domain, Assignments can be created in order to refer objective items from the Knowledge Unit. The Assignment grading will show the measurement for each objective item in detail, and its accumulation in the Objectives Unit and Marks Units, making it possible to show the students' main learning gaps, i.e., it identifies in which course objective, the student displays better or worse performance.

2. DATA MINING IN HIGHER EDUCATION SECTOR

Data mining can be used for the purpose of discovering new knowledge from databases. Data mining as a new technology allows the user to access or process large amount of information extracted mainly from large databases using its latest database technologies. The process of data mining uses its techniques to create automatic tools to investigate and then to generate new information from large databases. The generated new knowledge is then offered with the help of certain rules using different variables and then presented as a model. Data mining is used to predict new data, based on a set of rules or models extracted from databases. Data mining uses its techniques and powerful tools to describe database in a summarized way by capturing its important properties. Due to their multidisciplinary application, a multitude of data mining techniques have been studied, applied and proposed in a variety of different fields and visual data mining can be considered a data mining process enriched by visualization methods [29] [10]. Some works that apply Data Mining techniques in education concentrate on the data gathered during student interaction with communication tools: chat, forum and e-mail [31].

Data mining is applied on students 'performance-data' obtained from several of his Assignments (for example, Test 1 [A1], Test 2 [A2], Take-home-assignment [A3] and Final Examination [A4]). The main idea is to prepare the data collected from all of his assignments related with different objectives of a course and relate them by using their hierarchical organization of study, in order to discover new knowledge about students learning by using data mining tools.

Assessments Unit of the Relational Model presents data from the database that contains Assignment data showing students' performance in various assignments stored in relational database model. Students' knowledge is measured based on the different objectives of the course using different assignments and the findings are recorded using a relational database.

FIGURE 2: TABLE OF RELATIONAL ASSESSMENT UNIT

Relational Model for Assessments Unit

Student ID	Assignment ID	Objective ID	Performance
1001	A1	O1	10
1001	A1	O2	08
1001	A2	O3	08
1001	A2	O4	10
1001	A3	O1	02
1001	A3	O2	02
1001	A3	O3	03
1001	A3	O4	02
1001	A4	O1	12
1001	A4	O2	13
1001	A4	O3	10
1001	A4	O4	10
…	…	…	…
1002	A1	O1	10
1002	A1	O2	09
…	…	…	…

This data from the relational model is then summarized to get another data for a multidimensional model of Objectives Unit, as shown in the table below. It shows students' summarized performance in different objectives that were measured previously using various assignments.

FIGURE 3: TABLE OF MULTIDIMENSIONAL OBJECTIVE UNIT

Multidimensional Model for Objectives Unit

Student ID	O1	O2	O3	…	On
1001	24	23	21	…	22
1002	20	25	20	…	20
…	…	…	…	…	…
…	…	…	…	…	…

Each objective (O1 for example) can be measured in several Assignments. The Knowledge Acquisition Level indicates the student knowledge level in a specific objective item of the knowledge domain and it could be computed using appropriate formula. For example, the knowledge acquisition level for the objective O1 can be calculated from three assignments (A1, A3, and A4) as 10 + 2 + 12 = 24 getting by adding all separate marks obtained in all different assignments testing that particular objective of the course. Another way of calculation is computing the arithmetic average of the percentages of marks obtained in various assignments of the course testing that objective.

In the multidimensional table of the Objectives Unit, the knowledge acquisition level for each objective (O1, O2,…,On) is displayed. This data corresponds to the objective evaluated (each respective line of the table in relational model) and the measures correspond to respective knowledge acquisition level for the objectives. (The objectives are all specified clearly and distributed to the students normally at the beginning of the course's training along with the syllabus for that course.)

Marks obtained in various assignments during the continuous evaluation process are summarized in Marks Unit as shown in the given table below. This is same as the summation of marks obtained in all the objectives for that course. (For example O1+O2+O3+O4=24+23+21+22=90) The student with ID: 1001 scored 90 marks and the grade 'A-' is awarded to that student according to the assessment criteria for the marks. (Assessment criteria are also specified in the syllabus of the course.)

FIGURE 4: TABLE OF MULTIDIMENSIONAL MARKS UNIT

Multidimensional Model for Marks Unit

Student ID	Marks	Grade
1001	90	A-
1002	85	B+
1003	96	A
...	...	...

Apply visual data mining tools along with other data mining techniques like clusterization, segmentation, classification and association on the data for knowledge discovery. Historical data must be kept and utilized for new knowledge discovery for a continuous assessment learning model. The conclusion based on historical data helps the teachers to see what qualities and problems their students face and who their students are. An improvement in education is possible by the implementation of a program of such data and analysis. A model for organizing, measuring, analyzing students' knowledge and performance with the help of data mining is discussed next.

3. A MODEL FOR ORGANIZING, MEASURING, ANALYZING STUDENTS' KNOWLEDGE AND PERFORMANCE

It is very important to find out continuously what the student knows by measuring their performance and knowledge. Keep this information in a database for its investigation, so that the new knowledge can be used for improvement of teaching by instructors as well as for improved understanding and study by students. This work proposes a model for knowledge organization, measurement and analysis based on ontology knowledge domain, and with the help of data mining techniques; the model makes discovery of new information from the data collected with the several assignments.

This model is based on knowledge organization representing the learning hierarchies, uses ontology knowledge domain with different objectives and its measurements using several assignments. Each problem or question in an Assignment must be associated with an objective of the course and the objective must be clearly indicated for each question specifying very clearly which objective is tested with that question.

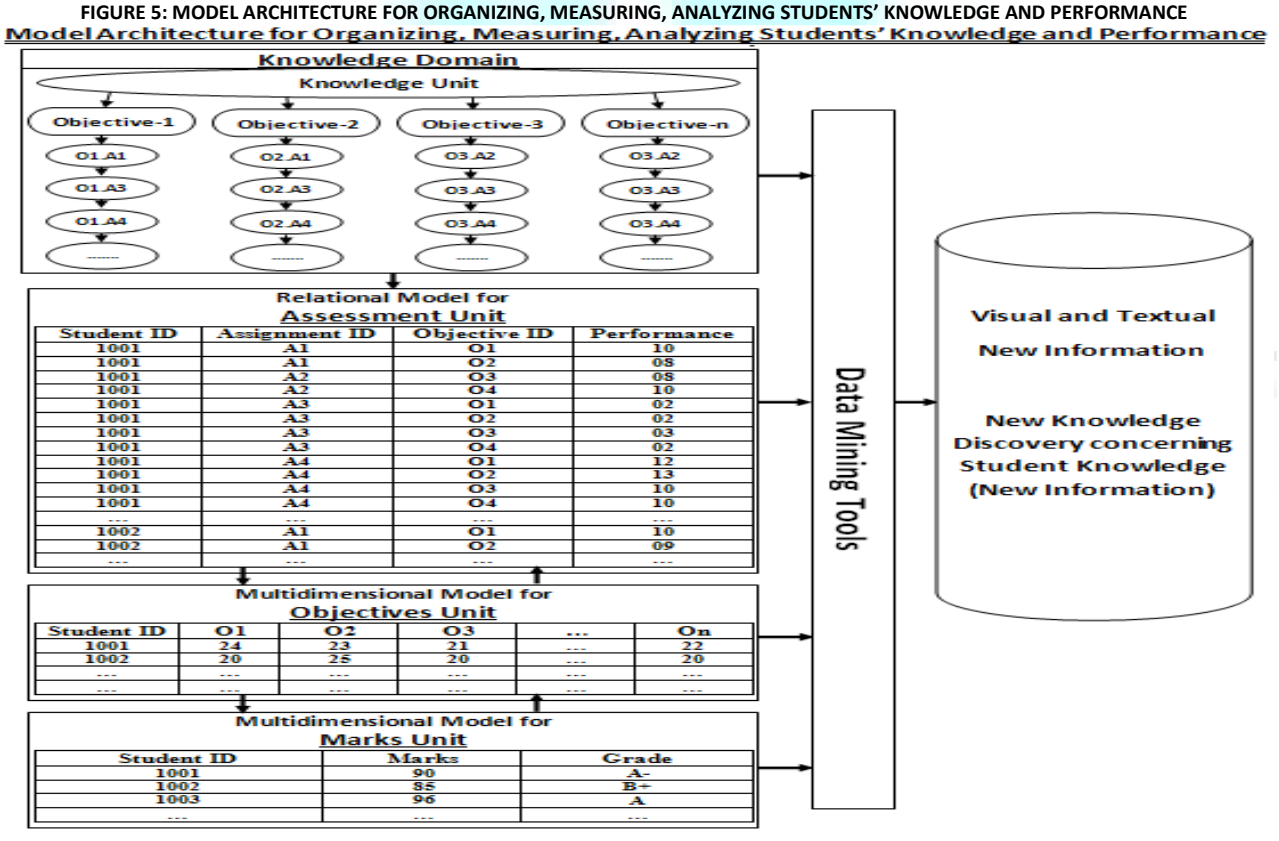
It is possible to establish a knowledge measure for each ontology objective item specified in the model. The establishment of knowledge measure in each objective item will allow the selection of more adjusted evaluations to the students' knowledge acquisition levels and it might trigger an adjusted guidance in accordance with the student learning gaps due to students' learning necessities.

Based on knowledge organization using Knowledge Unit and the current student knowledge calculated in the Objectives Unit and Marks Unit, the proposal is to apply data mining techniques for new knowledge discovery concerned with students' knowledge to get new information regarding them. The use of visual tools will help in the new knowledge reading and its interpretation.

Successful knowledge management (including knowledge sharing and reuse) needs to integrate data bases, information systems, and knowledge based systems. These kinds of systems can be connected based on the Data Ware-house of the architecture shown in the figure below. It provides an extensive basis of integrated data. This data can be presented and utilized via proper knowledge management; knowledge sharing and knowledge reuse activities with the help of data discovery or related tools.

Knowledge-based support for decision-making is becoming a key element of a Higher Educational setting. Traditional data warehouses with the combinations of knowledge management environments and its related tools may influence Higher Educational decision-makers. The knowledge oriented model together with a collection of services, can be used to manage and encourage knowledge activities within the Higher education sector, through the data mining and data warehousing techniques.

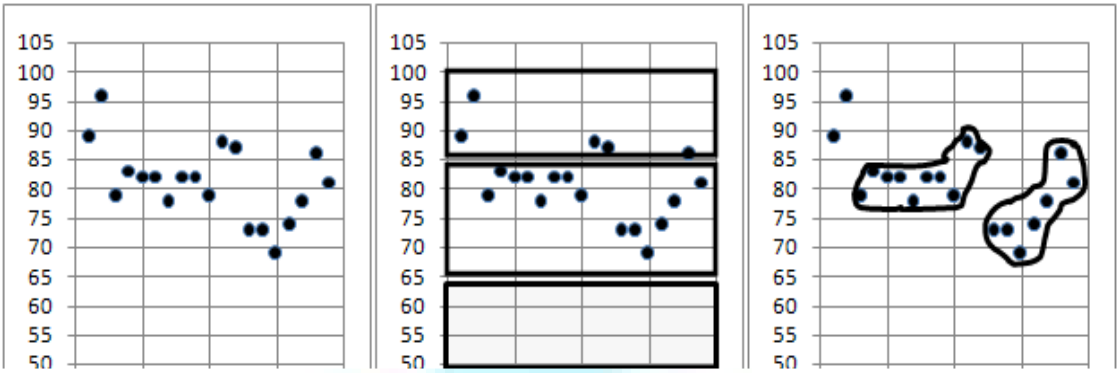
FIGURE 5: MODEL ARCHITECTURE FOR ORGANIZING, MEASURING, ANALYZING STUDENTS' KNOWLEDGE AND PERFORMANCE



The continuous learning assessment process aims to find out the learning gaps to improve the training, can create a huge amount of data. The collected data need to be recorded and analyzed so as to provide new and necessary information concerning the current student knowledge level and measure how much they know about the course and evaluate it to take decisions to improve the situation.

The model for organizing, measuring, analyzing students' knowledge and performance in systems of education with the help of Data Mining tools generates new information from the collected assessment data automatically. The model is based on knowledge organization using ontology of course objectives that represents the learning hierarchies and it makes possible to establish the knowledge acquisition level in each objective item of the knowledge domain. The model helps to organize, measure, analyze students' knowledge and performance and thus used to improve both students' as well as teachers' performances.

FIGURE 6: VISUAL DATA MINING



The model for organizing, measuring, analyzing students' knowledge and performance must be tested with some data mining techniques on the real data and implement the model after its validation.

4. PRACTICAL IMPLEMENTATION OF THE MODEL: EXPLAINED

The course instructor must have a syllabus to follow the teaching of the course or any particular subject. The syllabus of the course may contain many items like, course description, course objectives or outcomes, course plan, course assessment, grading criteria, etc.

Students are expected to achieve all the course objectives on successful completion of that course. A short description about the course should also definitely be specified as a part the syllabus. The table below shows Course Description and Course Objectives that specified as a part of the syllabus.

FIGURE 7: PART OF THE COURSE SYLLABUS - I

Course Description:

Introduction to file-based data structures, database concepts and the manipulation of database content. Theoretical and practical concepts are covered.

- File Handling Concepts – Creation and Maintenances
- Database Concepts – Creation and Maintenances

Course Objectives:

On successful completion of this course the students should be able to:

1. Describe File handling concepts and show a thorough knowledge in file organizations, file-based data structures and data manipulations.
2. Apply File handling concepts and demonstrate its capabilities by creation and maintenance of different types of files.
3. Describe Database concepts and show a thorough knowledge in the manipulation of database content.
4. Apply Database concepts and demonstrate its capabilities by creating and maintaining a database practically.

The table below shows Course Assessment Methods, Assessment Weightings and Assessment Criteria that specified as a part of the syllabus:

FIGURE 8: PART OF THE COURSE SYLLABUS - II

Assessment and Grading

Assessment Methods :

Mark Range	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Objective 6
Presentation/ Project						
Quiz						
Assignment	✓(25%)	✓(25%)	✓(25%)	✓(25%)		
Test1	✓(50%)	✓(50%)				
Test2			✓(50%)	✓(50%)		
Final Exam	✓(25%)	✓(25%)	✓(25%)	✓(25%)		

Assessment Weightings:

Test1 (20%), Test2 (20%), Final Exam (50%), Others (10%)

Assessment Criteria:

The final grade in the course will be determined by the following scale of percentages

Mark Range	95-100	90-94	85-89	80-84	75-79	70-74	65-69	60-64	55-59	50-54	0-49
Grade Points	4	3.7	3.3	3	2.7	2.3	2	1.7	1.3	1	0
Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F

On successful completion of the course, students are expected to achieve all the course objectives. So it is the duty of the course instructor to make sure that all the course objectives are achieved by each student to get the course successfully completed. So when the course instructor designs various assignments, care must be taken to assess the objectives specified in the course syllabus.

The front cover page of a typical assignment at least should contain the following data as shown in the table below, along with the course details like course code, course name, section number, instructor code or instructor name, day, date, time and duration, etc.

FIGURE 9: PART OF THE ASSIGNMENT'S FRONT COVERING SHEET

Question No	Marks Obtained						Maximum Marks	Comments if any
	Obj1	Obj2	Obj3	Obj4	Obj5	Obj6		
	10	10	0	0	0	0		
1	2						2	
2		1					2	
3	1						2	
4		2					2	
5	2						2	
6		2					2	
7	2						2	
8		2					2	
9	2						2	
10		1					2	
Objective Total	9	8					20	
Total Marks (in figures)	17							
Total Marks (in words)	Seventeen							
Evaluator's Signature								

Each question specified inside the assignment must be clearly stated and should also be indicated with the objective or objective number that is being tested or assessed for that question. The table below gives that idea and the questions specified in it clearly indicate which objectives are being assessed for it. It is also advisable to specify the objectives being tested, at the beginning of the assignment to give a clear picture to all candidates about the purpose of the assignment. These objectives are already specified in the syllabus and discussed much before the class begins for the course.

FIGURE 10: PART OF THE ASSIGNMENT'S QUESTIONS: A TEMPLATE

The following course objectives are tested during this assessment of Test1:

Obj1. Objective 1

Obj2. Objective 2

Question No. 1: [Obj1] [2 Marks]
Question 1

Question No. 2: [Obj2] [2 Marks]
Question 2

Question No. 3: [Obj1] [2 Marks]
Question 3

Question No. 4: [Obj2] [2 Marks]
Question 4

Question No. 5: [Obj1] [2 Marks]
Question 5

Question No. 6: [Obj2] [2 Marks]
Question 6

Question No. 7: [Obj1] [2 Marks]
Question 7

Question No. 8: [Obj2] [2 Marks]
Question 8

Question No. 9: [Obj1] [2 Marks]
Question 9

Question No. 10: [Obj2] [2 Marks]
Question 10

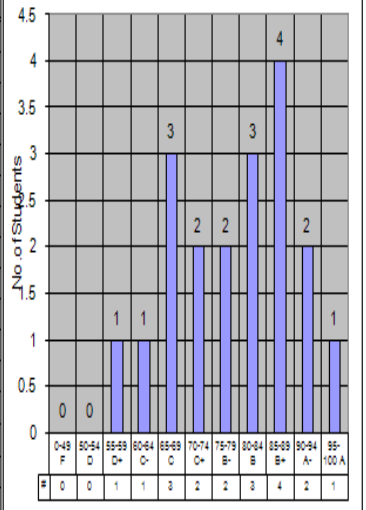
There can be many assignments to assess various objectives of a course. It is not always necessary that each assignment measure all the objectives of a course. The following example given in the figure below assesses only the objectives O1 and O2 for the course during its first assessment called Test1 (T1). The section (class) of the course consists of 19 students. The section average is shown on the right hand side of the graphical representation of the distribution of Grades (G) achieved by the students for this assessment of Test1. (Note that the range of marks for different grades is specified as per the assessment criteria mentioned already in the syllabus earlier.) Data Mining is done on the marks achieved by the students in the section of the course. 4 clusters are identified as Fail, Low, Mid and High grades of marks obtained and the number of students in each cluster is measured with its percentage for that section. The section average for the objectives being tested also measured and indicated.

FIGURE 11: ASSESSMENT FOR ASSIGNMENT NO.1 (TEST1 T1) RECORDED FOR ONE SECTION OF A CLASS

Course Code	0301270	Credit Hours	3
Course Name	Business Programming	Total Students	19
Section No.	2	Time & Days	03:00 - 04:00 Sat, Mon, Wed
Instructor Name	Roy Mathew	Room No.	L-2

Fail %	Pass %
0.0	100.0

No	ID	Name	Major	O1	O2	O3	O4	O5	O6	T1	100	G	P
1	120070301065	Saleh Sultan Mattar Al-Darai	IS	9	8					17	85	B+	3.3
2	120090301021	Narjis Saleh Said Al Ma'Mari	IS	8	10					18	90	A-	3.7
3	120090302035	Fatma Rashid Mohammed Al Wahaib	CS	8	6					14	70	C+	2.3
4	120100302004	Shma Khalifa Said Al-Ghaithi	CS	7	9					16	80	B	3.0
5	120100302039	Ahmed Ali Salim Al Shamsi	CS	8	9					17	85	B+	3.3
6	320070301033	Khalifa Hamed Said Al Saadi	IS	9	7					16	80	B	3.0
7	320080301013	'Abdullah Salim Said Al Mayasi	IS	8	5					13	65	C	2.0
8	320080301056	Shadha Darwish Khamis Al Falahi	IS	8	7					15	75	B-	2.7
9	320080301061	Rashid Salim Hamed Al-Sawaai	IS	7	9					16	80	B	3.0
10	320100301006	Sundus Mubarak Jamil Al-Hajri	IS	6	9					15	75	B-	2.7
11	320100301052	Yousuf Awadh 'Obaid Al Ka'Abi	IS	10	10					20	100	A	4.0
12	320080302006	Younis Salim Mohammed Al-Rumhi	CS	8	10					18	90	A-	3.7
13	320080302031	Mohammed Juma Salmeen Al-Jabri	CS	6	7					13	65	C	2.0
14	320090302001	Houda Juma Mohammed Al-Khadouri	CS	7	5					12	60	C-	1.7
15	320090302007	Fatema Ali 'Abdallah Al-Ajmi	CS	5	6					11	55	D+	1.3
16	320090302014	Said Al-Hemeidi Said Al-Badi	CS	6	7					13	65	C	2.0
17	320090302061	Muna Mohammed Mubarak Al Julandi	CS	8	9					17	85	B+	3.3
18	320090302074	Siham Salim Kharbash Al-Ghaithi	CS	8	9					17	85	B+	3.3
19	320090302075	Roudha Ali Khamis Al Maqbali	CS	8	6					14	70	C+	2.3



Range	#	%
0-49 F	0	0%
50-54 D	0	0%
55-59 D+	1	5%
60-64 C-	1	5%
65-69 C	3	16%
70-74 C+	2	11%
75-79 B-	2	11%
80-84 B	3	16%
85-89 B+	4	21%
90-94 A-	2	11%
95-100 A	1	5%
	19	

Grade	#	%
Fail	0	0%
Low	2	11%
Mid (BtoC)	10	53%
High	7	37%

Section Average	
Test1 Marks	15.4
Test1 %	76.8
Grade (G)	B-
Points (P)	2.7
Objective 1	7.58
Objective 2	7.79

The same procedure is repeated to record all measured data for all the sections of different courses taught by the same instructor for that assignment of Test1. Repeat these whole procedures of assessments again in a similar way for all assignments like Test2 (T2), Take-home-Assignment (A), and Final Examination (T3). (Data mining can be further done after accumulating all such data for different assignments of different sections taught by the same instructor.)

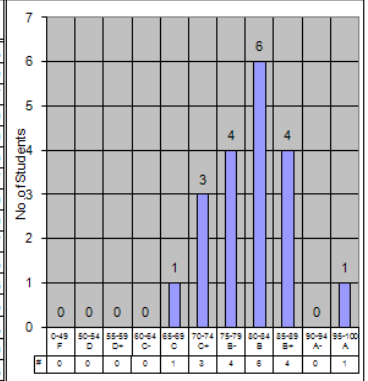
The figure below shows the data (marks) accumulated from all different assignments (Test1 T1, Test2 T2, Take-home-Assignment A and Test3 T3) in the same section of students for the same course. It also shows the accumulated data for different objectives measured through all different assignments in the section of students for that course.

FIGURE 12: ASSESSMENT FOR VARIOUS ASSIGNMENTS (TEST1 T1, TEST2 T2, HOME-ASSIGNMENT A, TEST3 T3) RECORDED FOR ONE SECTION OF A CLASS

Course Code	0301270	Credit Hours	3
Course Name	Business Programming	Total Students	19
Section No.	2	Time & Days	03:00 - 04:00 Sat, Mon, Wed
Instructor Name	Roy Mathew	Room No.	L-2

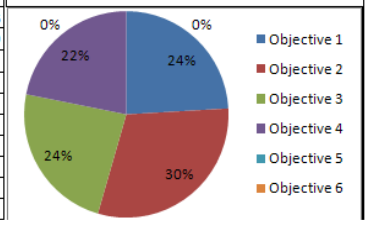
Fail %	Pass %
0.0	100.0

No	ID	Name	Major	T1 20	T2 20	A 10	T3 50	O1	O2	O3	O4	O5	O6	Final 100	G	P
1	120070301065	Saleh Sultan Mattar Al-Darai	IS	17	17	10	45	23	26	20	20	0	0	89	B+	3.3
2	120090301021	Narjis Saleh Said Al Ma'Mari	IS	18	18	10	50	22	30	23	21	0	0	96	A	4.0
3	120090302035	Fatma Rashid Mohammed Al Wahaibi	CS	14	14	9	42	20	21	20	18	0	0	79	B-	2.7
4	120100302004	Shma Khalifa Said Al-Ghaithi	CS	16	16	9	42	19	27	19	18	0	0	83	B	3.0
5	120100302039	Ahmed Ali Salim Al Shamsi	CS	17	17	9	39	17	27	20	18	0	0	82	B	3.0
6	320070301033	Khalifa Hamed Said Al Saadi	IS	16	16	8	42	22	23	21	16	0	0	82	B	3.0
7	320080301013	'Abdullah Salim Said Al Mayasi	IS	13	13	10	42	21	19	20	18	0	0	78	B-	2.7
8	320080301056	Shadha Darwish Khamis Al Falahi	IS	15	15	8	44	20	23	20	19	0	0	82	B	3.0
9	320080301061	Rashid Salim Hamed Al-Sawaai	IS	16	16	8	42	19	27	19	17	0	0	82	B	3.0
10	320100301006	Sundus Mubarak Jamil Al-Hajri	IS	15	15	8	41	17	27	18	17	0	0	79	B-	2.7
11	320100301052	Yousuf Awadh 'Obaid Al Ka'Abi	IS	20	20	7	41	21	29	22	16	0	0	88	B+	3.3
12	320080302006	Younis Salim Mohammed Al-Rumhi	CS	18	18	10	41	22	29	19	17	0	0	87	B+	3.3
13	320080302031	Mohammed Juma Salmeen Al-Jabri	CS	13	13	8	39	18	23	16	16	0	0	73	C+	2.3
14	320090302001	Houda Juma Mohammed Al-Khadouri	CS	12	12	9	40	18	19	18	18	0	0	73	C+	2.3
15	320090302007	Fatema Ali 'Abdallah Al-Ajmi	CS	11	11	8	39	16	21	15	17	0	0	69	C	2.0
16	320090302014	Said Al-Hemeidi Said Al-Badi	CS	13	13	8	40	17	23	17	17	0	0	74	C+	2.3
17	320090302061	Muna Mohammed Mubarak Al Julandi	CS	17	17	8	36	18	27	17	16	0	0	78	B-	2.7
18	320090302074	Siham Salim Kharbash Al-Ghaithi	CS	17	17	8	44	20	27	20	19	0	0	86	B+	3.3
19	320090302075	Roudha Ali Khamis Al Maqbali	CS	14	14	10	43	21	21	20	19	0	0	81	B	3.0



Range	#	%
0-49 F	0	0%
50-54 D	0	0%
55-59 D+	0	0%
60-64 C-	0	0%
65-69 C	1	5%
70-74 C+	3	16%
75-79 B-	4	21%
80-84 B	6	32%
85-89 B+	4	21%
90-94 A-	0	0%
95-100 A	1	5%
	19	

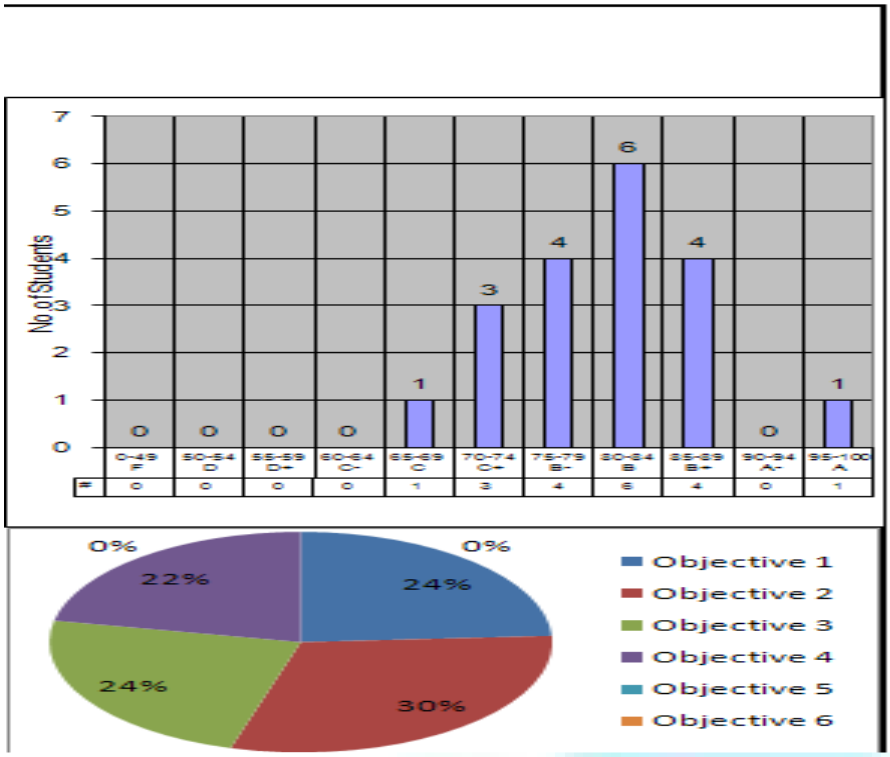
Grade	#	%
Fail	0	0%
Low	0	0%
Mid (BtoC)	14	74%
High	5	26%



Section Average	
Test3 Marks	41.7
Final Marks	81.1
Final Grade	B
Final Points	3
Objective 1	19.5
Objective 2	24.7
Objective 3	19.2
Objective 4	17.7

Data mining is done to those data and it is also shown separately in the figure below. Graphical representation for the distribution of grades obtained for the whole course as well for the objectives achieved through all assignments are also shown below. Section averages for Test3 and for the accumulated data from all the assignments are calculated. Section averages for the objectives accumulated through all assignments are represented by both quantitatively and graphically.

FIGURE 13: NEW INFORMATION: QUANTITATIVE AD GRAPHICAL DISPLAY



Fail %	Pass %
0.0	100.0

Range		#	%
0-49	F	0	0%
50-54	D	0	0%
55-59	D+	0	0%
60-64	C-	0	0%
65-69	C	1	5%
70-74	C+	3	16%
75-79	B-	4	21%
80-84	B	6	32%
85-89	B+	4	21%
90-94	A-	0	0%
95-100	A	1	5%
		19	

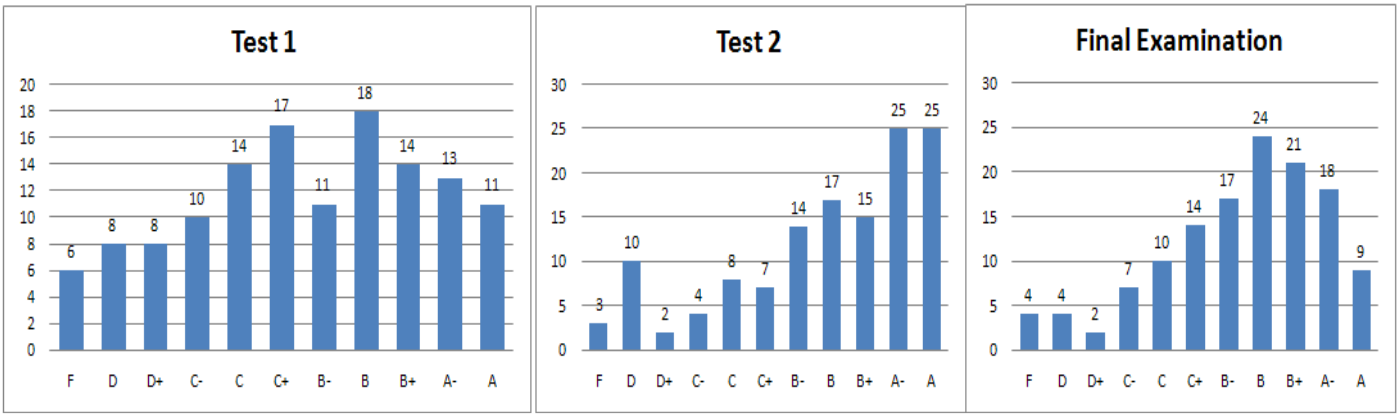
Grade	#	%
Fail	0	0%
Low	0	0%
Mid (BtoC)	14	74%
High	5	26%

Section Average	
Test3 Marks	41.7
Final Marks	81.1
Final Grade	B
Final Points	3
Objective 1	19.5
Objective 2	24.7
Objective 3	19.2
Objective 4	17.7

Data mining is further done after collecting all data for different assignments from all different sections taught by the same instructor. Accumulated Students' performances for all the sections taught by the same instructor during various assessments like Test1, Test2 and Final Examination are represented by both quantitatively and graphically in the figure given below.

FIGURE 14: SUMMARY OF ASSESSMENTS FOR VARIOUS ASSIGNMENTS IN DIFFERENT SECTIONS OF CLASSES TAUGHT BY AN INSTRUCTOR

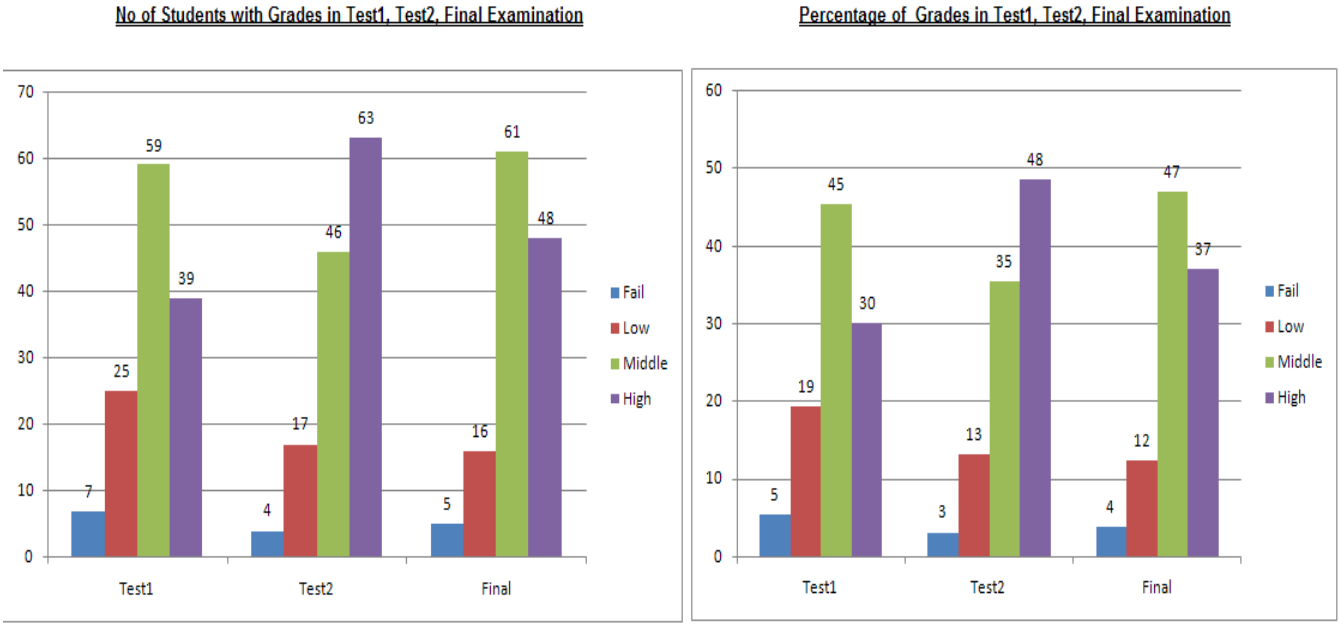
#	C. Code	Course Name	S#	Std #	Test 1 (No. of students in each Grade)											Test 2 (No. of students in each Grade)											Final Exam(No. of students in each Grade)										
					F	D	D+	C-	C	C+	B-	B	B+	A-	A	F	D	D+	C-	C	C+	B-	B	B+	A-	A	F	D	D+	C-	C	C+	B-	B	B+	A-	A
1	0301270	Business Programming	2	19	0	0	1	1	3	2	2	3	4	2	1	0	0	1	1	3	2	2	3	4	2	1	0	0	0	0	1	3	4	6	4	0	1
2	0302100	Computers: Their Impact And Use	4	35	3	3	2	4	2	3	2	1	7	4	4	1	0	1	1	0	1	3	5	5	9	9	1	0	0	0	1	4	2	6	10	6	5
3	0301270	Business Programming	1	23	2	0	0	1	2	4	4	5	0	2	3	0	0	0	1	0	2	5	7	4	2	2	0	0	1	2	2	3	5	4	2	3	1
4	0301441	Database Management System	1	20	1	0	1	2	4	3	1	4	1	1	2	1	2	0	1	2	0	1	1	0	4	8	1	1	0	4	2	0	1	2	1	6	2
5	0301441	Database Management System	2	13	0	4	3	1	0	2	1	1	1	0	0	1	2	0	0	1	1	1	0	1	4	2	1	1	1	1	2	1	2	1	2	1	0
6	0301232	Concepts Of Programming Languages	1	12	0	0	0	0	1	3	0	3	0	4	1	0	3	0	0	0	0	1	1	1	3	3	0	0	0	0	1	2	2	3	2	2	0
7	0301232	Concepts Of Programming Languages	2	8	0	1	1	1	2	0	1	1	1	0	0	0	3	0	0	2	1	1	0	0	1	0	1	2	0	0	1	1	1	2	0	0	0
		Total		130	6	8	8	10	14	17	11	18	14	13	11	3	10	2	4	8	7	14	17	15	25	25	4	4	2	7	10	14	17	24	21	18	9
		Percentage of Grades		100	5	6	6	8	11	13	8	14	11	10	8	2	8	2	3	6	5	11	13	12	19	19	3	3	2	5	8	11	13	18	16	14	7
		Grade			Fail		Low		Mid				High			Fail		Low		Mid				High			Fail		Low		Mid				High		
		#			6		26		60				38			3		16		46				65			4		13		65				48		
		%			5%		20%		46%				29%			2%		12%		35%				50%			3%		10%		50%				37%		



The data for 4 clusters Fail, Low, Mid and High grades of accumulated marks from all the sections taught by the same instructor form different assessments (Test1, Test2 and Final examination) are shown in the given figure below. Graphical representations of that data and its percentages are also shown.

FIGURE 15: NEW INFORMATION: QUANTITATIVE AD GRAPHICAL DISPLAY AFTER CLUSTERIZATION

	#			%		
	Test1	Test2	Final	Test1	Test2	Final
Fail	7	4	5	5	3	4
Low	25	17	16	19	13	12
Middle	59	46	61	45	35	47
High	39	63	48	30	48	37



The same assessment process can be repeated in a similar way for all the instructors teaching different sections of different courses from the same department. The table below shows the performance of all the instructors in the same department while assessing different assignments.

FIGURE 16: SUMMARY OF ASSESSMENTS FOR VARIOUS ASSIGNMENTS TAUGHT BY DIFFERENT INSTRUCTORS IN A DEPARTMENT

Department of Information Technology

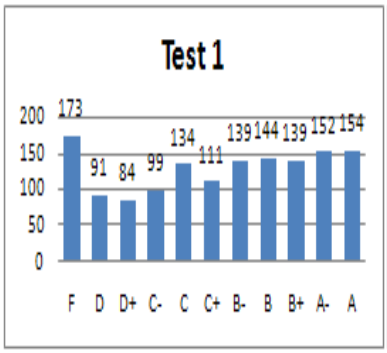
Analysis of Test 1, Test 2 and Final Examination Results, Semester 2: 2011-'12

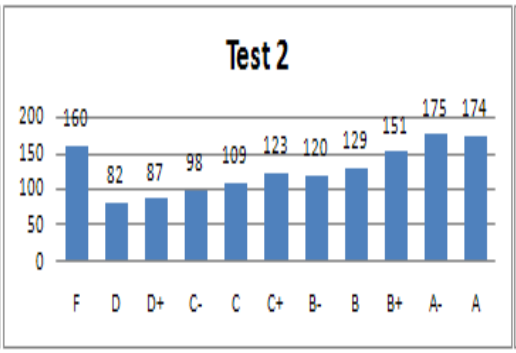
#	I. Code	Instructor Name	S #	Std#	Test 1 (No. of students in each Grade)											Test 2 (No. of students in each Grade)											Final Exam(No. of students in each Grade)										
					F	D	D+	C-	C	C+	B-	B	B+	A-	A	F	D	D+	C-	C	C+	B-	B	B+	A-	A	F	D	D+	C-	C	C+	B-	B	B+	A-	A
1	030104	Sohail Iqbal	5	50	3	8	4	3	4	3	4	7	1	6	9	3	15	7	1	3	2	6	2	2	4	6	3	14	1	8	3	4	2	5	3	4	3
2	030118	Amjad Miqdadi	7	151	21	8	9	12	16	10	17	10	11	16	18	36	5	15	13	10	15	12	5	9	11	17	14	9	10	16	15	22	12	15	12	17	6
3	030116	Dr. Jasim Alkaisey	6	135	14	4	5	9	9	10	22	20	13	19	10	9	4	5	5	10	18	16	21	20	21	6	9	3	6	6	10	16	19	19	19	24	4
4	030139	Dr Farkhanda Chohan	6	122	24	6	7	8	11	7	6	5	8	12	26	18	7	5	11	13	9	9	5	9	9	22	20	11	13	10	8	8	8	6	12	10	11
5	030103	Roy Mathew	7	130	6	8	8	10	14	17	11	18	14	13	11	3	10	2	4	8	7	14	17	15	25	25	4	4	2	7	10	14	17	24	21	18	9
6	030109	Raghad Moufaq	7	112	11	13	12	3	9	8	6	6	15	14	15	14	4	7	7	7	10	12	13	12	11	15	9	7	6	10	10	9	17	10	12	12	9
7	030120	Abdul Mahdi Salleh	7	116	16	11	7	10	11	9	10	10	10	10	12	15	13	5	8	12	6	11	13	8	9	9	24	14	6	6	6	9	8	13	8	8	7
8	030105	Lina M. Najib	7	114	12	7	8	8	13	11	10	16	11	7	11	21	3	9	8	8	9	11	9	8	12	16	10	12	6	11	16	9	8	16	8	16	2
9	030127	Baidaa Hamza	7	121	16	6	6	9	11	11	11	12	10	14	15	23	9	14	10	5	16	10	7	11	8	5	14	12	12	16	9	7	18	4	11	11	3
10	030134	Muhammad Tahir	9	170	24	9	6	16	18	9	15	22	19	20	9	4	4	3	17	16	12	2	17	28	39	27	1	2	2	31	20	13	14	22	30	22	6
11	030124	Ghalia AL Farsi	7	205	26	11	12	11	18	16	27	18	27	21	18	14	8	15	14	17	19	17	20	29	26	26	17	18	15	17	31	15	12	34	22	18	6
Total				1426	173	91	84	99	134	111	139	144	139	152	154	160	82	87	98	109	123	120	129	151	175	174	125	106	79	138	138	126	135	168	158	160	66
Percentage of Grades				100	12	6	6	7	9	8	10	10	10	11	11	11	6	6	7	8	9	8	9	11	12	12	9	7	6	10	10	9	9	12	11	11	5

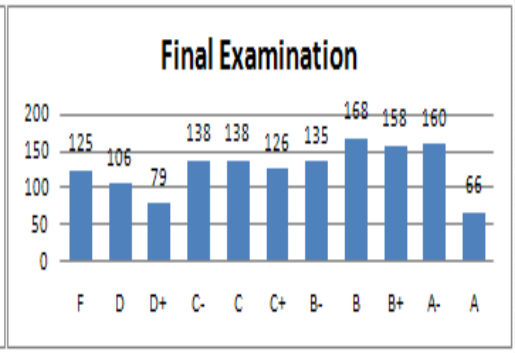
Grade	Fail	Low	Mid	High
#	173	274	528	445
%	12%	19%	37%	31%

Grade	Fail	Low	Mid	High
#	160	267	481	500
%	11%	19%	34%	35%

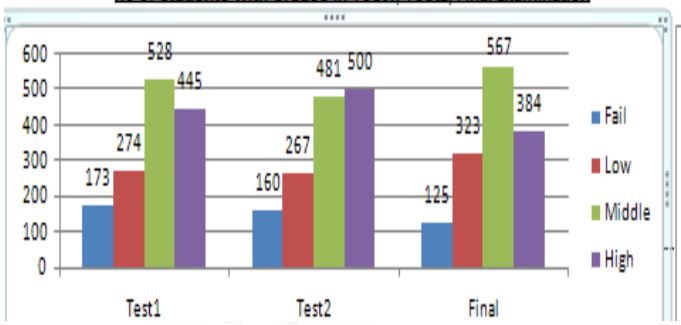
Grade	Fail	Low	Mid	High
#	125	323	567	384
%	9%	23%	40%	27%

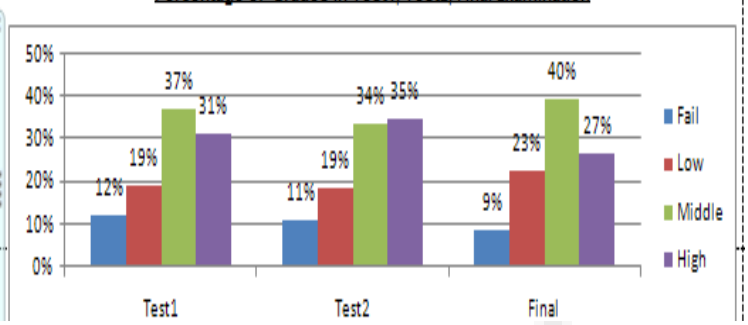






	#			%		
	Test1	Test2	Final	Test1	Test2	Final
Fail	173	160	125	12%	11%	9%
Low	274	267	323	19%	19%	23%
Middle	528	481	567	37%	34%	40%
High	445	500	384	31%	35%	27%





The performance of one instructor can thus be used to compare with another instructor in the same department or even with another department because of the percentage representation of data. Hence the performance of the whole department is measured and analyzed using this model. Thus the model can be used and applied for the improvement of the department and for the higher education institution. But the main beneficiaries of this model are the students themselves.

5. CONCLUSION

Measurement of Students' achievements in each objective of the course is displayed. The achievements are measured for all the sections of various courses. A prediction or projection of performance in other assignments for the same section of class could also follow the same pattern as displayed in the current assignment. Therefore care and intense training could be given separately to those who are week to improve their performance.

Performance of one student in one section can be compared with other students in the same or even with other sections. Comparison of achievements can also be done with all assignments of different students in the same section as well as with others in another section because of the percentage representation of data. It helps to study the projected trend for future assignments for the same group of students in a section.

Performance of teachers teaching the same course can be compared. Even those who are teaching different sections with different number of students as well as with sections of different courses can also be compared using this model because of its percentage analysis. Performance of various instructors in a department and hence the performance of the whole department itself can be measured and analyzed in an organized way using this model.

Student knowledge is measured and performance is analyzed after organizing the course with different objectives that are assessed using different assignments for the course. Teachers' performance in a department is also reflected while using this model and hence the performance of the whole department itself is very much evident in this model. So based on the new information received using this model, future action plan and other appropriate decisions can be taken for improvement of the higher education institution.

REFERENCES

[1] Benjamins V. R., Fensel, D., Pérez, A. G., Knowledge Management through Ontologies", Proc. of the 2nd International Conference on Practical Aspects of Knowledge Management (PAKM98), Switzerland, 1998.

[2] Berners-Lee T. R., Cailliau, A. Loutonen, H. F. Nielsen, and A. Secret, "The World- Wide Web," Communications of the ACM, vol. 37, pp. 76—82, 1994.

[3] Black P. and D. William, Assessment and classroom learning. Assessment in Education: principles, policy & practice, 5(1):7–71, March 1998. Academic Research Library.

[4] Borges L.M.S., Falbo, R.A., "Managing Software Process Knowledge", Proc. of the CSITeA'2002, June 2002.

[5] Broadfoot P. R., Daugherty, J. Gardner, C. Gipps,W. Harlen, M. James, and G. Stobart. Assessment for learning: Beyond the black box. Technical report, University of Cambridge, School of Education, 1999. Assessment Reform Group -ARG.

[6] Brusilovsky P. The construction and application of student models in intelligent tutoring systems. Journal of computer and systems sciences international,, 32(1):70–89, 1994.

[7] Council N. R. Knowing what students know: The science and design of educational assessment. National Academy Press, Washington, D.C., 2001.

[8] Cross R., Parker, A., Prusak, L., & Borgatti, S. P. (2001). Knowing What We Know: Supporting Knowledge Creation and Sharing in Social Networks. Organizational Dynamics, 30(2), 100-120.

[9] Davenport T. H., & Prusak, L. (2000). Working Knowledge: How Organizations Manage What They Know. Harvard Business School Press. Boston, Massachusets.

[10] Fayyad U., G. G. Grinstein, and A. Wierse. Information Visualization In Data Mining And Knowledge Discovery. Morgan Kaufmann Publishers Inc, SAN FRANCISCO, CA, USA, 2002.

[11] Firestone J.M., "DKMS Brief No. Nine: Enterprise Integration, Data Federation, and DKMS: A Commentary," Executive Information Systems, 1999.

[12] Gagne R. M., The Conditions of Learning. Holt, Rinehart and Winston, New York, 4th edition, 1985.

[13] Gruber T. R., Toward principles for the design of ontologies used for knowledge sharing. In Formal Ontology in Conceptual Analysis and Knowledge Representation. Kluwer Academic Publishers., Netherlands, 1993.

[14] Guarino N., Some organizing principles for a unified toplevel ontology. In Proceedings of AAAI Spring Symposium on Ontological Engineering, Stanford, CA, 1997. AAAI Press.

[15] Hansen M. T. (2002), Knowledge Networks: Explaining Effective Knowledge Sharing in Multiunit Companies. Organization Science, 13(3), 232-248.

[16] Harsh O. K, Three Dimensional Explicit Knowledge Management and Reuse. Presented in International Conference on Knowledge Management in Organization held in Lecee, Italy, Sept 10-11, 2007.

[17] Harsh O. K. and Sadiq Sohail, M An Experiment on Course Design, Delivery and Effective Interaction in Distance Technical Education. Malaysian Journal of Distance Education. Vol. 5, No. 1 ISSN 1511-6433 June 2003.

[18] Harsh O. K. and Sadiq Sohail, M. "Role of delivery, course design and teacher-student interaction: Experiment on adult distance-education" O. International Review of Research in Open and Distance Learning", Canada Published. Available at: http://www.irrodl.org/content/v3.2/harsh.html

[19] Henninger S. "Tools supporting the creation and evolution of software development knowledge," *ase*, p. 46, 12th IEEE International Conference on Automated Software Engineering (ASE'97) (formerly: KBSE), 1997.

[20] Huemer, L., von Krogh, G., & Roos, J. (1998). Knowledge and the Concept of Trust. In G. von Krogh, J. Roos, & D. Klein (eds), Knowing In Firms: Understanding, Managing and Measuring Knowledge. London, UK: Sage, 123-145.

[21] Ichijo, K., von Krogh, G., & Nonaka, I. (1998). Knowledge Enablers. In G. von Krogh, J. Roos, & D. Klein (eds), Knowing In Firms: Understanding, Managing and Measuring Knowledge. London, UK: Sage, 173-203.

[22] Johnson J. H. Data-driven school improvement. Technical Report 109, The Education Resources Information Center (ERIC), USA, 1997. ERIC Clearinghouse on Educational Management Eugene.

[23] Kerschberg L. and D. Weishar, "Conceptual Models and Architectures for Advanced Information Systems," Applied Intelligence, vol. 13, pp. 149-164, 2000.

[24] Markkula, M., "Knowledge Management in Software Engineering Projects", In: Proc. of the 11th International Conference on Software Engineering and Knowledge Engineering, Kaiserslautern, Germany, June, 1999.

[25] Martensson, M. (2000). A critical review of knowledge management as a management tool. Journal of Knowledge Management, 4(3), 204-212.

[26] Nonaka, I, & Takeuchi, H. (1995). The Knowledge-Creating Company: How Japanese Companies Create the Dynamics for Innovation. Oxford University Press, New York, NY.

[27] O'Leary D.E., Studer, R., "Knowledge Management: An Interdisciplinary Approach", IEEE Intelligent Systems, January/February, Vol. 16, No. 1, 2001.

[28] Pimentel E. and Omar N. Towards a model for organizing and measuring knowledge upgrade in education with data mining, pages 56–60, Published by IEEE 15-17 Aug. 2005.

[29] Pimentel E., Omar N. and V. Franca. Monitoring the knowledge acquisition level in distance learning education. In Methods and Technologies for Learning, pages 173–179, March 2005,Palermo, Italy.

[30] Rud O. P. Data Mining Cookbook: Modeling Data for Marketing, Risk and Customer Relationship Management. Willey Computer Publishing, New York, 2001.

[31] Self J. Formal approaches to student modelling. In Student Modelling: The Key to Individualized Knowledge-Based Instruction, pages 295–352. Springer-Verlag, Berlin, 1994.

[32] Silva D. R. and M. T. P. Vieira. Using data warehouse and data mining resources for ongoing assessment in distance learning. In The Second IEEE International Conference on Advanced Learning Technologies, Kazan, Russia, September 2002.

[33] Small CT, J Tatalias - The Edge: The MITRE Advanced Technology Newsletter, 2000-mitre.org, "Application of Domain Analysis to Knowledge Reuse", Eighth Annual Workshop on Institutionalizing Software Reuse (WISR), held at the Ohio State University, March 23-26, 1997.

[34] Steyn GM. (2002). Creating Knowledge Through Management Education: A Case Study of Human Resources Management. Education, 123(3), 514-531.

[35] Todd R. J. (1999). Knowledge Management: Utilizing the knowledge capital of a learning community. Access, 13(3), 11-14.

[36] VanLehn K., Student modeling. In Foundations of Intelligent Tutoring Systems, pages 55–78. Lawrence Erlbaum Associates, New Jersey, 1988.

[37] Woods P. J. and J. R. Warren. Rapid prototyping of an intelligent tutorial system. In Annual Conference Australian Society for Computers in Learning In Tertiary Education, Melbourne, 1995.

[38] Wu M. C., A.P. Buchmann: Research Issues in Data Warehousing: Proceedings of the BTW 1996.

REQUEST FOR FEEDBACK

Dear Readers

At the very outset, International Journal of Research in Computer Application and Management (IJRCM) acknowledges & appreciates your efforts in showing interest in our present issue under your kind perusal.

I would like to request you to supply your critical comments and suggestions about the material published in this issue as well as on the journal as a whole, on our E-mail **infoijrcm@gmail.com** for further improvements in the interest of research.

If you have any queries please feel free to contact us on our E-mail **infoijrcm@gmail.com**.

I am sure that your feedback and deliberations would make future issues better – a result of our joint effort.

Looking forward an appropriate consideration.

With sincere regards

Thanking you profoundly

Academically yours

Sd/-

Co-ordinator

ABOUT THE JOURNAL

In this age of Commerce, Economics, Computer, I.T. & Management and cut throat competition, a group of intellectuals felt the need to have some platform, where young and budding managers and academicians could express their views and discuss the problems among their peers. This journal was conceived with this noble intention in view. This journal has been introduced to give an opportunity for expressing refined and innovative ideas in this field. It is our humble endeavour to provide a springboard to the upcoming specialists and give a chance to know about the latest in the sphere of research and knowledge. We have taken a small step and we hope that with the active co-operation of like-minded scholars, we shall be able to serve the society with our humble efforts.

Our Other Journals