

## Design and Development of a Quality Management Information System for Higher Education

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### ABSTRACT

The Utilization Of Quality Assurance System Has Turned Out To Be Essential For Arab Universities To Have The Capacity To Survive The Competition In Providing Education. The Present Market Urges Many Universities To Acquire The National Accreditation And Academic Accreditation Commission (NCAA) Benchmarks' Accreditation. But, Most Universities Face Challenges In Acquiring Accreditation Such As The Huge Numbers Of Printed Materials. This Research Presents A Higher Education Quality Decision Support System (QDSS) Which Incorporates Quality Tools And In Addition Process Quality Information. The Outcomes Demonstrated That The Usage Of The QDSS Can Enhance The Procedure Of Designing Academic Program, Reducing The Time Cycle, Lowering Cost, And Achieve Quality Improvement Consistently.

**Keywords:** Quality Assurance, Quality Management, Quality Information System.

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### I. INTRODUCTION

At The UNESCO World Conference On Higher Education In The Twenty-First Century: Vision And Action, Quality Assurance, Accreditation, And The Acknowledgment Of Capabilities Were Distinguished As Key Worries For Higher Education [1]. Quality Assurance And Accreditation Are Developing Around The World, Higher Education Incorporates The Formation Of The International Network For Quality Assurance Agencies In Higher Education (INQAAHE) [2], The Production Of The INQAAHE Guidelines Of Good Practice In Quality Assurance, And The Arranged Offering Of An INQAAHE Created Graduate Certificate In Quality Assurance By The University Of Melbourne. Quality In Accomplishing Academic Excellence Has Been A Focal Incentive In Higher Education [3]. Universities Depend On The Reputation Of Their Faculties To Get Students And Researchers And To Provide Trustworthiness To Their Degree Programs, Their Graduates, And Their Researchers. On The Other Hand, The Way Quality Assurance's Key Parts, Accreditation And Evaluation Or Assessment, Are Characterized Affects Its Execution And Effect.

Currently, The Consideration Is Progressively Being Focused On Quality Management In Higher Education Establishment Throughout The Arab Community. The Administrators Of Universities Are In Charge Of Making Choices And Designs With The Goal That

They Could Utilize Of The Inadequate Resources Efficiently. Universities Were Being Condemned Because Of Higher Expenses For Students And The Burdens For Getting Money Related Help From The Government. Accreditation Was The Essential Tool Utilized By The Reviewers To Decide If The Institution Was Met All Requirements For Higher Education. A Look For Of More Than Two Dozen Database Uncovered That No Research Concentrated On The Quality Management Theory And Higher Education [4, 5, 6].

Inside The Bologna Process, The Models And Rules For Quality Assurance In Higher Education Have Been Created By The European Association For Quality Assurance In Higher Education (ENQA) [6]. There Is An Extensive Variety In Accreditation Benchmarks And Practices In Europe And Russia.

The Paper Is Organized As Follows: Section 2 Presents The Related Work. The Module Architecture Of The QDSS Is Presented In Section 3. Section 4 Presents The Methodology And Framework Development. The Conclusion Is Presented In Section 5.

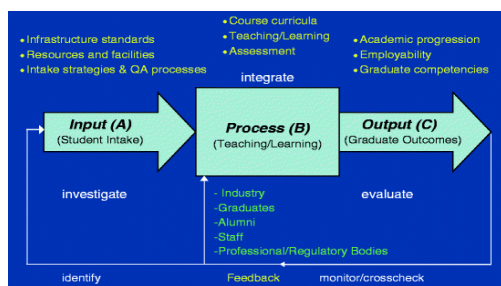
### II. RELATED WORK

Quality And Information Systems Are Inseparably Connected. The Requirement For Information Systems For Quality Management Has Been Discussed By M. Sakthivel, (2006) [7] In His Study The American And Japanese Assembling

Industries. Obviously, Particular, And Definite Information Is Required To Choose The Cause For Quality Issues, To Have The Capacity To Follow The Related Quality Issues And Their Effect In The Universities, To Respond Rapidly, And To Utilize Related Information On All Arranging Issues.

### 1.1 Scientific Management Movement In Higher Education

The Essential Distinction Between Chua's Input-Process-Output (IPO) System And The Educational Process Cycle Appeared In Fig. 1 Is The Feedback Loop From The Output Element Of The System Back To The Input And Teaching/Learning Process [8]. This Is Called Closing The Assessment Loop.



**Fig 1:** The Educational Process Cycle Modified From IPO Framework Of Educational Quality

The Scientific Education And Management Movements Come From Objective And Practical Assumptions. This Is As Opposed To The Subjectivist And Intuitivist Assumptions Of The Accreditation Movement That Depends On Proficient Specialist Increased Through Experience. Given The Conventional Culture Of Higher Education, Several Faculty Staff, Regardless Of Whether They Are In Scientific Disciplines Hold Subjectivist And Intuitivist Assumptions About How To Sort Out And Assess Or Survey Instructing And Learning And Who Ought To Have The Ability To Start Such Activities. What's More, Customarily, Evaluation Or Assessment For Accreditation Purposes Analyzed The Limit Of A Higher Education Organization, Degree Type, Or Program To Meet Certain Criteria And Standards In Connection To Data Sources And Procedures, I.E., The Nature Of Assets And Activities. In Any Case, With The Beginning Of The Scientific Education And Management Movements, And The Embracing Of Student Learning Outcome Evaluation As A Method For Quality Assurance, The Importance Moved To Outputs. That Is, The Quality Of Students Regarding Academic Outcomes And Working Environment Recruitments Turn Into The Core Interest. Such An Adjustment In The Operational Meaning Of Proper Request And How Higher Education Is Evaluated And In This Way

Compensated Has Caused Extra Worry. What's More, The Pressure Caused By The Presentation Of The Scientific Education And Management Movements Into Higher Education Has Been Exacerbated By The Ascent Of The Accountability Development Portrayed In The Following.

### 1.2 Role Of Total Quality Management (TQM)

TQM Is An Administration Approach Concentrating On The Enhancement Of Quality And Performance In All Divisions And Procedures Over The Organization To Give Quality Administrations Which Surpass Client Desires. TQM Extends The Capacity Of Quality Of Each Division From Top Administration To Bring Down Level Workers. It Allows Administration To Implement A Strategic Way To Deal With Quality And Put More Exertion On Prevention Action As Opposed To Assessment. Through TQM, All Workers Are Prepared In An Expert Way And Urged To Settle On Choices All Alone To Enhance The General Quality And Achieve Higher Norms. This Is Critical To Accomplishing The TQM Outcomes, On The Grounds That Without Workers On Board And Feeling Empowered, You May As Well Be Swimming Upstream.

Through TQM, Organizations Enhance Consumer Loyalty, Lessen Expenses, And Promote Cooperation. Organizations Can Likewise Increase Higher Profits For Sales And Investment. The Capacity To Offer Quality Services Permit To Higher Costs To Be Charged. Add Up To Quality Means Better Access To Worldwide Markets, More Client Steadfastness, More Extensive Acknowledgment As A Quality Brand, And So On. TQM Is Extensively Founded On The Subsequent Standards:

- Customer Centric Approach: Consumers Are Definitive Evaluators To Decide If Items Or Administrations Are Of Prevalent Quality Or Not. Regardless Of What Number Of Assets Are Used In Preparing Employees, Improvement Machines And Pcs, Integrating Quality Design Process And Guidelines, Bringing New Innovation, And So On. By The Day's End, The Clients Have The Last Say In Judging Your Organization. Organizations Must Make Sure To Execute TQM Over All Fronts Remembering The Clients.
- Employee Involvement: Ensuring Absolute Staff Participation In Accomplishing Objectives And Business Targets Will Direct Staff Strengthening And Dynamic Contribution From The Staff In Decision Making And Deal With Quality Related Issues. Staff Strengthening And Contribution Can Be Expanded By Making The Workspace More Open And Without Fear.
- Continual Improvement: A Key Part Of TQM Is Persistent Enhancement. Persistent

Enhancement Will Direct Enhanced And Higher Quality Procedures. Persistent Enhancement Will Guarantee Organizations Will Discover New Ways And Strategies In Creating Better Quality Products, Generation, Be More Competitive, And Go Beyond Client Desires.

- Strategic Approach To Improvement: Businesses Must Implement A Strategic Approach Towards Quality Enhancement To Accomplish Their Objectives, Vision, And Mission. A Strategic Plan Is Extremely Important To Guarantee Quality Turns Into The Center Part Of All Business Processes.
- Integrated System: Businesses Involve Different Divisions With Various Usefulness Purposes. These Functionalities Are Interconnected With Different Level Procedures. Everybody In The Organization Ought To Have An Intensive Comprehension Of The Quality Policies, Measures, Objectives, And Essential Procedures. It Is Vital To Encourage A Quality Work Culture As It Accomplishes Greatness And Surpass Client Expectations. An Integrated System Guarantees Persistent Enhancement And Enables Organizations To Accomplish A Competitive Advantage.
- Decision Making: Data From The Performance Estimation Of Procedures Demonstrates The Present Strength Of The Organization. For Productive TQM, Organizations Should Gather And Examine Information To Enhance Quality, Decision Making Precision, And Prediction. The Decision Making Must Be Measurable With A Specific Goal To Maintain A Strategic Distance From Any Space For Passionate Based Choices.
- Communications: Communication Is An Essential Part In TQM As It Assists Staff And Enhances Their Spirits Amid Throughout Everyday Tasks. Staff Is Required To Be Included In Everyday Activities And Decision Making Procedure To Truly Give Them A Feeling Of Empowerment. This Makes The Environment Of Progress And Solidarity And Helps Drive The Outcomes The TQM Procedure.

It Requires Huge Efforts, Time, Courage, And Persistence To Effectively Execute TQM. Organizations Effectively Executing TQM Can Witness Enhanced Quality Over Every Single Significant Process And Divisions, Higher Client Maintenance, Higher Income Because Of Enhanced Sales, And Worldwide Brand Acknowledgment.

### III. MODEL ARCHITECTURE OF QDSS

Universities Consist Of Faculties And Every Faculty Has Academic Program, Which Offer Courses. Quality Assurance At The NCAAA Comprises Of Strategies And Approaches That Guarantee Quality Is Kept Up And Improved. Fig. 2 Shows The Model Architecture Of QDSS. QDSS Is Applied To Courses, Academic Program, Students, Staff, Assessment Modules, Strategies...Etc.:

- Course Administration Module: This Module Deals With The Course Specification Learning Outcomes And Teaching Techniques, See Fig. 3.
- Academic Program Management Module: This Module Handles Academic Program Information, For Example, Learning Outcomes, And Key Performance Indicators (Kpis).
- Student Management Module: This Module Includes The Student's Information And Academic Tables. Fig.4 Shows The Form For Selecting The Student's Year For QDSS. The Form For Selecting The Subject For The First Year For The QDSS Is Shown In Fig. 5.
- Staff Management Module: This Module Contains The Staff Courses And Courses Outline. Fig. 6 Shows The Form For The Instructor's Name. The Form For Course Grading Information Is Shown In Fig. 7. Also, Fig. 8 Shows The Form For Entering Course Information. Furthermore, Fig. 9 Shows The Form For Entering Course Information With Selecting CS Program. The Form For Entering Course Information With Selecting The Year Is Shown In Fig. 10. Fig. 11 Shows The Form For Entering Course Information With Course Codes And Fig. 12 Shows The Form For Entering Course Information Showing The Edit Box For Entering The Ilos. Fig. 13 Shows The Form For Entering Course Information Showing The Sequence Of Pressing The Buttons.
- Assessment Of Student Learning Module: This Module Evaluates Student Learning By Inspecting Examples Of Student Work That Are Straightforwardly Associated With A Program's Learning Objectives And Examining The Student's Feedback Associated With Courses.
- Quality Assurance Portal: A Quality Assurance Portal Produces Reports And Information That Demonstrate The Patterns Of System Qualities To Observe Diverse Quality Assurance Objectives. Users Can Tweak Their Quality Assurance Portal With Particular Graphs And Reports Making Their Analysis Of Quality Information More Efficient. This Module Produces NCAAA Documents, For Example, Academic Program Specification, Specification

Program Portal, Course Specification And Course Reports. Fig. 14 Presents The Matrix Showing The A's Ilos For Several Courses And Fig. 15 Presents The Matrix Showing The B's Ilos For Several Courses.

- IIOS And Data Analysis Module: By Giving IIOS Function In Reports, Users Can Sort, Filter, Aggregate Quality Information And Drill Up/Down In Dimension. This Can Significantly Decrease Efforts To Observe Quality Special Cases And To Explore And Decide The Reasons For Those Exceptions. In Light Of Data Mart Models In The QDSS Package, A Number Of Quality Assurance Reports Are Made Utilizing QDSS Functions.
- Evaluation Module: This Interface Gives Staff Performance And Course States. Additionally It Allows The Reviewer And Auditor To Check On And To Inspect The Academic Program And Recommendation.
- Quality Dashboard: Dashboards Abstractly Look Like Dashboards Utilized As A Part Of Vehicles By Representing The Present And Past Key Performance Measurements Of An Organization In Forms Such As Gauges, Tables, And Diagrams.

The QDSS Supports Multi-Language. Fig. 16 Shows The Main Menu The QDSS In Arabic Language.



Fig 3: The Main Menu The QDSS.

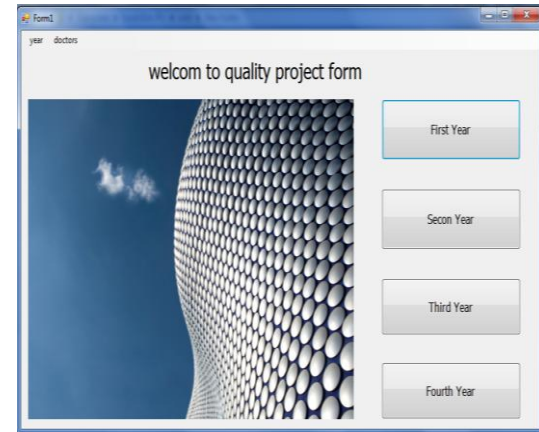


Fig 4: The Form For Selecting The Student's Year For QDSS.

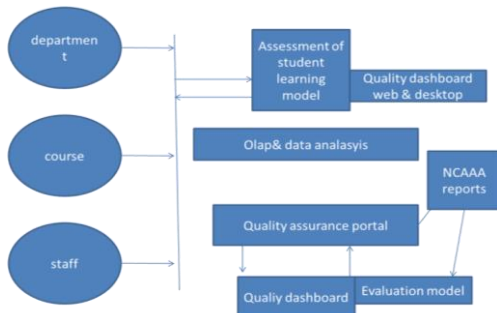


Fig 2: Model Architecture Of QDSS.

#### IV. QDSS METHODOLOGY AND DEVELOPMENT

The QDSS Methodology Depends On Implementation Of A Web-Based QDSS For Quality Measurement Utilizing Dashboard Technique. QDSS Contains Three Main Modules: Database, User Interface, And Web Application. The UI Of The System Was Planned And Created Utilizing HTML, CSS, PHP, Java Script And C# (C Sharp), Which They Used To Build Dynamic Web Application.

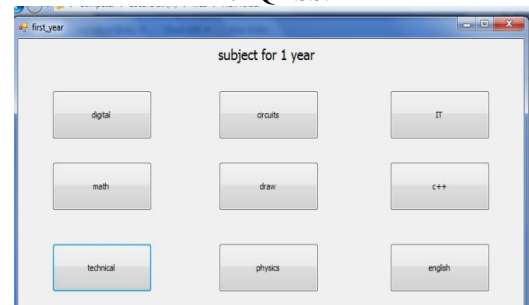


Fig 5: The Form For Selecting The Subject For The First Year For The QDSS.

#### 1.3 QDSS Reports

The Information From Different Departments Can Be Extracted Using QDSS That Provides Various Online Reports Such As Course Reports. Furthermore, Annual Academic Program Reports, Course Learning Outcomes Assessment Report, Staff Performance Report, And Other Report Types Can Be Extracted.

Fig 6: The Form For The Instructor's Name.

Fig 10: The Form For Entering Course Information With Selecting The Year.

code	doc_name	subject_name	total_degree	quiz_degree	exam_degree	section
1	hosan					
2	abd	Delat communication	100	10	50	10/10
3	tabba	Data Base	100	10	50	10/10
4	marghany	Data Mining	100	10	50	10/10
5	negma	network	100	10	50	10
6	Tayser	3a	100	10	50	10
8	Mohamed	IT	100	10	50	10
9	Mohamed	Health	100	10	50	10
10	Hosam	PHI	100	10	50	10
10	Hosam	PHI	100	10	50	10

Fig 7: The Form For Course Grading Information.

Fig 11: The Form For Entering Course Information With Course Codes.

Fig 8: The Form For Entering Course Information.

Fig 12: The Form For Entering Course Information Showing The Edit Box For Entering The Ilos.

Fig 9: The Form For Entering Course Information With Selecting CS Program.

Fig 13: The Form For Entering Course Information Showing The Sequence Of Pressing The Buttons.



