A model for improving the performance of quality standards in higher education institutions based on the methodology of the Information Technology Infrastructure Library

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Abstract — Interest in the Information Technology Infrastructure Library (ITIL) for system management best practices has increased in recent years, and companies have begun to integrate ITIL into their IT systems. In this paper we will present a solution using ITIL as a quality management methodology. All universities nowadays begin to receive academic accreditation. Therefore, to have this accreditation, they must have good quality management and the goal in this research paper to create a quality management proposal based on a good ITIL such a proposal contains a comprehensive set of best practices used to develop and implement IT services management. In this research, the performance of quality standards in higher education institutions was improved based on the ITIL methodology.

Keywords— Information Technology Infrastructure Library (ITIL), quality assurance, Higher Education

1. INTRODUCTION

Quality is a management system based on a set of values and depends on the employment of data and information of employees in order to invest their qualifications and intellectual abilities in various levels of organization such a process is implemented in a creative manner in order to achieve continuous improvement of the institution. Quality in the educational field refers to a set of standards and procedures aimed at continuous improvement in educational institutions [1].

Quality standards in education:

Quality standards vary according to the different fields they apply and the evaluation systems they monitor. Reviewing and developing standards and indicators measure the elements of education quality. Setting standards and procedures to measure the extent to which the educational institution satisfies the accreditation requirements [1].

- Strategic Planning
- Leadership and Governance
- Quality management and development
- Faculty members and Assistants
- administrative body
- financial and physical resources
- Academic standards and educational programs
- Teaching and learning
- Students and Graduates
- Scientific research and scientific activities
- Postgraduate Studies
- Community participation and environmental development .

Information Technology Infrastructure Library (ITIL)

(ITIL) is a library of best practices for managing IT services and improving IT support and service levels. One of the main goals of ITIL is to ensure that IT services align with business objectives, even as business objectives change [2].

the ITIL 4 framework:

- The ITIL service value system

The ITIL SVS denotes how the innumerable components and activities of the organization work composed to enable value creation through IT enabled services. the structure of the ITIL SVS is shown in Fig. 1.
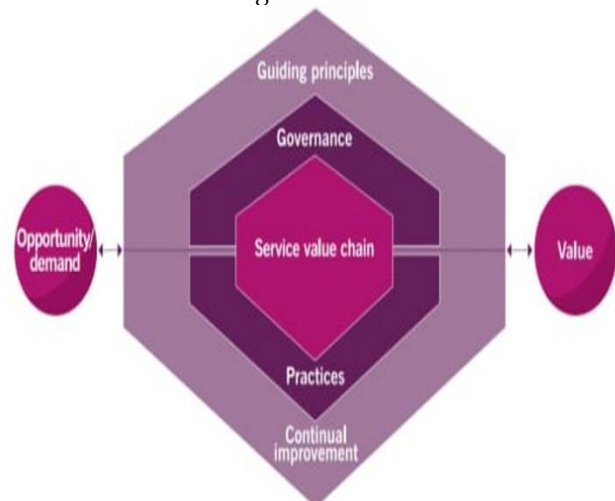

Fig .1 service value system

It requests to work as a system. The ITIL SVS defines the inputs to this system (opportunity and demand), the basics of this system (organizational domination, service management, continual enhancement, and the organization's abilities and resources), and the outputs (success of organizational objectives and value for the organization, its customers, and other stakeholders) "Mark Basham CEO , AXELOS" and et..al, [2].

The core components of the ITIL SVS are:
- The ITIL guiding principles
  - Attention on value.
  - Start where you are.
  - Movement iteratively with feedback.
  - Collaborate and stimulate visibility.
  - Think and effort holistically.
  - Keep it modest and practical.
  - Improve and automate.

- Governance
  - Governing bodies and governance
  - Governance in the SVS

- Service value chain

As shown in Fig. 2 the components of service value chain are :
  - Plan
  - Improve
  - Engage
  - Design and transition
  - Obtain/build
  - Deliver and support
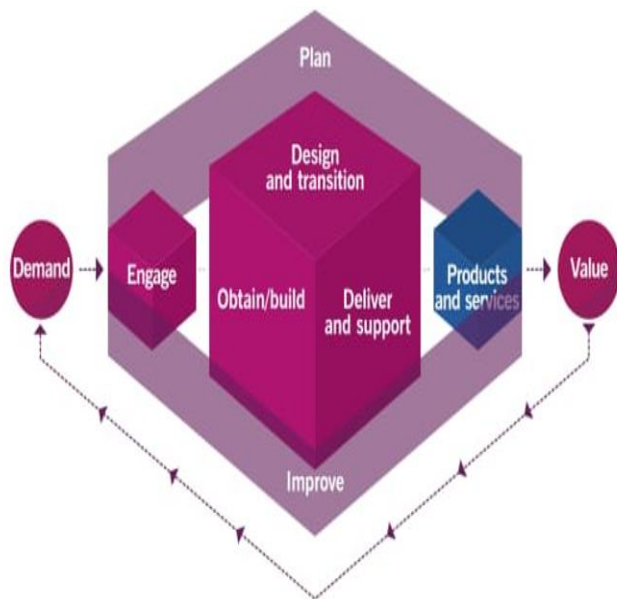

Fig .2 The ITIL service value chain

  - Opportunity, demand, and value

Opportunity represents options or possibilities to add value for stakeholders or otherwise improve the organization.

  - Continual improvement

Bring into line an organization's practices and services with changing business needs through the ongoing identification and enhancement of all elements complicated in the effective management of products and services.
  - Steps of the continual improvement model
  - Continual improvement and the guiding principles
  - Practices
  - Summary
- Practices

Set of organizational resources designed for performing work or accomplishing an objective [3].
  a) General management practices
    - Strategy management
    - Portfolio management
    - Architecture management
    - Service financial management
    - Workforce and talent management
    - Continual improvement
    - Measurement and reporting
    - Risk management
    - Information security management
    - Knowledge management
    - Organizational change management
    - Project management
    - Relationship management
    - Supplier management
  b) Service management practices
    - Business analysis
    - Service catalogue management
    - Service design
    - Service level management
      - Availability management
      - Capacity and performance management
      - Service continuity management
      - Monitoring and event management
      - Service desk
      - Incident management
      - Service request management
      - Problem management
      - Release management
      - Change enablement
      - Service validation and testing
      - Service configuration management
      - IT asset management

  c) Technical management practices
      - Deployment management
      - Infrastructure and platform management
      - Software development and management

General management practices

Service strategy area In the service strategy stage, the IT service delivery unit manages the clear requirements of the IT service usage departments and identifies plan services that meet the requirements.

Detailed Processes Requirements management, strategy

creation, service portfolio management, and IT financial management must be considered at the service strategy stage. It is necessary to check the contents of the service provided by the university information system and the strategy of the support activity to achieve the fulfillment of quality standards, the management of the service portfolio process, and the financial management of information technology.

The area of continuous service improvement required, the service measurement cycle, service analysis, service report and service improvement should be considered. In order to analyze future improvements and to analyze service change measurement forecasting, identify service measurement object, aggregation activity, presence of output, analysis of measurement data, implementation of analysis information reporting, improvement activity through continuous monitoring measurement, it is necessary to check whether it is being implemented or not [4].

Service Management Practices

Service Design Area This course introduces the principles of the integrated design of new or changing IT services to be applied to the operating environment at the service design stage, and introduces the processes that should be considered a priority when designing IT services. In addition, it introduces the organizational structure, role responsibilities and considerations from a service design point of view, so that service design provides cost reduction, quality improvement, enhanced consistency and ease of implementation.

Detailed Processes Required In the service design stage, service catalog management, service level management, capacity management, availability management, IT service continuity management, information security management and supplier management should be considered together. It is necessary to check the accuracy of the service catalog, standardization of service level, system capacity management plan, availability management against customer expectations, continuous training and service inspection, and change management. Also, it is necessary to check whether the information security policy has been established and maintained and the supplier contract.

Service Transition Area The processes that support the service life of a process within ITIL V3 include processes such as transition planning and support, change management, service asset and configuration management, release and application management, validation and test management, evaluation management, and knowledge management. In order to plan appropriate resources and capacity from release to application, check whether service asset change logging and configuration are optimized, release output and application plan. It also checks for verification and testing processes, reports on performance appraisal results, and knowledge management processes.

Service Operation Area Service operations are intended to provide and support services and are the most important step in envisioning services in the ITSM lifecycle. Operations include event management, order fulfillment, incident management, problem management, and access management. The event monitoring is checked and whether an early response process has been established, the request type

is documented, and the incident output is logged. Also, it is necessary to check the problem, whether the solution log is kept, and the user's access right Hee-Wan and et..al,[4].

- The four dimensions model

The four dimensions of service management The four perspectives that are critical to the effective and efficient facilitation of value for customers and other stakeholders in the form of products and services "Mark Basham CEO , AXELOS" and et..al, [2].
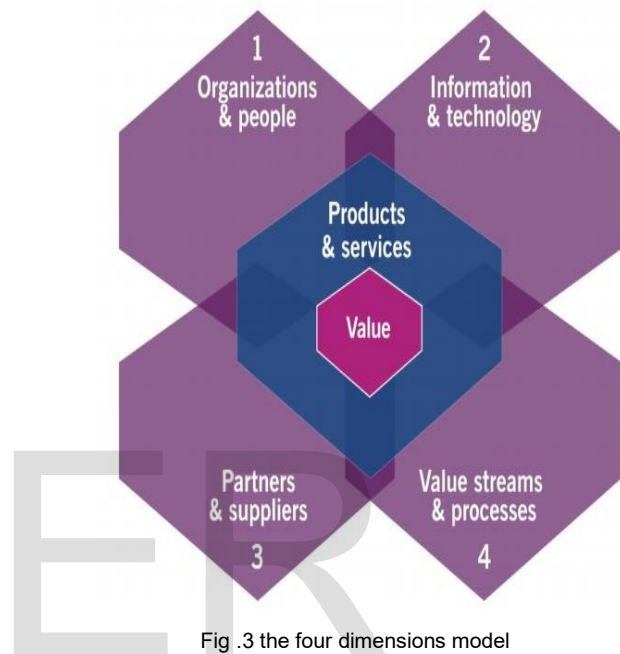

Fig .3 the four dimensions model

- Organizations and people
- Information and technology
- Partners and suppliers
- Value streams and processes

Hee-Wan Kim et, all derived the checklists of operation audit by each domain of service strategy, service design, service transition, service operation, and continual service improvement. this study appear to have more than average satisfaction the suitability results were [4].

Leandro Aparecida Antunes Steffen et, all This paper focuses on analyzing the aspects of IT Service Management at a Federal University, aiming to present its theoretical conception and the practical aspects involved in IT Governance. The methodology used consisted of the application of maturity models capable of determining how well the University knows and applies the practical aspects of the ITIL library [5].

Yuyun Tri Wiranti et, all This research includes three main processes, namely data and information collection, document generation, and validation. The method of data and information collection is carried out using interview techniques, and the process of document preparation, validation and verification is carried out by conducting group

discussion forums with service providers and service users. In this case, the users of the service are the academics at XYZ University, while the users of the service are the ICT department of XYZ University. This observation resulted in three major SLM documents, the SLR, the SLA, and the OLA, for Academic Information System help desk services [6].

Tining Haryanti et, all This research measures the readiness and success of implementing Service Design at Unipart using IT Balanced Scorecard (ITBSC). Scientific contributions in this study provide recommendations about the objectivity of each ITBSC perspective for e-commerce universities [7].

Further research needs to be done on how the suitability of objective measurement from every ITBSC perspective for e-commerce universities. The results of Unipart readiness measurements based on ITIL v.3 service design assessment have an average value of 2.69. Maturity levels based on the assessment index in repeatable level. Measurements on ITBSC for each service design domain produce an average score of 2.93. The processes in the service design domain measured include; service management with an average of 2.64, service design principles with an average of 2.65, a service design process with an average of 2.75, service design technology with an average of 2.85, organizing service design with an average of 2.82, design service considerations with an average of 2.49, and service design implementation with an average of 2.66. Requirements in each process must be fulfilled to achieve the expected level of maturity. The score is at an adequate level of effectiveness. Thus, the level of effectiveness of ecommerce universities at the University of X is at an adequate level [7].

Wang Zhen et, all this paper has developed the organization model, the process model and the technology model of campus IT service management based on the ITIL theory and the realities of Chinese universities [8].

Ilham et, all the summary of this paper is the conclusion from the results of this study is that Green Technology has an influence on the Improvement of Organizational Business Services, and Green Technology has an influence on Organizational Business Performance Improvement. Integrated Smart Systems affect the Improvement of Organizational Business Services and Integrated Smart Systems affect the Improvement of Organizational Business Performance. Then Information Technology Audit Management has an influence on Organizational Services Improvement and Information Technology Audit Management has an influence on Organizational Business Performance Improvement. In addition, Work Behavior Innovation has an influence on Organizational Service Improvement and Work Behavior Innovation Influences Organizational Business Performance Improvement [9].

Abı´lio Cardoso et, all in this paper, we investigate, on the one hand, how Information Technology Infrastructure Library could be useful to the migration of services, applications and data to cloud computing, and on the other hand, we discuss how these processes help people to improve their skills in the knowledge accessibility. The research was validated with the implementation of a case study and with interviews with stakeholders of the whole process [10].

Agus Hermanto et, all The end result of the service quality planning developed with ITIL can be used as a reference in improving the role of information technology and systems in supporting organizational business processes at Polytechnic XYZ, in the form of policy documentation and IT Service Management guide (ITSM). In the final stages, the critical success factor to ensure continuous improvement of IT services [11]

Wadie Berrahal et, all This paper proposes a model, a viewing perspective, for successful Implementation of an Information Technology Service Management (ITSM), in focus on the frameworks of best practices for delivering and governance IT services, such as Information Technology Infrastructure Library(ITIL), the current study intend to reduce the gap between the research committee and the professional world and initiates a critical reflection in relation to the implementation of IT Service Management standard [12].

2. PROBLEM DEFINITION:

There is a real problem in universities task distribution. One of the main requirements in the university quality is tasks scheduling and monitoring and, there are 18 quality measurements where each one has its action plan. There is also a work flow tracking: who should do which task, the task deadline, the delivery time. There must be a good management and tasks control in which other tasks related with triggers which need a follow up calendar to facilitate job task for each employee, all these factors are, there must be a methodology for quality assurance in education. Proposed using Information Technology Infrastructure Library (ITIL).

3. PROPOSED MODEL

The proposed model illustrates the educational processes that take place within the Egyptian higher education institutions and how to integrate them using the ITIL system, which focuses on constantly meeting customer requirements and enhancing their satisfaction. It is consistent with the organization's goal and strategic direction, so it was supposed to employ this system in higher education institutions is a must instantiation can benefit from such a procedure, as its components correspond to the requirements of the Egyptian quality assurance norms. Higher education institutions have to implement the ITIL system inside them to ensure global competition among all international institutions. This model includes 12 standards approved by the Egyptian Quality Assurance Authority, and they are compared with the four standards of the ITIL system as a way to achieve compromise adequacy for all quality outputs and the ability to deal with institutions, but there is one of the standards of the Quality Assurance Authority that is not used in these institutions, as it is limited to undergraduate students.

Table. 1 ITIL and the migration to quality standards in higher education institutions

Standard Practices	ITIL Practices	12 Community participation and environmental development	11 Postgraduate Studies	10 Scientific research and scientific activities	9 Students and Graduates	8 Teaching and learning	7 Academic standards and educational programs	6 financial and physical resources	5 administrative body	4 Faculty members and Assistants	3 Quality management and development	2 Leadership and Governance	1 Strategic Planning
Architecture Management	General Management Practices			<			<	<		<	<	<	<
Continual Improvement							<	<		<	<	<	<
Information Security Management				<	<	<	<	<	<	<	<		<
Knowledge Management		<		<	<	<	<	<		<	<	<	<
Measurement and Reporting				<	<	<	<	<	<	<	<	<	<
Organizational Change Management					<			<	<	<		<	<
Portfolio Management				<	<	<	<			<		<	<
Project Management		<			<	<			<	<		<	<
Relationship Management					<		<			<	<	<	<
Risk Management					<	<	<			<	<	<	<
Service Financial Management					<			<	<	<	<	<	
Strategy Management		<		<	<	<	<	<	<	<	<	<	<
Supplier Management		<			<		<	<	<	<	<	<	<
Workforce and Talent Management					<	<			<	<	<	<	<
Availability Management	Service Management Practices			<	<		<		<	<		<	<
Business Analysis		<						<	<			<	<
Capacity and Performance Management			<			<	<			<	<	<	<
Change Control						<	<			<	<		<
Incident Management						<	<			<	<		<
IT Asset Management			<	<	<	<	<	<	<	<			<
Monitoring and Event Management		<			<					<	<		<
Problem Management				<	<	<	<			<	<	<	<
Release Management					<	<				<	<	<	<
Service Catalog Management		<						<	<		<		<
Service Configuration Management		<						<	<		<		<
Service Continuity Management				<				<	<		<		<
Service Design		<			<	<	<			<	<	<	<
Service Desk		<			<	<				<	<	<	<
Service Level Management		<						<			<		<
Service Request Management								<			<		<
Service Validation and Testing					<	<					<		<
Deployment Management	Technical Management Practices		<	<	<	<	<	<	<	<			<
Infrastructure and Platform Management		<	<	<	<	<	<	<	<	<			<
Software Development and Management		<	<	<	<	<	<	<	<	<			<

The Information Technology Infrastructure Library (ITIL) is a set of concepts and policies for managing Information Technology (IT) infrastructure, development and operations, through a set of points:

A. Service Support:

The service support ITIL discipline is focused on the user of the ICT services and primarily concerned with ensuring that they have access to the appropriate services to support the educational functions. To a educational, customers and users are the entry point to the process model.

Fulfillment of quality assurance standards based on ITIL, The process of service verification and testing plays an important role. Ensuring that developments meet quality standards as well as expectations of operational outcomes for decision makers. The primary objective of implementing quality standards is to remove errors before launching the service, ensure goals are achieved, value increase, and improve user satisfaction. Service validation during the service transition phase ensures that new or changed services are fit for purpose and usable. By identifying risks, errors or problems early on, they can be addressed and eliminated. Customer satisfaction is increased when expectations are met.

The goal of using the ITIL methodology is to ensure the quality of service. Understanding and knowing how to direct, plan and improve value streams and practices, with testing all the time, is essential to continuous improvement efforts. Then, ITIL 4 is the ideal choice for educational institutions who want to benefit from best practices. ITIL encourages risk reduction, change management and quality standards, and does not restrict development. The essence of using the ITIL methodology is to provide quality assurance. ITIL knows that applying a standardized set of policies to the service development lifecycle as a whole means that teams are able to meet defined quality standards.

B. Service Delivery:

The service delivery discipline is primarily concerned with proactive and forward-looking services that the business requires of its ICT provider in order to provide adequate support to the educational users. The discipline consists of the following processes:-

- Service Level Management: Service Level Management is the primary management of IT services, ensuring that agreed services are delivered when and where they are supposed' to be delivered.
- Capacity Management: Capacity Management is the discipline that ensures IT infrastructure is provided at the right time in the right volume at the right price, and ensuring that IT is used in the most efficient manner.
- Contingency Planning: Contingency planning is the process by which plans are put in place to ensure that IT services can recover and continue should a serious incident occur.
- Availability Management: Availability Management is the practice of identifying levels of IT Service availability for use in service level reviews with customers. Availability management is the ability of an IT component to perform at an agreed level over a period of time. It covers reliability, maintainability, serviceability, resilience, and security.
- Cost Management for IT Services: Cost Management is the discipline of ensuring IT infrastructure is obtained at the most effective price and calculating the cost of providing IT services so that an organization can understand the costs of its IT services.

4. CONCLUSION

The target of this search is to execute a quality administration framework in the college's activities and to assess it through an internal review.

The venture responded to the accompanying examination question: "How the ITIL Quality Administration Framework is effectively applied in college activities?"

By addressing this inquiry, the task accomplished the accompanying achievements:

- ITIL status examination which explained the colleges position towards scholarly accreditation necessities
- The execution plan which distinguishes the improvement activities that should be steady with quality norm before the inward review is led.
- The inner review plan and the consequences of the inside review.

The point of this undertaking is to answer how a scholarly accreditation quality administration framework can be effectively executed in colleges tasks. To survey whether the execution has been fruitful requires additional time. Activities enhancements are reflected in the colleges quality rating quickly, as progress results require additional time. In any case, the venture has arrived at its objectives as an overall course of execution.

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