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Decision Support System for Scientific Promotion

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Abstract: *Decision support system has emerged as an important information technology tool to many sectors especially to managerial department or missions ; in order to save time, get maximum benefits from technology, get precise decisions based on the user roles. So DSS came to resolve some issues that managerial department faced when they resolve some semi-structured or unstructured problems that need important decisions, however, DSS can effectively provide precise decisions to managers at any position. There are many DSS implementations nowadays at many sectors. This thesis focused on redesign the scientific promotion process by implements a flexible prototype of Web-based DSS to support the decision-making process by the main actor scientific council at Saudi Universities, in addition serves different faculties with their different missions and goals. The aim of this system is to provide decisions based on predefined points related to promotion main criteria with its sub-criteria, each actor in the system has set of roles and privileges that clear in design and implementation phases.*

Keywords: *Decision Support System, DSS, Scientific Promotion, SP.*

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I. Introduction

In this research author builds, designs, and implements a flexible web-based DSS prototype for SP at Saudi universities in order to reduce subjectivity in the evaluation process, enhance the overall system and eliminate the traditional methods. SP system serve many actors especially scientific council and different faculties inside each university through several steps which were: analyzed the current SP architecture and its related criteria and sub-criteria by used mixed method "qualitative and quantitative method", built a logical model, system architecture, and system workflow for the overall system. System prototype implemented by using cloud server and open source software called Code-Igniter based on MVC technique, this framework used PHP scripting language, HTML tags, and JavaScript; finally, the results of the testing and evaluating the system is correct and specific outputs "decisions" based on predefined criteria and sub-criteria points and several scenarios.

II. Literature Review

In the following we will discuss the most relevant concepts and studies that are related to evaluation systems followed in different higher education sectors with its criteria and used for several purposes such as: rewards, tenure, performance track, and promotion systems. In addition, the chapter introduced the implemented promotion criteria and measured the satisfaction levels in different universities, explained the importance of DSS implementation, and how it was impact on the overall process architecture and workflow in the higher education context.

Generally, there were a lot of studies that explained the impacts and importance of DSS at several areas but in the higher education context especially in the area of promotion system at universities there were a lack in the studies, based on that the main contributions of this thesis were redesign the process architecture of the SP by generating new criteria with its sub-criteria, and developed and built a flexible and compatible W-DSS prototype for SP process based on the total criteria points to promotes applicants and that cope with different colleges at public Saudi Universities.

Form qualitative study that done in china university, Zhang [1] collected the data through two strategies: reviewed existing documents and conducted semi-structured interview in order to study the sources of institutional promotion criteria, explored faculty experiences and perception about these criteria, and explained the misalignment between the traditional reward system and faculty expectations and behaviors. Zhang focused on 24 participants from associated and full professor, and doctoral advisor from two perspectives: the teaching and research criteria. Teaching promotion criteria depends only on the university-level teaching competition, so this competition considered as a formal faculty evaluation, in this case the faculty must achieved third place or higher to be qualified for promotion, the quality of teaching evaluated from expert and student perspective depends on centralized and executive model. Research promotion criteria depends on

publications in international journals, official competitive awards for research and governmental grants, faculty member must achieve certain points to be promoted to a higher academic rank; so, they focused on the quantity and quality. Finally, author suggested that the promotion and evaluation criteria must be amended and modified to keep pace with changes and developments in universal universities.

In the same context authors in [2] studied the faculty members' satisfaction level with promotion criteria in Nigerian universities and what the new criteria should be added to the promotion system. They collected the data through two ways: interview and conducted a questionnaire which distributed to 349 faculty members in different level, authors found that 72.5% were dissatisfied from the current evaluation method "included the promotion criteria, procedures, long time"; promotion system was depend mainly on the individual's research output. The suggestion for promotion criteria were: assessment of faculty member by students, oral interview before promotion, increased the weight of teaching, and participation in professional activities; also, they recommended accelerating the promotion process and procedures.

In [3] the study was aimed to determine the most important criteria for promotion at two-year colleges in the United States, and to measure the clarity of policies and procedures, the strategies in data collection were questionnaire and email. Author found that many community college did not explain each criterion effects and weight in determining promotion process, there were no general role or certain criteria or procedures that were followed; some college covered teaching, years of experience, college service, professional activity and growth, and academic credentials while others covered part of these criteria; but the primary one was the teaching excellence criteria.

According to [4] author focused on three main criteria in faculty evaluation process which were: teaching, service, and research in San Jose State University, in order to study the weakness and strength in their current evaluation system. The result from distributed the questionnaire was that the faculty members did not satisfied "below Average" with existing evaluation system, procedures, and criteria. Author recommended to changes the evaluation procedures and criteria.

Another study [5] that measure the efficiency, reliability, and fairly of Taiwanese faculty promotion system, author focused on each criteria and sub-criteria inside the system and the founding from distributed a survey that the most important criterion and highly effected in the promotion points was published a book. Generally, the results were: (1) the productive faculty in researches publication got promoted faster than non-productive faculty, (2) timing of publishing and publication type influenced in promotion and rank system, (3) the promotion rate different from one academic field to another, (4) faculty member employed in private university reach the full professorship later than faculty in public university because of managerial and financial aspects.

In [6] authors measured the most important criteria in medicine college that influenced on the faculty performance from promotion committee and department chairs side. The result from distributed the questionnaire was teaching and clinical skills were the most important criteria in measuring the faculty performance. In another medical college [7], faced some challenging issues related to implement a reliable system for evaluation process of faculty members' activities; authors collected data through two strategies: questionnaire and semi-structured interview; based on the analysis results they suggested a model contained several criteria: education, research, administrative affairs, clinical services, and services outside university. Model based on six dimensions (explicit, accuracy, constructiveness, satisfaction, mission alignment and appropriateness) derived from several factors such as: (web-based system, flexibility, decision making, and evaluation period.

According to [8] authors presented and developed a tool that supported college promotion committee in order to reduce subjectivity in the evaluation process, enhance the overall system and eliminate the traditional method, so this tool facilitated the gathering and evaluation of faculty work. They followed several steps to fulfill their promotion cycle: (1) identified their own criteria: teaching /academic support, scholarship/ research, service and professional development; also each criterion was contained several activities, (2) divided activities into levels using quantitative and qualitative measures, (3) created a scoring rubric (integer rating scale from 1-4 assigned to each level) to identify and measure faculty work by using Excel spreadsheet and tied it with e-application, (4) assigned weighting for each activity based on its importance to institution, (5) created their own formulas and benchmarks in Excel spreadsheet to calculate the percentage for each criteria ,(6) created and implemented four distinct e-application for each criteria by using Active Server Pages 3.0 via Microsoft Front page and all electronic forms will be stored in Microsoft SQL Server, (7) the evaluation process was done through survey that developed by committee, (8) finally, the results were each committee member reviewed the candidates documents and information separately and ranked it in the system, the time was one hour to review each application.

Another study [9] introduced an Adaptable Model for Assessing Sustainability (AMAS) in higher education institutions. The model was depending on four main processes: (1) structure the problem, (2) build weighting criteria, (3) calibrate according to context, (4) calculate and show results. In order to implement

AMAS they followed several steps: first, built the assessment hierarchy that contains four levels: the first level the goal, the second level criteria: institutional commitment (B1), example setting/leadership (B2), and advancing sustainability (B3), the third level sub-criteria, and fourth level is the indicators, second: selected a set of indicators "25 indicators", and then they used Analytical Hierarchy Process (AHP method or algorithm) "is a theory of measurement through pair wise comparisons and relies on the judgments of experts to derive priority scales. To make comparisons, author scaled of numbers that indicates how many times more important one element is over another element with respect to the criterion with respect to a given attribute which they were compared" [10]. In order to determine the relative importance of each criterion and sub-criterion, also to prioritizing the problem, third, found the maximum consistency ratio, and then used formulas to calculate each indicator weight, fourth, normalized and aggregated data in case of wide range with different units were used. So, by using their model they found the most important criterion was example setting/leadership (B2) by 38.16%, and B1 and B3 were 36.14% and 25.70% respectively.

In the same context, Badri and Abdulla [11] introduced a model that contained the most important criteria and sub-criteria that used in evaluating the suitability of each faculty member "faculty evaluation system" for academic reward/awards system in institutions of higher education in order to make a clear procedures, roles, and weights for each criterion. The model covered three major dimensions: the research, teaching and service; also, the elements included in each dimension. Once the model was established, the prioritization methodology based on the AHP theory was implemented because there was a need to make the criteria adopted in academic reward/ award system decisions more explicit and made consistent decision-making process.

In the same context [12] there was a progression tool that developed and implemented to help and direct faculty members in the evaluation process and to compare their achievements with the milestones on the tool; its gave them a clear procedure, important activities that must be covered, and priority for each criterion in order to get high points towards achieving the goals in the tenure and promotion process. It was based on several criteria such as: published in international journals, wrote book chapter, attended to some research events, attended to seminars about development of teaching skills, became a member in some committee.

In [13] authors introduced and evaluated an e-portfolio approach for faculty performance and development process, it was consisted several functions for faculty member: (1) collected feedback and comments from many sources on several aspects of their work, (2) analyzed and compiled the feedback in their e-portfolio and make changed to their working way if it's necessary, (3) shared their e-portfolio with their supervisor to assessed their performance, (4) faculty created performance management plan to reach the goals. Approach based on main criteria: teaching, scholarship, formal leadership, applied research, and students' feedback. The software that has been used called Mahara; an open source software program which gave faculty member full control over the page. The evaluation method was through distributed a questionnaire to measure the satisfaction level. According to [14] authors suggested a standard-driven approach for faculty evaluation "for merit, tuner, and promotion system". Continuous improvement was done for old system by comparing the current procedures, rules, and criteria with most applicable standards in these areas. In analysis phase, they found that 11 of 18 standards were not met; so, they decided to reengineer by implemented Personnel Evaluation Standards which based on quality rather that quantity, system simplified the decision-making processes and based on fair, clear criteria and standards.

There were several goals from the previous studies in this section: evaluated and measured the satisfaction level for implemented assessment system, criteria and methods, also some studies redesigned their current evaluation system to achieve excellence, developed process workflow, minimized some current issues and challenges, and eliminated the non-value-added tasks and traditional methods. There were two aspects theoretical and practical studies, so studies [2, 3, 4, 5, 6 and 15] provided only the data collection results and recommendations in order to measure several aspects such as: satisfaction level of existed evaluation system, clarity level of promotion policies and procedures, accurately, efficiency, and fairly of promotion system. They focused in different criteria; for example: teaching, research output, external and internal services, scholarship, leadership, professional activates and years of experience, while others [6, 7, 8, 9, 10, 11, 12] provided practical solutions and focused on built models, tools, and framework to support evaluation system weather for tenure process, rewarding system, performance track, or promotion system; for example in [7] author focused in built measurement tool by using several techniques to serve reviewers in reviewing and ranking process. 8, 9] used mathematical model "AHP" to assign priority and weights for different criteria of evaluation process such as: asses' sustainability and rewarding system. While [10] built a guiding tool that helped faculty members reviewed their achievements with existing milestones, and [11] developed an approach for collected and analyzed the feedback and created performance management plan, so it's considered as managerial or control approach. Finally, [12] suggested faculty evaluation approach used in tenure and promotion process, in addition they added personal evaluation standards based on quality rather than quantity.

III. DSS in the Higher Education Context

Before starting in the DSS concepts' and its usage and impacts in the higher education context, the important question that needed to be answered: why we need a computerized DSS for decision making? Because the computerized systems possess has some strong capabilities which facilitated the overall decision support processes in several ways, including: (1) Maximized the productivity of group members, (2) speedy computations: allowed decision makers to conduct several computations quickly with low cost, thousands of criteria or alternatives could evaluated in short time, (3) enhanced communication and collaboration, (4) enhanced data management: several decisions contains complex computations; so the resulted data for these can be stored in multiple databases anywhere in the organization and even outside by using such cloud technique, these data includes: text, graphics, sound, and video; from this it is important to transmit data quickly, securely, and transparently by using computers for storing, searching, and transmitting this data, (5) anywhere, anytime support, (6) using the web, (7) improves understanding and increases confidence in the decisions taken, and finally, (8) Agility and quality support: computers enhanced the overall quality of decision made and helped the organizations to adapt with the changes in the environment to make good decisions quickly, so they could be able to reengineer processes, changed or replaced some operations, and adds innovative solutions [16] [17] [18].

According to these benefits the DSS considers as strong tool in information technology area to facilitate the decision-making tasks especially for high complex and deep analysis tasks; in addition, it plays a significant role in different areas inside any organization such as: inventory management, HR, and strategic planning [18] [19].

There is no universal or standard definition of DSS, it depends on the user view so it could be viewed as conceptual methodology i.e. "like an umbrella term to describe any computerized system that support decision making in an organization"; others viewed it as specific application i.e. they deals with DSS in a narrower scope either as the application itself or as the process for building customized application; so according to Turban et al. (2011) outline Scott-Morton and Keen (1978) "decision support systems couple the intellectual resources of individuals with the capabilities of the computer to improve the quality of decisions [17]. Power. Daniel [20] described DSSs as a specific "class of computerized information system that support decision-making activities." Also, Power mentioned another one "A DSS is an interactive computer-based system or subsystem intended to help decision makers use communications technologies, data, documents, knowledge and/or models to identify and solve problems and make decisions. Mcleod and George defined DSS in simple words as: "systems that assists management in solving a problem" [21], and Arnott and Pervan saw DSS as "a part of the Information Systems (IS) domain, in which the main focus is on providing support for decision making at the managerial level" [19].

From the implemented side of DSS there were several studies that explained and measured the impacts of DSS in their overall decision-making process, workflow and procedures, and process lifecycle. According to [22]; a qualitative study measured the impact of built and implemented a DSS at Ministry of higher education level in Gaza; the results shown a significant positive impact on all decisions made process by the ministry, increased the support level to senior management and their interest in using decision support systems, maximized the involvement of workers in the development of decision support system. Author recommended to build a comprehensive DSS which linked all departments in the Ministry to accelerate the overall workflow and took all advantages from DSS applications and usage in other ministries.

Another qualitative study [23] measured the impact of DSS on human resource output in Zimbabwe universities; author distributed a questionnaire to 13 universities. The result measured the six critical success factors or indicators of human resource output such as: quick problem solution, decision making, and decision scope. Author concluded that DSSs enhanced the overall decision-making process and the HR output.

In king Abdul-Aziz University in Jeddah there was a study [24] presented the role of implemented the DSS in the academic timetable; through implemented an automated system assist faculty member. Author followed ordered steps: (1) identified and defined the problem, (2) analyzed the causes, (3) drawn the plan, (4) executed the plan, and (5) analyzed and evaluated the results. The results were: saved the cycle- time of timetabling process and for change and exchange process, and got the maximum benefit from the existing room. In addition, the feedback of faculty member was high level of satisfaction.

In another study [25] the aim was to design DSS framework for higher education institutions and integrated it with strategic planning processes. The system developed to be used by decision makers in all different levels at higher education institutions; DSS will be a comprehensive and anchored in all databases of the higher education institution information systems. DSS framework consisted of several modules for analysis, group support, multi-criteria analysis, and reporting process. The results were reduced the cost and time needed to resolve the important issues of complex strategic decisions.

In another hand, there was a study [26] introduced a web-based DSS; the web-based DSS meaning the usage of web tools and technologies to develop/ implement DSS applications through a "thin-client" web browser, these web technologies used to implement different type of DSS such as: data-driven, document-

driven, model-driven or hybrid. So, the linking protocol between user computer and computer server that hosting DSS is TCP/IP, the method to retrieve the results; the web browser will send HTML (hypertext mark-up language) requests using the HTTP (hypertext transfer protocol) to a web server. Web server processes these requests using a CGI (Common Gateway Interface) script, which handles model processing, SQL generation, post-SQL processing, and HTML formatting. This application server then sends requests to a modeling program or a database server [27]. So, this study was developed web-based DSS application for the evaluation and strategic planning using ISO 9000 factors in higher education at Vietnam. The university was mainly used a traditional method for evaluation process; so, there were several issues that related to this method. To overcome the current problems authors followed ordered steps to develop DSS aligned with ISO factors, (1) analyzing the ISO factors, (2) built the hierarchy model using ISO factors, and (3) built the conceptual model for the web-based DSS application. The result was: the model facilitated the decision made process based on several alternatives.

In [28] authors described an adaptive DSS approach for resource allocation planning; because it's not well-structured decision process and there were several decision makers involved in the academic planning process; so, they have different goals and objectives. In addition, the satisfaction level of the allocation solutions was different from one decision makers to another based on the evaluations and perceptions processes. The solution was introduced an adaptive DSS that was suitable for different academic decision makers with different objectives and planning views. The result from testing DSS approach on four academic decision makers in large university provided a decision support for decision makers with several problem-solving styles; so, it's simplified the decision-made process.

According to [29]; authors defined an approach for multi-attributes decision making to select applicants for PhD program. The general approach was based on (1) reviewed the protocols and applicants, (2) justification and decision, (3) ranked the applicants, and (4) committee meeting. The approach consisted several phases; phase1: queries (information requests), phase2: value judgments/evaluations, phase3: justification of decisions (accept, reject, defer). The overall DSS approach served the committee in simplifying the evaluation process and the cycle-time. From previous studies in this section; authors have clearly the same objectives from implementing DSS models and approaches such as: got maximum benefits from the existing technologies, reached high effectiveness and efficiency, accuracy, improved the overall performance, minimized cycle-time of process procedures, and overcame the issues and problems related to managerial decisions. DSS considered as powerful tool supported all managerial level in different departments and simplified the overall decision making process; also there were a lack in the studies that covered the development of scientific promotion system especially on Saudi universities by using web-based DSS tool; so based on that the main contributions in this thesis were designed, developed and prototyping a flexible SPW-DSS based on cleared and defined criteria and sub-criteria points, and suitable for different faculties in the same university. Data collection and analysis based on two strategies: analyzed data from reviewed the current documents and forms, and distributing a questionnaire to faculty members in order to get clear answers for research questions. SPW-DSS is mainly served and helped scientific council at Saudi universities in order to (a) simplifying the decision-making process based on several and clear criteria and weights that are tight to the current rules and regulations, (b) reducing the overall cycle-time of the processes, (c) making paper-less procedures and, (d) achieving the self-governance concept for Saudi university by adds extra criteria in the SP terms. In addition, the system helped the secondary actors which were the faculty members and their reviewers by saving their time and effort in the SP life-cycle.

IV. SP Model Criteria

The proposed SP model in this paper is based on five mains:

A. Research Criterion

Research criterion related to writing a book, translation a foreign book, writing researches in high ranked journals with high impact factor, participants on conferences, and patent.

B. Teaching and Learning Criterion

To measure the performance in teaching and learning criterion there were several sub-criteria helped to calculate this criterion such as: mentoring students' projects, thesis, dissertations, gained awarded in teaching and learning filed, and puts years of experience into account.

C. Community Service Criterion

The sub-criteria that suggested measuring this criterion were president or a member in non-profit association, accomplished several non-profit tasks such as: training/ courses/ workshop, providing a practical solution for social problems, and doing voluntary work.

D. Management and Leadership Criterion

Management and Leadership and Entrepreneurship criteria added newly in calculating SP points. List of administrative positions have been included to weight this criterion, such as: Chancellor, vice chancellor, dean of college, head of department.

E. Entrepreneurship Criterion

Several sub-criteria involved to measure this criterion: setup or co-founding a company in Wadi Jeddah, launching an experience house, providing significant consultation in entrepreneurship, and working as certified trainer and conducting paid courses.

V. Design of the Proposed System

In the design phase, there were three main sections described the general system architecture, logical modeling of the application, system workflow and the process lifecycle.

i. General System Architecture

The System architecture contained three main tiers as shown in figure 1, "presentation layer, application layer, and database layer". Presentation tier presented user interface "UI", so it's structured by several forms "pages" that facilitated user's interaction, each form consisted of several fields collected and displayed inputs and outputs "decisions". Several technologies used to manage these forms and the general interface, such as: AJAX applications (Asynchronous JavaScript and XML, used to update the web page without reloading it, to request data from a web server, and display or use the data), and Bootstrap framework (combination of HTML, CSS, and JavaScript framework for developing responsive, mobile-first web sites as shown in figure 4.2 below). Application tier received HTTP requests and processing the input "request" and send the queries to the data layer that responsible of accessing, managing and retrieving from/ to database system.

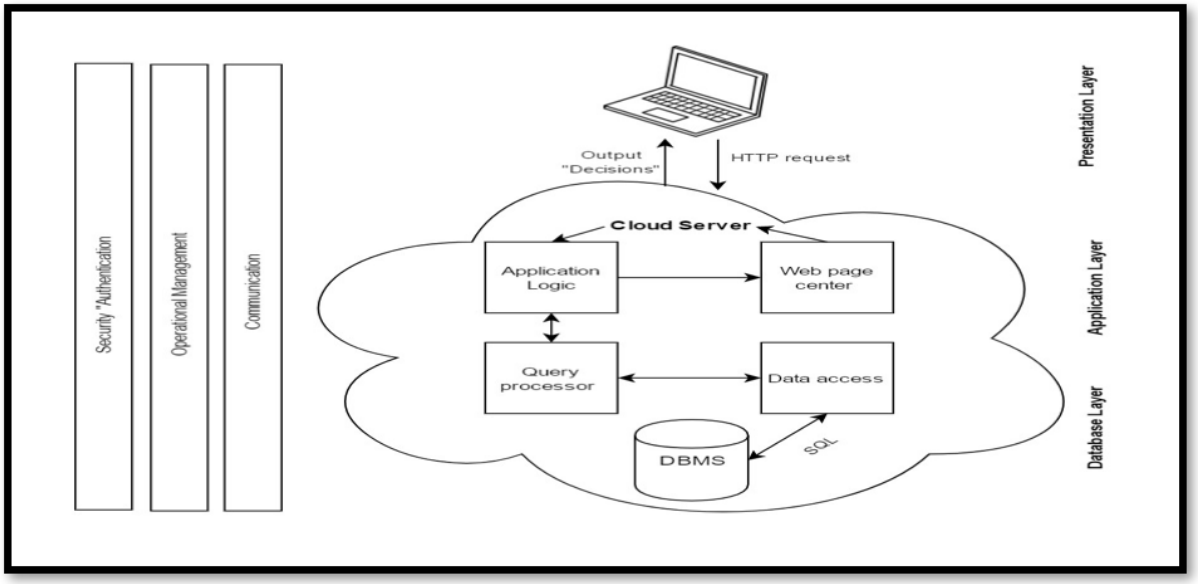

Figure 1: General system architecture

ii. Logical Modeling and System Workflow

The general logical modeling of the system prototype "flowchart of SPW-DSS application" presented in figure 2.

The first step in SPW-DSS is identifying the criteria points for each faculty separately, event started when college representative logged in to the system he will browse his faculty criteria (each college representative responsible to define criteria points of his college), then setup each criteria points then the system presented total weights and he will send the result with accepted status, so in this case the chairman of scientific promotion committee can view and browse all faculties with their associated criteria and sub-criteria to either pending these current criteria points or approved these points so in this case the approved criteria will appear directly in faculty member page and in other users accounts.

Event started when faculty member generate new promotion request, uploaded all requirements for each criterion then send request to head of department to evaluate all sub-criteria except research sub-criteria, after head of department received request and add relative points; system displayed the initial assessment if the total points for each criterion was matched the approved and predefined points; the request will initially accepted or if it's less than the defined limit; request will be rejected even though research criteria still not weighted. Evaluated request will pass through a series of approvals started with College Dean then Secretary of the Commission then College Representative check the request and approved or update reviewers list; after this step the request will again started the series of approvals through Chairman of Scientific Promotion Committee,

Chairman of the Scientific Council; then approved request returned back to Secretary of the Commission in order to send evaluation request for research criteria to the Reviewers. Either the request for arbitration is rejected or approved; in rejected case reviewer will send justifications or in approved case reviewer started check the research sub-criteria files and added points. Finally, the system displayed the final promotion decision either recommended or not recommended to promote applicant based on the total points for all SP criteria.

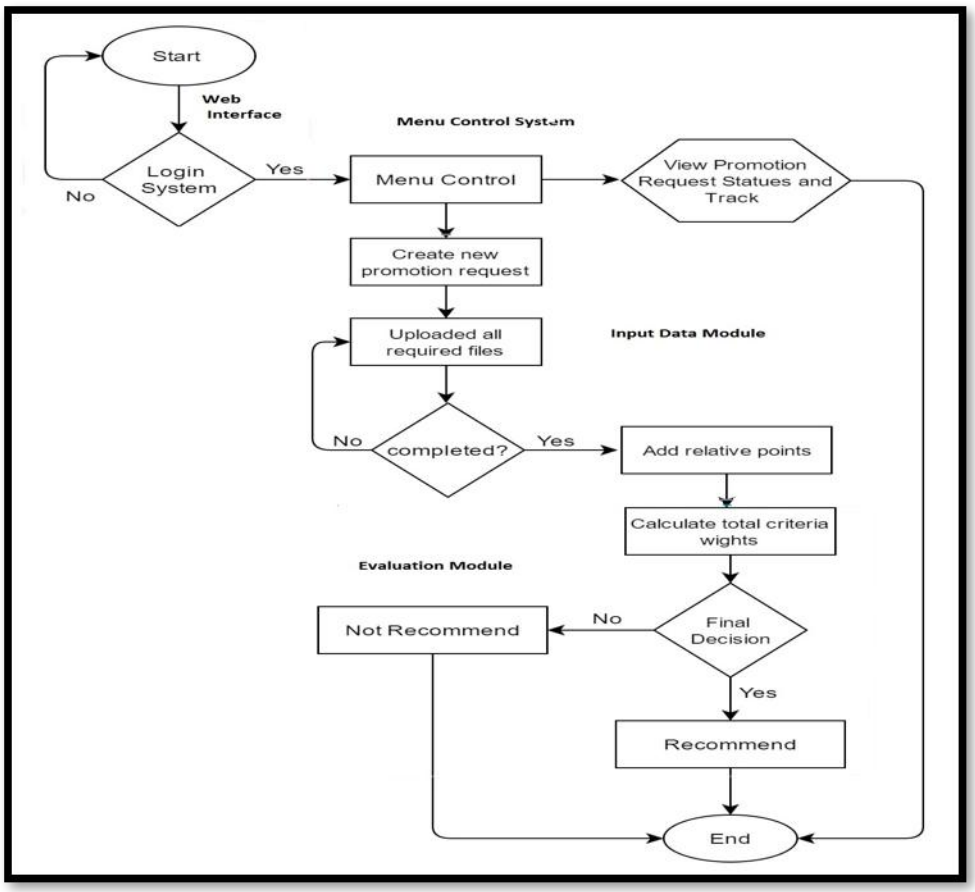

Figure 2: The logical modeling of SPW-DSS application

iii. Presentation of Graphical User Interfaces in SPW-DSS

In SPW-DSS prototype each user has its own privileges and permissions, main users interact with system: Faculty Member, Head of the department, College Dean, College Representative, Secretary of the Commission, Chairman of Scientific Promotion Committee, Chairman of the Scientific Council, and Reviewers.

A. College Representative Gate: The homepage contained several functions (1) create new promotion request and the ability to view the request status, (2) received promotion requests from faculty members in his faculty domain, (3) Browse reviewers list in order to modify this list "Delete, insert", and (4) Browse criteria; this considered as an important function that reflect the flexibility in the system

To assign points to each criterion, the college representative will click on each criterion and browse its sub-criteria. The default sub criteria that approved to appear in the page were chosen based on the analysis phase. There were two main statuses under the representative and chairmen of scientific promotion committee: the pending and the accepted statuses, in case1: when main criterion or sub-criterion is not important to the intended faculty, college representative will accept the 0 point for all sub-criteria " in this case the total point of main criterion will be 0"or for particular sub-criterion, case2: when sub-criterion is important he will edit the 0 point to hold the new point then accepted the new one, case 3: adding new sub-criterion with its points; so the result is transformation from pending status to accepted status in the representative column, then only the accepted points will appeared in the chairmen of scientific promotion committee page.

B. Chairman of Scientific Promotion Committee Gate: There were two main functions in the main page: received promotion requests to browse faculty members' requests and browse criteria to view each

faculty criteria and approved the accepted one.

C. Faculty Member (FM) Gate: In the faculty member home page, there were general information the personal, academic, and scientific degree information in addition there were two main privileges as mentioned before: create new promotion request, and following up the request statues by seeing the path through several committee and councils until getting the final decision.

When clicking on create new request tab, system will redirect faculty member to the general requirements page to upload copy of Master thesis and PhD dissertation, and report of the percentage of plagiarism (a report contained the percentage of plagiarism that has been mentioned in submitted FM researches).

After uploading the general files, FM clicks the submit button; then the approved criteria with its sub-criteria and points will appeared in the next page "the promotion request criteria and sub-criteria page", in this case each faculty has its own criteria with its sub-criteria and points that have been defined, accepted and approved by the faculty College Representative "CR" (each faculty has its own CR) and Chairman of the scientific Promotion Committee. Finally, faculty member will send the request to Head of Department after uploading all required files and forms.

D. Reviewer Gate: The home page contained two main privileges, the last step in the system is research criteria evaluation after faculty member request pass the initial criteria assessment by head of the department; then pass through series of approval, so when secretary of the commission received the approval request he will send evaluation request to only three reviewers from the chosen list and wait the acceptance from each reviewer, so the status will be changed to "sent to review",

After reviewers got the evaluation request he will reject or accept, in the accept case each reviewer could see and evaluate all research sub-criteria and start evaluation step for only this after that the status in secretary of the commission page will changed from under reviewing to finished and he got the final decision.

In the page of secretary of the commission will updated and the status will be either review started or review rejected in the rejection case he will send a new request to another reviewer until three reviewers accept evaluation request and start assessment phase that considered as final phase before the system generate the final promotion decision "Success or Failed" based on the total criteria points.

VI. Testing and Findings

The system has been evaluated through using several scenarios by used a dummy data, and analyzed the output from each case as mentioned in the results analysis section. All scenarios have been shown the expected outcome "decisions" from the proposed SPW-DSS prototype.

The output shown the flexibility of the proposed system prototype and how its serves the decision-making process for different faculties in the same university by defining their points for each criterion with its sub-criteria, in addition they could develop and generate new sub-criteria based on each faculty mission and activities.

VII. Conclusion

A web-based decision support system aiming to support different managerial levels to facilitated decision making process, show real-time results, and minimized the cycle-time and efforts. The proposed prototype of SPW-DSS serves different users but the main beneficiary is scientific council in Saudi universities in order to promote faculty members. The suggested prototype must be flexible and suitable for different faculties to set different criteria and sub-criteria with appropriate points that match their mission, vision, and college activities by two methods and users; the acceptance by college representative and approval by chairman of scientific promotions committee.

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