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Development of a Model for Student-Lecturer Rating System

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Abstract: A Student-Lecturer Rating System is the rating of the lecturers by the students where factors like level of class interaction, classroom cooperation, frequency of meeting, teaching effectiveness, punctuality and open communication etc are considered as rating factors. Evaluation of lecturer's performance usually faces challenges such as unfairness, imprecise and subjectivity in the area of allotting marks to lecturers. Another problem is the issue of information supplied by the lecturers that might not be one hundred percent true due to some typographical errors; it is often difficult to quantify performance dimensions, hence there is need to develop a model for rating lecturers by their students. The objective of this paper is to develop a model for student-lecturer rating system. The proposed system is based on using some variables which represent the rating factors which are evaluated using the models and using the aggregates are computed. On the basis of the aggregates, the rating factors are ranked. This system can be adopted to complement the existing system. The proposed model can be used where the students have the capacity to rate their lecturers on the basis of the rating factors. The lecturers with the high rated values can be promoted to the next level while the lecturers with low rated values are not qualified for promotion. If this can be adopted in the institutions, lecturers would like to add high rating factors to their values and to their work.

Keywords: Model, Variables, Education, Rating Factors

1. Introduction

Education in tertiary institution provides students with learning experiences and intellectual development. At the higher learning of education such as colleges, polytechnics and universities social relations grow either between student-to-student or student-to-lecturer. Higher Institutions in Nigeria have shown significant growth in terms of the number of enrolled students in higher education, number and type of courses being offered and the funds being invested to tertiary institutions are conducive for learning. In Tertiary education demands social relations such as lecturer-to-students and student-to-students relationships. Academic failure of students may be assessed by the frequency of problems from relationship between the lecturers and students. If a lecturer does not display good relationship with his students, there may be a difficulty with school work and has a great impact on the students' performance and as such students should be considered as part of the contributing factor to have input in evaluating lecturers performance.

Numerous assessment procedures have been introduced by education management teams to measure the quality of teaching of the lecturers in educational settings. These measures include classroom observation, students learning, students' academic performance, peer evaluation etc. Student-Lecturer rating can be included as one of the measures whereby the students will now rate the performance of their lecturers on the basis of some academic qualities. One of the academic qualities of teaching evaluation is teaching effectiveness, dedication and punctuality to class.

Teaching effectiveness can be expressed as the teacher's

ability to effect personal change and development in their students; their effectiveness in facilitating good academic work in their students [1]. It is essential therefore to find out the types of attributes the students want taking into account academic qualities of lecturers and their relative importance.

Student rating can be used as one of the measures of teaching effectiveness. Students' evaluations can be included in the key performance index for lecturers in staff appraisal and teaching effectiveness.

Student-Lecturer rating is the rating of the lecturers by students which shows the level of class interaction, commitment, classroom cooperation, frequency of class meeting, dedication and open communication. Students consider some performance characteristics like dedication, commitment, teaching styles of their lecturers; and equate rating on the basis of performance styles to the lecturers. This has to surface because students also have a clear picture of their lecturers as they are the first hand of interaction with the lecturers.

Rating of the lecturers is one of the important ways that can be used by the education regulatory system to rate the teaching performance of the lecturers. Normally, lecturers are rated and promote based on their educational qualification, number of publications and number of years in the service, professional association. In addition to these, students can be allowed to rate their lecturers by using performance ration factors to complement the usual method of evaluating lecturers.

Student-Lecturer Rating can be adopted as one of the ways or measures to rate lecturers teaching performance in addition to other measure as this will keep the lecturers on their toes to give the best to the students.

Studies explore contributing factors where students evaluate the performance of their lecturers in both public and private higher education institutions. There is no specific tool or method to access lecturers' performance through students evaluation as rating by students is perceived as unreliable and inaccurate method for teaching assessment by the majority (75%) of academics [2]. This fact does not have a solid point as rating by the students could be adopted to complement lecturers' performance evaluation.

Some tertiary institutions use a manual method /technique for evaluating or rating lecturers' performance is manual method where Appraisal Performance Evaluation Forms are distributed yearly for lecturers to fill various sections; and thereafter submission of the form follow, and after which scores are awarded on the basis of information supplied by the lecturers. Academic administrators such as the Head of Departments, Deans of Faculty and Institution Appraisal Committee are to rate the lecturers' performances. The manual method often faceswith some challenges such as biasness, unfairness, imprecise and subjectivity in the area of allotted marks.

At times, the information supplied by the lecturers might not be 100 percent true due to some typographical errors: errors by omission and commission. Hence, it is often difficult to quantify performance dimensions.

The objectives of the study are to determine the moral variables for student-lecturer's rating system and to formulate a model for student-lecturer rating system.

2. Literature Review

Teaching effectiveness is based on the quality associated with good teachings such as lecturer's knowledge, clarity, effective communication and classroom management [3]. Student participation or engagement should be encouraged in classroom. Through participation, students are motivated better [4].

Effective management of teaching and learning activities is an integral part of teaching effectiveness. This includes setting suitable teaching and learning objectives and methods, determining what to teach, knowledge sharing, skills or attitudes, how to teach, the approaches and strategies to employ. Hence, proper planning, organizing and managing teaching and learning activities can contribute to enable the lecturers to give the best to their students.

In teaching effectiveness, the lecturers use more thought-provoking learning activities where students can learn actively either through reading, writing, listening, and questioning or reflecting as compared to the standard modes of instruction in which learners passively absorb the knowledge transmitted by the lecturers. Clear representation is given to assist the students in making sense and absorbing new knowledge and skills that are being taught.

The teaching performance is based on learning measure. After teaching, students are evaluated by thescores and moral values they possess. The evaluation tool that for the lecturers to be evaluated upon may not only based on teaching performance and teaching effectiveness alone. Other teaching qualities are supplied in forms of measurable data on students' perceptions towards their lecturers rather than using a conventional system of evaluations deem these evaluations by students as highly reliable, valid and relatively free from bias.

Communication is part of the teaching effectiveness. Interpersonal communication is positively related to students' evaluations of their lecturers [5]. Lecturers that are dynamic and friendly communicate well with students; and as such tend to receive a higher performance rating by students.

A study by the Chireshe, R. also found students viewed their lecturers as effective lecturers if they had a great personality that builds good rapport, knowledgeable and competent in the subject area. [6]

Drumea, C. considered a study on staff performance evaluation in public organizations [7]. The study analysed the qualitative indicators that give an overview on staff's motivation, strive, ability, commitment to values and teamwork. The study discussed the system indicators that were meant to adjust staff classification and benefits to the staff's performance.

The authors suggested that researches should be carried out for modeling to figure out academic performance of students taking into consideration lecturer relationship, socio-

cultural and other key determinants [8]. There is need to develop a model to calculate and rate the performance of lecturers.

Kamath, R. S. studied a design and development of soft computing model for teaching staff performance evaluation [9]. The Fuzzy Logic Reasoning Approach which reflected human-thinking was adopted. This approach of performance evaluation allowed the organization to exercise professional judgment in evaluating employees.

Staff Performance Appraisal Using Fuzzy Evaluation was proposed by Arbaiy, N. et al. [10]. It study involved awarding numerical values or linguistic labels to their performance. The values and labels were used to represent each staffs achievement by reasoning incorporated the arithmetical or statistical methods. The study utilized hierarchical fuzzy inference approach since performance evaluation comprises of four criteria: namely work achievement, skill knowledge, personal quality, and community services. The result of the study provided the ranking of staff performance.

Faeq, M. worked on a title: Performance Evaluation Criteria Development Process for Academic Staff at Universities [11]. The author developed the performance criteria to be evaluated periodically by departmental managers. A detailed understanding of how Analytic Hierarchy Process (AHP) was also illustrated. With the process, it was useful to measure the performance and reward the achieving lecturers at educational institutions.

Nyadanu et al. examined the effects of lecturer-student relationship on the self-esteem and academic performance of nursing students at the University of Cape Coast, Ghana [8]. The descriptive statistics on the level-clustered random sampling was used as method. This indicated the lecturer-student relationships: more connectedness and non-threatening were to be positive relationships while the other two relationships: independent and conflicting were negative relationships. This finding revealed that there was little interaction between lecturers and students resulting in the average relationship. The prevailing relationship did not directly influence high academic and high level attainment.

Melnyk et alproposed an Information system development for teaching staff performance evaluation [12]. The aim of the study was to analysethe assessment of the educational activity from both source and the receiver. The business process model (BPM) of teaching staff performance evaluation was presented in the form of BPMN-diagram where the diagram made use of functional and non-functional requirements. The set of quality metrics and the convolution criterion were proposed by the authors.

Ijaduola, K examined teacher-student relationship in selected secondary schools in Yewa North, Abeokuta North, Sagamu, Remo North, Ijebu-Ode and Ijebu- East Local Governments [13]. The author used a total of 80 secondary schools (private schools inclusive), 10 teachers were drawn per school totaling 800 respondents. Five null hypotheses were generated and the study was analysed via Z-test at 0.05 level of significance. It was found out that teacher-students relations must be cordial always if the teaching-learning process is to yield fruitful results.

Merkine et. al. understudied the relationship between student-teachers interaction and academic achievement of trainee teachers [14]. The objective was to investigate the relationship between selected psychosocial variables and academic achievement. The study employed the use of correlation design to establish the nature of the relationships. Data was collected from 246 respondents selected from all streams in the college using simple random sampling method. The data were analyzed using the analysis of variance (ANOVA), T-Test, Multiple Regressions (MR) and Pearson product moment correlation statistical tools. The findings revealed that there was significant difference in academic performance on students of different age, no significant difference in academic achievement of students from different parental occupation level, no significant difference in parental education level and place of residence.

3. Methodology

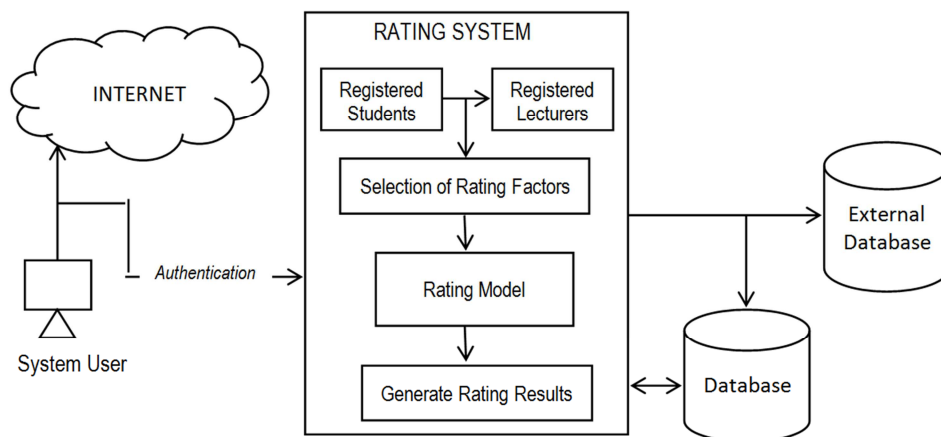*A. Description of the Student-Lecturer System*

Figure 1. A Student- Lecturer Rating System.

Figure 1 presents the users interacts with the system using the global network (internet). Password is used as an encryption technique to control access to the system. Once the login details are supplied, the system initiates the authentication process, interact with the external database to ensure that the conditions for students to rate lecturers are met. Full access is given to students to rate lecturers immediately authentication process is successful. During the rating, the system tends to select the rating factors, performs some calculations based on the defined rating model and the result of the rating is presented as the system output.

The Figure 1 shows the following components:
1) Internet: The system is designed in such a way that it requires authorization before access can be given and it can globally be accessed anywhere. Internet therefore, enables the accessibility of the system globally.
2) System Users: The users of the system include the system administrator who can be assigned to be in charge of the overall activities of the system and the students who are expected to rate lecturers must be duly registered.
3) Rating Factors: Salient factors that the students will use to rate lecturers are diligence, commitment, responsibility to duty, competence, course organization, skill communication, classroom management, teaching effectiveness and punctuality and so on. All the factors are well represented by variables such as f_1, f_2, f_3, … f_n.
4) Rating Model: The rating factors are passed or entered into the rating model for rating. This model is formulated to compute and rate the performance of lecturers by the students. Student-Lecturer Rating System is the whole integrated system responsible for rating lecturers. It has units such as registered students, register lecturers, rating factors, rating model, and rating result. The registered students are the eligible students expected to have the ability and the access to rate lecturers; registered lecturers are those presented by the system administrator to be rated. The selected rating factors are the factors upon which ratings are based upon. The Rating Model is presentedfrom equations (i), (ii), (iii), (iv) and (v).
5) Rating result: This is a component that is responsible for the output of the generated result of each lecturer that is being rated.
6) External Database: External database is a database outside the system. It is responsible to get the eligible students. The eligible students are those that are fully registered in the institution, paid tuition feeand other fees as stated by the institution and must in the same department with the lecturers to be rated.
7) Database: Database is a repository and reservoir of related data. Database is used in this system to store students and lecturers' data, selected factors and results of the rated lecturers.

B. Rating Model
The mathematical representation of the design phase is presented as follows. Four different variables (number of stars, rating factors, students and lecturers) are used in this paper and they are depicted by "nStar", "rf", "S" and "L" respectively. The variables have their prospective functions for which they are designed for and they act independently to each other. The relationship between the variables is represented in section C.

C. Variables Categorization and Relationship
Variable "nStar" (number of stars) represents the total stars that can be allocated to any selected variable "rf" (rating factors). Total stars to be used will be five each representing a certain value depending on the number of rating factors (rf).

$$rf_1 \begin{cases} nStar_1 \\ nStar_2 \\ ... \\ nStar_n \end{cases} \qquad (1)$$

where:
rf = Rating factor;
nStar<= 5.
Variable "L" (Lecturer) represents the number of lecturers that can be rated by any selected variable "S" (Student).

$$S_1 \begin{cases} L_1 \\ L_2 \\ ... \\ L_m \end{cases} \qquad (2)$$

where:
m = 1, 2, 3 ……. n;
S = Student;
L = Lecturer.

D. Mathematical Representation of Variables
Variable "rf" (rating factor) has weight ("w"). The weight ("w") alongside with the variable "uStar" (number of stars) defines the score of such rating factors. The "w" (weight) of variable "rf" (rating factors) is calculated as follow:

$$\begin{aligned} Y &= 100/nf \\ W_1 &= Y/uStar \end{aligned} \qquad (3)$$

where:
nf = Total number of factors;
uStar = Total number of stars used;
w = weight;
nf = 1, 2, 3, ……n;
uStar = 5.
The students are allowed by the system to rate lecturers based on rating factors ranging (rf>= 5) where total number of stars (uStar = 5) is made used of. To get the total rating score by students, the following formula is presented.

$$f(n) = \sum_{n=1}^{\infty}(W_n S_n)_{\text{where n} >= 1} \qquad (4)$$

where:
S = Students;
W = Weight;
F = Factor;
Formula breakdown from equation 4 is demonstrated below.

$$
\left.
\begin{aligned}
f1 &= \frac{W_1 S_1 + W_1 S_2 + \ldots + W_1 S_n}{nt} \\
f2 &= \frac{W_2 S_1 + W_2 S_2 + \ldots + W_2 S_n}{nt} \\
&\ldots \\
fn &= \frac{W_n S_1 + W_n S_2 + \ldots + W_n S_n}{nt} \\
TRF &= \frac{f_1 + f_2 + \ldots + f_n}{nf}
\end{aligned}
\right\} \quad (5)
$$

where:

F = Factor;

nt = Total number of students;

nf = Total number of factors;

W = Weight;

n = 1, 2, 3 …… n;

S = Student;

TRF = Total Rating Factor.

4. Conclusion

This paper presents development of a model for student-lecturer rating system. Many factors determining the lecturers' performance are identified and incorporated in the system. Other determining factors can also be included into the system. The formulated model for the evaluation of lecturers' performance can be used by the students to evaluate their lecturers as this makes good administrative decisions to keep the lecturers abreast of their primary duties. This proposed system can be employed to complement the current method of evaluating lecturers' performance. For performance assessment and adequate support in decision making, this model produces significant appraisal.

After the thorough implementation of the proposed system, taking into account the strengths of the new system, the proposed system can be deployed in Nigeria Tertiary Institutions (Universities, Polytechnics and Colleges of Education) so as to make the lecturers deliver their teaching capacity promptly.

The proposed system can be implemented using programming languages such as PHP and other web technologies, JAVA, C+ etc.

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