Abstract - Mutiara Mahakam Samarinda Institute of Health Sciences (STIKES-MM Samarinda) has a system for monitoring and evaluating the performance of lecturers or education staff. This system measures performance achievements in terms of teaching, research, and community service. Nevertheless, since every segment of the system is not yet fully computerized, this then raises several obstacles in the process of monitoring and evaluating the performance, length of time to obtain the final assessment results and the low accuracy level of the assessment. This study aims to seeks solutions to these obstacles and offers an educator performance monitoring system that combines the Behaviorally Anchor Rating Scale (BARS) and Management by Objectives (MBO) methods to be assessed quantitatively based on the rating scores in measuring the two methods. The BARS method was focused on evaluating behaviour that would affect overall performance with an average score of 4.14%, while the MBO method was focused on evaluating according to Tri Dharma of higher education, namely teaching, research and community service. The assessment system was then implemented to evaluate the performance of lecturers or teaching staff. Subsequently, the data obtained were analyzed to get the final result of the assessment. In particular for data from the MBO method, the analysis was carried out using step with and without KRA. This exploratory research succeeded in presenting the final results of the performance assessment of each lecturer who was assessed for both the value of the BARS and MBO methods. Data analysis from the MBO method, when calculated with and without KRA and KRA, showed some significant differences in MBO. For all lecturers, the difference in scores, if the average was 3.48%, then this assessment was more inclined to the BARS assessment, which had a better rating than MBO.

Keywords: Evaluation, data monitoring, performance, management by objectives

I. INTRODUCTION

Mutiara Mahakam Samarinda Institute of Health Sciences (STIKES-MM Samarinda) a university in health education sector, has two study programs: the Bachelor of Hospital Administration and the Diploma of Midwifery [1]-[3]. It is a health education institution that has the good achievements that show the progress of the institution in the last decade as the first health institution in East Kalimantan and North Kalimantan to achieve B accreditation from BAN-PT (National Accreditation Agency of Higher Education), while Lembaga Akreditasi Mandiri Perguruan Tinggi kesehatan is the institute that assesses accreditation within the scope of health institutions LAM-PTKes [4].

Human Resources (HR) of universities continue to develop technology that previously used paper in the form of a questionnaire that lacked of real-time data, especially from manual systems and then, is gradually changed with technology by creating an integrated information system [5]-[6]. The information system at STIKES-MM has been implemented well, showing campus profiles and attractive website designs as the main attraction for users or prospective students [7]-[9].

Several systems that have been running until now still use the manual method using Excel, one of which is the monitoring system for data on the performance of lecturers or lecturers[10]. The data recapitulation system has weaknesses or risks including redundancy, corrupt file, and cannot process real-time data in assessing performance aspects [11]-[12].

STIKES-MM has SPMI (Internal Quality Assurance System), a systemic activity of development of quality assurance taken out independently by each institution to manage and enhance higher education implementation in a planned and reliable manner as a part of quality assurance in managing HR performance in terms of processing data on the performance of lecturers. HR data can be used as an indicator of overall work results that become achievements in work and workplace [7], [13]-[14].

Some of the performance measures include discipline, responsibility, teamwork, planning, leadership, ability,
problem solving and retrieval ability, obedience, honesty, initiative, motivation, analytical thinking, refers to orientation, and innovation [15]. The monitoring of the achievement of these performance measures is used as a reference to develop an information system so that it can always be monitored by the leadership in conducting HR assessments that have an impact on the progress of the institution. Ideally, this system application can usually be monitored by the management, namely the director, SPMI, and administrators [16]-[17].

The Behaviorally Anchor Rating Scale (BARS) is based upon the development of crucial behaviors from the individual's position that can affect the success or failure of a job. Management by Objectives (MBO) methods collaborate the emergence of behaviors and the emergence of attitude with MBO partnership based on an institution's goal to well enhance the teaching area and determine individual success that will be judged good or bad according to the ranking of several aspects as the indicators of the assessment of the rating scale. BARS can overcome a performance scaling problem that tends to be exclusive to lecturers, while the MBO method is a structured strategy that prioritizes the acceptance of useful goals for improving performance between lecturers and directors. These two methods are critical since they can help to assess lecturer performance as a standardization of assessment for lecturers both of the goals to be achieved with an attitude when conducting education [1] and [18]. To be successful, MBO as a concept must be supported by senior management. Employees do not prefer MBO because they are pressured to partner with management when goals and objectives are set at an unrealistic level [19].

This study aims to monitor the performance data of lecturers at STIKES-MM using the BARS advantageously, behavior-based management enables behavior to be objectively observed and evaluated. BARS assesses behaviors that are relevant to important and specialized job.

The downsides of behavior-based performance, nevertheless, are that are BARS does not directly measure outcomes and it will take time to formulate rating scales for diverse jobs. It can only be used for behaviors and is difficult to detect traits such as innovation or leadership, while MBO methods are results-oriented process, and focuses on setting and controlling goals, thereby encouraging managers to do detailed planning. Both managers and employees must know their roles in order to prevent any, role ambiguity or confusion. Managers are required to set measurable targets, priorities and performance standards. In addition, the responsibilities and authorities of personnel must also be clearly defined. However, MBO concept also has many drawbacks. To be successful, MBO as a management concept must be supported by top management. Employees do not prefer MBO, as they are under pressure to associate with management when the goals and objectives are set unrealistically high. MBO is just a way for management to make the employees work harder and become more dedicated and engaged.

The emphasis in the MBO system is on the quantification of goals and objectives. It leaves no basis for subjective purposes. Some areas are difficult to measure and even more difficult to evaluate. The solution is expected to help the SPMI section and the director in seeing HR achievements so that they can work well based upon the standards [20].

II. METHOD

This study, discusses about the implementation of the BARS and MBO methods to assess the performance of lecturers or teaching staff that is descriptive, understandable, and table 1, 2 and 3 present the implementation. for performance evaluation at STIKES-MM Samarinda. In this study, there were 18 lecturers were involved as the objects with the performance to be assessed using the BARS and MBO methods. Meanwhile, the respondents assessing the performance of lecturers were obtained using random sampling consisting of 46 respondents, namely 9 students of the Hospital Administration Undergraduate Study Program, 36 students of the Midwifery D3 Study Program, and 1 director.

A. Combination Design of BARS and MBO Methods

The study combined the BARS and MBO methods carried out in several stages by researching BARS methods for behavior and MBO for target achievement in performance appraisal. The determination of objects, respondents, and questionnaires for the design of the assessment is deemed important [19]. Table 1 presents the list of assessment categories used in the MBO assessment parameters.

This stage is to determine the parameters of the BARS research performance assessment and focus on the lecturers’ behavior. This research used the BARS method and these steps on BARS:

1) Collect critical incidents. This situation talked with the experts in the job holders to explain the technical aspects of effective performance in detail and not by means of job rank analysis.
2) **Identify performance dimensions.** These conditions were grouped within a small set of work dimensions described in each dimension.

3) **Reclassify the incidents.** Other groups of people knew and redistributed the important event. At first, it was necessary to identify important groups and events and do the following. Reassigning each event to the group the object became the most important thing.

4) **Assign scale values to the incidents.** Performing the ranking of attitudes shown based on events in the field was effectively and efficiently to explain performance of its dimensions.

5) **Develop a final instrument.** The final output was a selection of five to thirteen instruments as standardization of attitudes on the dimensions.

Following the completion of the prior explanation, the next step was to define the parameters for the evaluation of the bars method, which would be implemented in 13 parameters in this analysis, as represented in Table I. These variables generate a parameter for evaluating the BARS method. The assessment predicate as shown in Table I was implemented for this BARS parameter assessment.

**B. The Determination of MBO Method Parameter**

To assess the performance of the teaching staff, this research used the MBO method [20]. These MBO steps:

1) **Set Corporate Objectives.** The concept level of the whole institution for the next several years and validate the specific goals of the institution based on the strategic plan of the industry.

<table>
<thead>
<tr>
<th>No</th>
<th>BARS Method Assessment Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Discipline</td>
<td>The field in consideration is to offer timely education, research, and voluntary work.</td>
</tr>
<tr>
<td>2</td>
<td>Responsibility</td>
<td>The duty is to achieve a specified goal as a lecturer while remaining connected to the duties being occupied.</td>
</tr>
<tr>
<td>3</td>
<td>Teamwork</td>
<td>Teamwork seems to be the capability to assist lecturers in their activity by doing research into educating team and collaborating with other lecturers in community service.</td>
</tr>
<tr>
<td>4</td>
<td>Planning</td>
<td>Planning to design a teaching syllabus, doing research in its field, and spreading its insights via relevant community service.</td>
</tr>
<tr>
<td>5</td>
<td>Leadership ability</td>
<td>Leadership ability to coordinate when delegated as coordinator of both educational teams and research and community service.</td>
</tr>
<tr>
<td>6</td>
<td>Problem Solving and Retrieval</td>
<td>Issues in teaching, research, and community service can act consign individually or in teams.</td>
</tr>
<tr>
<td>7</td>
<td>Obedience</td>
<td>Obedience means that lecturers rarely break the rules as lecturers.</td>
</tr>
<tr>
<td>8</td>
<td>Honesty</td>
<td>Honesty is teaching, research, and public service without any plagiarism and lies.</td>
</tr>
<tr>
<td>9</td>
<td>Initiative</td>
<td>Initiatives find learning ideas, management research, and carry out specific implementations of community service.</td>
</tr>
<tr>
<td>10</td>
<td>Motivation</td>
<td>Motivation refer to what we have seen in the assessment of the BARS method. Mainly, as long as it is seen when doing work that admit to already be given and completed on time.</td>
</tr>
<tr>
<td>11</td>
<td>Analytical Thinking</td>
<td>A thought process by collection information to definitely solve a problem. Analytical thinking is similar in definition and is often combined with critical thinking because it requires good analytical skills by influencing the areas of teaching, research and community service.</td>
</tr>
<tr>
<td>12</td>
<td>Refers to Orientation</td>
<td>This means that capability views are even alongside the vision and mission of the institution and existing regulations.</td>
</tr>
<tr>
<td>13</td>
<td>Innovation</td>
<td>Innovation is a key to bring about extraordinary improvement in education, research and community service.</td>
</tr>
</tbody>
</table>
2) **Set and Align Employee Objectives.** The director takes the plan and carries out the strategic goals of the institution in improving quality and legitimizing together.

3) **Monitor Performance.** The directors and heads of fields as well as lecturers conduct negotiations agreed upon by the group and legalize common goals according to the target section of the field.

4) **Evaluate Performance.** The director and head of the field consider the concrete performance and goals of each lecturers.

5) **Reward Employee.** The Director and the Head of the Division make a consensus, evaluate the results of this latest progress and give reward to lecturers.

Table II shows 11 research parameters were used as assessment measure for the MBO method. The MBO data parameter describes the Key Result Areas (KRA) used as parameter elements in the MBO evaluation. KRA plays an important role in the assessment as it serves as a reference for the evaluation from Table II. Next is Table III. KRA MBO for determining parameters in three KRAs such as Education and Learning, Research and Community Service.

As displayed in Table III, these parameters obtained a measure of the evaluation of the MBO method and the weight of the values settled in the assessment of the MBO and KRA MBO parameters utilizing the assessment predicate.

C. **Monitoring System Application Design**

Monitoring Application Design creates a design application beginning with the flow system. The design of inputs and outputs, as well as other components was necessary for the application's construction. The design of the application would be negotiated with institutional stakeholders. The author will supplied input and output designs in which the institution would authorize and execute operationally.

The monitoring system application design refers to a system design plan for building a system applied to the outcomes of the BARS and MBO methodologies for lecturers' performance results at STIKES-MM as shown in Fig 1.

**TABLE II**

<table>
<thead>
<tr>
<th>No.</th>
<th>Assessment Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Can the implementation of lectures be carried out effectively?</td>
</tr>
<tr>
<td>2</td>
<td>How does the lecturer guide the student’s seminar?</td>
</tr>
<tr>
<td>3</td>
<td>Does this lecturer guide students in real work lectures, real work practices, field work practices?</td>
</tr>
<tr>
<td>4</td>
<td>Does this Lecturer direct and co-guide in order to create the final project?</td>
</tr>
<tr>
<td>5</td>
<td>Is the lecturer an examiner both as chairman and as a member of the congregation?</td>
</tr>
<tr>
<td>6</td>
<td>How is the Lecturer's Performance in fostering student activities in the academic and student affairs division?</td>
</tr>
<tr>
<td>7</td>
<td>How do Lecturers explain the lecture materials?</td>
</tr>
<tr>
<td>8</td>
<td>Do active lecturers produce scientific papers in unaccredited national journals?</td>
</tr>
<tr>
<td>9</td>
<td>How do lecturers have a synergy in building a scientific work?</td>
</tr>
<tr>
<td>10</td>
<td>Do lecturers provide training / counseling / upgrading / lectures to the community?</td>
</tr>
<tr>
<td>11</td>
<td>Do lecturers actively participate in scientific activities as participants?</td>
</tr>
</tbody>
</table>

**TABLE III**

<table>
<thead>
<tr>
<th>KRA-n</th>
<th>KRA Name</th>
<th>Relevant MBO Parameter</th>
<th>Weight Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Education and Learning</td>
<td>1, 7</td>
<td>20%</td>
</tr>
<tr>
<td>2</td>
<td>Research</td>
<td>2, 4, 5, 8, 9, 11</td>
<td>60%</td>
</tr>
<tr>
<td>3</td>
<td>Community service</td>
<td>3, 6, 10</td>
<td>20%</td>
</tr>
</tbody>
</table>

This system flow is an explain how the processes for the BARS and MBO methods were implemented by performing an introduction, Design a Performance Appraisal System Using a Combination of BARS & MBO, Monitoring System Application Design, Data collection and data analysis in sequence.

The process to build the system in this research required data building.
D. Data Collection and Data Analysis

Data collection became the final stage of Application that was carried out online without time constraints in the assessment input process for both students and directors. Data were collected within a few days from May 01 to June 01, 2021. During the assessment, it was expected that a good internet connection would be easier for the data input process. Data analysis was carried out using the BARS and MBO methods with (1) for each method that would be implemented according to the equation referred of the journal citation [17], the first is used the BARS (1).

\[
\text{BARS score} = \frac{\text{Total score}}{\text{total Critical Incident}} \quad (1)
\]

Total score = the value given by the respondent
Critical incident = performance appraisals that need the evaluation of written materials related to the acts of lecturers that are both positive and negative

As for the MBO method, researchers referred to be more flexible assessment model, namely from journals [16] that are appropriate and the step appraisal system carried out by researchers and the condition in the environment. The MBO data analyst's calculation step is shown here, with three steps. The first step, the MBO value was calculated directly on the average of the 11 categories of MBO from each lecturer (2).

\[
\text{MBO category score} = \sum \frac{\text{MBO category score}}{\text{total score}} \quad (2)
\]

The mean value of the MBO category was divided by the number of KRA MBO means in the second and third steps, respectively. MBO values were computed by categorizing 11 MBO types into three KRA from Tables 2 and 3. The average of the MBO category input into the relevant KRA in Table 3 is used to calculate the value of each KRA. and the outcome of this formula as displayed in (3).

The third step calculated the MBO value by involving the weighting of the KRA by referring to Table III. The MBO value was obtained by first calculating the contribution of each KRA according to its weight in (4). Equation(5) with the value of KRA MBO value divided by the number of categories. Equation(6) with unweight MBO value. The mean value of the MBO category was divided by the mean number of KRA.

\[
\text{Mean MBO WITH KRA Without Weighing} = \sum \frac{\text{Mean of MBO category score}}{\text{Total KRA Mean}} \quad (3)
\]

\[
\text{MBO score with weighing} = \sum \left( \frac{20}{100} \times \text{mean KRA 1} + \frac{60}{100} \times \text{mean KRA 2} + \frac{20}{100} \times \text{mean KRA 3} \right) \quad (4)
\]

\[
\text{KRA MBO score} = \sum \frac{\text{category score}}{\text{total category}} \quad (5)
\]

\[
\text{Mean of MBO WITH KRA Without Weighing} = \sum \frac{\text{Mean of MBO category score}}{\text{total KRA Mean}} \quad (6)
\]

III. RESULT AND DISCUSSION

A. Data BARS Analysis

BARS data analysis was to measure the BARS Method (Behavior) by making 13 parameters, the second stage was calculated with a value of 1-5 in each parameter, and the last stage was divided by the number of parameters to get the results of the BARS method. The calculation of the BARS data analysis in Table IV. required an anchor rating for the BARS ranking with one respondent, namely the director. It is exemplified in...
Table IV. With the shaded blue. Assessments C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, and C13 represented the assessment parameters for the BARS method. The parameter for C1 value 5 stated that the anchor rating was discipline, by always being on time with 0% absenteeism. C2 value 5 stated that the anchor rating was Responsibility by always doing tasks according to the instructions given and collecting them on time. C3 value 5 stated that the anchor rating was teamwork, being able to coordinate and communicate with various parties and appreciate proposals. C4 value 5 stated that the anchor rating was planning by always making plans before working and monitoring to ensure the plan goes well. C5 value 5 stated that the anchor rating was an ability to lead by acting decisively and impartially and being an example. C6 value 5 stated that the anchor rating was an ability to solve problems and took decisions by being able to formulate relevant alternative solutions to solve problems. C7 with a value of 5 stated that the anchor rating was compliance by always obeying the rules and work procedures and following instructions given by superiors. C8 value 5 stated that the anchor rating was honesty by always reporting the results of their work to their superiors according to the actual situation. C9 value of 4 stated that the anchor rating of motivation by doing the task was more than expected. C10 a value of 4 stated that the anchor rating of motivation by doing the task was more than expected. C11 score 5 stated that the anchor rating of innovation by performing new things at the organizational level caused the company to have better performance. C12 value 4 stated that the anchor rating referred to orientation by improving work performance. C13 value 5 stated that the anchor rating of orientation by performing new things at the organizational level caused the company to have better performance. This analysis was for a lecturer named NH. and shaded in blue. The output parameters of the BARS method were referenced from Table IV showing 5 of 18 lecturers who were assessed by the Director. The five lecturers included NH, SN, DRA, RY, and NI.

The BARS value for NH was 4.76 as the result of the sum of all the BARS parameter values divided by 13 parameters (the number of BARS parameters).

B. MBO Data Analysis

The MBO technique (objective) data analysis has been completed. The MBO method analysis of data (objective) was to assemble the outcomes of the MBO design that evaluated the performance achievements, where this evaluation design was created, and these outputs are shown in this part.

Table V shows the mapping of respondents who gave the MBO value to the object of research (lecturer). In this table, six students evaluated the lecturer on behalf of RY. showed the calculation of the value of 11 MBO categories from 6 students in the order of 1 (AA), 2 (FGH), 3 (KL), 4 (AT), 5 (FHL), 6 (MKR) to the lecturer on behalf of RY. The value of each category was calculated based on the average (mean) of the scores given by the students.
into three KRAs for one lecturer on behalf of RY. The value of each KRA was calculated by finding the average value of the MBO category that was incorporated into the relevant KRA, namely KRA-1, KRA-2, and KRA-3.

The second step, the MBO value was obtained by averaging the three KRA scores from each lecturer. The third step calculates the MBO value by involving the weighting of KRA with the weight of KRA-1 20%, KRA-2 60%, and KRA-3 20% the MBO value was obtained by first calculating the contribution of each KRA according to the weight mentioned in eq.(2) Table VI.

The explanation in Table VII showed results of the calculation refers to eq (2) with the following calculations:

MBO-1 category value : (3+3+4+4+3+4)/6 = 3.33

MBO-1 category scores from six students on behalf of RY, with a value of 3.33.

Table VII means KRA lecturer scores were taken from Table VII on the mean value for a lecturer named RY This colored column was used as an example of assessment for the lecturer's KRA mean. After the value of the MBO category for all 18 lecturers who became the object of this research was obtained, then the KRA value was calculated which was a combination of several MBO categories. Of the 11 MBO categories, they were combined into three KRA. Table VII shows a snapshot of the merging of the MBO categories into three KRAs for three lecturers, namely RY, SN, and NH. The analysis of the MBO data in this study calculated the MBO value for each lecturer with three step. The first step was to calculate the mean of 11 MBO categories directly. The example of calculating the MBO value for a lecturer on behalf of RY with this first step is presented as follows.

MBO scores for three lecturers are shown at the end of Table VII.

In the second and third step, the MBO value for each lecturer was calculated by considering the grouping of 11 MBO categories into three KRAs. For this reason, it is important to first calculate the value of each KRA. The value of each KRA was obtained by calculating the mean of all MBO categories for the respective KRA. Table VII. shows a snapshot of the merging of the MBO categories into three KRAs for three lecturers, namely RY, SN, and NH.

Mean Category MBO WITH KRA = \[ \frac{3.33 + 2.83 + 3.17 + 2.83 + 3.33 + 3.50 + 3.83 + 3.67 + 3.17 + 3.67 + 3.33}{11} \]

<table>
<thead>
<tr>
<th>Category MBO</th>
<th>MHS 1</th>
<th>MHS 2</th>
<th>MHS 3</th>
<th>MHS 4</th>
<th>MHS 5</th>
<th>MHS 6</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
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<td>11</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3.67</td>
</tr>
</tbody>
</table>
Based on the results of MBO with KRA with weighing from eq.(4). KRA 1 was multiplied by a weight of 20%, KRA 2 was multiplied by a weight of 60%, and KRA 3 was multiplied by 20% and then added and divided by the number of KRAs with the result of 3.33. The result of the comparison of MBO with KRA without weighing with MBO with KRA with weighing was 3.29 and 3.33 with this result of slight difference of 0.4, the performance achievement with the predicate was satisfactory.

IV. CONCLUSION

It can be concluded that this research seeks solutions to these obstacles and offers an educator performance monitoring system that combines the Behavioral Anchor Rating Scale (BARS) and Management by Objectives (MBO) methods to be assessed quantitatively based on the rating scores in measuring the two methods. The BARS method focused on evaluating behavior that would affect overall performance with an average while the MBO method focuses on evaluating according to achievement, namely teaching, research and community service performance, and discovered a solution to the achievement element that the BARS method, which became (behavioral) value 4.14%, still did not support with the MBO step, which became (goal) value 3.48%. The application of the combination design of the BARS and MBO methods was in the form of designing and creating a monitoring application for lecturers at STIKES Mutiara Mahakam.

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