

Designing Self-Assessment Tool for Library Performance Measurement Adopting Malcolm Baldrige Framework (Case Study: Central Library of Andalas University)

by Nilda Tri Putri

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4 Designing Self-Assessment Tool for Library Performance Measurement Adopting Malcolm Baldrige Framework (Case Study: Central Library of Andalas University)

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Abstract. Currently, competitions between universities at **1** the national and international levels become tighter. Every university gives the best effort. They develop every aspect of the university's pillars quality to get more attention. These aspects include curriculum so that each student can learn more in an organized way. The same also applied for its facilities so that each student **1** never lack of supporting tools and a delightful environment to learn. Even the lecturers are the best in their field so as to educate quality students. This happens not only in **1** the national but also at the international level. In accordance with the proverbs often heard, 'library is the heart of the university'. Naturally the library becomes an important part of the university. Library of Andalas University has been awarded 'excellent' on a national scale by BAN-PT, according to SNI 7330.2009 and SNP 010: 2011. This achievement also requires library to maintain their quality. In line with Andalas University goal to obtain international recognition, **1** library also need acquire ISO certification as in ISO 11620. The framework corresponding to the library's performance appraisal tool is MBNQA (Malcolm Baldrige National Quality Award), because MBNQA is the best management **1** guide for organizations in order to achieve high quality and world-class certification. Thus, to obtain certification of international standards and maintain it, designing a new library performance appraisal tool is necessary. This new assessment tool will adopt MBNQA framework using national scale by BAN-PT and ISO 11620 indicator. The process to make new assessment tool will be assist by AHP (Analytical Hierarchy Process) method.

Keywords: ISO 11620, Library, MBNQA, Performance Assessment

1. Introduction

A library is an important existence for students. Especially for an academic library that is often considered as the 'heart' of an organization or institution. Usually, the role of academic library is to act as information service and the source of knowledge material for its user (student, lecturer and all of the parties in university society). As for the student, an academic library is an important existence in the areas of learning, teaching, research and service. The academic environment without a library also describe as a person in the absence of a brain. Indisputably library existence is determined by the user. In [1] state that conventional library lost its function because of modernism. Information is easy to get



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and its diverse of the source is outstanding so that more people use electrical source of information. Nowadays, people tend to browse the internet rather than screen through library shelves to find information they need. Thus, there are fewer visitors who want to visit library in the current time than in its glory days. To solve this problem, librarians must think harder to find a way so that library's existence stand firm [1].

According to letter by National Library Republic of Indonesia number 66/4.1.2/PPM.02/I.2016 on 13th January 2016 tell that library of Andalas University officially registered as grade A with 'very good' predicate. This became a new support for Andalas University that also already gain grade 'A' accreditation on January 2014. This result proves that library of Andalas University already get a very good accomplishment and success in maintaining their existence. It can be said that, library of Andalas University must maintain this accomplishment. It is not just to maintain this grade but if possible to achieve more by obtaining certified ISO as international standard. It is necessary to do so that current situation in compliance with future planning. In order to achieve those future planning librarians can do some activity such as performance assessment [2]. As [1] said that for an institution, performance assessment is a set of activities or evaluation task on its goal, design, policy, project, program and implantation of all activities that are systematic and objective for internal as well as external side. The purpose of performance assessment is to gain knowledge about library's current situation.

The library at Andalas University who already obtain 'very good' predicate in national scale is living up to SNI 7330.2009 and SNP 010:2011 evaluated by BAN-PT. Library need to maintain its quality because the next purpose is to gain ISO certification as in ISO 11620 for international scale. Thus, to achieve both standard and maintained, designing a new self-assessment tool for the purpose of quality assurance is needed. In [6] stated that (Malcolm Baldrige National Quality Award) MBNQA was envisioned as a standard of excellence that would help U.S organization achieve world-class quality. Malcolm Baldrige criteria have been accepted widely around the world as a standard for performance excellence. The Baldrige criteria for performance excellence are a comprehensive management framework that can be used to improve overall performance. This framework can give leaders all internal and external understanding of its organization to make the best decision, at the perfect time and in the right way [6]. Based on those reasons above, researcher thinks that it is need to design a self-assessment tool for quality assurance and performance assessment at the library of Andalas University using designed tool.

This new of design self-assessment tool is adaption of MBNQA framework using national scale by BAN-PT also ISO 11620 indicators. The process to make new assessment tool will be assist by AHP (Analytical Hierarchy Process) method. AHP method is a multi-parameter retrieval approach and was introduced by Saaty (1977 and 1994). This uses a multi-purpose, criteria, sub criteria, and alternative hierarchical structure. The AHP is used is a set of pairwise comparisons. This comparison is to measure results, and performance of alternatives in terms of each individual decision. If the combination is not perfect, then it provides conditions for increasing consistency. In this study, which will combine many indicators into one framework, the AHP method is very helpful [8, 9].

2. Objectives

The Objective of this research is designing a self-assessment tool for library performance with combining indicators between ISO 11620 and Indonesian library accreditation standard and adapting MBNQA framework.

3. Methods

There are a number of tools for performance assessment. Some of them are for business or for-profit organization; there are also a number of development tools for non-profit organization in recent time [5]. The most common tool used for library assessment is LibQUAL+ that was developed from ServQUAL method by Association of Research Library (ARL). There are other methods such as Focus Group Discussion (FGD), interview, balanced scorecard and also MBNQA (Malcolm Baldrige National Quality Award). Each tool has its superiority and shortage. Many librarians try to find more

suitable tools to do a performance assessment so that the result can be more accurate [3]. The framework that is suitable to be adopted into new self-assessment tool is MBNQA (Malcolm Baldrige National Quality Award) because MBNQA is the best management guidance for an organization in order to achieve high quality and world class certification.

As this new assessment tool will use to maintain library accreditation using Malcolm Baldrige is the correct choice, because the iterative process of review, planning, continuous improvement, and fundamental appraisal for institutional effectiveness and should be thoroughly integrated into the fabric of every establishment aspiring to excellence. Another reason that suggests Malcolm Baldrige framework provides a valuable measure of organizational effectiveness. A study found that the results obtained using this framework were consistent with increased job satisfaction, increased attendance, reduction of turnover, quality improvement, cost reduction, increased reliability, timely delivery, fewer errors, reduced waiting times (customers), increased satisfaction, fewer complaints, higher customer retention rate (profitability), better market share, and better financial indicators [7].

The method chosen in the process of designing a performance appraisal tool for library is AHP (Analytical Hierarchy Process). The use of this method is due to AHP has several advantages of other that fit with this research. In designing this new performance appraisal tool that necessary to define a complex method of decipher complicated issues and prioritizing the elements. The most important characteristic is the ability to decipher a rather large and complex task or problem into smaller, more manageable tasks or sub-problems. Most problems can be more easily understood and solved if they can be broken down into smaller parts. Some benefits of AHP over other are AHP doesn't require consensus but rather a combination of several different assessment results as well as consideration of the logical concessions need in the AHP method to determine priorities [4].

4. Designing Step for New Self-Assessment Tool

The process to make self-assessment tool divided into 3 major steps, they are:

a. Early step

The beginning step to designing self-assessment tool is to make a proposal of a new assessment tool for library performance before verified by expert. The framework which will be used as foundation for this self-assessment tool is adopting Malcolm Baldrige National Quality Award (MBNQA) framework. MBNQA framework consists of 7 criteria and 11 sub-criteria. The early steps of designing new self-assessment tool consist of:

- i. Identified indicators from ISO 11620 and national library accreditation standard. From ISO 11620 there are 45 indicators meanwhile from national library accreditation standard there are 81 indicators.
- ii. Group those indicators into Malcolm Baldrige criteria and sub-criteria that become proposed framework of self-assessment tool for library performance. Make questionnaire and give it to the experts. This questionnaire will help the experts into deciding how many indicators that will be used and where to place those indicators in new assessment tool based on Malcolm Baldrige framework.
- iii. Determine experts that will be choose as respondent. The experts are must understand clearly about library performance, library accreditation as well as Malcolm Baldrige framework. Once expert selection is over, they will begin the filtering process of the indicators that are used in the new performance assessment tool. The experts are as follow:
 - Ikhwan Arief, M.Sc as a lecturer at Industrial Engineering at Andalas University and also Chief of Library Committee at central library of Andalas University.
 - Dr. Alexie Haryandie Bronto Adi as a lecturer at Industrial Engineering at Andalas University.
 - Yose Rizal as head of user service area at central library of Andalas University.
 - Monalisa Fitri Andes staff of processing and development of collection at central library of Andalas University.

- Armaida as coordinator of backup collection service at central library of Andalas University.
- Andi Saputra as staff of several administration and equipment sector at central library of Andalas University.
- Iswandi Syahrial Nupin head of processing and development of collection at central library of Andalas University.

This major step results in a new assessment framework that will use in next step. From overall early step 26 indicators chosen by experts is deleted. The decision to remove the indicator based on the discussions result of library staff as the experts. Deleted indicators are some points that not significantly affect performance such as TV, fan, sofa for guests, bulletin board and others. In addition to these reasons, several indicators have been represented by others because they have the same points. The indicators that deleted and moved can be seen at Table 1. and Table 2. After all indicators evaluated, each of them will put into a code system that consist 4 levels of this hierarchy; they are Level 0, Level 1, Level 2 and Level 3. The purpose of this hierarchy is place at level 0. In this case the purpose is self-assessment for library performance. Level 1 is the 7 criteria while Level 2 is 11 sub-criteria of Malcolm Baldrige framework. Meanwhile Level 3 consists of 97 indicator chosen from ISO 11620 and national accreditation standard for library. There are 44 indicators from ISO 11620 and 53 indicators from national accreditation standard remaining. Those indicators distribute into 7 criteria and 11 sub-criteria in accordance with experts opinion. The example of coded system for this new assessment tool can be seen at **Table 3**.

Table 1. Indicators that were deleted based on expert opinion

| No | Source | Indicator | Reason Deleted |
|----|-------------------|--|---|
| 1 | National Standard | Comparison of study program with Scientific Journal subscribed | This indicator will be combined with indicator 4.2.J |
| 2 | National Standard | Area of Collection (45%), consisting of: Referral area, Textbook area, periodic collection / printed area, Multi media collection area and Newspaper & clipping area | This indicator already represent and combined by indicator 2.2.C |
| 3 | National Standard | Area of Reader (25%) consisting of: Circulation Area, Circulation Area, Mixed Reading Area, Library Catalog Area, Cutting Area Display Area, Goods Area and Meeting Area | This indicator already represent and combined by indicator 2.2.C |
| 4 | National Standard | Area for Staff (20%) consisting of: Leadership Room, Administration Room, Procurement Room, Processing Room and Dining Room | This indicator already represent and combined by indicator 2.2.C |
| 5 | National Standard | Other areas (10%) consisting of: Lobby, Living Room and Toilet | This indicator already represent and combined by indicator 2.2.C |
| 6 | ISO 11620 | Percentage of the total library lending to external users | Central library of Andalas University does not apply this service yet |
| 7 | National Standard | The Power Status Library consists of | This indicator is include in indicator 1.1.B |
| 8 | National Standard | The Formal Languages of Formal Education consists of | This indicator is include in indicator 1.1.B |
| 9 | National Standard | Book processing / monograph | This indicator will be combined with indicator 4.2.E |
| 10 | National Standard | New magazine processing | This indicator will be combined with indicator 4.2.E |

Table 2 Indicators that moved into another criteria and/or sub-criteria

| No | Source | Indicator | From | Move To |
|----|-------------------|---|------|---------|
| 1 | ISO 11620 | Ratio of acquisition expenditures to staff cost | 1.1 | 1,2 |
| 2 | ISO 11620 | Percentage of expenditure on information provision spent on the electronic collection | 1.1 | 1,2 |
| 3 | ISO 11620 | Percentage of library staff providing electronic services | 1.1 | 1,2 |
| 4 | ISO 11620 | Percentage of Institutional Means Allocated to the Library | 1.1 | 1,2 |
| 5 | National Standard | Source of Budget | 1.1 | 7,5 |
| 6 | National Standard | Budget Amount / year | 1.1 | 7,5 |
| 7 | National Standard | Budget Allocation for libraries | 1.1 | 7,5 |
| 8 | National Standard | Survey of collegial needs | 1.2 | 1,1 |
| 9 | National Standard | Institutional Library | 3.2 | 3,1 |
| 10 | ISO 11620 | Percentage of information requests submitted electronically | 4.1 | 4,2 |
| 11 | ISO 11620 | Public seating occupancy rate | 4.1 | 4,2 |
| 12 | ISO 11620 | Workstation use rate | 4.1 | 4,2 |
| 13 | ISO 11620 | Median time of document acquisition | 4.1 | 4,2 |
| 14 | ISO 11620 | Median time of document processing | 4.1 | 4,2 |
| 15 | ISO 11620 | Shelving Accuracy | 6.1 | 6,2 |
| 16 | ISO 11620 | Public access workstations per-capita | 6.1 | 4,2 |
| 17 | ISO 11620 | Seats per-capita | 6.1 | 7,4 |
| 18 | National Standard | Total collection (print) | 6.1 | 4,2 |
| 19 | National Standard | Type of Reference Book owned (print) | 6.1 | 4,2 |
| 20 | National Standard | Electronic resources (monograph) | 6.1 | 4,2 |
| 21 | National Standard | Subscribe to electronic journals | 6.1 | 4,2 |
| 22 | ISO 11620 | Cost per-loan | 6.2 | 2,1 |
| 23 | ISO 11620 | Cost per-database session | 6.2 | 2,1 |
| 24 | ISO 11620 | Cost per-content unit downloaded | 6.2 | 2,1 |
| 25 | ISO 11620 | Cost-per-library visit | 6.2 | 2,1 |
| 26 | ISO 11620 | Cost per-user | 6.2 | 2,1 |
| 27 | National Standard | Book loan system | 6.1 | 3,2 |
| 28 | National Standard | Promotion type ever implemented | 6.1 | 3,2 |
| 29 | National Standard | Special collection (research result, thesis, thesis and dissertation) | 6.1 | 3,2 |
| 30 | National Standard | Access Electronic Journal | 6.1 | 3,2 |
| 31 | National Standard | Information retrieval system | 6.1 | 3,2 |
| 32 | National Standard | Book completeness | 6.1 | 3,2 |
| 33 | National Standard | Computers for users with Internet access | 6.2 | 3,2 |
| 34 | National Standard | Multi media device | 6.2 | 3,2 |
| 35 | National Standard | AC | 6.2 | 3,2 |
| 36 | National Standard | Inventory taking | 6.1 | 7,3 |
| 37 | National Standard | Weeding | 6.1 | 7,3 |
| 38 | National Standard | Homepage / library website | 6.1 | 7,3 |
| 39 | National Standard | Computers and printers for library management activities | 6.2 | 7,3 |
| 40 | ISO 11620 | User area per-capita | 6.1 | 7,4 |
| 41 | National Standard | Percentage of core collections of the entire collection | 6.1 | 7,4 |

Table 3. The Code of Each Element for Self-Assessment Tool

| No. | Code | Criteria | Code | Sub-criteria | Code | Indicator | No |
|-----|------|------------|------|--|-------|---|----|
| 1 | C.1 | Leadership | 1.1 | Senior Leadership | 1.1.A | Establishment of Library | 1 |
| | | | | | 1.1.B | Institutional Library | 2 |
| | | | 1.2 | Governance and Societal Responsibilities | 1.2.A | Information Literacy | 3 |
| | | | | | 1.2.B | Added collection per year | 4 |
| | | | | | 1.2.C | Library development activities carried out by library staff | 5 |
| | | | | | 1.2.D | Utilization of funds | 6 |
| | | | | | 1.2.E | Line of commands Head of Library | 7 |
| | | | | | 1.2.F | Ratio of acquisition expenditures to staff cost | 8 |
| | | | | | 1.2.G | Percentage of expenditure on information provision spent on the electronic collection | 9 |
| | | | | | 1.2.H | Percentage of library staff providing electronic services | 10 |
| | | | | | 1.2.I | Percentage of Institutional Means Allocated to the Library | 11 |

b. AHP step

Designing self-assessment tool process is using Analytic Hierarchy Process (AHP) method to design hierarchy system for self- assessment tool, determining weight and determine experts' consistency in giving assessment value for this tool. The first step in the process of designing new tool is making a hierarchy for the self-assessment tool. To facilitate reading the hierarchy each element translates into some codes. This code system classified into three parts, they are criteria, sub-criteria and indicator. The steps are as follow:

- i. Create a hierarchical structure of the problem.
The first step designing this new tool is arranging a hierarchy system for this self-assessment tool. Arranging hierarchy so it's easier to read each element translates into some codes. Construction of this hierarchical structure aims to elaborate the problem into more detailed parts. This code system classified into three parts, they are criteria, sub-criteria and indicator.
- ii. Create a pair wise comparison matrix.
A pair wise comparison finished by providing an assessment of the importance between two indicators. The AHP method has 9 pairs of paired appraisal scores. Then distribute it to expert that already chosen. There are five experts.
- iii. After that calculate each weight for criteria, sub-criteria and indicators based on AHP calculation until it lead to consistency value.
Weight assessment for each element is done by 5 experts with pairwise comparison. To unite all 5 experts' opinion, this calculation is using geometric average (geomean). After calculating geomean value, the next step is determining weight of each element. But in order to calculate weight of each element, matrix of pairwise comparison need to be made first. To fill in the matrix of pairwise comparison between same criteria, the value is 1. Meanwhile for result under the value 1 is 1/value upper.
- iv. After each weight calculated the consistency of expert opinion need to be tested. The value of consistency ratio is related to the ability of the experts on performing pair wise comparisons to maintain consistency in their judgments. Even though it's hard to maintain perfect consistency, the Consistency Ratio (CR) value is expected $\leq 10\%$.

c. Designing matrix for self-assessment tool adopting national library accreditation system from BAN-PT into Malcolm Baldrige framework. Matrix performance appraisal for library is designed by adapting national library accreditation scoring system. In this matrix each indicator has a few standards that group into some value as can see in **Table 4**. For example for indicator 1.1.A is about status in establishment of library, appraiser can choose which scale the library belongs to. Then appraiser will get the scale value and multiplied it with total weight. The result from it will be final value from indicator 1.1.A and will be sum up from other indicator to get the value for library performance. The final value from library performance can be classified into some categories that can be seen at **Table 5**.

Table 4. Assessment Matrix for Sub-Criteria Senior Leadership

| SUB-CRITERIA | CODE | INDICATOR | INFORMATION | SCALE | | | | |
|-------------------|-------|--------------------------|--|--|--|---|---|---|
| | | | | 4 | 3 | 2 | 1 | 0 |
| Senior Leadership | 1.1.A | Establishment of Library | Status in establishment of library | The library was established based on the decree of the establishment of Diknas | The library was established based on the establishment decree of Diknas in the process | Library was established based on the decree of the founding of the rector | The library is in the process of its establishment | No SK of establishment of library |
| | 1.1.B | Institutional Library | The organizational structure and the division of tasks from all parts of the library | The library has an organizational structure and job descriptions | The library has a complete organizational structure | The library has a simple organizational structure | The organizational structure of the library is in process | The library does not have an organizational structure |

Table 5. Final Result Categories

| Scale | |
|-------------|-------------------------|
| 0 – 0,75 | Early Development |
| 0,76 – 1,25 | Early Result |
| 1,26 – 1,75 | Early Improvement |
| 1,76 – 2,25 | Good Performance |
| 2,26 – 2,75 | Emerging Library Leader |
| 2,76 – 3,25 | Library Leader |
| 3,26 – 3,75 | Benchmark Leader |
| 3,76 – 4,16 | World Leader |

5. Result and Discussion

From the process that already done in the design of self-assessment tool for library performance, it can be seen that each step determines the accuracy of measuring instruments made. The process is start from the selection of framework and indicators that will use, experts as respondents to the creation of library performance assessment matrix. After choosing the framework and indicators to be used, the compilation of the proposed tool is also very important. In the stages of grouping the indicators into the criteria and sub-criteria required serious consideration to determine the correct place. The initial plan determines the direction in the early stages of library performance measurement, because of the need for a very strong basis in grouping these indicators. Using the opinion of 7 experts, is expected to represent the requirement of library at Andalas University in terms of performance measurement.

Once expert's opinion collected, the result can be used as the basic form of performance measurement tools for libraries. The next step is to determine weight of each element for the criteria, sub-criteria and indicators prepared. The weights for each element in the measuring instrument are determined by the Analytical Hierarchy Process (AHP) method. The initial stage in AHP process is to hierarchies the self-assessment tool for measuring the weight. After that, make a questionnaire for the AHP process that is easily understand by respondents. In completing this questionnaire, the researcher must provide complete and easily understood information by the respondents because if the respondent doesn't understand the questionnaire then most likely the result of AHP calculation will be inconsistent. The result of inconsistent data is surely need repetitive retrieval that will require significant investment.

In the process of calculating the weight of each element required a very high accuracy to avoid errors. Especially in the manufacture of matrix pairwise comparison which is the results of AHP questionnaires, because this stage is the starting point in the process of calculating the weight of each element. Furthermore, no less important is calculation of consistency ratio for each element in the library performance measure. As said before, if the result shows an inconsistent data then retrieval process should be repeated. Tolerance limited for a consistency ratio is small equal than 10% or 0.1. From the calculation results can be seen that all the data doesn't exist beyond the limit of 0.1. However, some data have a consistency ratio value close to 0.1 such as comparison between 7 criterias with a value of 0.091 and some comparison indicators such as indicators for sub-criteria 2.2 with a value of 0.086 and an indicator for sub-criteria 6.1 with a value of 0.084. The ratio of the indicator with the lowest consistency ratio value is for sub-criterion 5.1 with 0.002. This is possible because there are only 3 indicators in the sub-criteria.

For comparisons between sub-criteria in one criterion, only one criterion meets the requirements in the calculation of consistency. This is because the criterion C.1 until C.6 only has 2 sub-criteria. So the consistency ratio doesn't need to be calculated because the results always consistent. Nor can it be calculate mathematically because the results are unlimited. This is because the index ratio for 2 elements is 0. Besides sub-criteria, it also occurs in the comparison of indicators for senior leadership sub-criteria (1.1) and workforce involvement (5.2) which only has 2 indicators in one sub-criterion.

For the total weight value of each indicator, the weight value of each indicator is multiplied by the weighted value of the criteria and the sub-criteria of the indicator are located. From the calculation results can be seen that the largest value of weight is for the indicator 5.2.B with a value of 0.092. Next is 7.5.D with 0.042 and 1.1.B with the same value. There are some indicators that have no value (N/A) in scoring matrix. This is because the University of Andalas library has not implemented the indicators so the value matrix for self-assessment cannot be made. For example, all indicators for cost such as indicator 2.1.A, 2.1.B, 2.1.C, 2.1.D and 2.1.E, require specific expenditure data but the cost budget for the Andalas University library is incorporated in the University's cost draft bill so that the costs incurred by the library not specified according to the needs for assessment of the indicator. Likewise, the indicators 7.1.C, 7.1.H, 7.2.A and 7.2.B are all indicators from ISO 11620. These indicators have not been applied yet by the Andalas University library, so the data required to measure each indicator is missing. Thus, there are 9 indicators in total that has no available value in self-assessment matrix for library performance.

For overall process in designing assessment tool for library performance, some point should be discussed. The main point is, 'are the experts selected ideal for this research?' In this research choosing expert is an important point, because designing process of new assessment tool relied so much in experts' opinion credibility. Then, 'can this new assessment tool made based on expert opinion from the Andalas University Library be used for other libraries?' Even though this research use central library of Andalas University, researchers hopes this new assessment tool can be used in another library. Because of this new assessment tool designed using MBNQA framework and both national and international standard.

6. Conclusion

The conclusions of this research are as below:

- a. Designing self-assessment tool for library performance finished with integrating national standard from National Library Accreditation Standard and international standard from ISO 11620:2008 using Malcolm Baldrige framework. Total initial elements for this assessment tool are 7 criteria, 11 sub-criteria and 145 indicators that come from 80 national standard indicators and 45 ISO indicators.
- b. After selection process and discussion with 7 experts, there are 18 indicator deleted. Also there are 28 indicators that moved to another sub-criterion. The final framework for new library performance appraisal tool consists of 7 criteria, 11 sub-criteria and 97 indicators. For matrix performance appraisal is made with combining final framework of new library performance appraisal tool with assessment category that already approved by librarian of Andalas University. There are 9 indicators with (N/A) value because those indicators aren't applying yet in Andalas University library therefore there is no other way to assess those indicators.
- c. This new assessment tool is expected to be able to maintain accreditation, maintain and improve the quality of the library both nationally and internationally. Nationally because it uses national accreditation standards while interatively because it adapts the ISO 11620 indicator. All indicators are embedded in a very good framework of malcolm baldrige framework.

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