STMIK Primakara Academic Data Audit Based on DAF (Data Audit Framework)

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Abstract—This time the development of a large amount of data occurs in various sectors, one of them is education sector. Although addition of data occurs every day, college does not yet have a formal strategy to perform collection, observation, and maintenance of the data. This condition is experienced by STMIK Primakara. The audit framework is required to mapping the existing data in higher education. Joint Information Systems Committee (JISC) develop Data Audit Framework that contains the stages of structured work to audit the academic data. The implementation of DAF on the academic data STMIK Primakara produce SWOT analysis which represent data asset condition.

Key Words—Audit, Data Audit Framework, Academic Data

I. INTRODUCTION

Today Universities are required to have a competitive advantage by using the resources they have. Beside the human resources, facility and infrastructure, information resources can also be used to improve competitiveness against other university. The role that is owned by the information system is getting, data processing, which will later be displayed in the form of information. Other than that the information system is also able to provide accurate information in decision-making activities.

STMIK (Sekolah Tinggi Manajemen Informatika dan Komputer) Primakara is a private university located in Renon, Denpasar. In its vision STMIK Primakara will work develops themselves into the extraordinary universities become reference in national technopreneurship field in 2020. As we can see, the students are not only given knowledge IT only, but also business knowledge. Carry their tagline technopreneuirship STMIK Primakara educating students not only powerful and become IT specialists global was but also can be creative as entrepreneurs who can create new jobs. This University can be classified as the new university for new standing at 2012.

The lack of experience in managing academic data cause this universities are rated under the board of the university located in Indonesia. Based on data from the Ministry of Research and Technology of Higher Education of the Republic of Indonesia 2015, STMIK Primakara located on the stages of the 1920 from 3320 universities Further data revealed [1].

The mapping of academic data is the first step that must be done to be able to good manage the data. By doing the mapping of data will be known: (1) The classification of academic data, (2) Description of the academic data (3) Academic data storage location, (4) Overall responsibility for a data, (5) Business process of academic data, and (6) History of academic data. The results of this mapping is then used for academic data analysis process.

The Data Audit Framework (DAF) facilitates an organization to identify, location, explains, and assess data from the organization [2]. DAF is a method to make it easier to survey the auditor get the information. DAF help in planning a strategy to ensure that the audit process went smoothly [3]. DAF was created in a project is chaired by HATII (Humanities Advanced Technology and Information Institute from the University of Glasgow. Standard implementation DAF will facilitate the process of academic data mapping STMIK Primakara. Besides using DAF, audited data will be more easily accessible because we know the data history more clearly.

II. LITERATURE REVIEW

A. Data Audit Framework

The University has data in a number of many, often this data is managed without a certain strategy. The situation that often occurs is the lack of attention to the content of a data or how a managed data [4]. The JISC (Joint Information Systems Committee)-funded Data Audit Framework (DAF) has been developed in response to these issues. If institutions are to be in a position to manage and share their data, they must first establish an overview of holdings and the policies and practices in place to manage them.

Auditing data can bring several benefits for an organization. They could be categorized into efficiency savings, risk management, and enabling access and reuse [5]. Realizing all of these benefits relies on knowledge of data holdings. Being aware of what is held and by whom can identify duplication of effort and enable prioritization of resources. Knowing how data are being curated, and whether controls are in place, will point to areas of potential risk. Similarly, an understanding of data agreements is crucial to facilitate access and promote reuse. Thus, knowledge of holdings is the cornerstone of effective data management. The Data Audit Framework is a first step in this process, assisting organizations to

collect such information so they can develop policies and processes appropriate to their needs.

The DAF methodology was conceived by Sarah Jones, Raivo Ruusalepp and Seamus Ross from HATII at the University of Glasgow [4]. It was designed to be applied without dedicated or specialist staff. Subject-specific expertise is helpful but is not viewed as essential. An understanding of data issues and curation practices takes precedence. It has been designed so that it can be applied without dedicated or specialist staff and with limited investment of time or effort. The methodology has four stages:

1. Planning the audit
2. Identifying and classifying data assets;
3. Assessing the management of data assets; and,
4. Reporting results and making recommendations.

The stages generate two key outputs: an inventory of data assets created during Stage 2; and a final report that incorporates recommendations on how data management could be improved. A detailed workflow of tasks and outputs within each of these stages can be seen overleaf (see Figure 1).
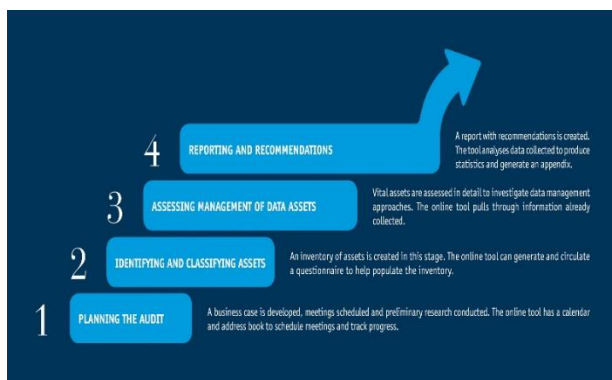

FIGURE 1 Stages in the DAF methodology, 2008 HATII, University of Glasgow

1. Planning the audit

There are two key objectives of the planning stage: (1) to secure organizational buy-in by establishing a robust DRAMBORA: Digital Repository Audit Method Based on Risk Assessment is available at: business case; and, (2) to prepare as much as possible in advance of the audit so time spent on-site can be optimized. Securing agreement from top management and ensuring this commitment is filtered down is crucial. Establishing expected outcomes will assist data auditors with determining the scope and focus of the audit. By conducting background research the auditor can minimize demands placed on data creators, managers and users, and scheduling interview times and locations in advance will help ensure they are ready to contribute. Planning of the audit involves the following tasks:

- Appoint an auditor;
- Establish a business case;
- Conduct initial research to plan the audit; and,

- Set up the audit.

2. Identifying and classifying data assets

The purpose of the second stage is to establish what data assets exist and classify them according to their value to the organization. Essentially, an inventory of data assets is compiled through a mapping exercise. The overall quality of the entire audit depends on this first knowledge-gathering exercise. Classification schemas are suggested in the inventory but will need to be tailored to the particular organizational context. The classification step will determine the scope of further audit activities, as only the vital or significant assets will be assessed in greater detail. This stage should proceed through the following steps:

- Analyze documentary sources;
- Conduct questionnaire and/or interviews;
- Prepare data asset inventory; and,
- Approve and finalize asset classification.

3. Assessing the management of data assets

The aim of this stage is to collect additional information about the data assets central to the work of the organization. Assessing the management of these assets enables auditors assess whether the current level of resources provided is sufficient. Information collected should help identify weaknesses in data management practices and point to occasions when data are being placed at risk. During this stage, several forms are completed which assist auditors in asset and context profiling (Audit Form 3A or 3B). The methodology provides two elements sets to support the collection of information at different levels of detail. The level of detail adopted will be determined by the audit aims and scope set at the planning stage.

4. Reporting results and making recommendations

In the final stage the auditor draws together the results of the data audit to produce a final report. This report will include recommended actions to improve data management. Suggestions of relevant services and tools that could be used by the organization to enhance their practices and services are provided in the audit toolkit and as new ones emerge we will hope to link these to the toolkit. We recommend that it would be best practice to submit the audit report to the appropriate managers within the organization for comments before it is finalized.

III. RELATED RESEARCHES

A. The Data Audit Framework: a toolkit to identify research assets and improve data management in research led institutions

Although vast quantities of data are being created within higher education, few institutions have formal strategies in place for curating these research outputs in the long-term. Moreover, there appears to be a lack of awareness as to exactly what data are held and whether they are being managed. In response to these concerns the

Joint Information Systems Committee (JISC) issued a call for proposals to develop and implement a Data Audit Framework suited to the needs of the UK higher education research communities. The Data Audit Framework (DAF) Development project was funded to produce an audit methodology, online toolkit, and a registry. Four additional implementation projects were funded to test the toolkit and promote its uptake. This paper outlines the audit methodology, introduces the online toolkit, and provides feedback on implementing the Data Audit Framework [3].

B. Experimenting With The Trial Of A Research Data Audit: Some Preliminary Findings About Data Types, Access To Data And Factors For Long Term Preservation

Developing systems and services for the effective and efficient management of research data as well as addressing issues around their long-term curation is an area of increasing activity in UK Higher Education. This paper discusses some preliminary results from a questionnaire survey, conducted as part of the trial implementation of the Data Audit Framework Methodology at University College London (UCL). Fifty-seven (57) academic and research staff from 5 designated departments and an interdisciplinary research center provided information about the nature of their research and the types of primary research data they produce. The survey explored factors that could impact on access, use and preservation of such data. The preliminary results indicate that researchers recognize the potential usefulness of such data for other researchers as well as their long-term value. Retaining primary research data after the end of the funding period and re-using them for initiating further research are practices already acknowledged. However, ownership, copyright and restrictions on access to research data can be hazy areas for academic and research staff and require further investigation, advice and support. The value of primary research data appears to be closely linked to the context within the data which were generated [6].

C. Scoping Digital Repository Services For Research Data Management

The project Scoping Digital Repository Services for Research Data Management started in January 2008 as across-agency collaborative effort in Oxford. The project aimed to scope the requirements for digital repository services to manage and curate research data generated by Oxford researchers. The project contributed to the HEFCE funded UK Research Data Service feasibility study. As part of the requirements gathering exercise around 40 interviews with researchers took place and a consultation with service units in Oxford was conducted. The interviews with researchers helped us to learn more about their data practices and to capture their top requirements for services to support their data management. The consultation with service providers used the data management and curation services framework, to understand what services are available and identify gaps in the service provision. The results of this

consultation showed how expertise is widespread amongst service units in Oxford but on the whole, the vast majority of the research data management and curation services identified are not being offered fully or at all by service units across the University [7].

IV. DISCUSSION

A. Planning the Audit

In stage of collection information about the data audited, the auditor using two methods, that is: interview and questionnaire method. The data will be audited is a student academic data which consist of: (1), Student Data (2) Absent Data, (3) KRS Data, (4) Lecture Schedule Data, and (5) Point TAK Data. In the first stage of the auditor make Interview schedule and the spread of questionnaire to the authorities in managing academic data. Now the authority who asked for the information is as follows:

- Academic department is the authority who manage student data, KRS data, and lecture schedule data;
- The front office is the authority who manages absent data and lecture schedule data;
- Student department is the authority who manages point TAK data;
- PPTI is part authorities to back up and keep all the digital data that is in STMIK Primakara.

The next step is to fill the audit sheet 1 to know the complete profile from the audited organization. Audit sheet 1 can be seen in figure 2.

Form Audit 1 : Audited Organization	
Detail Of Organization	
Organization Code	STPR_DMHS_01_16
Organization Name	Sekolah Tinggi Manajemen Informatika dan Komputer Primakara
Organization Address	Jalan Tukad Badung, No.135, Renon, Denpasar
Contact the Organization	Telephone : (0361)-8956084 Email : info@primakara.ac.id Web : http://www.primakara.ac.id
Organization Type	Collage
Description of the Organization	Sekolah Tinggi Informatika dan Komputer (STMIK) Primakara Under the auspices of Primakara Foundation and has been established since 2012. STMIK Primakara give priority to control it and Technopreneurship for their student. This College has a vision to become the extraordinary Universities become the reference in the field of national Technopreneurship in 2020.
Data Management Details	
Data Management Strategy	Digital Data contained in STMIK Primakara managed by PPTI (Pusat Pengembangan Teknologi Informasi). The policy concerning the processing of digital data has been adjusted and stored by PPTI.
The Responsibility	PPTI has responsibility for maintenance : maintaining, backing up and repairing the existing digital data. As for the update or renewal of the data carried by each study program.
The Budget	The budget allocated to the cost of data management no
Audit Details	
Audit Date	31 October 2016 – 13 November 2016
Auditor	Ida Bagus Adisimakrisna Peling Putu Agung Ananta Wijaya
Auditor Contact	adi.peling@gmail.com ananta_wijaya@student.unud.ac.id
Settlement Date Audit Report	-

FIGURE 2 Form Audit 1

B. Identifying and Classifying Data Assets

In second stage, information about the audited data will be identified and classified according to the category of asset data DAF [5]. Audit data will be classified into three categories: vital, important, and minor. The explanation of each category can be seen in figure 3.

Category	Description
Vital	Vital data assets are crucial for the functioning of the organisation, their efficient management and protection should be the first concern of the organisation. Vital data assets will include datasets and information systems that: • are still being created or added to; • are used on frequent basis in the course of organisation's work; • underpin scientific replication e.g. revalidation; • play a pivotal role in ongoing research; • or are being using to provide services to external clients and partners.
Important	Important data assets include the ones that: • the organisation is responsible for, but that are completed (i.e. no data is added to them); • the organisation is using in its work, but less frequently; • the organisation may use in the future to provide services to external clients.
Minor	Minor data assets include those that the organisation has, but has no explicit need for, or it no longer wants to have the responsibility for (e.g., data assets that could be handed over to specialised preservation and curation service providers). Shared data assets or information systems which the organisation cannot control may also be classified as minor as somebody else is responsible for long-term curation.

FIGURE 3 Category of The Data

From the results of collected data asset data we obtained categorization as in figure 4.

Form Audit 2 : Asset Inventory Data

Name of the asset data	Description of the asset data	Business asset data	Reference	Classifica tion	Comment
Student Data	The Data contains the information from the students	Academic	Academic server computer	Vital	Student data is stored in the form of a database using My-SQL for its production. Where in this student data contains general information all students STMIK Primakara.
Absent Data	College student attendance data	Front Office	Computer server front office	Vital	Expense reporting data is stored in the form of the database. On the expense reporting data contains data about each student Expense reporting courses taken.
KRS Data	KRS Data students each semester	Academic	Academic server computer	Important	KRS data stored in the form of the database. On the KRS KRS data contains information from each of the students each semester is and each year
Data Lecture Schedule	Contains student lecture Schedule	Academic dan Front Office	Academic server computer and front office	Vital	Student lecture schedule Data contains about the schedule courses from Monday to Friday on the semester
Data Point TAK	Contains information about student activities	Kemahasiswaan	Kemahasiswaan server computer	Important	Data Point TAK lists of points of each student regarding the activity, followed by students

FIGURE 4 Form Audit 2

C. Assessing the Management of Data Assets

The third stage of the audit process is to gather more information about vital data asset and important data assets. Based on the information in this stage, the auditor can embrace re-classification of asset data. After determining the appropriate category, the next step is to create a list of data issues the asset. The issue faced by the management of asset data, how they manage data or actions that are performed when there is a threat or risk to the experienced.

The first step in this stage is to fill the form 3 for each data asset that has been classified. Charging the information on the form 3 is done with the method questionnaire and interview to the party who manages data assets. This is done with the purpose to make an expert not was puzzled as to when filling the form questionnaire. In addition, other purpose is so that the information obtained more closely.

The first Form 3 is about the student data management with an expert is academic department. From this data collection process obtained the information that the student data will be experiencing the addition of many when the new school year. This is due to such as in figure 5.

Form Audit 3A : Data Asset Management (core element set)

No	Parameter	Comments
1.	ID	DA_0001
2.	Data creator	Pusat Pengembangan Teknologi Informasi
3.	Title	Student Data
4.	Description	Student data is stored in the form of a database using My-SQL. Student data contains general information of students STMIK Primakara.
5.	Subject	Student General information
6.	Creation date	2012
7.	Purpose	Store general information of student STMIK Primakara
8.	Source	Student files
9.	Updating frequency	Uncertain
10.	Type	Database, picture, dan pdf
11.	Format	My-Sql
12.	Rights and restrictions	-
13.	Usage frequency	Uncertain
14.	Relation	KRS Data, Absent Data, TAK Data
15.	Back-up and archiving policy	Student data will be backup periodically once a week by PPTI. But in the backup process is not supported by the data management policy
16.	Management to date	The addition of a large amount of data occurs at the beginning of the first semester strange. This data is managed by the academic. Student Academic Data has never been audited previously.

FIGURE 5 Form Audit 3A Students Data

The second of Form 3 which is contain information about the details of absent data. To obtain detailed information, the auditor interviewed the front office. The results of the data collection absent can be seen in figure 6.

Form Audit 3A : Data Asset Management (core element set)

No	Parameter	Comments
1.	ID	DA_0002
2.	Data creator	Pusat Pengembangan Teknologi Informasi
3.	Title	Absent Data
4.	Description	Absent Data is data that store attandance of student per course. Absent data updated overyday (effective day)
5.	Subject	Students, Course
6.	Creation date	2012
7.	Purpose	To register the presence of students on each of the selected courses in the second semester. Absent data used to determine proper students to follow test scores.
8.	Source	List absent student (print form)
9.	Updating frequency	Everyday (effective day)
10.	Type	Database
11.	Format	My-Sql
12.	Rights and restrictions	-
13.	Usage frequency	Often
14.	Relation	KRS Data, Students Data, Schedule of Courses Data, Lecturers Data
15.	Back-up and archiving policy	Absent Data will be backup periodically once a week by PPTI. But in the backup process is not supported by the data management policy
16.	Management to date	Absent Data updated by the front office. The new student academic data never been audited previously.

FIGURE 6 Form Audit 3A Absent Data

The third of Form 3 contains the detail information about KRS data. This data is managed by the academic department and updated each semester. Then every once a week this data is backed up by PPTI. The results of the data collection of data KRS can be seen in figure 7.

Lembar Audit 3A : Manajemen Data Aset (core element set)

No	Parameter	Komentar
1.	ID	DA_0003
2.	Data creator	Pusat Pengembangan Teknologi Informasi
3.	Title	KRS Data
4.	Description	KRS Data (Kartu Rencana Studi) is data that contains the information the plan of study or courses taken students each semester and each year. The courses taken must be in accordance with the number of credits on the semester
5.	Subject	Students, Course, SKS
6.	Creation date	2012
7.	Purpose	To register the presence of students on each of the selected courses in the second semester. Absent data used to determine proper students to follow test scores.
8.	Source	List of Absent Students (physical)
9.	Updating frequency	Every day (day effective lecture)
10.	Type	Database
11.	Format	My-Sql
12.	Rights and restrictions	-
13.	Usage frequency	Per semester
14.	Relation	Student data, Scedule of course data, Lecturer data
15.	Back-up and archiving policy	KRS data is backed up regularly once a week by PPTI. However, in the backup process is not supported by the data management
16.	Management to date	KRS Data managed by the academic part. Student Academic Data has never been audited before.

FIGURE 7 Form Audit 3A KRS Data

Figure 8 explains the detail information about the lecture schedule data. This data is managed and updated each day by the front office. The same as other asset data this data is backed up every week by PPTI.

The fifth Form 3 is about the point TAK data. This point is used by the students as one of the conditions of graduation. This data is managed by the student department.

Form Audit 3A : Data Asset Management (core element set)		
No	Parameter	Komentar
1.	ID	DA_0004
2.	Data creator	Pusat Pengembangan Teknologi Informasi
3.	Title	Schedule of Course Data
4.	Description	Schedule of Course Data is the data that store schedule lectures every Monday - Friday (day effective courses) on a semester
5.	Subject	Students, Course, Course Code
6.	Creation date	2012
7.	Purpose	To schedule the scheduling of elective courses
8.	Source	List of course per semester
9.	Updating frequency	Per semester
10.	Type	Database
11.	Format	My-Sql
12.	Rights and restrictions	-
13.	Usage frequency	Per semester
14.	Relation	Student Data, Room Data, Course Data
15.	Back-up and archiving policy	Schedule of Course Data will be backup periodically once a week by PPTI. But in the backup process is not supported by the data management policy
16.	Management to date	Schedule of Course Data updated by the front office. Schedule of Course Data never been audited previously.

FIGURE 8 Form Audit 3A Schedule of Course Data

Form Audit 3A : Data Asset Management (core element set)		
No	Parameter	Komentar
1.	ID	DA_0005
2.	Data creator	Pusat Pengembangan Teknologi Informasi
3.	Title	TAK Point Data
4.	Description	TAK Point Data is data that store TAK (Transkrip Aktivitas Kemahasiswaan) point. Students that join BEM activity and enterpreneur activity will got TAK point.
5.	Subject	Students, Course
6.	Creation date	2012
7.	Purpose	This data store TAK point during student study on STMIK Primakara. TAK point data is one of the term form graduation.
8.	Source	List of courses per semester
9.	Updating frequency	Uncertain
10.	Type	Database
11.	Format	My-Sql
12.	Rights and restrictions	-
13.	Usage frequency	Uncertain
14.	Relation	Students Data
15.	Back-up and archiving policy	TAK Point Data will be backup periodically once a week by PPTI. But in the backup process is not supported by the data management policy.
16.	Management to date	TAK Point Data updated by kemahasiswaan. TAK Point Data never been audited previously.

FIGURE 9 Form Audit 3A TAK Point Data

D.   Assessing The Management of Data Assets

From the references that we read [2][5], no maternity level or point of the assessment used to draw the conclusion. Therefore, we decided to use a SWOT analysis to describe the situation in STMIK Primakara academic data. At this stage of the audit team to analyze the data obtained using SWOT analysis. SWOT analysis is a strategic planning method used to evaluate the strength, weakness, opportunities, and threat in a project or a speculation business. SWOT table can you see on figure 10.

	Helpful	Harmful
Internal Origin	Strengths: • Already have an adequate infrastructure for managing academic data • Integrated information system • Having a reliable HRKekuatan :	weaknesses: • There has been no policy or terms and conditions in the management of academic data • There is no budget allocated for student academic data management • Academic data is de-normalize • shortage of staff
Eksternal Origin	The opportunity • The number of students is still classified as a small	The threat • There is a possibility that the system affected by hacking

FIGURE 10 SWOT Table

V.   CONCLUSION AND SUGGESTIONS

From the results of audits that have been done, STMIK Primakara must immediately make business case in accordance to the asset data. With bussines case STMIK Primakara will be able to manage, control and monitor the existing asset data. Besides that, with bossiness case we will be able to analyze the feasibility, operational cost benefits and risks of each asset data.

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