Business Process Modeling for data analysis and reporting in a Quality Assurance Office

Christine Lucero[1]
[1] Quality Assurance Office, De La Salle University
2401 Taft Avenue Manila 1004
*Corresponding Author: christine.lucero@dlsu.edu.ph

Abstract: Institutions like DLSU build up their capacity to generate comprehensive, high quality data and information to support strategic planning and decision making to provide meaningful, comparative information about institutional performance to administrators, accrediting agencies and to the public. At DLSU, the Quality Assurance Office (QAO) serves as central repository and clearinghouse for institutional data and assessment findings. The paper discusses developments that confront QAO in managing collection of institutional data and monitoring of institutional performance. This study documents solutions that support data sharing and a "single source of truth" principle, leveraging existing technology, and more efficient use of limited human resources. Findings shows that by applying business process modeling (BPM), staff can simplify selected QAO processes, eliminate redundancies, and create a shared environment while improving the quality of coordination among staff.

Key Words: Quality Assurance; Higher Education; Business Process Modeling; Data Standards; Accreditation and Assessment

1 INTRODUCTION

De La Salle University positions itself as a leader in molding human resources who serve the church and the nation. A key part of its success is internal quality assurance and external accreditation and assessment, whether by national bodies like Commission of Higher Education (CHED) and Philippine Accrediting Associations of Schools, Colleges and Universities (PAASCU), or international ones like the ASEAN University Network Quality Assurance (AUN-QA) and Philippine Technological Council Accreditation and Certification Board for Engineering and Technology (PTC-ABET). Despite the diversity in quality assurance frameworks, there are some shared principles and methodological approaches among national and regional quality assurance and accreditation agencies. The Quality Assurance Office (QAO) serves as central repository and clearinghouse for institutional data and assessment findings for University stakeholders. Information needs for the external assessment of quality is a sore point for most HEIs and their relationship with the quality assessment agency. During the period of comprehensive program assessment there is often a widely shared view amongst departments that the information demands of external reviewers were a major burden on institutions, involving the collation of extensive datasets at short notice. The paper discusses developments that confront QAO in managing the institutional data collection and monitoring institutional performance and documents solutions that support data sharing and a "single source of truth" (SSOT) principle by leveraging technology and a more efficient use of limited human resources.

According to Melan (1993), the core principles for successful process management involve the following: *(1)* Establishing process ownership; *(2)* Analyzing boundaries and interfaces; *(3)* Defining the process by documenting its workflow; *(4)* Identifying control points and measurements; *(5)* Monitoring the process for control purposes by implementing the measures; and *(6)* Taking corrective action and providing feedback if deviations indicated that the process is no longer in control. Based on these core principles, the road to successful process management of an existing process can be divided into three phases: Phase I,

initiation; Phase II, definition; and Phase III, control. This study follows the three phase methodology towards a successful process management.

The scope of this research involves staff from QAO, Office of the Chancellor, Office of Vice Chancellor for Academics (VCA) and secretaries from academic department. This study explores actions that reduce reporting burden on data providers and speed up transformation or re-shaping of data into evidence while improving collaboration among staff.

2 METHODOLOGY

This study follows the basic principles of process management (M. Laguna and J. Marklaud, 2013) as shown in **Figure A**. Phase 1: Initialization, the purpose of the initialization phase is to appoint a process owner or process manager and to define the boundaries and interfaces for the process, that is, its entry and exit points. Phase 2: Definition, after assigning process ownership and defining the process scope, the next step to successful process management is to acquire a thorough understanding of the process workflow, the activities, and their precedence relationships. More precisely, the objective of the definition phase is to document the activities and workflow that constitutes the process and thereby facilitate communication and understanding regarding operational details for everyone involved in the process. Also, understanding how things are working currently provides a baseline against which to evaluate process improvement. Phase 3: Control, after assigning ownership, setting boundaries, aligning interfaces, and defining activities and workflows, the last phase of successful process management is to establish a system for controlling the process and providing feedback to the people involved.
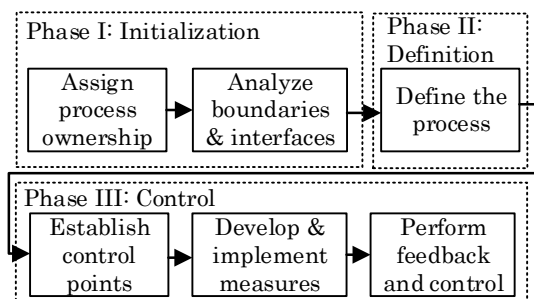
Figure A. Basic principles of process management

2.1 Phase I: Initialization

QAO identifies information that the university needs to produce, assess, and in some cases, publish in order to demonstrate to assessors, the public themselves that they have quality assurance systems in place and are working effectively. On a regular basis, the QAO requests various departmental units to provide them a copy of their electronic documents and reports. Electronic documents such as faculty credentials, department faculty plantilla, Plantilla Update Forms (PUF) and course syllabi are centrally archived in QAO. To carry out business activities and improve access to records, QAO transforms or reshapes collated data to create additional reports, tables, or charts.

DLSU describes its faculty profile and loading to administration, CHED, PAASCU, AUN and other quality assurance agencies by consolidating numerous spreadsheets of Department Faculty Plantilla, PUFs, and extracted data from faculty credentials. The practice of collecting digitized faculty credentials and course syllabi and archiving centrally at QAO has been very useful because the Office University Registrar (OUR) staff can quickly assist graduates seeking transfer credentials or certifications; Library staff can ensure that references are available in the collections, and gives assurance to the departments that their credentials and previous versions of course syllabi are stored in case they are ever needed.

The amount of data that QAO collates generates, and stores have grown exponentially, both in content and variety. When it is time to gather information and generate reports, they go through a slow process of consolidation and throughout the data are subject to numerous error-prone activities. Distribution of those reports is another challenge. QAO staff often cannot ensure the security of reports once they sent to their recipients despite being responsible for handling all alterations to the data and report applications. These reports resent every time a change are made, no matter how small. The amount of data and the number of repetitive versions of data is making it difficult for the office to create, store, amend, archive and retrieve electronic records.

It is clear that QAO is responsible for central archiving of the course syllabi, faculty credentials, and processing of faculty load distribution reports;

reshaping them into various departmental and institutional operational reports. Although QAO has no managerial control over the content of faculty credentials, course syllabi and faculty loading, the office is perceived as the owner of its data analysis and reporting and is held accountable for any failures. That is why it is important to clarify to all parties the importance of accurate and timely submission of inputs to QAO staff. With process ownership in place, QAO needs to analyze the process boundaries and interfaces. Based on the detected problems, QAO focuses its attention to its selected key processes, as follow:

a. *Managing QA records* – monitoring and central archiving of quality related records such as faculty credentials, course syllabi, department faculty plantilla, and PUFs;

b. *Data and report processing of faculty load distribution reports* – preparing and transforming data draw out from the Faculty Plantilla and Plantilla Updates Form;

c. *Data and report processing of course syllabus inventory* – monitoring and conveying status of syllabi collection to concerned offices.

d. *Data and report processing of Faculty Profile Masterlist* – preparing and transforming data draw out from QA records

e. *Processing of summary tables and statistics related to faculty data* – monitoring and conveying status of faculty resource to concerned offices.

A useful approach to deal with interface-related workflow problems is using a customer-producer-supplier (CPS) model (see **Figure B**). This model is based on the premise that a producer's output should satisfy the customer's requirements. The CPS model has three agents: the supplier who provides the inputs, the producer who transforms the input into value-added output, and the customers who are the recipients of the output. The interactions among these agents can be divided into three phases: the output requirement phase, the production capability phase, and the input requirement phase. A fundamental principle in the CPS approach is that all requirements must be mutually agreed upon by the parties involved: the producer and the customer, and the supplier and producer, respectively. Clearly, these processes were not well managed. The following section will discuss how the basic principles of process management can be used to improve it.
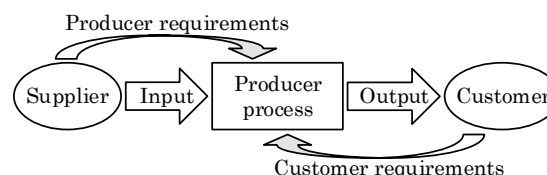
Figure B. Customer-producer-supplier model

2.2 Phase II: Definition

2.2.1 High level map for data analysis and report processing

Having determined the scope of the process, QAO defined the activities and workflow that are within the boundaries. **Figure C** illustrates SIPOC+CM of the existing QAO data analysis and processing of reports to understand the cross-functional activities under analysis. The name of the tool comes from the first letter of each word: **S**uppliers, **I**nputs, **O**utputs, **C**ustomers, **C**onstraints and **M**easures. Applying the SIPOC+CM has revealed some important requirements that QAO must take into account to accelerate access to information on quality and standards. QAO observes the following on its existing processes:
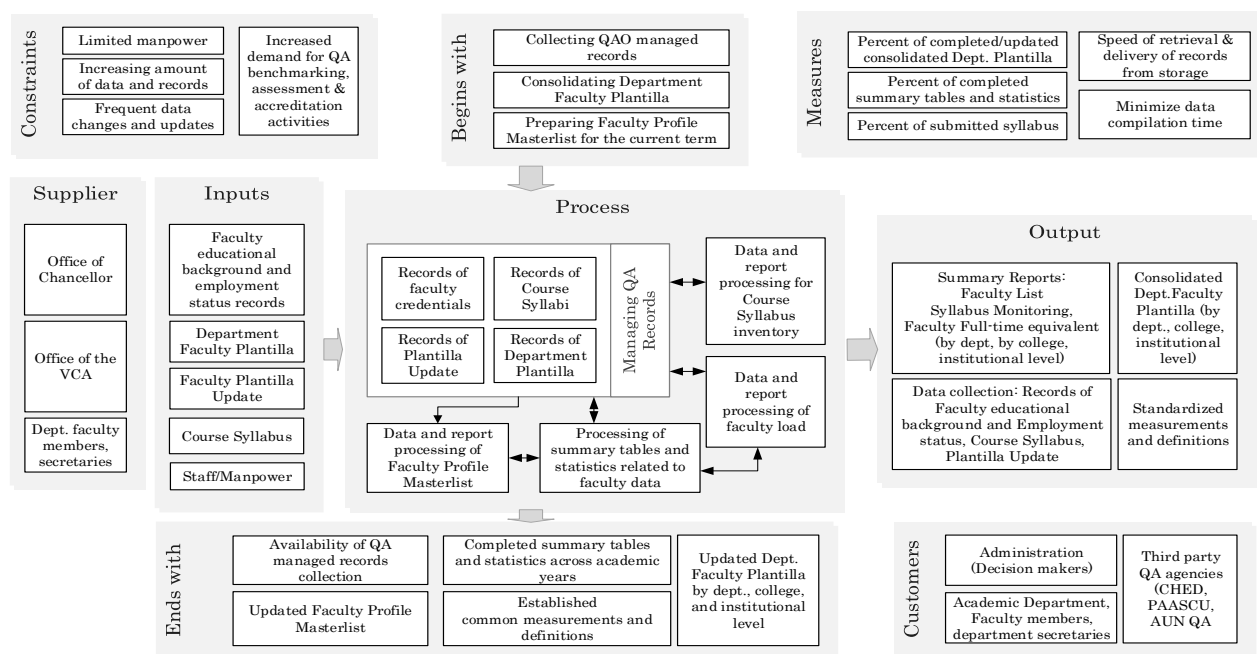
a. *Data variety and data preparation.* The information QAO gathers comes from diverse data types, data formats, and sources. It goes through preparation *such* as cleansing, shaping, blending to get insights. The problem stems from the fact that there are yet no official standards or file naming and storage policies within the organizations. Staff will do what they think is best, but without proper policies in place the results could be unpredictable and costly.

b. *Data in silo.* A data silo is an *isolated* group of data. QA records can take the form of raw data that have not been processed or analyzed or even just data held by different staff in a department. Everything sits in separate spreadsheets and network folders, creating a risk in inefficiencies and crucial data can slip in the movement of records. QAO have self-serve, independent data marts that without proper governance and close business involvement can quickly multiply into a large number of disconnected solutions that become unsustainable.

c. *Poor records preservation and retrieval.* QAO has been looking at big data for any length of time

and the challenge is more than just having a repository to store the content. The amount of data and the number of repetitive versions of data is making it difficult for the office to create, store, amend, archive and retrieve electronic records.

d. *Shortfall on feedback and control*. The manual and slow process of consolidation to create individual reports becomes impractical for QAO to provide progress reports to all academic departments. With lack of progress reporting, it becomes difficult for the chairs and secretaries to call for further actions.

Constraints			Begins with		Measures		
Limited manpower	Increased demand for QA benchmarking, assessment & accreditation activities		Collecting QAO managed records		Percent of completed/updated consolidated Dept. Plantilla	Speed of retrieval & delivery of records from storage	
Increasing amount of data and records			Consolidating Department Faculty Plantilla		Percent of completed summary tables and statistics	Minimize data compilation time	
Frequent data changes and updates			Preparing Faculty Profile Masterlist for the current term		Percent of submitted syllabus		

Supplier	Inputs	Process	Output
Office of Chancellor	Faculty educational background and employment status records	Records of faculty credentials / Records of Course Syllabi / Records of Plantilla Update / Records of Department Plantilla — Managing QA Records — Data and report processing for Course Syllabus inventory / Data and report processing of faculty load	Summary Reports: Faculty List Syllabus Monitoring, Faculty Full-time equivalent (by dept, by college, institutional level) / Consolidated Dept.Faculty Plantilla (by dept., college, institutional level)
Office of the VCA	Department Faculty Plantilla / Faculty Plantilla Update	Data and report processing of Faculty Profile Masterlist / Processing of summary tables and statistics related to faculty data	Data collection: Records of Faculty educational background and Employment status, Course Syllabus, Plantilla Update / Standardized measurements and definitions
Dept. faculty members, secretaries	Course Syllabus / Staff/Manpower		

Ends with			Customers	
Availability of QA managed records collection	Completed summary tables and statistics across academic years	Updated Dept. Faculty Plantilla by dept., college, and institutional level	Administration (Decision makers)	Third party QA agencies (CHED, PAASCU, AUN QA)
Updated Faculty Profile Masterlist	Established common measurements and definitions		Academic Department, Faculty members, department secretaries	

Figure C. SIPOC+CM of the existing QAO data analysis and processing of reports

2.3 Phase III: Control

The current process has weak control points; as a result, QAO may not realize that something is wrong with the process until it is too late. This situation represents a high "failure cost" for QAO in terms of loss of credibility within the institution. Based on customer feedback and the analysis, QAO find the following instances where control points appear to make sense:

a. *Standardization to enhance data sharing*. Standards make data uniform. Here are some practices to drive information into a database and record it there in a consistent, predictable, and homogenous way: *(1) Standardize Data Sources*. QAO started externally with sources that feed its database and internally with the data that it currently own. Data consistencies are imposed on implementing forms like Plantilla forms and PUFs. This enables the responses from the forms to flow

into the data database with formatting preset by QAO. (Coombs, 2017); *(2) Electronic documents named consistently*. In order to locate and retrieved electronic records and files easily and quickly, develop conventions for naming documents; making it clear when to use capitals, spaces, hyphens, underscores, dates or numbers. Follow a compile list of generally accepted university standard terms to ensure consistent terminology is used for the names of committees, organizations and activities etc; *(3) Standardize the Database*. Enforce standards on data already collected. Filter data to refine data sets, including only data the users need for a specific task, and to exclude "data that can be repetitive, sensitive or irrelevant". By retrofitting data, different people on different groups will interpret data in the same way.

b. *Technology and linking data to boost efficiency*. In working with data, QAO overstep reliance on single products or static processes. It

utilizes SharePoint and Power Query in MS Excel to automate its processes by developing various SharePoint Apps and MS Excel with Power Query template. These various systems were connected to create a unified solution that tells a meaningful story to the organization, each source of data contributes to the whole. The Document libraries and lists pull all data into one place. Data from implementing spreadsheet forms and/or exported from SharePoint lists are loaded to power query templates to generate QA managed reports. Power Query is like a machine because once you have your query setup, the process can be repeated with the click of a button every time your data changes. It has features that can transform data to a worksheet or data model that is ready for pivot tables and reporting.

c. *Secure document storage and management.* Data is growing faster than users' abilities to manage it. QAO with support from IT created a

document management system (DMS) leveraging on SharePoint. Here are some QAO experiences in setting-up its DMS : *(1) Data Storage.* The document size that can be stored was limited to 2GB and there also is a maximum upload size. SharePoint can store large amounts of data, but it will take many hours to complete a large file size data transfer; *(2) Security.* A site all the way down to a specific document or list item can have its own specific security setting. The issue is permissions are controlled manually and that becomes problematic; *(3) Search.* QAO started using the system even without its search function. The search tool, eventually worked after close collaboration with Information Technology group.

d. *Perform feedback to communicate outcomes to stakeholders.* Progress reports are fed back into the academic department as a whole to influence decision making. It gives department heads a clear line of sight into what's happening within their unit in terms of faculty load distribution and their syllabi collection.
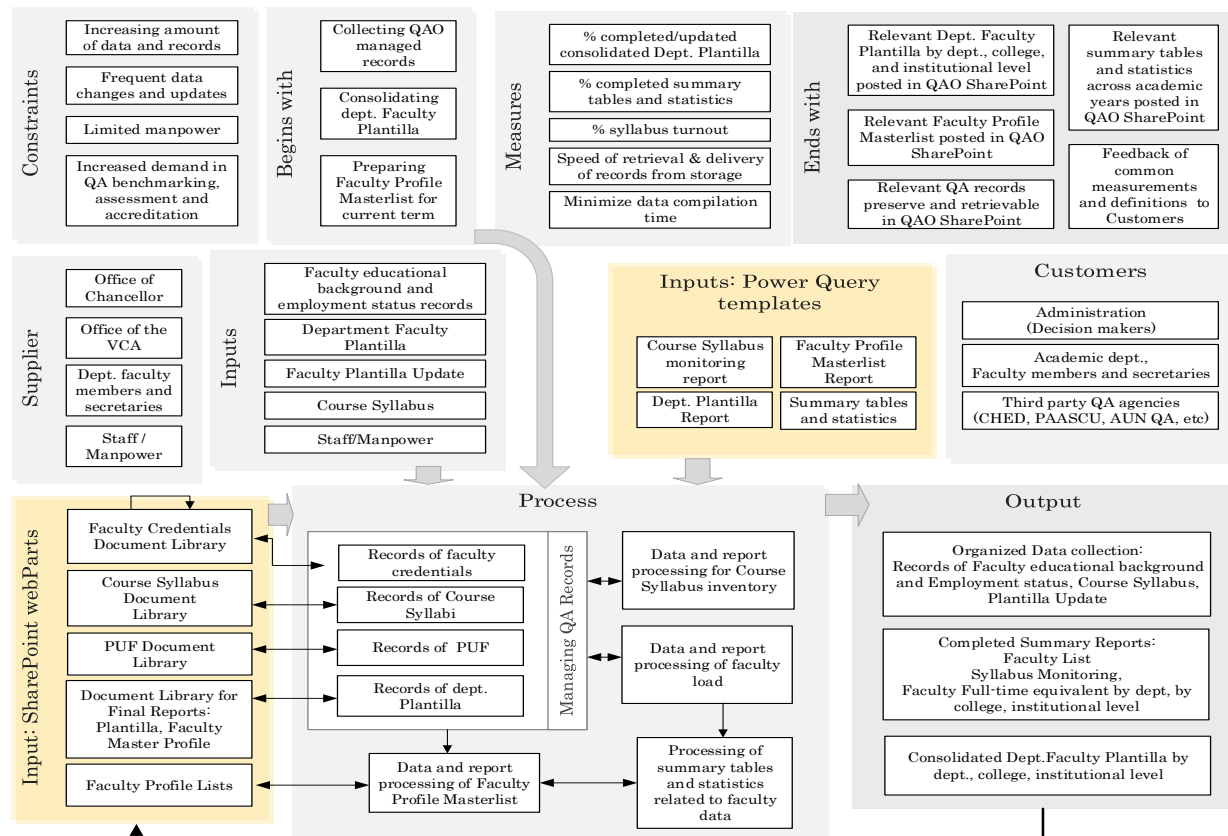
Figure D. SIPOC+CM of the improved QAO data analysis and processing of reports

3   RESULTS AND DISCUSSION

To complete the picture, based on the basic principles of business process modeling, QAO has come up with terms of action plan to achieve a well-managed data analysis and report processing of its selected quality data. Having established control points, **Figure D** above illustrates the improved SIPOC+CM. Here are some lessons learned in evaluating the extent of the implementation: *(1)* Data are correct, clean, and complete, formatted and verified before they gets into the repository of institutional data, and before any action is taken on that data. Doing so ensures the accuracy and integrity of the information and prevents "dirty" data from entering into database; *(2)* Having a solution that can mash-up disparate data sources together with minimal manual intervention reduces the workload on the business, freeing staff to focus on data analysis and actions on that data; *(3)* Deployment of a DMS reduces physical storage and lower costs. QAO staff can do paper scanning and uploading of digital versions to DMS. While this can be a time-consuming process, the freedom that comes along with moving away from paper is more than worth the extra effort, and the process also gives QAO an opportunity to pick and choose which documents to hold on to and which can be eliminated; *(4)* Save time, allows quicker access to documents when needed; and *(5)* Regular progress reporting creates a valuable written record of the programs' life. When feedback is given in a constructive manner, employees commonly perceive feedback as a positive action and will display interest and concern for the information and for the process. This tends to make people feel that they matter and encourages them to get more involved (Laguna, M., & Marklund, J., 2013).

4   CONCLUSION

This study shows that the proper application and implementation of BPM and design, leveraging SharePoint as content management with moderate to heavy modification, and boosting excel efficiency with power query can create a better process that is more cost effective and can meet the demands of customers. If QAO and its interfaces are able to carry out the proposed suggestions, they will be able to provide consistent information to decision makers and saves money by providing SSOT, consistent

reporting and optimize use of limited human resources. This study combined business and IT to simplify, eliminate redundancies and create a shared environment while improving the quality of coordination among staff for better working practices (Leonard, 2009). Partaking in process improvement has positive consequences for the professional and personal development of the participants, as staffs learn to become more proactive and take responsibility for effective change. In future work, the researcher will conduct another BPM and improvement on mechanism that supports regular communication and reporting, and if possible, set-up a progress dashboard so every employee concerned can see what is happening.

5 ACKNOWLEDGMENTS

6   REFERENCES

Ainslie, A. (2017) Business Intelligence: A single Source (Data) Truth.(2017, May). Vivonet. Retrieved from https://www.vivonet.com/blog/business-intelligence-a-single-source-of-data-truth

Bialek, R., Duffy, G. L., Moran, J. W. (2009). The public health quality improvement handbook. Milwaukee,WI: ASQ Press. Google Scholar

Coombs, B (2017, February 9). 4 Steps to Standardize Your Data and Get Better Insights. Retrieved from https://blogs.oracle.com/ marketingcloud/4-steps-to-standardize-your-data-and-get-better-insights

Laguna, M. and Marklund, J. (2013) Business Process Modeling, Simulation and Design, 2nd Edition. New York: CRC Press

Leonard, T. (2009, September 17). The Need to Simplify Data and Reporting. Retrieved from http://www.b-eye-network.com/view/11348

Melan, E. H. (1993) Process Management: Methods for Improving Products and Services. New York: McGraw-Hill

Rothberg, A., (2017). How to boost Excel efficiency with Power Query. Journal of Accountancy, 224 (6), 46-52.