

# GOOD DOCUMENTATION PRACTICES: UM EXPERIENCE

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## ABSTRACT

This paper discusses the requirement of documentation system in the context of higher education. The characteristic of a document system should include proper control, relevant, dynamic, currency, accessibility, scope, ownership / authority, record.

At University of Malaya (UM) the document system encompass all documents which are required under the MS ISO 9001:2000 and organizational needs. Currently, it consists of a Quality Manual, 30 Quality Procedures and 428 Work Instructions, 32 Document Specifications, 4 Guide Lines and Quality Records. Initially these documents were in printed format and CD ROM and were distributed manually to the respective departments and units. Due to logistic and economic reasons, the documents were converted into electronic format, first in pdf format and finally as hypertext format (html).

An E-document System has many advantages. First, it ensures the availability of documents to all staff and students at any time. These documents can be accessed without the need of any specific software or operating system. Accessibility is through any computer within the campus that has an Internet connection. Challenges to the documentation are manifold. In the wake of major changes introduced by management and supporting services, the system has to respond rapidly in keeping up to the needs of the documentation. Process owners should be given access to amend documents online in order to speed up dissemination of information and new or amended procedures to the campus. Relevant or critical documents such as course pro-forma and curricula have to be centralized as measures as an authorized source of reference.

**Keywords:** E-documentation

## 1. INTRODUCTION

University of Malaya (UM) is the oldest university in Malaysia. It has always been a tradition of the University to ensure that its excellence is maintained and distinction intensified. The University is committed to look for methods of assuring quality in all aspects including management. In 2001, the then Vice Chancellor announced that the University of Malaya would go for the MS ISO 9001: 2000 Certification for Quality Management System (QMS). Unlike many academic institutions in Malaysia, the then management decided to attempt for an overall certification. The scope of the QMS

includes management of teaching and learning activities, management of research and supporting services, and these include all responsibility centres, both academic and non-academic. The Quality Assurance Management Unit (QAMU) which was officially established on the July 27, 2002 is to coordinate, monitor and consolidate all activities pertaining to quality in UM.

Prior to certification, the University was first required to undergo an Adequacy Audit. Its aim is to ascertain that UM has developed and established an adequate documentation system. This is to ensure that a quality management system can successfully be implemented. With this documentation system in place and having passed the adequacy Audit, the University went on to successfully attain the MS ISO 9001:2000 certification on the 24<sup>th</sup> December 2002. This signifies international acknowledgement towards the management system practiced at the university.

## 2. DOCUMENTATION REQUIREMENTS

With the certification awarded, UM has to adhere and comply with the stated requirements as laid out by the Malaysian Standard MS ISO 9001:2000. The clause pertaining to documentation requirements is summarised in *Clause 4 Quality management system*. According to *Clause 4.1 General requirements*, it is required amongst others that UM establishes, **documents**, implements and maintains a quality management system. (For details on the clauses refer to MS ISO 9001:2000 Standard). *Clause 4.2 Documentation requirements* details the requirements set by the Standard pertaining to QMS documents which includes the following:

- i Statement of quality policy,
- ii The quality objectives,
- iii A quality manual,
- iv All documented procedures as required by the standard,
- v Documents needed by UM to ensure effective planning, operation and control of processes, and
- vi Records required by the Standard.

In complying with these requirements, UM sets out to determine the documents needed for a quality management system (QMS) and through discussion and rigorous brainstorming sessions, UM confirms the following documents as those needed for the QMS.

- a. Statement on Policies  
As required by *Clause 5.3 Quality policy*.
- b. Planning of the QMS  
As required by *Clause 4.2.2 Quality manual*.
- c. Quality Objectives  
As required by *Clause 5.4.1 Quality objectives*.
- d. Documented Procedures  
As required by the Standard, *Clause 4.2.3 Control of documents, Clause 4.2.4 Control of records, Clause 8.2.2 Internal audit, Clause 8.3 Control of nonconforming product, Clause 8.5.2 Corrective action and Clause 8.5.3 Preventive action*.
- e. Work Instructions

- Other procedures and work instructions that need to be documented. (*Clause 4.2.1 (d)*).
- f. Responsibilities and authorities  
As required by *Clause 5.5.1 Responsibility, authority and communication*.
  - g. Statutory and Regulatory Requirements  
As required by *Clause 5.1 (a)*. These include Acts and Statutes, Government and Treasury Circulars and Regulations.
  - h. Other documents  
Other documents deemed necessary by relevant agencies; for example those identified by Ministries, professional (e.g., law, medical, engineering, etc) bodies.

In summary, QMS documents are those documents needed to aid in the implementation of task/activities effectively and efficiently. It is apparent that documents listed by UM are numerous and massive, which warrants not only a structured documentation system be set up but more importantly a mechanism of controlling these documents. *Clause 4.2.3 Control of documents* in the Standard explains the control needed to approve adequacy of documents, to review and update documents as necessary, to ensure changes and current revision status of documents are identified, to ensure relevant versions of documents are available and easily retrievable, to ensure documents are legible and identifiable, and to prevent the use of obsolete documents. In a similar manner, records which are special type of documents are also controlled in terms of identification, storage, protection, retrieval, retention time and disposition (*Clause 4.2.4 Control of records*)

### **3. UM QMS STRUCTURE**

The QMS structure of UM is based on the MS ISO 9001:2000 which features a variety of characteristics. Accordingly with the Standard, the structure adopts a process approach and is customer focused. In establishing the structure, UM systematically identify the processes (both core and supporting), applications, inputs and outputs, resources needed and also determines the interactions between these processes. Then, processes are classified and the database organised accordingly as follows:

- i. Quality Manual
- ii. Teaching and Learning
- iii. Management of Research
- iv. Management of Human Resource
- v. Management of Infrastructure and Assets
- vi. Management of Finance
- vii. Management of Commercialisation
- viii. Management of Student Affairs
- ix. Management of Library
- x. Management of Residential Colleges
- xi. Management of Sports and Culture Services

The main document is the Quality Manual. It explains the scope of QMS, the documentation system, list of quality documents and process maps showing the

interaction between the processes of the QMS. It also states the Quality objectives which are measurable targets set by the UM's management to ensure the goals of the Quality Policy are achieved. Besides these, the main document also consists of the 6 documented procedures mentioned above as required by the Standard.

UM has also categorised its activities into ten core processes (ii – xi, above) with emphasis on the first two; namely teaching and learning, and research. The remaining eight processes are acknowledged as supporting processes. In ensuring uniformity and consistency, the work process for each main activity as well as the supporting activity for all the ten core processes is documented in the form of a quality procedure, work instruction, guidelines or document specification. Records providing evidence of conformity are also maintained. Figure 1 shows the UM QMS document structure.

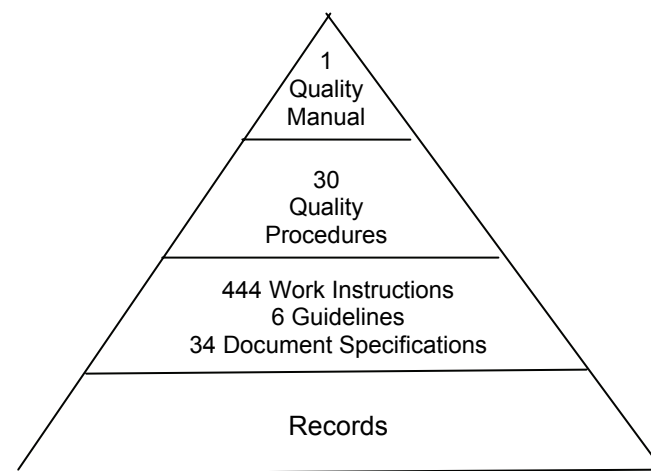


Figure 1: Document Structure as of October 2007

Quality procedures and work instructions are the main category of documents which describe in detailed how a process or activity is to be carried out. All quality procedures and work instructions are written according to a standard specification format in order to ensure uniformity. The key sections of the format are:

- a. *Purpose*: policy and aims of the document
- b. *Scope*: scope of use of the process/activity described in the document
- c. *Responsibility*: individual(s) responsible in ensuring the documented procedures are adhered to
- d. *Definition*: unique terminologies used in the document
- e. *Abbreviation*: list of abbreviation used in the document
- f. *Work process*: the systematic and detailed steps of a process/activity
- g. *Quality record*: records to be retained, including the length of time, place of storage and the officer responsible

In some instances, the documents contain flow charts to provide an illustrated description of the work process sequence. These flow charts are drawn according to standard notations and symbols. If external documents are used as reference in the work process, a list of these documents is added as well.

#### 4. DISADVANTAGES OF PAPER-BASED DOCUMENT SYSTEM

During the initial phase, all the documents were in hardcopy and distributed to all 176 responsibility centres (faculties, institutes, centres, departments and units) within the university. Most of the documents were not yet stabilised and thus went through quite an arduous task of revising, rewriting and changes were made to ensure continual improvement. As required, every revision and/or amendment made was recorded and logged. These changes were also made known to all responsibility centres to ensure correct and most updated versions of documents were being used.

However, it was not cost beneficial to print the documents each time there was an amendment and to distribute it to over a hundred responsibility centres. Documents which were distributed before the latest revision had to be retrieved and disposed in order to avoid use of obsolete documents. Distribution of the documents was also logistically tedious. Responsibility centres had to collect the documents and ensure that the relevant ones were received. Furthermore, requests for additional documents and replacements of lost ones make the control and monitoring of the documents more difficult. If photocopies were made, there was no control over the currency of documents being referred to, thus violating the requirements of the ISO documentation standard.

These factors initiated the need for a more technologically advanced system to manage the quality documents, thus evolved the UM QMS E-document system.

#### 5. UM QMS E-DOCUMENT SYSTEM

To take advantage of the processing and accessing speed of computers and the availability of large storage space, the documentation system had to be digitalized. The quality documents at hand were already available as MS Word document format, but this format was unsuitable for use as many computers which did not use Microsoft Windows operating system could not read the documents.

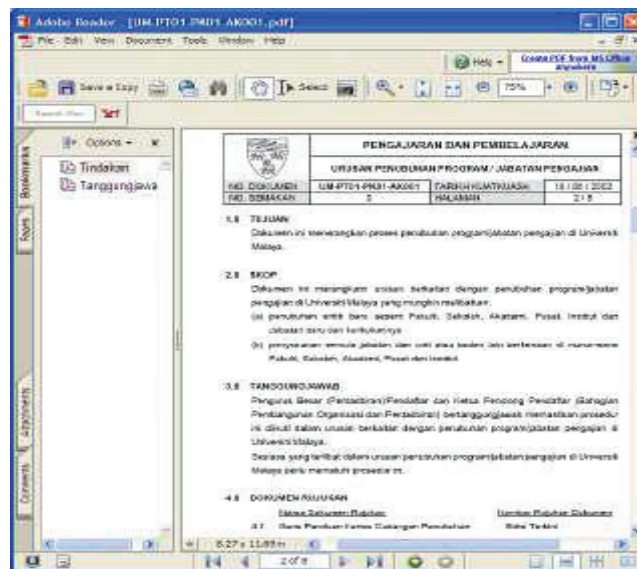


Figure 2: Example of a PDF quality document

Initially, the Acrobat PDF format, which has become a standard format for reading documents, was chosen due to the easy and wide availability of the reader software on different operating systems [Figure 2]. All documents were converted to PDF files and distributed using CD-ROMs to the respective Responsibility Centres. However, in time this measure was not so practical as it placed restriction on access. Due to the magnitude of the documentation, it was necessary to provide access to the dynamic documents to all personnel of UM at anytime, anywhere. Thus the solution was a web based system.

In April 2004 QAMU launched its website which hosted the electronic quality documents. The website took advantage of the fast fibre optics network in the UM campus and the availability of more than 4,000 computers at the responsibility centres. By putting on the website, the UM QMS documents were then accessible to all levels of staff who have access to the Internet. Gradually the PDF files were converted to HTML to overcome the space and access problems.

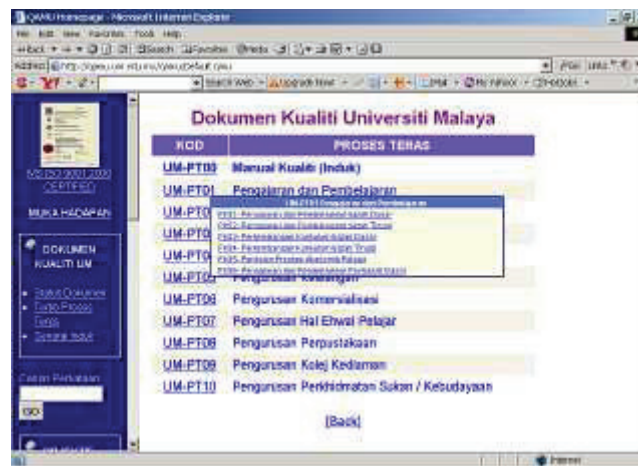


Figure 3: Quality documents online

The HTML format provided several enhancements to the documents. Hyperlinks were exploited by implementing links to other UM QMS documents, flow-charts and graphics (Figure 3). As a result, cross-referencing the documents became simple and rapid. The incorporation of blue colour shading over amended texts in revised versions of documents helped to inform the readers of changes made and improve readability.

It took about six months to convert all the 495 UM QMS documents. Finally, on 25 August 2004 these documents were put on the web for all to access (Figure 4).

Kod	Tempat Cetakan	No. Sematan	Tarikh Rujukan
UM-PT01-PK02- A0010	Pengawasan dan Pemeliharaan Ijazah Tinggi	0	13 Dis 2006
UM-PT01-PK02- A0011	Pengubalan Dasar Pengiraan Ijazah Tinggi	2	16 Aug 2006
UM-PT01-PK02- A0012	Pengiraan Program Ijazah Tinggi	2	15 Aug 2006
UM-PT01-PK02- A0013	Pemilihan Pelajar Secara Berkurap	3	8 Feb 2006
UM-PT01-PK02- A0014	Pencerahan Re-Program Ijazah Tinggi Secara Pertyetikan dan Pelantikan Penerima	1	15 Aug 2006
UM-PT01-PK02- A0015	Pemilihan Pas Pelayar Bukan Warganegara	2	16 Mac 2006
UM-PT01-PK02- A0016	Pendaftaran Calon Baru Ijazah Sarjana Secara Berkurap Dan Secara Berhatur Dan Diortot	4	3 Feb 2006
UM-PT01-PK02- A0017	Pendaftaran Calon Baru Secara Disertai Dan Tanpa	5	15 Aug 2006
UM-PT01-PK02- A0018	Pembayaran Pendaftaran Pelajar Lama	3	15 Aug 2006
UM-PT01-PK02- A0019	Pengubalan Pendaftaran Calon Baru	3	19 Mei 2006

Figure 4: Quality Work Procedures

The original structure of the UM QMS documents is maintained in the E-documents, which are divided into 9 sections. In general, the UM QMS documents can be accessed from the QAMU main webpage through three hyperlinked lists. The first is a master list which contains a list of the 495 UM QMS document in order of the document code. The second is the list by core processes UM-PT00 to UM-PT10. Each of these core processes is linked to a list of all the Work Processes concerned, and each of the PK is in turn linked to the list of corresponding Work Instructions. This is clearly a faster method of accessing a UM QMS E-document, particularly when its document code is known. The status of the E-documents can be obtained through the third list. This list contains a menu to all the new, amended and cancelled documents in the past three months.

A search box facility is also available. This facility displays the locations of the word being searched at four different sites – in the title of documents, the title of forms, the Quality Manual and the Section 6 (Work Process) of the E-documents.

## 6. BENEFITS OF THE UM QMS E-DOCUMENT SYSTEM

The UM QMS E-document System has ensured quality documents are available 24/7 to all staff and students of University of Malaya. It does not require any particular software or operating system, thus allowing access through any computer that has an Internet connection. The web page is fast to load and relevant sections can rather quickly be accessed because documents are downloaded in parts (Figure 5). During the last three years, many improvements have been made to the system and the benefits are clearly identified.

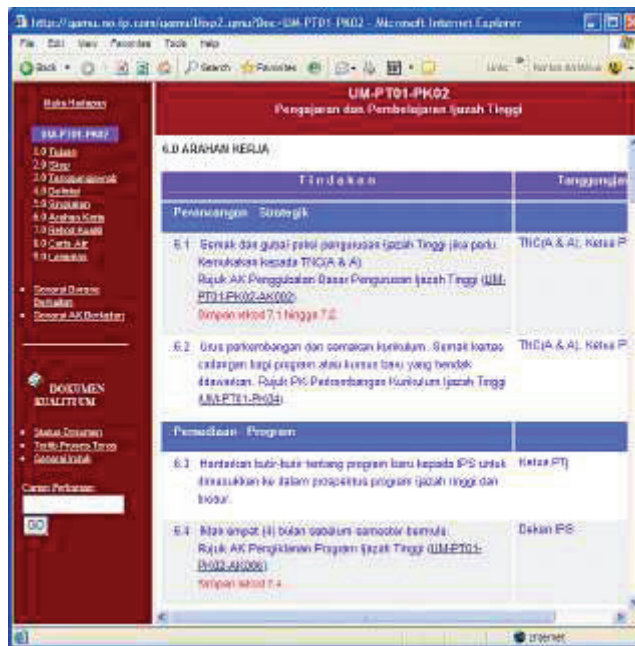


Figure 5: Accessing Section 6.0 of the E-document

*(i) Cost effectiveness*

Once documents have been made available online there is no need for printed documents to be distributed. All printed documents and error logs were retracted and only the online versions are considered current. It saves the organization a great deal in terms of time and cost such as paper, printing and dissemination. The structure of documents in parts and the search facility provide users with ease and convenience of accessing the relevant documents, thus saving user time with increased satisfaction.

*(ii) Revisions and availability*

The UM QMS E-document System is protected by not allowing access to real-time updated documents. As soon as the Document Manager approves the requested amendments and up-loads new/revised documents, the information will be immediately available to the user. Changes in the documents are still identified using blue shading in the respective area of change. The online documents are up-dated monthly and the number of revision is indicated. If any part/whole of the document is printed, it is pertinent to check for amendments by comparing with the online version. Accuracy of procedures is maintained by the Document Manager and all documents are identifiable and current amendments are tagged. Control is ensured by allowing access within the UM campus only. However, upon request, an organization may gain authorization to access the quality documents for a stipulated time for reference purposes.

*(iii) Customization of Access*

The various sections of the documents can be controlled by the Document Manager to allow different users to access only specific portion of the entire UM QMS E-document system. The staffs involved in uploading and maintaining documents have different access authorization than the general user on campus that can only view and print certain sections.



*(iv) Monitoring Access*

The UM QMS E-document System includes a report mechanism to monitor access by the users. Firstly, the system records the number of visits by the users to the QAMU website. The mechanism also monitors the number of times a specific E-document has been accessed (Figure 6). In addition, the reports reflect the users who are accessing the system and the types of searches successfully completed. This analysis is updated instantaneously.

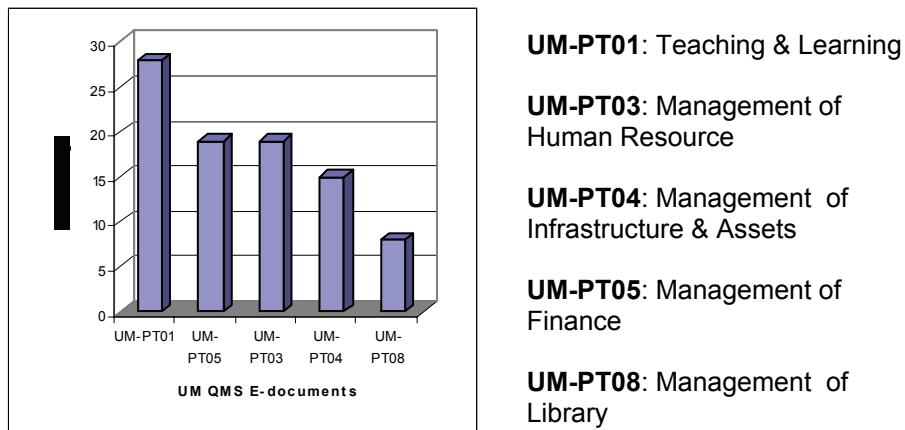


Figure 6: Five most frequently accessed E-documents (January 2006 to October 2007)

A survey conducted in 2005 has shown that the majority of these visits are for access to the quality documents (Table 1).

Table 1 : Categories of information referred to by respondents visiting QAMU website

Type of Information	Yes (%)	No (%)
Quality Document	60.7	39.3
Briefing / Workshop on UM QMS	23.4	76.6
Audit Activities	22.0	78.0
Workshops on Quality Assurance	6.8	93.2
Others	1.5	98.5

## 7. INNOVATION IN DOCUMENTATION

The needs of the UM QMS documentation system are still evolving from its initial requirement to distribute information about UM QMS to all staff members of the university as quickly, widely and economically as possible. To a respectable degree, these goals have been met through the implementation of the e-documentation system. Future changes are planned in some areas to make the system more efficient, reliable and secure.

To facilitate continuous development and innovations in the software development, an important consideration is the use of a programming language that can be understood by many programmers. Originally the UM QMS E-document System was developed using CGI scripts probably known only to very few individuals in the university.

Presently discussions are being held with UM Centre of Information Technology to revamp the system using PHP programming language instead, a popular language for developing web contents.

Enhancement to the UM QMS E-document System can be classified into:

- a) additional codes to provide the new features, and
- b) inevitable structural changes to the database.

While (a) is more obvious to the users of the system, its successful implementation depends on the facilities provided by the operating system, the programming language used and the skill of the programmers. The not-so-obvious (b) can restrict the development of (a), given all the facilities required. In addition, changes in the database structure can upset the efficiency and reliability of the software.

Ideally, the structure of QMS database, of how and where the data are stored, should be planned and set permanently in the initial stage of development. There on, codes are written and tested based on this structure albeit minor changes. However, this ideal situation is difficult to be met as one has to know all the features required of the system at the beginning of developmental stage.

UM QMS E-documentation System, a home grown system, may have fallen into this situation. Having fulfilled its initial function satisfactorily, it needs a major restructuring in the database in order to facilitate further enhancements.

Among the enhancements planned are:

- (i) online receiving and processing of request for quality document amendments
- (ii) online accessing and downloading of all controlled forms
- (iii) online access to document revision history. A good QMS has the ability to access and track changes to its documents.
- (iv) alert service to inform Responsibility Centres that their requests for amendments/ cancellation/new document have been received and approved
- (v) multiple level access
  - a. Document Manager
  - b. Quality Manager at each Responsibility Centre
  - c. Common user.
- (vi) online amendment of documents by Quality Manager/Document Controllers of Responsibility Centres, so that checking and approval can be hastened

To maintain the momentum of these changes, frequent meetings are held between QAMU and UM Computer Centre of Information Technology representatives to discuss plans and to exchange views. UM members at large are encouraged to give their comments on the system too.

## **REFERENCE**

Malaysian Standard MS ISO 9001:2000, Department of Standards Malaysia