

TRANSFORMING DOCUMENT MANAGEMENT: THE INTEGRATION OF AN AUTOMATED SYSTEM AT THE UNIVERSITY OF TETOVA

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Abstract

Universities, like many other organizations and institutions, process a great deal of documentation at multiple spectrums, which are very important to all concerned. The processing of documentation at the University of Tetova has conventionally been retained by manual or semi-automated means. The natural growth in the student population and the constant influx of requests for certain documents led to difficulties in due time, as all the documents were stored in one big collection; thus, it frustrated everybody. To bridge these gaps, an automated document management system was designed and put into operation by the professional software engineers' team at the University of Tetova.

It aimed to resolve all the challenges thrown up using manual methods and effectively integrate the work. The automated document management system ensures better access, fast processing time, and efficiency within the university. Its seamless integration with the LMS says a lot about its cohesive and integrated approach towards data and document management, reflecting that commitment to a modern and technologically advanced environment for academic and administrative staff and students.

The automated document management system at the University of Tetova marked a great leap forward: it overcame the existing weaknesses with fully automated processes, meeting the current needs, and aiming for further growth and development during the next years within the frame of the digital era.

Keywords: University, Document management, Automation, Efficiency, Challenges, Modernization, Growth and development

1. Introduction

For aspects such as student admissions, financial management, records of students' academic work, and human resources, among others, the educational industry alone generates a lot of documents yearly. These documents are quite bulky, and their management so that they would be accessible when needed is a daunting task for higher learning institutions [1].

Traditional document management methods, characterized by passive file management and reliance on paper-based systems, are not suited for the dynamic and digital-centric environment that characterizes modern education. The drawbacks of these approaches involve the document's untraceability, loss, and lack of accessibility that crops up when volumes increase making the distribution more complex through electronic mail systems [2].

Facing the above-mentioned challenges, the University of Tetova realized the need to implement an e-document management system to smoothen operations and facilitate faster efficiency amongst itself and its stakeholders: senior management, administration, professors, and students. Due to limited document access and inefficient practices for document storage, the university has low productivity, and long processes of document retrieval. Besides, physical requirements of document delivery and receipt create operational expenses and nuisances

among the students. Moreover, printing required so much physical infrastructure that added up to the costs.

This situation has necessitated the university software team to develop a full-fledged electronic document management system, which is expected to enhance access to documents, rationalize and speed up processes, reduce unnecessary costs, and help preserve environmental resources by saving on paper waste. In this research paper, we discuss the design and implementation of such a system through diagrams and explanations.

2. Documents Management System

During the last ten years, the concept of a document has undergone a significant evolution, driven mainly by the evolution of information technologies. Nowadays, documents in an organization mainly exist as computer files and are handled as a single entity by the operating system and email services [3].

Nowadays, users can prepare, process and store all documents in an electronic format directly from their PCs. They are normally referred to as electronic or digital documents which can be accessed, retrieved, and stored from other sources through the Internet, Intranet, and/or Extranet. They can also be processed and dispatched to others through the same networks.

A major advantage relating to digital media is flexibility, and unlike traditional paper documents, they can be presented in any format that suits a particular user's need [4].

Today, LMSs have become quite indispensable for the efficient handling of documents in a secure manner within modern organizations, including educational institutions such as universities. These systems store the documents centrally on servers making them accessible to users through web interfaces.

The main aim of management systems is to make documents accessible, retrievable, exchangeable and more importantly, more secure, by digitizing the documents and managing them structurally [5]. Its main features are as follows:

- The documents that are crucial for the organization are being digitized or are in digital format.
- Use, manipulation and distribution of documents are mainly computer-based.
- Usage of electronic documents can be traced, making possible measurements and subsequent analysis for process improvement.

DMS, which is used in higher education institutions, deals with so many documents such as admission forms, results, health history, financial documents, personnel records, etc. Thus, ensuring the shifting of their files from manual systems to digitized systems better organizes them and provides easier access and greater security.

The advantages of the adoption of DMS are listed below:

- Greater efficiency: simplifies the document processes and decreases manual paperwork.
- Accessibility: the search and retrieval of documents is easier, thus ensuring better information-sharing.
- Increased security: provide security for data through encryption and access controls.
- Compliance assurance: helps universities stay in compliance with the educational standards and data protection laws.
- Cost-effective: Digitalization of documents leads to reduced paper, printing, and physical storage costs.

3. DMS-case study University of Tetova

The implementation of the DMS as part of LMS at the University of Tetova has significantly improved the experience for all the actors of the university, such as students, administration, and professors. It also transformed the way activities are conducted by simplifying tasks and enhancing productivity since almost all activities are now streamlined through it, thus the time spent on various tasks is greatly reduced.

The primary goal of DMS implementation was to make students feel comfortable and minimize frustrations associated with administrative procedures as much as possible. By centralizing administrative processes and making them accessible through the DMS, students can easily navigate various tasks in a short time.

The first notable improvement is the application process for the new registrations of the students. Through the system, they can upload the necessary documents and make payments online. Additionally, course registration and access to teaching materials in electronic format have been facilitated, contributing to enhancing the quality and accessibility of educational resources. The exam process has been improved as well, providing students with all the information on exams such as the date, evaluation criteria and results in the shortest possible time. Students can access and retrieve all documents through the system, reducing the need for physical copies thus contributing to improving document management.

All these functionalities cannot be illustrated in one such study but will present one of them, the management of the exam process. UML diagrams, class diagrams and activity diagrams, present part of the architecture whereas its implementations from the perspective of the user/interface will be shown with screenshots.

The DMS not only has improved the efficiency of administrative tasks, but it also contributed to a more user-friendly and comfortable environment for students due to automated activities, simplified processes and enhanced efficiency.

3.1 The Architecture of the Exam Process : The class diagram, Figure 1., for the exam process includes several interconnected classes that play a role in managing exams. These classes include:

- **Staff:** Represents the staff members who are involved in the exam process, such as professors, supervisors, and administrative staff.
- **Administrative Contracts:** Represent the contracts or agreements that govern the administrative processes related to the staff involved.
- **Exam:** Represents the exam itself with its details, such as exam-id, exam-term, academic year, payments invoice and approved-by-person.
- **Exam Subjects:** Represents features of subjects/courses for which exams are being conducted, including information such as the subject name, course code, and status (obligatory or elective).
- **Exam Prerequisites:** Represents the prerequisites/requirements that students must fulfil to be eligible to take a particular exam, including completing certain courses or/and meeting specific academic criteria.

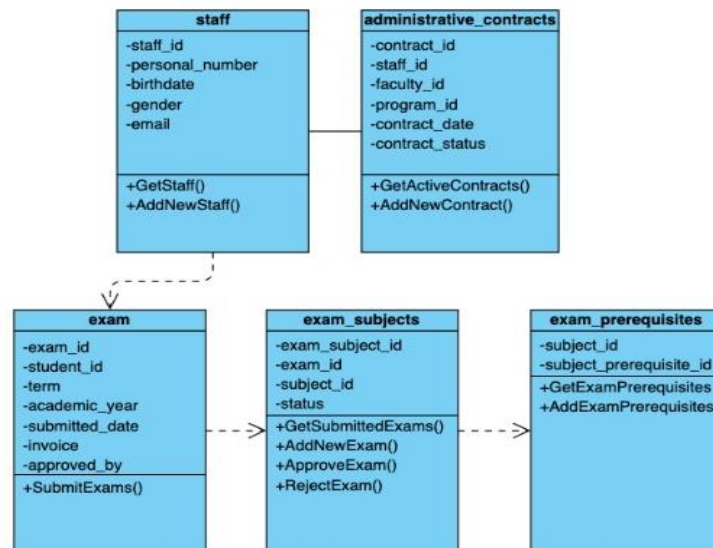


Figure 1. Class diagram of the exam application

3.2 System Implementation: The implemented system consists of several activities, as shown in Figure 2., the activity diagram. As regards the implementation/coding, the CBSE paradigm was used. Small packages/software components are built, then merged into larger software packages and tested as an assembly, software system. The interface is designed to be responsive to all devices, regardless of browser and/or devices, be it PC, tablet, mobile, etc. The main activity for the system is explained through an activity diagram, that outlines the workflow of the exam process from scheduling exams to accessing results, including activities such as selection of the exam dates, exam registration, taking the exam and viewing of the results. Visually the diagram represents the sequence of activities and decision points helping to understand the flow of operations.

- Exam Registration: Students register for exams providing necessary information and selecting the exams they wish to take.
- Prerequisite Checking: The system checks whether students meet the prerequisites for each exam they have registered for, which includes verifying that they have completed any required courses or met other academic criteria.
- Exam Scheduling: Exams are scheduled based on the availability of exam venues, staff, and other resources. The scheduling process is managed by administrative staff and is reflected in the exam schedule.
- Exam Administration: On the day of the exam, the staff members oversee the administration of the exam, making sure that procedures are followed, and students have a fair and secure testing environment.
- Grading and Results: After the exam, staff members evaluate and grade the exams and enter the results into the system, and students can view their exam results through the DMS.
- Feedback and Review: Students review the exam process and provide feedback. This feedback is used to improve future exam administrations.

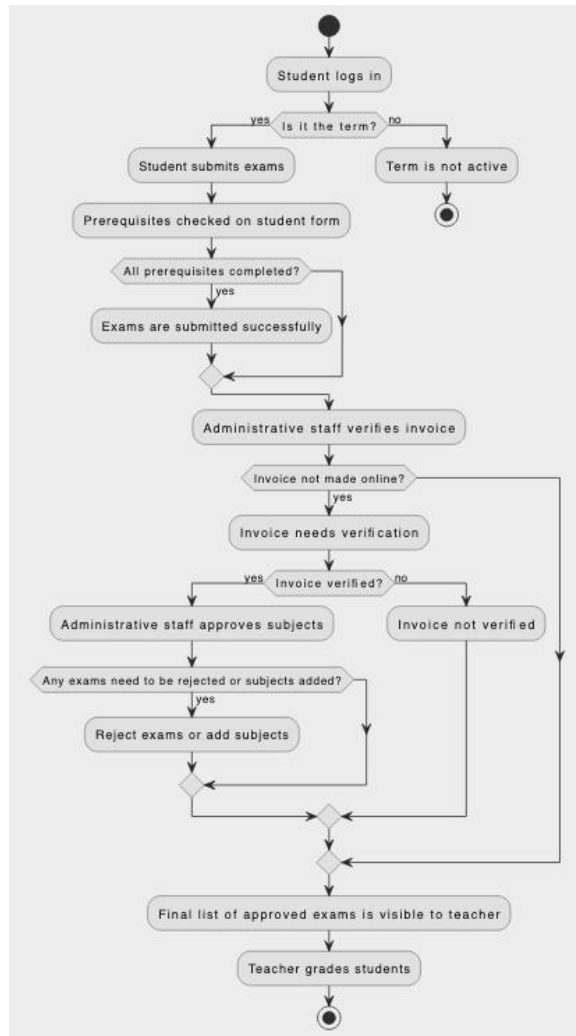


Figure 2. Activity diagram of the exam process

Below, there are screenshots of the exam scheduling interface, exam registration page, and exam result viewing section, Figure 3, Figure 4 and Figure 5. These screenshots provide a visual representation of how students interact with the system to schedule and register for exams and view their results.

Formulari | paraqitjes së provimeve | Формулар за пријавување на испити

Kujdes / Внимание

Ile ndenuar, në formularin më poshtë, selektoni lëndët të cilat i paraqitni për pjesëmarrje në provim, ndërkohë që nuk e bashkëngitni (attach) foto ose skenim të fletëpagesës përkatëse. Fletëpagesa do të dorëzohet në administratë ditën e provimit dhe duhet të jetë një fletëpagesë për të gjithë provimet. Provimet mund të paraqiten vetëm një herë. Lëndët të cilat shtohen me "X" kanë parakushte për provim dhe nuk mund të paraqiten!

Lëndët / Предмети (Qershor / Јуни 2023/24)

Selekto lëndët të cilat do t'i paraqitni. Nëse mundon ndonjë lëndë, atëherë lëndë nuk është e regjistruar/aprovuar ose nuk ka nënshkrim. Селектирај ги предметите кои ќе ги пријавите. Ако некој предмет не во листа, тогаш предметот не е запишан/одобрен или нема потпис.

- S V TEKNOLOGJË MULTIMEDIALE - O / ECTS 5
- S V RRËZAT KOMPIJUTERIKE - O / ECTS 7
- S V UEB PROGRAMM - O / ECTS 7
- S V BIZNES ELEKTRONIK - O / ECTS 6
- S V INZHINIERIA SOFTWERKE - O / ECTS 6
- S V SISTIMET E SHPËRNDARIA - Z / ECTS 4
- S V DATA MINING - O / ECTS 7
- S V IN KOMPONENTËT SOFTWERKE - O / ECTS 7
Parakushtet që nuk i plotëson: INZHINIERIA SOFTWERKE
- S V GIS - O / ECTS 6
- S V METODAT HËLLUMTIM - O / ECTS 6
- S V SISTIMET PARALELE - Z / ECTS 4

Numri i lëndëve të paraqitura për provim / Выплен број на пријавени испити *

0

Activate Windows
Go to Settings to activate Windows.

Figure 3. Exam submission form

Lenda	Euret / hendet	Semestri	Data	Ora	Sala
HYRJE NE SHKENCAT KOMPUTERIKE	AGON MEMETI	I	05.02.2024	10:00	BIBLIOTEKE
PROGRAMMI	GAZMEND XHAFERI	I	12.02.2024	10:00	AMF
GJERGJET LOGJIKE	FLORIM IDRIZI	I	07.02.2024	10:00	Biblioteka
STRUKTURE DISKRETE 1	ALIT IBRAHIM	I	15.02.2024	10:00	AMF
KALKULUS	LAZIM KAMBERI	I	20.02.2024	10:00	AMF
GJUHË ANGLEZE 1	Shpend Ademi	I	06.02.2024	14:00	AMF
PROGRAMMI I ORIENTUAR NE OBJEKTE	GAZMEND XHAFERI	II	12.02.2024	10:00	AMF
SIMULIM DHE PROGRAMMI I GJERGJEVE LO...	FLORIM IDRIZI	II	07.02.2024	10:00	Biblioteka
ARKITECTURA E KOMPUTERIVE	SHPEND ISMAILI	II	20.02.2024	10:00	LAB.1
INTERNET TEKNOLOGJITE	FLORIM IDRIZI	II	06.02.2024	14:00	LAB.2
STRUKTURE DISKRETE 2	ALIT IBRAHIM	II	15.02.2024	10:00	AMF
GJUHË ANGLEZE 2	Shpend Ademi	II	06.02.2024	14:00	AMF
BAZAT E TE DHENAVE	AGON MEMETI	III	08.02.2024	11:00	LAB.2
STRUKTURAT E TE DHENAVE	FLORIM IDRIZI	III	07.02.2024	10:00	Lab.2
ANALIZA NUMERIKE	EMIN DURMISHI	III	19.02.2024	10:00	SALLA NRP7

Figure 4. Exam schedule

Emri	OZ	Semestri	ECTS	Profesori	Afati	% akumuluar	Nota	Data e pr...	Konsultime	Vërejtje	Status	Grade confirmation
TEKNOLOGJITE M...	O	IV	5	FLORINDA IMERI	Janar / Janypaqe-20...	36	5	20.02.2024	20.02.2024 11:30		Pending	Consultation
INZHINERIA SOFT...	O	V	6	Festim Halili	Janar / Janypaqe-20...	28	5	16.02.2024	21.02.2024 10:30		Konsultime	Consultation
MËSIMI ELEKTRON...	O	IV	5	FLORINDA IMERI	Janar / Janypaqe-20...	82	9	15.02.2024	19.02.2024 09:30		Pending	Accept, Reject, Consultation
PROGRAMMI I AV...	O	IV	6	AGON MEMETI	Janar / Janypaqe-20...	91	10	08.02.2024	15.02.2024 11:00		Pranoi	Accept
ANALIZA NUMER...	O	III	5	EMIN DURMISHI	Shtator / Cerre...	95	10	15.09.2023	21.09.2023 08:00		Përfunduar	Your grade is finalized
TEKNOLOGJITE M...	O	IV	5	FLORINDA IMERI	Shtator / Cerre...	0	5	14.09.2023	18.09.2023 10:30	Abstenoi	Përfunduar	Your grade is finalized
PROGRAMMI I AV...	O	IV	6	AGON MEMETI	Shtator / Cerre...	0	5	13.09.2023	14.09.2023 11:00	Abstenoi	Përfunduar	Your grade is finalized
MËSIMI ELEKTRON...	O	IV	5	FLORINDA IMERI	Shtator / Cerre...	0	5	06.09.2023	11.09.2023 11:00	Abstenoi	Përfunduar	Your grade is finalized
SISTEMET PËR M...	O	IV	5	AGON MEMETI	Shtator / Cerre...	94	10	07.09.2023	14.09.2023 11:00		Përfunduar	Your grade is finalized
ANALIZA NUMER...	O	III	5	EMIN DURMISHI	Korrik / Jyze-2022...	10	5	18.07.2023	19.07.2023 12:30		Përfunduar	Your grade is finalized
SISTEMET OPERAT...	O	III	5	AGON MEMETI	Korrik / Jyze-2022...	93	10	17.07.2023	18.07.2023 11:00		Përfunduar	Your grade is finalized
STRUKTURAT E T...	O	III	5	FLORIM IDRIZI	Korrik / Jyze-2022...	95	10	05.07.2023	06.07.2023 10:30		Përfunduar	Your grade is finalized
ANALIZA NUMER...	O	III	5	EMIN DURMISHI	Qershor / Jyze-20...	10	5	20.06.2023	26.06.2023 11:30		Përfunduar	Your grade is finalized
GJUHË ANGLEZE P...	Z	IV	4	Shpend Ademi	Qershor / Jyze-20...	94	10	22.06.2023	26.06.2023 13:00		Përfunduar	Your grade is finalized
ETIKA NE TI	O	IV	5	EIP RUFATI	Qershor / Jyze-20...	95	10	19.06.2023	22.06.2023 12:00		Përfunduar	Your grade is finalized

Figure 5. Grade results.

4. Conclusions

We believe it is crucial to keep up with the recent technologies; particularly, in the field of education. Education institutions are looking at ways of incorporating the use of advanced technologies to help increase the quality of the learning process. Digitization takes over most aspects of life and is turning out to be quite imperative for universities.

Some of the key strengths of the DMS are the centralization of administrative processes and access via an easy-to-use interface. This saves time used in administrative work and reduces frustrations that are common with traditional paper-based processes.

Because of this, the implementation of the Documents Management System at the University of Tetova has raised the pace in various directions for efficiency, accessibility, and experiences of students, administration, and professors alike by automating many tasks and processes.

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