

ERASMUS+ PROJECT 2023-1-RS01-KA220-HED-000156660

EPIR | E-Procedure of Institutional Recognition of Foreign Higher Education Documents

WORK PACKAGE 3

WP3 - Development and improvement of IT systems for the recognition process of foreign students' HE documents

Progress Report	
Project:	E-Procedure of Institutional Recognition of Foreign Higher Education Documents
Work Package 3:	Development and improvement of IT systems for the recognition process of foreign students' HE documents
Focus Activity:	Programming phase of writing the code for a new IT tool or an upgraded software for the process of recognition of foreign HE documents as an integral part for international students integration into EHEA and partner HEIs
Report Period	October 1, 2024 to March 31, 2025
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EPIR project partners:



UNIVERSITY
OF NOVI SAD



UNIVERSITÀ
POLITECNICA
DELLE MARCHE



ROMANIA
1 DECEMBRIE 1918
UNIVERSITY OF ALINA IULIA



50 years of
University
of Split



REPUBLIC OF SERBIA
Qualifications Agency

1. Introduction

Main objective of the EPIR project is to develop and advance digital and green capabilities in the higher education sector of Serbia, Romania, Italy and Croatia by enabling the process of recognition of foreign higher education documents to be carried out in a digitalised, user-friendly and accessible way through four specific objectives:

- To carry out the digital transformation of the recognition process at project partners through new and/or upgraded IT solutions;
- To adapt and innovate accompanying institutional regulations, policies and structures to the digitalised process of recognition at project partners;
- To develop digital skills and competences of staff and students involved for the process of recognition at project partners;
- To raise awareness of the advantages of using modern technology in the provision of HE services, from the point of view of access, efficiency, cost-effectiveness and environmental benefits.

The primary objective of the EPIR project Work Package 3 (WP3) is to develop new or improve existing IT systems that facilitate the recognition of foreign higher education documents at the EPIR project partner institutions. This process will be executed through the complete cycle of system development, starting from system analysis and design, programming, and testing, to the final implementation of new or upgraded digital tools. WP3 should ensure that each partner institution carries out a successful digital transformation of the recognition process, in line with their individual needs and levels of digitalization.

Since the University of Novi Sad (UNS) currently do not use digital tools in the recognition process, a new IT solution, designed to meet the UNS specific needs and requirements will be developed in the scope of this work package.

This software system should enable candidates to submit recognition requests and accompanying documents online, simplify the tracking of the recognition process for all participants, provide more efficient reporting for institutional and regulatory purposes, and reduce the number of paper documents. The introduction of this system is expected to benefit all stakeholders involved in the recognition process.

Activities within WP3 are structured to progress through essential phases of software system development life cycle and to support collaboration and exchange of experiences between partners:

- System analysis and system design
- Exchange of IT experiences
- Programming
- Testing
- Implementing

The University of Novi Sad WP3 project team consists of two groups: a design team from the Centre for Information Technologies at UNS, primarily responsible for system analysis and design, and a development team from the University of Novi Sad Faculty of Technical Sciences, tasked with coding and software development.

The first activity of Work Package 3 System analysis and system design was finished by the October 1, 2024, The system analysis and design specifications, resulting from system analysis and system design phases, served as a blueprint for developing the system.

In this Progress Report an overview of key actions carried out in the scope of the Programming (development) activity for the period from October 1st , 2024 to March 31, 2025 are presented. The planned period for this activity is from October 1, 2024 to December 15, 2025. The main result of this activity will be a functional software for the process of recognition of foreign HE documents. All presented results obtained from these actions, align with the goals and objectives outlined in Work Package 3.

2. Overview of Activities in the Programming Phase

Coordination Meeting Between Design and Development Teams

On November 25, 2024, a coordination meeting was held between the design team from the UNS Centre for Information Technologies and the development team from the Faculty of Technical Sciences. During the meeting, a detailed analysis of the system specification was conducted, and all open questions raised by the development team were addressed. This meeting ensured that the software development could begin with a clear and shared understanding of the system requirements, and it served as a crucial step in aligning technical implementation with the defined system design.

Design and Validation of the User Interface Mockup

A mockup of the user interface design was created in October and November 2024. A mockup represents a visual depiction of a design or product in its final form. It is often used in design processes to present ideas, products, or applications before they are physically produced or implemented. Mockups are typically used to show what the final product or design will look like in a real-world context without the need for full production.

A sample (mockup) of the user interface design for the system aimed at digitizing the process of recognizing foreign higher education diplomas was implemented based on the previously developed system requirements specification. User interface samples were implemented for the roles of applicant, agency, officer, and administrator.

On December 5th, 2024 on-line meeting with the project partner from Alba Iulia was held. The Alba Iulia software for international student admission was presented to University of Novi Sad development team.

During December and January, corrections and verification of the mockup were carried out.

On March 4, 2025, the development team organized a presentation of the user interface mockup for members of the Legal Affairs Office and the design team. The presentation aimed to gather feedback and ensure that the proposed user interface aligns with user expectations.

Final version of the mockup of the user interface design (in serbian) is in the appendix of this report.

System Architecture Design

In December 2024, based on the results of the requirements analysis, the system architecture design was defined. As part of the system architecture design, the following activities were carried out: defining the system's modules and components along with their functions; determining the interactions and communication methods between the modules and components; establishing standards and guidelines for implementation; and ensuring flexibility and sustainability by anticipating potential future changes.

Also, in December 2024, the technology stack was defined, including the selection of technologies, tools, and platforms to be used in the implementation. The technology stack includes:

- Frontend technologies – HTML, CSS, JavaScript, jQuery, Bootstrap;
- Backend technologies – Spring Boot, JPA, REST architectural style for communication;

- Database – MS SQL Server relational database, MongoDB with GridFS extension for document file storage;
- Code versioning and team collaboration platform – GitLab was chosen as the platform for code management, combining version control functionality with development tools and CI/CD (Continuous Integration/Continuous Deployment) processes.

Database Design and Implementation

In January, the design, planning, and implementation of the database structure were carried out. Logical and physical database designs were completed. The physical design was adapted for the MS SQL database management system. As a result of these activities, the system's relational database was implemented.

Backend services implementation

Backend services implementation started in February. Framework initialization for API services had been done. It includes defining modules (controllers, services, data entities, basic configuration). Architectural decisions on a high level will be modular monolith architecture with a single relational database (ACID transactions) as data storage for business transactions and MongoDB (GridFS extension) for document file storage. MongoDB will also serve a purpose for user session management (token storage and token revocation) and for audit as well. Spring Boot framework is used for API services implementation.

The following functional requirements were implemented:

- User authentication and authorization
- CRUD operations on basic data catalogs

Frontend Prototype

In February, the prototype of the front-end part of the user application was implemented. The front-end prototype was developed using the Bootstrap library, relying on native jQuery and a set of ready-made JavaScript libraries. Since the backend was still in the early stages of implementation, dummy data was used for display and testing within the application prototype.

Design Refinement and User Feedback

In parallel to development, the design team organized meetings with prospective users to refine the system design. Meetings were held on: October 25, 2024, November 15, 2024, November 27, 2024, and January 17, 2025. These sessions provided valuable input for user experience improvement and refinement of the proposed system functionalities.

3. Conclusion

During the reporting period from October 1, 2024 to March 31, 2025, significant progress was made in the programming and development phase of the Work package 3 of the EPIR project at the University of Novi Sad. The design and development teams successfully completed:

- High-fidelity mockups for key user roles
- System architecture design and technology stack selection
- Database design and partial implementation
- Initial backend and frontend development
- Active engagement with users for design validation

These achievements demonstrate that the project is progressing in alignment with the defined objectives of Work Package 3- development of the system that will be functional, user-friendly, and aligned with real institutional needs.

Work in the upcoming months will focus on completing backend services, integrating frontend and backend components, testing, and preparing for deployment and training.

4. Appendices

Mockup of the user interface design in serbian language is a part of this report.