NORM IO5 REPORT

About piloting the prototype of the NORM curricula matching digital tool

Nóra Frank   Tiago Simões

Eötvös Loránd University   European University Foundation

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I.   The NORM project

The Erasmus+ KA203 strategic partnership project, called "Making Mobility the Norm" (NORM) aimed to map the existing mobility structures across European higher education institutions (HEIs) and identify the main barriers to student mobility. In order to reach this goal, as one of the main outputs (IO), the more than three-year-long project developed an online curricula matching tool.

The main aim of this IT platform is to help Higher Education Institutions (HEIs) share their course catalogues and easily find equivalences between them, ultimately strengthening the reliability of learning agreements and facilitating the recognition of credits after mobility.

The NORM curricula matching tool was implemented in the IO4 phase of the project by EUF, while the piloting phase was coordinated by ELTE in close cooperation with EUF.

II.   The NORM curricula matching tool

Platform development in IO4

The main aim of the IO4 phase of the NORM project was to develop an IT prototype, which can help Higher Education Institutions find academically compatible courses and credit equivalences in order to make the recognition of learning periods abroad easier. This IT prototype (aka the NORM curricula matching tool) was implemented by EUF.

The development of the NORM curricula matching tool included creating mock testing data in OCCAPI format, importing programme and course data from partner institutions into the NORM tool, in order that the system would be capable of designing course equivalence tables. An interactive application was also developed to help the course matching processes.

Piloting the NORM tool in IO5

The main aim of IO5 in the NORM project was to help piloting the curricula matching digital tool, which was implemented during IO4 by EUF. In order to achieve this goal, ELTE worked with a constant and close cooperation with the colleagues of EUF.

The two institutions had several consultations and meetings about the tool, its structure and functions, in order to provide that the second round of the platform implementation, which was based mainly on the feedback from partners, be even more align with the needs of the Higher Education Institutions (HEIs) and the project aims.

Feedback from the platform target group during IT development

Consultations with the members of the main target groups (such as IT colleagues or international / Erasmus coordinators) of the IT platform via meeting and trainings also helped the development of the platform. These feedbacks were taken into account during finalising the IT prototype, such as functions, filters, as well.

In order to receive feedback from those colleagues, who could be the primary users of the platform (such as international or Erasmus coordinators), an international coordinator from ELTE was also involved into one of the consultations. During the meeting, this colleague gave details about their practical work of course equivalence processes and helped the review of the platform functions, by giving suggestions related to filters, course types, expected outcomes (file formats) of equivalences, and potential benefits for the users, as well.

Online trainings

Two online trainings were also organised during IO5 to help the project partners take part in data upload processes and get to know the structure and main functions of the IT platform. These online events were provided the most important information for the institutions to prepare and take part in the piloting of the NORM IT tool. Both online events were recorded to help disseminate the information about the NORM tool piloting phase among the colleagues.

The first online training was organised on 11th May 2022 for the IT colleagues of the NORM project partner institutions. The participants learnt about the structure and main functions of the NORM tool, as well as about the OCCAPI standard and its applications, challenges during implementations, and possibilities on connecting internal services to external networks. The topics of the agenda were chosen in order to prepare all partner institutions how to upload their course catalogues to the NORM tool.

The second online training was organised on 13th October 2022 for those colleagues from the partner institutions who work with course equivalence processes (e.g. Erasmus coordinators, colleagues at international offices etc.). The main aim of the event was to give an overview for the participants about the NORM project and a brief introduction to the IT tool (functions, login, user dashboard, course catalogues, curricula matching demo).

Main functions

The NORM curricula matching tool is currently available for the partner institutions of the NORM project. There are functions that are available without login, such as course catalogues provided by the HEI project partners and the already created course equivalences. However, there are also functions, which are only available after login (and registration). For instance, creating course equivalences, editing course equivalence table data or adding messages to partner institutions are only possible for those users who are logged in to the NORM IT platform.

More details about the technical background and different functions of the IT tool can be read in the next chapters in this report (see Chapter V).

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III.   Technical needs of the IT platform development

The NORM curricula matching tool requires curricular data to be made available by participating institutions. For this purpose, the EUF has developed and published the Open Course Catalogue API (OCCAPI) specification describing how HEIs should publish their course catalogue data.

The OCCAPI specification is published at https://occapi.uni-foundation.eu/.

All issues pertaining to the OCCAPI specification are handled at the EUF GitHub repository: https://github.com/EuropeanUniversityFoundation/occapi-openapi/issues.

OCCAPI is designed to include not only information about available courses but also about the organisational units responsible for delivering the courses, degree programmes and how each course is included in any degree programmes. The main purposes of this approach are to 1) attach as much data as possible to the course proper, and 2) describe the relationships between courses and degree programmes, thus describing the actual curricula at the respective institutions. The additional context is complementary to the individual course data and helps to mitigate the lack of certain data points in any given course catalogue.

The OCCAPI specification also allows server implementations to divide the course lists based upon organisational unit and/or degree programmes, which can help to mitigate the strain to which a server may be subject due the large amount of data, while simultaneously allowing client implementations to fetch subsets of data more conveniently.

The NORM tool is designed to strictly read and import data from sources that implement the OCCAPI specification and, as such, leverages the features described above to collect as much information as possible and retain the curricular structure exposed in a course catalogue. Data is imported into the NORM platform by administrators after a data source has been validated. From that point onward, data is available to all users of the platform and may be progressively updated.

Since course catalogue data is scoped to the respective HEIs, and so are the user accounts, users can only effectively use the NORM tool if their own institution has published their course catalogue following the OCCAPI specification, and the data has been imported into the NORM platform.

IV.   Technical background

Technical description of the NORM platform and the NORM tool

The NORM platform at large includes course catalogue data management based on the OCCAPI standard, content management features that power the curricula matching process (in the form of course equivalence tables), as well as the feedback system and the User Guide, and also user management features that allow to create editorial teams to curate the content on the platform.

The NORM platform is built with Drupal, an enterprise grade Content Management System (CMS), which is Free and Open Source Software (FOSS) and is written in the PHP programming language. Besides the Drupal core software, the NORM platform relies on additional components, known as contributed modules, which are published and maintained by the Drupal community and available on

the project's website https://drupal.org. Both Drupal core and the contributed modules used in the NORM tool receive regular updates, including security updates, provided by the Drupal community.

In addition to the above, the NORM tool also relies on specific modules published and maintained by the European University Foundation (EUF). These include features that are specific to use cases in the fields of Higher Education and student mobility, such as data models for HEIs and organisational units as described in the Erasmus Without Paper (EWP) General Purpose API specifications, data models for courses and degree programmes as described in the OCCAPI specification, and Single Sign-On (SSO) capabilities compatible with the MyAcademicID standard.

Furthermore, the NORM platform includes custom built components, which deal exclusively with features specific to the NORM tool. These components are also built as Drupal modules, written in PHP and following the coding standards and best practices of the Drupal framework.

The NORM tool in particular is built upon the React framework, written in JavaScript, in the form of an embedded application inside the NORM platform. This choice of technology stems from the high complexity of the curricula matching process and is geared towards better usability of the tool.

OCCAPI server implementations

HEIs participating in the NORM project were asked to provide access to their course catalogue data by way of implementing the OCCAPI standard. This was the subject of the first training session in IO5 where an open technical discussion took place among the relevant stakeholders, IT professionals at the partner institutions.

The implementation of the OCCAPI standard was fully carried out by Eötvös Loránd University (ELTE) and Aristotle University of Thessaloniki (AUTh), while the other partner institutions encountered several issues that prevented a timely implementation. For the purposes of testing, the EUF provided a tool with minimal capabilities that allowed other institutions to manually provide a subset of course catalogue data to be imported into the NORM tool.

The matter of OCCAPI standard implementation generated valuable insights regarding the different types of systems for course catalogue management in use at different HEIs, as well as conceptual and structural differences that only became apparent at the stage of technical implementation. Specific technical issues were briefly discussed, but were deemed not especially relevant considering the vastly different systems used across the participating HEIs.

There were several generic issues identified during the discussions with the IT teams and other representatives from the partner institutions, ranging from technical limitations and missing data points to lack of available resources or even access to underlying components of the respective systems.

The systems in use at different institutions can be vastly different from one another. Some HEIs actively develop their own systems in house while others rely on bespoke legacy systems or depend on commercial software. The use of commercial software can usually result in vendor lock-in, meaning that the implementation an extra feature, such as publishing course catalogue data in OCCAPI format, can only be carried by the software vendor, which may or may not be able to develop such functionality at reasonable cost. Legacy systems often present the same kind of challenge, whereby implementation

of additional functionality may require wide ranging changes to the software, which cannot be reasonably accomplished.

The obstacles identified above also hold true for implementation of connections to the EWP network, the fundamental differences being on one hand the mandatory character of such an implementation, and therefore a clear institutional mandate for it, and on the other hand the existence of service providers that can bridge this gap. Since the OCCAPI standard is still under active development and open course catalogue availability is not yet fully required of the institutions, this sort of implementation faces additional hurdles which must be taken into account.

In the cases where implementation of the OCCAPI standard was indeed possible, the issues identified were greatly related to 1) availability of specific data points, especially regarding classification of fields of study at the course level, 2) multitude of data sources requiring significant effort to compile all data into one consolidated data set and 3) performance issues when dealing with vast amounts of data, in particular when including long text fields such as course descriptions and learning outcomes.

Manual collection of data for testing purposes

In order to widen the pool of test users, the EUF provided a rudimentary data collection system that allowed partners who could not move forward with the complete OCCAPI implementation to provide sample data sets. This process required not only manual work from the side of the partner institutions but also additional processing and verification by the EUF, deeming this approach very inefficient for the regular functioning of the NORM platform.

V. Structure of the platform

The NORM platform is generally structured around course catalogue data provided by the participating institutions. Course equivalence tables generated by the users and documentation covering all relevant features of the platform in general and the curricula matching tool in particular.

Access to the platform

Access to the NORM platform is done via a Single Sign-On solution, which is MyAcademicID in the production version of the platform (the EUF operates a similar system in the testing version of the platform). This solution allows any users with valid credentials at their HEI to access the NORM platform and make use of its functionality. However, since MyAcademicID carries the institutional affiliation of the user, the corresponding user account in the NORM platform will also be tightly associated with that HEI, meaning that if the HEI has not provided their course catalogue, the user will not be able to generate any content using the NORM tool.

In accordance with the relevant regulations, an account can be deleted along with its content.

Course catalogue data

All course catalogue data is primarily indexed by the institutions that provide it. The focus is on showcasing degree programmes offered at a particular HEI, highlighting data, such as field of study, qualification level, duration and ECTS credits, and from there listing all related courses. Conversely, courses also refer to related degree programmes, exposing as much information as possible about that relationship, in addition to the data points describing the course itself. For performance reasons, not all course data available in an OCCAPI implementation is stored on the platform: some optional long form fields can be read directly from a remote API, should a user require detailed information about bibliography, teaching method, etc.

The ability to easily present a structured course catalogue is extremely important to enable the user to begin the process of matching courses once it is determined that sufficient information is available on the platform.

Course equivalence tables

Curricula matching is achieved in the form of course equivalence tables, which can be created by any user with the help of the NORM tool. These tables gather individual course equivalences and also allow to attach some useful metadata and feedback for future reference by other users.

Course equivalence tables are user generated content and do not hold significance by themselves, instead providing a useful way to compile information that can then be used for other purposes, be it preparing learning agreements in the context of student mobility or planning mobility windows in the context of curricular design.

Feedback tools

The NORM platform provides basic feedback functionality on user generated content, allowing its users to discuss issues related to any course equivalence table and keep track of that discussion. This is meant to add context to the user generated content, allowing other users to better understand the logic behind matching and better evaluate if the content is fit for their purposes.

Documentation

The NORM platform includes its own User Guide, which covers every type of activity that can be carried out on the platform: login / registration, exploring course catalogues, creating and managing course equivalence tables, providing feedback and exporting content. Since the User Guide includes visual support in the form of screen captures, any changes to the platform workflow or interface can quickly be reflected in the User Guide throughout the platform lifetime.

Advanced features reserved to platform managers and administrators are documented in the relevant administration panels, while technical documentation can be found in the software repositories and is also included in the code.

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VI.   Case studies

For the purpose of testing the NORM tool, a few case studies were produced in order to outline the required functionality of the platform.

Student preparing mobility

A student is interested in going on an Erasmus+ mobility period.

The student visits the NORM platform and explores the course catalogue.

The student finds multiple possible destinations.

The student uses the NORM tool to match courses from their institution to courses available in different partner institutions.

The student finds an appropriate set of matching courses at a partner institution.

The student creates a course equivalence table on the NORM platform.

The student shares a link to the table with their mobility coordinator.

The mobility coordinator reviews the table and recommends it as a base for a learning agreement.

The student initiates their learning agreement based on that table.

Mobility coordinator reviewing equivalences

A mobility coordinator reviews a course equivalence table built by a student at their institution.

The mobility coordinator uses the NORM platform to see details of the selected courses.

The mobility coordinator requests feedback from the coordinator responsible for credit recognition.

The coordinator responsible for credit recognition reviews the equivalences and provides feedback.

The mobility coordinator makes recommendations to the student based on collected feedback.

The mobility coordinator makes a copy of the student's table to use as a template in the future.

VII.   Testing

The implementation of the NORM curricula matching digital tool was based on the need to help Higher Education Institutions to easily and seamlessly share their curricula and course catalogues and find equivalences between them, as it was written in the project application. The NORM prototype online tool was designed to serve these needs; to provide a platform for course catalogues where – with the help of a personal profile after registration – HEI representatives can create course equivalences. Due to the development process, the platform and its functions were customised based on the feedback of colleagues from IT departments (whose colleagues contribute to uploading courses to the system)

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and international offices (whose colleagues deal with course equivalences on a regular basis as part of their work).

However, the main target group of the piloting and testing phase consisted of the colleagues from the project partners; those who cooperated throughout the project implementation. They checked whether the prototype NORM curricula matching tool meets its original purpose; is it really a platform where HEI staff members can register, find or upload course catalogues, and create course equivalences.

Representatives of the project partners could try out and test the NORM IT platform. Due to the delay caused by the slow course uploading process from the partner institutions, this was the first occasion when the platform was available for testing. During the LTTA in Alcala, the participants and project partners received a demo presentation about the tool and the course equivalence process by the colleagues of EUF. With this guidance, they could simultaneously try out the functions of the platform on the spot.

Feedback from colleagues were collected via online, as well, their insights by answering of an online questionnaire. Colleagues from the University of Marburg and the University of Barcelona took part in this testing of the platform. Due to the low number of answers, the results cannot be regarded as representative for the whole partnership, however, the feedback can still serve as an important guidance for the further development of the platform.

During the testing, the participants had to register on the platform, create at least one course equivalence, and they had to send a message to a partner institution through the NORM platform about a course equivalence. All the participants were helped by a detailed user guide, which contains descriptions and visuals about the login, functions, and the steps of making course equivalence tables. Shorter instructions are also available in the platform itself.

Testing results, such as feedback and suggestions about the platform were collected with the help of an anonymous online questionnaire, which contained questions about general impressions, usefulness and helpfulness for the daily work (for a university staff member), about the registration process and the available course catalogues, as well as the manageability of the different functions, such as creating a course equivalence and communicating through the platform with a partner institution about a given course equivalence. International / Erasmus+ / incoming coordinators took part in this testing.

The general impression of the NORM platform is fairly positive. Although one participant highlighted that it is still obviously a prototype, with not many "extra" features and options, the majority of the answers found the tool intuitive, which is on a very good track. That is why half of the answers marked option 3 (in a 5-grade-scale, where 1 meant "not at all" and 5 meant "extremely useable"), while the other half of the answers found the platform extremely useable. Although it means that in average the platform received a 4 in the scale of answers, there are still functions to invent in order to make the NORM curricula matching tool even more user friendly. All of the colleagues who took part in the testing would recommend the tool for others.

Registration and login seemed quite easy for the users; the result of their answers is 4.5 on a 5-grade scale (where 1 means "not at all" and 5 means "extremely easy"). Though it should be noted that the current login and identification system is not the final version; MyAcademicID is only used during the testing phase of the platform.

Although it is not difficult to find the course catalogue in the system (75% of the answers claimed it "extremely easy" and 25% found also very easy), it seemed more complicated to the testers to create a course equivalence. (On a 5-grade-scale, 25% of the answers marked option 3, 25% of the answers marked option 4, while 50% of the answers marked option 5 – where 5 meant "extremely easy".) Communication and message sender functions also seemed a bit problematic according to the feedback; 50% of the answers chose option 3 (easy), while 25%-25% of the answers chose option 4 (very easy) and 5 (extremely easy). This means that in average the communication feature of the platform received a 3.75, which indicates that further development and more detailed instructions are needed to this function in the future.

In general, the testers found the registration and login process very easy, besides, course catalogues were also extremely easily available for them. Comments and feedback for further development relate to the course equivalence processes and the information sharing with the partners. The comments from the testers highlighted that "more 'explanatory' pages and features would need to be included either in the tool itself or an expansion of the guide", especially regarding the course equivalence making process and messages sending functions in the system (e.g. in order to make it more clear how the course equivalence tables and messages can be shared with the partners).

VIII.   Results and conclusion

Terminology for categories and filters

The piloting phase showed some challenges related to the platform development and data updates. One is the difference among the terms, such as modules, subjects and courses, which can be used differently in HEIs. The NORM IT platform concentrates on courses. Thus, even though an institutions has learning modules, still should use and upload courses into the platform. Only the same interpretation can provide adequate data source for making valid course equivalences. These terms should be clarified among institutions before starting the creation of course equivalences in the platform (or even before staring the upload of the courses).

IT background and requirements

Technical obstacles also made it difficult to start the testing of the platform. HEIs have different IT systems and regulations related to data protection and useable IT solutions. The course upload was only possible with transferring the data into that form, which can be used in the NORM IT platform. This required an active contribution from the IT colleagues of partners. Without this IT process, the courses cannot be uploaded into the system. If an institution does not have the source data in the required form or not allowed to use another IT systems to transfer these data, they cannot upload their courses and use the tool. This process affected the piloting phase, too. Some institutions had difficulties in uploading their courses, thus, the testing phase could only start month later as the originally planned tests. As a conclusion, all participating institutions have to be aware their own institutional regulations before starting use the NORM curricula matching tool.

Language of the IT tool

Similarly to the clear terminology, use of the same language in the NORM curricula matching tool is also essential. The platform was designed in English; all the functions, filters and explanatory materials can be found in English there. Since the English language is a "lingua franca" and it is one of the most commonly used procedural and working languages in the European Union; besides, English was the working language of NORM, the project also chose English to reach as much users as possible in the future.

Not only the names of the courses can be found in the platform, but a field for a short course description is also available, though, giving an explanatory course summary is not compulsory. All the course titles and descriptions should be added in English in the system to make the course equivalence making processes easier and faster, without spending time with translation, as one of the comments from the platform testers also highlighted.

Further development and sustainability

In general, the NORM curricula matching platform seems an innovative and useful tool for creating course equivalences, which can help strengthen the reliability of learning agreements and facilitate the recognition of credits after the mobility. Due to further development and improvement based on the results of the pilot phase, the platform can become even more user friendly and can make the creation of course equivalences faster.

The NORM digital tool can hopefully contribute to the course equivalence processes in the future not only for the project partners but for other HEIs, as well. As the number of participating institutions, as well as the number of courses and course equivalences increase, a constant IT backup and support is needed from the maintainer of the platform. Besides, the user guide should also be updated according to the newly appearing questions and needs.

As the IT background of the NORM curricula matching tool can make it enable to connect this platform to other systems or databases used in the Higher Education Institutions, this can be a more distant perspective. For instance, mapping the possibilities for connecting the platforms of the EWP initiative with the NORM digital tool could also be one of the next steps.

The NORM curricula matching digital tool already has a result that goes beyond the scope of the NORM project. Based on the IT developments that were essential in order that the relevant courses – which are open for the students taking part in mobility programmes – could be uploaded to the NORM platform from the institutional system (Neptun), Eötvös Loránd University developed a new webpage, as well. On this site, which is available in Hungarian and in English (https://neptun.elte.hu/mobilitycourses), all those courses can be found without login, which are open for mobility students. This can be extremely helpful for the students when they are considering ELTE as a hosting university and later during the preparation of their Learning Agreement.