



EMREX

HANDBOOK



EMREX handbook

(for administrators, coordinators etcetera)

Field Trial on the impact of enabling easy mobility on recognition of external studies.

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SUMMARY

The wait is over! Electronic result exchange is here!

EMREX is the solution for electronic transfer of student records between higher education institutions in Europe. **EMREX** will facilitate electronic transfer of study performances from the host university to the home university, induced by the student. The biggest benefit of **EMREX** will be the increased availability, quality and reliability of information about student records of achievements. The process will make it easier for the student, easier management of the institution, less risk of falsified certificates and larger share of crediting.

The **EMREX** field trial will promote higher attainment level to student mobility in higher education and also encourage more effective recognition of prior learning and avoid overlapping studies. In the first phase the transfer will be set-up between four Nordic countries and Italy.

The solution and its impact on enabling mobility will be evaluated by the University of Warsaw. The evaluation will include surveys and interviews with students, mobility coordinators and administration.

The partners in the **EMREX**-Project are from Denmark, Finland, Norway, Sweden, Italy and Poland but **EMREX** is meant for all of Europe, and upscaling will go on from 2017 and onwards. The solution will be available through free sharing of the source code. Standardized components developed in the project will also be available.

EU and national policy goals

The **EMREX**-project addresses both the EU 2020 target, as well as similar national policy goals of the countries participating in the proposal. Several European initiatives see student mobility as an important strategy for improving education and employability. "Youth on the Move" encourage students to take advantage of EU grants to study or train in another country, as a way to increase youth employment rate. "Education and Training 2020" has as one of its main strategic objectives to make lifelong learning and mobility a reality, and mobility is an essential part of achieving the Lisbon strategic objectives.

The **EMREX** project has a significant potential in realizing both the EU 2020 target and the national policy goals to increase student mobility. The **EMREX** will have full effect only if accompanied by some national policy changes, e.g. standardization of the national procedures for the student administration or further development of the institutional or national student information systems. The project partners are well suited for supporting such policy change: some of the project partners manage national consortia for student information systems, and all of the partners have long experience in national cooperation in developing services and facilitating national procedures. The **EMREX** cooperation has also the potential to strengthen and reconceptualise the notion of national IT-solutions in the participating countries.

The **EMREX**-project gained official support from the government of the project partners. Their involvement is ensured through commitment to the international **EMREX** Steering Group. The members in the Steering Group represent governments or other national bodies in the participating countries. The objective of the Steering Group is to monitor the project as well as to make sure that the results of the **EMREX** project will be sustained after the end of the project. Another objective is to ensure a continuous up-scaling of the **EMREX** results (both the technical ones e.g. Student Mobility Plug-in and National Contact Point, and the administrative ones e.g. the information packages and marketing material) and to help new countries and universities implement the **EMREX** platform within the EU and beyond.

The EMREX project

The full title for the **EMREX** project is: Field trial on the impact of enabling easy mobility on recognition of external studies. This is a three years project, running in the period 2015-2017.

The **EMREX** field trial aims at testing new ways of making the administration of student mobility easier, and thus promoting higher attainment level to student mobility in higher education. It also aims at encouraging more effective recognition of prior learning and avoiding overlapping studies. The recognition of external studies is a measurable function that can also be evaluated. In the first phase the trial will be set-up between at least three Nordic countries and Italy.

The following institutions take part in the **EMREX**-project:

- CSC, IT Center for Science Ltd, Finland (Coordinator of **EMREX**), CSC
- IT Department of the Ministry of Higher Education and Science, Denmark, UFM
- KION, Italy, KION
- FSAT, University of Oslo, Norway, FSAT
- University of Warsaw, Poland, UW
- The Ladok Consortium, Sweden, Ladok
- Swedish Council for Higher Education, Sweden, UHR
- Umeå University, Sweden, UMU

Please note that the **EMREX** project is neither an IT project as such, nor is the project aiming at developing a new system. The solution utilizes existing infrastructure (e.g. user authentication, authorization, data warehouses etc.).

After implementation of the solution the electronic transfer of the student achievement is initiated by a student's approval through the Student Mobility Plug-in (SMP), installed in the student web at the home university. The student records are then fetched from a platform, EMREG register. The EMREG register receives and sends information on academic records from the National Contact Point (NCP). The transfer requires only current contracts between the HEIs and the actual centralized administration will be used.

What are the benefits?

Support Student Mobility

Recognition of studies is a major obstacle for student exchange. When the student applies for studies, the institution needs information about previous studies to check admission requirements. In the case of recognition, the institution needs this information to check previous studies in relation to the study the student have been admitted to.

The situation today is to some extent a bit obscure. Each institution has different procedures to provide result information (Diplomas, Transcripts of Records, etc.), and the same is the case for the delivery of this information. The student has to obtain these documents, and submit them to the institution where he or she has applied for admission or recognition. In many cases, the student also has to obtain textual descriptions of the qualifications and modules included in these documents. The receiving institution has to receive these documents, check for any cases of possible forgery, and register details in its administrative systems. All this has to be done before getting to what is the actual purpose with collecting this information, i.e. to check the students' qualifications.

The most obvious outcome of **EMREX** is providing functionality for exchanging results between institutions, based on the students' consent. **EMREX** will give the student a much easier and a standardized way to hand over his or her assessments from the foreign institutions. **EMREX** provides result information about previous studies, which can as well include textual description of each qualification, program or module the student has achieved. This information is crucial for the institution in the admission or recognition processes. **EMREX** gives the institution the opportunity to import data about external results directly into their administrative systems, in a secure and trustworthy way. And the information will be ready to use for the check of the students' qualifications.

The solution will be based on common procedures, simplifying the exchange of information both for the student and the involved institutions. This will be a more secure and transparent solution for the student, giving him or her direct access to the flow of information. For the institution, many of today's manual procedures will become obsolete, like receiving paper copies of the documents, registering information and checking for possible cases of paper forgery, archiving, etc.

Automatic recognition

The process of recognition of external education is time consuming and expensive. The recognition requires information on studies completed by the student, as well as the comprehension of the study content. For countries with a highly automated administration, the administrative costs of handling students with results from foreign countries, compared to students with results from own country or own institution, is relevantly higher. It is therefore possible to cut costs by looking more deeply into these processes, with a goal to automate them.

In many countries, the education structure is standardized, and within some countries there exists an exchange of information between institutions. There will typically exist national classifications of programs and modules, which are used as part of the recognition process. Information that is needed to handle recognition is thereby present.

For institutions across borders, the exchange of assessment data is limited. Most information is exchanged using paper documents. Some supranational classifications exist, and these are important in an automatic recognition process. These should be connected to each qualification, program and module, for the purpose of exchanging information.

Automatic recognition requires a number of conditions that have to be fulfilled:

1. The information about the single student must be brought into the system where the recognition is to be handled.
2. The information must be in the form of data, not documents. For instance a PDF or Word document could not be used directly in such a process without some human interaction.
3. The exchange of data must be done with the help of standard formats, to enable the receiving systems to understand and handle these data.
4. We need to have sufficient standardized information to carry out the automatic recognition, information that can be used in the automatic process. Such information exists to some extent, like ECTS credits, different kinds of classifications and information about number of hours for

types of lessons.

5. All parties must agree on this information.

EMREX provides a standard way to exchange information, with a format all the partners have agreed on. The **EMREX** clients can send the **EMREX** data directly to the SIS at the institution, and the data can directly be part of an automatic recognition process.

EMREX will to some extent include common data that can be used in automatic recognition, like ECTS credits and ISCED codes. The work with this kind of data will probably be the most important further development of ELMO. Further development will as well presuppose new standards and new classifications, both on a political and practical level.

With **EMREX**, some of the recognition process can with little effort be handled automatically, or semi-automatically. The rules for recognition are often not made for computer handling. To provide more advanced functionality for automatic recognition, more work has to be done locally at each institution, to prepare the rules for automatic handling.

Learner Mobility Statistics

Mobility at the institution is administrated either by its SIS or by a mobility administration system. These systems will also be the main basis for Learner Mobility Statistics.

EMREX as such does not provide better statistics for student mobility. But it can be a part of a larger whole to improve the data foundation for such statistics. For instance together with the planned outcomes of Erasmus Without Paper project.

EMREX offers quality data to improve and simplify the recognition process, both for assessments and recognition in general. A successful **EMREX** will standardize the data that is part of these processes, and in the next phase cause a standardization of the process itself. This will directly give us comparable data about recognition and thereby a foundation for better statistics of the part of student mobility concerning recognition of external education.

The European Commission gathers extensive statistics about Erasmus student mobility for studies and for placements. The statistical data about student mobility for studies cover some of the following areas: outbound study exchanges, inbound study exchanges, subject areas and languages of study, study duration, study grants, students receiving special needs grants, zero-grant students, work-placements combined with studies and last but not least average expected ECTS credits.

The statistics is based on monthly reports from each European country. The data are registered in each country and reported separately, as there is no technical integration between the student information systems or the mobility administration systems across Europe. The **EMREX**-data will thus provide collection of consistent data for all the countries participating in the network.

Another source of data about the recognition practice and the recognition process are online surveys promoted via ESN and different other stakeholders such as National Agencies of the Lifelong Learning Programme, universities and other supporting associations. The data gathered through surveys depend on the respondents' will to answer the survey. As a result, some of the surveys are not able to draw conclusions due to the insufficient total number of respondents. The **EMREX**-data will provide a foundation for much more complete statistics.

Analysis of the statistics will have the potential to unlock significant value by stimulating the following development:

- Extended degree of knowledge about the recognition practice in the **EMREX**-countries.
- More focus on the always present need of quality assurance for the process of recognition.
- The transparency of the statistical data will potentially lead to more open procedures in the recognition process and ensure uniform standards for the process.
- Ensuring equal treatment of the recognition cases and in the admission process.

EMREX is a turnkey solution for connecting existing systems: as it is an easy tool to implement locally, students authorize the transfer (no new contracts is needed) and local infrastructure is utilized (data warehouses, authentication).

Upscaling and future possibilities

The partners in the **EMREX**-project are from Denmark, Finland, Italy, Norway, Poland and Sweden, but **EMREX** is meant for all of Europe, and upscaling will go on from 2017 and onwards.

EMREX is meant to be scalable in that each country joins the network through creating their own HEI clients and contributes to the network by providing their own NCPs. The idea behind **EMREX** is to have a system with as little central administration as possible. This means that the responsibility for the network falls on each participating country.

All communication in **EMREX** is peer-to-peer. Once an NCP is registered in EMREG, any HEI client can contact this NCP and establish a link. This way, there is no traffic through a central hub and therefore no bottleneck. **EMREX** will therefore easily scale as more NCPs and clients join the network. The **EMREX** project will provide examples of both clients and NCPs. However, some local implementation is required. All of this is explained in the **EMREX** Wiki. At this point it is hard to specify the extent of work that is actually demanded of the countries/institutions, who want to join. Large parts of the functionality in the **EMREX** clients will be shared components (the SMP part) for everyone to use, but some weeks of work will be demanded to make it function in a new environment. The NCP demands data sources (SIS or Data warehouse) that can deliver result data in an ELMO-format (perhaps first converting it) and – if possible – a description of these results. Depending on the technical development environment, the NCPs made by the **EMREX** partners will be a good base to build a new NCP.

In general, all code developed in the project, is open source.

One of the key features of **EMREX** is that the network will provide a way to transfer result data from a source (typically an institution) to a destination (also typically an institution) in a secure and trusted manner. However, if **EMREX** proves a viable solution, there is no reason why it cannot be applied to other processes that involve transfers of results for example a potential employer or a diploma registry of some kind.

Practical guide

Technical guide for HEIs

This section is a description of what technical parts needed from the HEI.

The **EMREX** project consists of several components. The idea is that they should be as independent of each other as possible. In this way, it will be easier to add new participants to the network. This is what technical parts you will need and which standards to use:

1. EMREX-Client / Student Mobility Plug-in - SMP

Each SIS or institution, depending on local implementation, that wishes to fetch results via the **EMREX** network, must implement a client. This client must provide the following functionality:

- Provide the student with a secure login.
- Enable the student to select which country they wish to fetch results from.
- Direct the student to the selected country.
- Display results that have been fetched.
- Provide a way to store the results in the local SIS

To make the implementation of the client easier, the **EMREX** project will be providing examples and a Student Mobility Plugin (SMP). The SMP is a library service that offers functionality to support the transfer of results.

2. National Contact Point - NCP

Each country that wishes to provide results to the **EMREX** network, must implement a NCP, or a number of NCPs, that will enable an **EMREX** client to fetch results from the given country or HEI. The NCP must provide the following functionality:

- -Provide the student with a secure login / authentication.
- -Enable the student to select and fetch their results from the desired HEI.
- -Return the selected results to the **EMREX** client.

To make the implementation of the NCP easier, the **EMREX** project will be providing some examples.

3. EMREX Registry - EMREG

EMREG is the only central component of **EMREX**. It contains a registry of available NCPs and how they can be contacted (URL). The registry is exposed through Web Services. Currently, the registry is hosted by the Norwegian partner.

4. Standards

The **EMREX** network will use the ELMO [ELMO] format to exchange the results. The specification of ELMO was established by CEN Workshop for learner technology (CEN WSLT) to drive the implementation of the two new CEN standards:

- EN 15981 European Learner Mobility – Achievement information [EuroLMAI]
- EN 15982 Metadata for learner opportunities – Advertising [MLO-AD]

These two standards describe data models. EN 15982 is a data model for learner opportunities, like study program, course, module etc. EN 15981 is a data model for assessments, modelling the information we will find on diplomas, transcript of records and Diploma Supplements. These specifications were developed by CEN WSLT, and the standards were prepared by CEN/TC 353 Information and Communication Technologies for Learning, Education and Training.

ELMO is still not a standard as it is undergoing some changes to better support the result exchange in **EMREX**.

The ELMO format is an XML format that has support for assessment information included in Diplomas, Transcripts of Records and Diploma Supplements. It also covers descriptions of the qualifications, programs, courses and modules for these assessments. This is information needed in admission and recognition processes.

Security

One of the important features of **EMREX** is the quality and reliability of the data. In order to ensure this, it is important that the transfer of data is done in a safe way. We are taking several steps towards securing the **EMREX** data transfer:

- Double login: The student must log in, using secure login, in both the **EMREX** client and the NCP.
- Enforcing HTTPS: **EMREX** will be enforcing the use of HTTPS to transfer data.
- Digitally signing the ELMO data: **EMREX** will use signatures for the ELMO data to ensure that the NCP is a valid one. The public keys are stored in EMREG.
- Verification of student: Since a student has to log in on both sides of the transfer, we can validate whether it is indeed the same student. We validate on gender, date of birth and name. Since name can be written differently in different countries, we use a Levenshtein algorithm with threshold to check the name.

In addition, the data is never “touched” by the student, meaning that the data cannot be tampered with.

Step by step guide for administrators informing students

The process is initiated by an **EMREX** client at the individual HEI. This will typically be an application where the student is asked to provide assessment information from other HEIs, for instance when applying for studies or recognition. The whole guide can be found in appendix I.

Field Trial and how to join

Technical set ups

To join **EMREX**, the information systems at the universities, and the technology used for authentication, interfaces, APIs, etc. must be ready to connect to such a network without extensive changes. For the five countries taking part in the **EMREX** field trial, connecting to the **EMREX** network can be done within reasonable costs, which equals a few months of work. Figure 1 shows the overall architecture within each country.

Denmark

The technical solution are planned to be ready by June 2016, which Means that a Danish National Contact Point along with the necessary services in STADS are being made enabling us to send results to other **EMREX**-countries. Hopefully a standalone Student Mobility plugin will be set up, so that Danish mobile students will also be able to initiate transfer of results from the other Nordic countries and Italy.

- One SIS - STADS - for all universities.
- One SIS - SIS - for all university colleges.
- One SIS – EASY – The Academies of professional higher education are changing to SIS during 2016.

National ID federation for education: WAYF. In addition, Denmark has a national ID service for the whole population. The digital application system used by the universities - DANS (Digital ANSøgning) - has a module – INT – which registers students going out of the country. This module will function as a self-service module – the Danish HEI-client – to which the SMP is connected.

Finland

Finland has a national data ware house called Virta. Virta will be the data provider for the NCP. Finland has a national ID federation for education: Haka. In addition, Finland has a national ID service for the whole population. Finland has a number of SIS. They report their results to Virta, and will not be directly involved in the export of results to the NCP. For the field trial Finland will have one stand-alone SMP, which participating HEIs can use.

The Field Trial in Finland will start in January 2016 and continue until end of February 2017. Development work of the **EMREX** solution was ongoing during fall 2015.

Confirmed Finnish HEIs taking part in the field trial:

- Hanken School of Economics
- Åbo Akademi University
- Häme University of Applied Sciences.
- Oulu University of Applied Sciences
- Helsinki University

Italy

Italy has one SIS - ESSE3 - used by the greater part of HEIs in Italy. ESSE3 will be the data provider for the NCP. The NCP will be hosted by KION. Italy does not have a common ID service for education, and study records will therefore be gathered directly from each HEI, letting the student log in directly to the local SIS (ESSE3). The assessment information will be returned from the local SIS. KION will develop an **EMREX** client connected to ESSE3, for use by the students that need to deliver assessment information to the Italian HEI.

Developing of National Contact Point (NCP) and Student Mobility Plugin (SMP) started in December 2015 and end by February 2016.

Norway

Norway has one SIS - FS - used by all state financed HEIs in Norway, and a number of private institutions. FS will be the data provider for the NCP. ELMO has already been implemented in FS, both import and export. The ELMO export-functionality will be used for extracting information to the NCP. Norway has one ID federation for education: Feide. In addition, Norway has a national ID service for the whole population: ID-porten. ID-porten was connected to the Stork2.0 federation in September 2015.

Studentweb is a self-service application for students, connected to FS. Studentweb is in use by all HEIs

The process is initiated by an **EMREX** client at the individual institution. This will typically be an application where the student is asked to provide assessment information from other institutions, for instance when applying for studies or recognition.

Preparations for the HEIs that has joined the EMREX project

- It is required that you are able to assist and guide students when logging and when they have queries concerning **EMREX**.
- It is also required that you monitor the students' process when using the functionality to observe possible errors.
- You need to prepare your local IT-department including the IT-helpdesk for students
- Academic staff at your institution must be informed the project and to whom to refer the students when they have questions.

EMREX warmly welcomes new institutions interested in taking part in the field trials and development work of the application.

Evaluation

The solution and its impact on enabling mobility will be evaluated by the University of Warsaw. The evaluation will include surveys and interviews with students, mobility coordinators and administration. The field trial will provide measurable data on the rate of recognition that can be analyzed and used for improving the national policies on student mobility.

- The analysis of **EMREX** impact on mobility rates and recognition rates. The study will be based on administrative data. Data on student mobility will be collected for the period of the field trial and compared with the statistic for preceding periods. Comparison of results for HEIs taking part in the trial and HEIs not taking part in the trial will be used to measure the **EMREX** impact on the student mobility.
- The analysis of students' opinion on SMP combined with the analysis of SMP. After finishing the import of records with SMP students will be asked to participate in a short survey. The survey will concern SMP's ease of use, look and feel, speed etc. The opinion study will be supplemented with the analysis of SMP logs.
- The students' opinion survey. The survey will be conducted during whole period of the **EMREX** field trial. It will be addressed not only to **EMREX** users but to all mobile students. Its main goal is to gather students' opinion on the academic achievement recognition process and the administrative burden associated with it. The questionnaire will also include questions regarding knowledge of **EMREX**, opinion about it.
- The qualitative study among mobility coordinators and administration. A series of in-depth interviews with administrative personnel responsible for recognition of foreign studies is planned. Because of their duties those people tend to have broad knowledge of student mobility and the process of academic achievement recognition. They ought to be able to identify obstacles that students may encounter while trying to have their academic achievements recognised. They will be also asked questions concerning **EMREX** ease of use, support, technical issues etc. and their own evaluation of the implemented policy.
- Software evaluation. Software is developed according to software requirements specification. The evaluation body will test if the described functional and non-functional requirements stated in the project have been met. The most important requirements comprise the following functionalities and features:
 - ❑ *Users can be authorized and identified with no special effort. In particular students are recognized as data owners and can trigger the action of data transfer for recognition purposes.*
 - ❑ *Data concerning student achievements can be sent from one institution to the other (usually from partner institution to home institution).*
 - ❑ *Privacy of data is protected.*
 - ❑ *System is user-friendly, i.e. occasional users do not need special trainings to use it effectively and system responses to user requests in a reasonable time.*
 - ❑ *System is robust and scalable, e.g. can be easily deployed in other institutions.*

The evaluation will be based on sound software engineering methodology with the support of dedicated tools.

More information about evaluation will be sent to participating institutions by each country's contact person (see information below).



Contact information

emrex.eu (local pages under "Field Trial")

If you have questions about the recognition process, please contact your university or University College.

For technical queries please turn to your IT department.

If you have technical problems with the **EMREX** transfer, you will find contact information at the country specific pages under FIELD TRIAL at emrex.eu.

Contact persons Norway: Agnethe Sidselrud, agnethe.sidselrud@fsat.no Finland: Mats Lindstedt, firstname.lastname@csc.fi, Josefine Nordling, firstname.lastname@csc.fi Italy: Stefano Russo, strusso@kion.it (technical questions) Denmark: Anders Bøgebjerg Hansen, abh@ufm.dk Poland: Janina Mincer-Daszkiwicz, jmd@mimuw.edu.pl Tomasz Zajac, t.zajac@uw.edu.pl Sweden: Pamela Henriksson, pamela.henriksson@gu.se, Mattias Holmlund, mattias.holmlund@jumu.se (technical questions)

Appendix I.

Step by step guide for administrators informing students using EMREX

The EMREX process starts with the authorization showed in Figure 1. The student logs in to the local application with the username and password used at the home institution. This will typically be a self-service application with functionality where information about external assessment is needed, for instance for admission or recognition. When the student is asked to fetch the external results, the application will present the page shown in Figure 2.

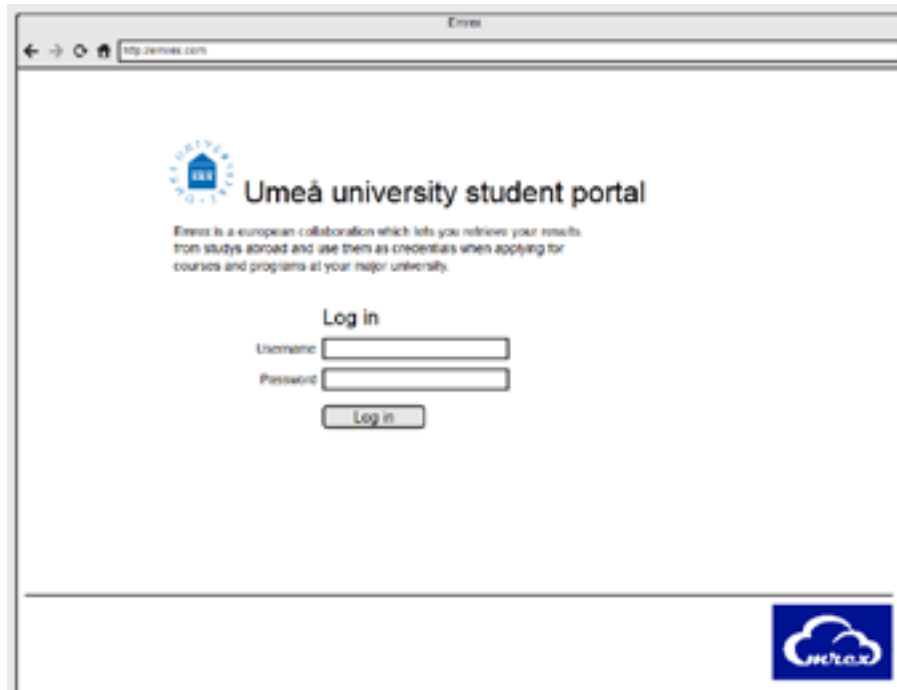


Figure 1. Log in page for the EMREX client (local example)

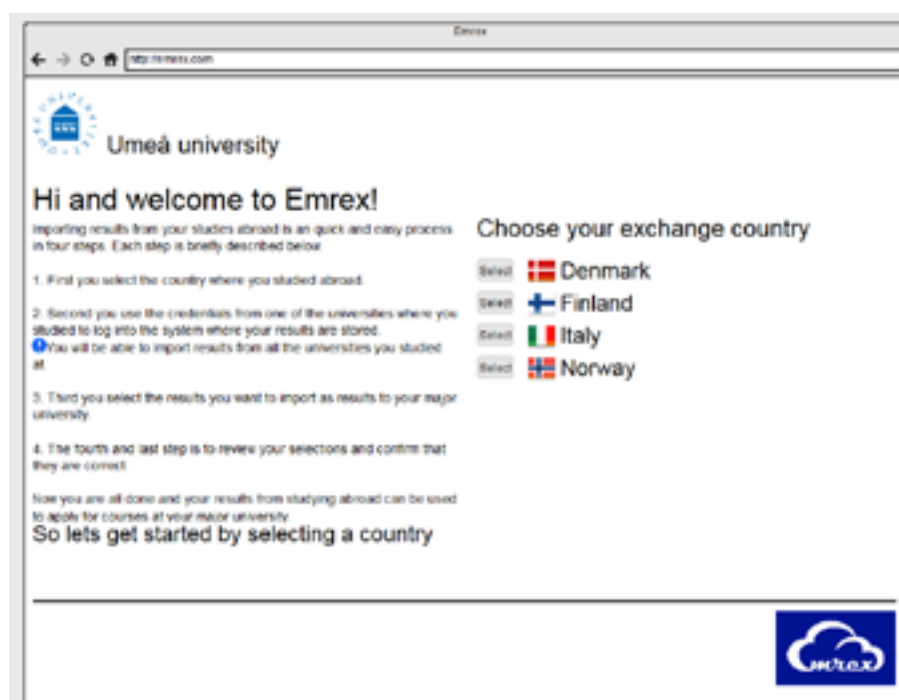


Figure 2. Choosing the country for retrieval of assessment information

After choosing country, the student will get redirected to the National Contact Point, as shown in Figure 3. In the trial, the national ID provider for education will be used for authentication. The exception is Italy, where the student first must choose the institution, and then log on to a service local to the university.

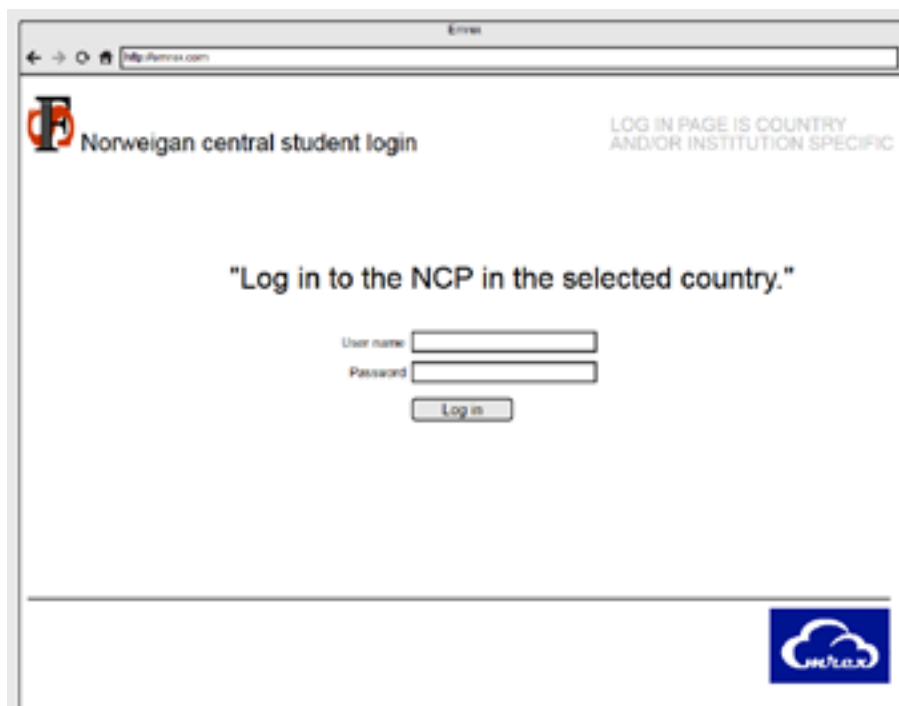


Figure 3. Log in page for NCP (local example)

After logging in, the students will see the results, see Figure 5, and after choosing which results to transfer to the home institution, the student is sent back to the initial web site (EMREX client).

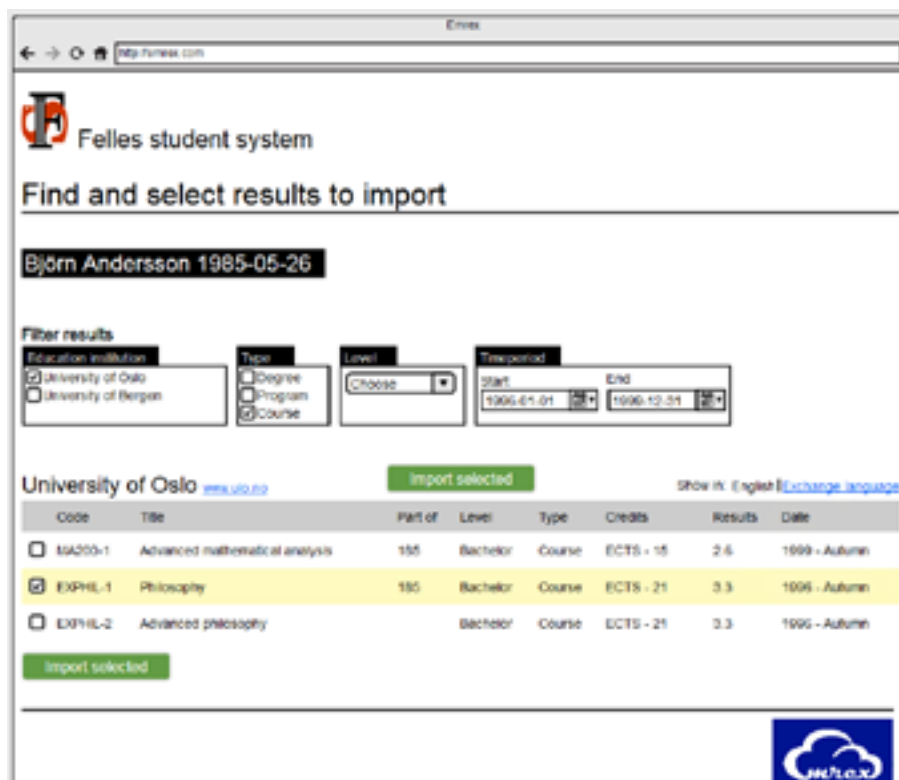


Figure 5. Choose result (local example)

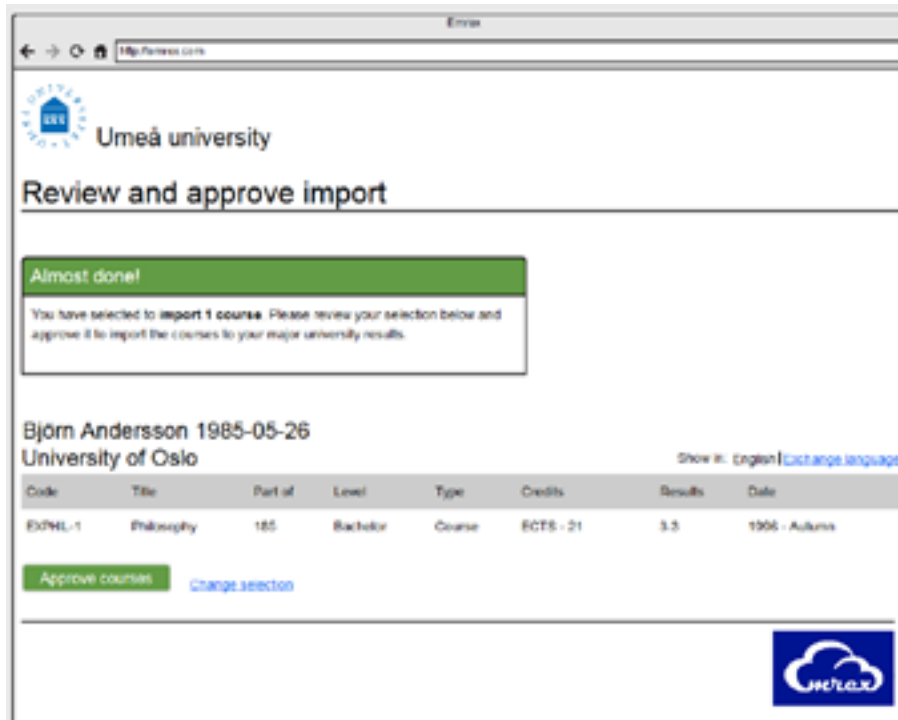


Figure 6. Finish the process (local example)

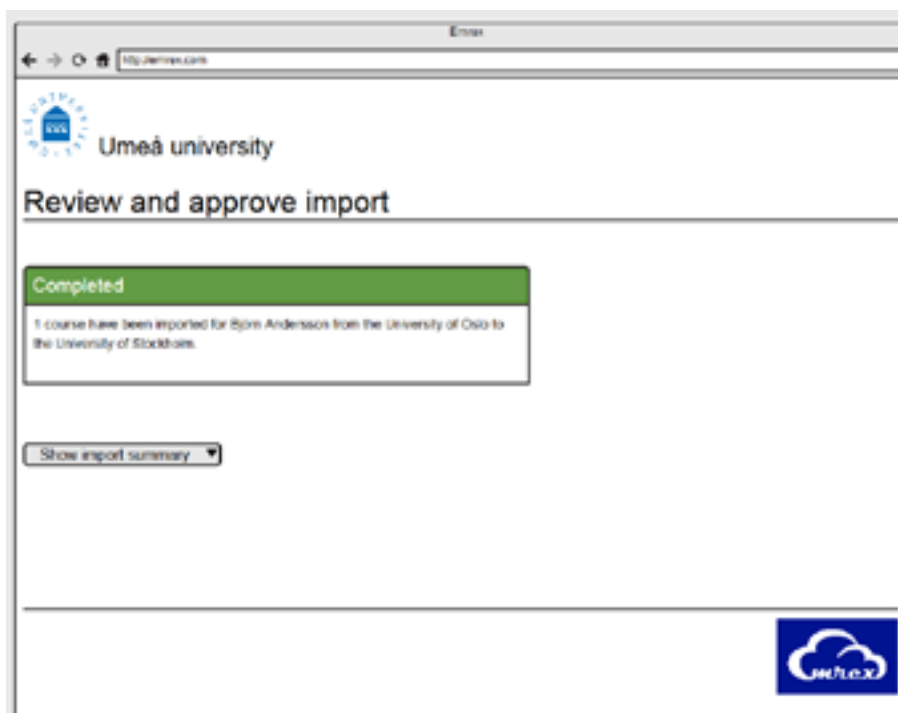


Figure 7. Process completed (local example)

After getting back to the initial web site, the student can see the information returned, and finally approve this information (Figure 6 and 7). The result will be sent to the local SIS or to another database, depending on the national technical infrastructure. The student should at any time be able to log into the EMREX client and see what external results have been registered.

If you have questions about the recognition process, please contact your university or University College.

If you have technical problems with the EMREX transfer, you will find contact information at the country specific pages under FIELD TRIAL at emrex.eu.