D6.2 – Summary, Analysis, Road-mapping and Production of Training materials

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Realising an Applied Gaming Eco-system

Research and Innovation Action

Grant agreement no.: 644187

D6.2 – Summary, Analysis, Road-mapping and Production of Training materials

RAGE – WP6 – D6.2

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EXECUTIVE SUMMARY

Deliverable 6.2 describes and summarizes the final results of the population of the RAGE Ecosystem portal (EP) with information, knowledge and training material.

As described in D6.6 in month 17, the Ecosystem portal was developed with particular consideration of the demands and requirements of small and medium sized game developing companies, education providers and related stakeholders like applied gaming researchers and end-users. The Applied Gaming (AG) industry should thereby get the best support to connect, communicate and create new effective technology based software components in order to build new, exceptional learning games.

RAGE therefore developed in a participative approach a multi-sided platform, providing services to the Ecosystem *customers*, represented by Game developers acting as *consumers* and technology providers acting as *sellers* or *suppliers* in a core interaction which involves specialised AG technology and Know-how transfer and marketplace mechanisms.

The contents in the RAGE EP are primarily composed of game components (software building blocks) and corresponding material, tutorials (text and video), publications, training material and training courses.
In detail, there are 40 RAGE components, 2 external components, 6 games, 93 documents - consisting of manuals, scientific publications and E-learning references, 10 online training courses and 8 multimedia resources (videos and software) available in the EP.

Together with the access to an Interactive Stakeholder Map, users of the EP have the opportunity to search and find resources, download them, learn about how to integrate and use them, learn about creating games with the components, get in contact with the providers of the resources and find additional contacts as well as build alliances with stakeholders of the AG community.

The core version of the EP and its services are tested and validated. The next step will be to make the EP a long-lasting, self-sustaining Portal. For this purpose, the functionalities for selling and buying, the shop system, were set up and are ready to be launched as part of the foreseen commercial exploitation of the EP as core element of the RAGE Ecosystem. Library, Media Archive, Software Repository are prepared to be systematically expanded by incoming external resources, and the Social network interoperability support is in place. Tutorials explain how to use the portal and how to make components or how to create specific aspects of applied games.

The content of this deliverable is part of the operational documentation prepared for the teams involved in the roll-out of the RAGE Ecosystem, thus representing its first priority audience.

1 INTRODUCTION

The interest in Applied Games and their application in education and business areas increased very fast in the last decade (Vasudevamurt and Uskov 2015).
To increase the innovation power of the branch the RAGE Ecosystem portal (EP) is fostering the merging of the heterogeneous Applied Gaming (AG) communities by providing an effective knowledge and innovation management service tool.

The EP serves as an interactive information, knowledge and content management platform and provides a diverse set of services across the knowledge value chain. A combination of training courses, training materials, multimedia resources and game components / game technologies together with social network interoperability provides a valuable context for collaboration and creation of innovative Applied Games.
The portal can be reached via https://www.gamecomponents.eu.

The RAGE project and herein Work package 6 developed the EP corresponding with the services of content and knowledge management, structure-giving taxonomies, and a learning management with Course Authoring Tool (cf. D6.1, D6.3, D6.4, D6.5 and D6.6)

2 INFORMATION AND KNOWLEDGE SHARING SYSTEM

2.1 Stakeholders and user communities

The stakeholders of the EP are different user groups and communities who will be using the services and possibilities of the system developed and provided by RAGE. The main target groups are:

- researcher (groups) and experts,
- asset developers,
- gaming companies and developers,
- training providers (educational providers, intermediary organizations), and
- end users (learners) in application scenarios (industrial and institutional sectors).

The project has shown that the industrial perspective of the game companies improved the usability of the portal. For example the taxonomies were revised together with the companies which made a big difference for the search functionality.
The large number of researchers and AG industry players involved in RAGE provided the initial input on basic AG content and knowledge for the Ecosystem portal, particularly publications.

2.2 Information and content collection process final results

The process was carried out successfully. The phased approach was accompanied by instructions or tutorials and face to face training at the RAGE meetings to support the partners in the upload and annotation steps. Using different so called user stereotypes with different interests, experiences and skills, the Ecosystem portal was populated only with community specific content.

Figure 1 is showing the numbers of content objects in the EP (at the time finalizing the report).

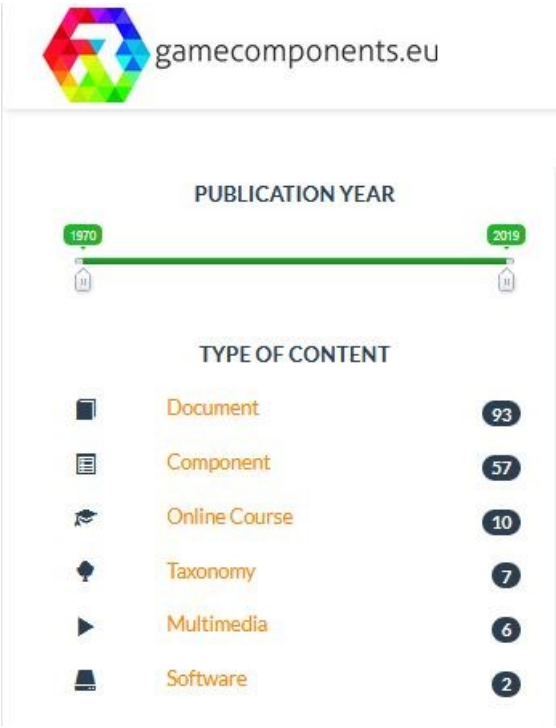

Figure 1: Quantity of resources in the EP

By the end of the project, an exemplary set of 40 RAGE components, 2 external components from the ENVISAGE project[1], 6 games, 93 documents - consisting of manuals, scientific publications and E-learning references, 10 online training courses and 8 multimedia resources (videos and software) are available in the EP.

Phase 1: In the first step the academic researchers and experts out of the RAGE consortium tested the import of component and knowledge resources. The content was the baseline of material (e.g. document corpus) to be available within the Ecosystem portal repository. Textual documents and slides respectively their references were complemented step by step by software components generated by WP2 and WP3 together with accompanying documents, such as documentation, tutorials, presentations and publications.

Phase 2: The game development companies of the consortium helped to improve the system. Out of their work on AG design, development and support for the application scenario pilots they assist other game developers of non-leisure domain while enhancing the usability and visual aspects and taking account of tutorials and illustrative videos.

Phase 3: As RAGE is having 6 different application scenarios with different end-users and intermediary organizations and several contexts, the related application partners contributed by complementing presentations and the user best practice perspective to support future Ecosystem portal users. Lately also games were uploaded in the system.

Furthermore, the consortium decided to harvest training resources only (cf. section 4.2). The team agreed that it is too complex to harvest AG information or software material subsequently, because the material was not constantly available or not available in the sufficient quality. Therefore the production of own content, mainly training material, was focused on.

[1] http://www.envisage-h2020.eu/

2.3 Knowledge Management final results

The process was performed in 4 iterations as follows (cf. D6.2):

***Iteration 1 (M1 – M12) - Integration and Availability*:**
The availability of the EP with its initial services was provided until month 12.
One of the core components for Knowledge Management, the taxonomy, was discussed a bit longer.

Iteration 2 (M13 – M24) - Component Collection, Initial Evaluation and Testing:
Afterwards the portal was populated step by step with community specific content, mainly game components and related documents. In addition the RAGE component developers created multimedia - and written tutorials to explain how to use and integrate their software components.

To enable semantical annotations and therefore categorization of content and the possibility to search content in the Digital Library and Media Archive, different taxonomies were developed to support different perspectives and understanding of the AG landscape.
One taxonomy is a broader and more complex one, to meet the requirements of the academical users of the portal (RAGCS Scientific taxonomy). The other one is much more market-oriented and lean and was the result of the discussions with game companies involved (RAGCS Practitioner). More complexity was not desired and rated as not practicable. The taxonomies are manageable and extendable, depending on the demand of the users and the variety of material in the system.
Additional taxonomies are included for structuring the learning goals for the learning management and the shop system.

Iteration 3 (M25 – M40) - Business Model driven refinement
One of the later steps was to refine the portal regarding the results of the business modelling in WP9. Amongst other things the RAGE game developers and therefore practitioners decided to use the smaller, more intuitive and easy to use taxonomy to categorize upload and to find components together with related content to buy or to use. The metadata parameters for the software library content were revised and improved.

The system has been expanded by a full suite of e-commerce features (e.g. shop and coupons). A rating system was added and the visual appearance of the portal and the content, primarily the components, was optimized. A new landing page is now much more inviting and is pointing the way to different services, depending on the user group visiting the page (cf. Figure 2). In addition, the terms of service were defined based on a thorough legal consultation, fulfilling GDPR requirements.

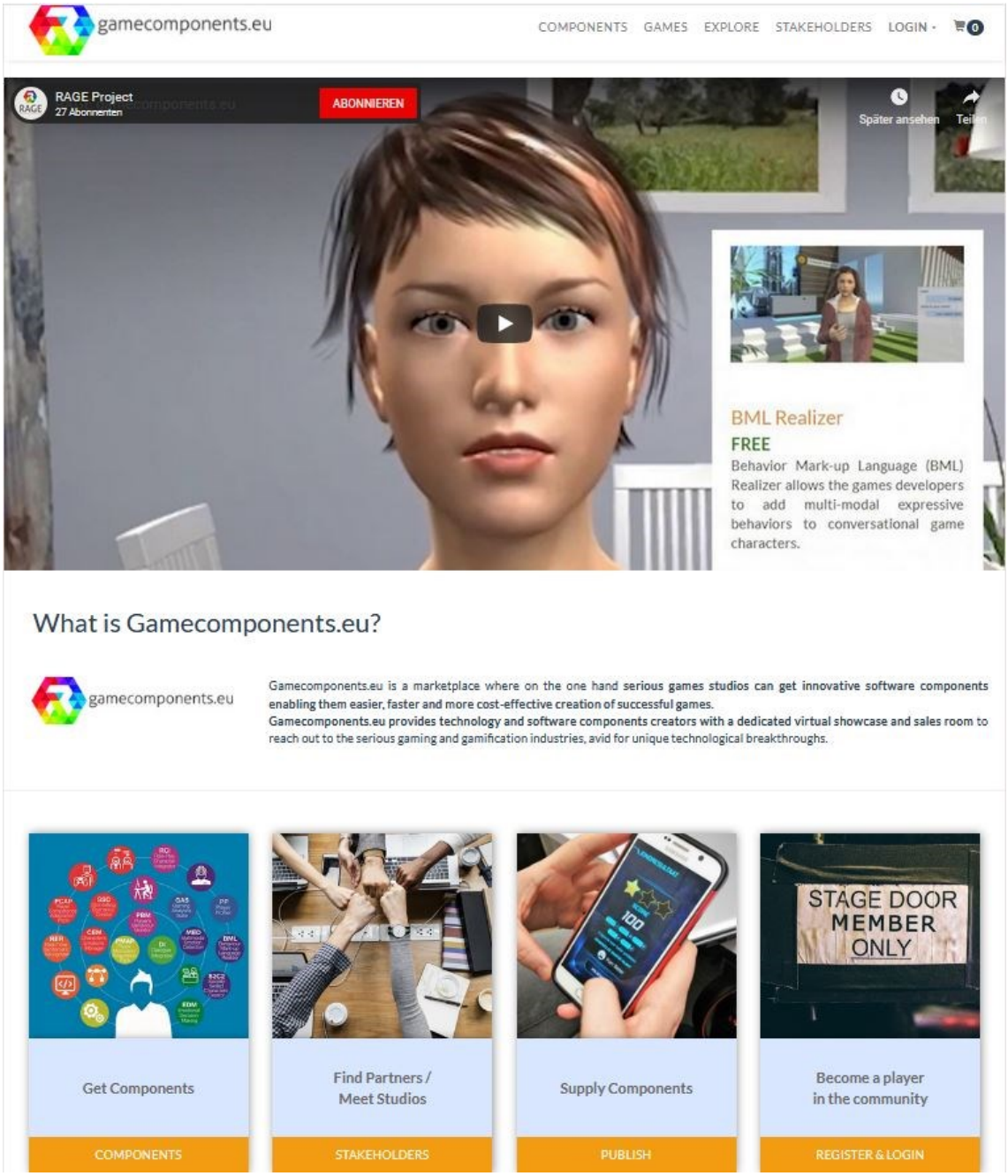

Figure 2: New landing page

To expand the offerings and further added value, training material was developed and provided by the RAGE consortium.

Iteration 4 (M41 – M48) - Preparation for sustained availability

In collaboration with WP8 the Ecosystem portal and its services were evaluated extensively during the project runtime. The results were indicators for optimization and confirmed the usefulness and usability of the Ecosystem portal and its offerings.

The infrastructure was further developed to be prepared for an increased number of users and activities on the portal, like upload, download of components and the execution of trainings.

3 EVALUATIONS OF THE ECOSYSTEM PORTAL

Together with WP8 a series of evaluations was performed. The first one corresponds to a pre-testing and qualitative validation of the initial features and functionality. The results are published in D6.6 and the corresponding WP8 deliverables. The system was further tested in the course of the project through the continuous use of RAGE partners and external users, such as students from the academic partners. Taking feedback into account, the usability and the services, such as the taxonomy manager and the upload, were improved over the time.

Additional evaluations verified the Seed Taxonomy, the Taxonomy Manager, the Search Habits, the Social Network Mediator and the Authoring Tools for Courses (cf. D8.3 & D8.4).

The results were indicators for optimization and confirmed the usefulness and usability of the Ecosystem portal and its offerings.

4 TRAINING MATERIAL

4.1 Development of RAGE training offerings

The planning envisaged to arrange workshops and to provide the infrastructure to offer training courses on an online training portal, covering training for both developers and educators in order to amplify AG uptake.
A number of hands-on training sessions at the RAGE meetings and events to support the production of training material were implemented during the lifetime of the project with the aim will be to make these activities self-sustainable by the end of RAGE.
It was noted that brief web sessions for explanations and a tutorial respectively online course were sufficient to explain the creation of these courses to the stakeholders of the consortium.

The topical focus of RAGE training offerings was laid upon addressing technical implementation related to the re-use of components within diverse validation settings. In addition, RAGE-specific training material related to general practical organization and integration issues (WP4: game design, development, and support) was developed by the respective game developers and component holders as they identify a specific demand for this material.

4.2 RAGE training offerings

For the training content WP6 consulted in depth with the stakeholders from the consortium and identified two primary goals for aggregating and curating training content on the RAGE portal (cf. D6.4):

- Increasing the adoptability of the RAGE components by providing component specific training material for component developers.
- Go-to online resource for high-quality information on applied gaming principles and training by providing a rich pool of online education sources for the applied gaming professionals.

In addition, the RAGE EP is offering not only the possibility to upload training material but to create training courses with a Course Authoring Tool (cf. Annex 1). The Course Authoring Tool allows to directly integrate RAGE components into the learning material.
To support continuing professional development in the communities and increase the number of participations within the target group (i.e. game developers) it is recommended to provide learning units in the form of short, quickly accessible contents, in different multimedia formats.

The consortium created 10 training courses for the EP, namely:

- **FAtiMA - An Emotional Agent Architecture**
  The course introduces you to the concept of FAtiMA (F earNot! A ffec ti ve M ind A rchitecture): an Agent Architecture with planning capabilities designed to use emotions and personality to influence the agent's behaviour.
- **Emotion Recognition through Facial Emotion Expressions**
  This mini-course will help you grab some information about emotion recognition technology from facial expressions, the development, integration, and configuration of a software component called real-time facial emotion detection.
- **Real-Time Performance Assessment and Difficulty Adaptation with the TwoA component**
  This course teaches how data from the player assessment can be used to dynamically adjust game mechanics which in turn improves the learning experience using the Adaptation and Assessment (TwoA) component.
- **Getting started with using RAGE components for game development**
  The course entails a hands-on technical session addressing how to enrich your serious game with RAGE software components. Based on concrete examples discussed and presented in this course you will learn and understand how to quickly unpack, install and integrate software components in your game project.
- **Creating RAGE components using C#**
  This course shows how to create RAGE components using C# and Visual Studio 2017.
- **Natural Language Processing with ReaderBench**
  This course introduces NLP basics and the application of the ReaderBench components.
- **Competence Component (P-CAP: Player Competence Adapation Pack v2)**
  This course presents and explains the Competence Component. It consists of an introduction and basic concept of the component, then a video is given to demonstrate how it works with a game, and finally a conference paper is provided that further explains the component.
- **Unity Gateway**
  In this course you learn about a LTI bridge for Moodle and the Unity Engine. With this technology an interactive Unity game can now be integrated into an online course and be executed at run time through an LTI call.
- **Creating E-Learning Content with the KM-EP Course Authoring Tool**
  This course is a tutorial on creating courses with the KM-EP Course Authoring Tool.
- **X3D Gateway**
  This course teaches how to use the X3D Gateway to integrate Virtual-Reality technology through a LTI bridge with Moodle.

The courses on "Natural Language Processing", "Emotional Recognition", "FAtiMA" etc. describing in detail the ideas behind the corresponding RAGE components, their specifics, how to implement and how to use them.

The "Unity Gateway" and "X3D Gateway" courses are covering new components added to the RAGE portal, which were not previously foreseen in the workplan, and exceed the expected outcome of WP by delivering training for additional components.

The "Creating E-Learning Content with the KM-EP Course Authoring Tool" is an explanatory course to introduce new users to the Course Authoring.

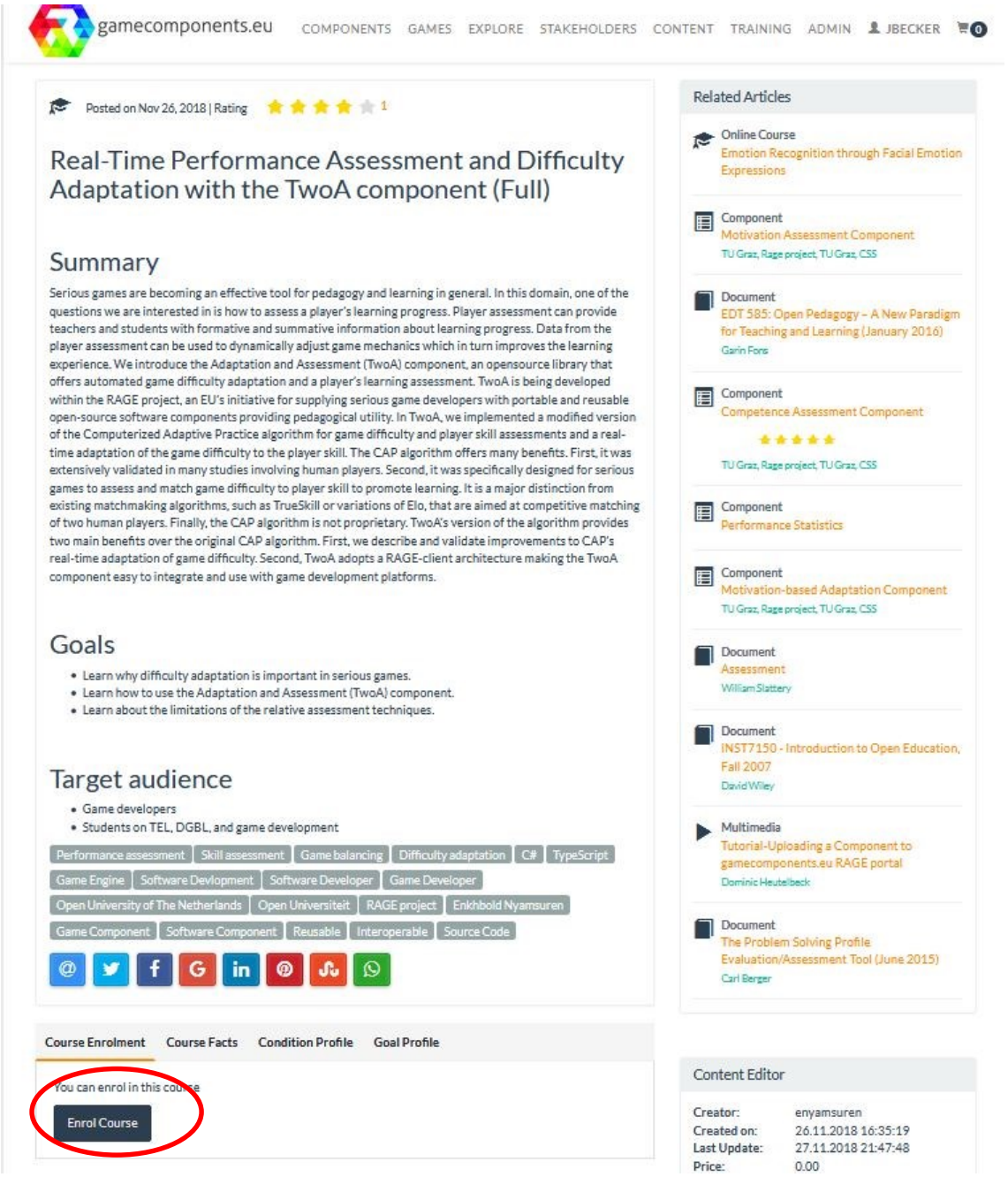

Figure 3: Exemplary screenshot of a training course

The user needs to be logged in to enroll the course (cf. Figure 3).

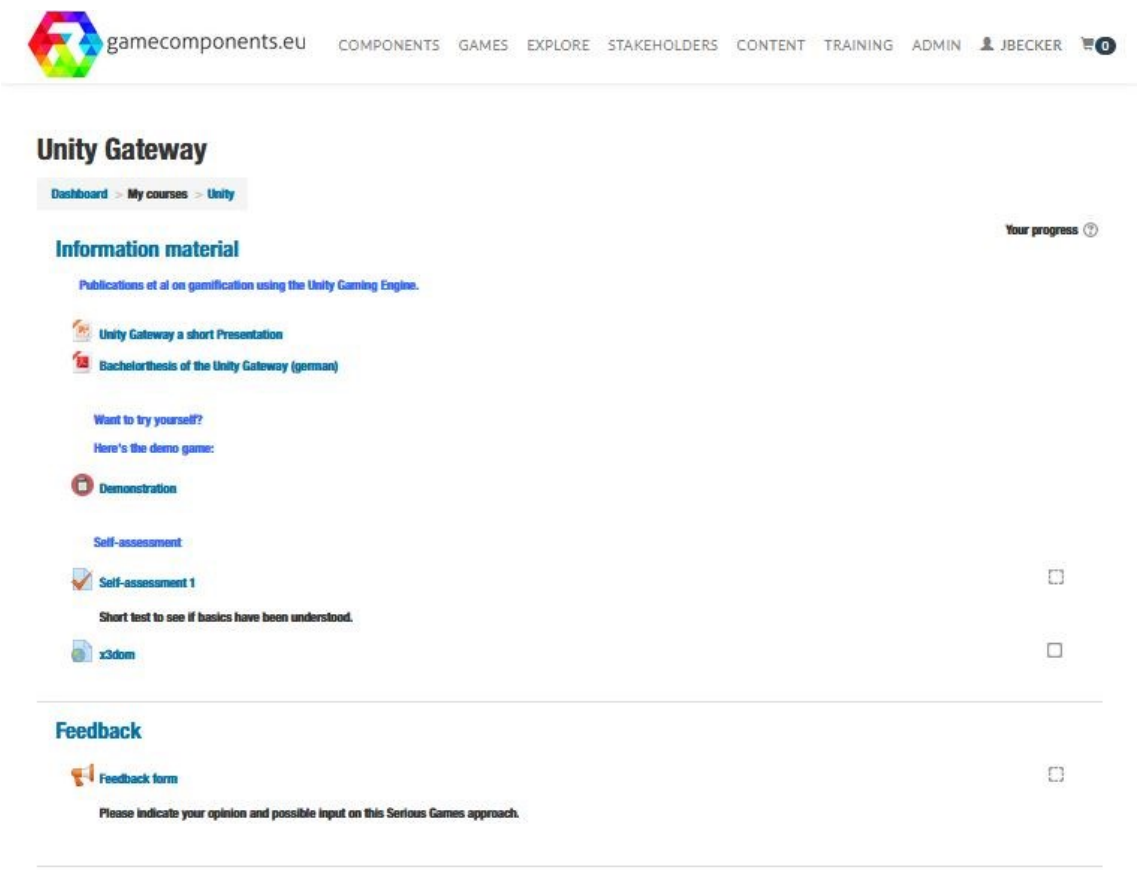

Figure 4: Exemplary course structure

Afterwards different media objects are provided to learn the contents. A self-assessment test at the end is serving as a knowledge check, whether the contents have been understood. The tests could be structured by simple “Yes or No” questions, open questions or multiple-choice questions (cf. Figure 5).

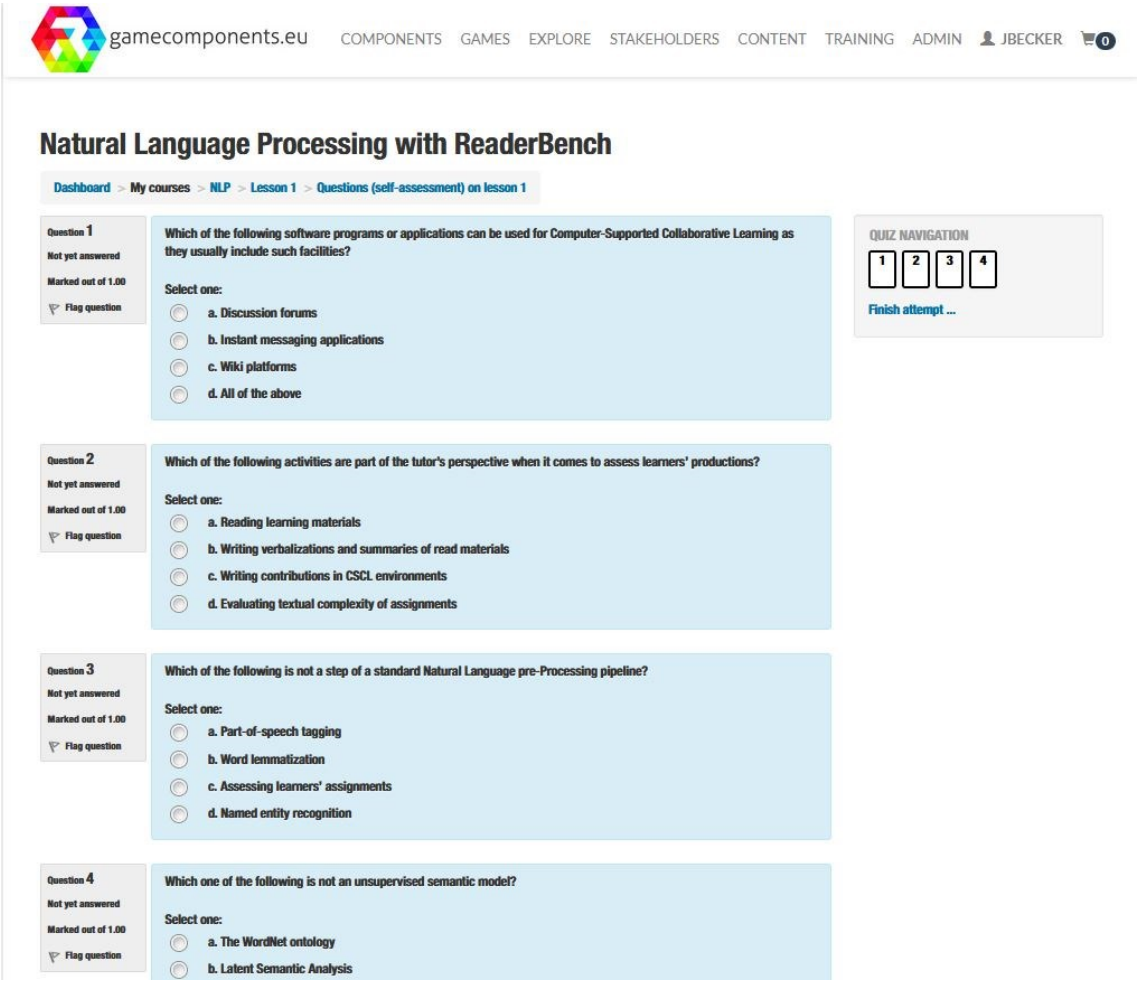

Figure 5: Exemplary knowledge quiz

Additional face-to-face training was provided in several events. The list of events is provided by WP9 in D9.3.

5 ROADMAPPING BEYOND THE PROJECT RESULTS

In accordance with the Launch Plan (D9.4), the RAGE Foundation will lead the exploitation of the legacy generated by the works of the RAGE project. The Ecosystem portal (functional, reliable, usable and emotionally designed) is showcasing a Community-driven marketplace with

- Upload -, download-, ingest- and harvest- functionalities for software, publications, documents, videos and slides,
- Stakeholder Map,
- Taxonomy management,
- Creation tool for training courses,
- eCommerce management

The next step will be to make the EP a long-lasting, self-sustaining Portal, as foreseen in the RAGE Exploitation Plan.
For this purpose, the functionalities for selling and buying were set up. Library, Media Archive, Software Repository are prepared to be filled with external resources, and Social network interoperability is in place. Tutorials explain how to upload components and how to create components.

The Portal will need to grow in terms of contents and in terms of users. To reach the attention of the corresponding target audience and larger groups of game developers and companies, the Foundation will foster the execution of and participation at events to constantly present new game components and training material. FTK will be present at the Gamescom and Learntec in the next year(s) for example. Additionally scientific conferences will be addressed to ensure a broader audience.

6 SUMMARY AND CONCLUSIONS

The deliverable summarizes the results of the information and knowledge collection and provision in the RAGE Ecosystem portal during the project runtime. Technology and media resources as well as documentation and training material were explored and collected from the heterogeneous and dispersed Applied Gaming landscape.

The various consortium partners supported the process step by step with their expertise to create a complex, flexible, scalable Applied Gaming-specific Portal for different user stereotypes with different interests, experiences and skills.

The core version of the EP contains

- a Repository of AG oriented Software (the RAGE components),
- an Interactive Map of Stakeholders related to Business Use Cases,
- a Social Tool Suite Supporting Community Building and Collaboration Mediation and
- Multimedia Training Content and Courses for AG practitioners.

The multi-sided platform will enable the targeted stakeholders to get centralized access to applied game components and the corresponding developers, to benefit from knowledge and training resources and to collaborate and create new outcomes leading to innovative products and services.

REFERENCES

1. Vasudevamurt, Vinay Bhargav; Uskov, Alexander (2015): *Serious Game Engines: Analysis and Application*. In Electro/Information Technology (EIT), 2015 IEEE International Conference on ELECTRO/INFORMATION TECHNOLOGY, At Dekalb, IL

7 ANNEX 1 – TUTORIAL: COURSE AUTHORING WITH COMPETENCES

This tutorial provides an illustrated walkthrough to create a new course with course material and assignments. To show the functions to create a course, we used a course from the University of Hagen with German learning material. Furthermore, we show how to create competence based learning goals and condition profiles and assigning them to the new course.

Target Audience

The stakeholders of the Ecosystem are different user groups and communities which will be affected by and will be using the services and possibilities within the system developed and provided during the project. The main Ecosystem related target groups are given by:

- researcher (groups) and experts,
- asset developers,
- gaming companies and developers,
- training providers (educational providers, intermediary organizations), and
- end users (learners) in application scenarios (industrial and institutional sectors) coming from within or (mainly) from outside the project consortium.

While researchers and experts can provide the first important input on Applied Gaming content and knowledge to be imported into the Ecosystem, game and asset developers represent the game development and industrial perspective on Applied Games and provide information and software assets with related material; training providers and learners together embody the educational and learning perspective on Applied Games and will probably most likely not search for assets but may be interested in publications and other media objects.

Prerequisites

- Recent web browser – Mozilla Firefox, Google Chrome, ... (Microsoft Edge currently not supported)
- EcoSystem Portal account (please send E-Mail to jmertens@ftk.de)
- EcoSystem Portal URL (Test Environment): https://www.gamecomponents.eu/

Contact

Please contact ***ragesupport@ftk.de*** for bug reports and support.

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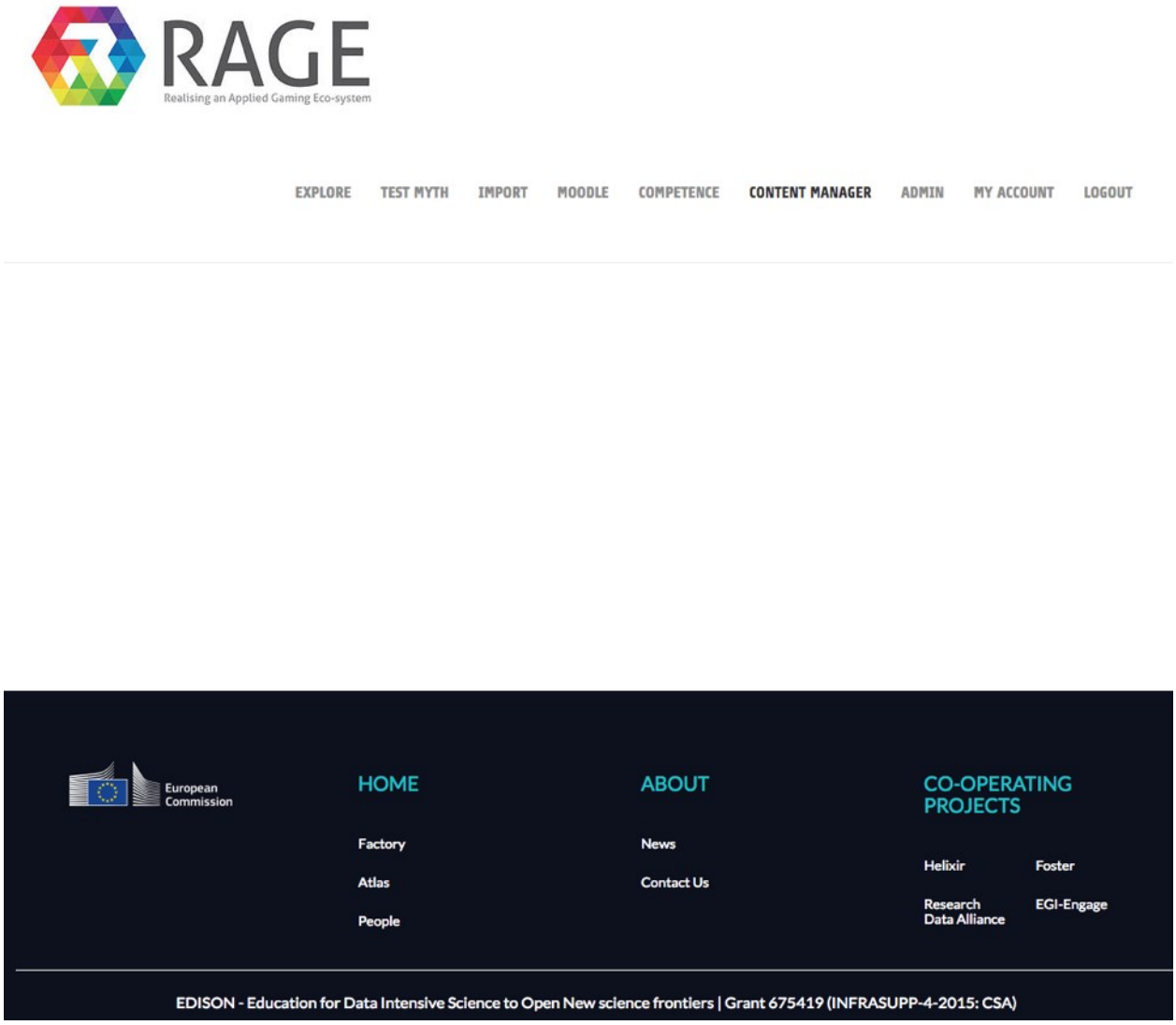
7.1 Login

Point your web browser to the RAGE EcoSystem Portal URL https://www.gamecomponents.eu and click "*Login*" in the upper right hand corner.
Please enter the RAGE credentials provided (login, password) in the corresponding form fields and press the "Login" button below.

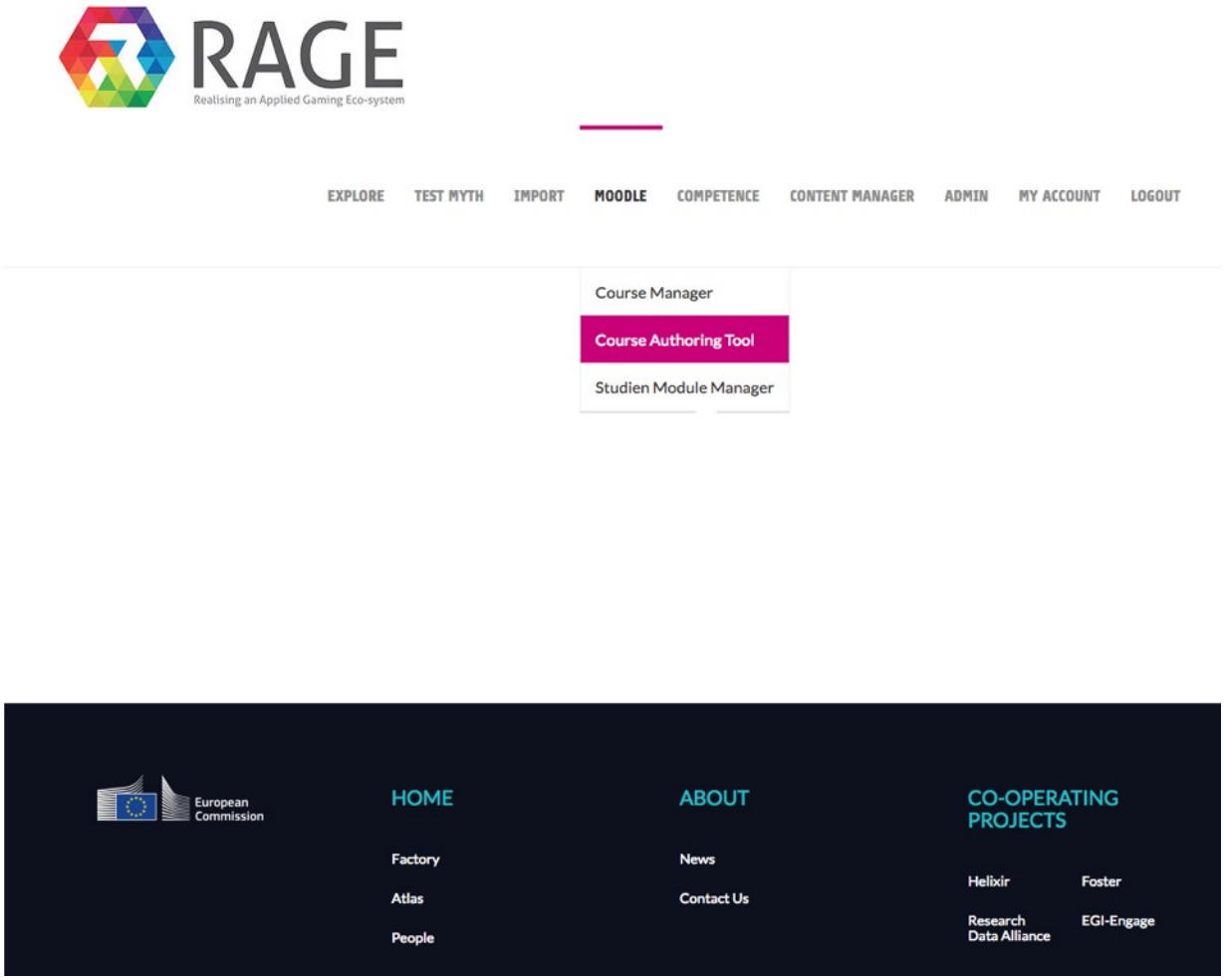
The EcoSystem Portal dashboard should then look similar to the following screenshot.



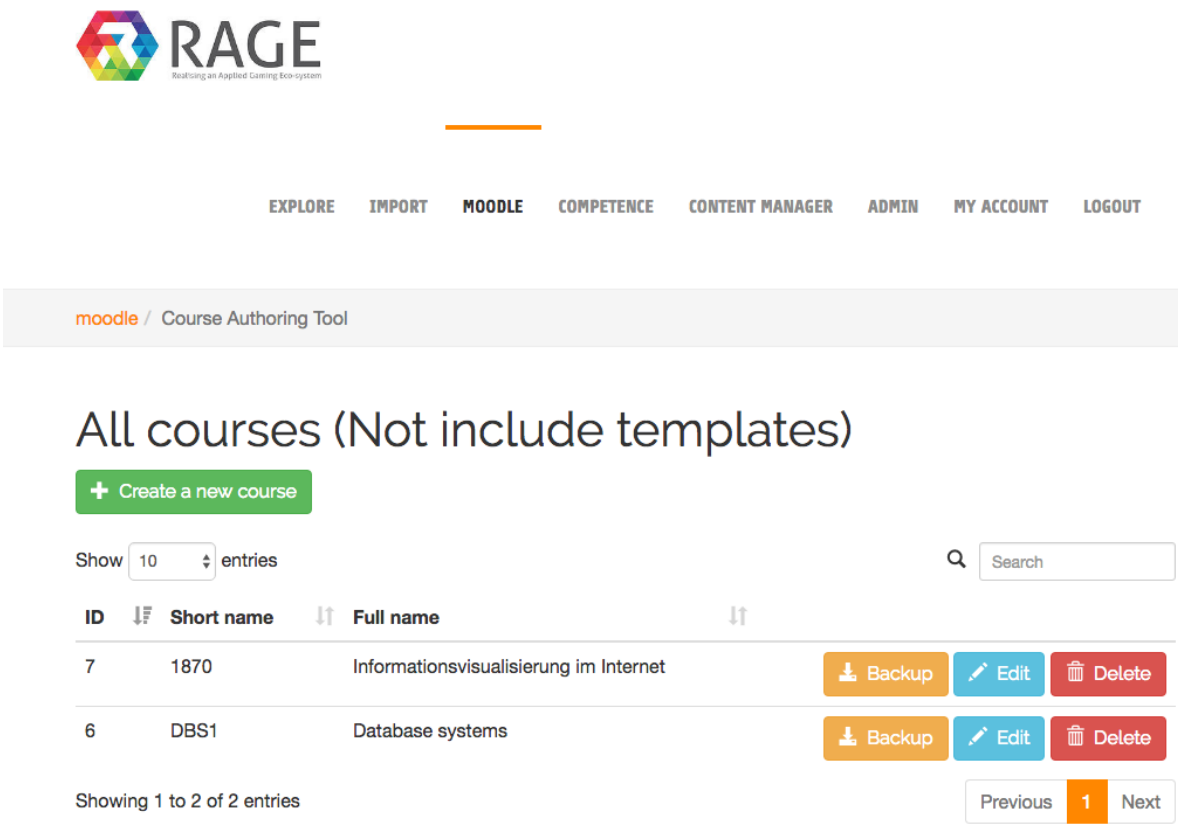
You will find a menu bar with the functions **Explore**, to search and browse the Ecosystem, **Import**, to import external data from Bibtex, OAI-PMH, Mendeley and Slideshare into the Repository, **Moodle** to create and manage courses, **Competence** to manage competences and competence profiles, **Content Manager**, to manage your own content, create Assets, Publications, Presentations and Software and assign material to asset collections and to manage taxonomies, **My Account**, to edit your account data, and **Logout**.
This tutorial will concentrate on the creation of a new course and the use of competences for condition profiles and learning goals. We will show you how to create a new course with experimental course material and assignments. Subsequently, we will see how to manage competences. Therefore, we create at first a new competence framework and fill them secondly with new competences. After that we bundle competences from the competence frameworks to build two competence profiles, a learning goal and a condition profile and link both profiles to our course. Finally, we show how to enroll to the new course.

7.2 Create a new Course

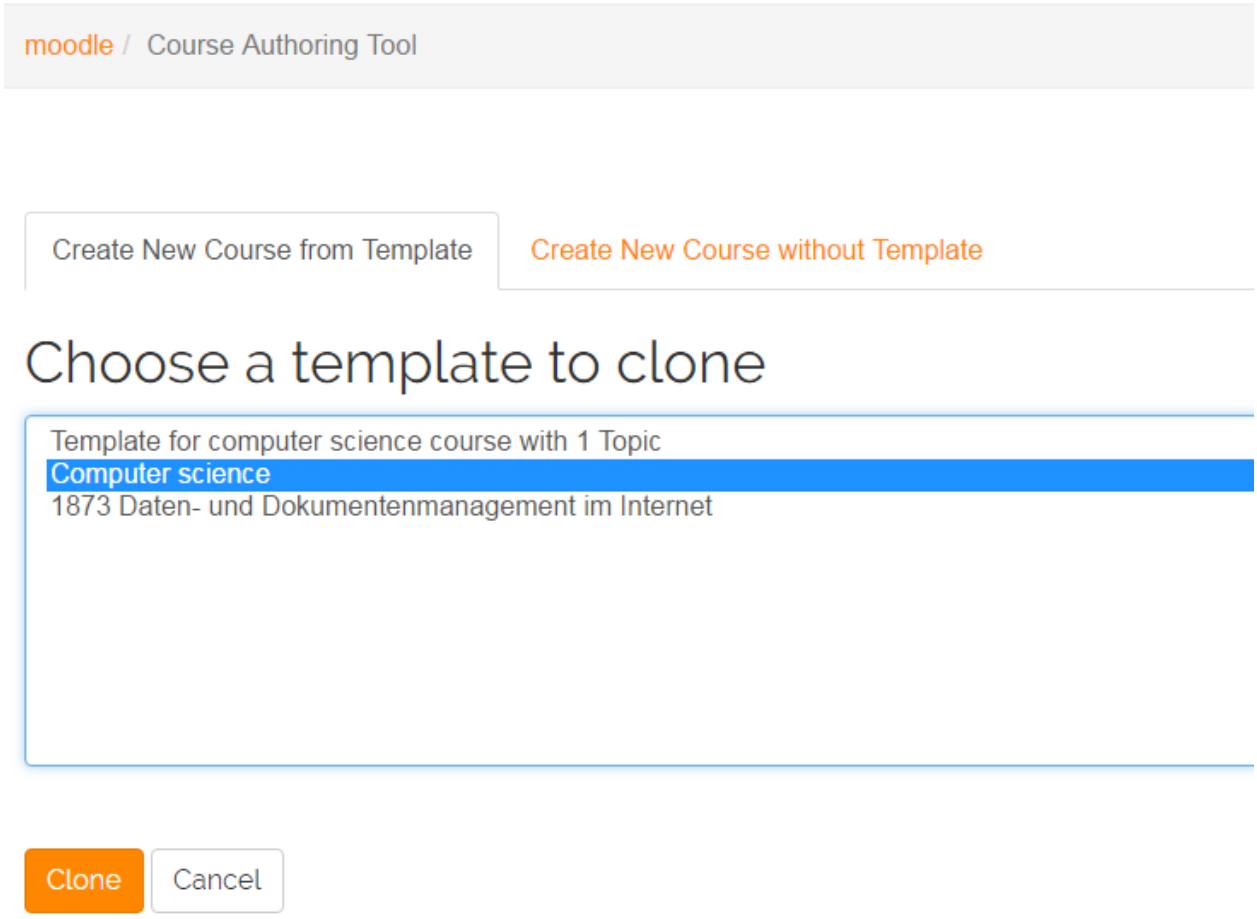
To create a new course, select “Moodle » *Course Authoring Tool*” from the dashboard menu.


RAGE
Realising an Applied Gaming Eco-system
EXPLORE
TEST MYTH
IMPORT
MOODLE
COMPETENCE
CONTENT MANAGER
ADMIN
MY ACCOUNT
LOGOUT
Course Manager
Course Authoring Tool
Studien Module Manager
European Commission
HOME
Factory
Atlas
People
ABOUT
News
Contact Us
CO-OPERATING PROJECTS
Helixir
Foster
Research Data Alliance
EGI-Engage

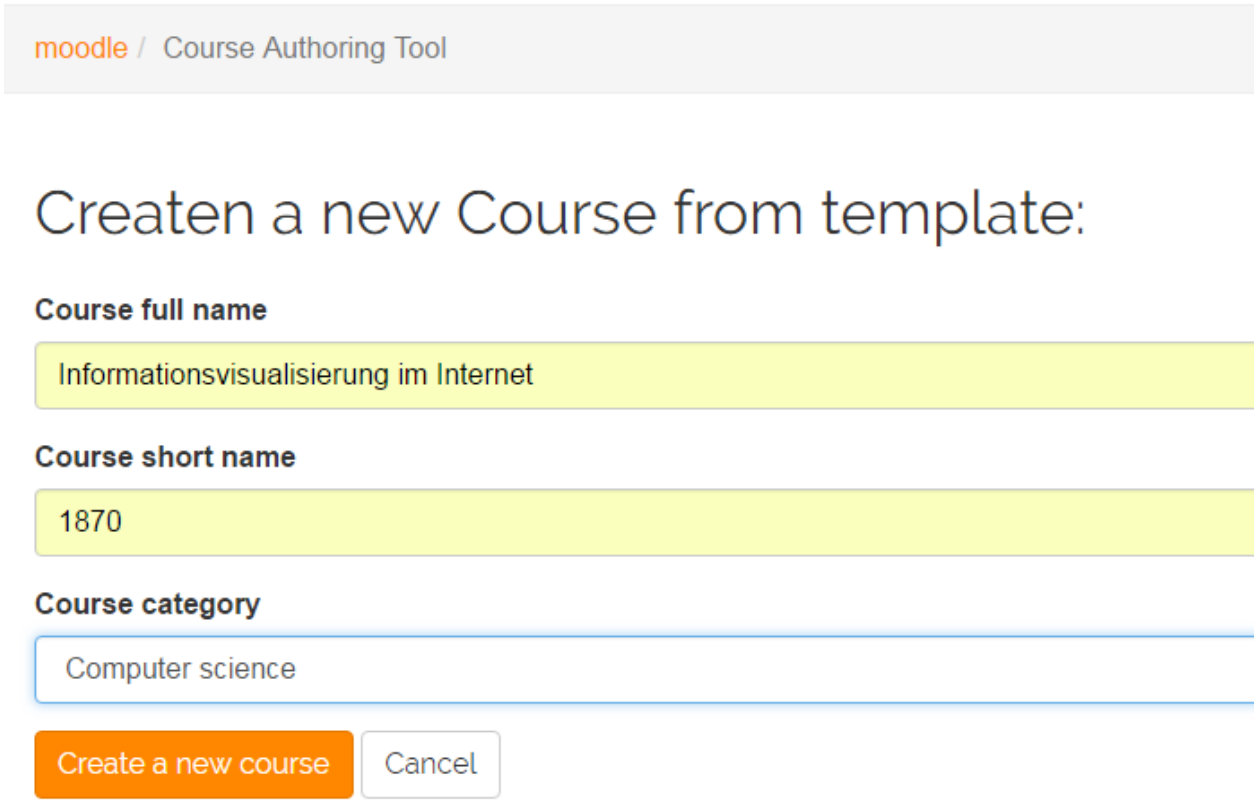
In the following screen, please select "+ *Create a new course*".



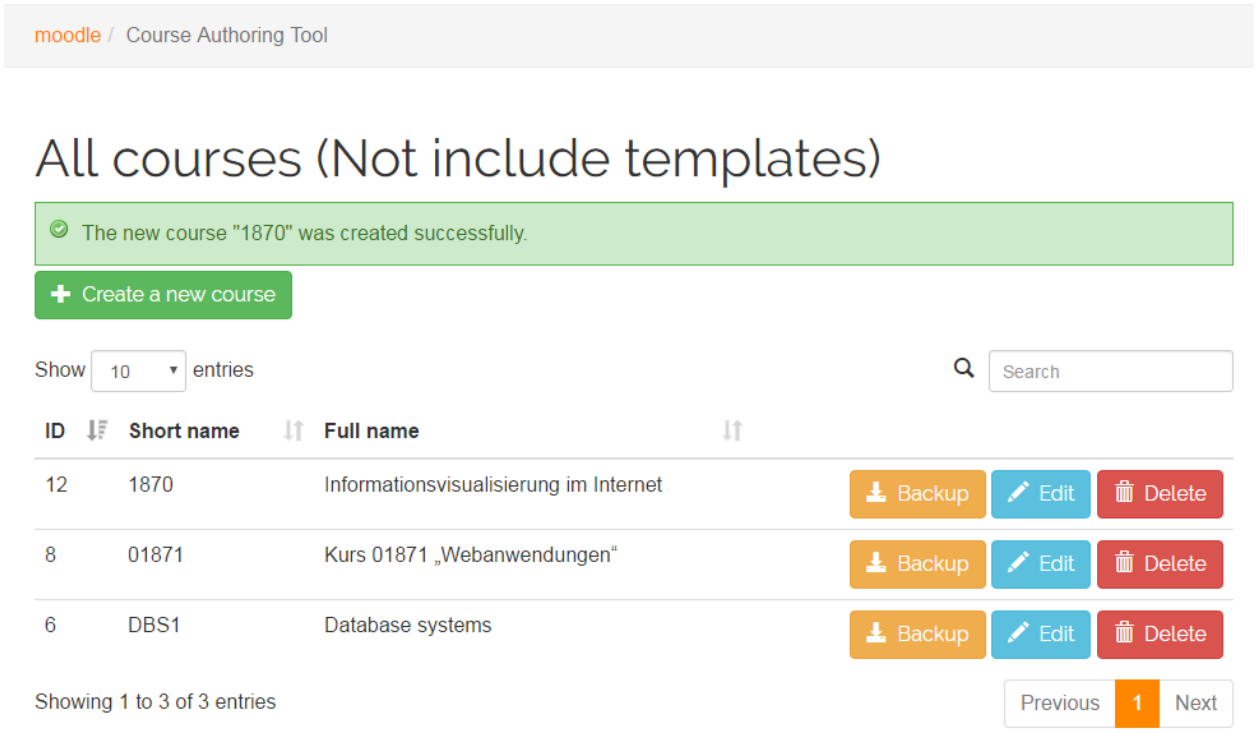
In the next step you can decide to use a course template with predefined sections and learning activities. For this walkthrough please choose the template "Computer Science" and click on "Clone".



Now enter in the field “Course full name” *Informationsvisualisierung im Internet* and in the field “Course short name” *1870*. Finally click on “Create a new course”.



After the creation of the new course you get the message *The new course "1870" was created successfully* as in the following screenshot to see. Click then on the button "Edit".

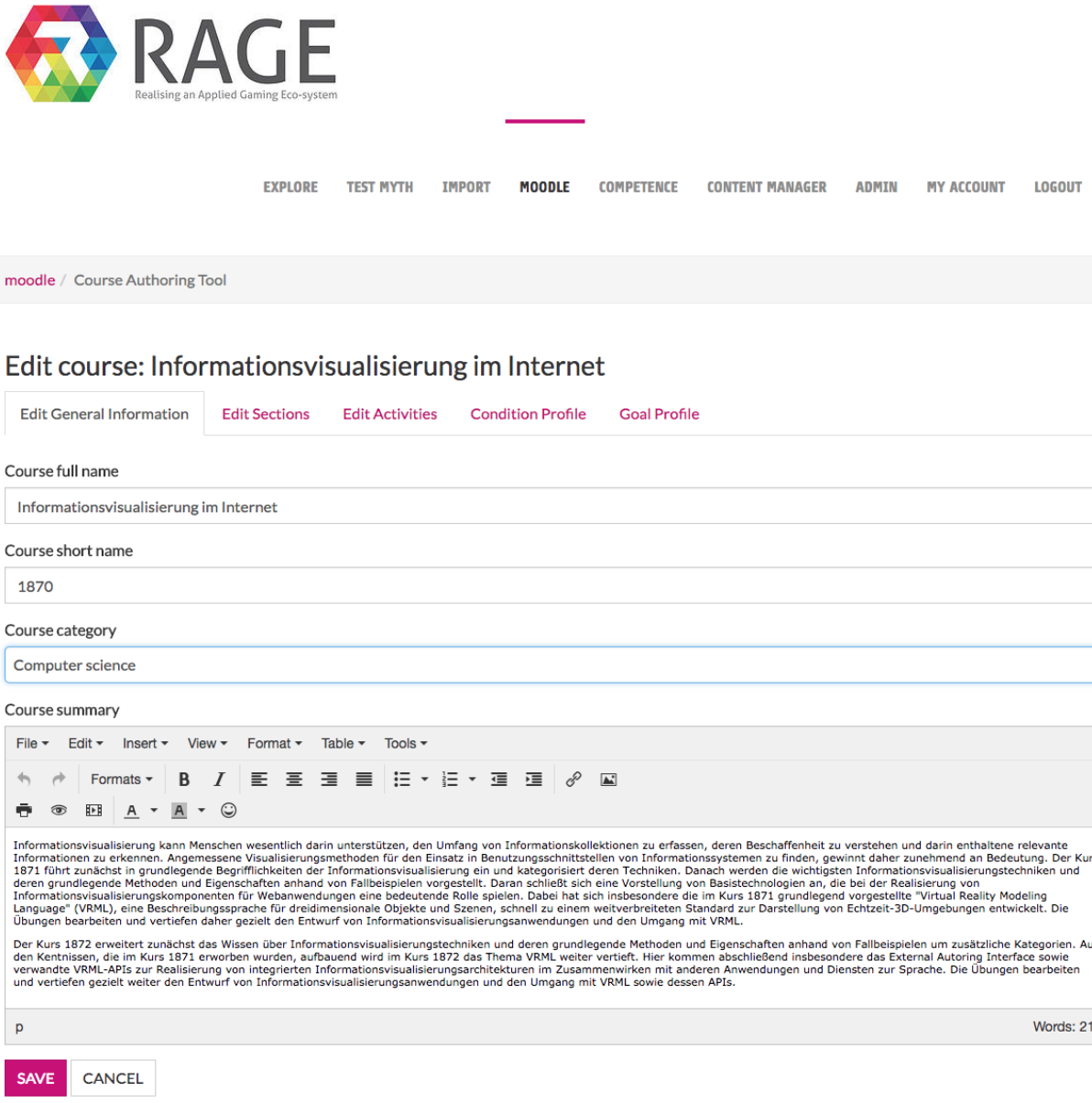


Now you have five tabs to edit the course. In the first tab you can change the *course name* and *category* and enter a *Course summary.* Please Copy & Paste the following description in the field *Course summary:*

Informationsvisualisierung kann Menschen wesentlich darin unterstützen, den Umfang von Informationskollektionen zu erfassen, deren Beschaffenheit zu verstehen und darin enthaltene relevante Informationen zu erkennen. Angemessene Visualisierungsmethoden für den Einsatz in Benutzungsschnittstellen von Informationssystemen zu finden, gewinnt daher zunehmend an Bedeutung. Der Kurs 1871 führt zunächst in grundlegende Begrifflichkeiten der Informationsvisualisierung ein und kategorisiert deren Techniken. Danach werden die wichtigsten Informationsvisualisierungstechniken und deren grundlegende Methoden und Eigenschaften anhand von Fallbeispielen vorgestellt. Daran schließt sich eine Vorstellung von Basistechnologien an, die bei der Realisierung von Informationsvisualisierungskomponenten für Webanwendungen eine bedeutende Rolle spielen. Dabei hat sich insbesondere die im Kurs 1871 grundlegend vorgestellte "Virtual Reality Modeling Language" (VRML), eine Beschreibungssprache für dreidimensionale Objekte und Szenen, schnell zu einem weitverbreiteten Standard zur Darstellung von Echtzeit-3D-Umgebungen entwickelt. Die Übungen bearbeiten und vertiefen daher gezielt den Entwurf von Informationsvisualisierungsanwendungen und den Umgang mit VRML.

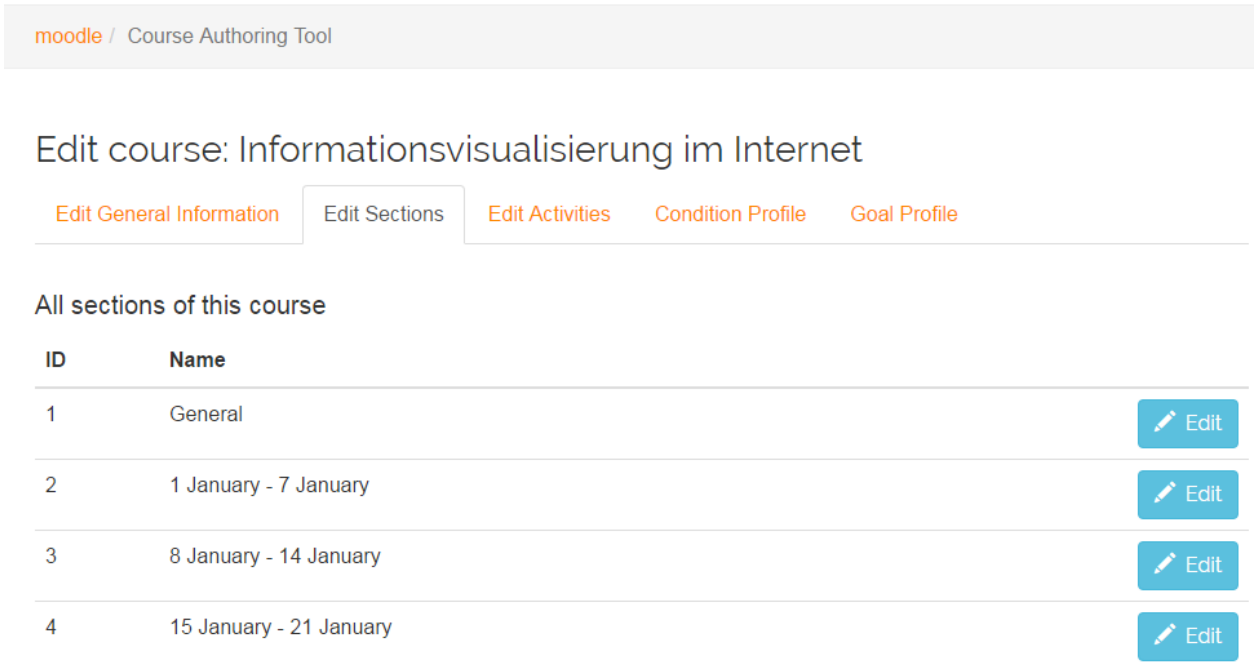
Der Kurs 1872 erweitert zunächst das Wissen über Informationsvisualisierungstechniken und deren grundlegende Methoden und Eigenschaften anhand von Fallbeispielen um zusätzliche Kategorien. Auf den Kentnissen, die im Kurs 1871 erworben wurden, aufbauend wird im Kurs 1872 das Thema VRML weiter vertieft. Hier kommen abschließend insbesondere das External Autoring Interface sowie verwandte VRML-APIs zur Realisierung von integrierten Informationsvisualisierungsarchitekturen im Zusammenwirken mit anderen Anwendungen und Diensten zur Sprache. Die Übungen bearbeiten und vertiefen gezielt weiter den Entwurf von Informationsvisualisierungsanwendungen und den Umgang mit VRML sowie dessen APIs.

Finally please click on „Save“. The new course is now created. The next section shows you how to create course material.



7.3 Create course material

To fill the new course with learning material, click on the second tab “Edit Sections”. Sections are used to bundle learning activities. We need only two ones for course units and for the learning material assignments. First click on “Edit” at the section “General” to rename the first one.



Now change the "Name" to *Course units.* The field Summary can be left blank. Click on "Save" to accept the changes.

moodle >> Course Authoring Tool >> Edit Sections

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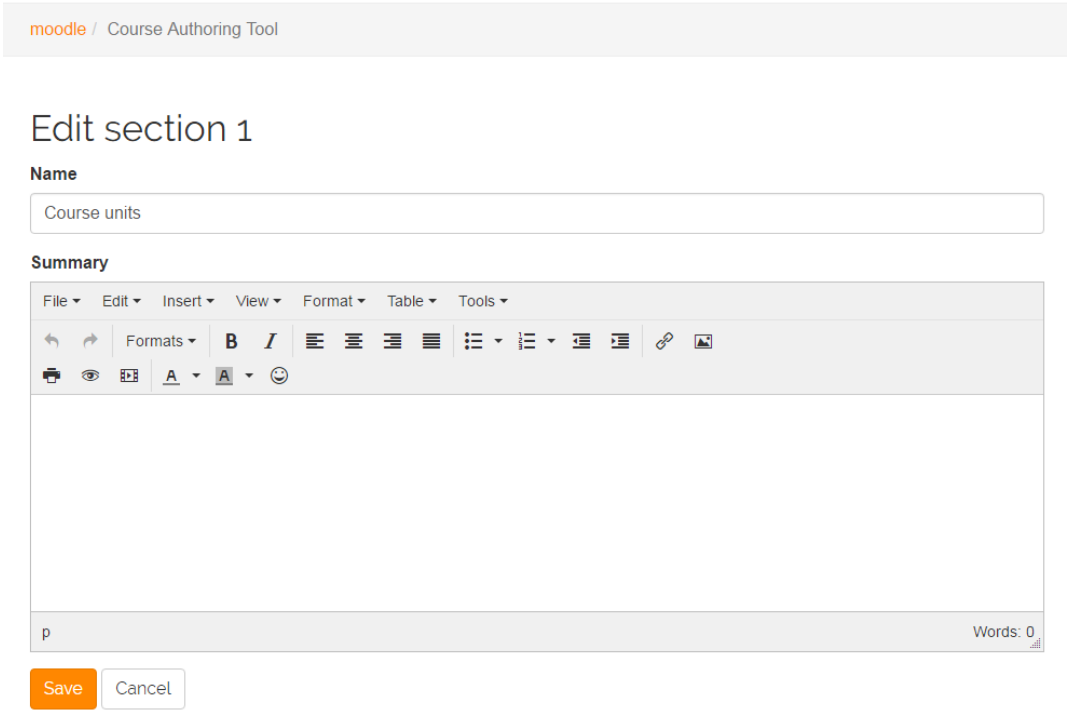
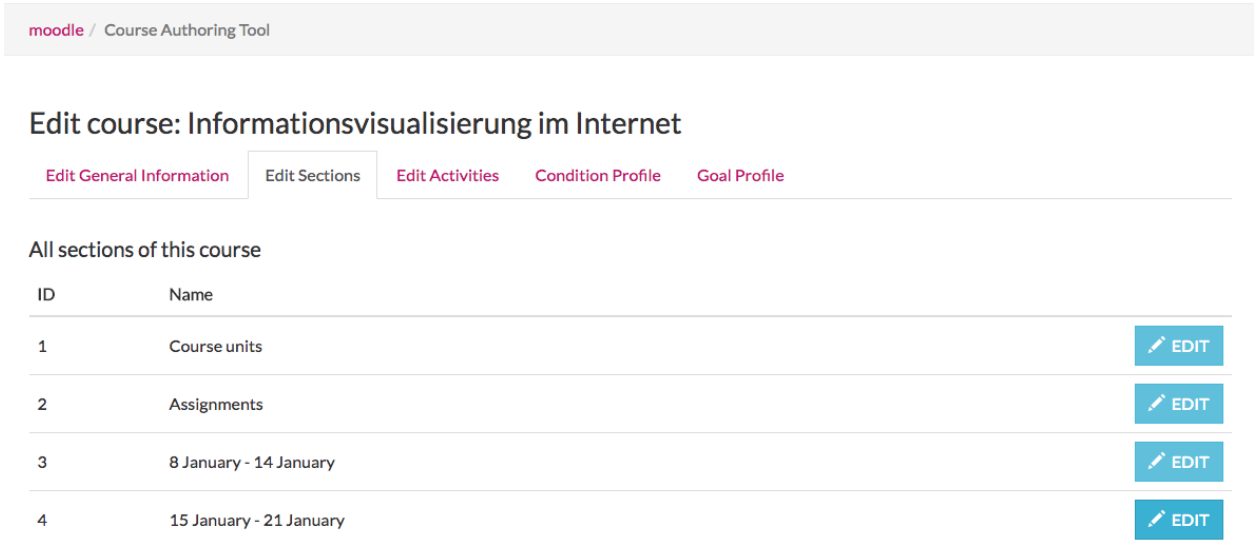
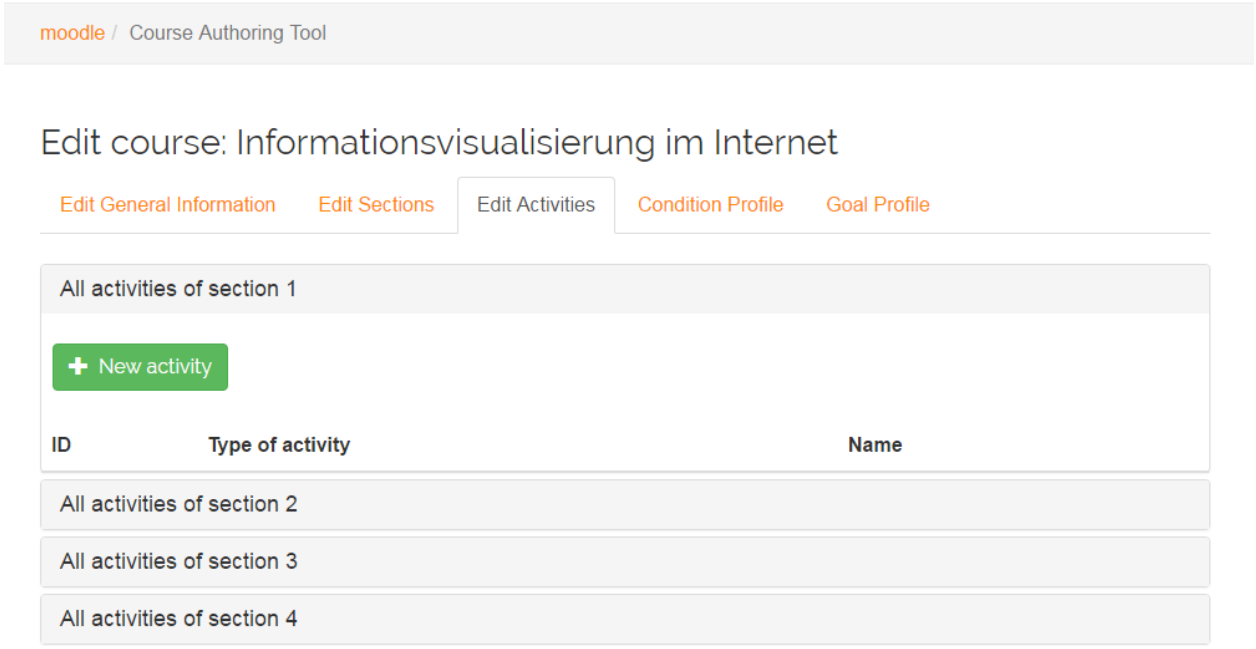
9



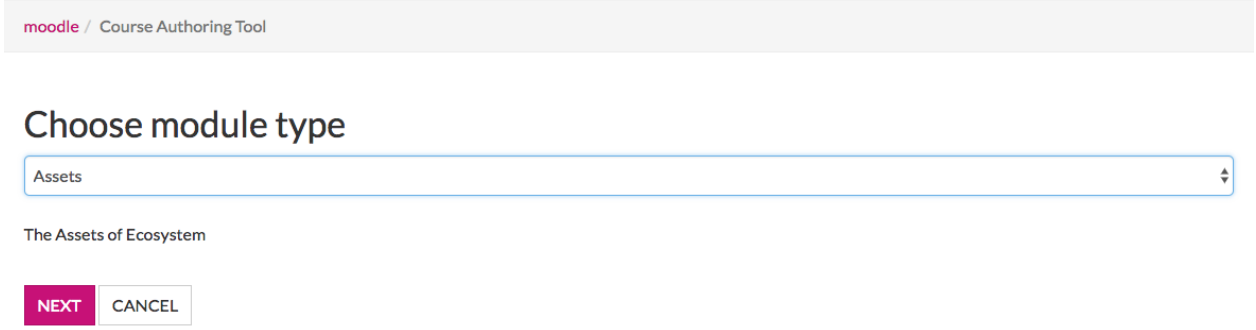
Change now the second section "1 January – 7 January" in the same way to *Assignments*.



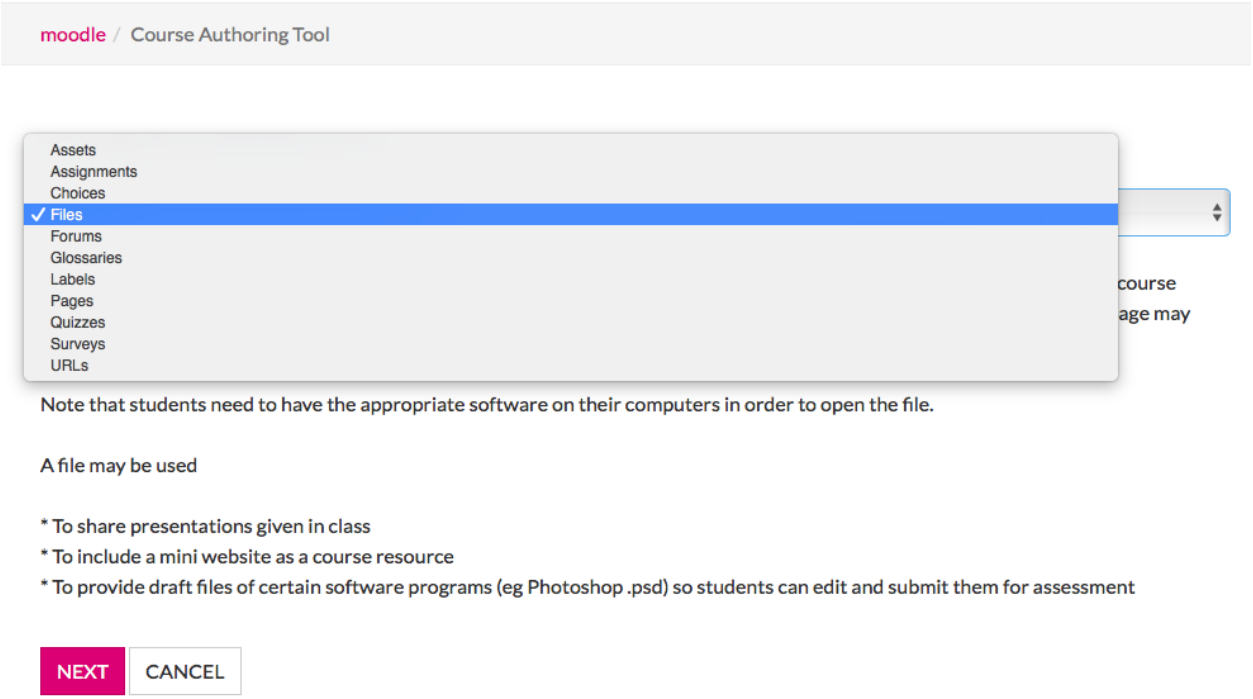
In the next step we would like to fill the section “Course units” with course material. The creating of assignments are discussed in the next section. Therefor please click on the third tab “Edit Activities” and then on “All activities of section 1 » + New activity”.



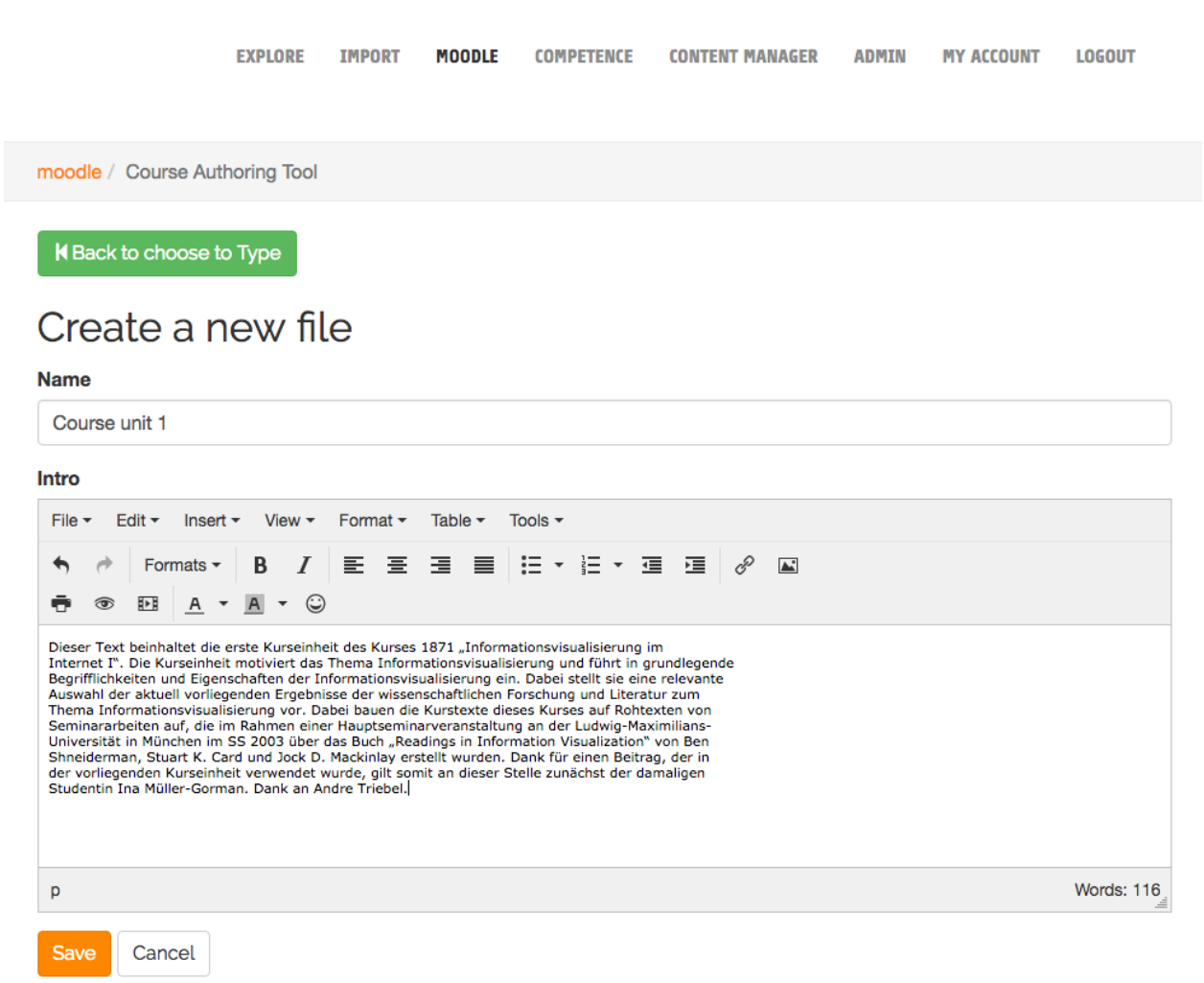
In the next screen we can select the module type for the new activity. For each activity you can add one or more module types, for example learning material or assignments.



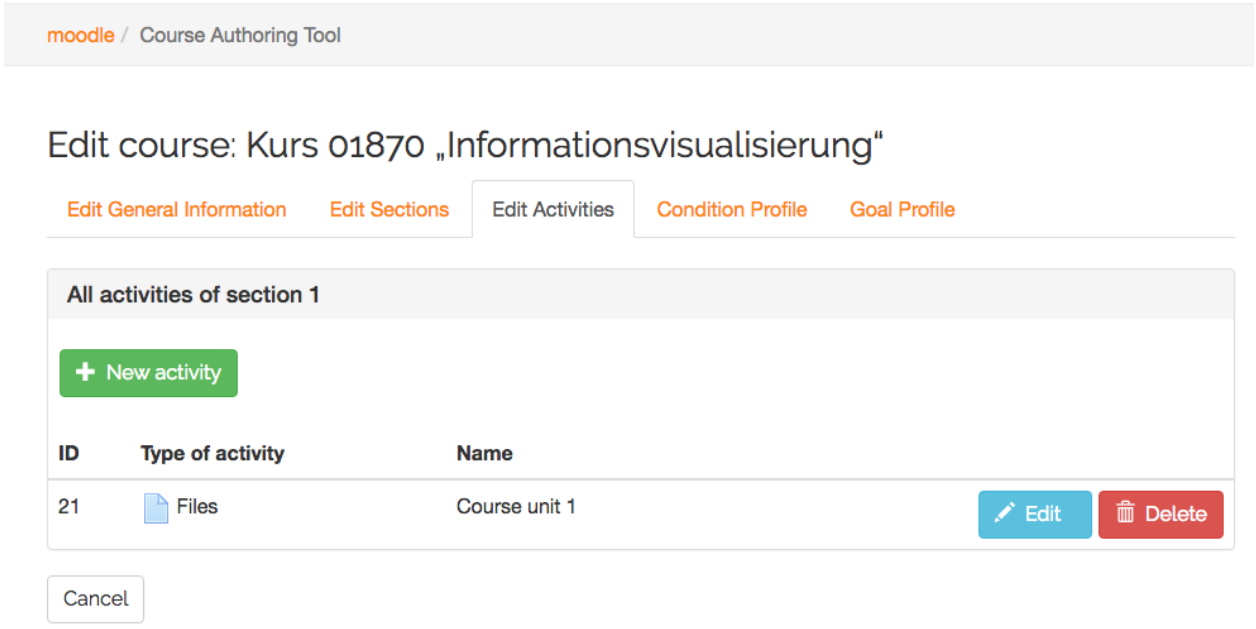
For this course we would like to provide the course material in form of pdfs. Therefor, click on the drop down menu and select the module type "Files".



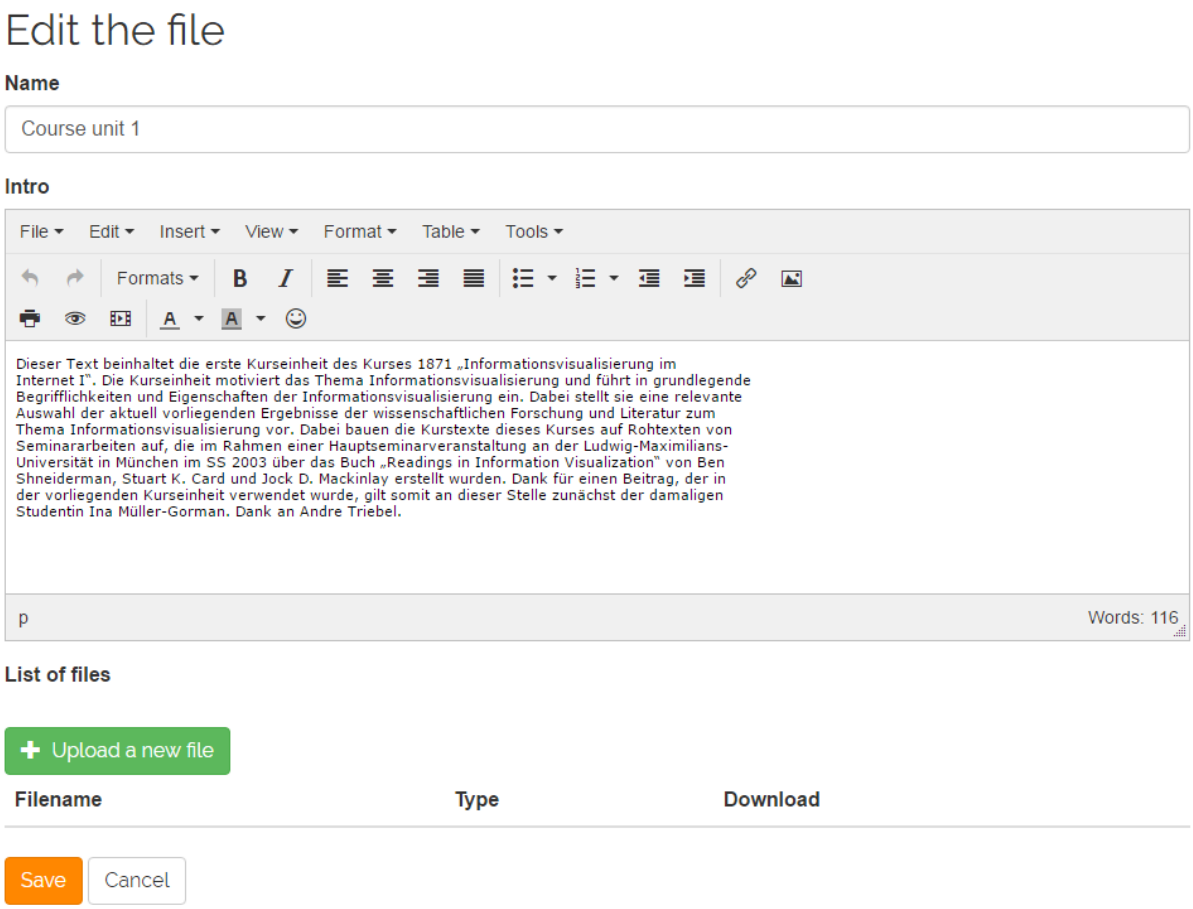
At first please enter *course unit 1* in the field "Name" and the following text in the field "Intro":
Dieser Text beinhaltet die erste Kurseinheit des Kurses 1871 „Informationsvisualisierung im Internet I". Die Kurseinheit motiviert das Thema Informationsvisualisierung und führt in grundlegende
Begrifflichkeiten und Eigenschaften der Informationsvisualisierung ein. Dabei stellt sie eine relevante
Auswahl der aktuell vorliegenden Ergebnisse der wissenschaftlichen Forschung und Literatur zum Thema Informationsvisualisierung vor. Dabei bauen die Kurstexte dieses Kurses auf Rohtexten von Seminararbeiten auf, die im Rahmen einer Hauptseminarveranstaltung an der Ludwig-Maximilians-Universität in München im SS 2003 über das Buch „Readings in Information Visualization" von Ben Shneiderman, Stuart K. Card und Jock D. Mackinlay erstellt wurden. Dank für einen Beitrag, der in der vorliegenden Kurseinheit verwendet wurde, gilt somit an dieser Stelle zunächst der damaligen Studentin Ina Müller-Gorman. Dank an Andre Triebel.
Finally, click on „Save".



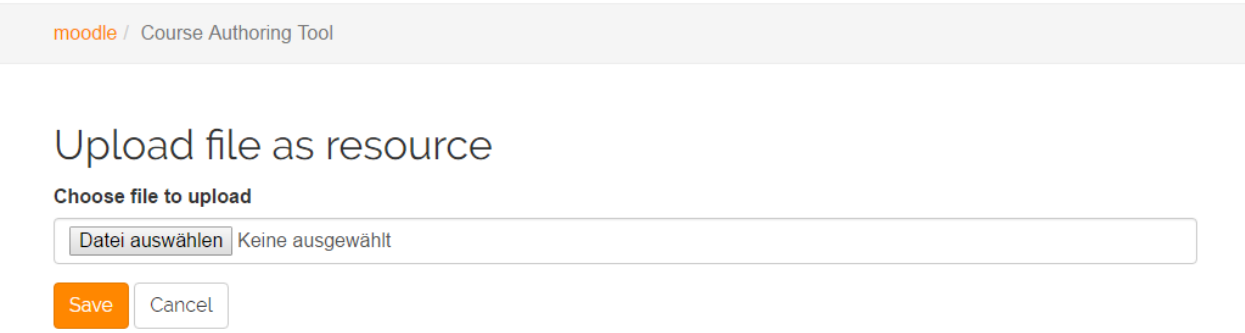
The first activity is now created however empty. To upload a file, click on “Edit”.



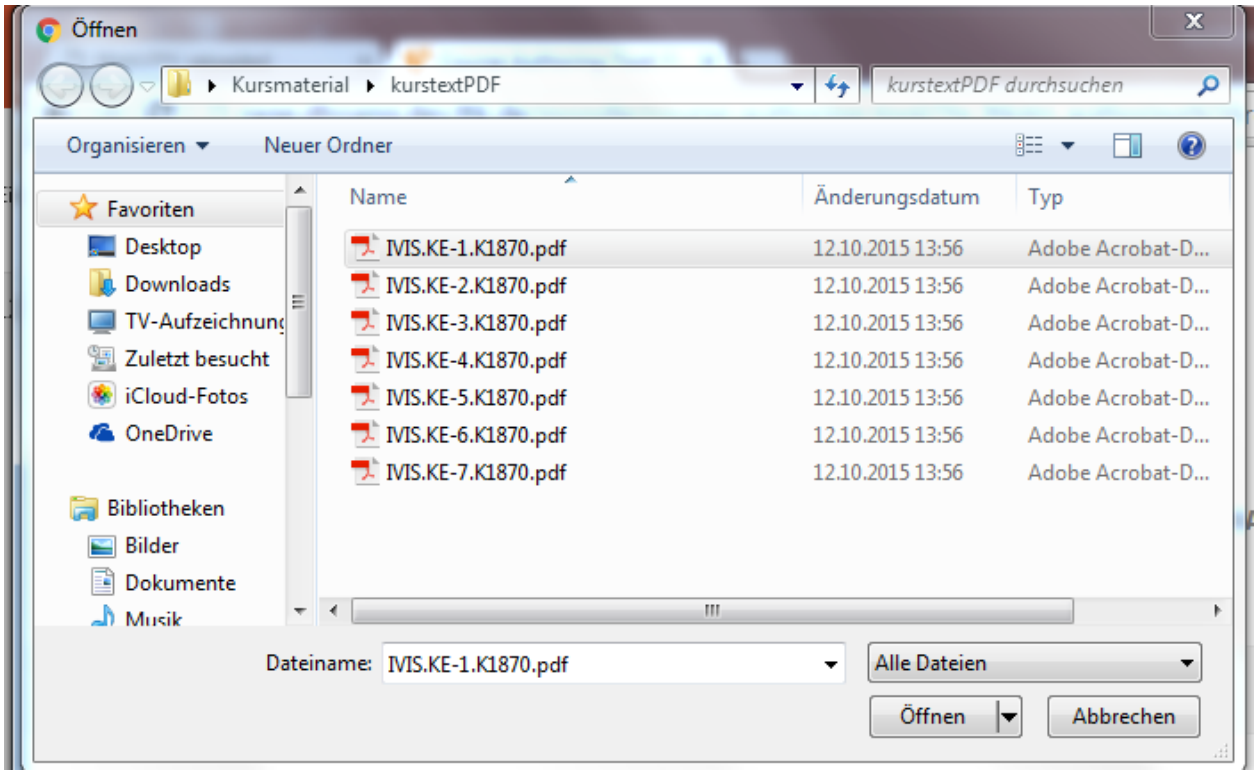
Now we can upload on or more files by click on “+ Upload a new file”.



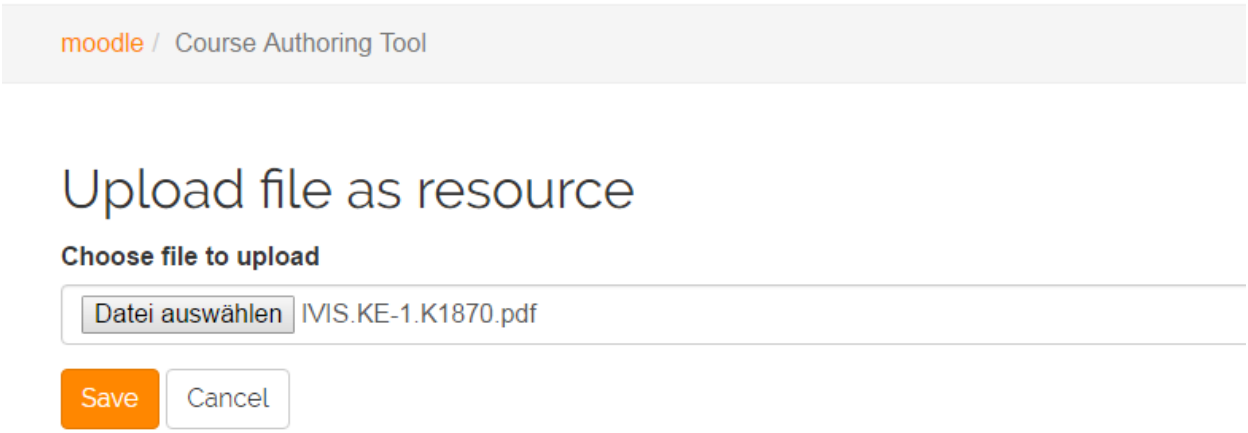
On the next window click on “Datei auswählen”



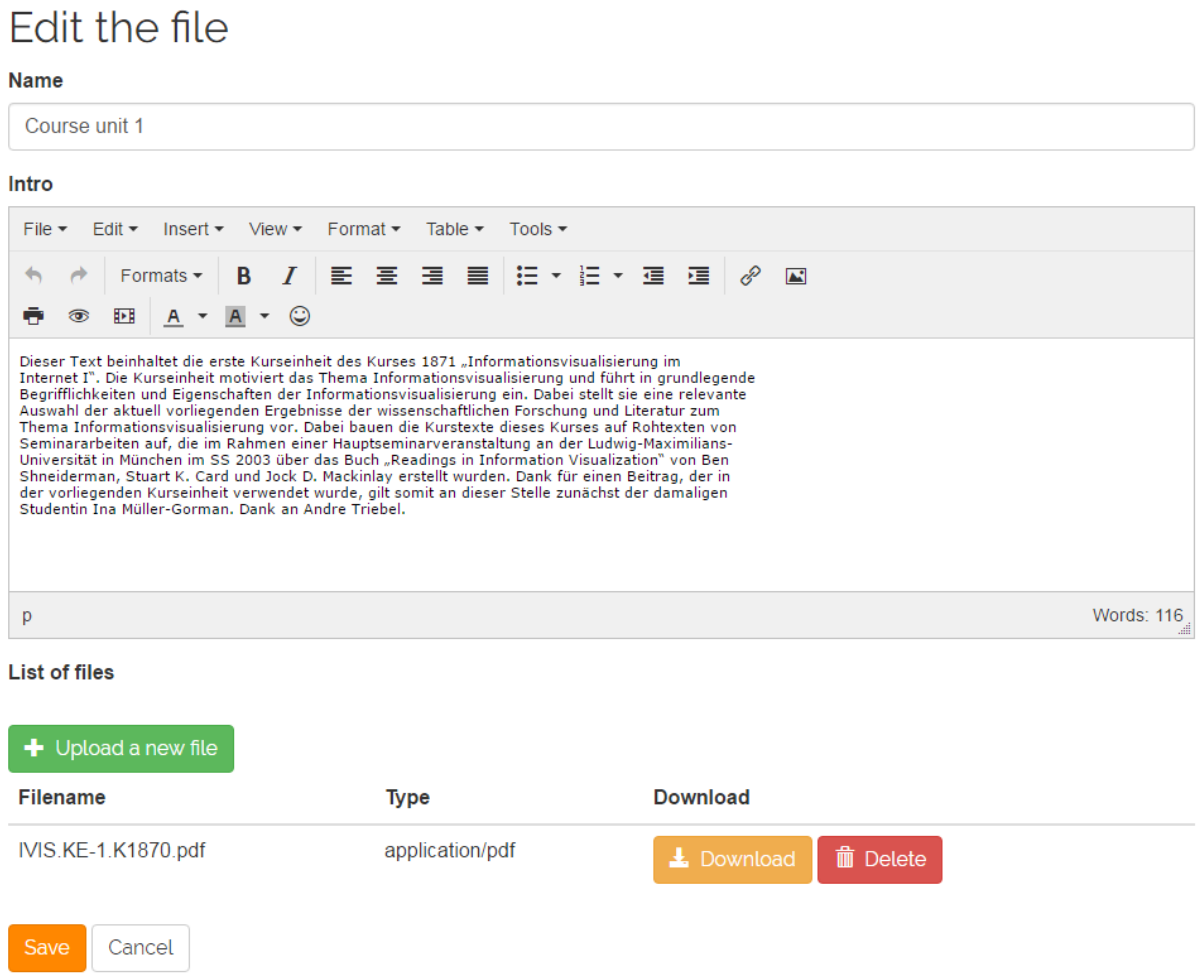
Now we have to choose the file to upload. This manual contains all seven course units of the course 1870. You find them under the folder */kurstextPDF*. The units are named *IVIS.KE-{n}.K1870.pdf* in which *{n}* stands for the unit number from 1 to 7. Please select the first one *IVIS.KE-1.K1870.pdf* and click on “Öffnen”.



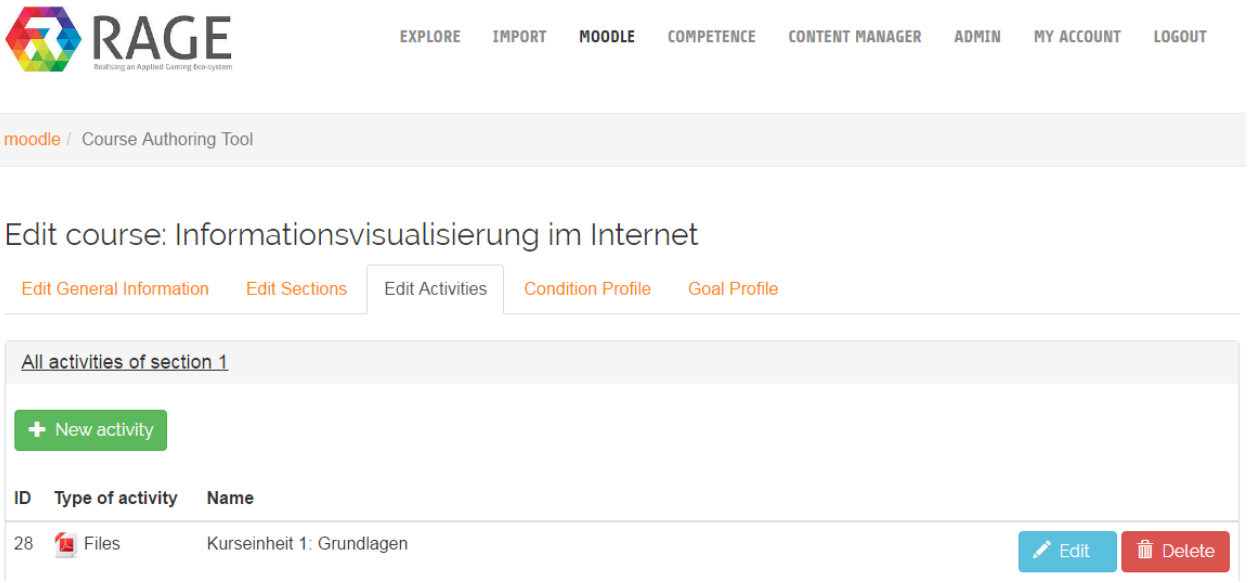
To finish the upload click on “Save”.



Now the uploaded file is in the EP. In the same way you can upload any more files for this activity. In our case we have only one file.



When we go back to the tab “Edit Activities” by click on “Save”, we see an another icon for the activity “Files” which indicate the uploaded pdf.

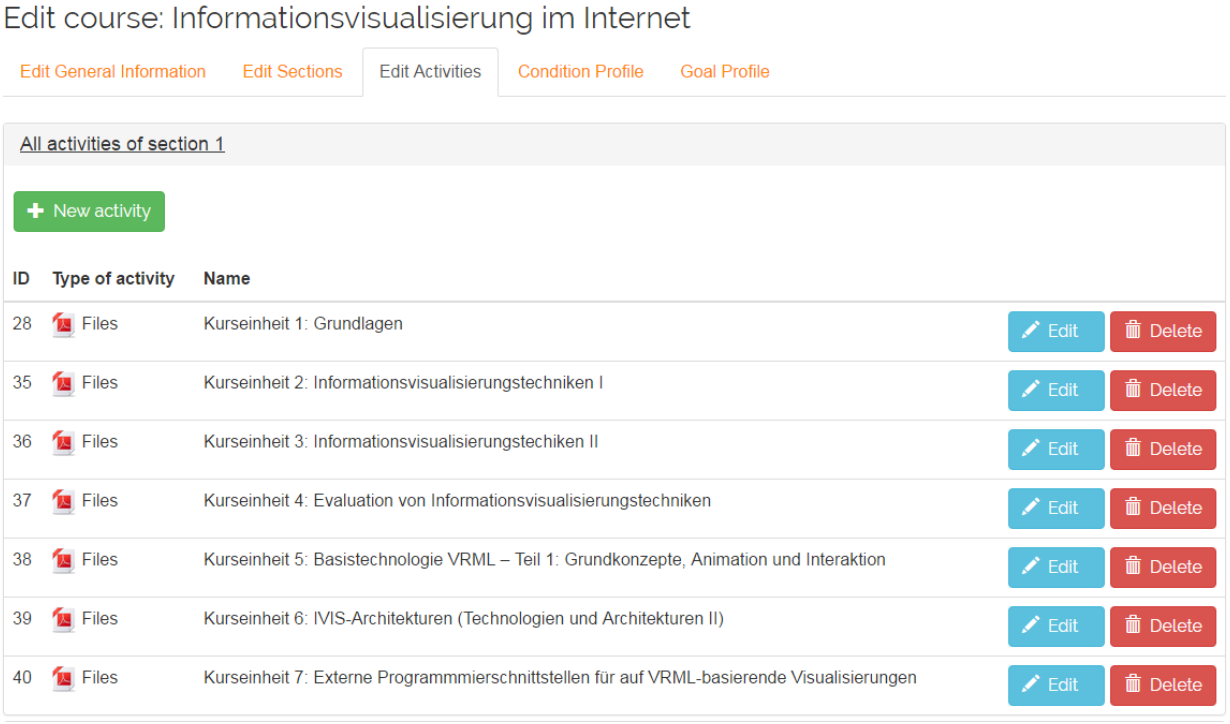


The steps to upload the other six course units are analogous to the first one. The titles of the other units are in the following table. The summaries can be led blank.

Course unit	File name	Title

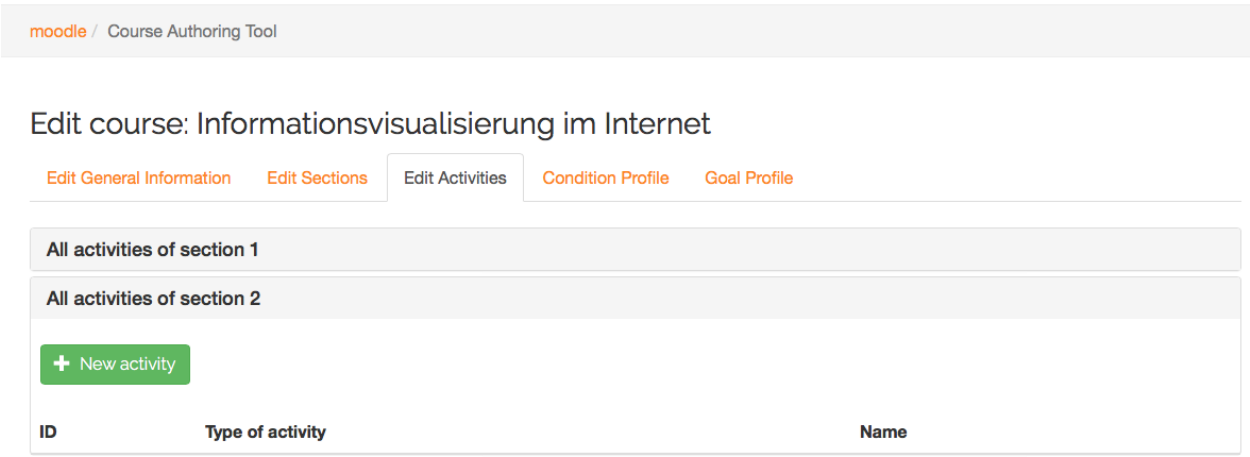
2	IVIS.KE-2.K1870.pdf	Kurseinheit 2: Informationsvisualisierungstechniken I
3	IVIS.KE-3.K1870.pdf	Kurseinheit 3: Informationsvisualisierungstechiken II
4	IVIS.KE-4.K1870.pdf	Kurseinheit 4: Evaluation von Informationsvisualisierungstechniken
5	IVIS.KE-5.K1870.pdf	Kurseinheit 5: Basistechnologie VRML – Teil 1: Grundkonzepte, Animation und Interaktion
6	IVIS.KE-6.K1870.pdf	Kurseinheit 6: IVIS-Architekturen (Technologien und Architekturen II)
7	IVIS.KE-7.K1870.pdf	Kurseinheit 7: Externe Programmmierschnittstellen für auf VRML-basierende Visualisierungen

If you have created the other course units similar to the first one you should see the following screen for the section “Course units”.

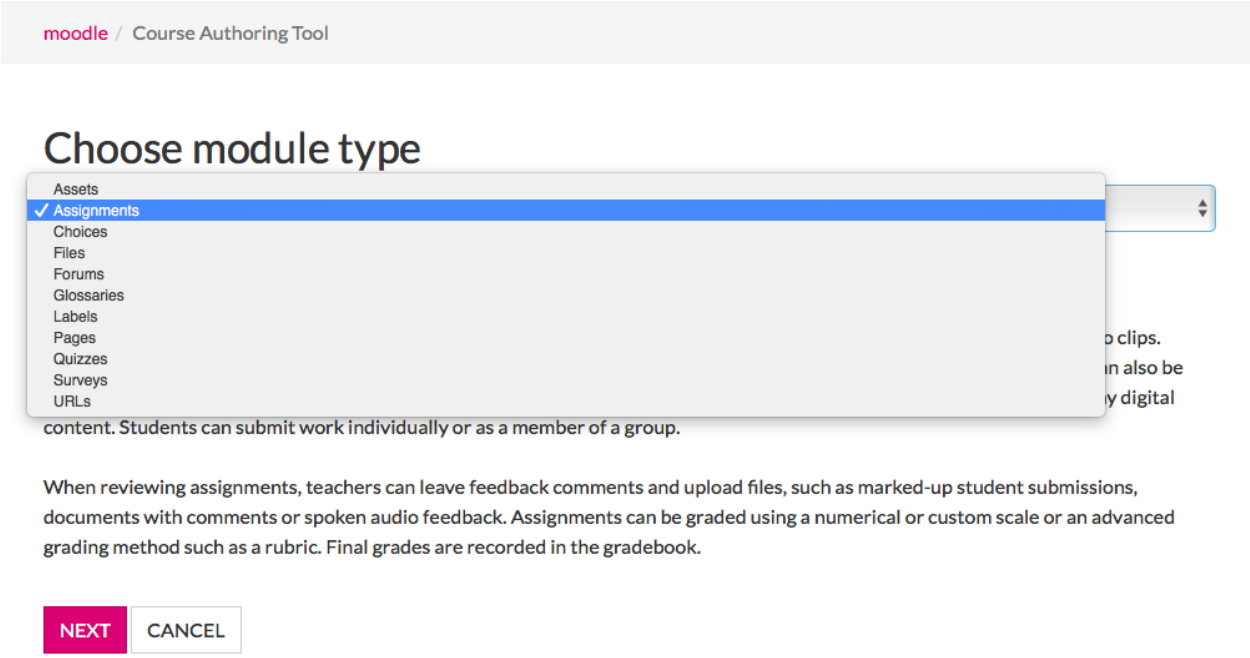


7.4 Create assignments

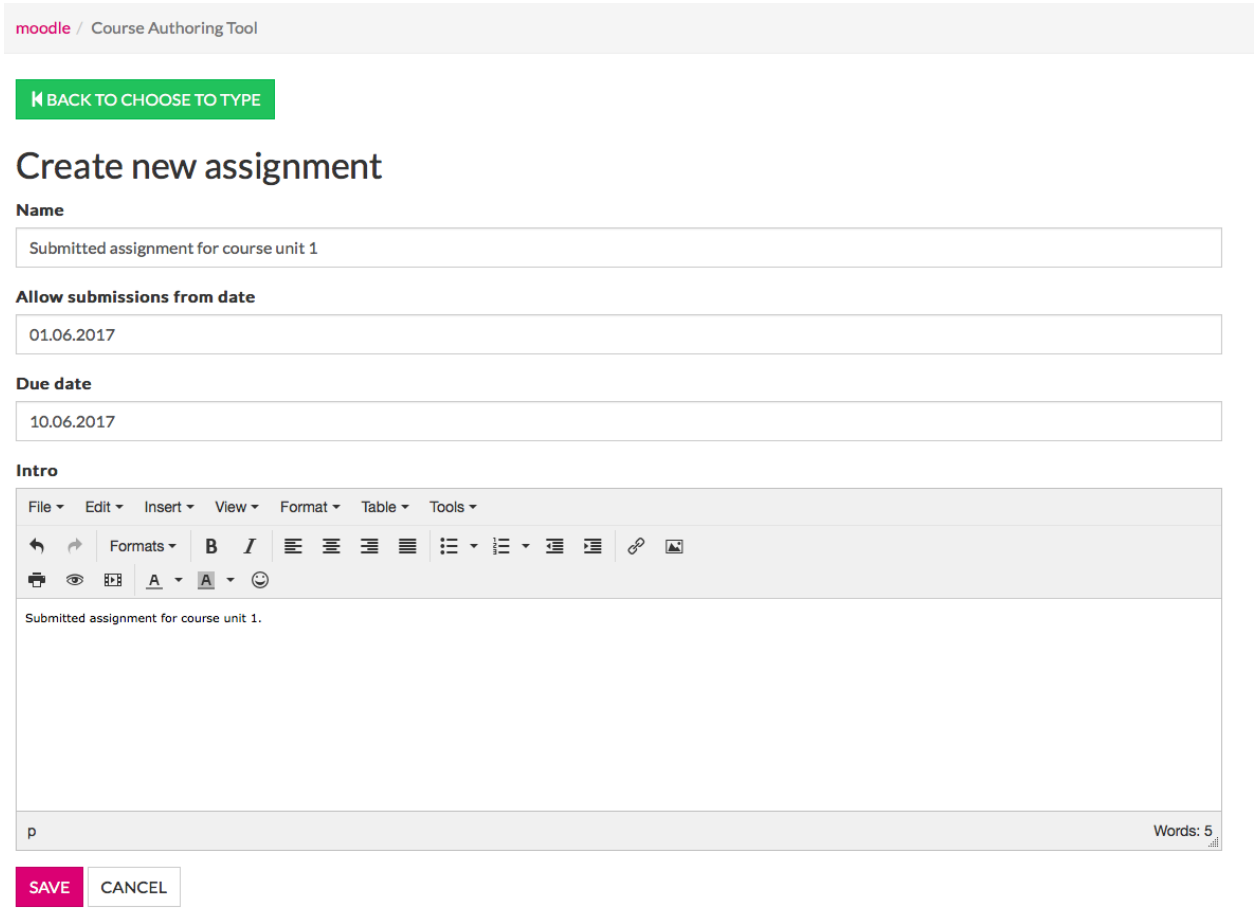
Now we start with the creation of assignments for the course 1870. Please go again to the tab “Edit Activities” but now to the section “All activities of section 2”. This section should be containing all assignments. Please click on “+ New activity” to add the first assignment.



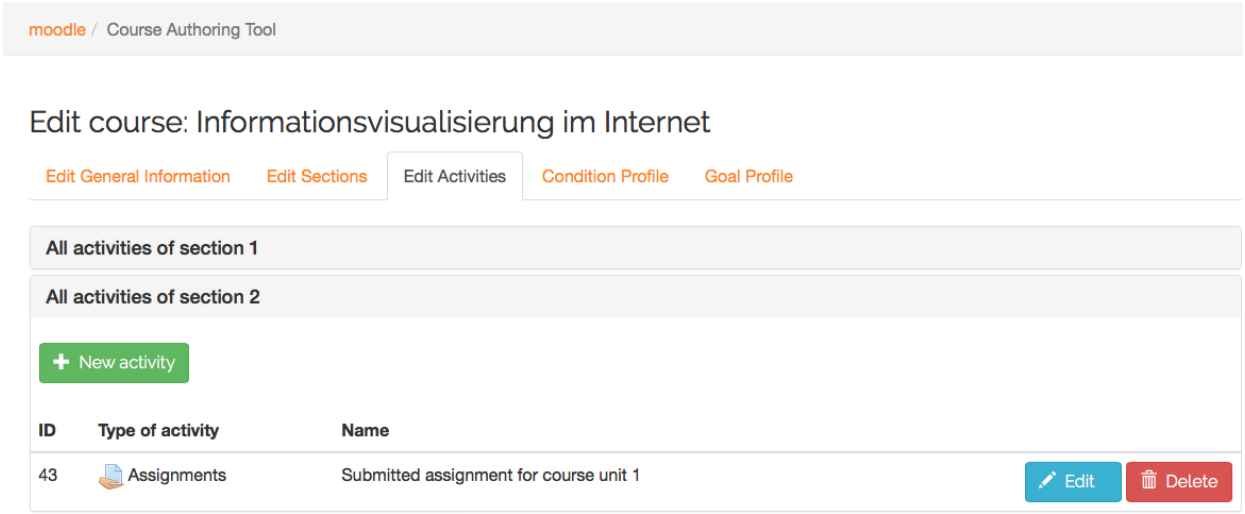
In the next screen we can select again the module type for our new activity. This time we select "Assignments". Then click on "next".



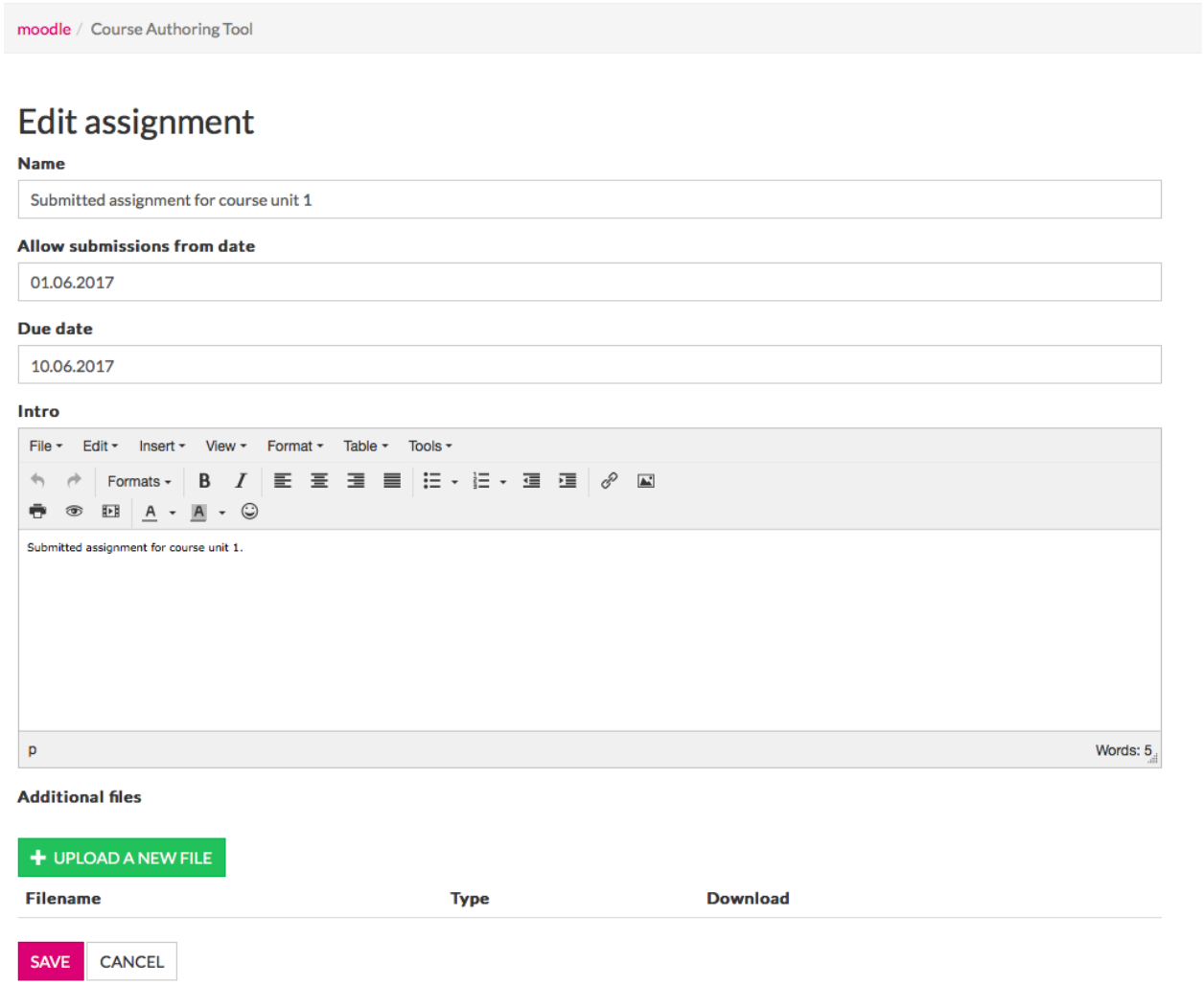
Next please enter in the field "Name" and "Intro" the same text *Submitted assignment for course unit 1*. The other both fields enable to select a start and end date to edit the assignment. In the field "Allow submissions from date" select the current date, in "Due date" the current date plus 7 days. So a learner has one week to edit and submit the assignment. Finally, click on "Save".



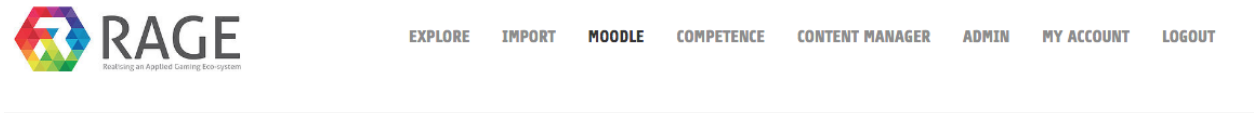
Subsequently the EP presents us the new assignment in section 2 though still without content.

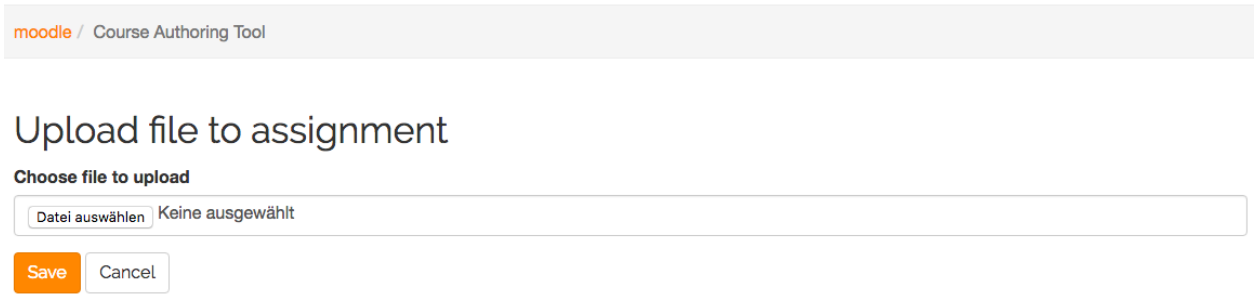


To add content click on “Edit”. Now we have the possibility to upload a file by clicking on “+ UPLOAD A NEW FILE”.

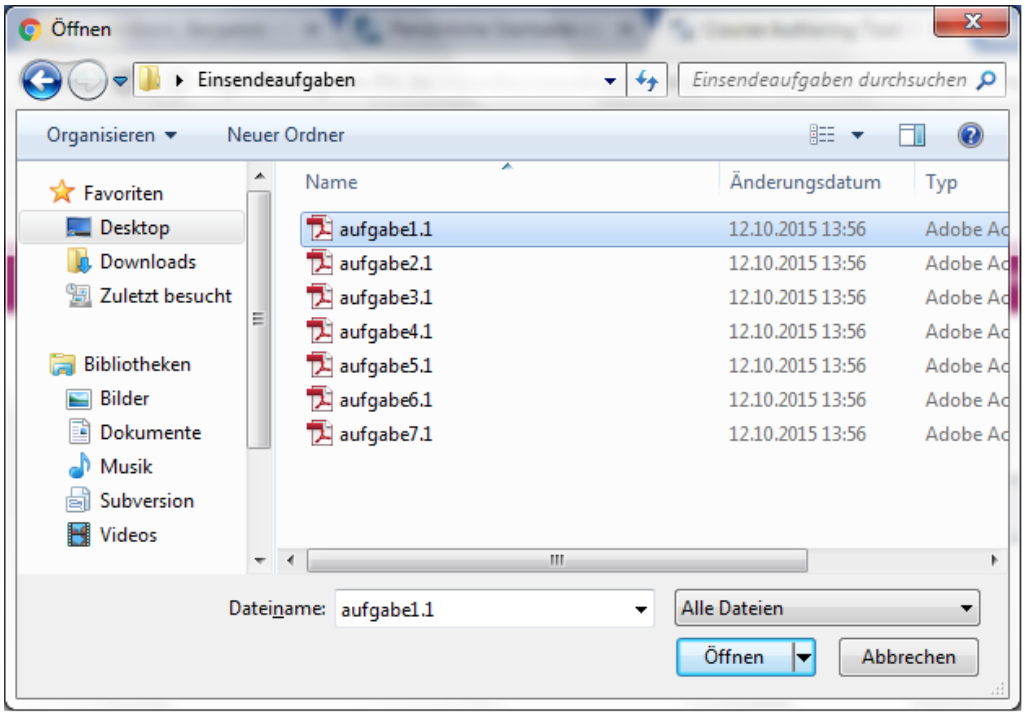


In the next screen click on “Datei auswählen”.

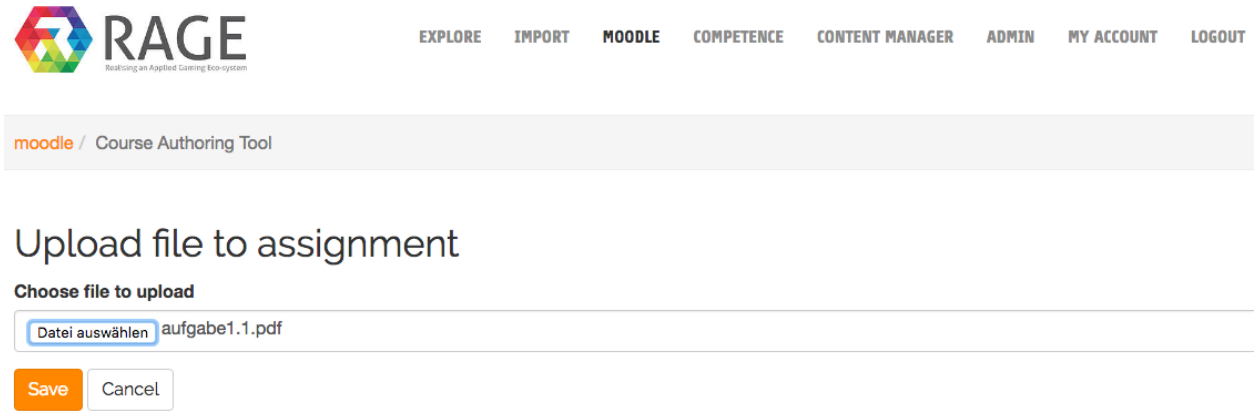




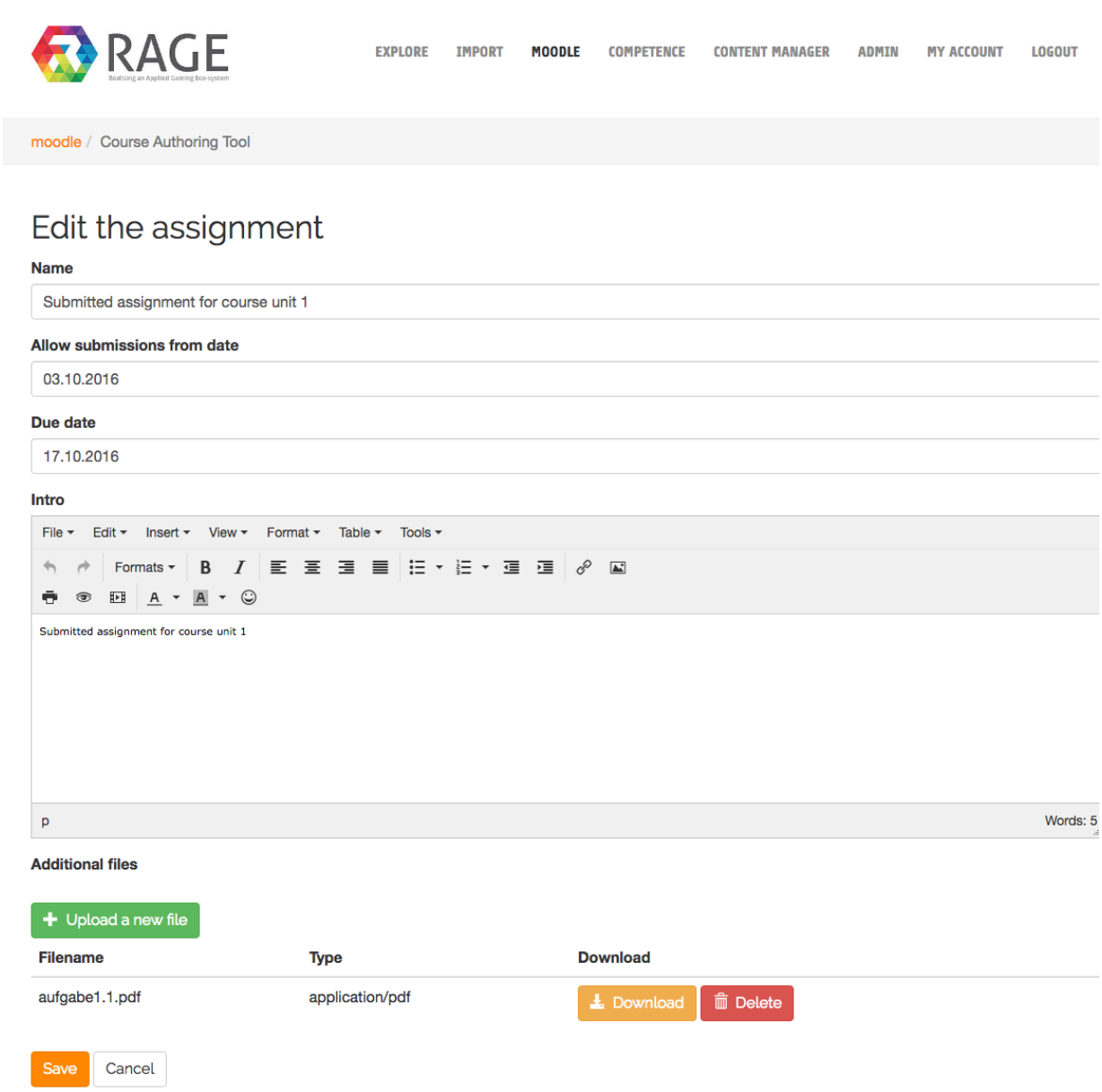
Like the course units we have to choose again the file to upload. This manual contains all assignments of the course 1870. You find them in the folder */Einsendeaufgaben*. The assignments are named *aufgabe.{n}.1*.pdf in which *{n}* stands for the unit number from 1 to 7. Please select the first one *aufgabe1.1.pdf* and click on “Öffnen”.



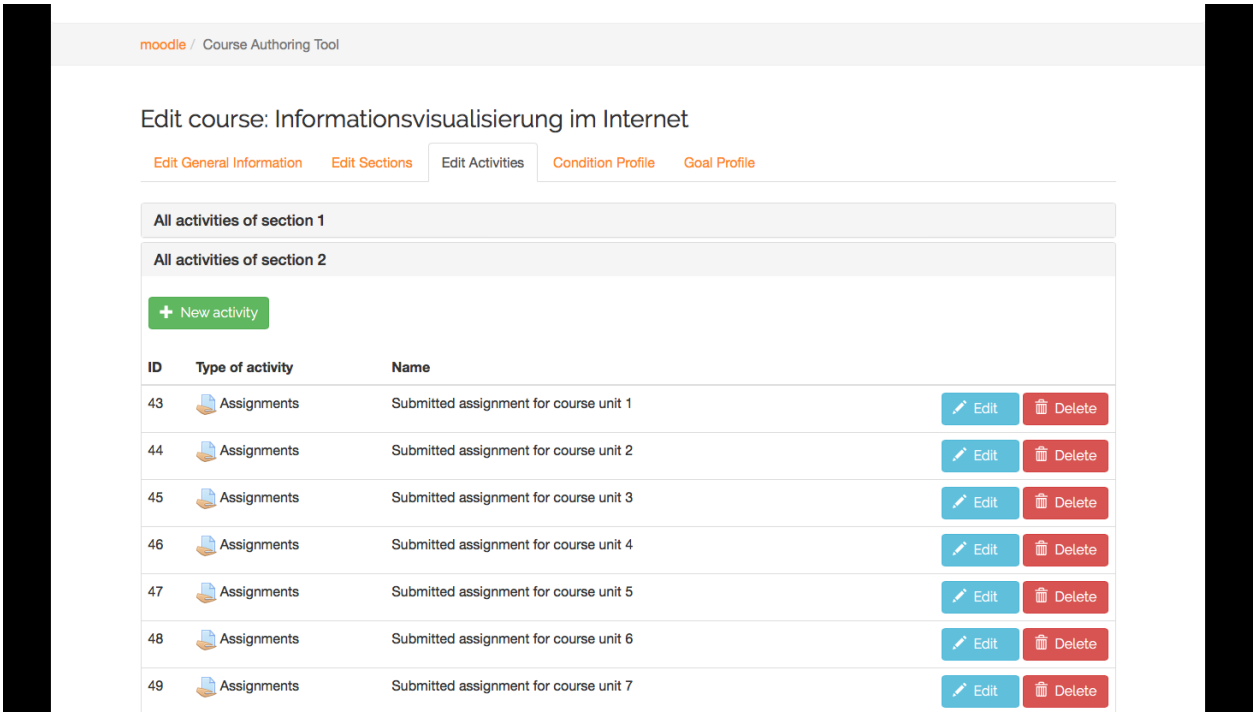
In the next screen click on “Save” to upload the file to the EP.



After that you see the first assignment including the uploaded file.



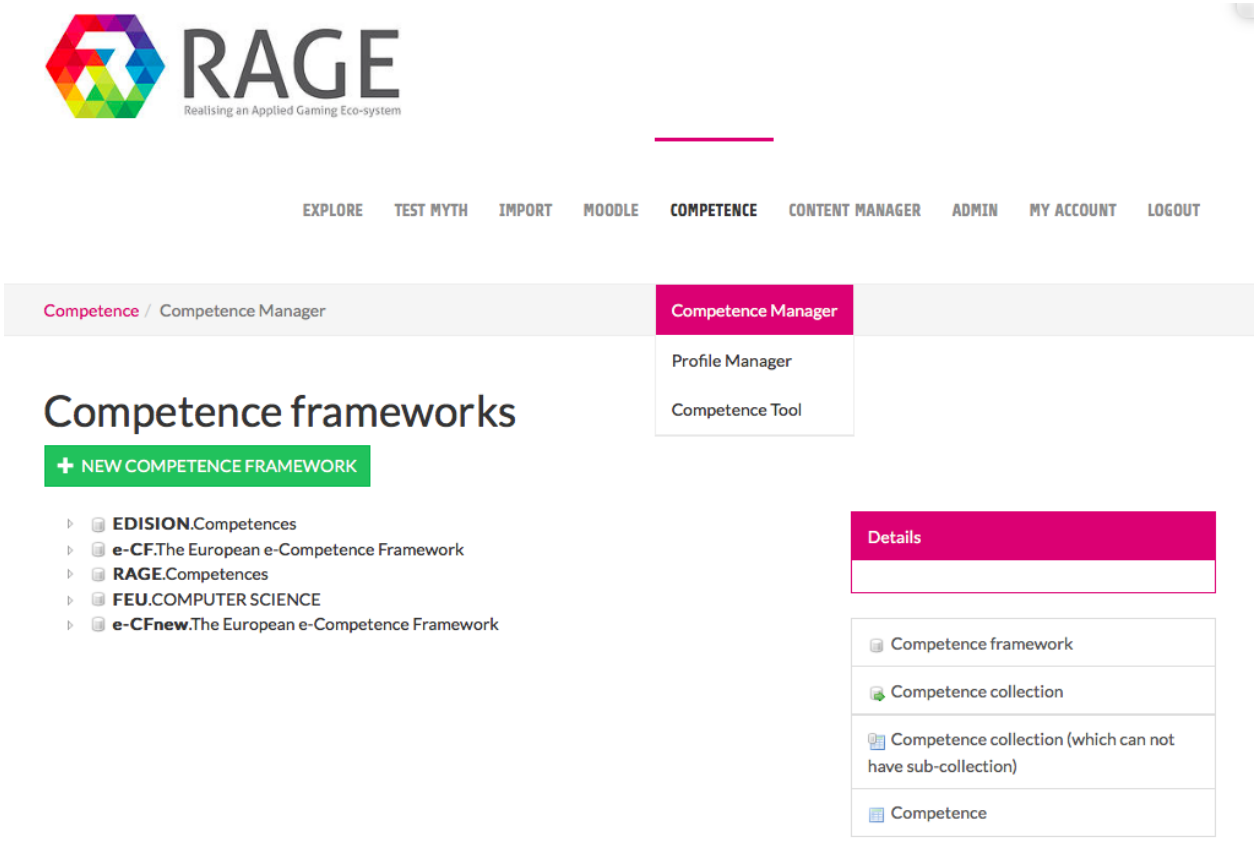
When we go back to tab “Edit Activities” by click on “Save” we can add the other assignments. The steps to create and upload the files for the other six ones are analogous to the first one. The following screenshots shows all uploaded files for the section “Assignments”.



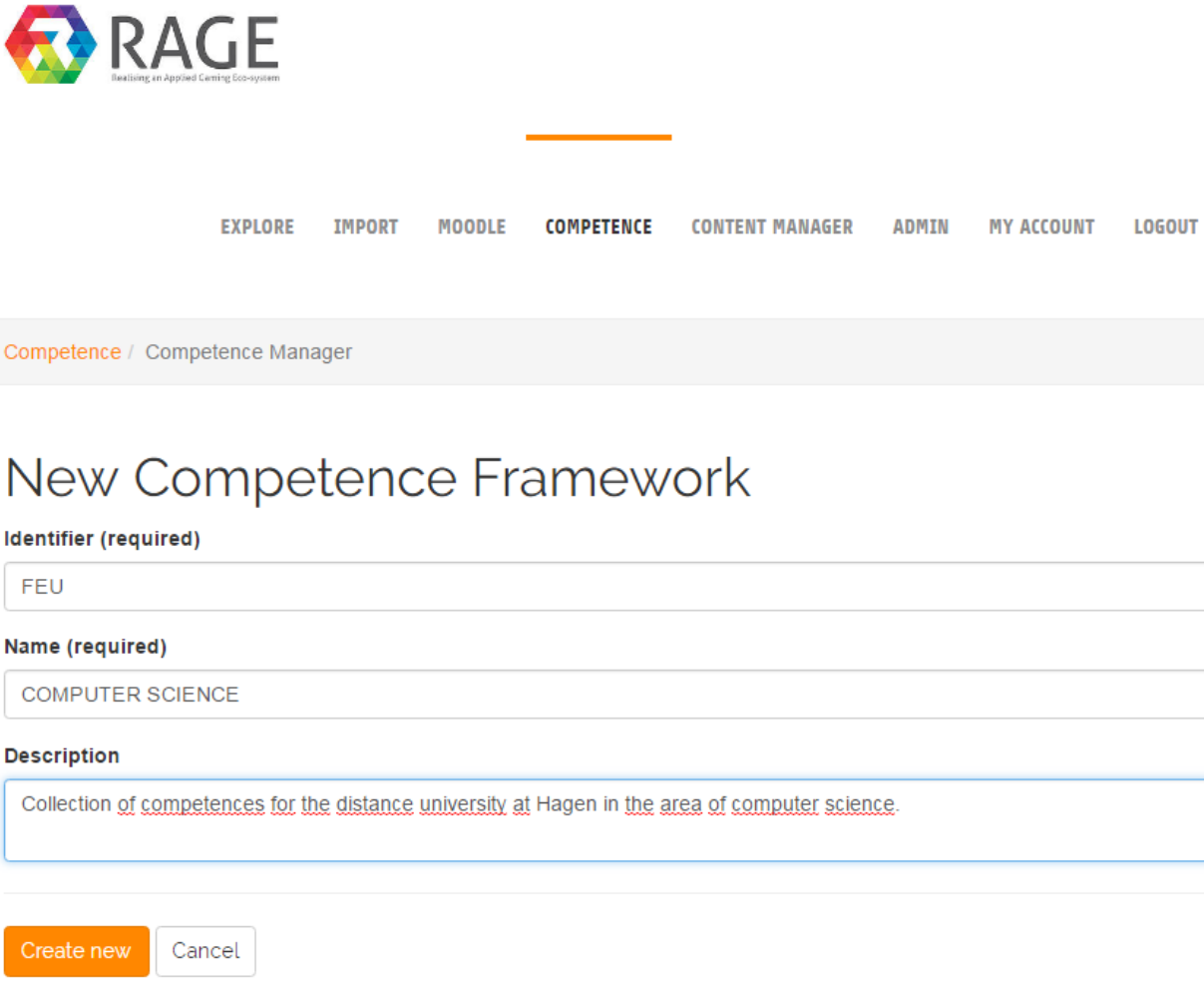
Now we have finished to create a new course and add learning material and assignments. The next step is to add competence information to the course.

7.5 Create a new Competence Framework

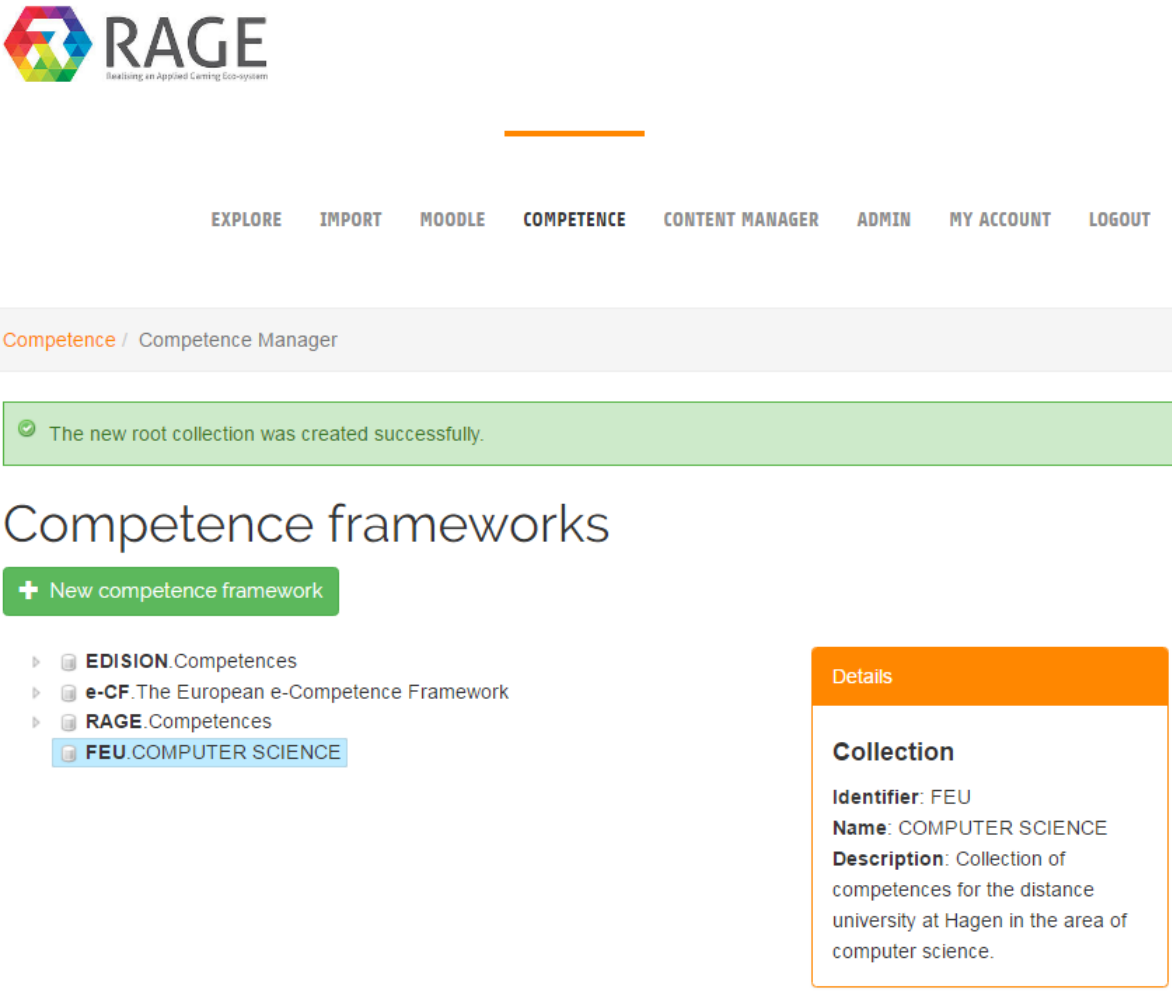
To be able to use competences we must first create them. To do this please click on the menu “COMPETENCE»Competence Manager”. The Competence Manager managed competences within Competence frameworks. A framework can have on or more sub regions to bundle competences, for example thematically. Now we would like to show how to create a new framework. First step is to click on “+ NEW COMPETENCE FRAMEWORK”.



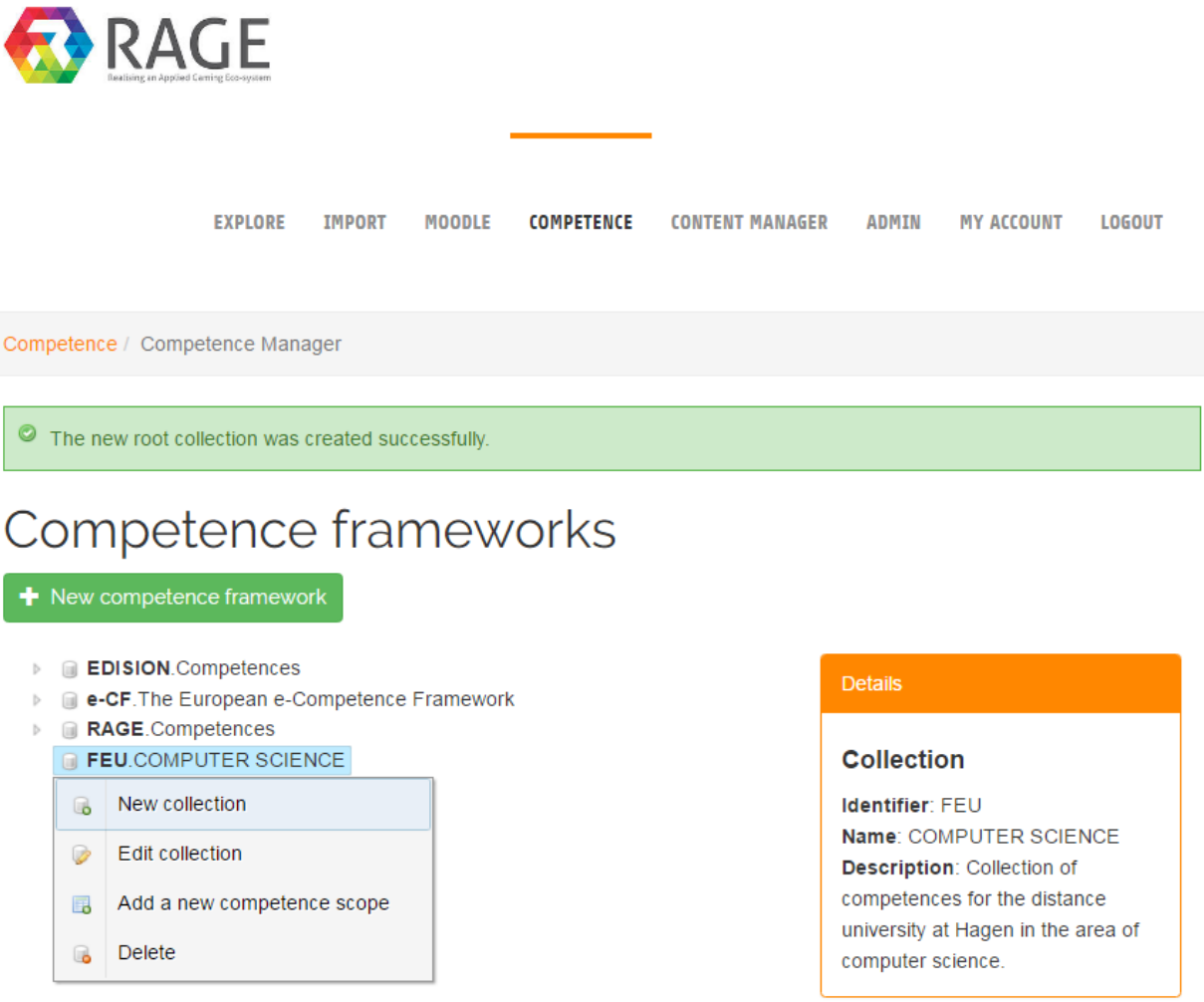
Now enter in the field “Identifier” *FEU*, “Name” *COMPUTER SCIENCE* and for the “Description“ *Collection of competences for the distance university at Hagen in the area of computer science*. Finally click on “Create new”.



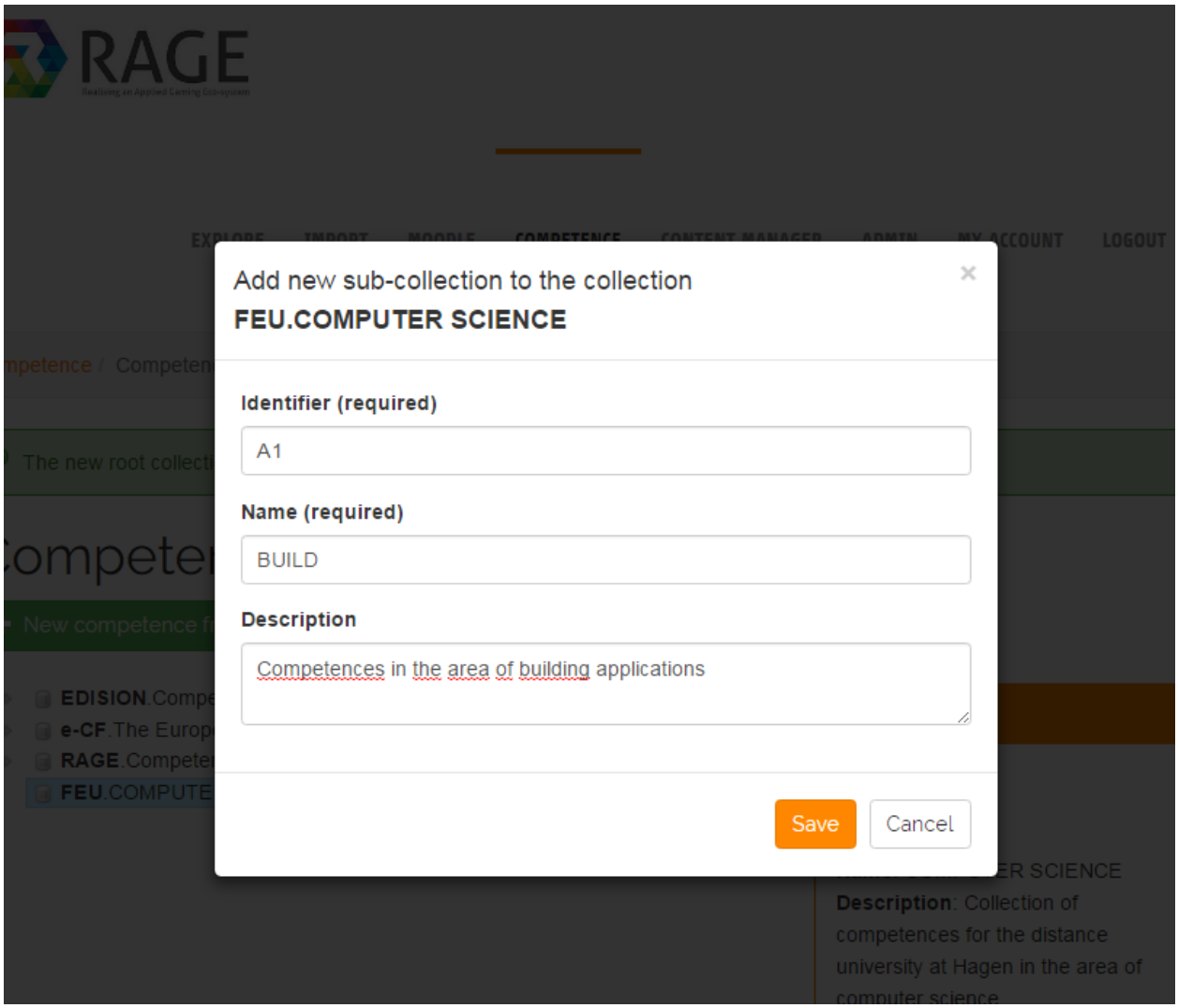
Now we see the new competence framework *FEU* in the start screen of the Competence Manager. On the right site, we have a menu with the framework details.



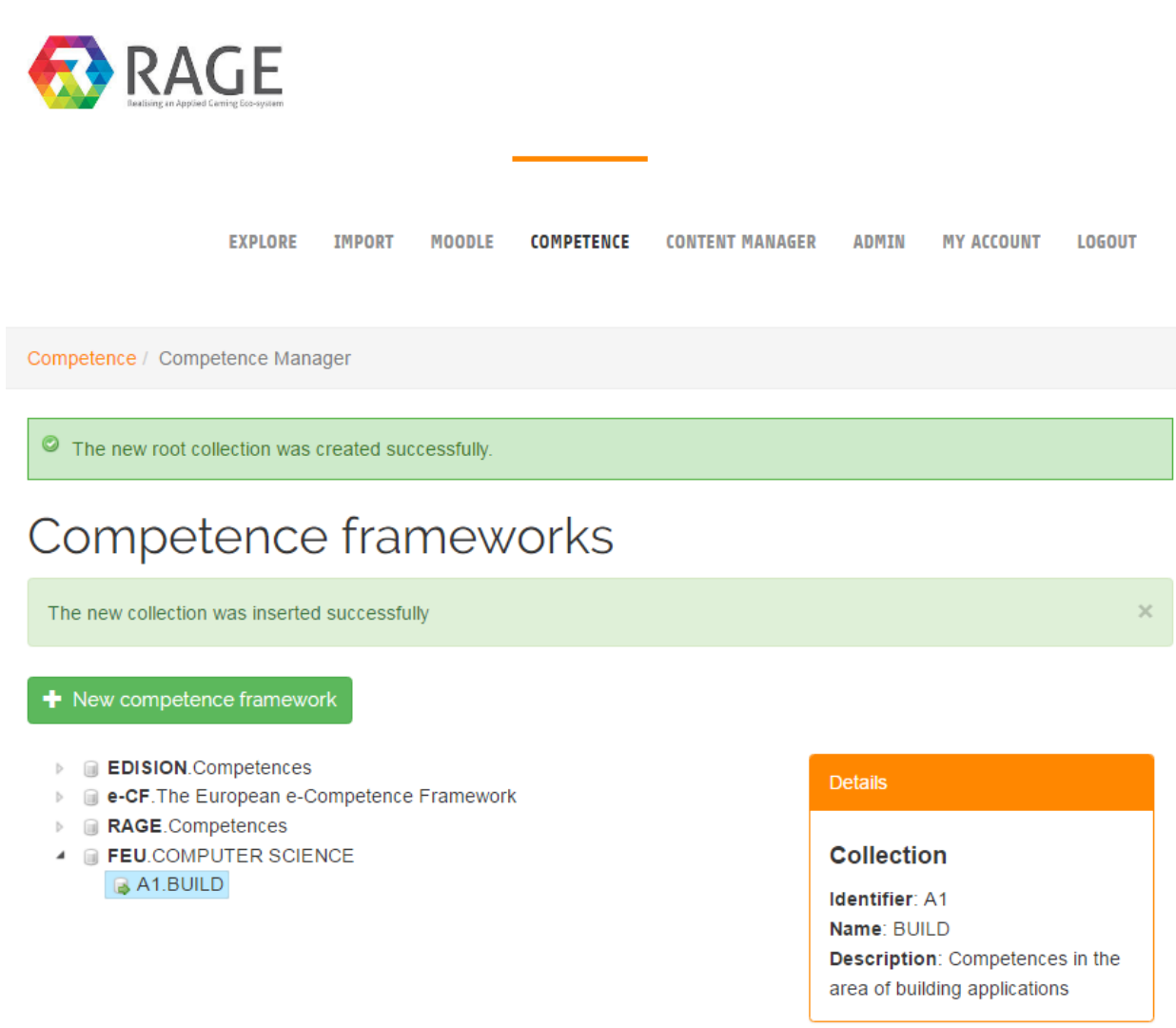
To subdivide the new framework into different areas right click on the framework and select "New collection". If you want it is equally possible to create new competence directly under the framework without additional collections but for this case, we would like to subdivide the new framework.



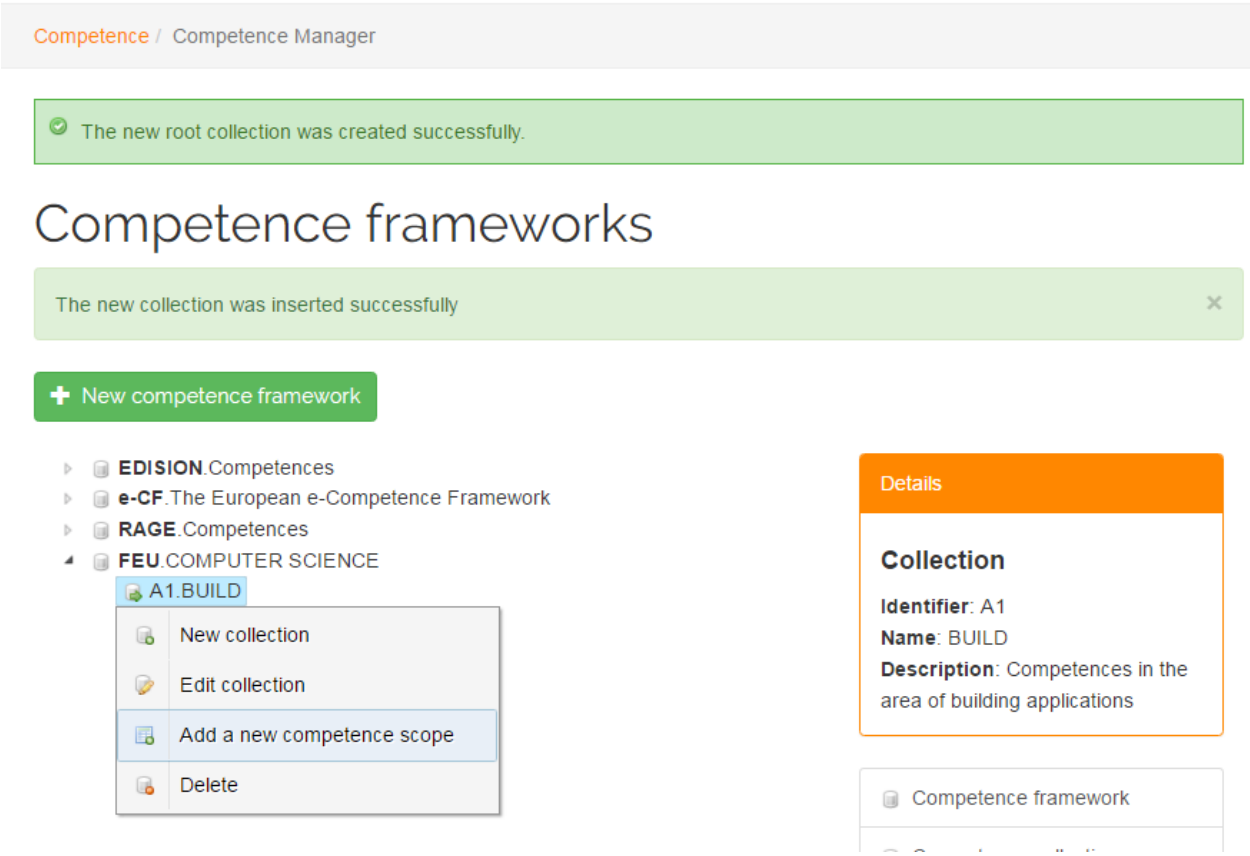
In the next screen enter the "Identifier" *A1*, the "Name" *BUILD* and for the "Description" *Competences in the area of building applications*. Finally save these information with a click on "Save".



The new collection “A1. BUILD” are shown in the following screenshot within our new framework *FEU*. With a left mouse click we see, like by frameworks, on the right site detailed informations about the collection.

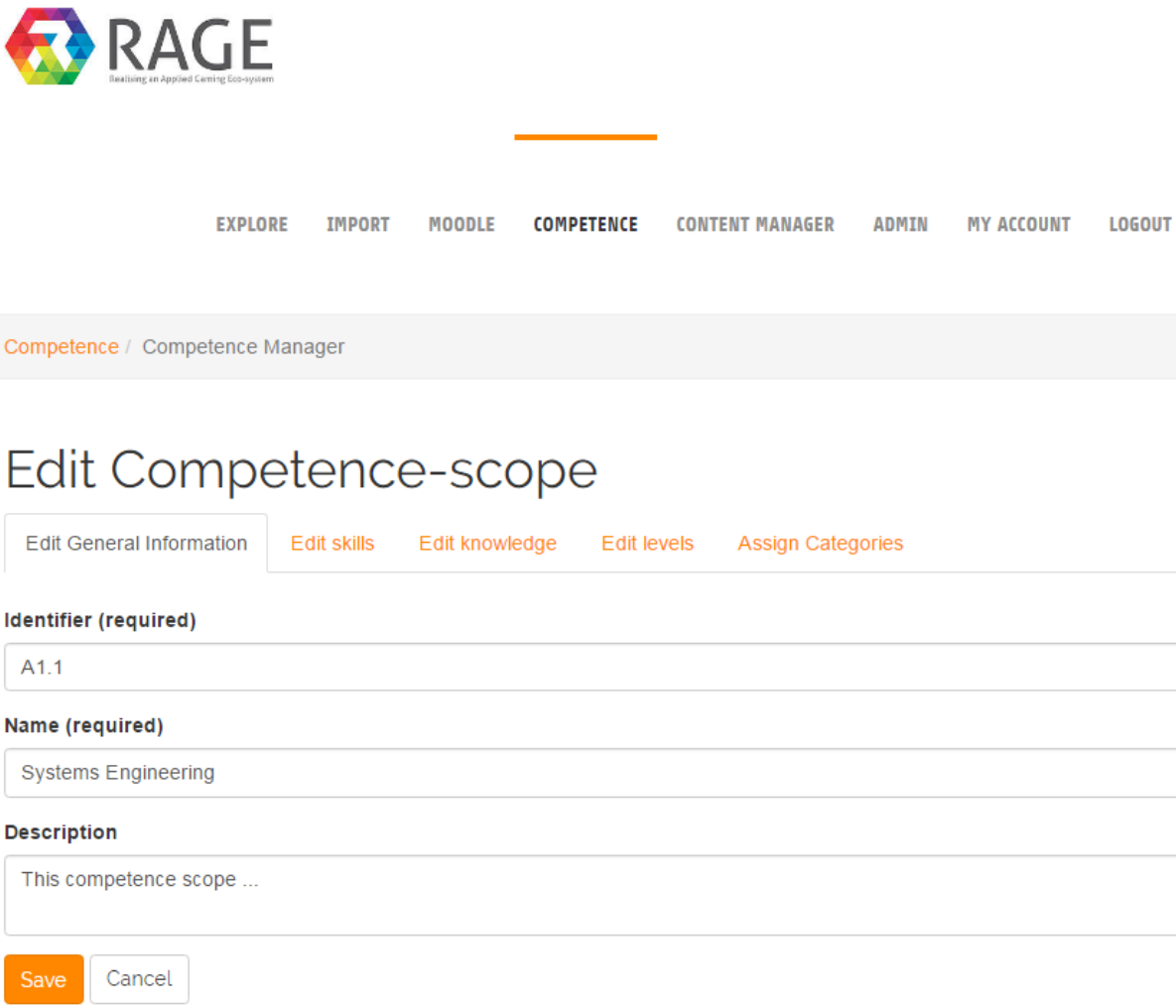


Now we create a new competence within the collection “A1.BUILD”. With a right mouse click on the collection “A1.BUILD” we select “Add a new competence scope”.

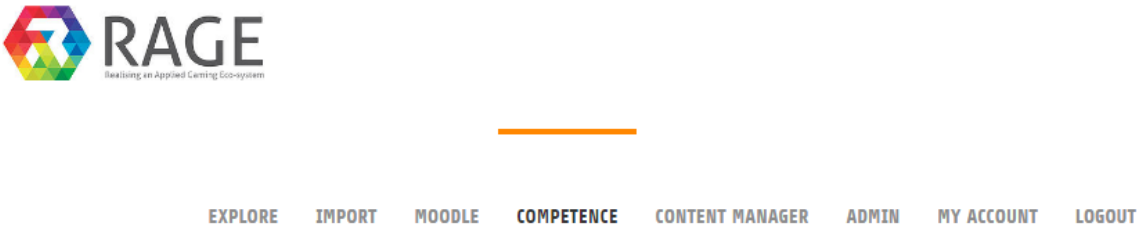


Competences within the competence manager are named competence scopes. The reason is, that they are distinguished normally of the competences which are practically in use, for example as a part of a learning goal for a course. Competence scope defines the "maximum competence" and specifies a fixed pool of available ***Proficiency Levels (PLs), Skills and Knowledge Examples (SKEs)***. Through the possibility to select individual SKEs from a competence scope, there are theoretically endless possibilities to create a concrete Competence from one competence scope. To avoid here misunderstandings, the different names.

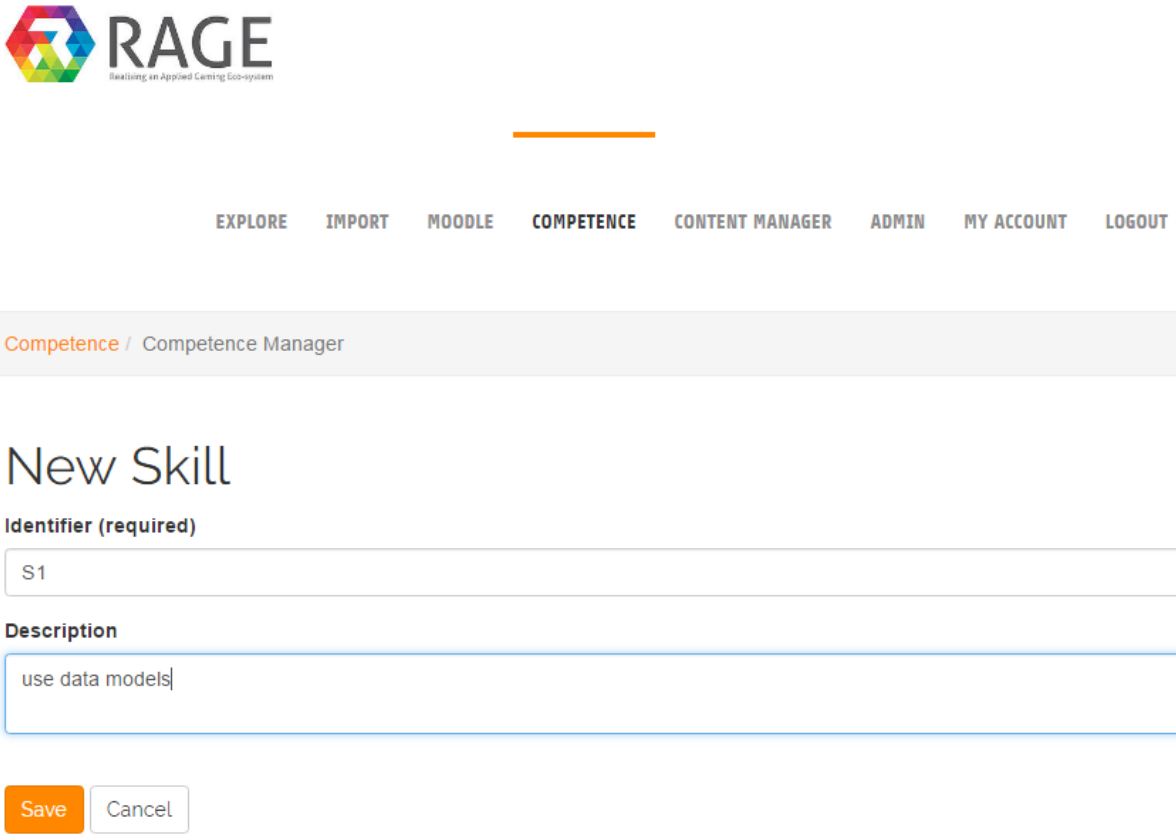
As "Identifier" for the new competence scope enter *A.1*, for the "Name" *Systems Engineering* and as *"Description" This competence scope … Click on "Save"* to back up the informations. Besides this general informations we have a four more tabs to add optional skills, knowledges, levels and categories. In the next step we would like to add some skills to the new competence scope. Therefore please click on the second tab "Edit skills".



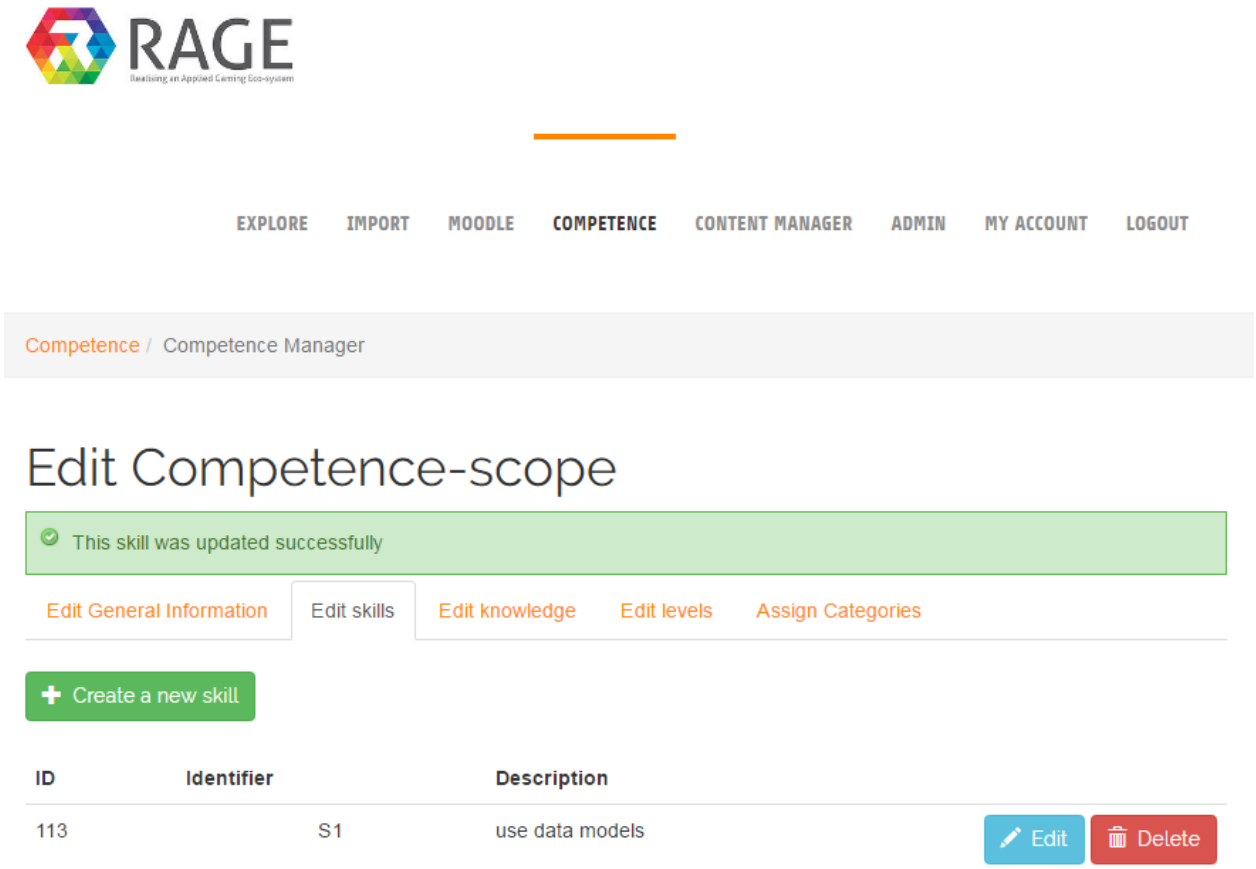
On the next screen click on “+ Create a new skill”.



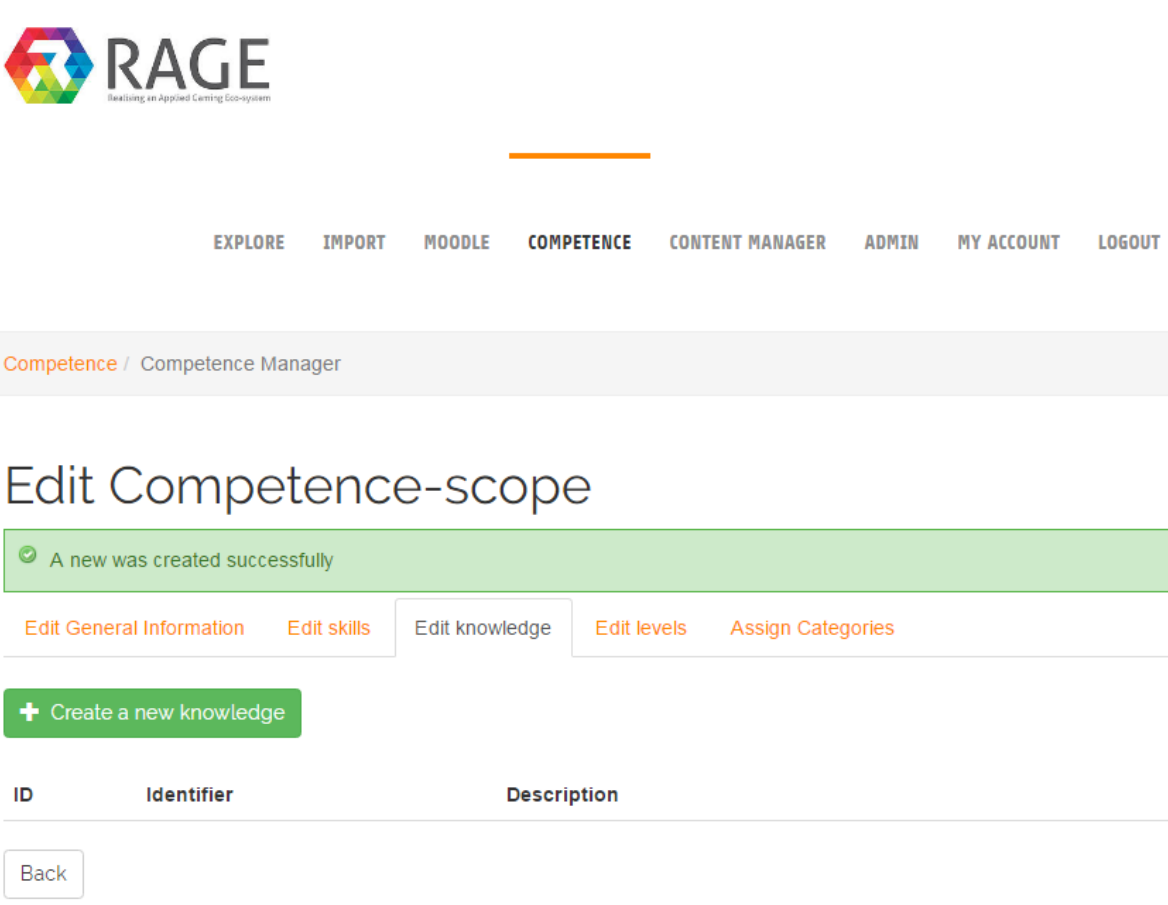
Enter *S1* in the field “Identifier” and *use data models* in the “Description” field. Finally click on “Save”.



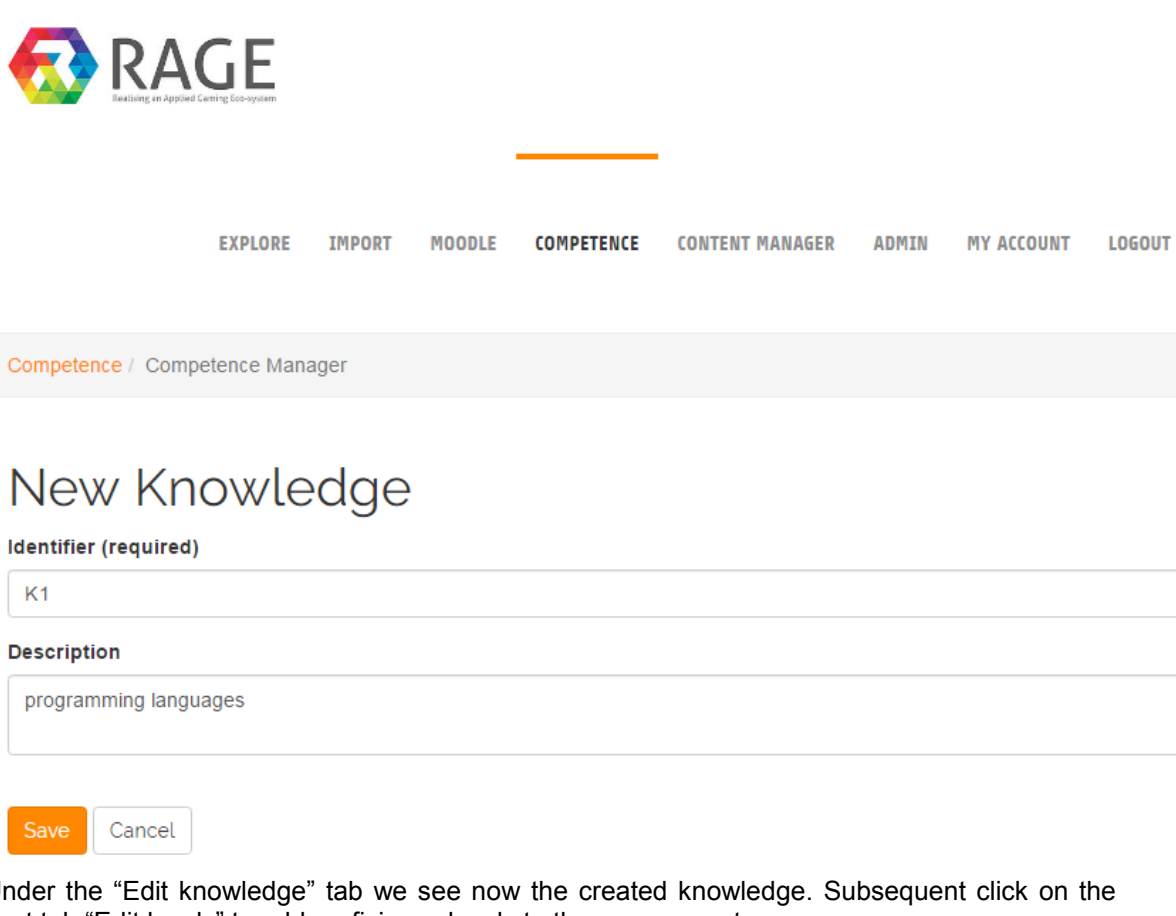
The new skill now listed under the skills-tab. Please click in the next step on the third tab “Edit knowledge”.



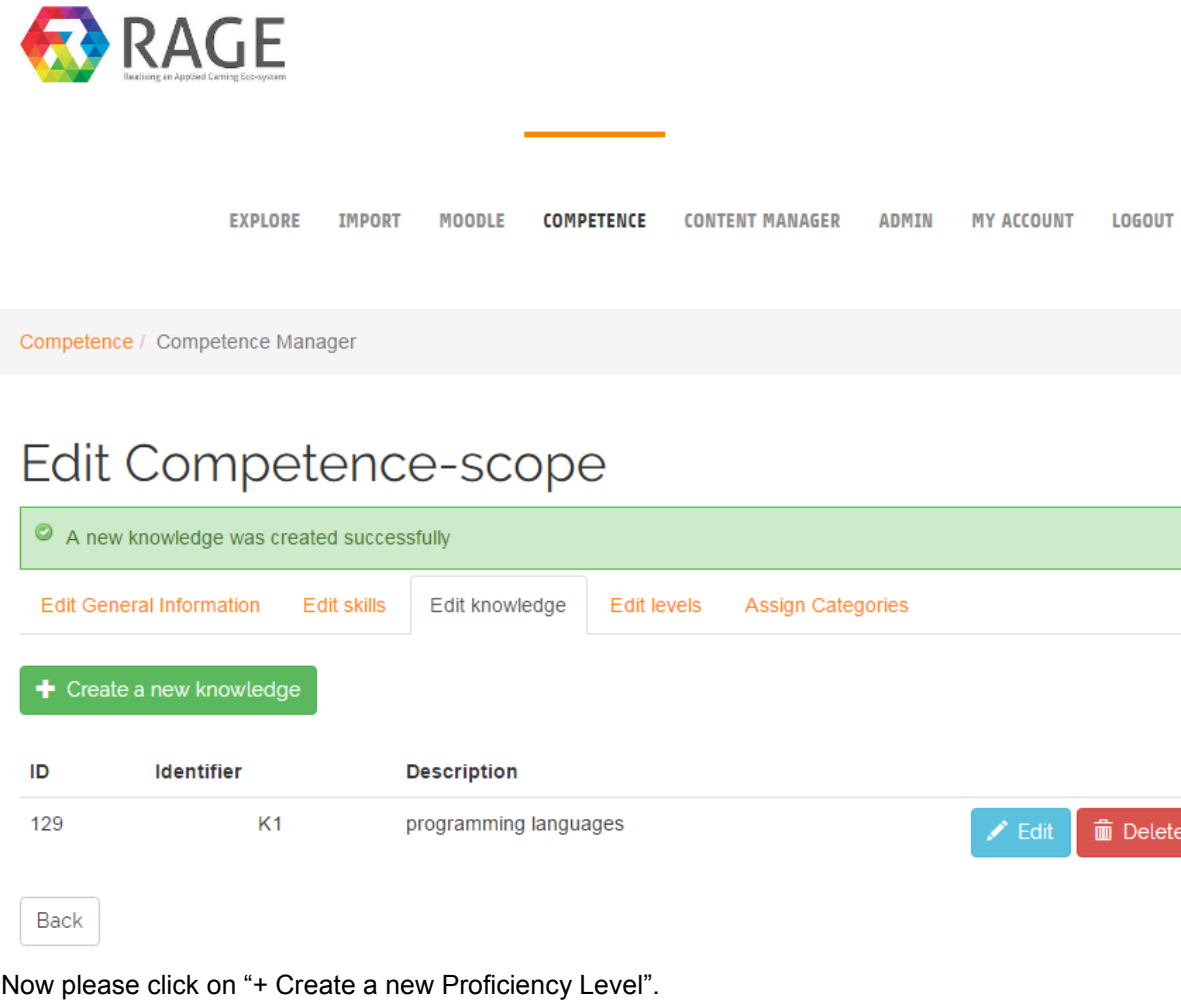
The way to create new knowledge is identical to the creating of skills. So we click again on “+ Create a new knowledge”.



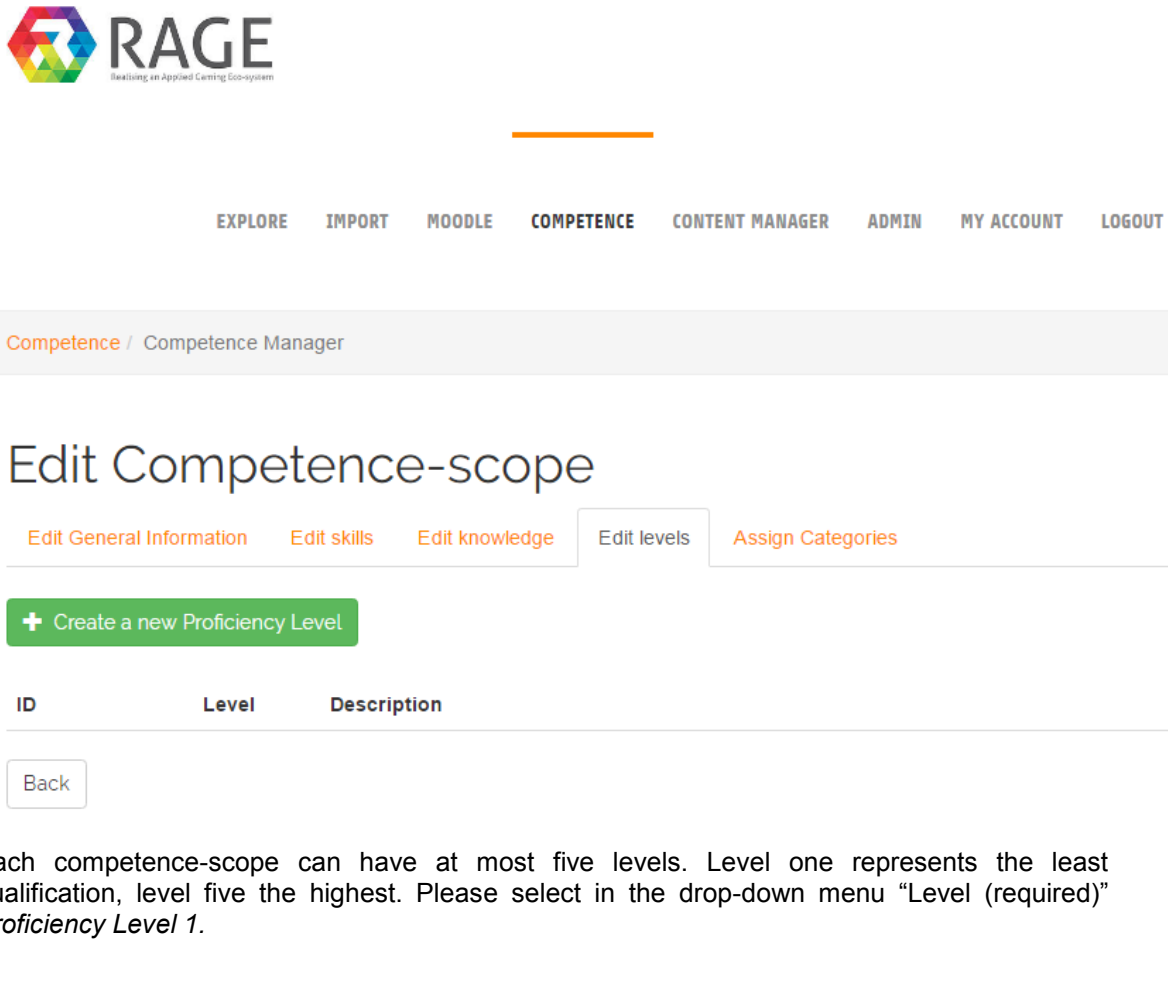
Then we enter again an “Identifier”, here *K1*, and a “Description” *programming languages*. Store the informations by a click on “Save”.



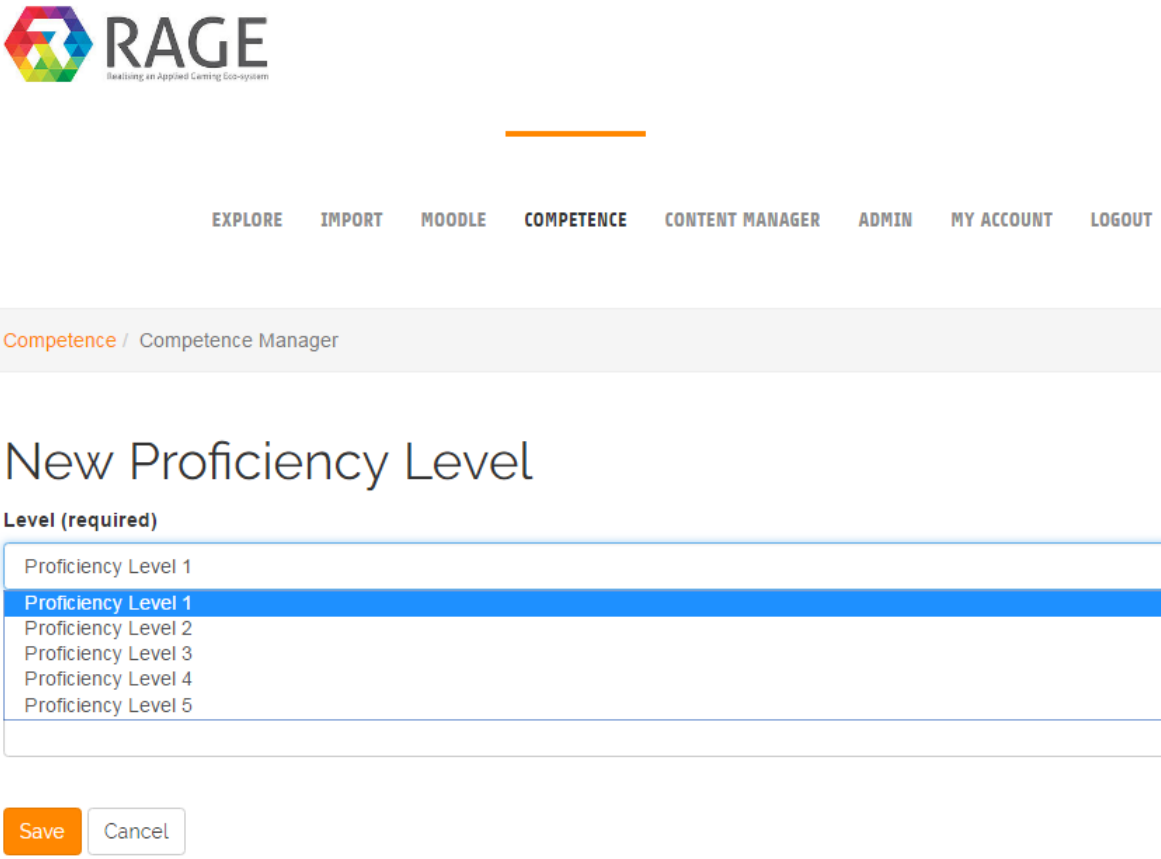
Under the “Edit knowledge” tab we see now the created knowledge. Subsequent click on the next tab “Edit levels” to add proficiency levels to the new competence.



Now please click on “+ Create a new Proficiency Level”.

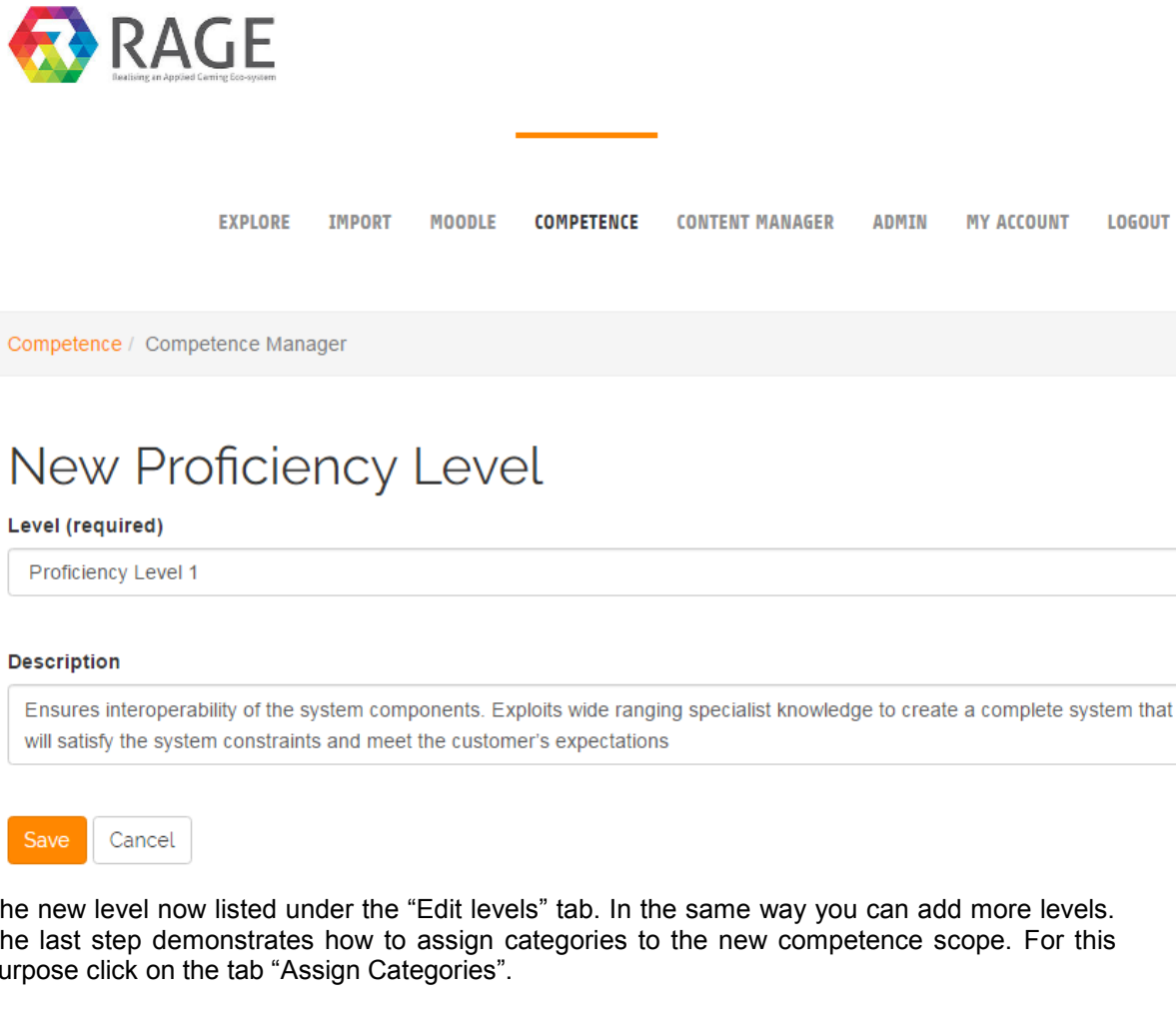


Each competence-scope can have at most five levels. Level one represents the least qualification, level five the highest. Please select in the drop-down menu “Level (required)” *Proficiency Level 1.*

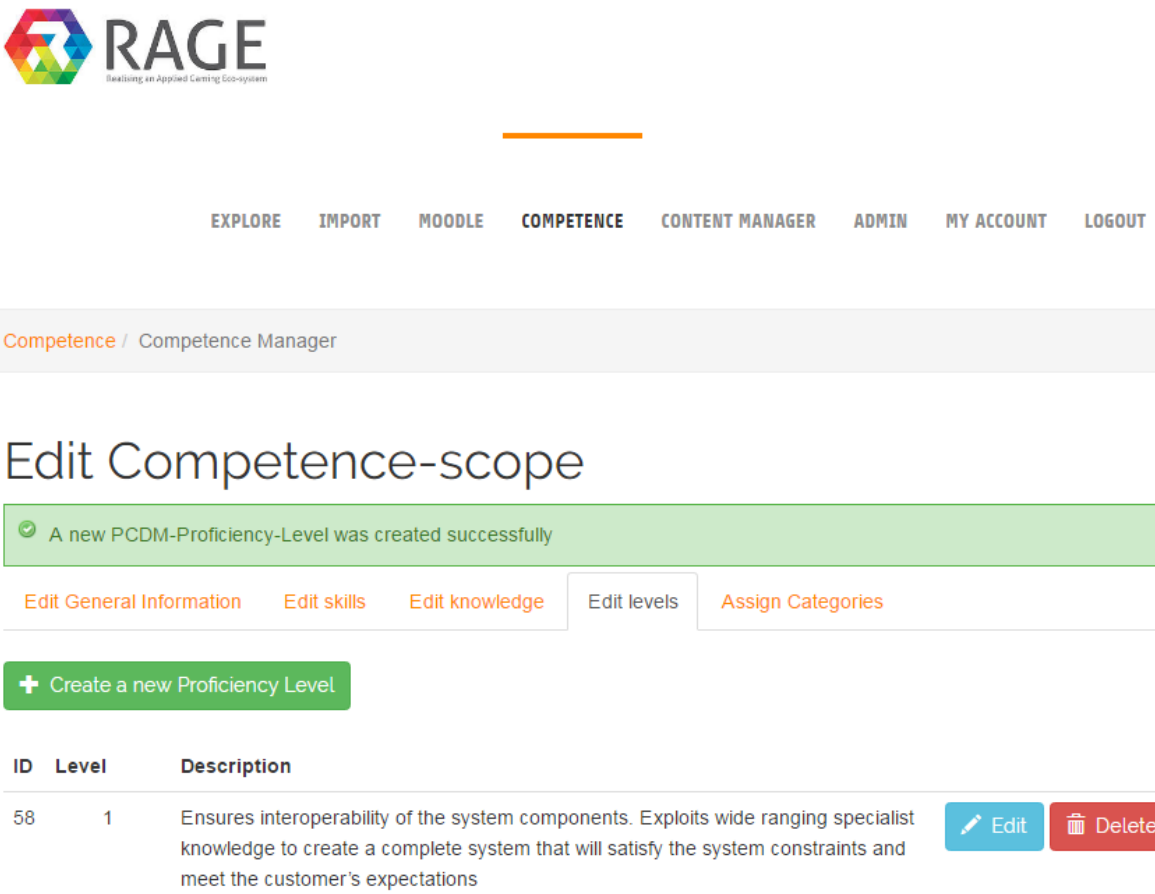


In the “Description” field enter the following text:
Ensures interoperability of the system components. Exploits wide ranging specialist knowledge to create a complete system that will satisfy the system constraints and meet the customer’s expectations

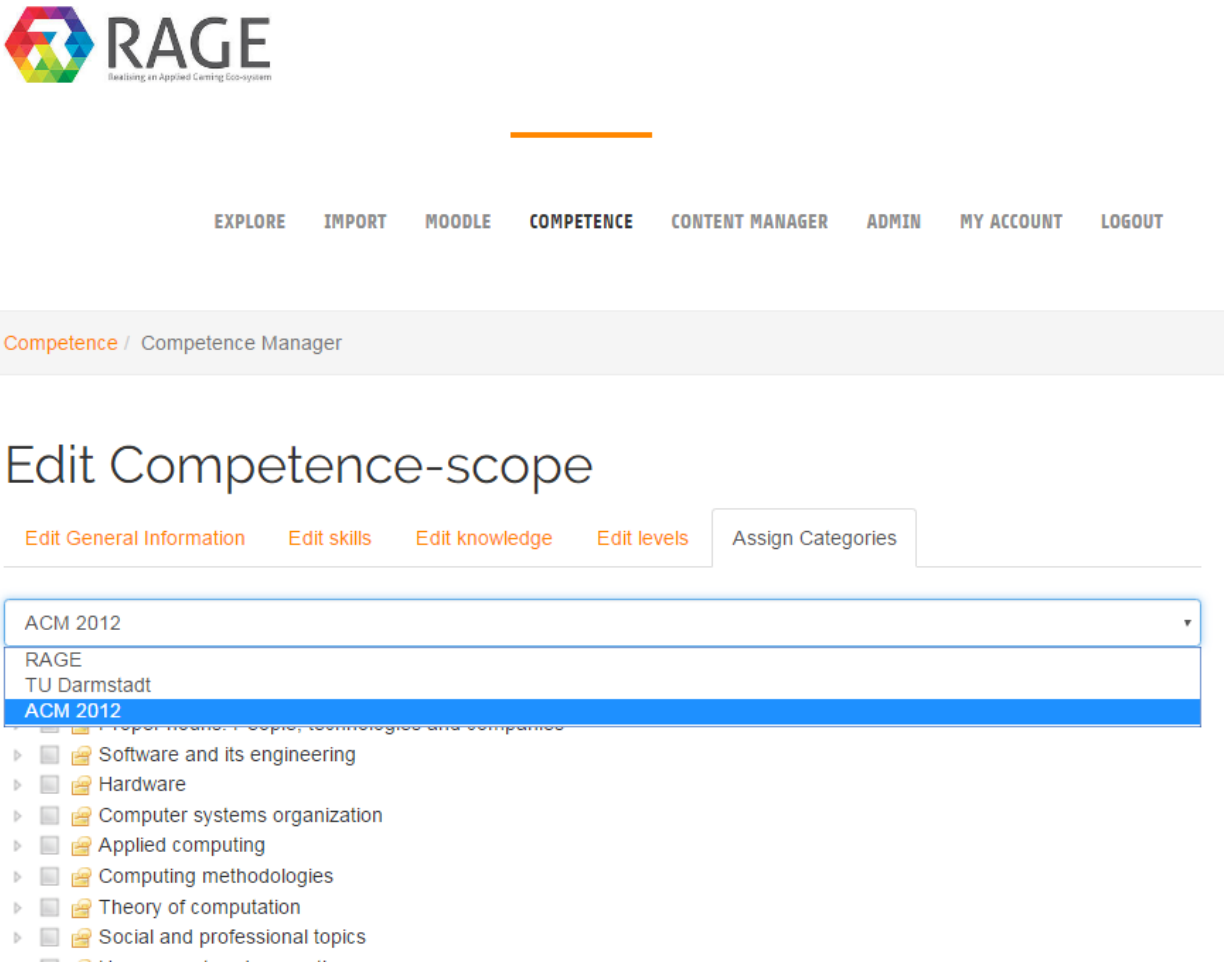
Finally click on “Save” to add the new level to the competence scope.



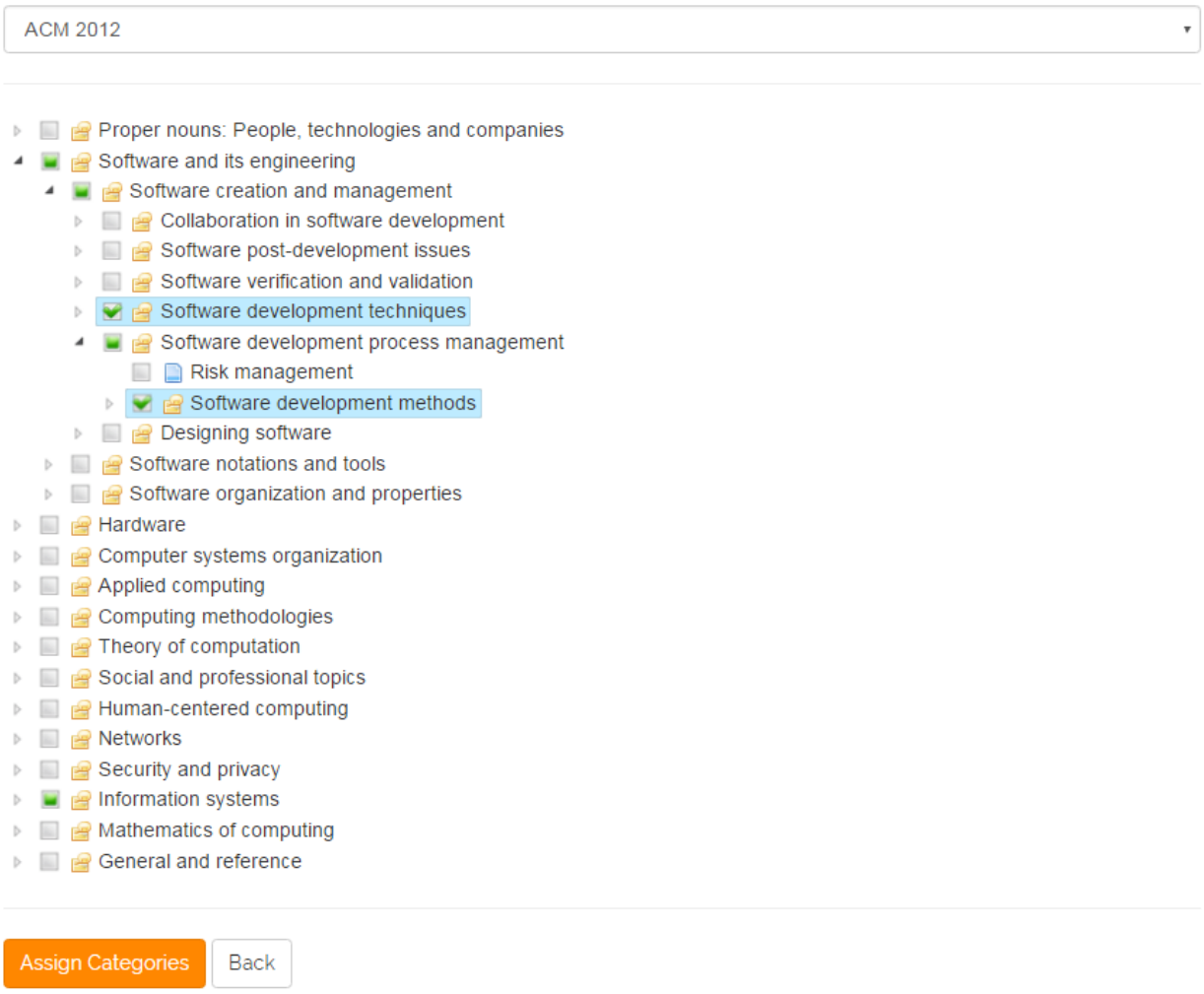
The new level now listed under the “Edit levels” tab. In the same way you can add more levels. The last step demonstrates how to assign categories to the new competence scope. For this purpose click on the tab “Assign Categories”.



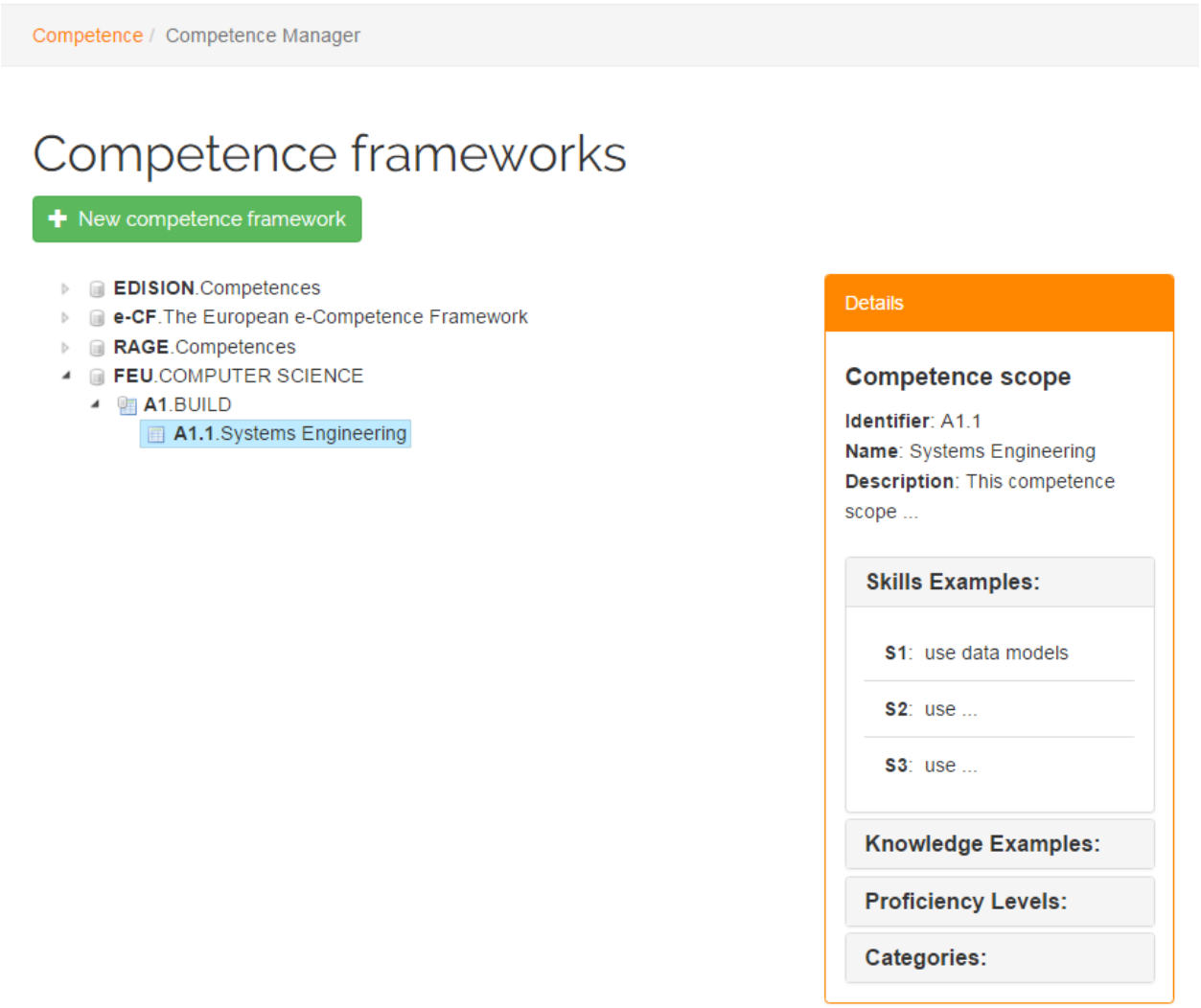
The assignment with categories serves to add semantic informations to competence scopes. To link categories we must first select a taxonomy by click on the drop down menu as in the following screenshot to see. Select then the taxonomy “ACM 2012” which contains terms for the area computer science.



After selecting the taxonomy the EP lists the terms in form of a poly-hierarchical tree. Please select now the two terms “Software and its engineering » Software development techniques” and “Software and its engineering»Software development process management»Software developments methods”. Finally click on “Assign Categories” so save the changes.

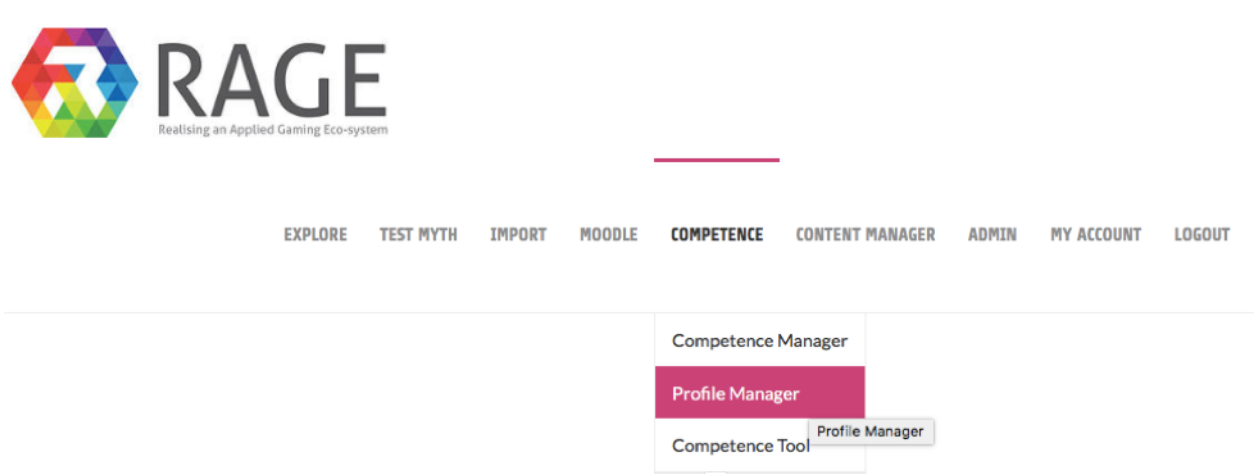


The new competence scope is now created. By click on it at the start screen of the competence manager you can see in the right menu the details of the new competence scope *Systems Engineering*. In the following screenshot we see, for example, the added skills. With a click on "Knowledge Examples", "Proficiency Levels" or "Categories" you can see the other informations. In the same way we can fill bit by bit the new competence framework with competence scopes.

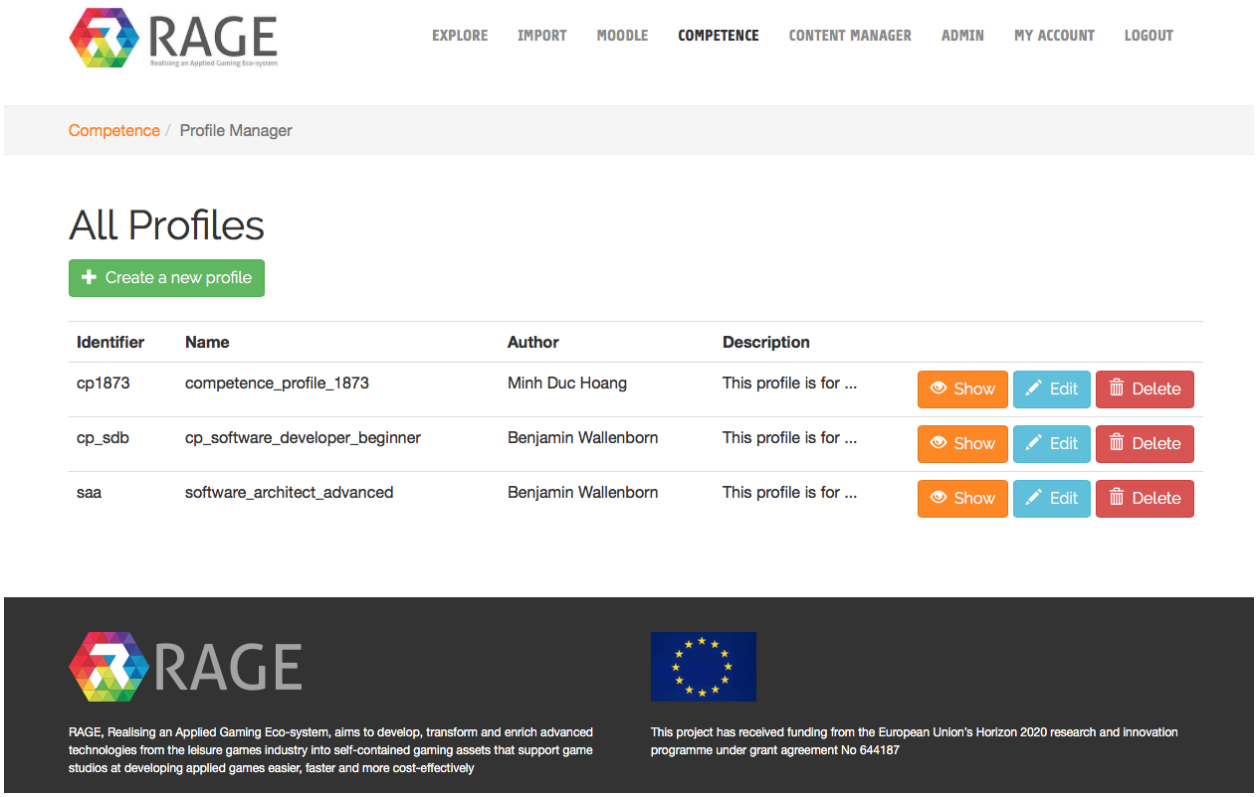


7.6 Use of competences - Create a new learning goal

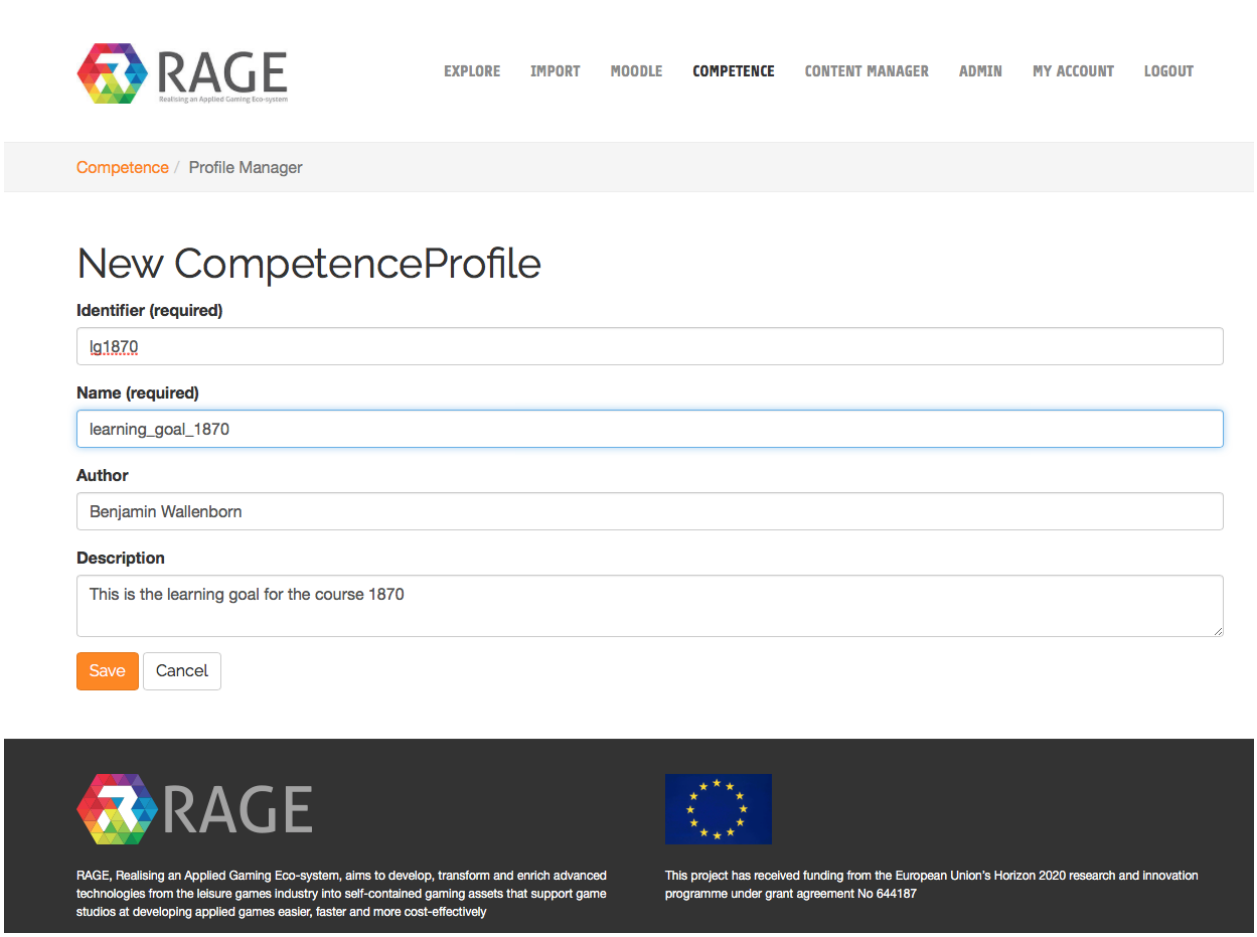
In the last section we have seen how to create competence scopes which defines the "maximum competence" and specifies a fixed pool of available ***Proficiency Levels, Skills and Knowledge Examples***. Now we would like to see how to use competences to define a new learning goal for our test course 1870. Learning goals always consist of one or more bundled competences. To create a new learning goal please click on "COMPETENCE»Profile Manager".



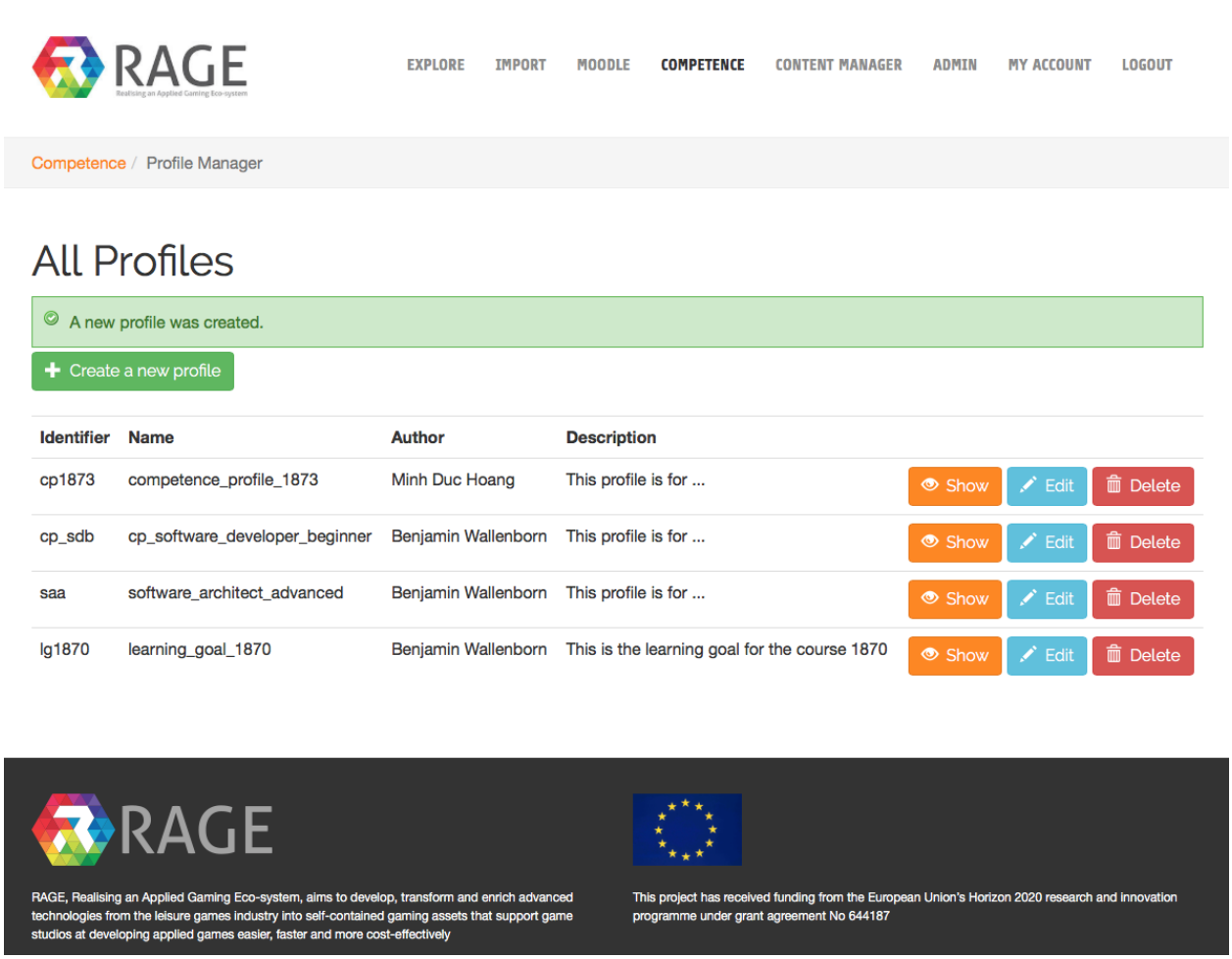
The next screen shows all existing profiles. Next click on "+ Create a new profile".



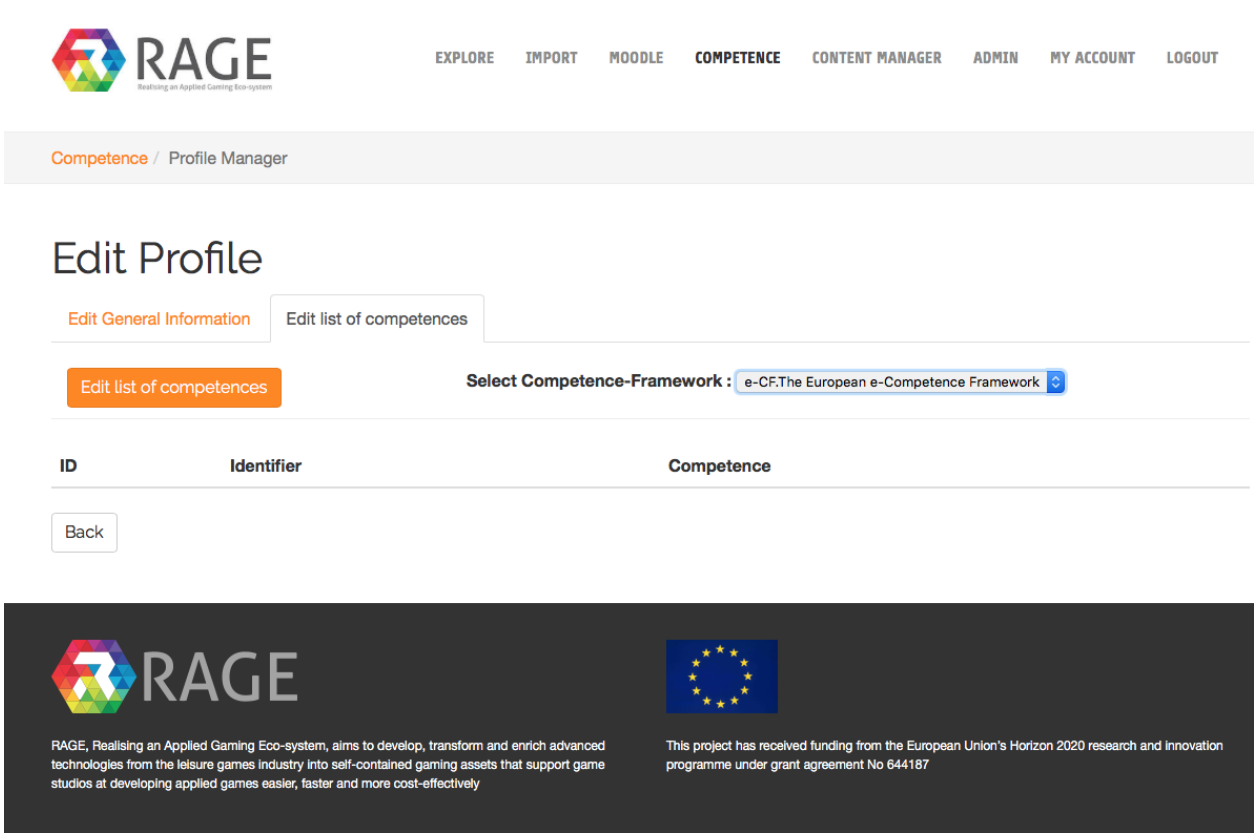
As "Identifier" please enter *lg1870*, for the "Name" *learning_goal_1870*, as "Author", if you want, your name and a "Description" *This is the learning goal for the course 1870*. To create the new learning goal click on "Save".



In the list of all profiles we see now our new learning goal *learning_goal_1870*. Next we have to fill it with competences from the competence manager. Therefore, click on “Edit”.

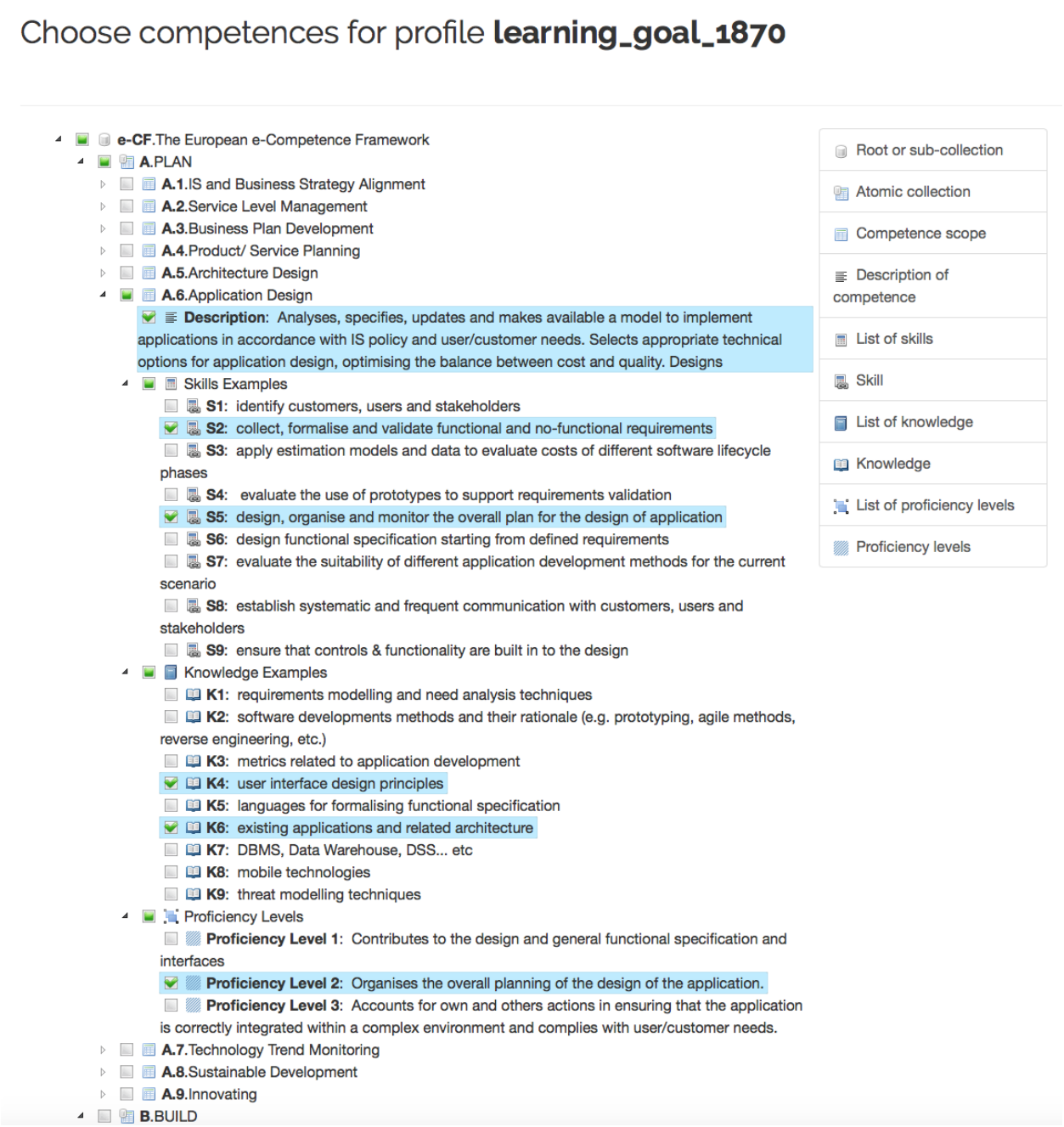


The new profile is still empty. First you have to set the competence framework from which you would like to receive the competences. Because it will be very protracted to create a lot of new competence scopes will work in the following steps with a ready to use framework, the European e-Competence Framework (e-CF). The e-CF contains 30 competence scopes for the domain of *Information and Communication Technology (ICT).* To use the e-CF please select *"e-CF. The European e-Competence Framework"* from the drop down menu on the right side.
Then click on "Edit list of competences".

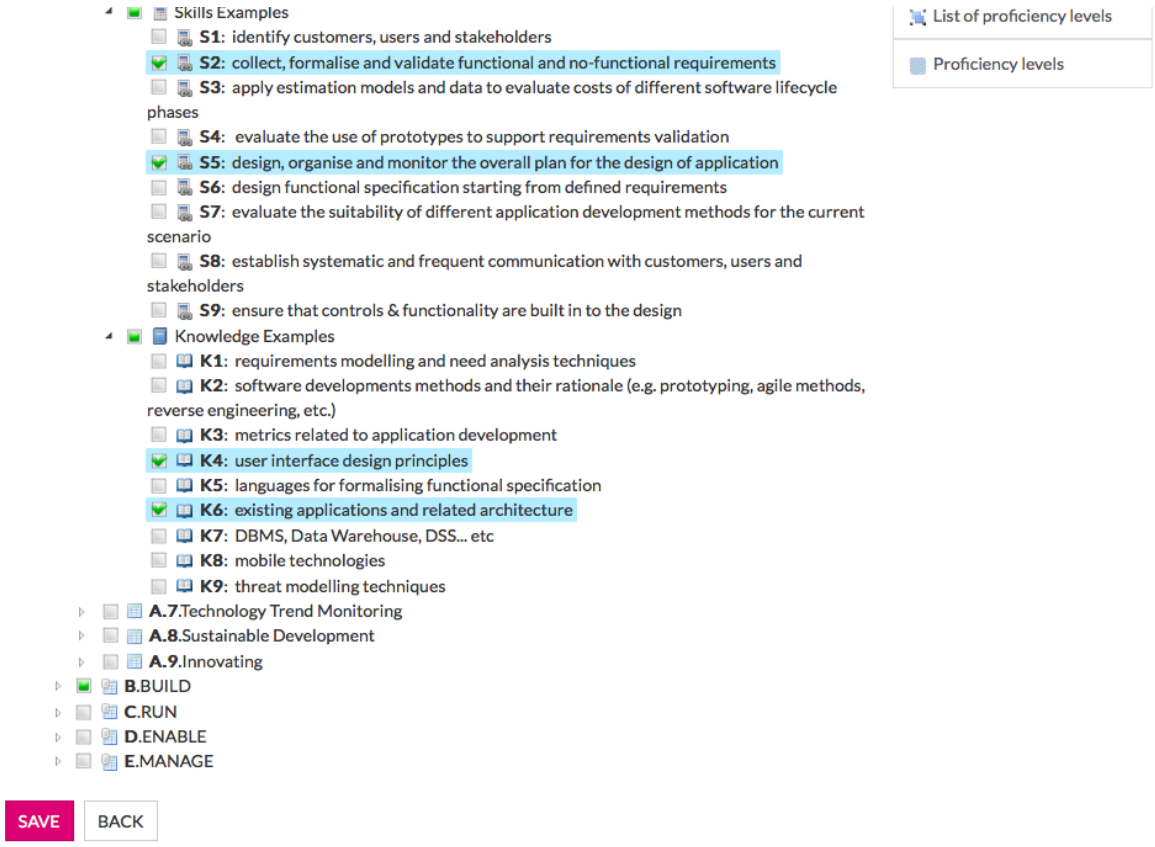


The next screen shows all competence scopes of the e-CF. To define the first competence open the first collection "A.Plan". Here we have nine different competence scopes from A.1 to A.9. Next open A.6.Application Design. You can now see the "Description" and all available "Skills", "Knowledges" and "Proficiency Levels" of this competence scope. Please select the following:

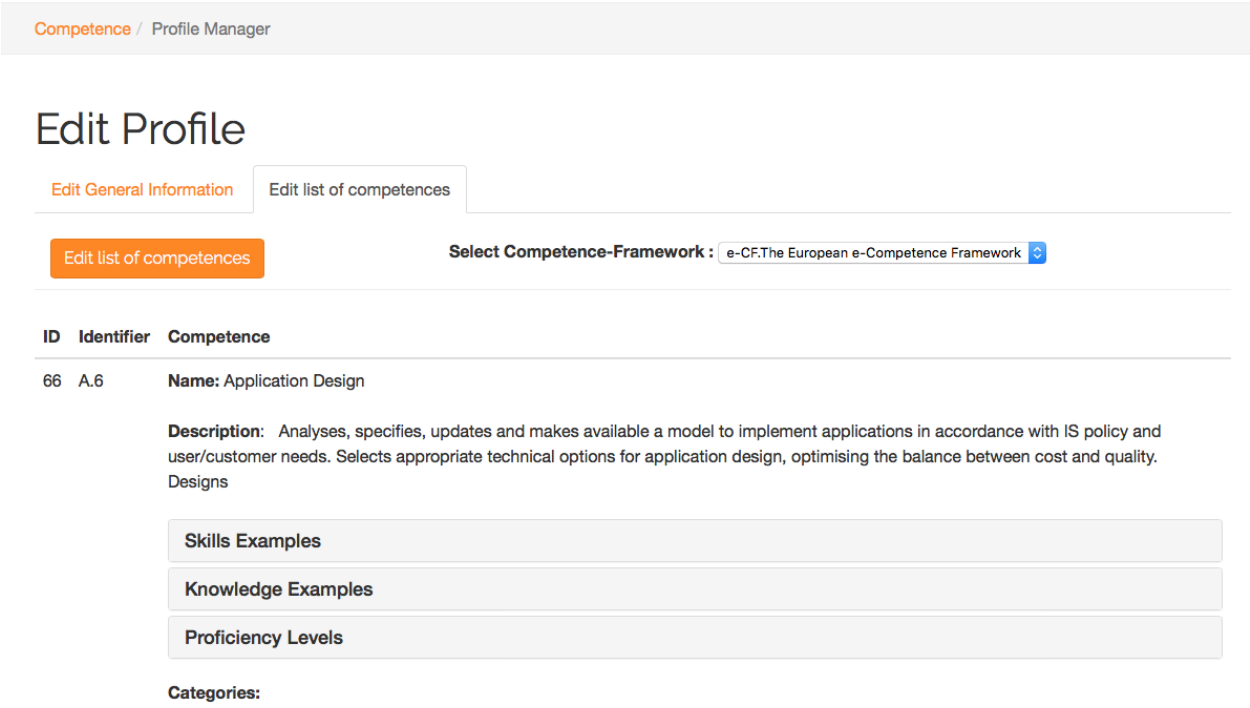
1. "Description"
2. "Skills Examples": *S2* and *S5*
3. "Knowledge Examples": *K4* and *K6*
4. "Proficiency Levels": *Proficiency Level2*



Then scroll down to the end of the page and click on “Save”.

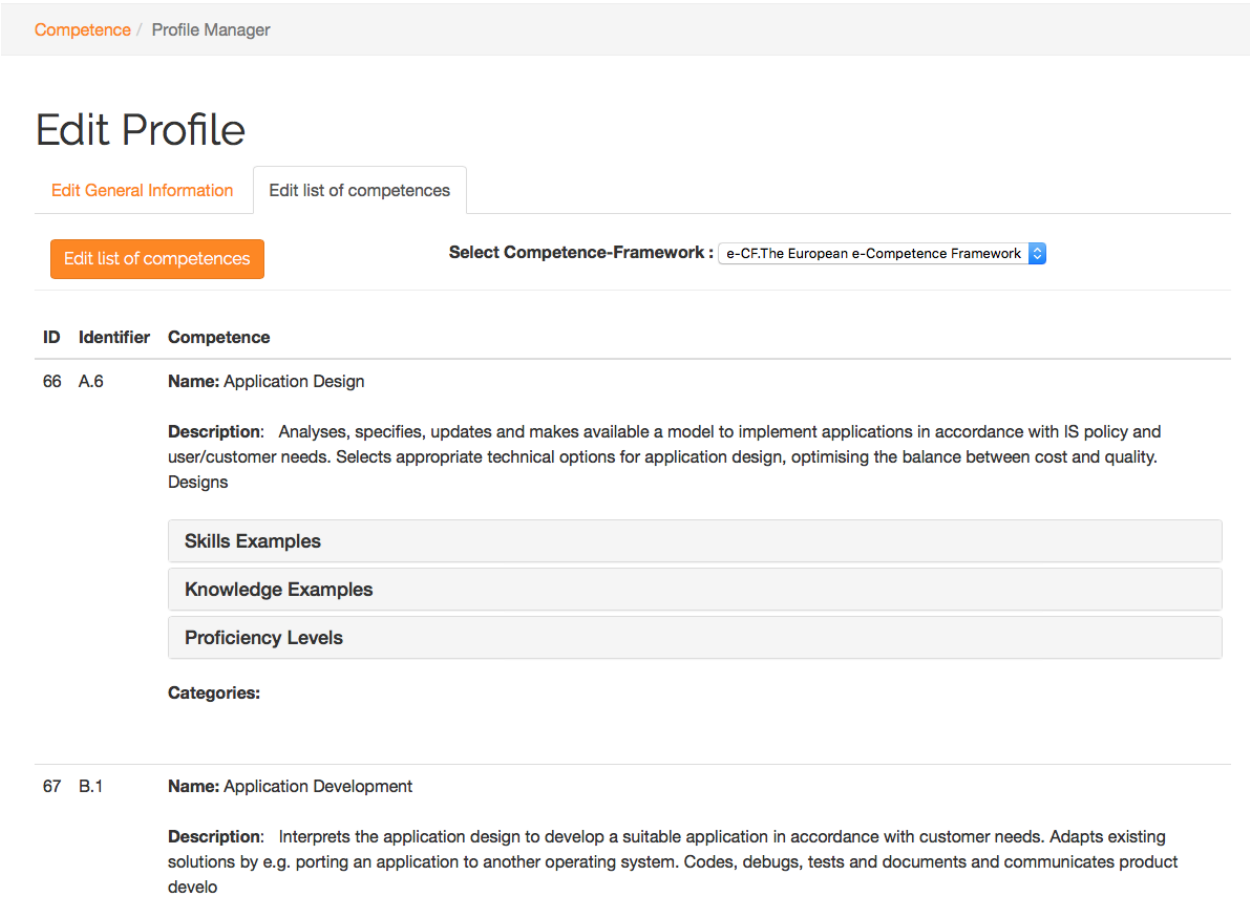


The next screen shows now the new profile with our first competence “Application Design”. To fill the profile with more competences click again on “Edit list of competences” and select more competences with desired Skills, Knowledges and Levels.



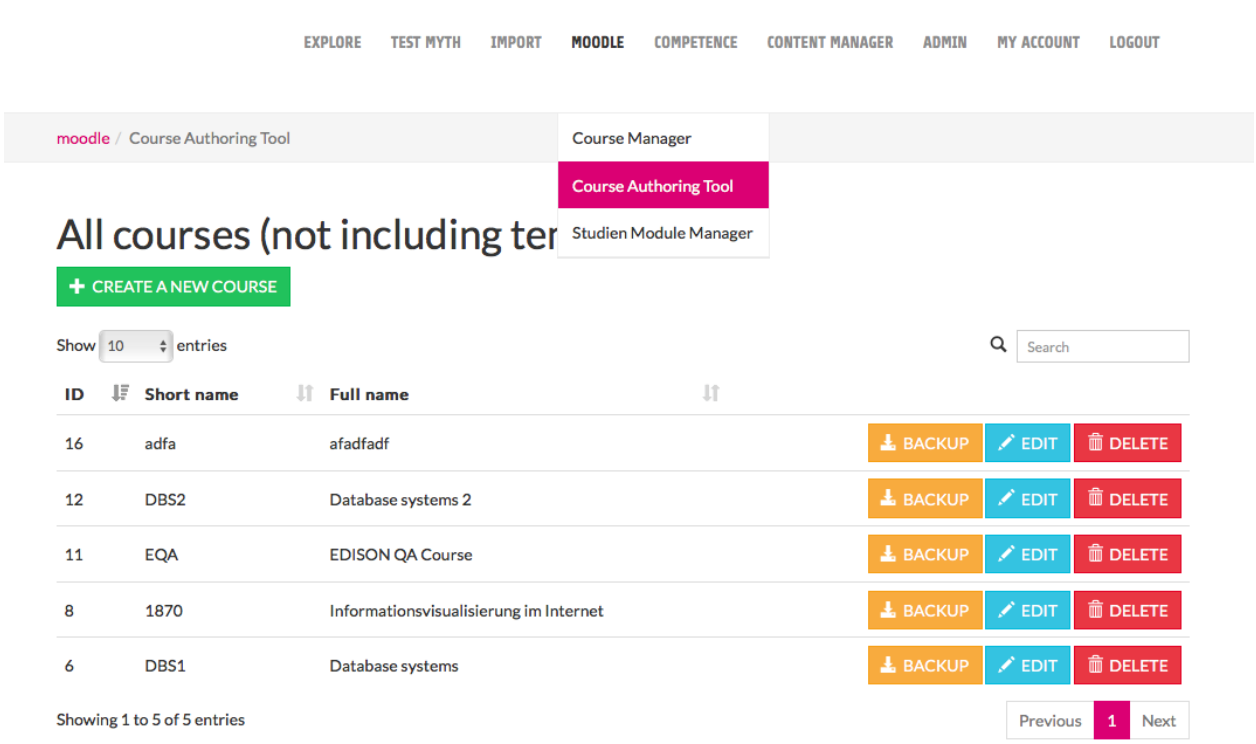
For this manual only one more competence will be enough. Please select the competence “B.1 Application Development” with “Skills”, “Knowledges” and one or more “Levels” your choice. Again scroll down to the end of the page and click on “Save”-The next screen shows the profile

with the second competence Application Development.

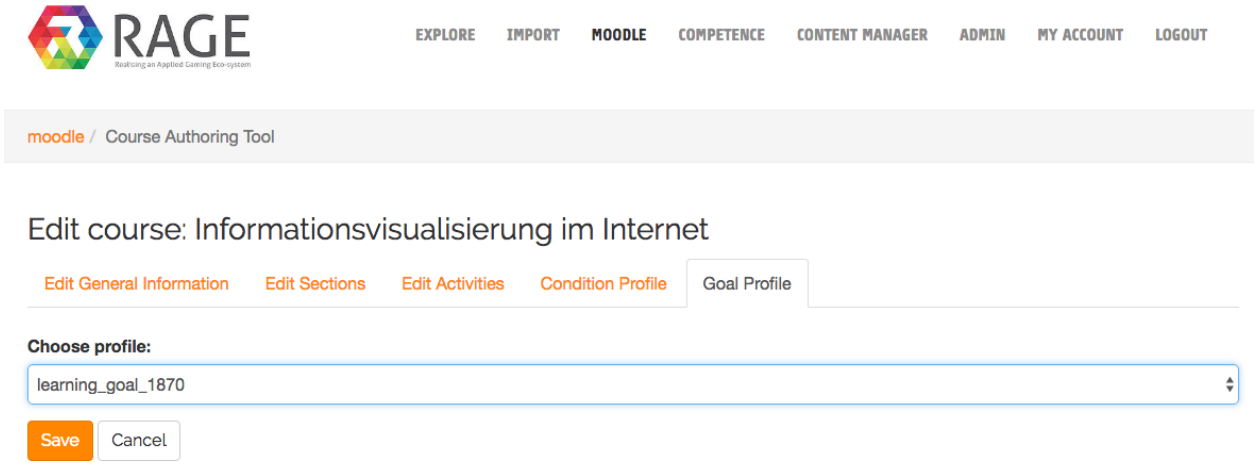


7.7 Assigning profiles to the course

Because we have now created a learning goal for our course 1870, the next step is to assign them to the course. Therefore we have to go to “Moodle » Course Authoring Tool”. Then click on “Edit” behind the course 1870.

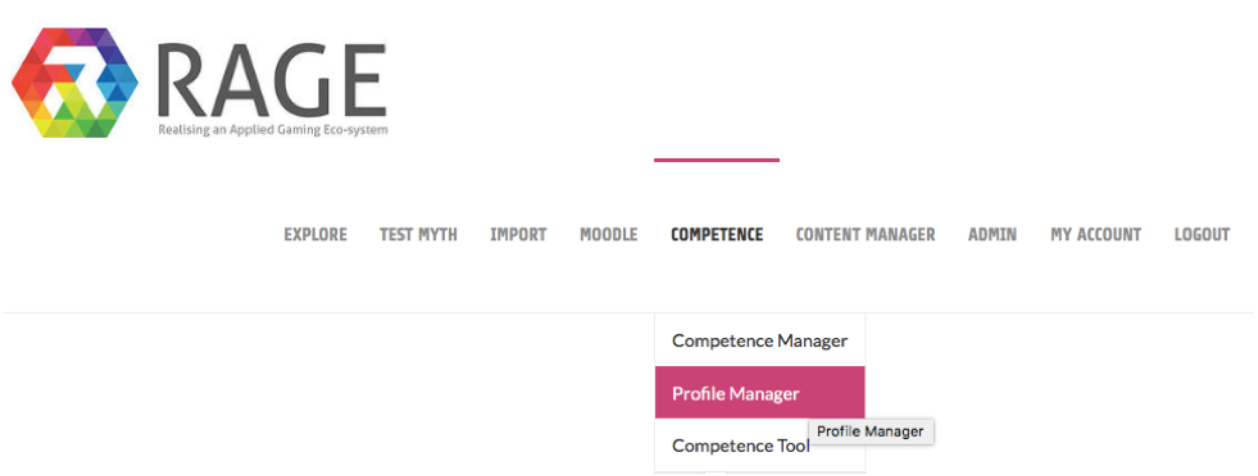


To assign a learning goal to the course click on the tab “Goal Profile”. With a click on the drop down menu “Choose profile” we see all available profiles. Please select our recently created profile *learning_goal_1870*. Save the assignment with a click on “Save”.

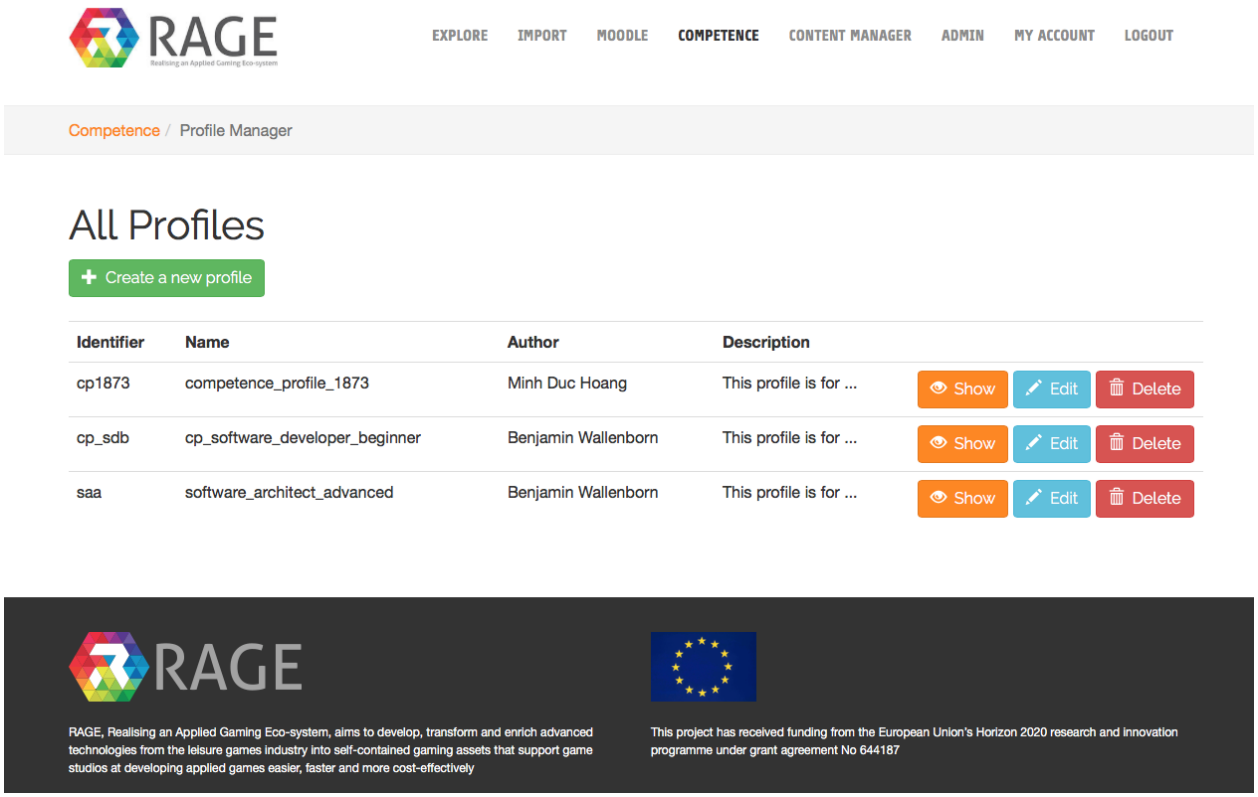


7.8 Use of competences - Create a new condition profil

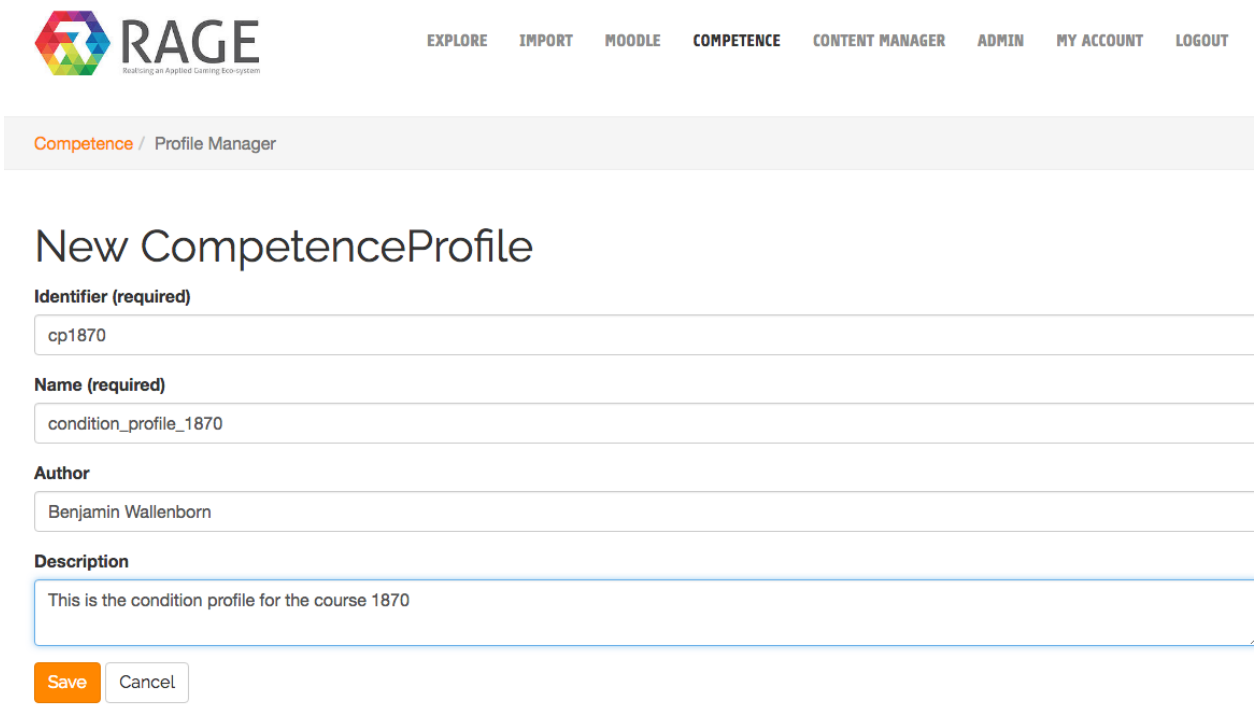
After we have created and assign a learning goal to our course, we will do it in the same way for a new condition profile. To create a new learning goal please click again on “COMPETENCE»Profile Manager”.



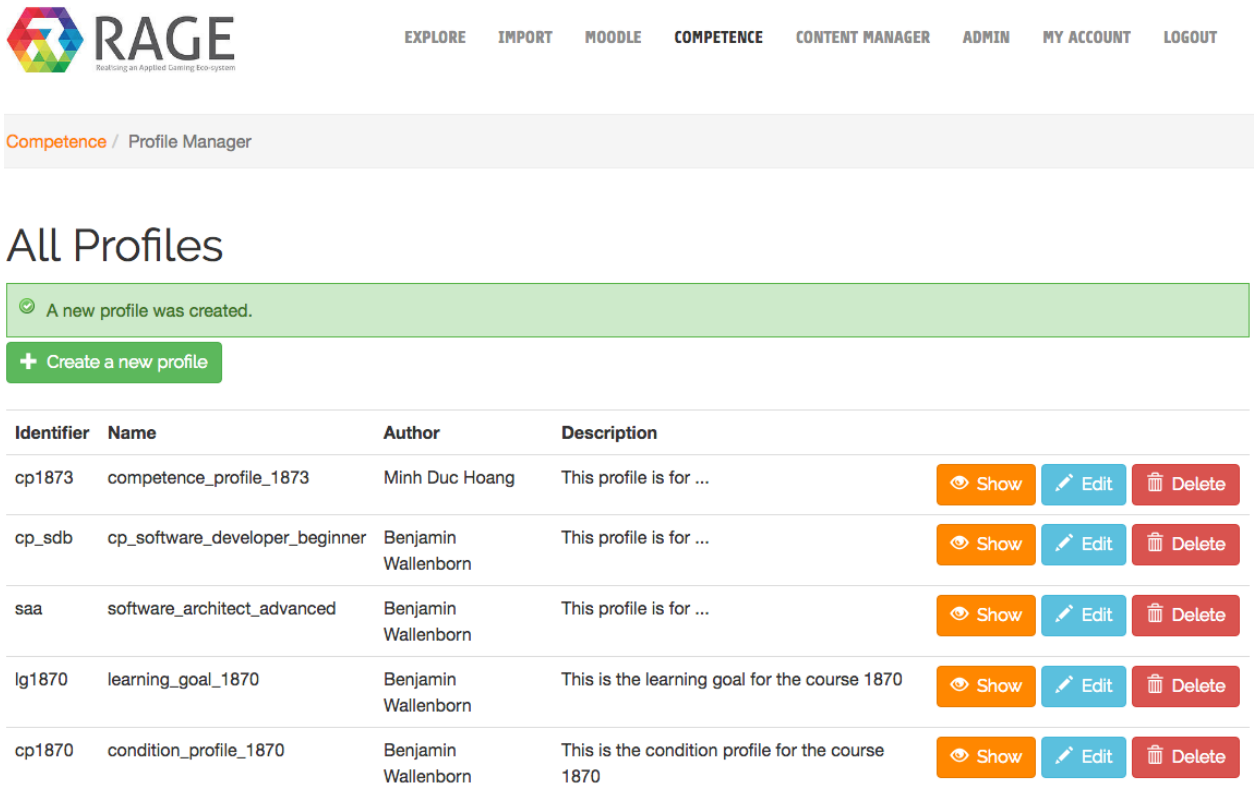
Next click on "+ Create a new profile".



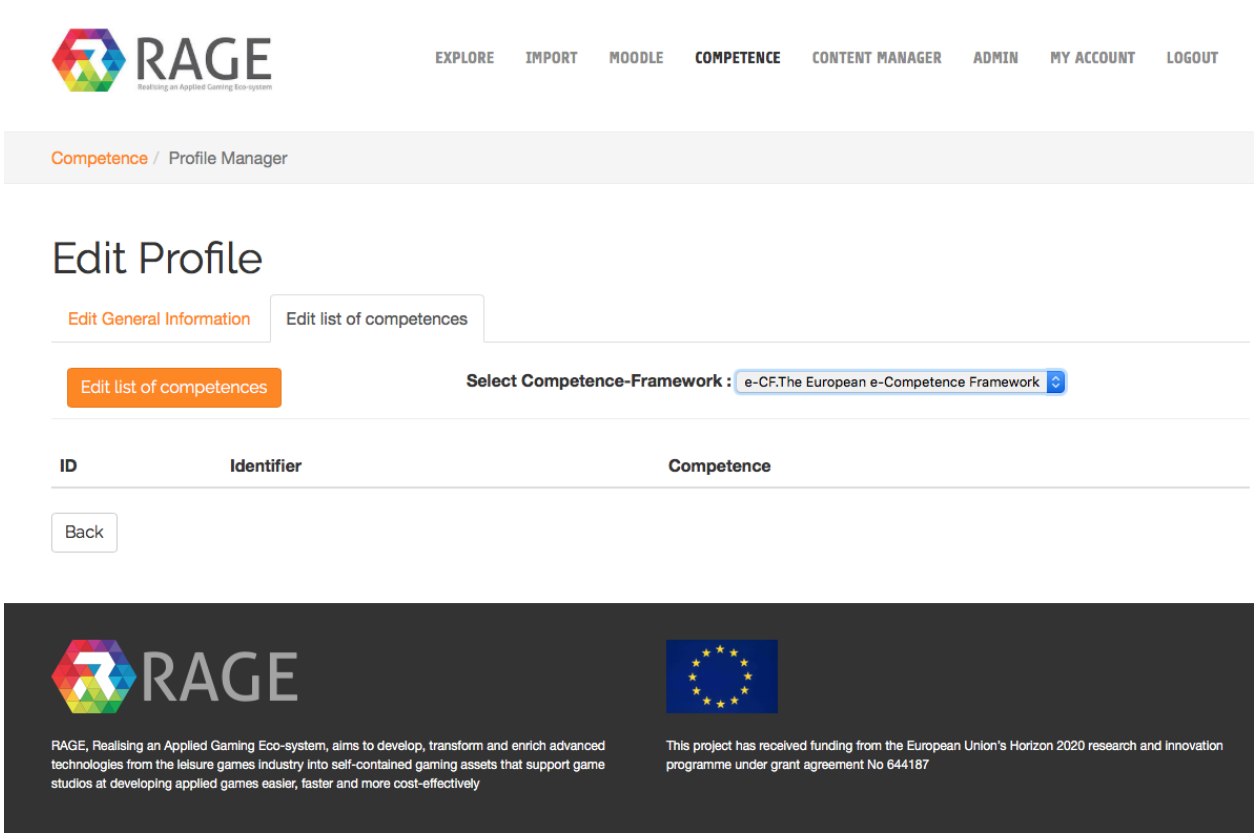
As "Identifier" please enter cp*1870*, for the "Name" condition_profile_*1870*, as "Author", if you want, again your name and a "Description" *This is the condition profile or the course 1870*. To create the new condition profile click on "Save".



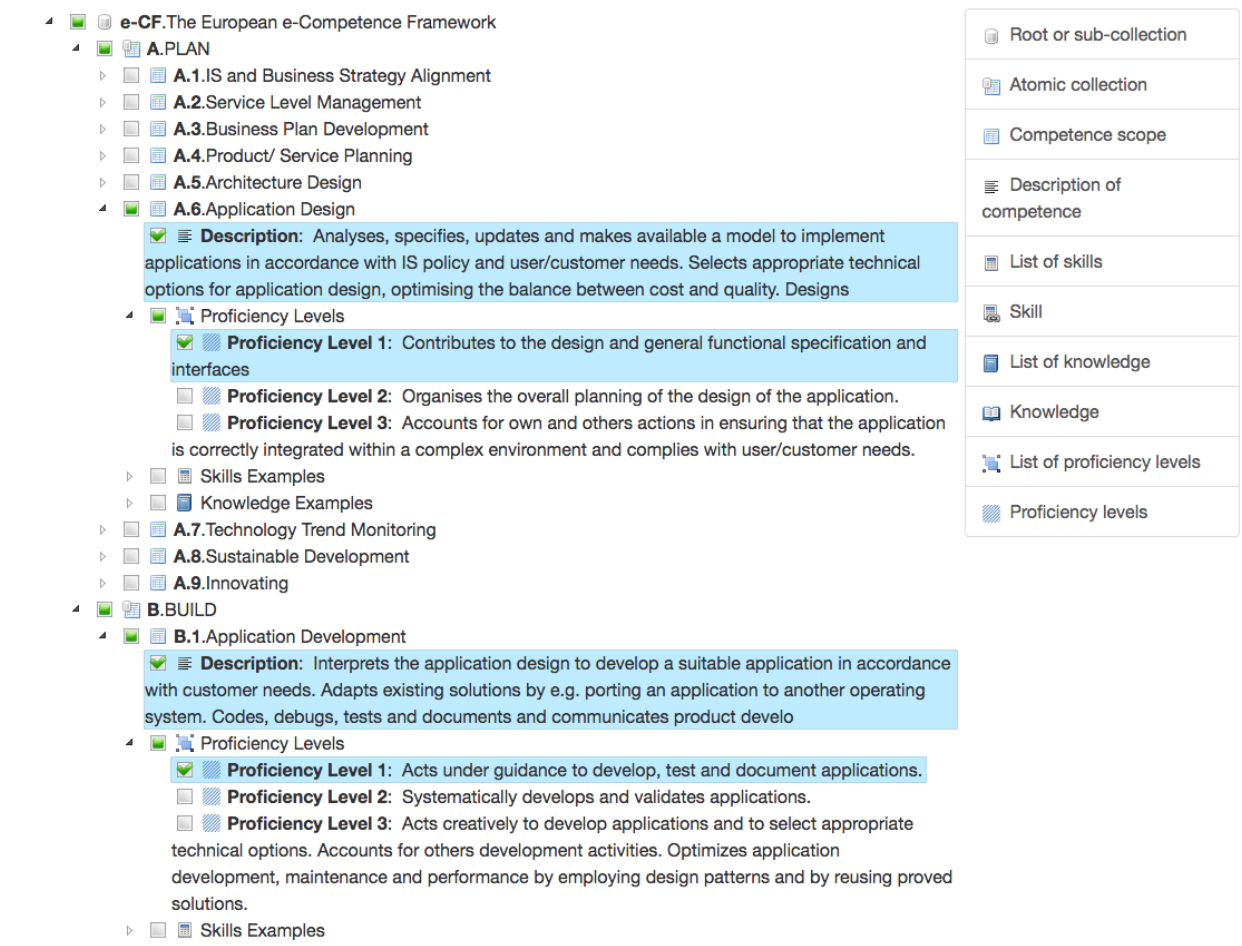
In the list of all profiles we see now our new *condition_profile_1870*. Next we have to fill it with competences from the competence manager. Therefore, click on “Edit”.



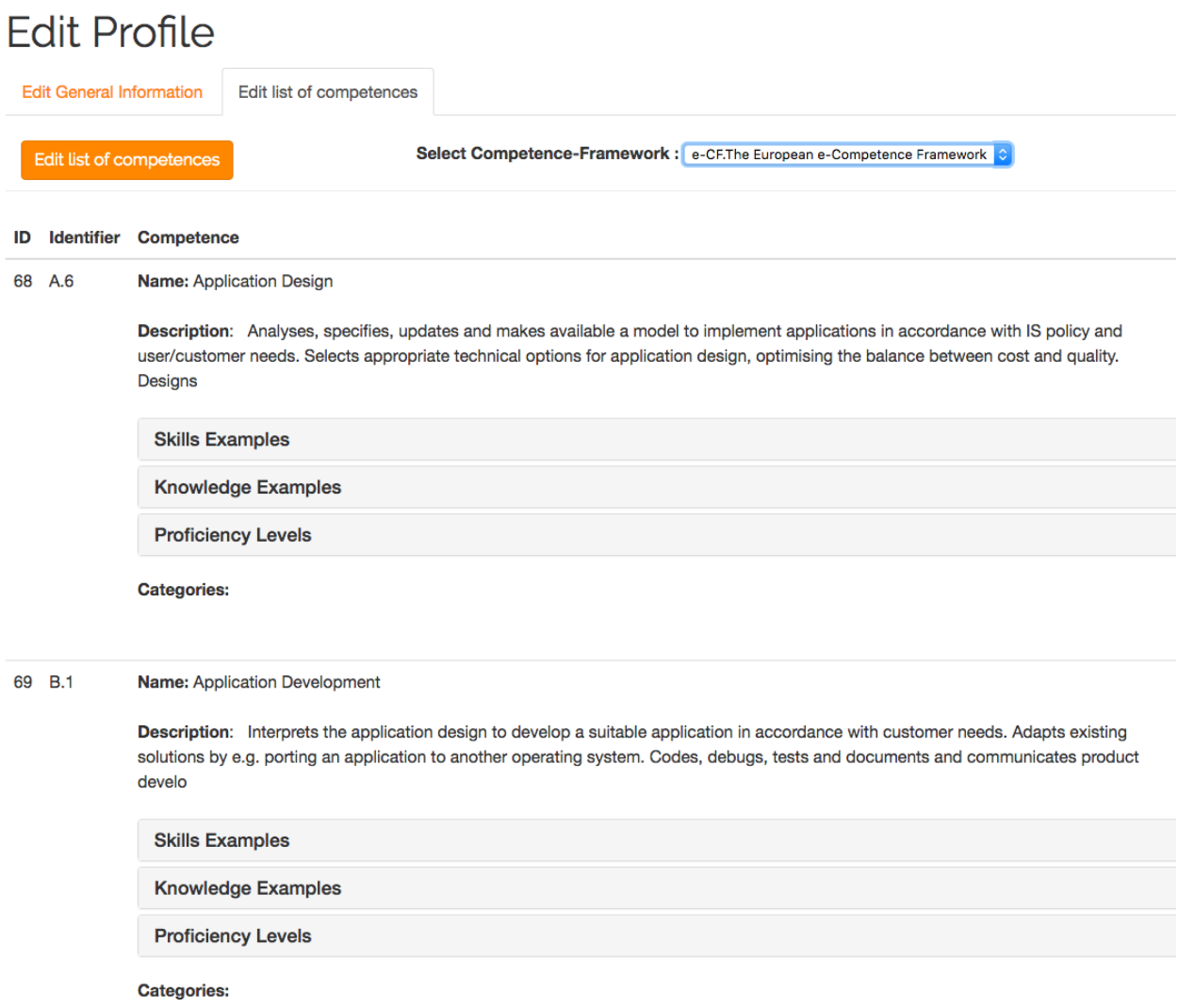
Select again *e-CF.The European e-Competence Framework* as source for the competences and click on “Edit list of competences”.



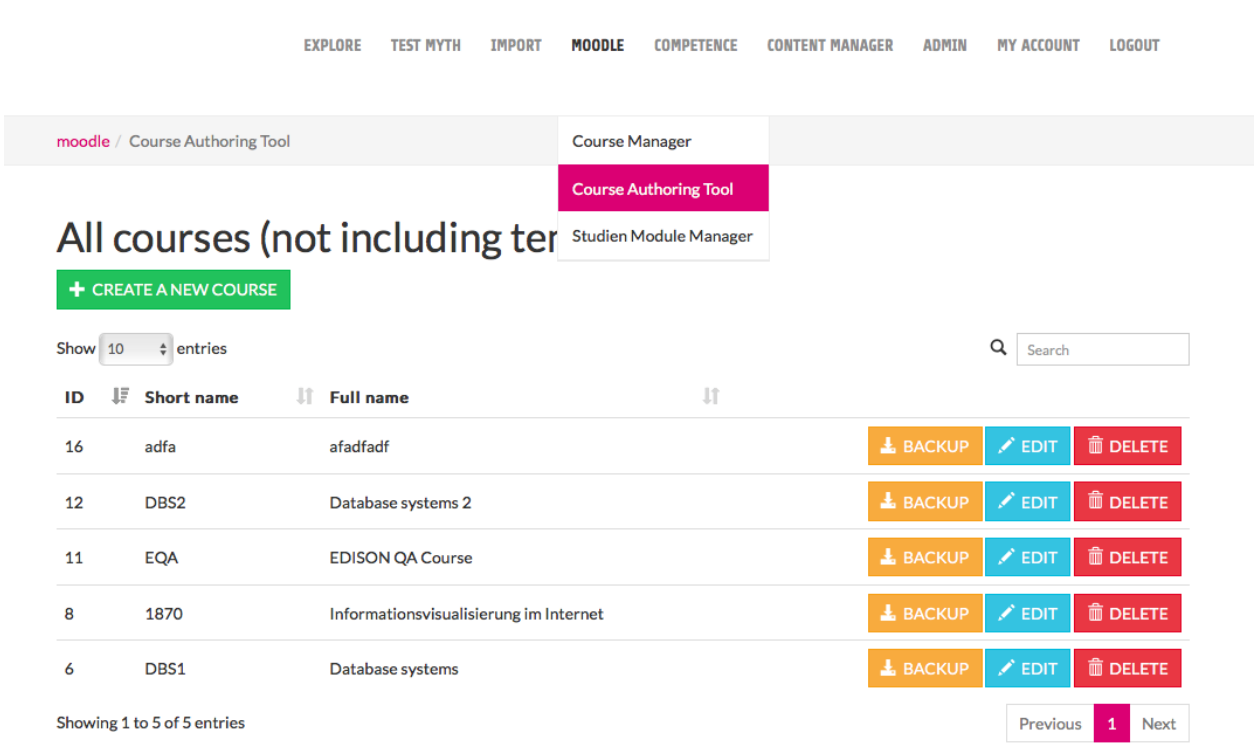
Now please select two competences: *A.6.Application Design* with *Level 1* and *B.1.Application Development* also with *Level 1*.



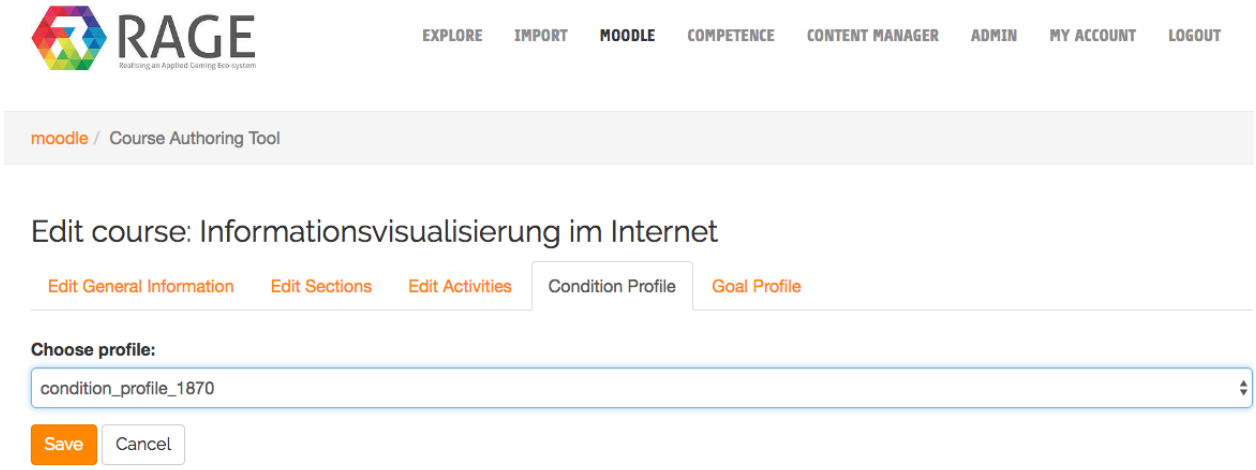
Then scroll to the end of the page and click on “Save”. The next screen shows you the two assigned competences to our new condition profile.



To connect our course 1870 with the created condition profile please click on “Moodle » Course Authoring Tool” and then on “Edit”.

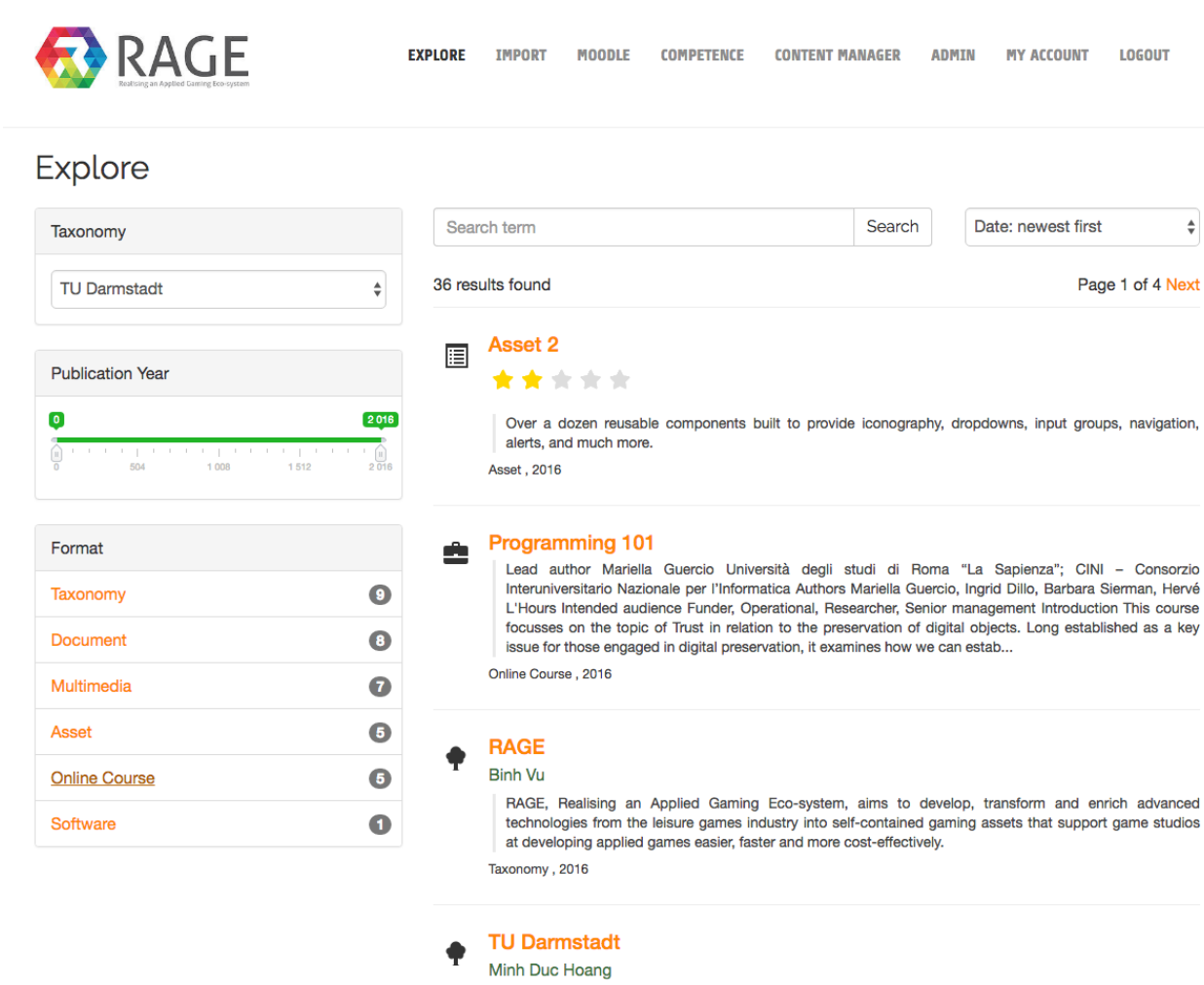


Now click on the tab “Condition Profile”. In the drop down menu “Choose profile:” select the new profile *condition_profile_1870*. Finally, please click on “Save”. Now our course 1870 are connected with two profiles, a learning goal and a condition profile.

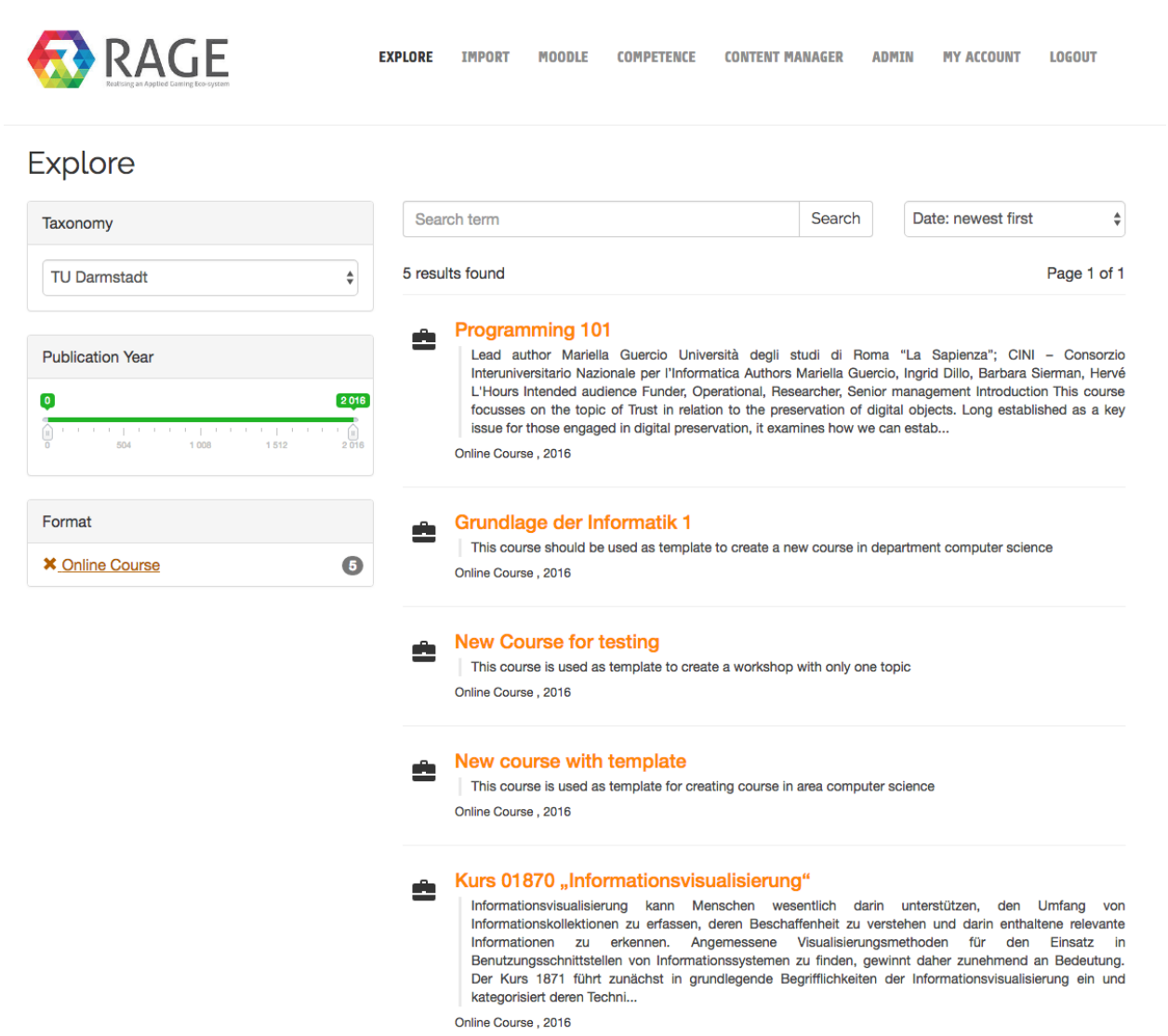


7.9 Enroll to the new course

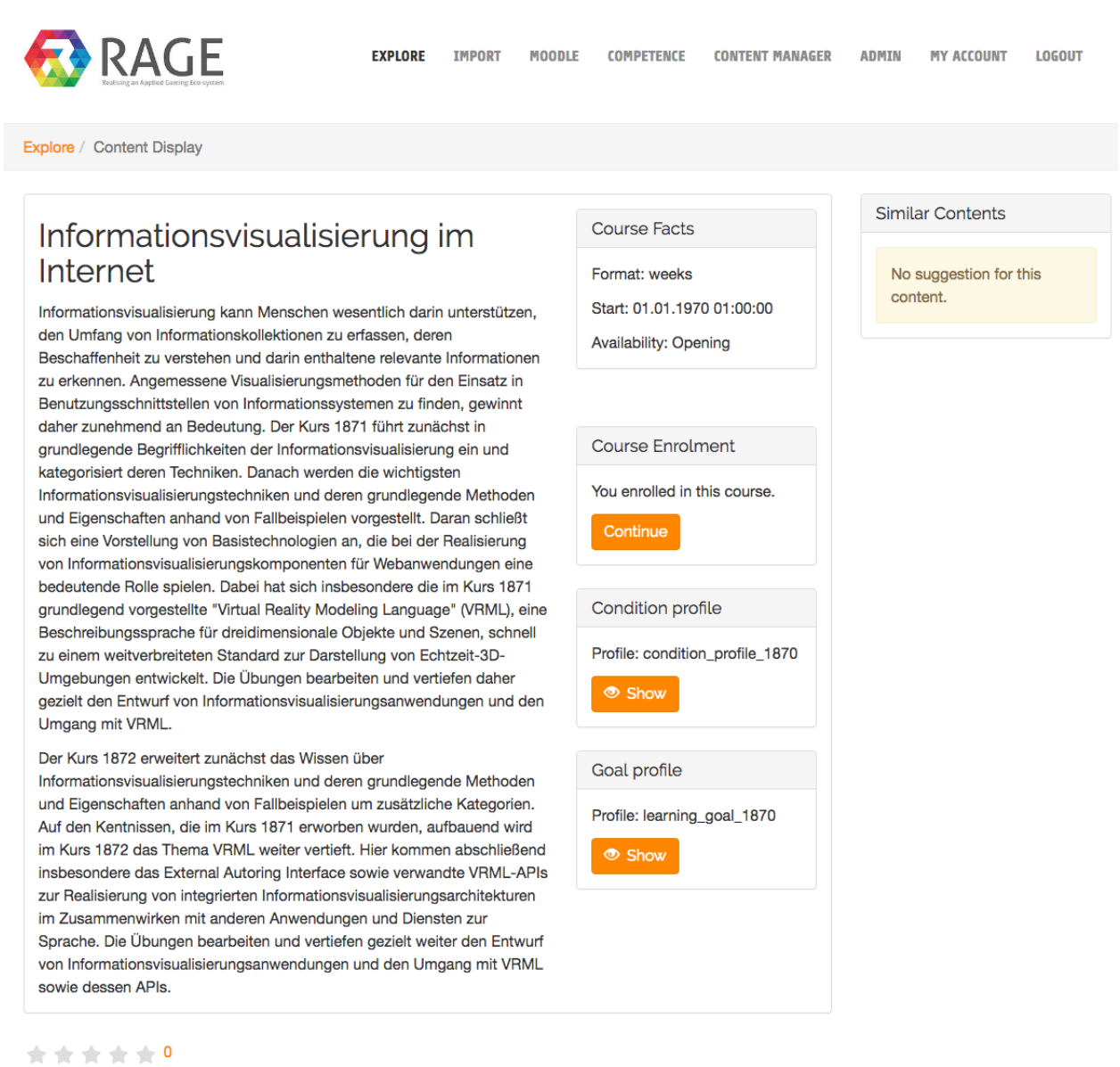
To enroll to the created course 1870 click first on “EXPLORE”. On the left side we have then different possibilities to filter content from the EP.



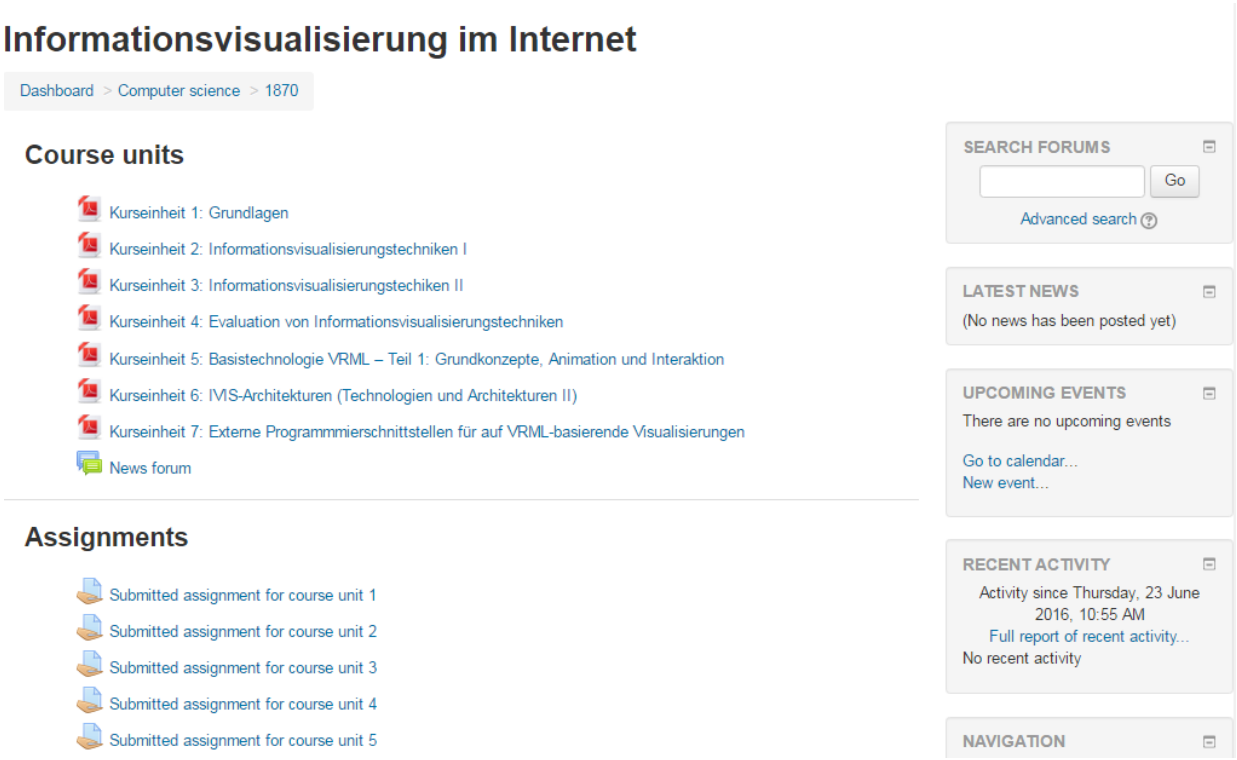
As "Taxonomy" select "TU Darmstadt" and as "Format" "Online Course". The result list now shows on the right side all available courses inclusive the course *01870*. To see details please click on *Kurs 01870 "Informationsvisualisierung"*



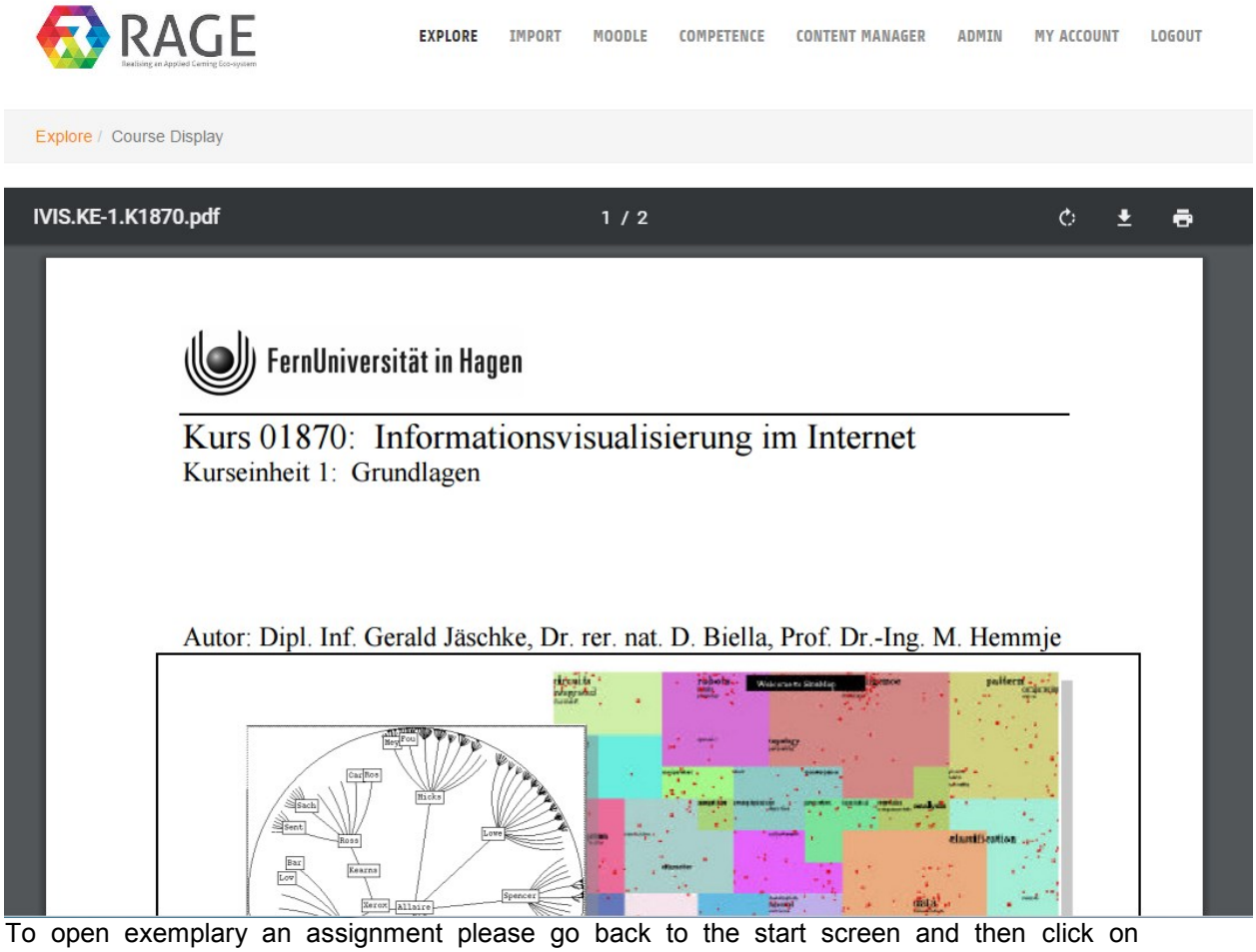
In the next screen, we found beside a more detailed summary further informations of the course: The **Course Facts** with format, start date and the availability, the **Condition profile** and the **Goal profile** and if available **Similar Contents.** Finally, we find the information whether we are already enrolled to this course under **Course Enrolment**. To enroll please click on “Enroll”.



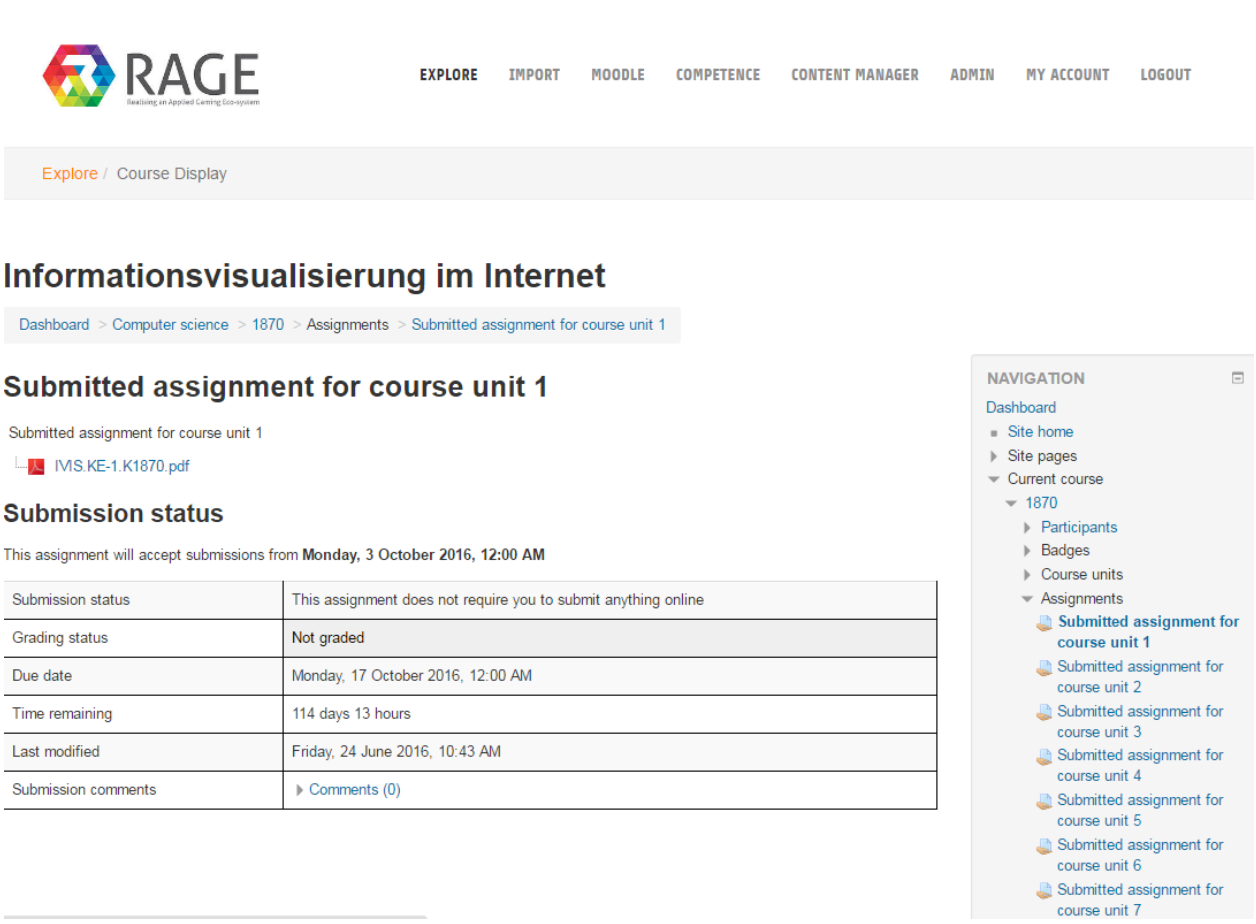
Now we see the start screen of our course with the different course units and assignments. To open exemplary the first unit please click on “Kurseinheit 1: Grundlagen”.



The corresponding pdf-file for course unit one will be displayed in a new screen. Here we can navigate throw the unit, download or print it.



To open exemplary an assignment please go back to the start screen and then click on “Submitted assignment for course unit 1”.



We see now the document with the first assignment “IVIS.KE-1.Kk1870.pdf” and information about the submission status. To open the actual assignment please click on “IVIS.KE-1.Kk1870.pdf”.