

# Producing and delivering online course package at a higher educational institute

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**Abstract.** This paper presents a process to design and implement an online course package. In this case the subjects of the course package belong to discipline of Information and Communications Technology (ICT). The main goal of such a development effort is to improve the quality of ICT education and to increase the competitiveness of ICT sector. Another goal is to reallocate recourses from basic studies to more advanced ones by organizing jointly online courses and course packages between universities. Typically, the aims are 1) to improve the availability of online course content to be offered to students independently on place and time, 2) to increase the productivity of teachers and teaching by reducing distributed and fragmented preparation work and sharing the delivery of courses, 3) to improve the quality of ICT education and increasing the equality among university students of a disciplinary. There are different options concerning the delivery of the courses. They can be offered locally with local arrangements or offered completely online as self-studies. Students adjust the pace of the course independently. Sometimes the examination requires student' attendance in a classroom, sometimes they are organized online aligned to the MOOC concept. Online course packages can be developed by independent and/or commercial developers, or by local faculty members or by a consortium of universities. The authors of this paper have experienced various strategies of online course development and delivery. The paper discusses achievements of online course package development by an independent developer.

**Key words:** Online course offerings, Pedagogy, Productivity, Open Education, Online Education

## 1. Introduction

A major concern of an education manager is how the education of Information and Communications Technology (ICT) should be organized and systematically developed to reach an optimal solution. This concerns teaching quality, students' on-time graduation, and the course palette with relevant substance content as well as effective teaching resource utilization. This directs universities focusing on their strengths according to their profile of their expertise and specialization.

Often it is understood that it is important to create a network and cooperation model to boost collaboration between educators and stakeholders without forgetting the

benefits of international collaboration and a chance to influence working life and entire societies. However, the cooperation model should be created as minimized administrative overhead as possible. The model is to be designed so that the demand and supply of the study modules would begin to grow spontaneously [1].

To create a desirable course, the first footstep is to provide educational material and content. To deliver the material to the students, audiences, and targeted groups, one needs to create an outstanding and comprehensive delivery method. Offering knowledge, solely based on printed books is ancient history now. With the advent of computers, we are facing an ever-changing situation almost every year due to new technologies, platforms, and delivery methods. New tools and methods are invented every year, which may be used for educational purposes [2]. Educational administrations, especially in developed countries are spending a large portion of their budget on adopting and equipping themselves with such new tools and abilities to provide state-of-the-art applications to make it easier for their targeted groups to learn, and have access to their material. Computers and smart gadgets are here with us now. We benefit from two progress factors every day, namely better performance of computers and a higher speed of accessible internet. Such progress equips educational administrations to offer more advanced applications for educational purposes. We no longer need to ship the material to students as our end users. They may simply benefit from online material by going through a few-click processes. Such advantages let us dedicate more of our time, budget, and resources to the quality of our material and offer new features to our students [3].

Still, even today, lecturers upload their static material into university portals and their specific work spaces and ask the students to download, read, and use such material. In such cases we only use technology to make it easier to transfer and deliver the material. The students still need to personally go through the material, do the exercises, attend in classrooms, and discuss the problems with lecturers or their teaching assistants. It's like having a high-tech, state-of-the-art 4K screen, and all we do with it is play and watch Atari games from 1980. Computers are merely used as delivery guys and not to directly interfere in the process of learning.

The paper presents a case of the TechClass online learning community [4]. In ongoing development phase, the technology was gradually changed from a delivery portal to an advanced, sophisticated, and smart-assistant type of portal [5]. It serves as a proper study buddy to deliver and support students throughout their studies.

The development of TechClass portal is discussed in five different parts; the advent of TechClass, Material Framework, Tutorial videos, basic edition of the portal, and finally the advance edition of the portal.

## 2. TechClass Material Framework

TechClass started as a MS SQL course carried out in one single intensive week. In Helsinki Metropolia University of Applied Sciences, after each semester, there is a one-week break before the next semester starts. Some students use this time to enroll and complete one or two intensive courses usually between 3 - 5 ECTS credits each to add

to their transcript to help them finish their studies more quickly, and learn more about a practical subject.

To create material for this course and deliver it to the students, many content delivery environments were analyzed and finally the TechClass Material Framework was created. All the courses offered in the TechClass portal follow the same framework and continuously improved thanks to feedback from the students.

The reasons for using the same framework for all the courses are the following:

- The framework has been created, maintained, and evolved from the first course to the next ones.
- It makes it much easier for a student to complete a course and enroll in another one due to being already familiar with the framework, tasks, delivery method, and assessments.
- It reduces significant amount of the lecturer's time needed for framework creation each time he/she offers a new course.

To fully enlighten the students on what to expect from the course regarding topics, assessment, practical arrangements, grading, and references, course descriptions are available before enrolling in the course so that the students can make sure, the course will be beneficial for them and then they enroll in the course. (Figure 1 and 2).

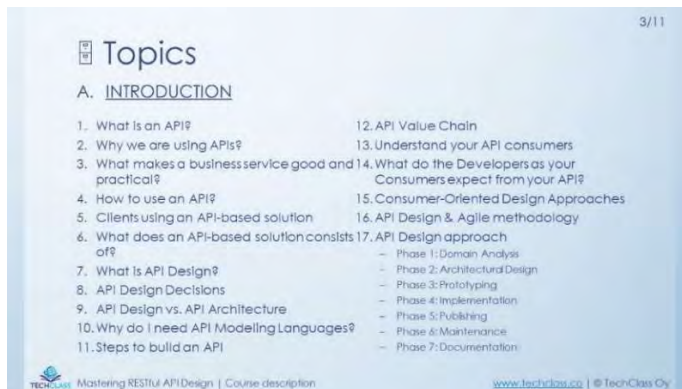


Figure 1. A sample of course topics in course description.

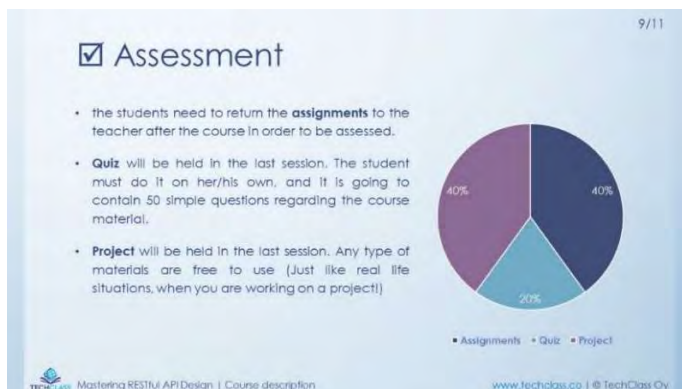


Figure 2. A sample of course assessment in course description.

The course material is available in various slides in multiple formats such as PDF and PowerPoint.

Difficulty Level Indicator (DLI) is used at the top of the slides, showing color coding: green for easy content, yellow for moderate content, and red for difficult content. Students have different goals when they enroll in courses. Some would like to just get familiar with the concepts and have overall familiarity with the topics and learn the basic ones, some others would like to learn the ups and downs of each topic and possibly enroll in a more advanced course regarding the same topic. By introducing DLI, we help the students to find topics that suit them best.

Since the courses are intensive, fast pacing courses, if a student misses a session of a class due to illness or some other reason, it is difficult to catch up with the knowledge by himself. Some decides to drop the workshop and the ones who decide to come a day after have a difficulty following up and the lack of information could lead to them asking primitive or already discussed and taught topics which is frustrating for the lecturer and other students to go through again. Later, the lecturer decided to record and teach the whole knowledge as tutorial videos and give the possibility to the students to watch and learn the material by themselves which added more value and advantages as well. First, if anyone is absent for a day, they can watch and learn the material by themselves. Second, students can go through the material before it is taught in class and thus have sufficient understanding over the topics and in the actual class ask for more advanced topics and deeper understanding. Finally, if some students have difficulty understanding a few topics, they can watch those parts after the class and learn the material more thoroughly.

Figure 3 shows a screenshot of the login page to the course space in the basic portal. Figure 4 shows a screenshot from a course space in the basic portal where students can download the course slides, assignments, and the tasks related to the course.

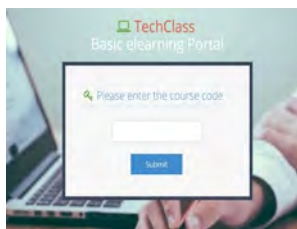


Figure 3. Login page.



Figure 4. Course space.

In a year and a half since the start of TechClass, the number of students has reached 600, and there have been 5 courses which the lecturer has offered. First the enrollment process was done in an old-fashioned way, having a list of students in Excel sheets, manually inserting them when they enrolled, and also manually entered their grades and updated their status when they had completed courses or cancelled their enrollment. A significant amount of time and energy was spent to handle such process manually, and there were cases that the lecturer made an error by forgetting to insert a student to the enrollment list, or updating their status. At this point, an automated system to handle the enrollment was required.

To begin with, we developed an all-new platform for the students to be able to create an account, view the list of available courses, and enroll in the ones they are interested,

and on the other hand, the admin of the portal could accept or reject the students' enrollments. Such improvement initiated the benefit of creating a community as a social community for the students. Students had to enter their personal, contact and university information. Figure 5 depicts the registration process of the portal and the information the student needs to give to register.

Figure 5. Registration process of the portal.

### 3. Portals

In the first edition of the portal, there were four different user types which had their own portal and features to use. If the admin was assigning a specific role to a student account user, he/she could go to that portal by selecting it from the second menu on the right.

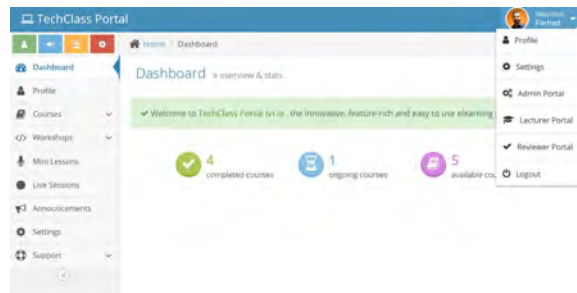


Figure 6. Student portal dashboard and menus.

As shown in Figure 6, the sample user has the right for Admin, Lecturer, and Reviewer portals as well.

#### 3.1. Student portal

The main user group of TechClass eLearning portal are the students. All users first need to create a student account.

The features that the student portal supports, are:

- Profile information: Entering and updating their latest information in the portal.
- Enrollment: Enrolling in the available courses in the portal.
- Ongoing courses: See the list of their ongoing courses and their status, downloading the material of the courses, and watching their tutorial videos.
- Completed courses: See the list of completed courses and their grades, downloading the material of the courses, and watching their tutorial videos.
- Workshops: See the list of upcoming workshops and being able to enroll in them, and manage their enrollment.
- Mini lessons: List of mini tutorial videos from the courses in the portal for more advanced and comprehensive content, and also motivating the students in enrolling in other courses.
- Live sessions: Watching live workshops from the portal if any workshop was broadcasting online.
- Support: Various method of support for the users.

### 3.2 Admin portal

The Admin portal is used to manage the students account and the portal settings. Figure 7 shows a screenshot from the admin portal and its menu.

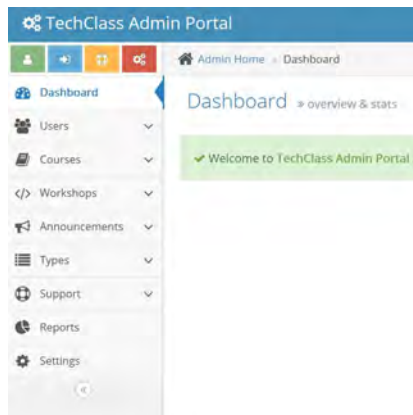


Figure 7. Admin portal.

The Admin portal features, as shown in Figure 7, are:

- Users: Managing users, admins, lecturers, and reviewers.
- Courses: Managing courses, their enrollments, information, grading, and getting reports.
- Workshops: Managing workshops, their information, and their enrollments.
- Announcements: Managing portal announcements.
- Types: Managing list of universities, student types, and lecturer types.

- Support: Managing support section.
- Reports: Getting the full report from the portal, the courses, and the students.
- Settings: Managing portal settings.

### 3.3 Lecturer Portal

Lecturers also have their own portal to manage their courses and the students enrolling in their courses. Figure 8 shows a screenshot from the lecturer portal and its menu.

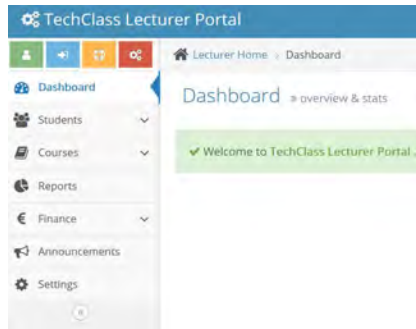


Figure 8. Lecturer portal.

The Lecturer portal features, as shown in Figure 8, are:

- Students: Getting the list of their students.
- Courses: Managing courses, their enrollments, information, grading, and getting reports.
- Reports: Full report about their students, and courses.
- Finance: List of payments from the portal to the lecturers.

### 3.4 Reviewer portal

The university staff needs to validate student enrollments and enter the grades into their own portal. There is a specific portal for Reviewers to check and enter the grades. Figure 9 shows a screenshot from the reviewer portal and its menu.

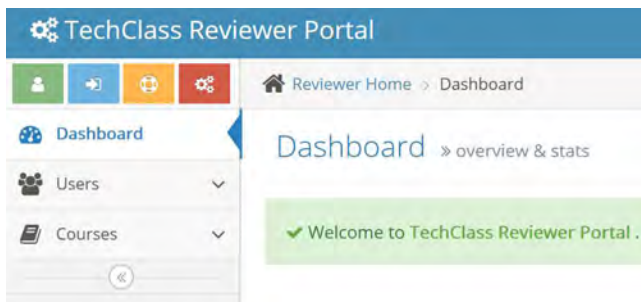


Figure 9. Reviewer portal.

The Reviewer portal features, as shown in Figure 9, are:

- Users: List of students and reviewers.
- Courses: Report about the courses and checking the grades of the enrolments.

The objective characteristics of the portal are summarised:

- Simple: The portal is easy to use and the User Interface makes it practical and straight-forward for the students to use it.
- Modern: The state-of-the-art vision of the portal enables developers to equip it with the constantly evolving needs of industry and students.
- Smart: Using Artificial Intelligence algorithms the portal acts as a teacher to assist students to perform their tasks and assignments.
- Accessible: The portal is accessible from anywhere and anytime from every device that has a web browser and an access to internet.
- Quality: The strength is the quality of the content of the courses. There are strict guidelines to evaluate the quality of the courses.
- Development: According to the feedback from the students, new features are constantly developed.

The plan is to add more social features to increase the involvement of the students with each other in the portal. In further development phase the following features are planned to be added to the portal:

- Communities: Related educational communities to make students getting in touch with each other.
- Companies portal: A specific portal for companies for posting job advertisements and announcements about their events and happenings.
- Portal Smart Assistant (PSA): A feature to work as a smart bot to help the students with their enrollment and the course tasks.
- Hangout: a place where a student can find a study buddy, let each other know about events, and sell their education materials.
- Tutors: Students with higher skills are able to help other students answering their questions and problems.
- Boards: Discussion forums for students and lecturers to discuss course problems.
- Messages: Users are able to send messages to each other in the portal making it unnecessary to send regular emails to each other.
- Notifications: Sending notifications for major amendment in the portal.

## 4. Package content and feedback system

The content of TechClass is deals with Web Development and related fields. The offered course names are listed here:

1. *Developing Modern Web Platforms: Introduction to Web design and HTML, CSS, and Javascript*
2. *Introduction to Animation 3D: Basic animation topics*
3. *Introduction to ASP.NET Web Forms: Backend programming*

4. *Introduction to MS SQL Server*
5. *Mastering Bootstrap4 and CSS3: Learning Bootstrap framework and using styles in web pages*
6. *Mastering Search Engine Optimization: SEO tips and tricks to boost up SEO ranking for websites.*
7. *Mastering Version Control with Git: Introduction to version control and using Git*
8. *Mastering the Fundamentals of RESTful API Design: Introduction to RESTful API design and its characteristics and features.*

Students feedback collection was changed from a last moment feedback to a continuous feedback. In the past, students were asked to evaluate different parts of the course pace as the last task of course assignments. The flaw of this method is that the students write the feedback before their assessment is completed and afterwards the lecturer needs to evaluate their assignments and projects. Therefore, such a task order may have an influence on the students' feedback. In the new procedure, the students are asked to write their feedback online in the course work space. In addition, reporting and analyzing feedback are significantly easier in the new procedure, since the data is stored in different sections of a database. For instance, the report of the last 50 feedbacks received from the students took about an hour to populate manually, but the same report from the new procedure is done in seconds by considering multiple factors and filter criteria for instance for each course, lecturer, and student group.

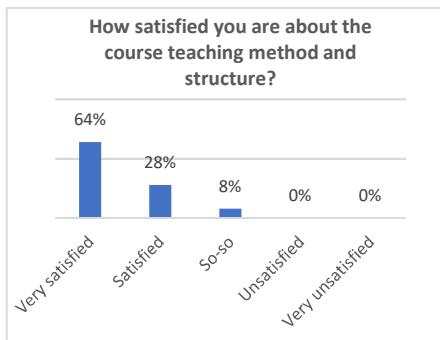


Figure 10. Feedback question about teaching method.

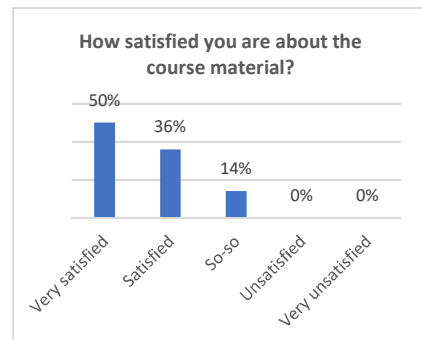


Figure 11. Feedback question about teaching material.

## 5. Conclusions

Since the Finnish education system is known one of the best systems in the world, the goals need to be set accordingly [6], [7]. We need to know what students expect more from us. The quality that may be good enough somewhere else, may not be acceptable here. We need to aim for more to maintain the competitive edge we have.

Not only do we understand these facts, but we also have such higher goals. Our aim is to make people passionate about what they are learning. Education is essential to enhancing people's careers, but we are also aiming to make it fun and pleasant. We believe people can complete a task in a perfect way, only if they truly enjoy what they

are doing. In addition, we believe that the way content is taught is what makes for a great learning experience. We are constantly analyzing the industry needs and providing new and user-friendly features to be able to deliver them in a more innovative and efficient way to our students.

We believe eLearning is a two-way communication channel. By providing smart and social features, we are aiming at putting students as much as we possibly can in control of their learning experience. Not only a system can understand the students and their desires, but we can connect students with each other to enable them to support and help each other with their study problems. Having such community will eventually lead to boosting up the students' motivation to learn ample competences in an efficient way.

As a conclusion we see that many different types of eLearning providers are needed. One fundamental question is: Are universities sufficiently flexible to create business models for supporting online course development and are they willing to distribute, update and upgrade online course packages? It seems that independent and business-oriented providers are more agile in providing a university community with powerful and featureful eLearning experience. At least they give a good boost to the academic community.

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