What works in course development? A practice guide

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Abstract

Course development is an important part of education at ETH Zürich. Yet, ETH Zürich has not consolidated the relevant information in one concise way or defined a process to guide the hands-on course development processes. Therefore, I developed the Course Development Cycle (CDC) and wrote a guide for my research group. The main aim of this initiative was to streamline the journey from concept to course by providing colleagues a structured guide with all the information they should consider when they develop a course at ETH. During the development of an undergraduate course with the help of the CDC the guide proved to be useful. Now, the guide needs to be refined further and turned into a generic version that will work across ETH.

1 Introduction

At the Health Ethics and Policy Lab, we designed in 2018 a new undergraduate semester course called Ethics in Medicine and Healthcare for the Bachelor in Human Medicine degree program. Our seasoned course development team members worked iteratively over several months to achieve this together. The research group is relatively new at ETH, and so despite being experienced course designers in general, designing a course specifically at ETH Zürich was new for all of us. A colleague and I enrolled in the administrative department Educational Development and Technology (LET) course *Foundations of Teaching and Learning* to get acquainted with the processes at ETH. In addition, I started to reach out to support staff and scoured ETH teaching resources to learn how to best develop an undergraduate course at ETH.

Whereas the Guidelines for Lecturers provide plenty of information about lecturing at ETH Zürich in general, unfortunately, I quickly realized that ETH had not yet consolidated the relevant information or defined a process to guide would-be teaching teams in the hands-on course development process (ETH Zürich Guidelines for Lecturers 2019). Therefore, I wrote a best practice guide for course development at ETH for my research group. The main aim of this initiative was to streamline the journey from concept to course by providing colleagues a structured guide with all the information they should consider when they develop a course at ETH. As the guide is used in practice, the main benefits of the guide are shorter development time for courses; common ground for course teams; better assessment and less frustration.

Other universities provide similar guidance as for example the Online Course Design Guide developed by the Massachusetts Institute of Technology Office of Educational Innovation and Technology; the Course and syllabus design guide developed by the Washington University Center for Teaching and Learning; or the Course Design guide developed by the Stanford University Teaching Commons (Massachusetts Institute of Technology Office of Educational Innovation and Technology 2019; Washington University Center for Teaching and Learning 2019, Stanford University Teaching Commons 2019). The guides differ in depth and style, but

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all follow a structured way of guiding course designers though the process of course development.

The guide presented in this article follows the structure of the Course Development Cycle (CDC), Figure 1. I developed the CDC based on previous teaching experience, what I learned during the Foundations of Teaching and Learning course, and hands on experience co-developing the course Ethics in Medicine and Healthcare. Several rounds of feedback from colleagues in my research group, and teaching support staff at the Department of Health Sciences and Technology (D-HEST) and LET improved the model and contributed to the cycle I present here. I structured the CDC into eleven steps plus two initiation steps. All steps together describe a full course cycle from the first rough idea, through the refining kiln of collaborative development, and on to the final product: the course that you deliver. I believe the *Course Development Guide* can help standardize the rigour we apply to course development processes at my research group and beyond, and thereby promote quality of courses at ETH.

Figure 1: Course development cycle.

1.1 How does the guide contribute to student learning?

So far, we developed two independent courses with the CDC. The students' feedback shows that students acknowledged the structure, organisation and red thread of the courses. From my perspective, the CDC supports a course structure that follows a logic and story as student learning is at the core of the CDC. Providing a course structure where objectives, content and assessment are aligned, helps students to focus much more on the actual learning so that students are not distracted by a potential unclarity of course design. By no means the design processes of the two courses are finished as we are constantly revising the courses to account for student feedback and content updates. The CDC proved to be a good starting point leading to a structured first course design and student learning. I hope the guide can be used by other lecturers and course developers at ETH as a starting point for their own course development. When following the CDC, lecturers can be certain that they cover the main steps that are relevant for course development at ETH. In practice, a step-by-step approach that follows the cycle from the start to the end seems reasonable.

2 Teaching concept

Considering teaching practice in general and hands on teaching experience in courses that were developed with the help of the CDC, our experience shows that the CDC did not only contribute to student learning but also to teaching practice. Similar to student learning, the CDC helps to structure teaching in a way that lecturers find the course and narrative of the course easy to follow. The teaching practice clearly benefits from a thoughtful course development process.

In what follows, I describe the CDC steps. It is important to bear in mind that I wrote the CDC for the Health Ethics and Policy Lab at D-HEST. Hence, while most of the information in the CDC applies across ETH, some information might be most useful for research groups at D-HEST. Together with LET, I am in the process of developing a generic version of this guide which will be applicable across ETH. This guide will be publicly available in 2020.

2.1 You get an idea!

The cycle starts with your first idea for a new course. If you have an idea for a course, talk to other team members within and outside of your research group to mature this idea. Then, sketch your idea on maximum one page. In this process some questions to consider are, Table 1:

About the course	What student population is the course aimed at? Is the course a graduate or undergraduate or non-degree course? What competences do you want students to acquire (objectives)? Are the content and competences relevant for the student that will be enrolled in your course?
	Will the learned skills be useful for the students' future career? Does the course fit to your research group's focus? Will the course be distinctive enough to survive among the variety of courses that are already offered within the ETH environment? What are its distinctive features?
	Do you have the staff, resources and knowledge to teach this course? If not, what needs to be done? What format do you imagine for this course? (Length, teaching methods, assessment. Does the assessment fit to the objectives?)
	Which department should the course be affiliated with?

	What is your course title?
About you	Do you feel comfortable and confident enough to teach the content? What unique strengths do you bring that qualify you to teach this course? Will you enjoy the course and does it resonate with you? Would you take the course yourself? Do you need any further training (knowledge and/or skills) to facilitate the course?

Table 1: Questions to help to sketch first course idea.

At this early stage it is absolutely normal if you reconsider/adjust your idea, seek additional advice or advance your personal teaching skills further before continuing with your course idea.

As already stated in the table above, please consider, that competence taught in your course should reflect broadly the research areas of the research group you are part of. ETH explicitly highlights that it is important to focus on the competence students should learn during courses as compared to only focusing on knowledge content.

To better understand the variety of courses offered at ETH, the Science in Perspective stream at the Department of Humanities, Social and Political Sciences, shows the broad range of for example elective courses offered at ETH (ETH Zürich Science in Perspective 2019). The ETH's Course catalogue provides information to all teaching activities at ETH (ETH Zürich Course Catalogue 2019). The ETH's Studies website provides information about all degree and non-degree courses offered at ETH (ETH Zürich Studies 2019). Detailed study regulations for each degree programme are archived, only in German language, in the ETH Rechtssammlung (ETH Zürich Rechtssammlung der ETH Zürich 2019)

2.2 Decide to develop the course

Before developing a course, your research group leader needs to approve your course proposal and to agree to develop the course. This step is important because course development takes a lot of time and requires several team members to work on this process. Also, it is common practice to involve the research group leader in this decision.

2.3 Involve more team members and select a team leader

As teaching usually involves more than one person, you want to involve other team members as early as possible in the development process. This also includes other staff within ETH or external organisations, if it would be useful. From our experience, we would advise course designers to work in pairs at minimum. Further, it is helpful to assign one person to be the development lead for the project. This person is the main contact point for the research group leader and other team members that are not directly involved in the course project.

2.4 Develop competence-oriented learning objectives

Where objectives lead, your course will follow. Therefore, it behoves you to define your objectives carefully and early. Start by answering the most important question: *What should students be able to do after your class?*

LET provides a useful guide here: Formulating competence-oriented learning objectives (ETH Zürich, Educational Development and Technology, Formulating competence-oriented learning objectives 2019)

Choose the course type
ETH offers the possibility to make use of a range of different course types (ETH Zürich, Educational Development and Technology, Course Types 2019). These are: lecture, exercise, mixture of lecture and exercise, seminar, colloquium, practical course, independent project, diploma thesis, and revision course. Hence you are not bound to somewhat traditional course types such as you lecturing and students listening. Please consider, that the course type might limit the student number in your course.

Choose performance assessment & grading methods
For most courses at ETH (unless the course is not graded), students will have to take part in performance assessments. ETH provides a range of different performance assessment formats that are considered as appropriate. These include written as well as oral assessment methods and include for example, essays, presentations, or multiple-choice tests. It is essential that the assessment methods fit the learning objectives of the course. To provide a fair assessment, it is worth to rely on different assessment methods within one course. This way students can show what they learned by using different skill sets. Objectives and assessment build the book ends of the course as both frame the course syllabus.

Before continuing with the assessment development please carefully read the following documents:

a) ETH Guidelines on grading written examinations (ETH Zürich, Educational Development and Technology, Guidelines on Grading Written Examinations 2019*)*
b) ETH Directive: Deploying continuous performance assessment in teaching (ETH Zürich Directive: Deploying continuous performance assessment in teaching 2019)
c) ETH Zurich's Grading System and ECTS Grades (ETH Zürich ETH Zurich's Grading System and ECTS Grades 2019).

Further, the Examination scheduling service at ETH is helpful in advising and informing about assessment methods at ETH (ETH Zürich Examination schedule/session 2019). The Examination scheduling service coordinates the end of semester assessments at ETH. For a wide range of courses, you are allowed to grade with pass/fail only and not necessarily with grades 6-1.

After the course has finished and you have graded your students, you will need to fill in the grades at eDoz, which is a teaching administration software (ETH Zürich eDoz 2019). The administration software eDoz helps lecturers to coordinate classes.

2.5 Develop the course syllabus and timetable

Now, after defining the main course objectives you will need to develop a course that meets the identified objectives. A way to structure this work process is to break down the syllabus into the following dimensions, Table 2.

Dimension	Explanation
Date & time	Describes the course date and time of each course day
Learning activity	Describes the type of activity you are aiming to do, such as workshop, seminar, lecture, movie etc.
Objective	Describes the objective for each learning activity
Content	Describes the content of the learning activity
Performance assessment	Describes what can be used from this learning activity in the final assessment, e.g. a question, concept, framework, definitions, skill, etc
Further info	Describes to all further information that you think is useful.

Table 2: Course syllabus dimensions.

Course syllabus

Eventually, the objectives, learning activities and performance assessments need to be aligned. The content of your course will be influenced by your own and your colleagues' experiences and knowledge, teaching manuals (e.g. books with case studies) and other information sources such as scientific articles, experiments, learning software, media and more. When choosing the course content and learning material/activities, keep in mind the skills the students should acquire. Therefore, do not focus on knowledge only.

When developing the course content, please consider the following questions, Table 3:

General	Do you have a narrative and story line for the course? Will students find the story appealing (especially important for elective courses)?
Students	Will students understand what competences they will acquire as well as how these are useful for their own career path? Will students understand the purpose of the course and value the time they spend for your course? Are the chunks of information you deliver appropriate and digestible by your student cohort? Does the course challenge students at the right level? Does the course fit in the overall curriculum of your student cohort in terms of knowledge, skills and workload? Are the learning activities appealing to students? Are the students' preparational tasks and homework proportionate? Is the level of language you use in the course suitable? How do you build cohesion among the students, i.e. feeling of belonging and cohort?
Administration	Is your timeline realistic? Are the information sources (reading material, audio-visual material) understandable? Can students access the sources or can you provide the sources (check, copy right)? Do you invite external speakers (external to the research group and ETH)? Will you conduct interim assessment and/or end of course assessment? Do you have enough time scheduled for students' assessment after the course? Particularly important for e.g. essay grading which is very time consuming. Which semester do you want to offer the course and with what frequency?

Table 3: Questions to aid course content development.

Building social cohesion among students

Social cohesion among students in your course can be critical for the learning experience of students and the overall success of your course. For example, in the field of ethics potentially controversial as well as highly emotional and personal issues are discussed during courses. Examples are end of life decision making, abortion or gene editing. As the success of similar courses largely depends on in class discussions among students, an open, respectful and

equal discussion culture is vital. When students feel that they can discuss issues in a safe and supportive environment, they might be more inclined to actively discuss critical as well as personal issues.

The concept of social cohesion mainly incorporates two societal goal dimensions:

a) *'The first dimension can be shortly denoted as the inequality dimension. It concerns the goal of promoting equal opportunities and reducing disparities and divisions within a society. This also includes the aspect of social exclusion.*
b) *The second dimension can be shortly denoted as the social capital dimension. It concerns the goal of strengthening social relations, interactions and ties and embraces all aspects which are generally considered as the social capital of a society.' (*Berger-Schmitt 2002, 406)

Applying this quotation to student cohorts, the conceptualisation suggests that we, as course leaders, need to promote equal opportunities, reduce disparities and divisions within the cohort. Further, we need to strengthen social relations, interactions and ties and embrace all aspects which are generally considered as the social capital within the student cohort.

At this point, ETH appears not to offer official guidance in this area. Therefore, I suggested to discuss within the course team what steps are necessary and practical for the course format to build social cohesion among your student cohort. Depending on where your course sits within the overall curriculum, students might know each other already and have a good relationship. Also, some degree programme coordinators organize social activities to build social cohesion among the student cohort. Further, you should observe social cohesion throughout the course and if you feel that seminar groups or entire course cohorts could benefit from targeted measures, please discuss your ideas within the course leadership team. In addition, you can also ask the LET Team for advice.

Course development support
Before finalising the course syllabus, please discuss the syllabus in detail within your teaching team and with other staff members. Also, it can be helpful to play with different ideas for the learning activities and test run the activities with friends or colleagues. Further, you can seek professional support at your departmental teaching support staff and LET.

Language of instruction
The ETH Directive Languages of instruction in Bachelor's, Master's and university continuing education programmes outlines the requirements for language of instruction (ETH Zürich Directive: Languages of instruction in Bachelor's, Master's and university continuing education programmes 2019). It is relevant to know that the languages of instruction are German and English, in some cases French and Italian. Undergraduate courses, especially first year, must be held in German and examined in German. Graduate courses are held in English and examined in English.

2.6 Align objectives, learning activities and performance assessment

It is essential for the logic of the course that objectives, learning activities and assessment are aligned, i.e. that the three parts fit together and none of the parts is out of proportion. This process is called constructive alignment (ETH Zürich Constructive Alignment 2019). Please read carefully the LET guide on constructive alignment and you may want to consult LET staff in this process.

2.7 Check the course proposal before submitting it to your ETH department

Before submitting the course proposal to the relevant department contact for accreditation, the syllabus needs to be approved by your research group leader.

Depending on what kind of course you develop and what department will review the course, you will need to move the content into a template that will be provided to you by the respective department. Here, every department follows a different strategy. Also, please consider deadlines at the departments. These are important to know so that the course can start in the semester you aim for.

2.8 Wait for your ETH department to authorise the course

After submission to the respective ETH department, the authorisation process can take several weeks. Usually, the decisions are made in committees.

2.9 Adapt the course during the semester

It can be helpful to get interim and direct feedback from your students during the course to adapt to student needs while they are enrolled in the course. A way to get direct feedback during the seminars and lectures is pass out post-it notes to the students that they can use to give feedback. For example, you can ask your students to write in short and anonymously 'What went well (WW)?' and 'What to do differently (DD)?' on one post-it. They can stick the post-its to the door frame when they leave the room or you ask them to stick the notes to one table. You collect the notes after the class and keep them during the course. Here, it is important to explain to the students what the notes are for and that the notes are anonymised, if necessary. The interactive smartphone application EduAPP provides a similar function in an online mobile app format.

You will not be able to change major areas of the course such as objectives, but you can adapt the number of case studies per seminar or change certain teaching and learning methods based on interim feedback or your observations. From experiences, students seem to like this very much, as they feel empowered to provide feedback and they see that their feedback has a direct impact for themselves and not 'just' for the following years.

Yet, when running a course for the first time, LET suggests that is useful to follow through with your planned course. Too many changes in the first run will blur the students' evaluation in so far as it will not be possible to assess what of your original plan worked out well and what did not work.

2.10 Evaluate the course

ETH considers course evaluation as an important part of teaching and course development. Usually, data is collected by student surveys.

ETH course evaluation
All courses at ETH will be evaluated. Course units and performance assessments are evaluated alternately in all departments each academic year. First-year examinations will be evaluated every semester. You can find detailed information here: Teaching: Evaluation (ETH Zürich Teaching: Evaluation 2019). First time courses can be evaluated on demand. Also, it is possible to customize the official evaluation by introducing additional questions.

An example for the Questionnaire for lectures BSc/MSc as well as all other questionnaires are online (ETH Zürich Basis Questionnaires 2019, ETH Zürich LET Test Fake Lecture 2019).

Research group course evaluation
To evaluate courses, you can use different types of evaluations to receive as much information as possible to improve future courses. The overall evaluation draws on the established ETH evaluation, ongoing in class evaluation, last lecture feedback rounds and internal debriefing. Thorough evaluation is necessary to be able to adjust and improve courses in the future.

Additionally, it can be useful to ask peers to attend a lecture or seminar to observe your teaching and to provide useful feedback. Some lecture halls also provide the opportunity to video tape your lecture, if this functionality does not exist in your lecture hall or seminar room, you can ask the LET Team to assist you by setting up a video camera (ETH Zürich Educational Development and Technology 2019).

Last lecture/seminar
The last lecture/seminar is usually a good opportunity to engage with the students in a feedback round. This is voluntary, but provides an opportunity for discussion and direct feedback. Also, this way students feel engaged and taken seriously. You might want to take anonymised notes during this feedback session. Here, it is important to explain to the students what the notes are for and that the notes are anonymised.

After the examinations
Internal course evaluation plays a vital part to inform the course improvement process. To do this, you should reflect on your personal experiences, the ETH evaluation feedback, as well as student feedback. At minimum, the internal discussion should focus on, Figure 2:

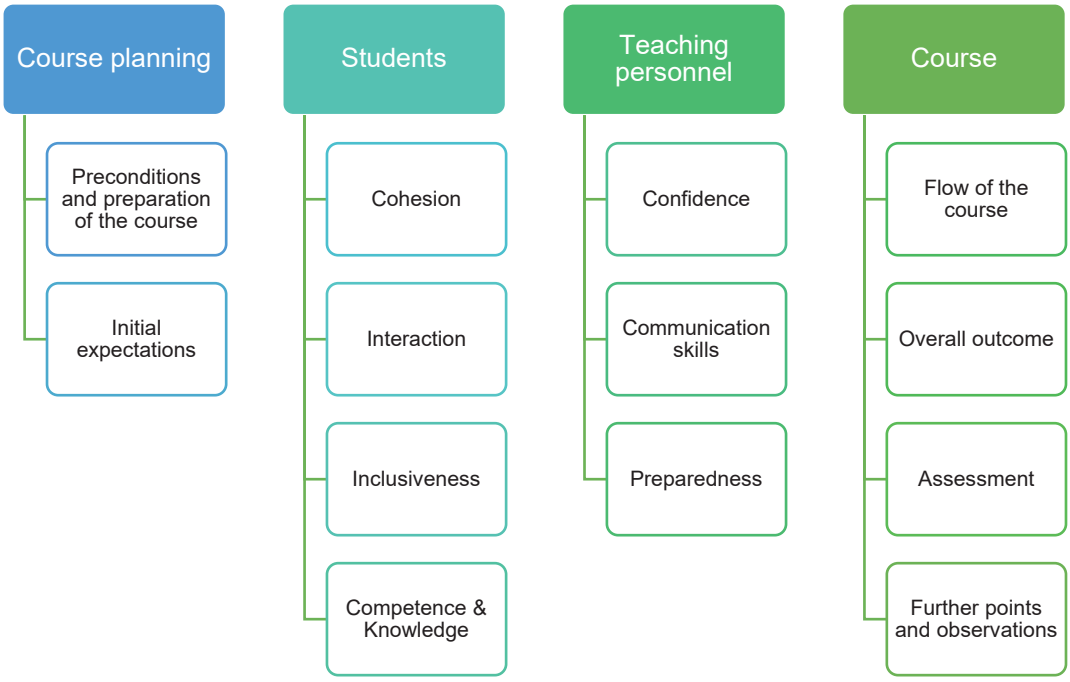

Figure 2: Points to consider during internal evaluations after the course finished.

2.11 Reflect, then improve the course

After the course finished, the grading completed and you took a break from teaching, it will be useful to meet once more with the teaching team and reflect on course. This should include at least, Table 4. From experience, it is a good idea to take half a day or more to do this. You may find a workshop format useful.

Recap the course.
Views and opinions from each team member.
What worked well, what do you want to do different?
What can be improved for the next cohort?
What should remain the same for the next cohort?
Are there any new developments in the field of the course that need to be covered in the next year?
Does the course still fit to the curriculum or are there new courses which overlap/compete with your course?
Are there new staff members that could be included in the course team?

Table 4: Points to consider during course improvement workshop.

3 Lessons learned

In this article, I explained the motivation to write a best practice guide for course development at ETH and presented the content of this guide. As I wrote the guide alongside the development of a new undergraduate course, it is promising to see that the ETH official students' feedback of the same course was very positive, highlighting the structure and organization of the course. This feedback suggests in part, that the content of the guide seems to be valuable for course development and students feel that this supports their learning experience. Yet, the full guide needs to be tested in practice and revised further. To do so as well as to transfer the content of this guide into a generic version of the guide that is suitable across the ETH, at present, this course development guide is under review and tested at the Institute for Building Materials and Institute of Neuroinformatic. We continue to use the guide in our research group and constantly improve or annotate the guide. Updated versions will be available on our research group's webpage: https://bioethics.ethz.ch/

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Disclaimer

Even though I tried to be as accurate and comprehensive as possible in this article, I make no claim that this information is exhaustive. Especially since the ETH teaching and course development environment is constantly moving forward, you are required to double check the information and it is your responsibility as a course leader to be up to date with the latest relevant changes in your department and at ETH. Neither this article nor the internal course development guide it is based on are official ETH approved documents.

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