

SWITCHING TO ONLINE TEACHING

A PRACTICAL HANDBOOK

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UNIVERSITY OF TWENTE.



Switching to Online Teaching: A Practical Handbook

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PREFACE

After a classical high school experience (at least, in the big lines), I was expecting a rather classical university experience as well. I chose for the Technology, Liberal Arts and Sciences programme at University College Twente, which is all but standard, but that was part of the reason I chose it. However, I was still expecting the regular setup with on-campus education, project work around a table and becoming part of the community of my study programme. In the first six months of my bachelor's programme, this expectation was met. However, a totally unexpected event changed this situation, heavily influencing not only our education, but also the rest of our lives.

In the first months of 2020, the COVID-19 virus took over the world. As a result, many countries decided on a lockdown, and so did the Netherlands, the country where I was born and have lived ever since. Education could not take place as it used to be anymore, and in a matter of days, educational institutions needed to switch to an online alternative. As might seem logical, practically nobody was prepared for this situation, and in the beginning, there was a lot of improvising and trial and error.

Although I have had a limited amount of courses since the start of the pandemic, I think it's worth sharing that I experienced teachers to try to replicate the face-to-face situation in the online environment. Learning activities often only had minor changes, with as a result that there was a mismatch between the online environment and the learning activity sometimes. Although it might not be the best situation, I think it's understandable that teachers chose for this. They often have years of experience in teaching face-to-face, and it's not a rare case where a teacher did not receive any training to offer online education to his/her students. It simply was the easiest option in the crisis situation that was presented to them.

In high school, I already found a passion for positively influencing education. When I got elective space in September 2020, I was inspired to write this handbook. I want to help teachers with their online education by writing a hands-on handbook that explains the basics of switching to online education, describing the process from design till the end of the course, with a focus on learning activities.

I hope that this book will help you with your online teaching. When you are reading this book, either you or the educational institution you work for is interested in offering online education. That could be because you have to (the COVID-19 pandemic as an example), or because you have the possibility to offer online education. Either way, I hope that this handbook will inspire you in your adventure to online education.

Jarmo Schoemaker – Student at University College Twente.

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INTRODUCTION

This book is about starting with providing online education, and especially in the situation where there is a switch from face-to-face education to online education. There can be several reasons for this switch, such as the flexibility and possibilities online education offers and the COVID-19 pandemic, which resulted in a lockdown in many countries. Online education could be seen as a revolution or new chapter in education. This switch, however, can come with challenges, many questions and a time of adjustment.

This handbook is not written to contain all information and answers you need to design online education. Instead, it is written as a starting point to guide you in the right direction. Consider looking for more information on online education that fits with your target group and the course you are designing.

Each chapter begins with an introduction into the topic of the chapter. After that, the content of that chapter follows. At the end of the handbook, a cheat sheet can be found containing the most important statements per chapter.

Although this book is written with an aim at university education, it might still be helpful for educators from other types of education.

1 WHY IS ONLINE TEACHING RELEVANT?



One of the questions that might pop up is why you should even consider online teaching as a possibility. This is a legit question, in my opinion, since it will take some time and energy to switch to (partially) online education, time and energy that you might also want to spend on other things.

Something that stands out to me is that education is mostly centred around relatively long lectures, in which the lecturer explains the theories. Afterwards, students are often given an assignment set to apply the theories, and that is repeated each week. Let's look back at how education was 20 years ago. I don't have experience with it myself, but you might. Now, ask yourself some questions: Is education very different from how it was then? Is there a lot of improvement in flexibility over the years? I hope that these questions will show you that education didn't change much. Of course, we have the help of digital tools nowadays, and group work is incorporated, but most courses still use lectures as their primary way of transferring information. In this chapter, I would like to explain to you shortly why I think it is a good idea to consider implementing online education.

1.1 HELLO MODERN WORLD

We are living in a world where technology and digital skills are becoming more and more important. You might feel that the new generations are better with those technologies than you, but don't let this hold you back. In the end, educational programmes are there to learn their students things that are useful for the rest of their lives. Wouldn't it make sense to try to incorporate a bit of technology into the education itself? Additionally, the online environment contains many great tools and resources that can improve the learning experience, student motivation and decrease the time you as a teacher need to invest.

1.2 FLEXIBILITY

One of the aspects of online education that might be the most important one is the flexibility it offers. In classical education, students have to be present in the lecture hall and pay attention for e.g. two hours. If two courses plan their lectures at the same moment, or if a student cannot attend due to other circumstances, the student misses out on a significant part of the course, especially when attendance is mandatory, this can result in problems. With online education, you can allow the learning process to start before the planned session, and you can allow your students to plan their learning more to their own wishes and schedule. This will give a green light for education in which the student can take control of his/her own learning, and where there is the possibility for a student-focussed design and adjusting to the personal needs of the students.

Another point where flexibility is increased is the resources that you have for your online education. An almost infinite amount of software, videos and data is available online, and with online education, you can easily benefit from this candy store filled with inspiring materials. Think about the use of videos explaining the topics you are teaching, or software for quizzes that you can incorporate into your courses. The possibilities are endless. This might also form a challenge on itself, since what should you choose when possibilities are endless? This will be discussed in chapter five.

Additionally, online education (or maybe better: the use of digital tools and software) allows for other assignments and more creative or modern hand-ins. Instead of letting your students write papers and essays, you could consider to let them make websites, videos, applications, social media pages and much more. These new means might be more appealing to your students, since it might fit more into their world. They are often very familiar with social media, videos, podcasts, websites and so on. Using those digital tools might be a good way to motivate your students and spark their creativity for the assignment. Additionally, it is likely that students will need to work with those digital tools in their future jobs, so having some experience with using them might be very beneficial.

1.3 GLOBAL POSSIBILITIES

An advantage of online education that is related to the points above is the possibilities that online education offers regarding global accessibility. Where the traditional face-to-face education happens on location, online education takes place on an online platform. Hence, the location of the attendees does not matter anymore, as long as they have a stable internet connection. This does not only allow your students to learn from the place they want to, but it also allows you to incorporate teachers or professionals from all over the world into your course. This means that there is a decrease in travelling time and that your course is accessible, independently from the location of the location of your students, yourself and other attendees.

1.4 SOURCES AND RECOMMENDED READINGS

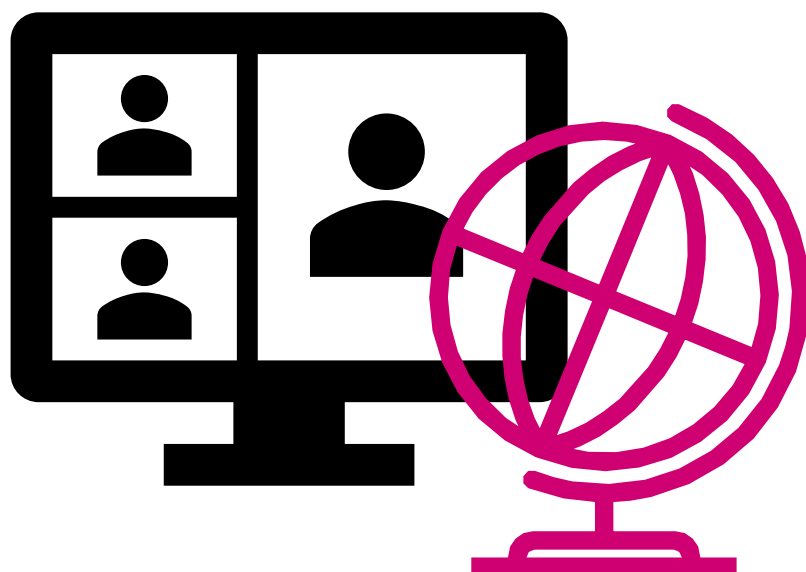
As an addition to the sources below, my personal experience and the experience of others in my bachelor programme are taken into account.

Kim, K.-J., & Bonk, C. J. (2006). The Future of Online Teaching and Learning in Higher Education: The Survey Says... *Educause Quarterly*, 4, 22–30.

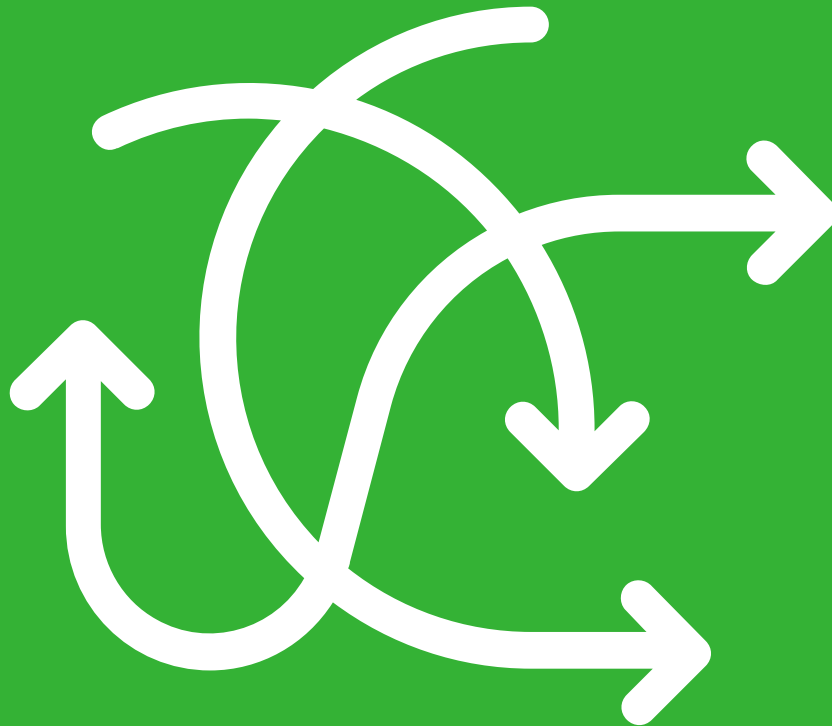
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Willcox, K. E., Sarma, S., & Lippel, P. H. (2016). *Online Education: A Catalyst for Higher Education Reforms*.



2 SWITCHING TO ONLINE TEACHING: THE BIG LINES



Switching from face-to-face education to online education is not just a step. It's a process that requires some thinking and time. When you start to think about online education, you might consider to replace the classroom with an online conference tool. However, you might find out that you (or maybe your students) do not like this, or that you discover that "it just doesn't work".

This chapter will introduce you to some steps that will structure your path to online education, and will help you to increase satisfaction and learning outcomes.

Would you design your course the same for a big 300 student lecture hall as you would for a small 15 person room? Probably not, right? The course designs might be very similar, but they both take the teaching environment and the facilities available into account. Wouldn't it make sense to design your course to match with the online environment, instead of only changing the environment, but not the design?

2.1 TRANSFORMATION OR STARTING FROM SCRATCH?

The basic rule of switching to online education is having a proper redesign process. This enables you to make choices that take the online environment into account. Additionally, you can plan for how your online environment looks like, for example which conference software you will use. This is comparable to how you design your face-to-face education. Constructive alignment between your intended learning outcomes (ILOs), learning activities and assessment is very important, as you might know. In the proper redesign process, you go over the whole course design as if you were designing it from scratch, and you think critically about your choices and make changes where there should be. This does not mean that you take your existing course and tweak a bit here and there. On the contrary, this means that you start from scratch with the design of your online course, where you critically reuse parts of an existing course.

2.2 INTENDED LEARNING OUTCOMES IN ONLINE EDUCATION

Clearly defining your ILOs is important in online education, just as it is in face-to-face education. Often, the ILOs of a face-to-face course can be used for an online course as well. However, do not simply copy them because of this. I would always recommend to ask yourself if the existing ILOs still cover what you want your students to learn. Additionally, check if there is a level indicator in your ILOs. This level indicator will help you in the rest of the design of the course, and will help your students in their self-assessment. Defining those ILOs is the same as it is in a face-to-face environment. The most important thing is to think about whether you still want your students to learn the same, or do you want them to learn other things? Table 1 contains some examples that fit well with a certain environment.

Table 1

Face-to-face environment	Online environment
On-paper calculations	Use of mathematical software
Experiments	Computer simulations
Prototyping	3D computer sketching

2.3 LEARNING ACTIVITIES

After you have chosen what you want your students to learn, it's time to choose activities that help your students to reach the ILOs. For choosing and designing learning activities, properly defined ILOs are very helpful. If you want your students to be able to apply certain theories, you could have different activities than when you want your students to recall or recognize something. In other words: your ILOs state what the intended level of learning is at the end of your course. The level of the activities should build up and match the ILOs it taps into. Additionally, the ILOs state in which of the three learning domains (cognitive, affective, psychomotor) you want your students to learn, and thus what the activity should aim for. In this, there is the

difference between being able to conduct an experiment and being able to apply a certain theory on a data set, for example.

Something else to take into account with learning activities is how active and deep the learning is. Although you might be used to giving lectures, accompanied by some assignments, there are other ways that can possibly allow your students to learn on a deeper level. This deep learning, where a student struggles with the materials himself, is essential to learn. You could think about project work, problem-based learning, or a flipped classroom approach. Especially when students learn together, for example in projects, they learn a lot. Next to these options, there are also things that you can incorporate into, for example, a lecture. The use of polls and short formative quizzes in your lectures is a good example. Students usually have an attention span of max. 15 minutes, so having one or two quiz questions related to the materials you just talked about might come in very handy to recharge their attention, let them use the materials and check if the students understood what you just told.

Another thing that you need to think about when designing for online education is what software you will use for it. There is an almost infinite amount of tools available, but which to choose? The use of the online world is not the goal, it's the vehicle that allows you to reach a goal, or in this case, the vehicle that allows your students to reach the ILOs. On the other hand, switching vehicles often is not very nice either. Hence, it is important to carefully pick the software tool that you are going to use for a certain activity. Additionally, it is also good to (get to) know the software yourself, so you will be able to use the software and explain to your students how the programme works.

The following chapters will dive deeper into these elements related to the design of online learning activities.

2.4 SOURCES AND RECOMMENDED READINGS

Biggs, J. (2014). Constructive Alignment in University Teaching. *HERDSA*, 1, 5–22.

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McIntyre, S., & Mirriahi, N. (2018). *Learning to Teach Online | Coursera*. Coursera. <https://www.coursera.org/learn/teach-online>

Zeung, L. M., & Tracy, X. Z. (2019). *University Teaching | Coursera*. Coursera. <https://www.coursera.org/learn/university-teaching>

3 INTENDED LEARNING OUTCOMES AND ONLINE EDUCATION



It may go without saying that properly defining the intended learning outcomes (ILOs), or learning objectives, of your course is rather important. This is not only important for online education, but also for other forms of education. These ILOs clearly state what the students are expected to learn in your course. This is not only good to know for your students (it allows for self-evaluation), but also very helpful for you. Since the ILOs tell you what the students should learn, it is clear what things should be included in the learning activities and with that, also what you don't need to include.

Good ILOs are defined so that it is very clear in which domain or domains the learning is expected (cognitive domain, psychomotor domain and affective domain). The use of action verbs connected to these domains can help with that. At the same time, those action verbs allow for indicating the expected level that you want your students to reach.

This chapter will give you some tips in how you can design your learning activities to match with ILOs that were originally written for face-to-face education.

3.1 WHAT DO YOU WANT YOUR STUDENTS TO LEARN?

Let's say that you have well-defined intended learning outcomes (ILOs) for the online course that you are designing, which come from a face-to-face course on exactly the same topic. It might feel very logical or superfluous, but I would advise to analyse those ILOs thoroughly before you start with choosing learning activities. Questions you could ask yourself are: "What are the students expected to learn? At what level? Which domain does this belong to? Why is it important that the students learn this?"

This analysis does not necessarily need to take a lot of time, and it might not offer you much new insights if you just defined the learning outcomes, but it will help you in choosing learning activities that match with your ILOs. Additionally, this will also help you when you are designing the assessment of your course. To come back to the vehicle mentioned in the previous chapter, these ILOs are in essence the planned destination. The analysis above will help you to make the difference between saying "We are going to Italy", "We are going to Rome" and "We are going to the Colosseum", which makes a difference in planning the trip, or in this case, the learning activities. There are many roads that lead to Rome, and your exact plan might give the final argument for choosing one of these roads.

3.2 CHOOSING ACTIVITIES

You might be used to having certain learning activities for a course. Lectures, for example, are often used. This, however, does not necessarily mean that lectures will be a good choice for the course you are designing. When you are choosing activities for online education, keep the possibilities of the online setting into account. Letting your students work with very expensive or risky laboratory materials won't be a possibility, but computer modelling of a phenomenon would fit well.

Ask yourself how long you want the activity to take. Do you want one big activity that taps into one ILO, or would you rather have multiple small activities? Depending on the learning objective, both could be effective.

The possibilities regarding learning activities in online education are practically endless. Watching videos, commenting on online discussion forums, conference calls, polls and group work are activities that might feel familiar to you, but there is so much more possible. Using shared digital whiteboards for collaborative mind mapping, incorporating the learning in a digital scavenger hunt, using online experiment simulators and using MOOCs (Massive Open Online Courses) are just some examples of what you could do as well. Take some time to think out of the box. I would like to encourage you not to think in technical limitations, but to think creatively about activities that will help your students in reaching the ILOs. Look around on the internet for inspiration, maybe you will find a tool or idea that fits with your wishes and the online environment very well. As said before, there are multiple paths that lead to Rome. Take the time to study the map and see which routes are there, maybe you'll discover a new route that is much more fun than the routes you already knew.

3.3 ILOS AND ONLINE LEARNING ACTIVITIES

The central theme of this chapter is not going straight to the point. Take the time to explore and analyse your ILOs, look around what others have done in their online education and let that inspire you to come up with your own, creative plans for your course. Keep in mind, there is no solution that will fit with every course. Hence, this chapter helps you to get to the solution yourself, instead of giving a few general solutions. Don't forget that it's all about the students and their learning: what do you think they need to be able to learn?

3.4 SOURCES AND RECOMMENDED READINGS

Biggs, J. (2014). Constructive Alignment in University Teaching. *HERDSA*, 1, 5–22.

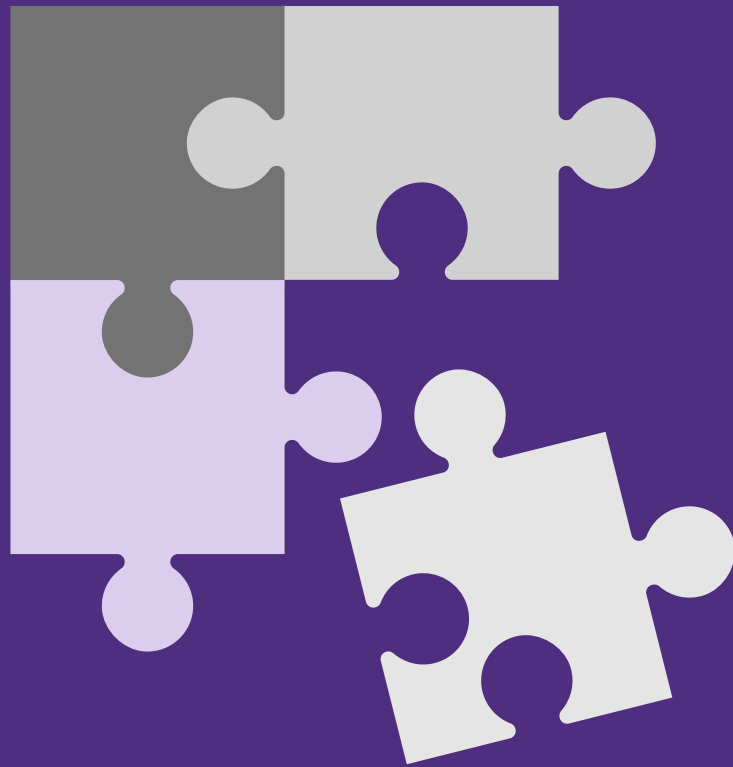
Hoque, M. (2017). *Three Domains of Learning: Cognitive, Affective and Psychomotor*. 2, 45–51.

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Zeung, L. M., & Tracy, X. Z. (2019). *University Teaching | Coursera*. Coursera. <https://www.coursera.org/learn/university-teaching>



4 DEEP LEARNING IN ONLINE EDUCATION



An essential element of learning is the active use of the materials. Giving lectures and letting students read their books is nice to introduce them to the topic, but to bring the learning to a higher level, students need to engage with the materials.

This chapter will introduce some ways in which you can make your learning more active. The more active learning is, the more it facilitates for deep learning. You probably want your students to learn as much as possible. A switch from passive, teacher-focussed education to active, student-focussed education will facilitate for this. Online education offers many possibilities for an active style of education.

Many teachers already try to incorporate deep learning into their face-to-face education. Think of class discussions, think-pair-share and group projects. Similar activities can be applied to online education. This chapter will give some examples of this, and how that could be used in your course. The goal with this is to give you an idea of the possibilities and to inspire you to come up with active learning forms yourself.

4.1 DISCUSSION FORUMS

First of all, let's have a look at the use of discussion forums. You could think about a conference call with your class where you discuss some questions they have, but that is not the only option. Many LMSs (Learning Management Systems), like CANVAS, Moodle and Blackboard, but also other software tools such as Microsoft Teams, offer possibilities for written discussions. If you encourage your students to ask their questions there and also answer to each other, you can create a situation where students can learn together and deepen their thinking by reading new perspectives and responding to that. On top of that, the learning is not bound to one set timeslot anymore, allowing for more learning, and students are less dependent on you for answers on their questions. The collaborative learning that happens and the interaction between different ideas of students will deepen their learning, that is what makes this tool rather powerful once you get your students to actively use it.

4.2 POLLS

This second point is one that can help you making, for example, online lectures more active. As you might know, students have a limited attention span of around 10-15 minutes. After those 15 minutes, it is good to have some time for your students to think about the things they were just told. Imagine a situation where you are giving an online lecture through an online conference tool. Now, consider to divide that lecture into multiple smaller parts of about 10-15 minutes, where you end each part with some quiz questions or poll questions. Some conference tools, like BigBlueButton, have a built-in poll function that allows for easy use of polls. Next to that, you could also consider websites like Quizlet or Kahoot!, which offer more options regarding questions and exporting data, and might also look more appealing. Especially Kahoot! is great for student engagement and is an easy way to transform your learning activity into a fun, active game show instead of a passive lecture.

4.3 FORMATIVE TESTS WITH AUTOMATED ASSESSMENT

One of the challenges that online education can have is that it might be harder for you to see how your students are performing. In a face-to-face lecture, you would be able to see their facial expressions and even take a peek at their work and see your students working. In the online environment, this is rather difficult. Introducing a weekly or biweekly assignment set, for which the students fill in the answer in an online tool which automatically marks their work allows you to have insights into your students' performance. Additionally, these tests will give them insights in the level of their performance. This form of timely feedback is an ideal way for your students to get to know if they need to improve and how.

Of course, making a fully-automated test might not be the best option for all courses. You can also consider a mix of computer marked questions, like multiple choice questions and questions with numerical answers, and questions that you mark yourself, like argumentations and explanations, or even a form where you do all the

assessment yourself. However, the more of the marking of the assignments is done automatically, the less time it takes for you. This is not only great for you as a teacher, but also for your students, since this will allow them to get their feedback earlier. Seen that this form of formative testing during the course costs relatively little time for you as a teacher, you might be able to put in more of those “checkpoints”. This means that there is an increased amount of data on students’ performance and more insights for your students in how well they are doing, which is promotes learning very well. As might go without saying, these formative tests are a very active way of learning since students need to use the materials actively to come to the answers (depending on the questions you ask, of course).

4.4 GROUP PROJECTS

The use of group projects in your course will allow your students to actively work with the materials on a rather deep level. The students often need to have a deep understanding of how the theories work, so that they can apply them correctly to their project. They will often look for information themselves too, resulting in broader and deeper learning. Such a project might also make the theories less abstract, and students will have the ability to learn from each other a lot. Such a project could be supported by instruction videos or lectures with related content.

Next to the active and deep learning that group projects facilitate for, group projects allow your students to learn far more than just the theories related to the project. They will learn to collaborate and communicate with each other, and they will often practice with sharing the results of their project with their peers. This group work is a very active way of learning. Although you might be a bit hesitant about group work when students are not able to physically meet, the use of online conference tools and shared documents might actually facilitate this distant group work very well.

4.5 JIGSAW METHOD

The jigsaw method is something that often involves groups. With this method, the whole package of knowledge that needs to be learnt is cut into pieces and divided over the students. Each student studies his/her own piece, and shares the findings with the rest of the students. This form of learning is related to group work, and will emphasise students’ responsibility for the learning experience of the other students. Learning from each other is the key term here.

If you have a class of, let’s say, 50 students, it might not be the best idea to split the materials into 50 small pieces. Instead, consider to divide the class into groups that all handle a portion of the whole, after which they can present their findings to the whole class. This will also lower the responsibility for each individual and decrease the chance that a certain part is not explained properly due to a student’s misunderstanding.

Another way you could use this jigsaw method is in a sort of matrix form. You will divide the class in equal groups. Table 2 will give an example of this, applied to knowledge of the construction of a bicycle.

Table 2

	Wheels	Pedals	Frame	Saddle	Steer	Bike lights
Group 1	Student	Student	Student	Student	Student	Student
Group 2	Student	Student	Student	Student	Student	Student
Group 3	Student	Student	Student	Student	Student	Student
Group 4	Student	Student	Student	Student	Student	Student
Group 5	Student	Student	Student	Student	Student	Student

In this example, each group consists of six students, each with their own expertise. The students in the frame column (green box) will learn all about the frame of the bicycle together, as will the students from the other columns. As soon as each column is done with their parts, they split up in 5 groups in which they each discuss their own findings. In group 3 (pink box) for example, the student who studied the frame of the bicycle will explain the rest of group 3 about the frame, and all other students will do the same for their parts.

The beauty of this jigsaw method is that it facilitates a learning community where students need each other to learn. They all become experts on certain parts and need to understand these parts thoroughly. Explaining these materials to others is an active use, and good for the learning of the students.

4.6 LEARNING TOGETHER

As emphasized in the two parts above, students can learn a lot from each other. Sharing ideas and visions can spark their minds and inspire them to think about different stand points. Another positive point for you as a teacher is that the group knows more than the individual students, so you will probably need less time to explain the materials to your students. Helping each other and explaining theories and assignments to each other are active forms of learning. The student needs to understand the materials thoroughly, and explaining it will help the student in having a solid argumentation for it. This collaborative learning can be reached in many ways. Group projects and the jigsaw method are examples, just like the discussion forums, but also think about letting students do their assignments in duos or letting your students write blogs to which the others respond.

4.7 THINK ABOUT IT

Now you have read some examples for facilitating active learning, think about it yourself. What other methods could you think of? There is a lot possible for making learning more active. Take a look at the internet, talk to colleagues, think about the unique things the online environment offers and see what you can come up with.

4.8 RECOMMENDED READINGS

The extensive list below shows multiple types of sources: From handbooks to scientific papers. There are ample examples of activities and methods that can be used in online education that go far beyond what is mentioned in this handbook.

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5 ONLINE EDUCATION: THE TECHNICAL SIDE



One thing that is rather essential for online learning is the good use of the available technologies. You might perceive this as a challenge, and it might take some adjustments and getting used to. The internet is like a whole new environment: where you would normally request a big auditorium, a small lecture room or a laboratory, you now have an almost infinite amount of possibilities regarding software to choose from. You might feel overwhelmed with the possibilities and how different the online environment is. This chapter will offer some support in choosing the software that best fits your purpose.

Furthermore, you might be struggling with the hardware involved in online education. Webcams, poor connections, unclear audio and writing on a digital whiteboard – these are common hardware related struggles for which some advice will be included in this chapter. As said before, the online education is the vehicle that will help you to get to your destination, but a car with a flat tire won't get you to Rome.

5.1 THE SEA OF SOFTWARE AND THE DATA SHARKS

There is an overload of software and tools available on the internet that you could use for your online education. What are the differences, why would you use it and how can you use it in your online education?

The first distinction that can be made in the available software is the difference between institutionally supported software and open access platforms. Institutionally supported software and tools are offered by your institution. Your university often pays for it, and normally, there is support available to help you fix problems. Another advantage of this software is that your institution makes sure that you can safely use it, and that it is available for all your students. Additionally, logging in can often be done with your university credentials. This also means that grades and accomplishments most of the time can be easily exported towards the learning management system. Negative sides of these institutionally supported technologies can be that it could need some training or time before you can use it. Additionally, the software might not have the full functionality that you would like for your learning activities.

The main benefits of open access technologies are that most students are already familiar with them and they usually are a bit easier to use. Think of websites as Facebook, Youtube, Flickr and Wordpress. These open access technologies are usually free, get constant updates and are not limited to your institution only. This allows for working with externals or other institutions as well. Reasons not to choose for an open access technology include that these technologies do not offer an export or record of the interaction or accomplishments. There might be hidden costs, and there is no technical support from your institution for it. Also, there might be some copyright issues.

Now, one of the main concerns to think about is safety. With institutionally supported technologies, you can be sure that they are safe to use, but with open access technologies, you cannot. What if your chosen technology shares the personal information of your students? This is (partially) your responsibility. Additionally, if you ask your students to make public posts, blogs or websites, keep in mind that people outside of your organisation can read them as well and that they might make negative comments or reuse your students' work. Your students might be reluctant to share their full opinion online due to this, especially now privacy policies, laws and data sharing are hot topics.

To conclude, it is smart to be careful with using open access technologies, especially when students need to register for them and/or personal information or thoughts are entered into that technology. When using such a technology, it is smart to check with your institution what their opinion is about the use of that technology. When in doubt if the technology is safe to use, see if there are institutionally supported technologies that could offer the same or comparable functionality.

5.2 WHAT IS IMPORTANT WHEN CHOOSING SOFTWARE?

Next to the safety considerations mentioned before, there are other things to think about when choosing software. First of all, you need to be able to work with it yourself and teach your student how to work with it too. You cannot assume that all students know how certain software works without any help.

Secondly, think about the amount of different software the students need to use: if every course they have uses a different software package, and each course uses new software every week, it can become overwhelming and unclear to the students. If you limit the amount of software used for your course to a few technologies that are also used in other courses, that will offer your students more structure and clarity, and will decrease their learning curve. Learning management systems like CANVAS, Moodle and Blackboard often have many functionalities and tools integrated in them. It might be nice to consider if you can use one of these tools instead of another software package.

If you have a certain learning activity in mind, but have trouble finding software that will accommodate for that activity, consider to contact your institution's e-learning expert, library or software support department. They are often able to help you. Don't be scared to try new things, maybe you will find something that is perfect for supporting your learning activity. Do not forget: the technology is not the goal, it is merely the vehicle that will get you to your destination.

Additionally, think about a plan B. Expect that the technology won't work. That way, you are not up for surprises and you will be able to continue your online learning activity without too much trouble.

5.3 ONLINE REOURCES: ANOTHER SEA, BUT LESS SHARKS

A big advantage of online education is the amount of resources that is available. Most of us know Youtube and use the internet to find scientific papers, but the list is longer than that, and entails sources aimed at education as well.

Before mentioning some sources that you can check, please think about copyright when using a source. Often, using parts of someone else's work is not allowed. Although it is possible to download videos from Youtube, for example, the author has rights on his/her video. If you are planning on reusing bits of existing materials from the internet, make sure to check if you are allowed to do so. A better option might be to refer to the original source, for example by sharing the URL of a certain Youtube video or web page. When you are using someone else's materials in your course, always make sure to check the reliability of the source: Is the information correct and can I trust the author? When you are putting your own work online, consider registering your work with a free creative commons license.

When you are looking for online resources, you might use a search engine to find websites, videos and more about your chosen topic. This is not necessarily wrong, but there are also websites available that are made for sharing educational resources. This means that these sources contain things like videos made by other

universities or institutions and other course materials. Table 3 contains some examples of educational resources.

Table 3

Name	URL
TED-Ed	https://ed.ted.com/
MERLOT	https://www.merlot.org/merlot/
MIT OpenCourseWare	https://ocw.mit.edu/index.htm
OER Commons	https://www.oercommons.org/
Khan Academy	https://www.khanacademy.org/

5.4 HOW TO USE THESE RESOURCES?

The best thing about these resources is that you do not have to reinvent the wheel yourself. There are high-quality materials available from prestigious universities. An example of how to use these materials can be to use lectures from one of these sources instead of giving a lecture yourself. Students can watch the video themselves, and join a conference call to discuss the found materials. This means that the learning can already start before the weekly session takes place. Additionally, students will be able to pause and playback the video, meaning that it can be adjusted to their own learning speed. Since you don't need to prepare a lecture anymore, you have time to find out what students need help with and prepare some extra explanation on that for the discussion session. Another way in which you can use these resources is using them as extra explanation or deepening, or you could use them integrated in your lecture. A last example is the use of these materials as inspiration for your own course. Whole course syllabi can be found, so they might also inspire you when writing your ILOs. Of course, the list with possibilities is longer than just these examples.

5.5 THE HARDWARE ASPECT – SOME TIPS

5.5.1 WEBCAM

The webcam – either built-in or external – might be one of the most used pieces of hardware for online education. To get the best quality webcam, it couldn't hurt to check if your institution could supply you with a good external webcam. Either way, take into account that the webcam is not aimed at a big light source. This will make it almost impossible to see your facial expressions. Good lighting is aimed at you from the front, or a bit from the sides. This will help in getting a good, clean video feed. Next to that, try to have a tidy background. It's not necessarily bad to have colour or many items in the background, but it can be distracting when it is a bit unordered. Additionally, consider your clothing. It's not super strict of course, and please wear what you feel comfortable in, but, where possible, it is recommended to avoid black or dark coloured clothing, just like very colourful, distracting prints and fine stripes.

5.5.2 CONNECTION

An essential part of online education is the online part, or the internet connection as we call it. If you are experiencing slow internet connections, low-quality video conference calls and long download times, then it's good to have a look at your internet connection. Are you using a wired internet connection, or are you using WiFi? You will have the best internet when you have a wired connection between your computer or laptop and your internet network (often your router). If this is not possible, get closer to a WiFi point. This means that you can move to a place closer to the router/WiFi repeater/access point, or that you place an extra access point or WiFi repeater, preferably with as little walls and ceilings in between that WiFi source and your laptop/pc. If this doesn't help, you could check if you can upgrade your internet service, or that your internet provider could help you in getting better internet at your working location.

5.5.3 AUDIO

For video conference calls, audio might be the most important element. A low-quality video connection might be a bit annoying, but an unstable audio connection makes you inaudible and hard to understand. Hence, it is certainly worth investing in a good pair of headphones with a nice microphone or a speakerphone, especially if you need to use them a lot. Many brands offer audio products for conference calls. You might even be able to get some nice gear from your institution.

5.5.4 WHITEBOARD

Many teachers use a whiteboard in their face-to-face classes. When switching to online teaching, this is a thing that is often missed, especially when teaching maths or physics. Conference software often has a built-in whiteboard function, but drawing with your mouse or laptop touchpad doesn't really work. There are some hardware tools available that might help you in solving this problem. The cheapest option is the use of a drawing pad that can be connected to your current computer or laptop. This will give you the ability to draw on that pad, which makes your writing digital. A second option is the purchase of a tablet or laptop with a touchscreen. However, this becomes rather expensive, and tablets or laptops in tablet mode might not work together with all software. Again, your institution might be able to provide you with hardware, so make sure to contact them if you face this problem!

5.6 SOURCES AND RECOMMENDED READINGS

This chapter is mostly build upon my own experience and knowledge. Next to the three sources below, try searching on the internet for things like “webcam lighting tips” or “video call audio” to find out more about the topics, or ask your institution’s IT or e-learning expert.

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Dunlap, J. C., & Lowenthal, P. R. (2018). Online educators’ recommendations for teaching online: Crowdsourcing in action. *Open Praxis*, 10(1), 79.
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6 ASSESSMENT AND EVALUATION IN ONLINE EDUCATION



This chapter will shortly describe the final elements of a course design: The assessment of students in an online environment and the evaluation of your new online course.

Assessment is an item that is important for many people. Not only for you as teachers, but also for students and your institution. It could be that you need to assess your students via an online activity. What are things to take into account when you are designing for online assessment?

Related to the assessment is the evaluation of your course. With a new or redesigned course, it can be expected that you and/or your students are not completely satisfied. Evaluation is important to find out what you can improve in your course and how.

This chapter will give a small introduction into online assessment and evaluation strategies.

6.1 ONLINE ASSESSMENT – WHAT TO PAY ATTENTION TO

Assessment in an online situation can be quite different from assessment in a face-to-face situation. Conducting exams is harder, and depending on technology. Therefore, consider assessment activities that are less sensitive to fraud, such as group projects, essays, blogs or websites. Do you need an exam for assessment? Probably not, right? Other assessment activities might just be as good, or even better suited with your ILOs. When designing for assessment, keep in mind that you want to find out if the ILOs are met. The learning activities are there to help your students reach the ILOs. Hence, it makes sense to align your assessment with the ILOs and your learning activities.

Things to take into account with online assessment is that you should think about is the influence of technology. Technology can fail, so keep this in mind with the assessment. In case technology fails or causes a delay, don't be too strict on the student and help him/her with the technical issues. You want to measure in what extent the student reached the ILOs, and most likely not how good your student is in solving problems with the technical infrastructure. It might be nice to keep this into account with assessment. When it's the first time a student gives an online presentation for example, their performance might be influenced by the totally new presentation environment. If the students need to upload a video, they might be a bit late with handing in due to an unexpectedly slow internet connection. To sum up, please consider not being too strict on your students.

6.2 EVALUATION

Especially for a new or redesigned course, evaluation is important to find out where the course can be improved. There are several ways for doing this. You could send out an anonymous survey, for example. Other things that might work are having a focus group with students at the end of the course. Do take in mind, however, that you do this after their final assessment. They might be moderate with feedback because they don't want to negatively influence their own assessment. Another option is to ask a colleague to have a look at your course and give feedback. There are ample opportunities for you to get feedback on your course design. Once you got the feedback, have a look at how the course can be improved. Consulting the internet to find others experiences might be very helpful for this. You could, of course, also ask a curriculum design expert, e-learning expert or a colleague for advice. Whatever you do to evaluate your course design, keep in mind that you want to have information that is as objective as possible, and not influenced by power.

6.3 SOURCES AND RECOMMENDED READINGS

Biggs, J. (2014). Constructive Alignment in University Teaching. *HERDSA*, 1, 5–22.

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7 MOTIVATING STUDENTS IN ONLINE EDUCATION



One of the things that you might have experienced already is that your students are less motivated to study with online education than they were with face-to-face education. Even if you have not experienced this, it is still a good idea to think about student motivation and engagement.

Very important for creating this motivation and engagement is the start of your course. If your students are motivated at the beginning of the course, it is relatively easy to maintain this motivation throughout the whole course. Motivating and engaging students after a bad start, however, is very difficult.

This chapter will provide you with a few tips that can help you to establish this initial motivation and to maintain it during the course.

7.1 INITIAL MOTIVATION AND ENGAGEMENT

7.1.1 SHARE EXPECTATIONS AND RULES

In the first session of a course, or maybe even before that, it is good to tell your students what is expected from them. It might be that your students do not have experience with online education, so it will be helpful for them to hear in what extent you expect them to participate, and what they should do to pass the course. If students are not sure about what is expected from them, it is possible that they don't meet expectations in the end.

Take some time to go over the course with your students. Make sure that it is 100% clear what is expected from them and that they know how the course will look like. Additionally, it can be nice to explain why you chose certain activities. This might take away the chance that students don't participate in certain activities because they don't see the added value without you explaining it. Lastly, tell them how much time you expect them to put in each activity. That way, they can plan everything properly and don't underestimate the size of an assignment or activity.

In case you are not sure if something will work yet, or if you still need to decide on some details regarding for example a certain activity, be open about it. It is likely that your students would like to be informed. Additionally, it will answer some questions students might otherwise have later on. If you tell your students that you are not sure about something yet or that you are trying out something new, this could be reassuring for your students since they know then that you are aware that things might not go according to plan.

7.1.2 FEEDBACK PLEASE – BUT NOT TOO LATE

Timely feedback is essential for learning. It shows students what their strengths and weaknesses are and how they can improve their learning. However, when feedback comes in late, it is less useful, since students will have moved on already and might have forgotten what the feedback was exactly for. As described in chapter 4.3, the use of digital tools can help with giving timely feedback. Additional options for being able to give timely feedback is the use of their peers. If you let your students comment on each other's work, they will get useful feedback and deepen their own thinking at the same time. Additionally, peer feedback will accommodate for the forming of a learning community where your students learn together.

If you want to give feedback yourself, it might be useful to consider giving audio feedback. With audio recorder apps on smartphones and computers, it is very easy to record your voice nowadays. Giving spoken feedback can save you some time. Additionally, spoken feedback will feel very personal. After a while, it will feel a bit like you are speaking to a student. For the student, it is nice to have this personal touch, instead of receiving textual feedback with little personality in it.

Another form of feedback that will help in motivating your students is acknowledging their contributions. Especially in situations where students can comment on each

other's work (such a blog or discussion), this works really well. When you see that the whole class is improving a lot, then this is something that you can share as well.

7.1.3 SUPPORT, PLEASE

Providing support to your students for when they need it can boost their learning a lot. If a student struggles a lot with the software you are using, offering some technical support will help your student with getting rid of frustrations and thus demotivation due to the technical issues. This does not only go for technical issues. For all situations where a student is performing below expectations, try to find a solution together that will help your student to improve his/her learning or participation. With online education, detecting the problems might be harder than in a face-to-face situation. Taking some time for a one-on-one conversation might help. Many institutions have staff members or teams dedicated to student support. Consider contacting them for more advice. It might also be helpful to share the contact details from these people at the beginning of your course, and mention that students can also contact you if they need support.

7.2 MAINTAINING MOTIVATION AND ENGAGEMENT

The main thing here is to keep participation relevant for your students. Try to design your course in such a way that participation is essential for the students' learning process. If students don't see the purpose of a certain activity, they will usually not participate. To some extent, this can be influenced by the way you communicate the learning activities as well: Sending your students a pre-recorded lecture and having a Q&A session a few days later that they can join if they have questions might feel less meaningful than communicating that there is a discussion session in a few days for which you expect your students to watch the pre-recorded lecture as preparation. The content of the Q&A and discussion session might be rather similar – in both, you will most likely encourage your students to bring up the topics they find interesting and collaboratively talk about it after that. An important note here is that you need to make sure that you prepare the discussion session well. If the discussion feels like it is not important for their learning, they might not join the discussion session in the future.

Another way to improve engagement is to tie the participation to assessment. Students will often only do something or participate very actively if they are rewarded for that. Making participation a part of the assessment will help in getting your students to actively participate in your learning activities. Examples of how to include this in assessment are having bonus points for active participation, or having a rubric describing several levels of participation, which is a part of the final assessment. Important here is that you really assess the quality of the participation, and not just the quantity.

7.3 SOURCES AND RECOMMENDED READINGS

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8 CHEAT SHEET

Intended learning outcomes	Define proper ILOs before you start with choosing learning activities. If you use existing ILOs, make sure you completely understand what they mean.
Learning activities	Choose learning activities so that they need active student involvement and that they allow for deep learning. Put some variation in there, that will keep it interesting. Do not simply copy existing face-to-face activities to your online course. Instead, do a proper redesign and choose activities that fit with the digital environment.
Deep learning	Consider learning activities where the focus is on the students work instead of on the teacher. Group work and online discussion forums are examples of this.
Choosing software	When choosing software, keep privacy and security in mind. Where possible, institutionally supported software is preferred over open access technologies. Additionally, try to limit the amount of software: using new software every week can become confusing for students. Make sure to have a plan B in case your first choice doesn't work.
Online resources	Consider using existing resources, such as videos, for your courses. Not having to reinvent the wheel might save you a lot of time. Be careful with copyright: Try to link to the original source instead of downloading or copying the resource itself.
Hardware	Try to arrange good hardware. Failing or low-quality hardware will influence the effectivity of your education a lot. Good hardware will not guarantee that your online education is good, but it will certainly help you!
Assessment	Align your assessment with the ILOs and learning activities. Often, exams are not the only possibility for assessment. Consider other options, like assessing group projects or blogs.
Student motivation	Keep student motivation in mind. Make sure to have a good start of your course, this will give student motivation and engagement a head start. Give timely feedback and offer support where needed.

9 FINAL NOTES AND ACKNOWLEDGEMENTS

When reading this handbook, please don't take the information as the solid truth. I'm not an educational expert, and there certainly is no "one size fits all" recipe for online education. However, I hope that this handbook will give you some inspiration in how you can design your online education.

In case you would like to have help with designing your online course, consider contacting your institution's e-learning specialists or centre for educational support, or use the internet to find experience stories, theories or online courses regarding online education.

I am aware that this handbook is not very extensive. It allows you to get some basic knowledge on switching to online education without it taking a lot of time. Additionally, I strongly encourage you to look further than this book. I see this book as a starting point in your journey towards online education, and not as a book containing all information you need.

I learned a lot from writing this book. As a preparation, I participated in two MOOCs about university teaching and learning to teach online, both containing a fair amount of literature as well. Where I started with no knowledge on designing for education, I think I would now be able to properly design an online course.

During the whole process, I was supervised by Drs. E.M.P. Hermsen and L. Pei MSc, both consultants at TELT (Technology Enhanced Learning & Teaching) at the University of Twente. I would like to thank Eduardo and Linlin for their time, help and effort. I appreciate it a lot that they were willing to supervise me despite their rather full schedules due to the COVID-19 crisis. The discussions I had with them were very valuable for me.

Next, I would like to thank University College Twente, part of the University of Twente, for offering me the possibility to write this handbook as a part of my curriculum of the Technology, Liberal Arts and Sciences programme. I am grateful that I was offered the opportunity to come up with my own plans and execute them.

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For proper online education, there are several things to take into account. The current online possibilities and resources are practically endless, but how should you use them? More importantly: If you decide to (partially) switch your face-to-face course to an online version, what are the most important things to keep in mind?

Just changing the platform, but not the design of the course won't be sufficient. This handbook will help you in discovering what to think about and will hopefully inspire you to come up with an educational design that is creative, modern and appropriate for you and your students.

