

Developing Online Teaching and Learning

– Design, Execution, and Evaluation of a Module Based Course in Carbon Capture, Storage and Utilization

Introduction

The background for this scholarship in Teaching and Learning (SoTL) assignment is the web-based teaching we all needed to adapt to after the pandemic hit in March 2020. By coincidence, I had applied for funding for developing an online continuing education (CE) course (EVU in Norwegian) and was awarded 450 KNOK to develop a fully web-based course on Carbon Capture and Utilization (CCUS) for people in Industry, teachers, but also for engineers' in-between jobs. Approaches to online teaching and learning were quite new and interesting to me when we first applied for EVU grants, and the rapid transformation to digital technologies for online teaching during the pandemic ramped up our efforts to provide asynchronous digital content also at times when students were allowed to meet physically. We have now run this course five times for people in industry and enterprises as a Continued Education (EC) course (five rounds, 180 students in total), and for in-house students and international students in Ecuadorian and Colombian universities that we collaborate actively with (two times). This SoTL discusses our experience with designing a fully web-based course and seeks to emphasize our efforts in setting up digital group sessions and how it compares to written assignments that we used in our first round running the course.

I will attempt to reflect on our own collegial experience in the development of the course; and the practical aspects of setting up the group work and assessing these in online Zoom sessions. I will discuss the feedback we received from the students and the feedback we received in the written evaluation survey (attached as appendix). The question that we want to answer is: does the implementation of digital group work improve students' motivation and learning? This report has no solid scientific answer to this question but will serve some recommendations.

Course design

The course provides perspective on climate and energy transition and insight into technologies for carbon capture, utilization, and storage. The UN goal of reliable and sustainable energy for all, energy transition and reduction of CO₂ emissions are key in this context. We discuss how we can reduce CO₂ emissions fast enough and the role of CO₂ capture utilization and storage (CCUS) and the technologies available. Another interesting possibility introduced in the course is the production of hydrogen (H₂) from natural gas, where handling and storage of the by-product CO₂, as well as intermediate storage of hydrogen, are part of the value chain.

A total of 10 modules with digital content were designed, one for every week in the duration of the course:

- 0 - Before we get started
- 1 - Energy for the future
- 2 - Climate Perspectives
- 3 - What is CO₂ storage
- 4 - CO₂ storage demonstration
- 5 - Storing CO₂ on the Norwegian Continental Shelf
- 6 - Technologies for CO₂ capture and transport
- 7 - Low-carbon solutions for the oil and gas industry - Part 1
- 8 - Low-carbon solutions for the oil and gas industry - Part 2
- 9 - CCUS - the whole value chain
- 10 - Hydrogen technologies

The course was built with flexible, asynchronous online learning modules through the canvas platform MittUiB with 3 stp. credit (around 80 hours of workload). Eight professionals (professors and researchers) contributed with their expertise in producing content for the various modules. The modules were designed with short, pre-recorded videos of 5-16 minutes length, support literature and in-between-quiz that worked as a check point to confirm the students learning of the key take-away-points in each module. The student quiz needed a score of 80% to be approved, and the students had three attempts to fulfill each quiz. When approved, the student could move on to the next module. A new module became available every week. Students could then decide whenever they wanted to study. After completing a module, the course participant was asked to write a reflection note or submit an exercise. Teachers lecturing the module were available through chat in open digital rooms for questions and discussion at scheduled times. After each module the students were invited to join in a synchronous Q/A Zoom session. These sessions were often very fruitful in terms of discussions among the people that took the opportunity. However, not very many showed up, typically 15-20 %. This fact was part of the reason we wanted to test digital group work to connect and engage students.

Modules were designed with content like outlined below for Module 1. Short videos, quizzes and reflection notes or a tutorial that we provided feedback to were part of the week's work.

MODULE 1 - ENERGY FOR THE FUTURE		Fullfør alle element ✓ + ⋮
📄	Brief introduction to Module 1	✓ ⋮
📄	Lecture - Energy Perspectives (mandatory) <small>Vis</small>	✓ ⋮
📄	Quiz - Energy Perspectives (mandatory) <small>5 poeng Oppnå minst 5.0</small>	✓ ⋮
📄	Lecture - Cleaner Energy (mandatory) <small>Vis</small>	✓ ⋮
📄	Quiz - Cleaner Energy (mandatory) <small>5 poeng Oppnå minst 5.0</small>	✓ ⋮
📄	Lecture - Energy Security (mandatory) <small>Vis</small>	✓ ⋮
📄	Quiz - Energy Security (mandatory) <small>5 poeng Oppnå minst 5.0</small>	✓ ⋮
📄	Podcast: Den globale energiutfordringa (In Norwegian - optional)	✓ ⋮
📄	Reflection - share your thought about the energy for the future (optional, highly recommended)	✓ ⋮

Figure 1: Example of module design in canvas (module 1)

Pedagogical Framework

The theoretical framework guiding the development of the online course was the theory of constructive alignment: “where care is taken to ensure that all elements of your course support the learning you intend” (Biggs, 2003). The approach we followed to do so was through backward design: “where you start by articulating the intended end result and design toward that end” (Wiggins & McTighe, 1998). Figure 2 illustrates the idea of backward design where you start by defining the desired results. In our case these are the learning outcomes defined in knowledge, skills and learning outcomes:

Knowledge:

- Knowledge about carbon capture, utilization, and storage and its role in reducing emissions.
- Knowledge about the different principles of CO₂ capture
- Knowledge about new technologies for low carbon energy supply with CO₂ capture and storage (CCUS)

Skills:

The student should be able to:

- Understand and explain technology concepts for CCUS.
- Contribute to the implementation of CCUS projects.
- Contribute to the development of more sustainable technologies for energy supply.

General competence:

- The student should be able to contribute to discussions and action for energy transition and carbon management.

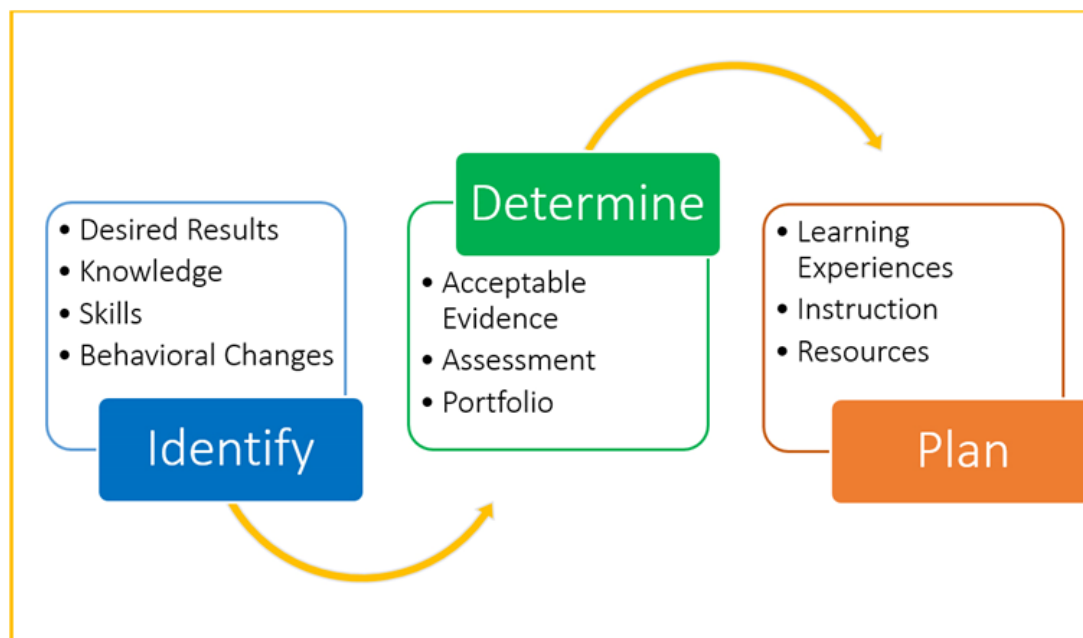


Figure 2 backward design (notes from Magnus Nohr's UPED course: making instructional videos)

In the pursuit of designing the modules after articulating the intended learning outcome we were guided by Gagne's Conditions of Learning Theory. This is a systematic approach and points out certain conditions vital for human learning. Gagne's 9 events are listed below along with the activity aligned in our course.

Table

Gagne's 9 Events of Instruction and Examples of Implementation in Course (modified set-up as used in Miner et al.)

Gagne's Event of Instruction	Activity	Examples used
Gain attention	Engage learners	Students were asked to introduce themselves (written) on MittUiB
Inform learners of objectives	Give learner objectives for the class	Students were presented with the overall objective (before starting the course) and objectives for each module were presented before each module through introduction videos. We tried to give practical examples and answer the question: how is this useful?
Stimulate recall of prior learning	Present a context, practical or scientific, that awoke memories of prior learning	Theory and "big questions" and images known by the general populations were incorporated

		to facilitate connection to prior learning
Present stimulus	Deliver content	New content was delivered in short videos, 6-16 minutes. Most of the instructional videos were teaching videos using slides and a talking head. Some videos were demonstrational videos showing experiments on-site.
Provide learner guidance	Give learner examples	A short summary was added in podcasts where the expected learning outcome was repeated (optional)
Elicit performance Provide feedback	Give practice activities Feedback should be immediate, specific and corrective	Quizzes that could be repeated until approved provided an immediate feedback/ confirmation of learning
Assess performance	Present learners with post-assessment items	Reflection notes/ written assessments/ group work

The last event in Gagne's list was in our Modular set-up, an assignment where new and confirmed knowledge (through quiz) should be confirmed as useful. In our five rounds of the CE course, we have used both individual written assignments (reflections notes) and group assignments where people were connected across backgrounds and countries. The motivation for the latter was twofold 1) providing feedback to 60 students four times during the course was quite a workload, 2) We identified in the first round that the interaction among students should be improved.

Mandatory assignments, round 1: Written individual assignments

In the written individual assignments that we started out with 4 mandatory assignments where the intention was to reflect and use their knew knowledge as base for personal reflection. The assignments were not very specific, but answers were asked to be grounded in the content that students had been presented for in the module. The assignments were handed in and feedback was provided individually within 14 days. Two examples of written assignments are presented below for modules 1 and 2:

Module 1 assignment: *Which source(s) of energy do you think will be most important in the coming 50 years, considering the goals for carbon neutrality? Justify your answer. Your answer should be approximately 1 page (500 words).* Module 2 assignment: *How can you contribute to lowering global greenhouse gas emisisions- is your role as an individual/consumer, employee/industry representative, scientist/engineer, activist/influenceretc.... more important? There is no right or wrong answer; write freely from your own perspective. The text should be approximately 1 page (500 words) long.*

Mandatory assignments, round 2-3: Digital group work

The digital groups' work initiated were set up thematically different from the university student course and the continued education course. However, the format and the conceptual idea were the same, with the main intention of connecting students and increasing the level of “relatedness” that is shown to be important for student motivation and learning (Niemic & Ryan, 2009). The hope was also that the group work could be a way to provide a networking opportunity. In the student course the groups were asked to work together and present an overview of the Energy situation and CCUS potential in different regions of the world. The group assignment for our student course was expected to follow the below guidelines and delivered as a group presentation on Zoom (ca. 10 minutes).

The presentation should include:

- Student group members (name, affiliation, nationality)
- Profile of given region/country of interest
- Hydrocarbon resources and recovery
- Potential for CO₂ storage and CO₂-EOR
- formats possible: power point presentation, movie..

In the EC course for industry participants, we set up a mandatory activity in the CCUS course as digital group work divided into specific topics in CCUS. The course participants were divided into groups based on their choice of topic listed below:

- Land-based transportation
- Maritime transportation
- Air transportation
- Waste management
- Electrification of petroleum installations (two groups)
- Cement production
- Electric power grid

The group work was to present an overview of the topic of choice and place it in the context of CCUS. The assignment was not very specific in terms of what to address, but rather given suggested aspects to consider:

- Global and regional emissions
- Mitigation potential
- Current Technologies for CCUS
- Future perspectives and new ideas

The group leader was appointed arbitrary from the list and given the responsibility to schedule the first meeting and be the person of contact when setting up the Zoom sessions for the groups to present themselves.

The group work assignments were in general well received among both University students and CE students, the opportunities to connect this way with people that share interests, and likely also have a similar background, can be very rewarding. It was examined whether the network gained from the course, and particularly the group work, had been useful after the course ended. So, I have been in contact with 10 students from the spring 2021 class. Three of them reported that they have been in contact with people they acquainted in the CCUS course the following year after they finished it, which indicates that some network has been developed in these group sessions.

Surveys and outcome of Student Evaluations

For every course we have sent out a well-planned questionnaire designed for the purpose of improving the quality of the courses. These questions were inspired from a survey our colleague Trygve Skjold made as part of an UPED course (Appendix 1). We have used the same survey for every round running to make the feedback comparable. Our goal was to keep it short and precise, hoping that more students would take the time to answer the questions. The questions were divided into survey four “ingrediencies” of the course design:

- SECTION A: GENERAL ASPECTS
- SECTION B: THE INSTRUCTORS
- SECTION C: ORGANISATION AND EVALUATION
- SECTION D: LEARNING OUTCOME

In addition, we added a last section where students could write in their own words answering the important questions: 1) What aspects of the course or class worked well and facilitated your learning? And 2) Do you have any specific recommendations for improving the course?

The results for the first run and third run are shown in appendix 2-3. The answers are generally and throughout the survey very positive. All the students strongly agree (71%) or agree (29%) when asked if they found the course overall interesting and useful. When asked if students are likely to recommend the course to others the average score is 9/10. The structure, the style with short videos, the flexibility, the quizzes are generally very well received. It was very encouraging to see these good reviews, which in sum confirms a constructive alignment of the course content. On the how-to-improve part it seems that

the written assignments are not the first thing mentioned on the positive side, but rather in the section of suggested improvements:

"The assignment type "one page reflections" didn't feel as useful use of time. My reflections could normally be formulated much shorter than 500 words."

"Maybe some of the assignments given after a module was a bit to general."

"The assignments were ok, but the time spent on the assignments would have given me more if spent on more lectures."

These comments were partly the background for setting up the group work, we saw that a sense of community and exchange of ideas could be "relatedness supportive" as described in self-determination theory for student motivation. The group work was in general well received among the students. For the student exchange program in the Nored project on CCUS it was very helpful in starting up a new collaboration during the corona pandemic. Post pandemic we have had several of the students visiting and the CCUS course worked as a fine way to get acquainted with the three universities, with their staff and students. However, the group work was not always a great success. Some of the groups did not function well and there were typically two reasons: 1) The leader appointed did not do his/her job schedule meetings, so we sometime needed to step in and do this, but then time passed, and frustration grew. 2) Some of the students on the EC course had difficulties meeting online as they were travelling, working offshore etc. In this case the group logistics was tedious and there was too much effort getting all the students onboard. We solved this problem by running a hybrid version of the assignments the last time around. Those who knew they would be offline or travelling could chose to deliver a written assignment instead of participating in the group work.

Summary and lessons learned

The process of designing and running an educational course in Carbon Capture, Utilization and Storage has been rewarding in several ways. The Continued Education program at the University of Bergen gives opportunities to reach out to people that have their hands on the wheel in the industry that will be vital for the implementation of the technologies presented in the course. The impact of the course content feels direct and important. The fine experience of working with colleagues throughout the process in a very systematic approach in the design, execution, evaluation, and redesign of the course: It was rewarding to see the positive attitude among 8 colleagues in testing something very new to us all. I think we all came closer in our effort to develop as teachers and facilitators for learning.

Lessons learned:

- Making instructional videos and digital content for higher education and continued education is fun!
- "The new way" of setting up a course inspired colleagues to collaborate in teaching and learning

- Short videos and quizzes and aligned digital content were very well received among students. The flexibility of the asynchronous modules was very much appreciated among the CE class of (mostly) working engineers.
- Q/A sessions were successful in terms of discussions, but not many people took the opportunity. The discussions gained momentum if questions were prepared and presented in advance. Efforts should be made to find the optimal time for Q/A sessions.
- Digital group work was generally a positive experience for both teachers and students. Care should be taken to make the groups work. Group leadership and clear directions of tasks and expectations are key to success.
- A hybrid version of the assignments where one could choose to deliver an individual written assignment instead of joining the online group work is recommended for the CE format where flexibility is key and availability for synchronous meetings is low. Supporting autonomy by providing a choice of assignment was useful to motivate students both for written assignments and group work.

References:

Biggs, J.B. (2003). Teaching for quality learning at university. Buckingham: Open University Press/Society for Research into Higher Education. (Second edition)

Ms. Amy Miner, Dr. Jennifer Mallow, Dr. Laurie Theeke, and Dr. Emily Barnes "Using Gagne's 9 Events of Instruction to Enhance Student Performance and Course Evaluations in Undergraduate Nursing Course" [Nurse Educ. 2015 May-Jun; 40\(3\): 152–154.](#) doi: [10.1097/NNE.000000000000138](#)

Wiggins, Grant and Jay McTighe. "What is Backward Design?," in Understanding by Design. 1st edition, Upper Saddle River, NJ: Merrill Prentice Hall, 2001, pp. 7-19.

CP Niemiec, RM Ryan - Theory and research in Education: Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice, 2009

Inspirational Resources:

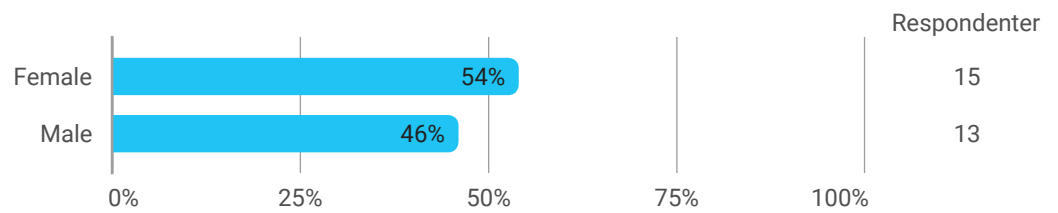
J Koumi Pedagogic design guidelines for multimedia materials: A call for collaboration between practitioners and researchers Journal of Visual Literacy 32 (2), 85-114

Quality Learning & Teaching (QLT)

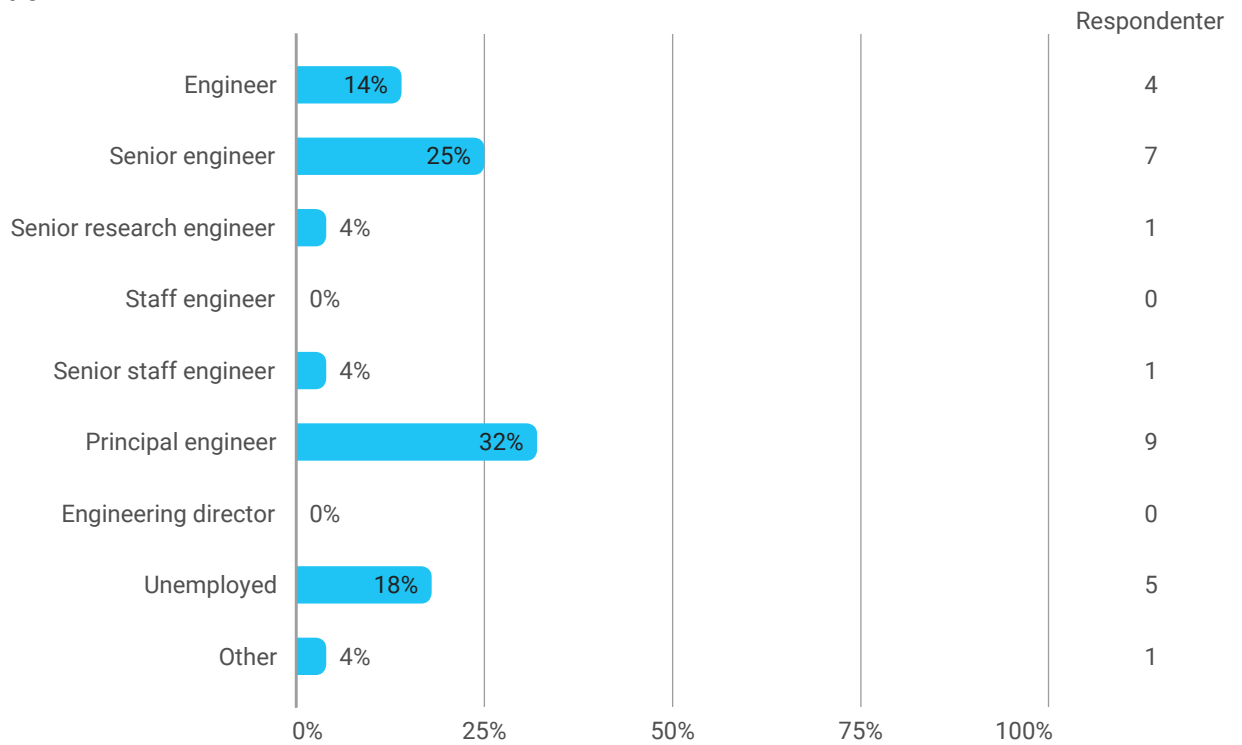
<https://www.csuchico.edu/tlp/course-development/qlt/index.shtml>

Appendix 2: Evaluation, round 1

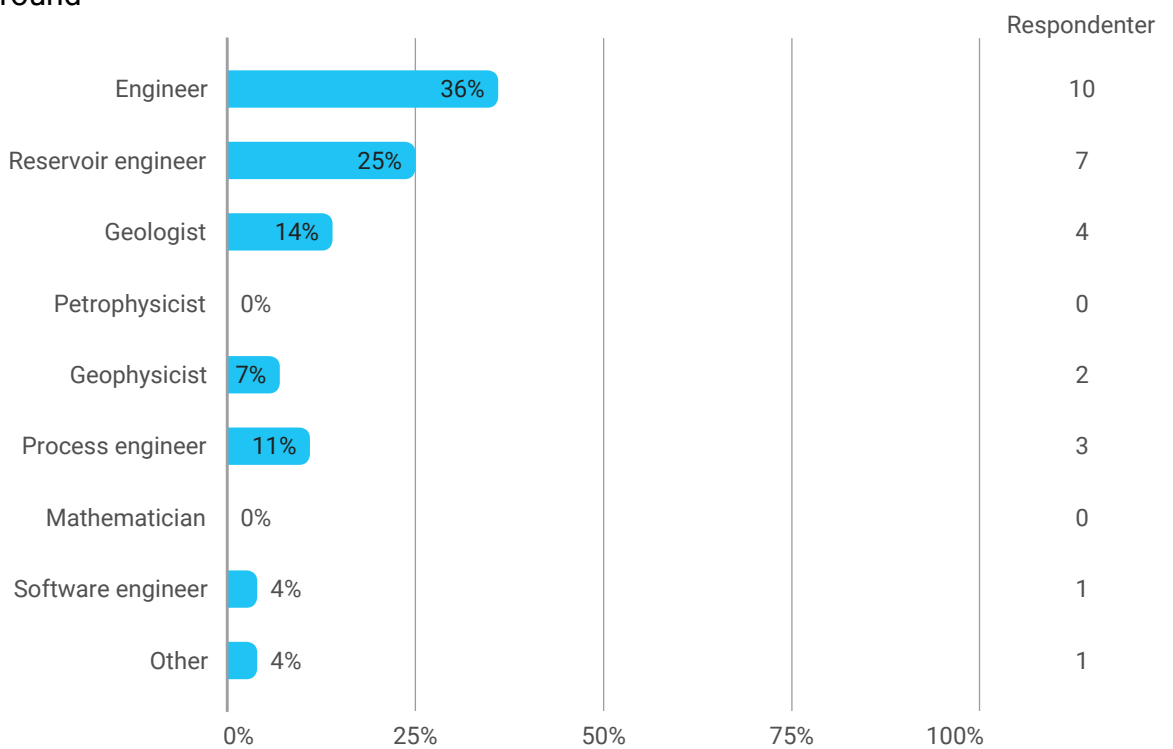
Gender



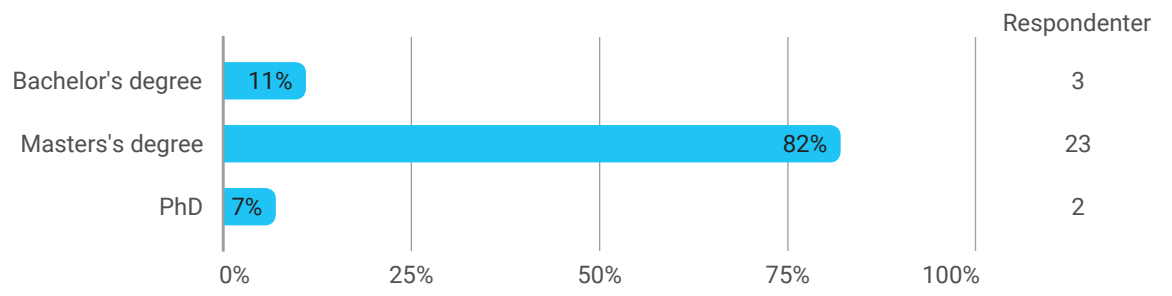
Current position

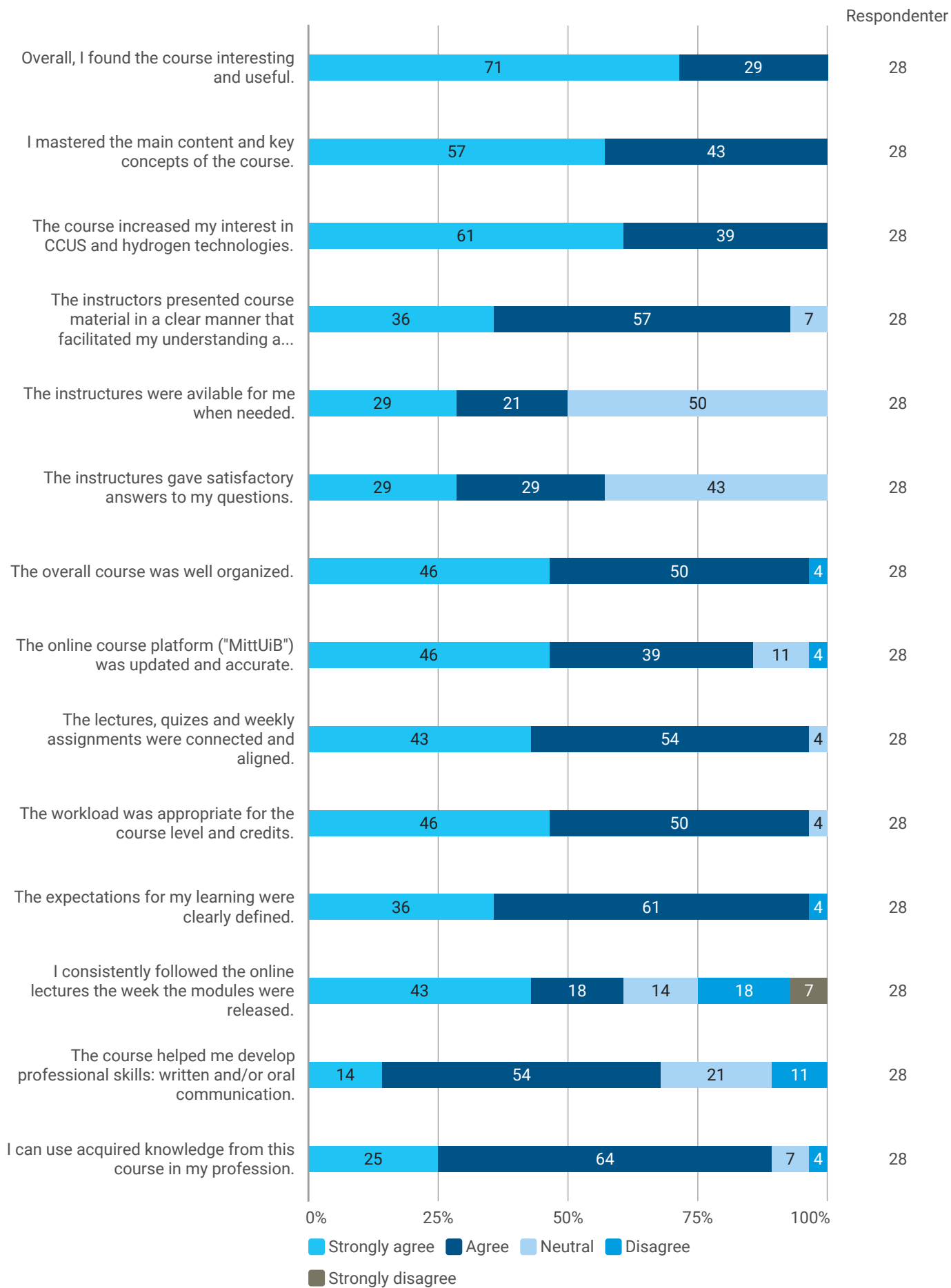


Academic background

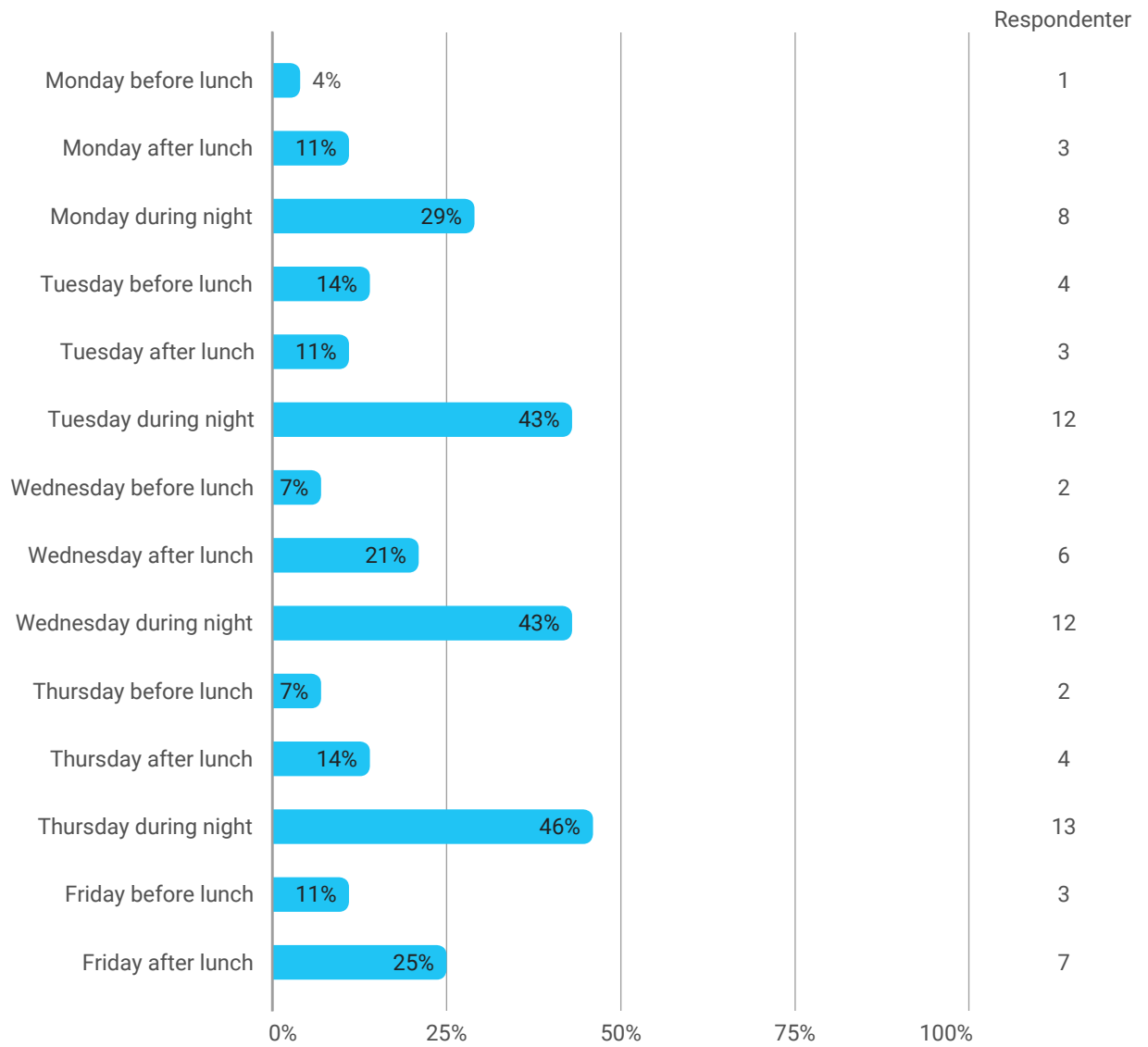


Education level

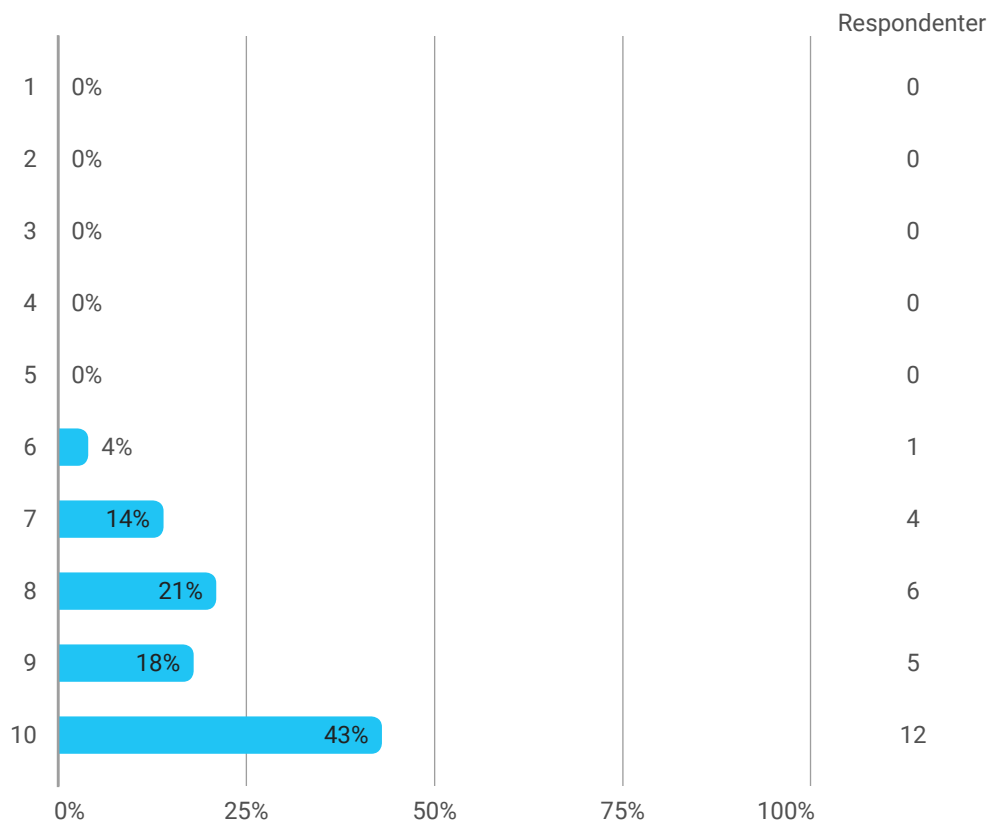




When would it suit you best with a Q&A session? (you may choose more than one option)



On a scale from 0 ("Not at all") to 10 ("Absolutely"), how likely is it that you would recommend the course to other students?



What aspects of the course or class worked well and facilitated your learning?

- Test
- I think the lectures were well structured, and I particularly like the short segments, as well as the quizzes capturing the main points.
- Content was good and well spread out over the 10 weeks. The videos had a good mixture of high level picture and detail - good balance.
- The videos and quiz
- High degree of flexibility. Good lecturers. Clear and accurate powerpoints.
- I liked that the modules were divided into sub-lectures with following quizzes, instead of putting the whole subject of a module into one long lecture. It is more inspiring and focused and also feels more efficient to complete a lecture than to have to stop and re-enter. I liked the assignments at the end of each module.
- I liked the setup with presentations and quizzes. Podcasts were appreciated!
- The pace was excellent. The subjects were presented in a conceptual way and then progressed gradually to focus in certain topics. It was very natural to follow this progression, from planetary view to atom level.

The topics covered were of great interest.

The video conferences and presentations followed by quiz was a very efficient format.

It was good that the course avoided going too much into very specific details and technicalities. The content was adequate.

Also, the flexibility to share reflections without the goal to achieve a grade, allowed for a more relaxed thinking and imagining.

- The short video lectures were quite effective and made it easier to understand the concepts. The quizzes and assignments were also closely related to the lectures and having them right after each lecture helped with keeping the material in memory
- Short video lectures and following quizzes.
- Every module is focused on a single topic, was easy to concentrate: cover the learning material, complete quiz, write an essay - great learning experience
- Online lessons worked very well. The quiz after each lesson is a good way to confirm learning and a reason to keep focus during the lesson.
- The lectures and assignments
- Great set-up with online tuition! Relevant quizzes along the way and good reflection tasks after most modules.
- Since I work shifts (days and nights) it worked well that it was possible to follow the course whenever it suited me.
- Most of the videos were good and well prepared. The quiz at the end was also useful
- n/a
- The combination of lectures and a following quiz
- Very well organised and flexible to fit into my schedule. Well done!
- Shorter videos with following quizzes
- The course gave me a broader understanding of how important it is to reduce our carbon footprint, and how little time we have.

Also knowing there are solutions like CCUS that can be implemented for existing industry, I found very reassuring, since I work in the oil & gas industry myself.

- The weeks without the written assignment was generally better learning wise. I would rather have one extra lecture/quiz than a written assignment.

The lectures where there was a more 1/1 relationship between the slides and the oral information were easier to follow and absorb the material.

- -objective material
- -scientific contents
- -statement of problems and offered solutions
- -short and well prepared videos
- All aspects: Video presentations, posted documents and weekly QA sessions (when held - and possible to attend without conflict with other tasks).
The availability and positive attitude from staff, both the academic and administrative.
- The set up with videos short quizzes and reflection notes worked really well. This was an efficient method for absorbing the material. Showing the flow dynamic in the lab experiment was really useful.

- Thank you for a very nice and insightful course.
- Well organized online lectures. Not too long video lectures but appropriately divided into different topics. Interesting video of lab experiment with Co2 injection, helped understand the mechanisms involved.
- Materials on website

Do you have any specific recommendations for improving the course?

- Test
- Probably more detail feedback on the assignments and a more interactive Q&A session.
Overall very happy. Tusen takk!
- The video player - kaltura had a lot of issues in playing the content, it would start and then 4 to 6 seconds into the video, it would just stop playing. I had this issue consistently for all the 10 weeks. So cant say this was for one video only. The "refresh button would sort it out but sometimes required refreshing upto 10 times.
- Some of The English Was difficult to understand. More podcast In Norwegian? It Was time consuming with The reflections that we had to deliver. More direkt questions?
- Have some more literature available at mitt uib.
- I don't have any specific recommendation for improvement.
However, I would be interested if you would initiate a CCUS course part II. As a geologist, find the Northern Light project very interesting and the way forward with respect to mapping and evaluation of new licences for CO2 storage.
- No
- Keep it as is.
- It would have been nice to have a general quiz at the end of each of the modules; covering all lectures in each of the modules. This would also give a good overview of the concepts in each of the modules

All in all, the course was great and I enjoyed learning about the basics of CCUS

- Perhaps too Geology dominated. Could expand on the capture and transportation parts of the life cycle.
- No
- Maybe some of the assignments given after a module was a bit to general.
- No
- Great work by the lecturers! Some comments;
- some lecturers spoke to swiftly. Very hard to take not and get all their points. Suggest to review some and adjust.
- for us that has not attended courses on UIB prior it would be great to see how the excersises should be delivered. References, set-up etc.
- A pdf version of the lectures would be nice to have available.
- The assignment type "one page reflections" didn't feel as useful use of time. My reflections could normally be formulated much shorter than 500 words.
- n/a
- In my opinion, more lectures and quiz. The assignments were ok, but the time spent on the assignments would have given me more if spent on more lectures.
- Collect questions and answers from students (written) which has come up during the course and in Q&A's. would be beneficial. Conduct reflection sessions on assignments the week after being submitted.
- Not in the moment
- Some of the lessons had noise issues from external sources that interfered with the lectures. They should be re-recorded.
- As a professional with a varying workload and occasional offshore trips with 12 to 16 hours work days combined with a family life, one and a half week extra time is not what I would consider self paced. I was about three weeks behind and offshore when the end date was first announced. I managed, but it was a sprint in the end.

A more consistent lecture length and pace would be practical with regards to planning sessions for my self in between other activities.

I was not able to find the lecture notes other than in the videos, thus if I only missed a small thing then I had to shuffle through the lecture video to find it.

In some cases I had to slow down the video to 0,6x to catch some information that was asked for in the quiz after failing it. Having in some cases to writhe down the whole lecture verbatim if the goal was to pass the quiz at the fist attempt should not be necessary. Some fails and rewatching parts of the lectures should be expected though.

- None comes to my mind at the moment!
- Make weekly QA sessions fixed and better attended: Find optimum time, skip no dates, allow early questions on invitation thread, focus on a weekly challenge.
Promote true CCUS curiosity and professional trust by also highlighting challenges and setbacks (analogue to development of horizontal well technology development/adaptation for the NCS from 1990).
- I recommend that you record the QA sessions so that those not able to attend can watch the recording and get some learning from the discussion.
- I only made one of the Q&A and really enjoyed it. I have a busy schedule and I'm sure many others do as well based on the number of participants in the Q&A that I did attend, so my recommendation would be to announce these good (perhaps sending out an email) to ensure that as many as possible can attend.

One of the presenters (Zach if I remember correctly) talked very fast, perhaps a bit too fast, no criticism of content, just speed of talking.

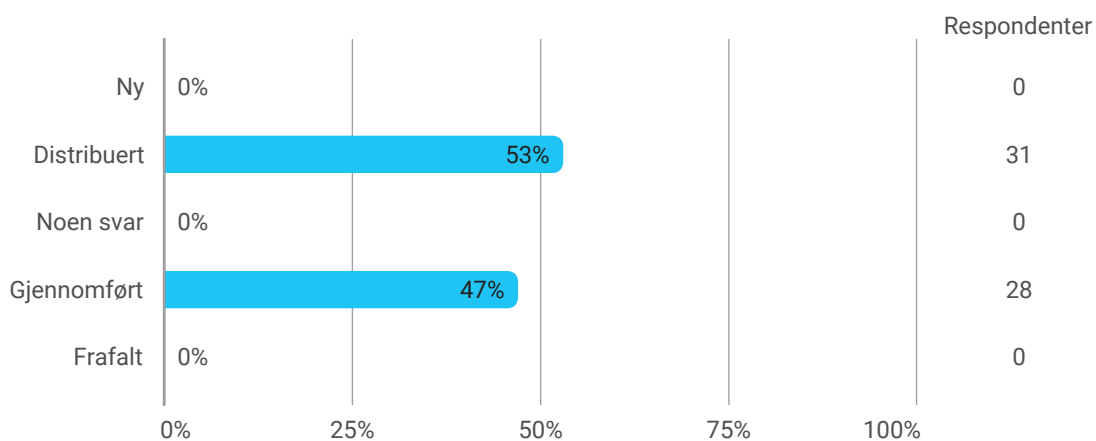
- Q&A during work hours was difficult to attend. Could it be recorded or a transcript with Q&A released after the session?
- Keep up the good work

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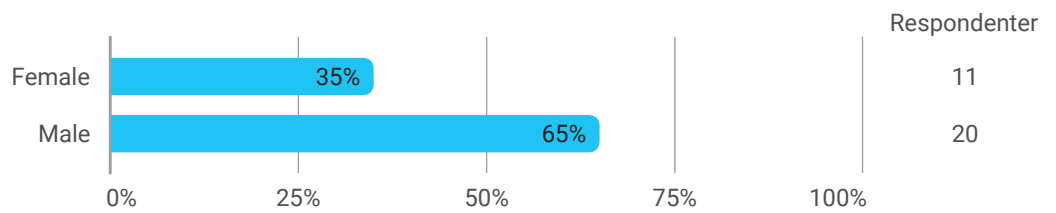
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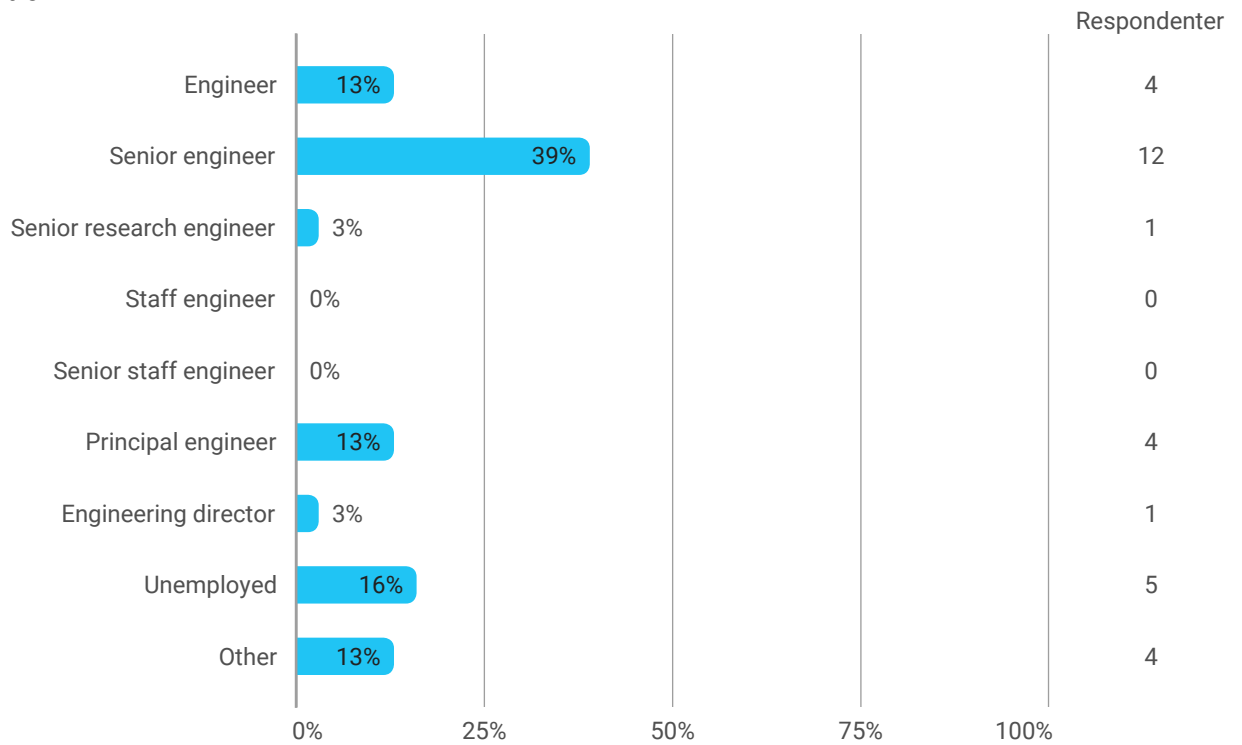


Appendix 2: Student evaluation, round 2

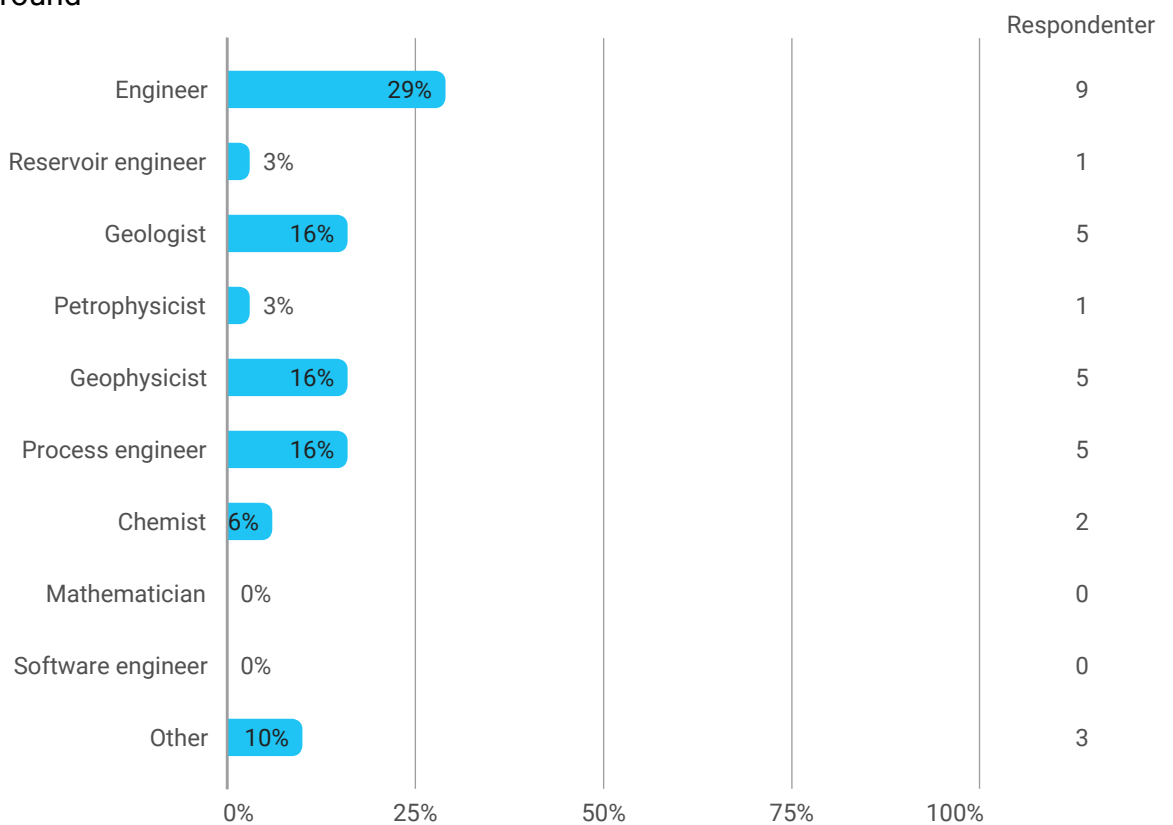
Gender



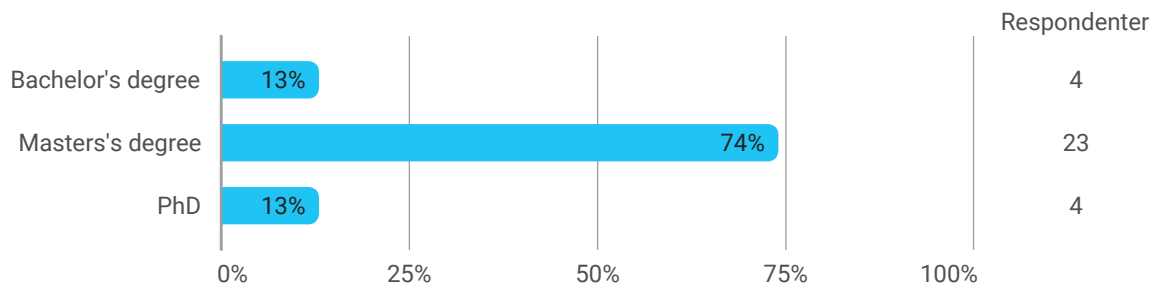
Current position

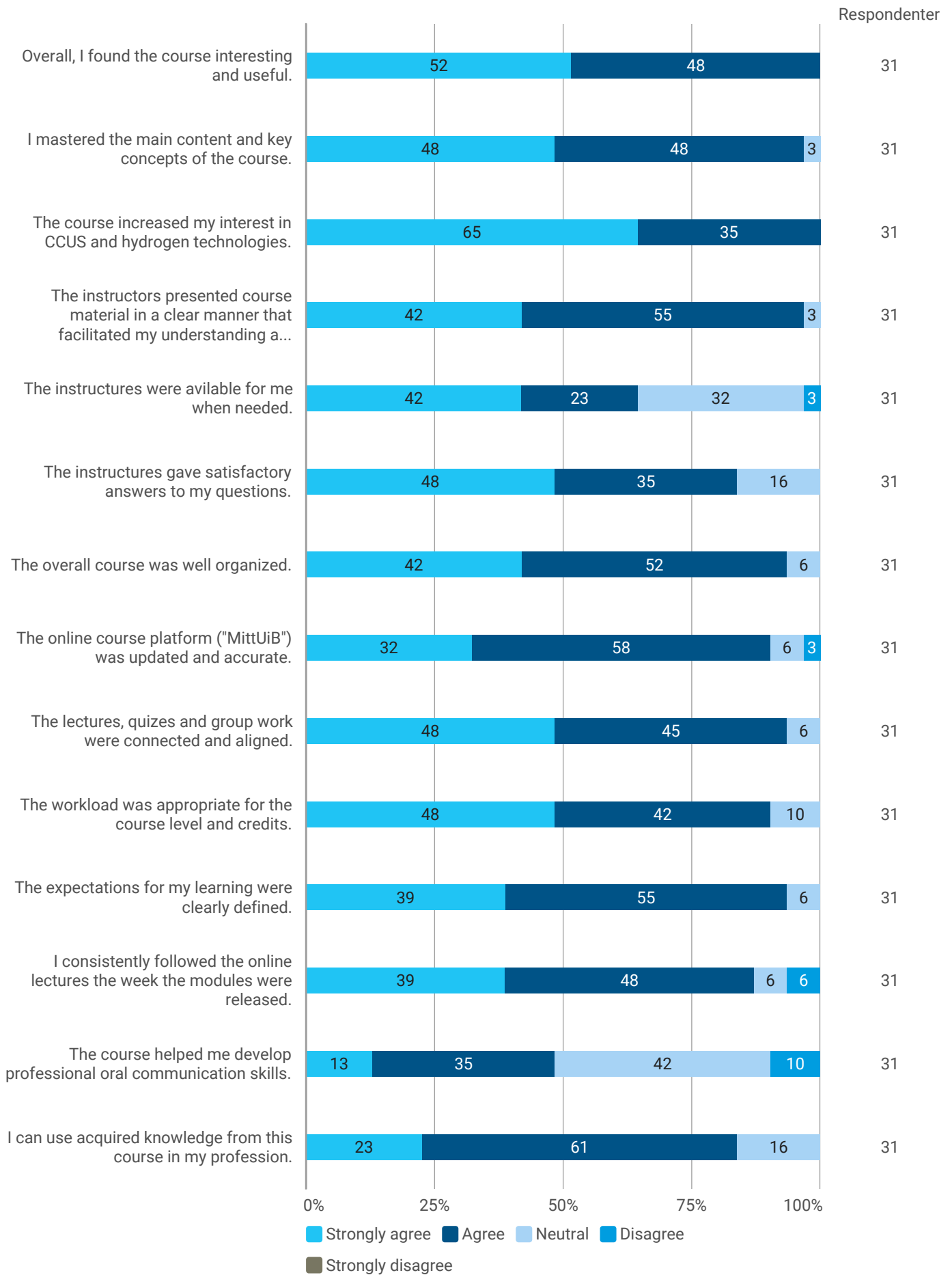


Academic background

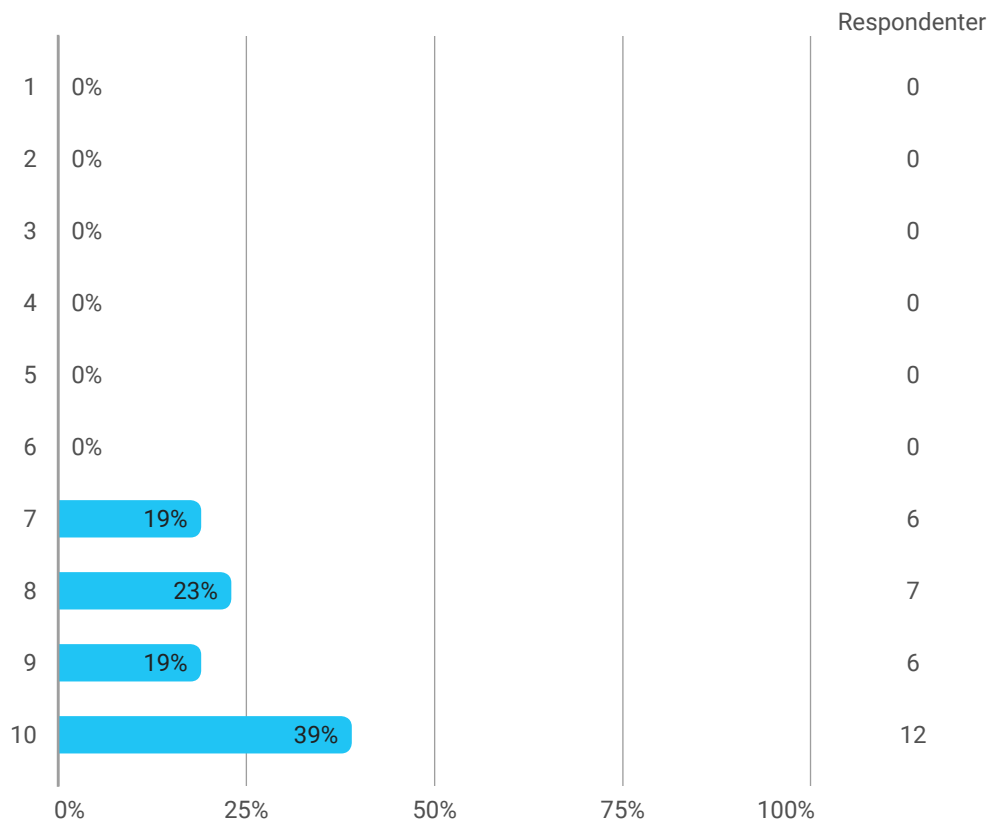


Education level





On a scale from 0 ("Not at all") to 10 ("Absolutely"), how likely is it that you would recommend the course to other students?



What aspects of the course or class worked well and facilitated your learning?

- Great with video lectures and that the course could be done in a timeschedule that suited me.
- .
- Clear courses (although I can imagine the course to be too difficult for students without subsurface background)
Appropriate length
Videos
- All
- N
- I really appreciated the Wednesday Q&A sessions
- 1
- good structured lecture plus quizzes.
- Short presentations followed by a quiz worked well. The QA sessions were also interesting to follow. The group work was harder to organize but worked in total...
- Good quizzes at the end of each module
- - online forelesninger som jeg kunne ta når jeg hadde tid og kapasitet
- gode quizer som bidro til å fokusere på de viktige delene av hver forelesning
- gruppearbeidet mot slutten, selv om dette med fordel kunne vært gjennomført tidligere (slik at vi ble bedre kjent på et tidligere stadium)
- Good lectures, flexible timing
- Enjoyed Q&A session that made me feel my days at NTNU.
New learnings/refreshers course
- Lectures;
Weekly discussion, questioning.
- Group work
- Relevant topics
- Overall, an interesting course specially with high focus toward greener energy sources and UN goals.
- The course was well prepared and covered a large variety within the CCUS. Given my geological background the geological part was most useful to me, but it was good to gain knowledge across the whole CCUS chain.
- It was nice to follow the lectures in your own tempo. The quizzes following the videos were a nice way to repeat what you have learned.
- I think lectures and quizzes after each lecture have helped me to memorize a new material.
- Videos from experiments were great and increased the learning experience.

- Very well-structured program and syllabus. To have the lectures released on Friday made a big difference than on Mondays. Since then, I had the weekends to go through them before the weekly question section.

I enjoyed the instructor's presentation and all the information given by them. They explained in a simple manner something is that is complicated.

- The good dynamics with the sessions issued every week with the Q&A sessions

The freedom to complete sessions at own pace

- Liked the flexibility, and that it was divided in modules with quizez after every lecture
- Videos/modules worked very well for me wrt the flexibility to do the course when suited, and to be able to have a repeat if needed. And great to do at home. The Q&A sessions once ('ish) a week was great to have. Thanks for letting me be a part of the course.
- .
- Group work was good for networking and learning
- Well structured videos, clear information and enough examples of each topic.
- The flexibilty was essential
- On-line
- All the modulets sete great. The Q&As were perfect!

Do you have any specific recommendations for improving the course?

- No
- .
- The course might be too dense : I feel I understood well (and could answer quizzes immediately after watching the videos) but probably do not remember that much (doubt I would score 100% at the quizzes now after 1 month)
Maybe course/ppt/videos could be made available to students for future reference and follow up
- None
- N
- Better description of the group assignment.
- 1
- I would like to have some slides from the lectures. I took snapshot but that time consuming.
- Lecture notes + references is nice to have.
The lectures should be available as early as possible...
- No
- Jeg synes det er uheldig at presentasjonene i de ulike modulene kan deles som pdf-filer til deltakerne. Videoinstruksjonene er meget gode, men vi mister tilgang til disse etter 3 mnd og da er det begrenset hva vi har igjen å bla tilbake i. Jeg hadde ønsket muligheten til å laste ned pdf-filer av presentasjonene for å bedre ta vare på kunnskapen.
- Some lessons was very short, 4-5 minutes only, followed by a quiz after every short lecture
- Hi,
I suggest UiB may also think about a course on H2 Technology as a part of this course in wider aspect. Credit & load can be increased while course name can also updated.
- Possibility of selecting Presentation theme.
- No
- Hope we can receive the power point presentations. Sometimes the quiz contained too detailed questions
- The course was well balanced with good discussions.

Maybe some more interesting movie clips from different experiments in lab could be attached.

Good luck with future courses

- Good and well prepared instructors.
- Maybe send a mail to the Group leaders when they were chosen. It took some time before noticing if you were a Group leader or not.
- It would be nice to share slides with the students, it is easier to comment on the slides while listening the lectures.
- The CO2 transportation aspect of ccus should be further detailed.
 - Ship transport => 15 barg vs closer to tripple point should be discussed.
 - CO2 storage onshore and the transfer solution/interface between ship and shore.
 - A bit more focus on cost and energy efficiency of different storage technologies

- Keep the availability of the modules on Friday.

Also, it would be very helpful if you plan to have a level two for this course. An advanced version of the course will be beneficial for many of us.

- It would be good to have the sessions issued on fridays to allow the weekend to work on them
- No
- The group work I would say did not work very well for our group. It was decided to divide the work load/topic between us, and that was ok. But we did not have any discussions within the group. And it was decided that one had only the presentation, and did not go through any topic of his own. And the others should be prepared for questions of our topic. Because of the time (10 min) I felt we did not really show what we had been through and learnt. The presentation could have been of an other format. Well, at least I learnt a lot of the topic I had to go through. I don't know if you could do any better wrt this, but the group could have..
- .
- Maybe increase from 3 to 5 stp and include 1-2 written deliverables
- No that I can think about.
- More optional in depth reading cold be provided, students interests will vary, for example as a geologist I wouldhave read more about processes in the reservoir, which would be of less interest to others
- NO
- I was a little confused on how to use the website (no big problem)

Will there be some kind of diploma (how to show that you have followed the course?)

E-post

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Samlet status

