

Course evaluation of BIO216 – Toxicology, spring 2022

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About the course: BIO216 is a 10-credit course that covers many topics, such as the history of toxicology, absorption, distribution, and excretion of xenobiotics, biotransformation of exogenous compounds, carcinogenesis, organ toxicology, neurotoxicology, nutrition toxicology, occupational toxicology, ecotoxicology, toxicity testing and risk assessment. BIO216 is a mandatory course in the environmental toxicology master program at the Department of Biological Sciences (BIO), University of Bergen.

Learning environment: The teaching in BIO216 started this semester online and using Zoom as the communication platform (the three first lectures). After the covid-19 restrictions were lifted (beginning of February), we switched to physical classes at campus. The course consisted of 4 common classes per week (including colloquiums), a two-day lab course, a project assignment, a midterm exam, and a final written exam. The lab course (10%), project assignment (10%), midterm exam (20%), and the final exam (60%) are mandatory activities and constitutes the final grade of the course. Both the midterm exam and the final exam are based on long form assignments, while the project assignment and lab course are evaluated as a classroom presentation and a lab journal, respectively.

The course has a few invited visiting teachers with expertise within specific fields of toxicology. This semester, we were also able to organize two visits to two different companies/institutions (Equinor and the Institute of Marine Research) with relevant activities within toxicology.

Course book and teaching materials: As the last years, the course book was “An introduction to toxicology” (Springer) by Philip C. Burcham. ISBN 978-1- 4471-7256-7. The supplemental literature were Chapter 11 (Toxic responses of the blood), chapter 16 (Toxic responses of the nervous system), and chapter 25 (Radioactivity) in Essentials of Toxicology, 3. edition by Cassarett & Douell, Lange, 2015. Chapter 10 (Biomarkers) and chapter 15 (Extrapolating from molecular interactions to consequent effects at the population levels) in Principles of Ecotoxicology, 3. edition by C.H. Walker, S.P. Hopkin, R.M. Sibly, and D.B Peakall, Taylor & Francis, 2006. Report from AMAP 2009, Arctic Pollution 2009. pp 83.

Lecture notes, other course related materials, and supplementary literature were made available for the students electronically as PDF-files at the MittUiB portal. The coursebook was available at Akademika.

Laboratory facilities, reagents, and equipment was available at the Department of Biological Sciences.

Course statistics: 18 students attended the first lecture and registered for the final exam.

The distribution of the final grades is shown below:

A: 4, B: 3, C: 7, D: 2, E: 1, F: 1

Teaching and student assessment (short):

Teaching occurred mostly in the classroom this semester. It was therefore convenient to reintroduce many of the active learning activities that have been used previously in BIO216. These activities have been designed to promote the learning objectives and support achievement of learning outcomes. Among the activities used were extensive pair-share activities to stimulate student activity and engagement, quizzes for emphasizing parts of the curriculum and for repeating central elements, and team-based learning where the students collaborate to understand (and present) a specific topic. As a new activity, I tried this year a student peer-review activity in relation to the mid-term exam. In this case, the students peer-reviewed in pairs (anonymously in both ends) answers given to the midterm assignment. My incentive for testing this activity was to increase the learning outcome for the students. In addition to answer the test themselves, the students must critically evaluate the performance of their peers. Commenting on their peers can help students better understand the assignment, reflect on their own errors, and increase their understanding of the topic. I will follow-up and explore more around this activity the spring 2023. My impression so far is that this activity was useful and significantly increased the learning outcome.

As previous years, formative assessments on student performance were used as much as possible. The students were provided feedback on their assignments throughout the semester, which I believe enhances the students' opportunity to monitor their own learning and adjust accordingly. It is also beneficial for me for identifying parts of the curriculum that the students struggle to comprehend. I can then adjust the pace of the teaching and provide individual feedback on strengths and weaknesses. Written individual feedback was given throughout the semester on the project assignment, the midterm test, and their lab journal. Constructive feedback should make the students reflect critically regarding their own performance and working routines, as well as increase their awareness regarding learning.

Similar to the last semester BIO216 was taught, the overall learning outcomes of the course (<https://www.uib.no/emne/BIO216>) was presented at the first lecture. Specific learning objectives were later presented in the beginning of each class. Teaching and course activities were designed to support the learning outcomes.

Student course evaluation: The student course evaluation was performed with a survey prepared by BIOceed (Centre for Excellent Teaching in Biology) situated at the Department of Biological Sciences, UiB). This survey collects feedback on constructive alignment, workload, overall satisfaction, generic skills, and other background variables.

Follow-up on previous course evaluations:

On the previous course evaluation, some students requested more discussions on specific topics during the class. I tried to accommodate that request during this semester. Group discussions can make the students more engaged and stimulate their interest in the subject. However, one challenge I experienced was that it usually was the same group of students (and rather few) that actively participated in these discussions, leaving the majority of the students not attending or with only limited involvement. In order to stimulate more student activity and participation in such discussions, one solution could be to initially organize the discussions in smaller groups. This could lower the threshold for active participation. The session can thereafter end with a common discussion in plenary.

Another comment from the previous evaluation was the lack of clarity regarding the supplementary literature (especially regarding external teachers). This is something I tried to communicate better to the students this spring, among others by often pointing to the literature made available to the students through MittUiB.

Comments on the course evaluation (see student evaluation at the end of this document)

The vast majority of the students were satisfied with the quality of this course, and the workload was apparently not too heavy. Most students did also reply that the course helped in developing their generic skills, including planning of own work, communication, problem tackling and solving, teamwork, and analytic skills. It also appears that most students are aware of the learning outcomes, and that these were communicated well by the lecturers during the semester. I am also happy to see that the majority of the students appreciated the different learning activities used in BIO216, and that they express that these were helpful for achieving the learning outcomes. This confirms that the active learning strategies that have been developed over the years (with this in mind) are applied in an efficient and successful way during teaching. The students were also satisfied with the feedback given on their performance during the semester, clarifying what they were supposed to learn. This is exactly what the teacher wishes to achieve by providing a formative evaluation of the students. They also express that the assessments were meaningful in regard to their anticipation of what they were supposed to learn. Most of the students did also find the feedback helpful for guiding their own learning. I currently in the opinion that the course has a design which complies with the principles of constructive alignments in teaching. There is always room for improvement, and some of the comments from the students are requesting a better “red line” between the different lectures that better connects the curriculum. This could be a challenge regarding the use of external lecturers (their schedule does not always allow for placing them in the best logical order). However, this is something that I should have in mind for the next BIO216 course, spring 2023. Another useful comment was for the students to work more actively with the curriculum after lectures/classes for improving the understanding and the learning outcome. Usually, I post questions relevant for specific topics after each class, but this semester many of those questions were published a bit late. This should of course be improved. In addition, more quizzes could be used for this matter, which I intend to do next semester. It is also very nice that the students strongly appreciated the visits that were organized to Equinor and IMR. This is something that I will pursue to organize also in the future.

Student course evaluation

19 august 2022

This course evaluation report was generated using student responses to a variety of survey items. Likert-scale responses (Figs. 1;2;4-7) were obtained using validated scales (see further below), while text inputs (Tables 1-8) were obtained using open-ended items (see the Comments section).

Workload and overall satisfaction

The perceived course workload was surveyed using Appropriate Workload Scale from the Course Experience Questionnaire (CEQ) (Ramsden 1991), while course satisfaction is surveyed using the Overall Satisfaction Item that has been included in newer versions of CEQ.

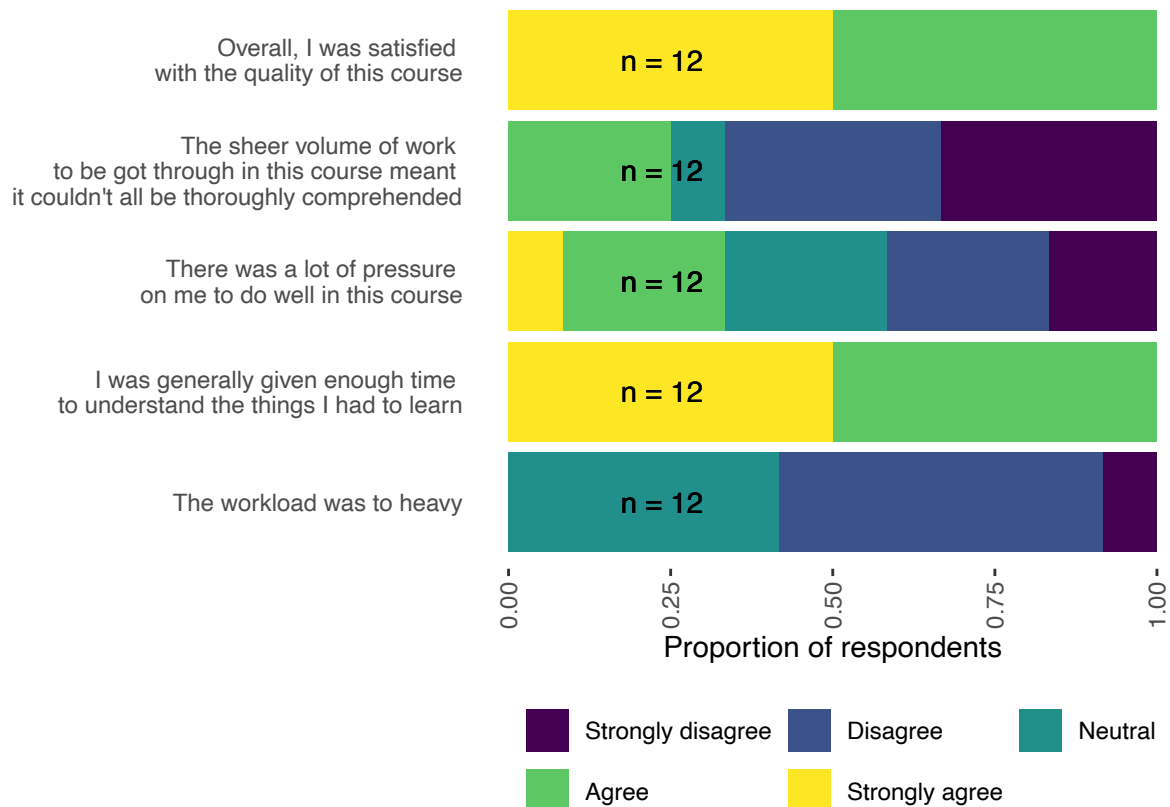


Figure 1: Perceived workload and overall satisfaction of surveyed students.

Generic skills

The perceived development of generic skills was surveyed using Generic Skills Scale (Wilson *et al.* 1996), an addition to CEQ.

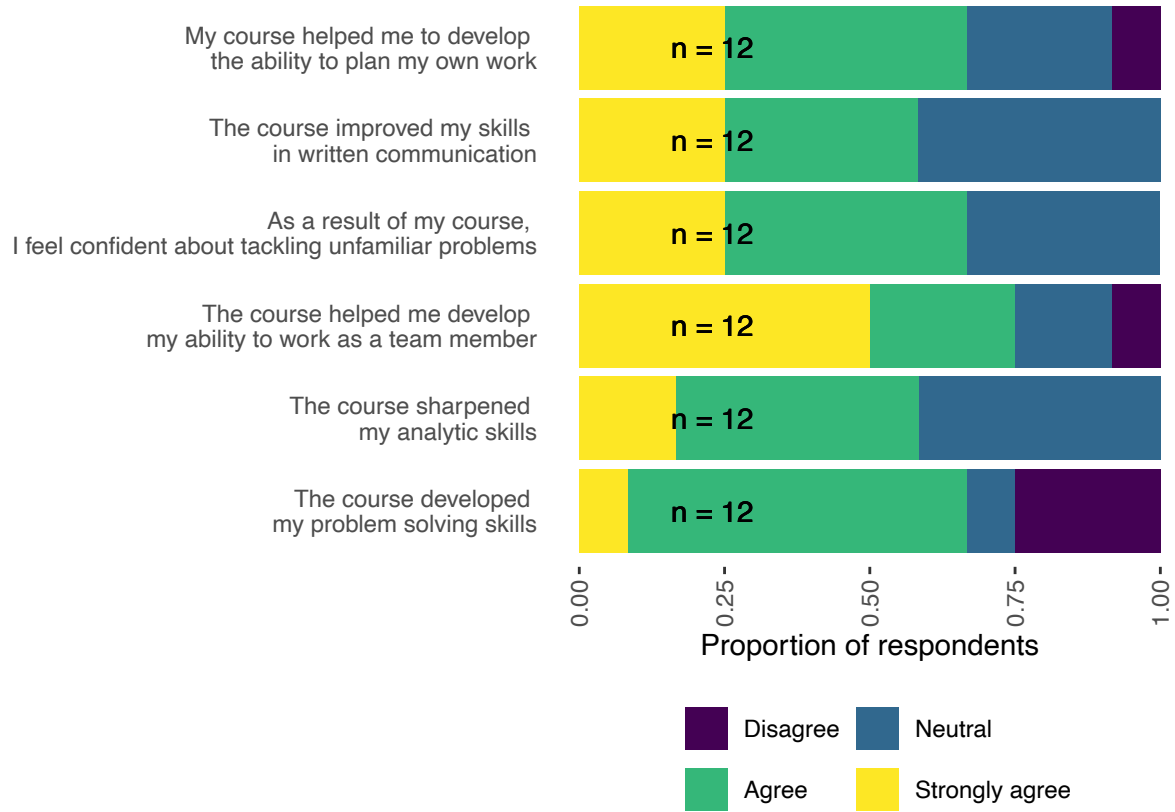


Figure 2: Perceived development of generic skills among surveyed students.

Constructive alignment

Constructive alignment was inferred using the Constructive Alignment Learning Experience Questionnaire (Fitzallen *et al.*(2017).

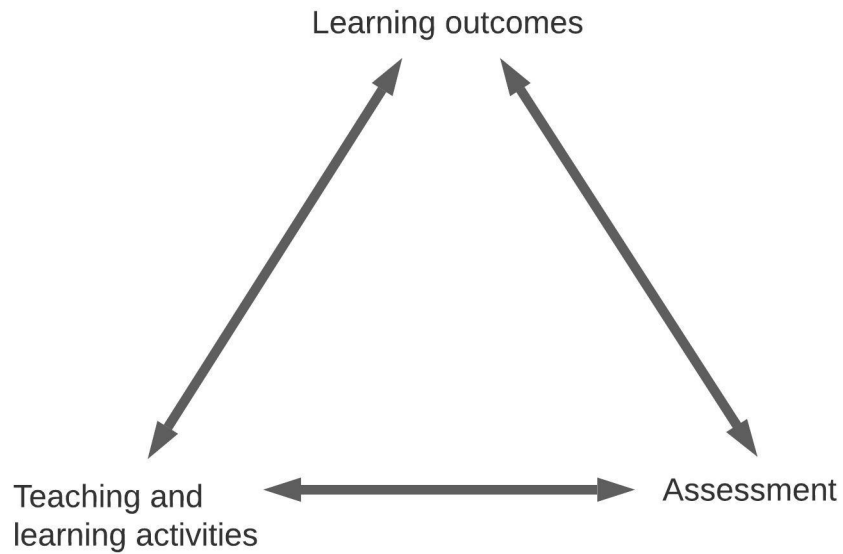


Figure 3: Constructive alignment represented as the relationship between intended learning outcomes, teaching and learning activities and assessment (adapted from Biggs 1999).

Clarity of intended learning outcomes

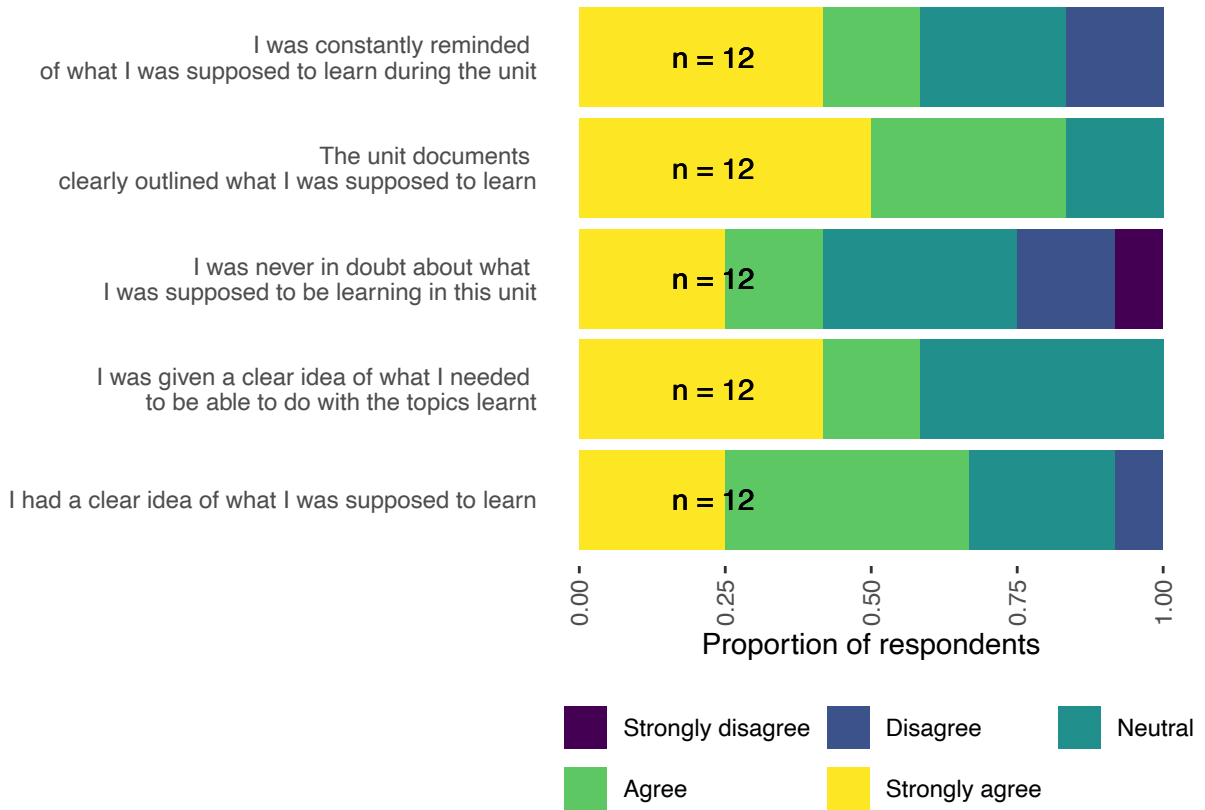


Figure 4: Perceptions of intended learning outcomes among surveyed students.

Teaching alignment

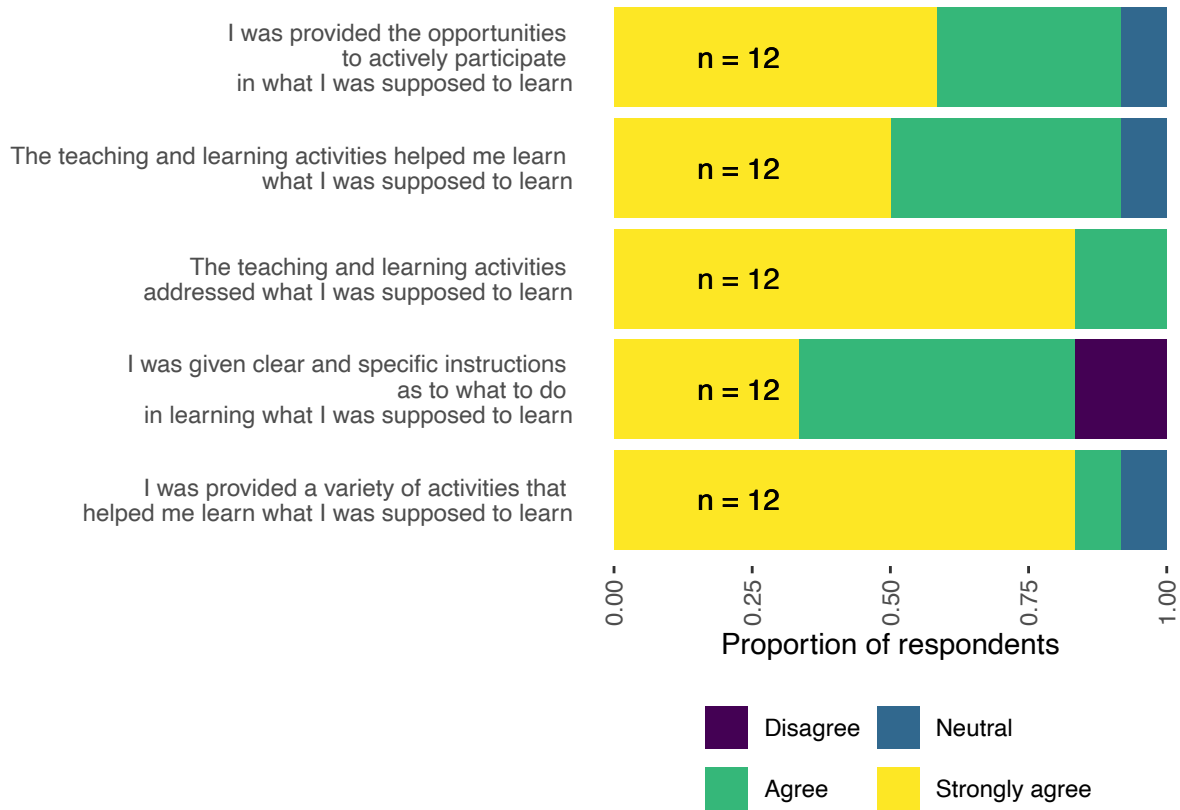


Figure 5: Perceptions of teaching and learning activities among surveyed students.

Assessment alignment

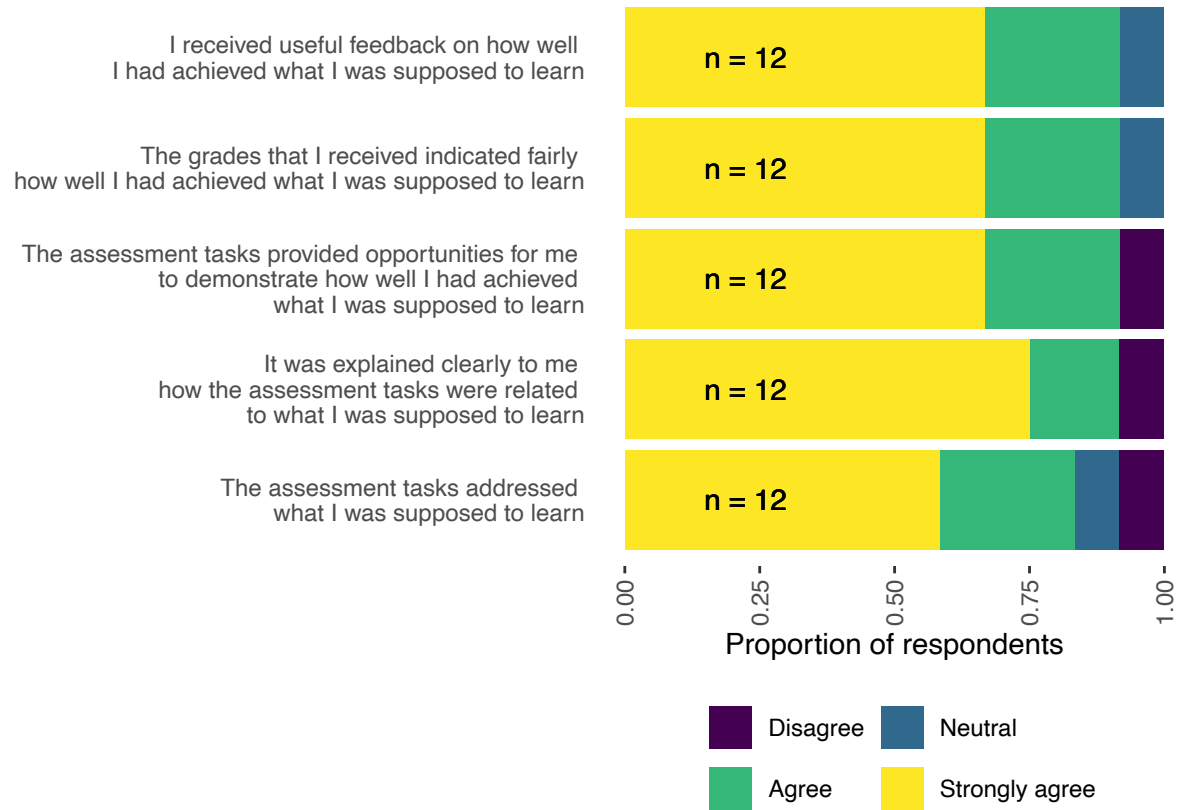


Figure 6: Perceptions of assessment among surveyed students.

Feedback effectiveness

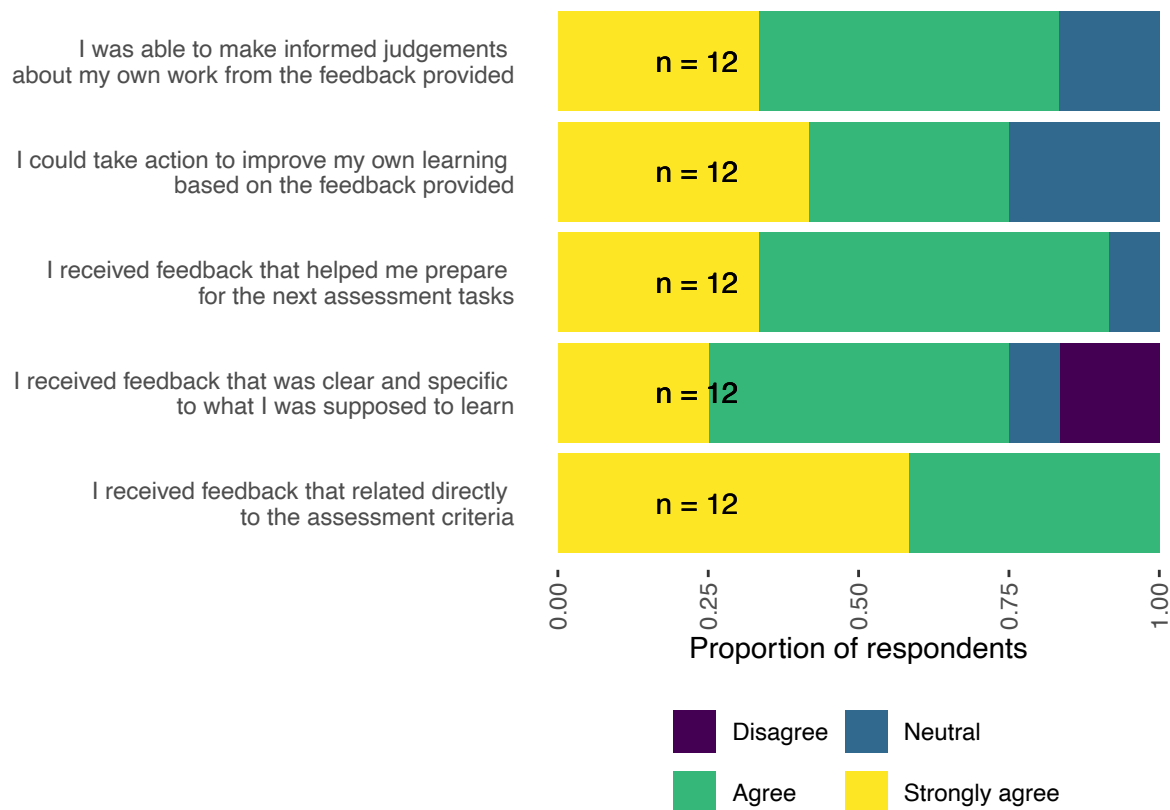


Figure 7: Perceptions of feedback among surveyed students.

Comments

Table 1: Studenters svar på spørsmålet "Hva ville forbedret kommunikasjonen mellom deg og underviser?"

Answers
- Communication in general was very good, as constructive feedback was given as well as emails answered quickly. Only was it not entirely clear to me how much we should study with the course book and which topics should be covered in addition to what was covered in the lectures.
- Jeg synes kommunikasjonen med underviser her har vært veldig bra, og får alltid raskt svar om jeg lurer på noe.
- Det kunne vært klarere hvilke av forelesningene som faktisk var pensum, og hvilke man burde fokusert mest på
- No communication problems, I always received a fast and helpful answer.
- ikke mye, jeg fikk svar på alle spørsmål
- Communication between the course teacher was good throughout the entire course.

Table 2: Studenters svar på spørsmålet "Hva var bra med emnet? (Stikkord: pensum, undervisningsmetode, forelesninger, diskusjoner, praktisk arbeid, innleveringer, eksamen, tilbakemeldinger...)"

Answers

- feedback, lectures, lab work and practicals, variation in learning methods
 - Tilbakemeldinger var gode. Vi får god hjelp om vi trenger det. Det var lett å forstå hvorfor vi har gjort de obligatoriske oppgavene i forhold til pensum.
 - I appreciate that the grade is constituted by not only the exam. I feel like valuable skills can be learned from group work and lab work and learning becomes easier when it is applied.
 - variert emne, hyggelig foreleser.
 - Undervisningsmetodene var bra, og innleveringene underveis som teller på avsluttende karakter gjør at man lærer mye av pensum underveis i semesteret. Fint at vi får tilbakemeldinger på innleveringene om hva som er bra og hva som kan forbedres. Bra at vi har gjesteforelesere.
 - The large variety of activities which complemented each other. I was impressed that even a short lab exercise was included. Even if this surely needs a lot of extra resources, I hope it will be continued. I found it very useful, especially as an external student which is otherwise excluded from laboratory courses due to capacity. The semester assignment (presentation) was very useful to develop both teamwork and in finding and processing sources on a specific topic. The excursions were both useful and interesting, hopefully they are continued with. The midterm exam was a useful exercise in finding answers by connecting various parts of the curriculum. Overall I am impressed by how much effort the course leaders put into this course, with a great variation of activities and feedback along the way.
 - Foreleser, Lab, Presentasjon,
 - mangfold i forelesninger undervisningsmetode pensum
 - Flere vurderingsformer er fint. Fint med praktisk arbeid slik som labarbeid. Tilbakemeldinger på journal, midtsemester og presentasjon var fint.
 - Syllabus was interesting. It was good to have variation in the teaching forms (lab and presentation). It was also nice to have a mid-term to "force" a refreshing of the first half of the course.
 - Veldig relevant labarbeid og muntlig fremføring, som bidro til bedre forståelse av faget.
 - Very interesting lectures by the external lecturers, excursions to Equinor and Institute of Marine Research, lab work
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Table 3: Studenters svar på spørsmålet "Hva var kritikkverdig eller kan forbedres med emnet? (Stikkord: pensum, undervisningsmetode, forelesninger, diskusjoner, praktisk arbeid, innleveringer, eksamen, tilbakemeldinger...)"

Answers

- Veldig fornøyd med faget
- More lab work would be nice.
- Hva som egentlig er pensum. Mer informasjon om midtsemester eksamen, jeg fant ut av den dagen før da jeg far i praksis i tiden før
- I really hope more lectures can be streamed/recorded in the future. I missed a lot of lectures because I could not participate physically at the given time. Records of the lectures would improve understanding and sense of participation in the course. The only big negative aspect of this course was the exam. I was very disappointed to see that it only covered the first few lectures of the course. Although this covered central elements of toxicology, it seemed pointless considering that the same topic was already covered by the midterm exam. About 3/4 of the course curriculum were nowhere to find in the exam questions, which does not seem right. These were interesting topics and could have been used to determine the individual student's interest and understanding of the curriculum. Hopefully the next exams will cover the whole curriculum.
- Ikke alltid rød tråd, men dette kan være på grunn av mengden gjesteforelesere.

- mangel på rød trå mellom forelesning
 - Litt mange lange og tunge forelesninger om forskjellige temaer. Mange av disse emnene var det ikke fokus med å jobbe med i ettertid, som gjør at det blir litt tungt å lese til eksamen selv om man har jobbet jevnt med emnet. Fint med lab, men kunne gjerne vært enda mer :)
 - It could at times be difficult to understand what was relevant in the presentations given by the guest lecturers.
 - Gjerne mer skriftlig forklaringer på forelesningsnotatene. Var en del poenger og pensum som ofte bare var nevnt i bilder eller stikkord, noe som gjorde det vanskelig å forstå i etterkant.
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Table 4: Studenters svar på spørsmålet ”Deler av pensum i BIO216 ble gjennomgått av foreleserne fra andre institusjoner. Har du noen synspunkter om bruk av eksterne forelesere i BIO216?”

Answers

- En foreleser hadde ikke fått med seg at en andel av studentene var engelsk og holdt derfor forelesningen på norsk. Dette var litt uheldig. Ellers veldig fornøyd med gjesteforelesere, fint å kunne høre fra folk som jobber innen relevant felt for temaet vi går gjennom.
 - I think it is very interesting to see in which fields one could work if one pursues a career in toxicology. They all seemed very motivated and the lectures were interesting. The only issue is that it is a bit difficult to estimate what is relevant for the exam.
 - Dette var gøy forelesninger men jeg skulle gjerne vist hvor relevant det var for eksamen før de bel holdt, slik at jeg kunne fokusert mest på de forelesningene
 - Veldig bra mtp at de er ”eksperter” på emnet + at det gir et innblikk i relevansen til emnet på arbeidsplasser.
 - I think the external lecturers were an enrichment for this course, as they not only bring a variety of topics to the course, but also a connection to industrial and research applications of toxicology.
 - Sammenhengen mellom de forskjellige foreleserne er ikke like god som hvis det bare hadde vært en foreleser, men det er fint å få litt forskjellige forelesere med forskjellige ”spesialiteter”
 - syntes det er gøy og spennende, men eksterne forelesere har og veldig forskjellige evne til å fremføre så blir litt forskjellig nivå på de forskjellige forelesningene, noen har mye notater og andre har lite så det er litt vanskelig å lese seg opp i etter tid. samt kan eksterne forelesere gi forskjellig mengde av relevant pensum, mange i dette faget var flinke tror jeg, men vanskelig å vite hva som bare er en ekstra detalj de liker eller om det er viktig for eksamen.
 - Greit, men litt varierende fremføringer, både i lengde og relevanse.
 - Very interesting lectures that I enjoyed
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References

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