Own evaluation of the BIO325 ocean-going survey (22-28.11.2020 – Tokt Nr. 2020112)
Tom Langbehn

General

In 2020, I stepped in as a substitute for Katja Enberg as the responsible and cruise leader for the BIO325 module "ocean-going survey" for the first time. My previous experience of the course was limited to my role as a guest lecture in the previous year. It is anticipated that I will be cruise leader and responsible for the ocean-going survey also in the coming years until Katja Enberg returns to regular teaching in autumn 2023 after her extraordinary teaching duties related to the One Ocean Expedition, the Bergen Summer Research School, and a sabbatical.

Both, teaching (aside from regular guest lectures) and being a cruise leader were new to me at the start of BIO325 H2020. In the following I will self-document my experience, any changes to the module that were implemented in response to the student feedback from the previous year, the student feedback from 2020 and make suggestion on how to improve for the following year.

It should be noted that Katja Enberg in 2019 made substantial changes to the module when she took over as a responsible. The core student work is now a group research project, taking students from developing their own research questions, through planning and carrying out their research activities on board, to data analysis, and to the final stage of writing a research report. Further, learning outcomes were specified and assessed by a portfolio of methods, including individual "mini" oral exams and competence demonstrations, as well as group presentations and a written research plan and a final report.

These changes were generally well received by the students and assessments showed that the students were able to reach the intended learning goals. Therefore, most change implemented in 2019 were kept unchanged in 2020. However, based on the student feedback from 2019, we implemented a few changes that are documented in the section "Course development from 2019" below.

In 2019, in response to student feedback asking for more information before the cruise, Katja Enberg implemented a "survey manual" detailing the preliminary schedule for the cruise, planned research activities, cabin numbers, student groups etc. The survey manual was distributed to students and teachers in good time before the start of the survey and printed out on board and made available to the crew in the social areas on board. This was also done again in 2020 (see survey manual attached at the end of this document). Further, regular morning meeting were held onboard to provide update on changes, clarify plans for the day and check that all participants are well.

COVID-19

COVID-19 forced us in 2020 to implement several ad-hoc changes to the course. These changes were not pedagogically motivated but necessary to guarantee the safety of everyone on board. The following covid-19 related changes were made:

(i) due to the reduced number of people allowed on board students were split into two groups, meaning that each student got to join either the "fjord-going" or the "ocean-going" part of the survey. We tried to make this as fair as possible and considered student preferences for which leg of the survey to join. We were able to accommodate most preferences, but since more

Assessment framework for BIO325 Ocean Science – Fall 2020

Module		Form of assessment	Maximum points	
Module I: Marine Benthic Fauna and Methods		Individual report	Up to 90	
Module II: Biological Oceanography		Multiple choice test	Up to 70	
Module III: Research Cruise	Fjord	Competence demonstrations (onboard vessel)	30* (Pass/Fail)	Up to 150
		Knowledge transfer (after survey)	30* (Pass/Fail)	
		Individual term paper	Up to 90	
	North Sea	Competence demonstrations, small presentations, Mini oral exams (onboard vessel)	30* (Pass/Fail)	Up to 150
		Knowledge transfer (after survey)	30* (Pass/Fail)	
		Group research plan (written part and presentation) + group report (written part and presentation)	Up to 90	
Module IV: Fisheries Ecology		Oral exam	Up to 90	

*Will not count towards the final grade **TOTAL POINTS: 400**

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		Group research plan (written part and presentation) + group report (written part and presentation)	Up to 90	
Module IV: Fisheries Ecology		Oral exam	Up to 90	

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students wanted to join the "ocean-going" we had to do a lottery and draw the remaining students at random. This was made transparent to students (and served as another learning possibility) by providing them with the R code for random sampling.

(ii) To ensure that the "fjord" and "ocean" group had the same learning experience and did not miss out on learning activities conducted on other half of the cruise, we organised a two-day "knowledge exchange" after the survey at BIO. The objective of the knowledge exchange was to let the students teach and update each other on the activities done during the respective parts of the cruise. For example, since one of the main learning outcomes is to "be able to use appropriate tools, including taxonomic keys, to identify common marine animals in Norwegian waters" individuals from all species caught during the North Sea survey were frozen and transported to BIO for some hands-on specifies identification exercise, followed by a species quiz. The North Sea students also taught the Fjord students how to use the electronic measuring boards which we had setup on land.

Due to very strict COVID-19 infection prevention measures implemented by the "rederi" and UiB, everyone joining onboard was obliged to self-quarantine for 10 days prior to the survey. Because the one-day acoustic and trawl technology surveys in Byfjorden were scheduled before the first leg of the survey going to the fjords, all students and several teachers had to quarantine for almost a month e.g., in case of the North Sea group first 10 days before the one-day survey, then another week while the fjord group was out, then onboard during the North-sea survey and afterwards another week during the knowledge exchange part. This time could have been considerably shortened by re-arranging the order of the different cruise components.

Research topics 2020

The research topics for the group work were designed to follow up on work conducted in 2019, focussing on the ecology and distribution of the Greater Argentine (*Argentina silus*), a little studied but important commercial species.

This year's projects focused on: life-histories (3 students, expert: Arild Folkvord), geographical distributions (4 students, expert: Frank Midtøy) and vertical distributions related to light (4 students, expert: Tom Langbehn).

Course development from 2019

Katja Enberg outlined the following five suggestion for course development in her 2019 self-assessment:

1) Clearer expectations for the assignments should be presented, and it would be beneficial to draft rubrics for the different assignments.
2) These expectations should be distributed earlier to the students, and now that the survey manual has been made, if can easily be updated and distributed to the students already in good time before the survey.
3) Some more effort should be put towards "non-fish" methods and questions.
4) The lectures on acoustics are unfortunately in general on too high level for the large majority of the students.
5) Too much time is wasted in the survey trying to get the MultiSampler to function, and we will most likely not use that gear in the future, but rather trawl at different depths with a regular trawl.

Assessment of intended learning outcomes for the ocean-going survey

	When:	before		on board				after			
	ASSESSMENT METHOD:	Research plan written	Research plan presentation	Competence demonstrations	Learning by teaching	Mini oral exams	Small presentation	Report presentation	Report written	Knowledge transfer (pass/fail)	total points
	Max. attainable points:	20	10	10	2.5	10	10	20	40	30	150
INTENDED LEARNING OUTCOME											
Knowledge	Identify the most common fauna of the North Sea			X	X					four-day-long knowledge transfer exercise between Ocean and Fjord	
Knowledge	Explain how CTD works and why it is used					X	X				
Knowledge	Describe how acoustics work and identify their limitations					X	X				
Skills	Process, catalogue, and interpret collected field samples and experimental data			X	X	X	X	X			
Skills	Use measuring board and import the resultant data to a database			X	X						
Skills	Age fish using hard structures			X	X						
Skills	Conduct genetic sampling of fish			X	X						
General competences	Work as part of a team on board a research vessel			throughout the survey							
General competences	Follow safe practices in field work										
General competences	Contribute to designing and executing field work based on a research question	X									
General competences	Communicate scientific results from field studies							X			

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Knowledge	Describe how acoustics work and identify their limitations					X	X				
Skills	Process, catalogue, and interpret collected field samples and experimental data			X	X	X	X	X			
Skills	Use measuring board and import the resultant data to a database			X	X						
Skills	Age fish using hard structures			X	X						
Skills	Conduct genetic sampling of fish			X	X						
General competences	Work as part of a team on board a research vessel			throughout the survey							
General competences	Follow safe practices in field work										
General competences	Contribute to designing and executing field work based on a research question	X									
General competences	Communicate scientific results from field studies							X			

In the following I will describe the changes and consideration made to the points above.

Related to suggestion 1. and 2.:

The student feedback from 2019 was overall very positive, however, there appeared the need to be more explicit about the expectations related to the different assessments.

In 2019, only 35% of the students agreed or strongly agreed with the statement "*I received good enough instructions about what was expected in the mini-orals*", 30% were neutral, and 35% disagreed or strongly disagreed. 55% of the students agreed or strongly agreed with the statement "*Clear expectations were presented for the assignments*", 20% were neutral, and 25% disagreed.

Here, I saw some room for improvements and decided to follow the suggestions outlined by Katja Enberg to make a rubric where the expectations and associated credits are clearly defined and made transparent to the students (see below). The rubric was distributed to the students together with the survey leaflet before the survey, well ahead of the delivery deadline for the final reports.

Rubrics for final group report of the ocean-going part of Module III in BIO325

	Criteria	Excellent	Good	Acceptable	Insufficient	Unacceptable	Max score
General	**Is the report clearly organized?** The report should be organized in the standard IMRaD fashion (Introduction, Methods, Results, and Discussion – an abstract is in this case not expected for the reports). Within paragraphs, sentences should be cohesive and logically organized.	The report adheres to the IMRaD structure and writing within paragraphs is easy to follow throughout.		The report adheres to the IMRaD organization, and the writing within paragraphs is mostly easy to follow.		The report does not adhere to the IMRaD organization, or the writing within paragraphs is frequently difficult to follow	4.0
	Score	4.0		2.0		0.0	
	Is the use of literature / references correct and appropriate? All claims in the report should be supported by relevant sources from the peer-reviewed scientific literature. Grey literature such as cruise reports, pre-prints, theses, and dissertations should be used with caution and only when no primary literature is available. The references should be complete, consistently formatted (following the style of ICES Journal of Marine Science) and reflect the content of the source text correctly.	All claims are supported by predominantly peer-reviewed sources (for reports such as IPCC or ICES a link should be included) AND all cited papers are highly relevant, flawlessly referenced in both text and reference list, and reflect the content of the source text correctly AND at least 10 peer-reviewed articles are cited AND (key) references have been found independently and demonstrate excellent overview of the literature.	All claims are supported by mostly peer-reviewed sources AND nearly all cited papers are relevant, almost always flawlessly referenced in both text and reference list and reflect the content of the source text correctly AND at least 8 peer-reviewed articles are cited.	Most claims are supported by relevant sources which are referenced in both text and reference list and reflect the content of the source text correctly AND at least 5 peer-reviewed articles are cited.	More than half of the claims are not supported by sources OR cited sources are in several cases insufficient, inconsistent, incomplete, or incorrect OR less than 5 peer-reviewed articles are cited.	Does not cite sources OR misrepresents cited sources.	2.0
	Score	2.0	1.7	1.2	0.4	0.0	
	Is the report free of spelling / grammar mistakes?	Minimal spelling and/or grammar mistakes.		Noticeable spelling and grammar mistakes		Frequent and/or recurrent number of spelling and/or grammar mistakes.	1.0
	Score	1.0		0.6		0.0	

Assessments during the survey

1. Competence demonstrations (10p)

Your name tag includes 5 competencies that you need to acquire during the survey. The teachers will evaluate when you have reached an appropriate level of competence. You also have LbT (Learning by Teaching) tags in your name tag. You can earn these by helping other students to learn a competency you have already acquired yourself. LbT will give 0.5 extra bonus points each that will add to your individual points for the group report. Note, you cannot attain more than max. 150 points for this entire module.

2. Mini oral exams (10p)

Everyone is examined individually. It is your responsibility to make sure you have taken the oral exam. One oral exam will last about 5 minutes. Prepare for all three topics, one topic will be picked randomly for evaluation.

- CTD – what, how and why?
- How & why we sample fish?
- Acoustics – what, how, limitations

3. Small presentations on board (10p)

Each group prepares all three presentations (each presentation should be about 5 minutes/5 slides) and submits them to Tom on a memory stick. Each group will present 2 randomly picked out of the three topics. Each member of the group will have to be prepared to present all of the three topics. One student from each group will be randomly picked at the beginning of the presentations to present the group's work.

- CTD – what, how and why?
- Trawling – principles, gears, and limitations.
- Acoustics – what, how, why and limitations.

Assessments before/after the survey

1. Written **research plan (20p) & presentation** (10p)

   Written research plan should be max. 1000 words (use font 12 and add line numbers).

   The research plan should include the following:
   - A clearly defined research question based on literature (what and why)
   - An outline of methods and sampling design (What are you planning to do, where, when and how?)
   - Full list of equipment

   NOTE! coordinate your sampling plans with the other groups.

2. Written **report (40p) & presentation (20p)**

   Written group report should be max. 3000 words, excl. data tables (use font 12 and add line numbers) and present the results in at least two key figures.

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Introduction	**Are the research question and hypothesis clearly stated?** The introduction should include a clear research question and formulate a plausible and testable hypothesis.	There is a clear, concise, and original research problem with exceptional scientific merits AND the hypotheses are clearly stated, testable and consider plausible alternative explanations.	There is a clear, concise research problem AND hypotheses are clearly stated, testable and consider plausible alternative explanations.	There is a broad research problem OR the hypotheses are stated but improbable to test or only marginally related to the research question.	The research problem is vague AND the hypotheses are stated but improbable to test or only marginally related to the research question.	Research question absent or lacks focus AND hypotheses missing, implausible or untestable.	**2.0**
	Score	**2.0**	**1.7**	**1.2**	**0.4**	**0.0**	
	Does the introduction demonstrate an understanding of the problem, its significance, and how it fits in biology at large? The purpose of the introduction is to place the work in a scientific context. This should be done by giving a clear overview of the state of the art/previous work, providing relevant background information, and explaining relevant theories, identifying knowledge gaps, and highlighting the social and/or scientific relevance of the problem.	Clear, complete, and coherent overview of relevant literature/theories taking an original or innovative approach to the existing theoretical framework. Knowledge gaps are clearly outlined and the social and/or scientific relevance of the research problem are convincing and well-argued for.	Complete and concise overview of relevant literature. The project is well-embedded in the existing body of literature, from which relevant scientific theories are selected and used, resulting in an accurate and coherent conceptual framework. Some knowledge gaps are identified, and the relevance statement is broad.	Adequate overview of relevant literature. The project is linked to relevant (theoretical) literature, which is sufficient for executing the proposed research. Theories are used correctly. The description of knowledge gaps and relevance of the research problem is broad and would benefit from more specificity to the research question.	Incomplete or inaccurate overview of literature. The project is linked to literature that is only partly relevant and/or incomplete, leading to poor substantiation of the proposed research OR no knowledge gaps have been identified failing to provide a rational for the study.	The project is linked to literature that is mostly irrelevant and/or of insufficient quality to answer the research question(s) AND no knowledge gaps have been identified failing to provide a rationale for the study.	**3.0**
	Score	**3.0**	**2.6**	**2.3**	**0.6**	**0.0**	
Methods	**Does the description of the methods allow others to reproduce the study?** For the results to be trustworthy, the method section ought to be a detailed, fool proof, "cooking recipe" that allows others to successfully repeat the study.	The method section is exceptionally clear and logical in structure, pays meticulous attention to detail, highlights key steps and potential pitfalls, guides the reader through the use of compelling figures, such as flow-charts or maps AND measuring units are without exceptions correct.	The method description is complete, well-structured and provides appropriate level of detail, uses illustrations such as flow-charts and maps AND measuring units are with minor exceptions correct.	The method description is complete but lacks attention to detail or structure AND measuring units are with minor exceptions correct.	The method description is lacking key parts that prevent others from successfully replicating the study OR measuring units are frequently incorrect.	No description of methods and analysis of the information/data.	**8.0**
	Score	**8.0**	**6.8**	**4.8**	**1.6**	**0.0**	
	Is the sampling design likely to produce convincing, trustworthy, and repeatable results? The proposed methods and sampling design should – within the constraints of the survey (e.g. with respect to the number of replicates) – be suitable to answer the research question (i.e. tests the hypotheses posed).	The study has an original/innovative, and appropriate methodological approach or shows an innovative application of methods by combining elements in an original way.	Used methods and analysis of data/information are appropriate.	Used methods and analysis of data/information mostly appropriate.	Used methods and analysis of data / information are mostly not appropriate.	The proposed methods do not match with the research question.	**4.0**
	Score	**4.0**	**3.4**	**2.4**	**0.8**	**0.0**	
Results	**Are the obtained results presented in a clear way that support the conclusion?** Relevant data should be summarised in a logical and appropriate format, i.e. as tables or graphs. Further, all data needs to be properly labelled including units. This also includes, that graph axes are appropriately labelled and scaled, and captions are informative and complete.	The description of the results is particularly compelling, intuitive, and key results are easy to find. All main findings are presented in original, publication-quality figures/tables. All figures/tables are informative, self-explanatory (work as 'stand-alone') and relevant, their captions are informative, they are properly referenced in the text, and all axis labels/annotations are unambiguously and readable.	The results are well described, and all key findings are presented as figures/tables. All figures/tables are informative, self-explanatory, and relevant but lack originality. Their captions are informative, they are properly referenced in the text, and all axis labels/annotations are unambiguously and readable.	Description of results is complete but not all key findings are presented as figures/tables and/or some figures are irrelevant and/or not necessarily self-explanatory. Legends and figure captions are complete, and all figures are correctly referenced in the main text.	The presentation of results is incomplete OR figures/tables are missing.	The presentation of results is incomplete AND figures/tables are missing.	**6.0**
	Score	**6.0**	**4.8**	**3.6**	**1.2**	**0.0**	

Both the presentation and the report should follow the IMRAD-structure (see https://biowrite.w.uib.no/structure-imrad/) and cite relevant literature.

Group reports will be evaluated based on the following criteria:

Abstract

- Does the abstract give a brief summary of the term paper's background, aim and main findings?

Introduction

- Does the introduction cover the relevant background information needed to understand the relevance of the chosen research questions?

Methods – Describe equipment and methods used to collect organisms and to measure environmental variables.

- Are descriptions of gears linked to the questions that are asked?
- Are the principles of different sampling approaches described?
- Are all relevant equipment used well described and relevant illustrations included?
- Is the methods section well structured?
- Are the subsampling procedures and the measuring protocols well described?

Results & Data Analysis:

- How relevant are figures?
- Are interpretations correct?
- How clear are results described?
- Are measuring units dealt with correctly?
- Is the results section well structured?

Discussion

- Are results interpreted considering earlier research & in view of research questions from the introduction?
- Are potential sources of error discussed? I.e. strengths and weaknesses of the different sampling gears?

Evaluation of group effort

You will evaluate your own and your group members' effort for the group work in connection with the ocean-going survey research project. The effort is considered for all the parts of the work - before, during, and after the survey. No-one should be punished if they for example become sick (and if there are any circumstances you would like me to know about, just write that down).

Each team member will evaluate their own and each other's contribution towards the groups work.

Each group has 100 points to share between the members. If you are 4 in the group, that will give 25 points per person given equal contributions, if you are 3, that will give you 33.3 points per person given equal contributions.

These points you give will affect the point sum each member of the group gets from the research project group work.

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	Are the raw data and code for the analysis/figures included as an editable file in an electronic supplement? To allow others to re-analyse or built on the data in the future it is important that all raw data is made available in a non-aggregated format, including relevant meta information (station number etc.)	The supplement includes all raw data (non-aggregated) and computer code for analysis/figures in an editable format (e.g. as and electronic supplement with ".xls" or ".csv" and ".R" files in a ".zip" folder).		The supplement includes all raw data (non-aggregated) and computer code for analysis/figures in a non- editable format.	The supplement is incomplete, some raw data and/or computer code are missing OR data has been aggregated (e.g., only presented as summary statistics such as average, minimum, maximum, sum, and count).	Supplement with raw data and scripts is missing.	**2.0**
	Score	**2.0**		**1.2**	**0.4**	**0.0**	
Discussion	**Does the discussion provide a thoughtful summary of the results and draw the appropriate conclusions?** The conclusions should follow logically and unambiguously from the results and should be linked to the stated research question. You should discuss alternative explanations and explain how (and if) they can be eliminated based on your findings. Further make sure limitations of the data and/or experimental design and corresponding implications for data interpretation are discussed. Where appropriate, identify questions that remain unanswered and suggest possible follow-up directions. Note, it is not uncommon to have inconclusive or incomplete results – this is perfectly acceptable but should be discussed accordingly.	Complete, critical, and balanced discussion of strengths, limitations, new insights, and hypotheses. The discussion links back to the original research question and hypothesis, and contextualises findings with relevant literature, makes connection to existing theory and identifies new follow-up research topics. Conflicting data (if present), and/or weakness in the sampling design that could have influenced the results are thoroughly addressed.	All conclusions are clearly and logically drawn from data provided. A logical chain of reasoning from hypothesis to data to conclusions is clearly and persuasively explained. Conflicting data (if present), and/or weakness in the sampling design that could have influenced the results are briefly discussed.	Most conclusions are supported by the results. Conflicting data (if present), and/or weakness in the sampling design that could have influenced the results are adequately addressed.	The majority of conclusion are insufficiently supported by, or misrepresent, the results OR the discussion remains general and superficial throughout OR the discussion fails to identify major weaknesses or and/or points at weaknesses which are in reality irrelevant or non-existent.	No discussion and/or reflection on the research. Discussion only touches trivial or very general points of criticism.	**8.0**
	Score	**8.0**	**6.8**	**4.8**	**1.6**	**0.0**	

Max score
40.0

Related to suggestion 3:

With the 2020 covid-related restrictions it was impossible for me to follow up on the suggestion by Katja that "some more effort should be put towards "non-fish" methods and questions" e.g., zooplankton sampling is not yet covered in the course. One additional reason is that we had 30% less cruise time in 2020, only 7 instead of 10 days for the North Sea part. Covering the CTD transect and take bottom and pelagic trawls in the Norwegian and Faeroe trench (as it has been done previously) is only possible in seven days in the best-case scenario. More likely is that bad weather or other unforeseen circumstances will delay sampling. Therefore, with the current timeframe, adding more work or sampling techniques is not possible under the current setup.

Related to suggestion 4:

Each student can distribute 100 points among all group members, including him/herself.

Example 1: Equal contribution/effort to the group work

Alfred:

Name	Effort
Alfred:	20
Brian:	20
Connie:	20
Diana:	20
Erin:	20

Brian:

Name	Effort
Alfred:	20
Brian:	20
Connie:	20
Diana:	20
Erin:	20

Connie:

Name	Effort
Alfred:	20
Brian:	20
Connie:	20
Diana:	20
Erin:	20

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Alfred:	20
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Diana:	20
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Erin:

Name	Effort
Alfred:	20
Brian:	20
Connie:	20
Diana:	20
Erin:	20

Name	Average effort	Group points	Max points	Individual points
Alfred:	20	30	40	**30**
Brian:	20	30	40	**30**
Connie:	20	30	40	**30**
Diana:	20	30	40	**30**
Erin:	20	30	40	**30**

To weight the group points by the individual effort we calculate:

= min (average effort/(100/number of group members)*group points, max points)

Example 2: Unequal contribution/effort to the group work

Alfred:

Name	Effort
Alfred:	10
Brian:	20
Connie:	30
Diana:	30
Erin:	10

Brian:

Name	Effort
Alfred:	12
Brian:	10
Connie:	30
Diana:	40
Erin:	8

Connie:

Name	Effort
Alfred:	10
Brian:	25
Connie:	35
Diana:	20
Erin:	10

Diana:

Name	Effort
Alfred:	11
Brian:	25
Connie:	25
Diana:	30
Erin:	9

Erin:

Name	Effort
Alfred:	7
Brian:	20
Connie:	30
Diana:	30
Erin:	13

Name	Average effort	Group points	Max points	Individual points
Alfred:	10	30	40	**15**
Brian:	20	30	40	**30**
Connie:	30	30	40	**40**
Diana:	30	30	40	**40**
Erin:	10	30	40	**15**

Each student can distribute 100 points among all group members, including him/herself.

Example 1: Equal contribution/effort to the group work

Alfred:

Name	Effort
Alfred:	20
Brian:	20
Connie:	20
Diana:	20
Erin:	20

Brian:

Name	Effort
Alfred:	20
Brian:	20
Connie:	20
Diana:	20
Erin:	20

Connie:

Name	Effort
Alfred:	20
Brian:	20
Connie:	20
Diana:	20
Erin:	20

Diana:

Name	Effort
Alfred:	20
Brian:	20
Connie:	20
Diana:	20
Erin:	20

Erin:

Name	Effort
Alfred:	20
Brian:	20
Connie:	20
Diana:	20
Erin:	20

Name	Average effort	Group points	Max points	Individual points
Alfred:	20	30	40	**30**
Brian:	20	30	40	**30**
Connie:	20	30	40	**30**
Diana:	20	30	40	**30**
Erin:	20	30	40	**30**

To weight the group points by the individual effort we calculate:

= min (average effort/(100/number of group members)*group points, max points)

Example 2: Unequal contribution/effort to the group work

Alfred:

Name	Effort
Alfred:	10
Brian:	20
Connie:	30
Diana:	30
Erin:	10

Brian:

Name	Effort
Alfred:	12
Brian:	10
Connie:	30
Diana:	40
Erin:	8

Connie:

Name	Effort
Alfred:	10
Brian:	25
Connie:	35
Diana:	20
Erin:	10

Diana:

Name	Effort
Alfred:	11
Brian:	25
Connie:	25
Diana:	30
Erin:	9

Erin:

Name	Effort
Alfred:	7
Brian:	20
Connie:	30
Diana:	30
Erin:	13

Name	Average effort	Group points	Max points	Individual points
Alfred:	10	30	40	**15**
Brian:	20	30	40	**30**
Connie:	30	30	40	**40**
Diana:	30	30	40	**40**
Erin:	10	30	40	**15**

The acoustic lecture part had to be shortened and could not be held in its regular format due to the COVID-19 restrictions. This year's introduction was held by Espen Johnsen, and verbal feedback provide by the students after the one-day survey was positive. However, some noted that more time could have been dedicated towards better understanding acoustics. I will pick this matter up again when can resume the normal course format.

Related to suggestion 5:

The MultiSampler was serviced and functioned exceptionally well this year.

Related to the data labs:

In 2020, the data labs for the "fjord-going" and "ocean-going" part of the survey were taught separately (to my knowledge for the first time), as before all students joined both parts.

The teaching approaches for the two groups were different. The fjord students work with predefined research questions and ready-made scripts for data analysis. This has the advantage that it reduces workload for teachers and teaching assistants and guarantees that correct statistical analyses are performed. However, from my personal experience, coding and data analysis is best learned hands-on. Therefore, I decided that for the "ocean-going" part students would have to develop their analysis themselves from scratch. Googling how to achieve certain things in R is an essential element of learning how to code. Most students had already some prior knowledge of R, but very few were advanced users. An additional challenge was that because in person lectures were not possible due to covid-19, we had to move the data labs online. I prepared the raw data in a format that would be easy for the students to work with and gave an introduction with live/coding on how to read data into R and get started with some simple explorative plots. After that, it was up to the student groups to develop their own analysis, but with the explicit possibility of getting help when they got stuck. All student groups made use of this and I spend considerable time with each group coding together using the shared screen option on zoom. This approach is admittedly much more time consuming then working with existing scripts, but in my experience the learning curves are very steep, and students quickly are able to work relatively independent. To be able to *"process, catalog, illustrate graphically, analyse statistically collected field samples and interpret result*" is one of the learning goals of BIO325. I made however clear form the beginning that the focus will be less on statistical analysis (which is the focus of BIO300B) than on learning how to explore the data, present the result in figures and writing.

Teaching R using the shared screen option, with the possibility to request control and directly write code on the student's screens, was surprisingly effective and allowed all students to see the screen and follow along. When teaching coding in person, this is more difficult and those that are not directly in front of the screen but just observe over someone's shoulder lose focus quickly.

Student evaluation 2020

In addition to the general course evaluation that is performed at the end of the whole course, we asked the students participating in the North Sea survey to fill out a short survey tailored to the "ocean-going" module. In 2020, we used the same survey questionnaire as in the previous, with some minor modification to over COVID-19 related changes. All 11 students joining for the ocean-going survey completed the questionnaire. The main results are attached as an appendix, but are shortly summarised here:

Compulsory Assignments and Attendance

In the ocean-going part of BIO325 Module III, all scheduled activities, including presentations, data labs and contact hours, are obligatory for all students.

Week	Date	Time	Activity
33	13.08.2020	10:15 - 12:00	Orientation Meeting
34	21.08.2020	16:00-17:00	Lecture: Introduction North Sea cruise
36	31.08.2020	09:15 - 10:00	Lecture: Progress update research plan
36	to be determined		Contact hour with expert for group work
37	10.09.2020	12:15 - 14:00	Lecture: Otolith and ageing fish
37	10.09.2020	14:15 - 16:00	Lecture: Presentation research plan
37	11.09.2020	14:15-16:00	Lecture: Introduction to Ocean Data View (ODV) and Acoustic Surveys
38	14.09.2020	all day	Research Cruise in Byfjorden
39 -40	22.09.2020- 28.09.2020	all day	Research Cruise to the North Sea
40	29.09.2020	08:15 - 16:00	Knowledge transfer (Fjords to Ocean)
40	30.09.2020	08:15 - 16:00	Knowledge transfer (Fjords to Ocean)
40	01.10.2020	08:15 - 16:00	Knowledge transfer (Ocean to Fjords)
40	02.10.2020	08:15 - 16:00	Knowledge transfer (Ocean to Fjords)
41	08.10.2020	08:15 - 12:00	Practical Exercises: Datalab 1
42	13.10.2020	08:15 - 12:00	Practical Exercises: Datalab 2
43	19.10.2020	12:15- 12:00	Lecture: Students present group work ODV & acoustic Survey
43	22.10.2020	08:15- 12:00	Practical Exercises: Datalab 3
to be determined			Lecture: Presentation group report

Compulsory Assignments and Attendance

In the ocean-going part of BIO325 Module III, all scheduled activities, including presentations, data labs and contact hours, are obligatory for all students.

Week	Date	Time	Activity
33	13.08.2020	10:15 - 12:00	Orientation Meeting
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36	to be determined		Contact hour with expert for group work
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38	14.09.2020	all day	Research Cruise in Byfjorden
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40	29.09.2020	08:15 - 16:00	Knowledge transfer (Fjords to Ocean)
40	30.09.2020	08:15 - 16:00	Knowledge transfer (Fjords to Ocean)
40	01.10.2020	08:15 - 16:00	Knowledge transfer (Ocean to Fjords)
40	02.10.2020	08:15 - 16:00	Knowledge transfer (Ocean to Fjords)
41	08.10.2020	08:15 - 12:00	Practical Exercises: Datalab 1
42	13.10.2020	08:15 - 12:00	Practical Exercises: Datalab 2
43	19.10.2020	12:15- 12:00	Lecture: Students present group work ODV & acoustic Survey
43	22.10.2020	08:15- 12:00	Practical Exercises: Datalab 3
to be determined			Lecture: Presentation group report

- 100% of the students strongly agreed with the statement "*Communication with the teachers was good*".

- 100% of the students agreed or strongly agreed with the statement "*I am in general happy with this module*".

- 100% of the students agreed or strongly agreed with the statement: "*Module title, module description, and learning outcomes reflect the module content*".

- 100% of the students agreed or strongly agreed with the statement "*I find this kind of a project work [the group research projects] good for my learning*".

- 82% of the students strongly agreed with the statement "*I received constructive feedback on my performance*", 18% agreed.

- 91% of the students agreed or strongly agreed with the statement "*The workload was OK*", 9% disagreed.

- 73% of the student strongly agreed with the statement "*This module motivated me to work hard*", 27% agreed.

- 91% of the students strongly agreed with the statement "*Clear expectations were presented for the assignments*", 9% (one student) was neutral.

- Regardless, 64% strongly agreed with the statement "*Preparing for mini-orals was useful for my learning*", 36% agreed.

- For the group presentations, 73% strongly agreed or agreed that "*Preparing for the short presentations was useful for my learning*", 18% were neutral and 9% strongly disagreed, while 63% strongly agreed or agreed that "*Listening to other groups' presentations was useful for my learning*". 27% were neutral and 9% disagreed.

Overall, I think this is a feedback we can be really happy with. In more detailed comments in the surveys several students highlighted that they especially enjoyed the hands-on parts and enjoyed the continuous assessment through the competence demonstrations. Relative to 2019, the student satisfaction has increased, where this was still possible. In 2020, 82% of the students found that the expectations for the assignments were clearly outlined. This is an improvement by 30% from last year and indicates that the rubrics implement in 2020 has helped to clarify the expectations. Similar, now 65% (35% in 2019) found instructions related to the mini orals clear.

<u>Feedback specific to the data labs</u>:

Student feedback also highlighted that the data labs which were held online were successful. General, there was a high degree of satisfaction: "*The data labs were extremely helpful, both from the advice given in relation to the task at hand but also for developing one's own skill set in R and using this in later projects*". Another student noted that they found it challenging but rewarding: "*I found developing our own code very challenging, however I think it was very useful and I am glad that we didn't just get the code*". However, it became clear that coding is a threshold skill for many students: "*I felt like we don't really have the knowledge yet to do this*

Map of study area

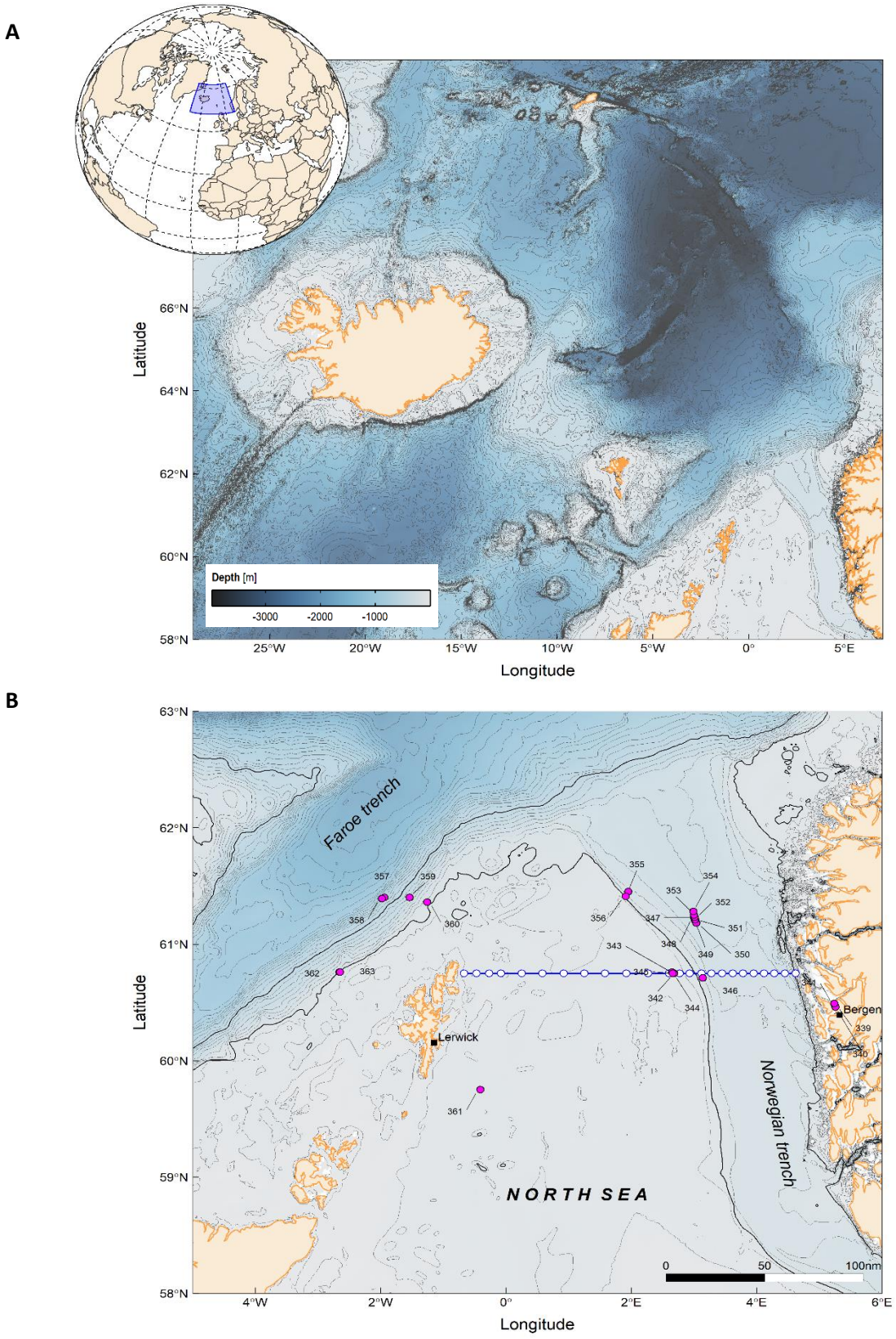

Fig. 1: Map of the study area. **(A)** bathymetry of the North-east Atlantic. **(B)** Fedje-Shetland transect, CTD stations for the long-term monitoring are marked in blue, and trawl station from the previous year, 2019, are marked in magenta. The 200 m and 600 m depth contours are highlighted in black.

Map of study area

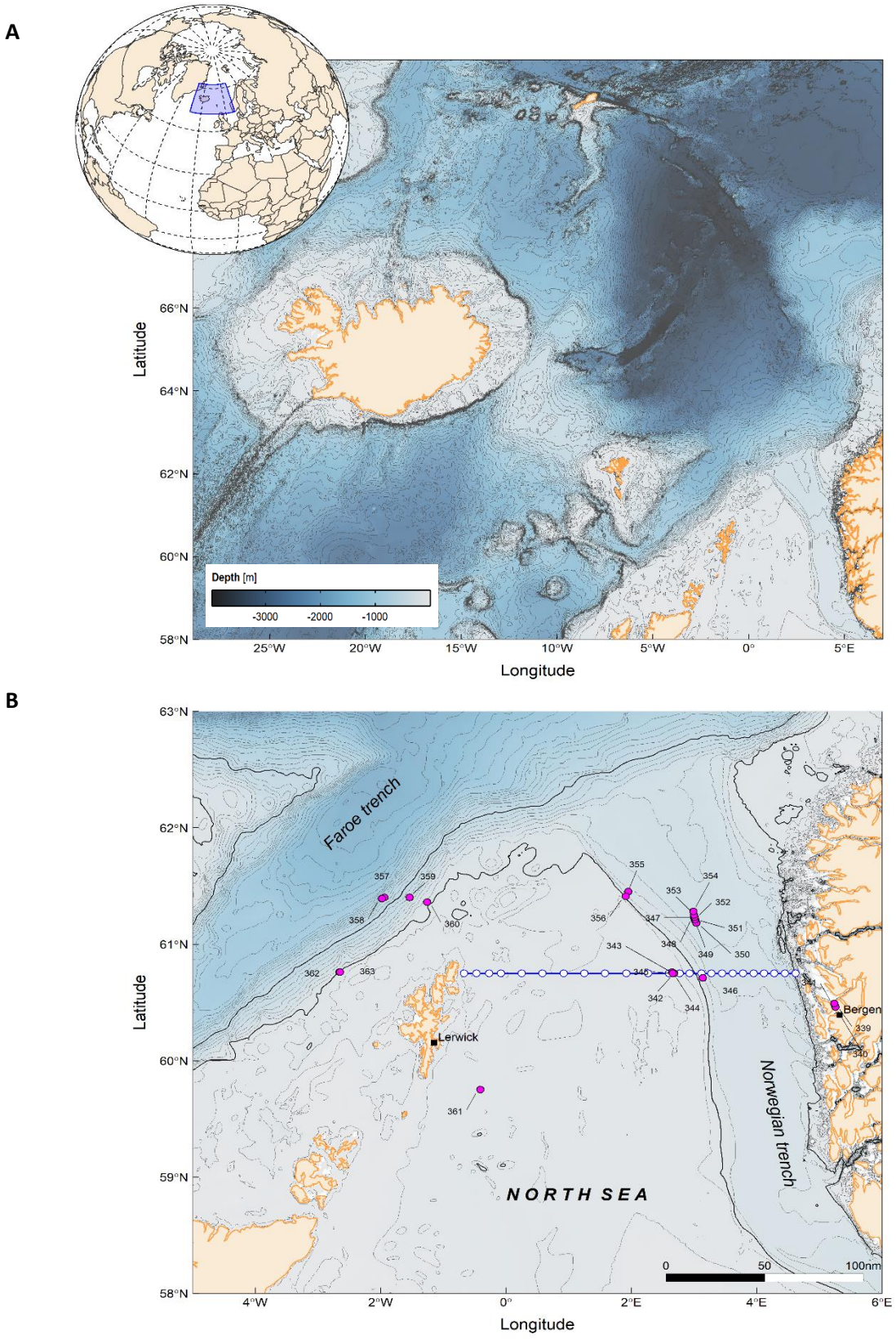

Fig. 1: Map of the study area. **(A)** bathymetry of the North-east Atlantic. **(B)** Fedje-Shetland transect, CTD stations for the long-term monitoring are marked in blue, and trawl station from the previous year, 2019, are marked in magenta. The 200 m and 600 m depth contours are highlighted in black.

part well on our own and it required a lot of help from the teachers", highlighting the need to develop the data labs. Since data analysis is a key skill necessary to successfully complete a master's degree in biology, I think, many students would benefit from dedicate course teaching just basic coding skills. Such a course should be placed early on in the curriculum, best before students go out to the field to collect their own data. Programming in Python is now obligatory at the undergraduate level at MatNat (https://www.uib.no/matnat/131366/arbeidsgruppenes-anbefalinger-generiske-ferdigheter#programmeringsemne), but the effects are not yet noticeable at the graduate level.

Several students highlighted that the labs would likely have been even better when held in person. It is unclear from the feedback how this would have different from the online format, making it hard to draw some lesson from this for course development. One student however explicitly noticed that *"having the data lab online was sometimes even better than in person I think since every one in the group had no difficulties looking at the screen*".

In general, there was consensus that the introductory part to R could be expanded, including some tutorials and task that everyone has to solve so that everyone is at the same level when working on their data.

Planned improvements for 2021

Based on the student feedback from 2020, I will suggest implementing the following changes:

- dropping the presentations on board, as there is little idle time for the students in the now smaller groups, and the topics can also be covered during the mini oral exams. This would also help reduce the overall student workload, which was considered high by most in their feedback.

- developing rubrics also for the other assessment types e.g., the mini oral exam, research plan presentation etc. Also, mitt.uib could be used more actively to structure the course and information flow.

- if the "knowledge transfer" part is to be repeated, it should be made more clear to the students that the main objective is teaching their fellow students, not demonstrating to the teachers what they know. This should help reduce redundancies in the presentations. Several North Sea students noted that they received three, near identical presentation from the Fjord students. There is a need to better communicate which are the novel aspects not covered during the other part of the cruise e.g., for the ocean-going students the zooplankton sampling in the fjords was new and relevant.

- Student feedback confirms that developing their own code is difficult but rewarding. I suggest, however, to develop an R data analysis tutorial including some exercises that will provide students with hands-on experience and take them through the relevant steps of data analysis (i.e., reading data, cleaning data, transforming data, plotting data) and introduce them to some of the most important and widely used functions in R.

- One additional aspect that should be discussed between the module responsible teachers is how to better standardise grades in between the "ocean" and "fjord" module.

Preliminary daily plans

These daily plans are prone to change (and we have a Plan B, C, D…). This schedule should be taken more as a guideline of all the activities we are planning to do during the survey – but the time point can change depending on weather and other factors. Updates on the schedule will be announced during the morning briefing every day.

Tuesday September 22nd, 2020

08:00-10:00	G.O. Sars arrives in Bergen at Nykirkekaien, exact time unknown.
10:00-10:30	Finding cabins, getting familiar with the vessel, security information
10:30-11:30	Morning meeting. Update on where we are and what we plan to do today
11:30-12:30	Lunch
12:30-13:00	Steaming towards Fedje, prepare the lab and equipment for the next day's sampling, else students work independently e.g. preparing their presentations.
15:00-15:30	Coffee
15:30-17:30	Prepare the lab and equipment for the next day's sampling, else students work independently e.g. preparing their presentations.
17:30-18:30	Dinner (NOTE that due to COVID-19 we might not be allowed to all eat at the same time, we will plan for this onboard)
18:30-20:00	Prepare the lab and equipment for the next day's sampling, else students work independently e.g. preparing their presentations.
20:00-	Free time, during the night we will be steaming, and the crew will take several CTDs along the Fedje-Shetland transect.

Preliminary daily plans

These daily plans are prone to change (and we have a Plan B, C, D…). This schedule should be taken more as a guideline of all the activities we are planning to do during the survey – but the time point can change depending on weather and other factors. Updates on the schedule will be announced during the morning briefing every day.

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15:30-17:30	Prepare the lab and equipment for the next day's sampling, else students work independently e.g. preparing their presentations.
17:30-18:30	Dinner (NOTE that due to COVID-19 we might not be allowed to all eat at the same time, we will plan for this onboard)
18:30-20:00	Prepare the lab and equipment for the next day's sampling, else students work independently e.g. preparing their presentations.
20:00-	Free time, during the night we will be steaming, and the crew will take several CTDs along the Fedje-Shetland transect.

- Students indicated the wish to rotate more in their tasks on board. This has always been up to the students but should be made more clear.

Wednesday September 23rd, 2020

07:30-08:00	Breakfast
08:00-08:30	Morning meeting. Update on where we are and what we plan to do today (be on time!)
8:15-11:30	First CTD + Bottom trawl stations on the plateau. Handling, registering, and measuring the catch in the fish lab. NOTE: no Greater argentine catch expected while we trawl on the plateau.
11:30-12:30	Lunch
12:30-15:00	CTD + Bottom trawl stations on the plateau. Handling, registering, and measuring the catch in the fish lab.
15:00-15:30	Coffee
15:30-17:30	CTD + Bottom trawl stations on the plateau. Handling, registering, and measuring the catch in the fish lab.
17:30-18:30	Dinner
18:30-20:00	CTD + Bottom trawl stations on the plateau. Handling, registering, and measuring the catch in the fish lab.
20:00-	free time, during the night we will be steaming, and the crew will take several CTDs along the Fedje-Shetland transect.

*Time in between stations should be used to prepare for the group presentations and mini oral exam. Competence demonstrations will continue throughout the survey.

Wednesday September 23rd, 2020

07:30-08:00	Breakfast
08:00-08:30	Morning meeting. Update on where we are and what we plan to do today (be on time!)
8:15-11:30	First CTD + Bottom trawl stations on the plateau. Handling, registering, and measuring the catch in the fish lab. NOTE: no Greater argentine catch expected while we trawl on the plateau.
11:30-12:30	Lunch
12:30-15:00	CTD + Bottom trawl stations on the plateau. Handling, registering, and measuring the catch in the fish lab.
15:00-15:30	Coffee
15:30-17:30	CTD + Bottom trawl stations on the plateau. Handling, registering, and measuring the catch in the fish lab.
17:30-18:30	Dinner
18:30-20:00	CTD + Bottom trawl stations on the plateau. Handling, registering, and measuring the catch in the fish lab.
20:00-	free time, during the night we will be steaming, and the crew will take several CTDs along the Fedje-Shetland transect.

*Time in between stations should be used to prepare for the group presentations and mini oral exam. Competence demonstrations will continue throughout the survey.

General Assessment framework

Module		Form of assessment	Maximum points	
Module I: Marine Benthic Fauna and Methods		Individual report	Up to 90	
Module II: Biological Oceanography		Multiple choice test	Up to 70	
Module III: North Sea or Fjord Survey	Part A	Competence demonstrations (onboard vessel)	30 (Pass/Fail)	Up to 150
		Knowledge transfer (after survey)	30 (Pass/Fail)	
		Individual term paper	Up to 90	
	Part B	Competence demonstrations, small presentations, Mini oral exams (onboard vessel)	30 (Pass/Fail)	Up to 150
		Knowledge transfer (after survey)	30 (Pass/Fail)	
		Group research plan (written part and presentation) + group report (written part and presentation)	Up to 90	
Module IV: Fisheries Ecology		Oral exam	Up to 90	
			TOTAL POINTS:	**400**

Thursday September 24th, 2020

07:30-08:00	Breakfast
08:00-08:30	Morning meeting. Update on where we are and what we plan to do today
8:15-11:30	CTD + Bottom trawl stations on the plateau. Handling, registering, and measuring the catch in the fish lab.
11:30-12:30	Lunch
12:30-15:00	CTD + Bottom trawl stations on the plateau. Handling, registering, and measuring the catch in the fish lab.
15:00-15:30	Coffee
15:30-17:30	CTD + Bottom trawl stations on the plateau. Handling, registering, and measuring the catch in the fish lab. (begin with individual mini oral exams, one at a time).
17:30-18:30	Dinner
18:30-20:00	CTD + Bottom trawl stations on the plateau. Handling, registering, and measuring the catch in the fish lab (continue with individual mini oral exams, one at a time).
20:00-	free time, during the night we will be steaming, and the crew will take several CTDs along the Fedje-Shetland transect.

*Time in between stations should be used to prepare for the group presentations and mini oral exam. Competence demonstrations will continue throughout the survey.

Thursday September 24th, 2020

07:30-08:00	Breakfast
08:00-08:30	Morning meeting. Update on where we are and what we plan to do today
8:15-11:30	CTD + Bottom trawl stations on the plateau. Handling, registering, and measuring the catch in the fish lab.
11:30-12:30	Lunch
12:30-15:00	CTD + Bottom trawl stations on the plateau. Handling, registering, and measuring the catch in the fish lab.
15:00-15:30	Coffee
15:30-17:30	CTD + Bottom trawl stations on the plateau. Handling, registering, and measuring the catch in the fish lab. (begin with individual mini oral exams, one at a time).
17:30-18:30	Dinner
18:30-20:00	CTD + Bottom trawl stations on the plateau. Handling, registering, and measuring the catch in the fish lab (continue with individual mini oral exams, one at a time).
20:00-	free time, during the night we will be steaming, and the crew will take several CTDs along the Fedje-Shetland transect.

*Time in between stations should be used to prepare for the group presentations and mini oral exam. Competence demonstrations will continue throughout the survey.

Assessment methods and learning-outcomes of the "Ocean-going" module

	When:	before		on board				after			
	ASSESSMENT METHOD:	Research plan written	Research plan presentation	Competence demonstrations	Learning by teaching	Mini oral exams	Small presentation	Report presentation	Report written	Knowledge transfer (pass/fail)	total points
	Max. attainable points:	20	10	10	2.5	10	10	20	40	30	150
INTENDED LEARNING OUTCOME											
Knowledge	Identify the most common fauna of the North Sea			X	X					four-day-long knowledge transfer exercise between Ocean and Fjord	
Knowledge	Explain how CTD works and why it is used					X	X				
Knowledge	Describe how acoustics work and identify their limitations					X	X				
Skills	Process, catalogue, and interpret collected field samples and experimental data			X	X	X	X	X			
Skills	Use measuring board and import the resultant data to a database			X	X						
Skills	Age fish using hard structures			X	X						
Skills	Conduct genetic sampling of fish			X	X						
General competences	Work as part of a team on board a research vessel			throughout the survey							
General competences	Follow safe practices in field work										
General competences	Contribute to designing and executing field work based on a research question	X									
General competences	Communicate scientific results from field studies							X			

Friday September 25th, 2020

07:30-08:00	Breakfast
08:00-08:30	Morning meeting. Update on where we are and what we plan to do today.
8:15-11:30	Likely arrival at the Faeroe trench. CTD + bottom, and pelagic trawls. Handling, registering, and measuring the catch in the fish lab. NOTE: Greater argentine catch expected, start collecting data for your group work.
11:30-12:30	Lunch
12:30-15:00	CTD + bottom, and pelagic trawls. Handling, registering, and measuring the catch in the fish lab.
15:00-15:30	Coffee
15:30-17:30	CTD + bottom, and pelagic trawls. Handling, registering, and measuring the catch in the fish lab (continue with individual mini oral exams if necessary, one at a time).
17:30-18:30	Dinner
18:30-19:30	Small presentations (Part 1)
19:30-23:00	Free time, rest
23:00-02:00	Midnight sampling, CTD + bottom, and pelagic trawls. Handling, registering, and measuring the catch in the fish lab.
02:00-	During the night we will be steaming back across the plateau towards the Norwegian trench, estimated arrival the next day after lunch

*Time in between stations should be used to prepare for the group presentations

Friday September 25th, 2020

07:30-08:00	Breakfast
08:00-08:30	Morning meeting. Update on where we are and what we plan to do today.
8:15-11:30	Likely arrival at the Faeroe trench. CTD + bottom, and pelagic trawls. Handling, registering, and measuring the catch in the fish lab. NOTE: Greater argentine catch expected, start collecting data for your group work.
11:30-12:30	Lunch
12:30-15:00	CTD + bottom, and pelagic trawls. Handling, registering, and measuring the catch in the fish lab.
15:00-15:30	Coffee
15:30-17:30	CTD + bottom, and pelagic trawls. Handling, registering, and measuring the catch in the fish lab (continue with individual mini oral exams if necessary, one at a time).
17:30-18:30	Dinner
18:30-19:30	Small presentations (Part 1)
19:30-23:00	Free time, rest
23:00-02:00	Midnight sampling, CTD + bottom, and pelagic trawls. Handling, registering, and measuring the catch in the fish lab.
02:00-	During the night we will be steaming back across the plateau towards the Norwegian trench, estimated arrival the next day after lunch

*Time in between stations should be used to prepare for the group presentations

BIO325: OCEAN-GOING SURVEY

Survey manual 2020

This manual introduces the intended learning outcomes of the survey, how they will be assessed, and presents a provisional survey plan.

Tom Langbehn
Department of Biological Sciences
University of Bergen

UNIVERSITY OF BERGEN

Saturday September 26th, 2020

07:30-10:00	Rest, free time.
10:00-10:30	Late morning meeting. Update on where we are and what we plan to do today.
10:30-11:30	Small presentations (Part 2)
11:30-12:30	Lunch
12:30-13:00	Small presentations (Part 3)
13:00-15:00	Likely arrival at the Norwegian trench. CTD + bottom, and pelagic trawls. Handling, registering, and measuring the catch in the fish lab. NOTE: Greater argentine catch expected, start collecting data for your group work.
15:00-15:30	Coffee
15:30-17:30	CTD + bottom, and pelagic trawls. Handling, registering, and measuring the catch in the fish lab. Continue group work.
17:30-18:30	Dinner
18:30-23:00	Free time, rest
23:00-02:00	Midnight sampling, CTD + bottom, and pelagic trawls. Handling, registering, and measuring the catch in the fish lab.
02:00-	During the night we will be steaming, and the crew will take the last CTD stations.

Saturday September 26th, 2020

07:30-10:00	Rest, free time.
10:00-10:30	Late morning meeting. Update on where we are and what we plan to do today.
10:30-11:30	Small presentations (Part 2)
11:30-12:30	Lunch
12:30-13:00	Small presentations (Part 3)
13:00-15:00	Likely arrival at the Norwegian trench. CTD + bottom, and pelagic trawls. Handling, registering, and measuring the catch in the fish lab. NOTE: Greater argentine catch expected, start collecting data for your group work.
15:00-15:30	Coffee
15:30-17:30	CTD + bottom, and pelagic trawls. Handling, registering, and measuring the catch in the fish lab. Continue group work.
17:30-18:30	Dinner
18:30-23:00	Free time, rest
23:00-02:00	Midnight sampling, CTD + bottom, and pelagic trawls. Handling, registering, and measuring the catch in the fish lab.
02:00-	During the night we will be steaming, and the crew will take the last CTD stations.

Contents

Sunday September 27th, 2020

07:30-08:00	Breakfast
08:00-08:30	Morning meeting. Update on where we are and what we plan to do today.
8:15-11:30	Last day of sampling. Norwegian trench. CTD + bottom, and pelagic trawls. Handling, registering, and measuring the catch in the fish lab.
11:30-12:30	Lunch
12:30-15:00	CTD + bottom, and pelagic trawls. Handling, registering, and measuring the catch in the fish lab. NOTE: Greater argentine catch expected, start collecting data for your group work.
15:00-15:30	Coffee
15:30-17:30	CTD + bottom, and pelagic trawls. Handling, registering, and measuring the catch in the fish lab. NOTE: Greater argentine catch expected, start collecting data for your group work.
17:30-18:30	Dinner
18:30-20:00	Start cleaning and packing.
20:00-	Free time, during the night we will be steaming towards Bergen.

Sunday September 27th, 2020

07:30-08:00	Breakfast
08:00-08:30	Morning meeting. Update on where we are and what we plan to do today.
8:15-11:30	Last day of sampling. Norwegian trench. CTD + bottom, and pelagic trawls. Handling, registering, and measuring the catch in the fish lab.
11:30-12:30	Lunch
12:30-15:00	CTD + bottom, and pelagic trawls. Handling, registering, and measuring the catch in the fish lab. NOTE: Greater argentine catch expected, start collecting data for your group work.
15:00-15:30	Coffee
15:30-17:30	CTD + bottom, and pelagic trawls. Handling, registering, and measuring the catch in the fish lab. NOTE: Greater argentine catch expected, start collecting data for your group work.
17:30-18:30	Dinner
18:30-20:00	Start cleaning and packing.
20:00-	Free time, during the night we will be steaming towards Bergen.

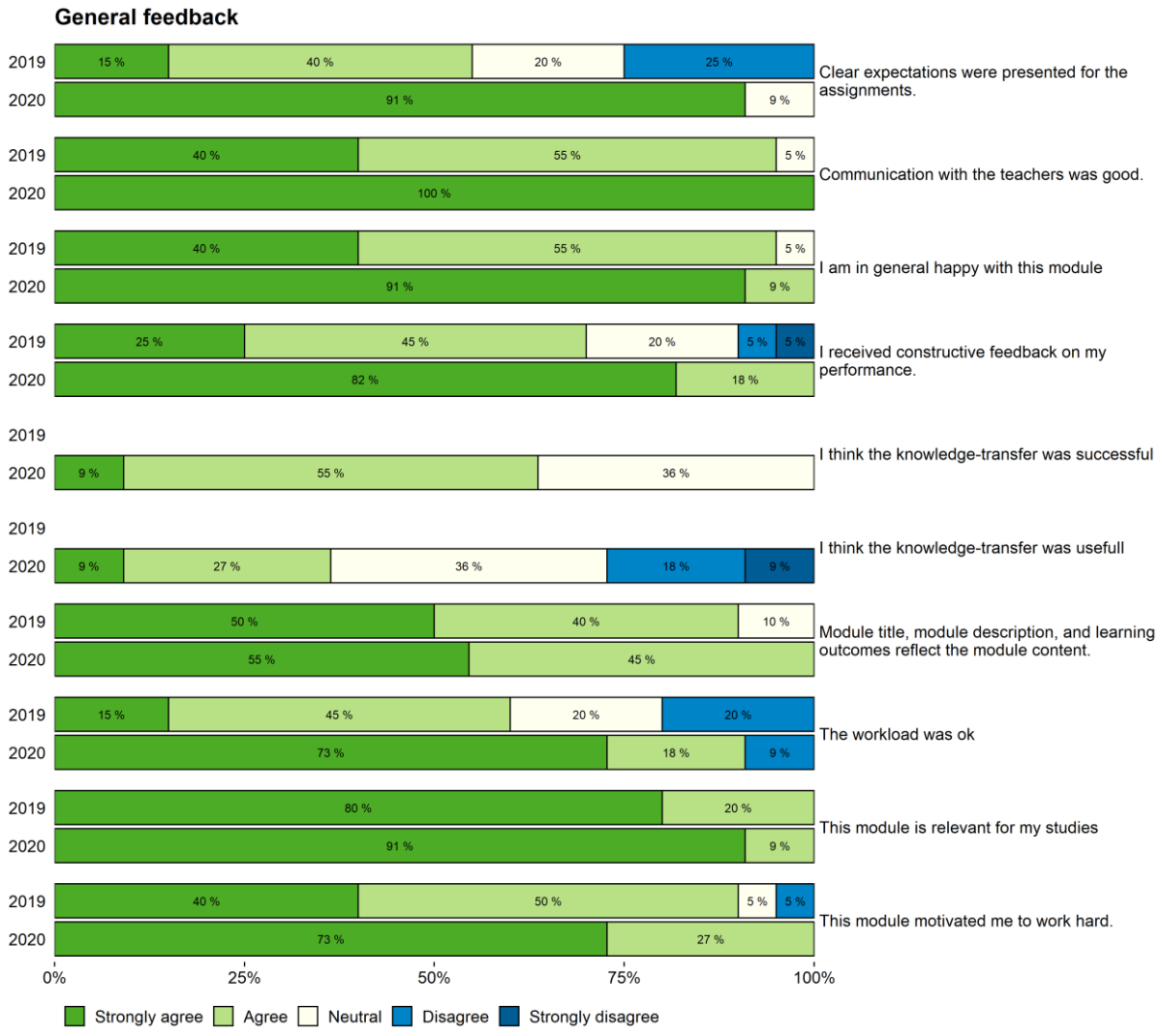
Monday September 28th, 2020

07:30-08:00	Breakfast
08:00-08:30	Morning meeting. Update on where we are and what we plan to do today.
08:30-12:00	Continue cleaning and packing
12:00	Arrival in Bergen at Nykirkekaien.

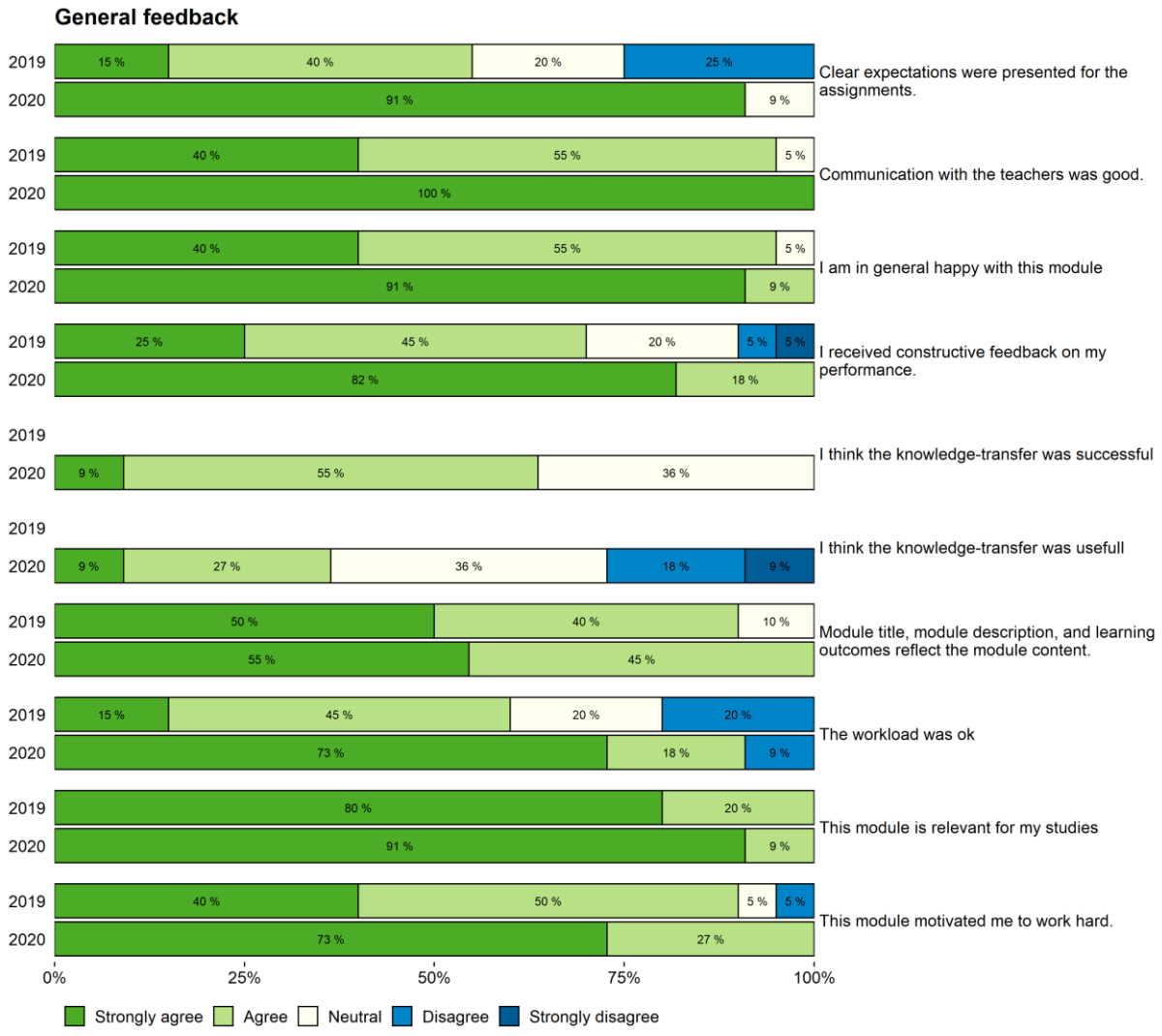
Monday September 28th, 2020

07:30-08:00	Breakfast
08:00-08:30	Morning meeting. Update on where we are and what we plan to do today.
08:30-12:00	Continue cleaning and packing
12:00	Arrival in Bergen at Nykirkekaien.

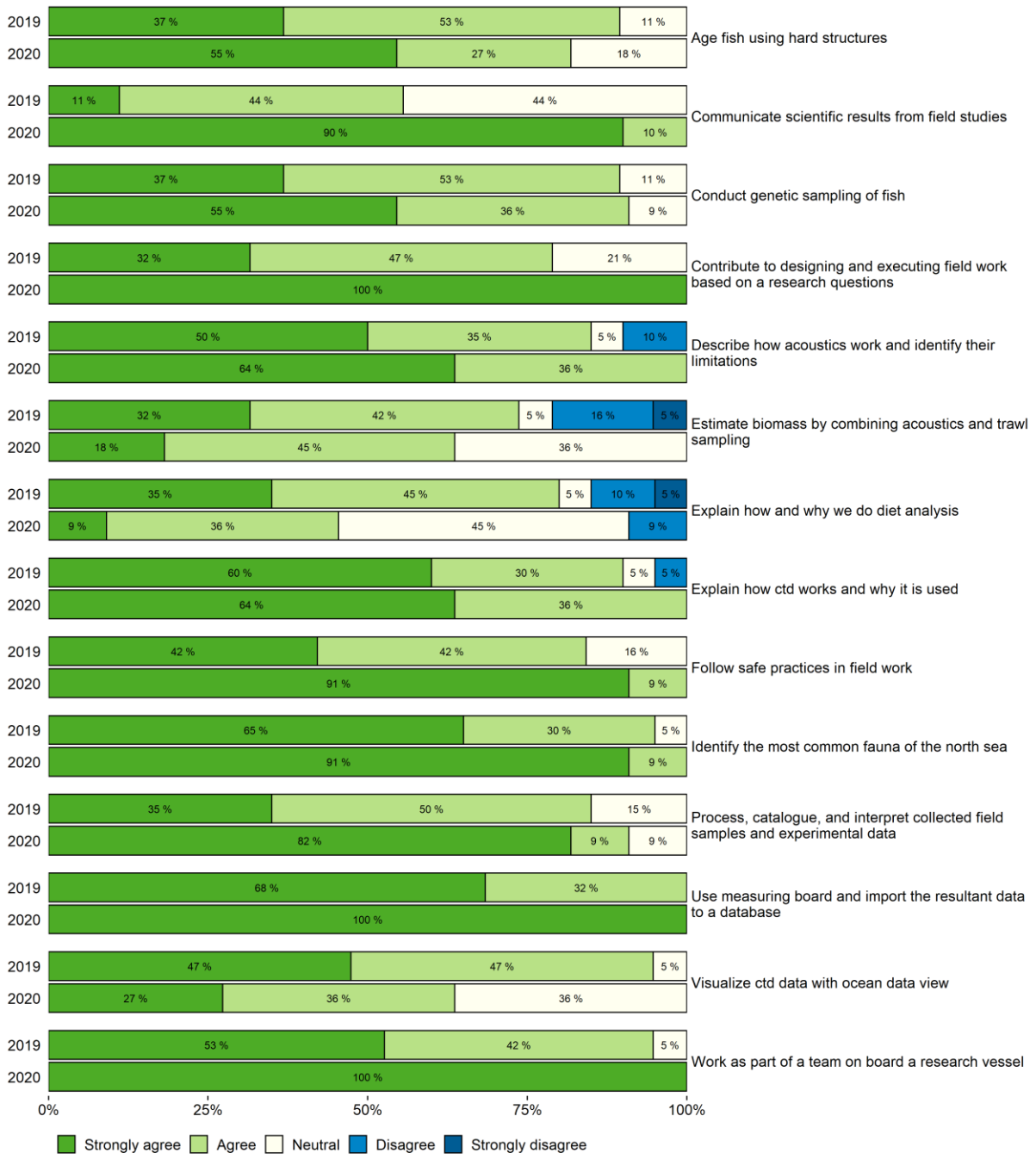
BIO325 Ocean-going survey feedback 2019 and 2020



BIO325 Ocean-going survey feedback 2019 and 2020



How well do you feel the module material and assignments helped you to reach the different learning outcomes?



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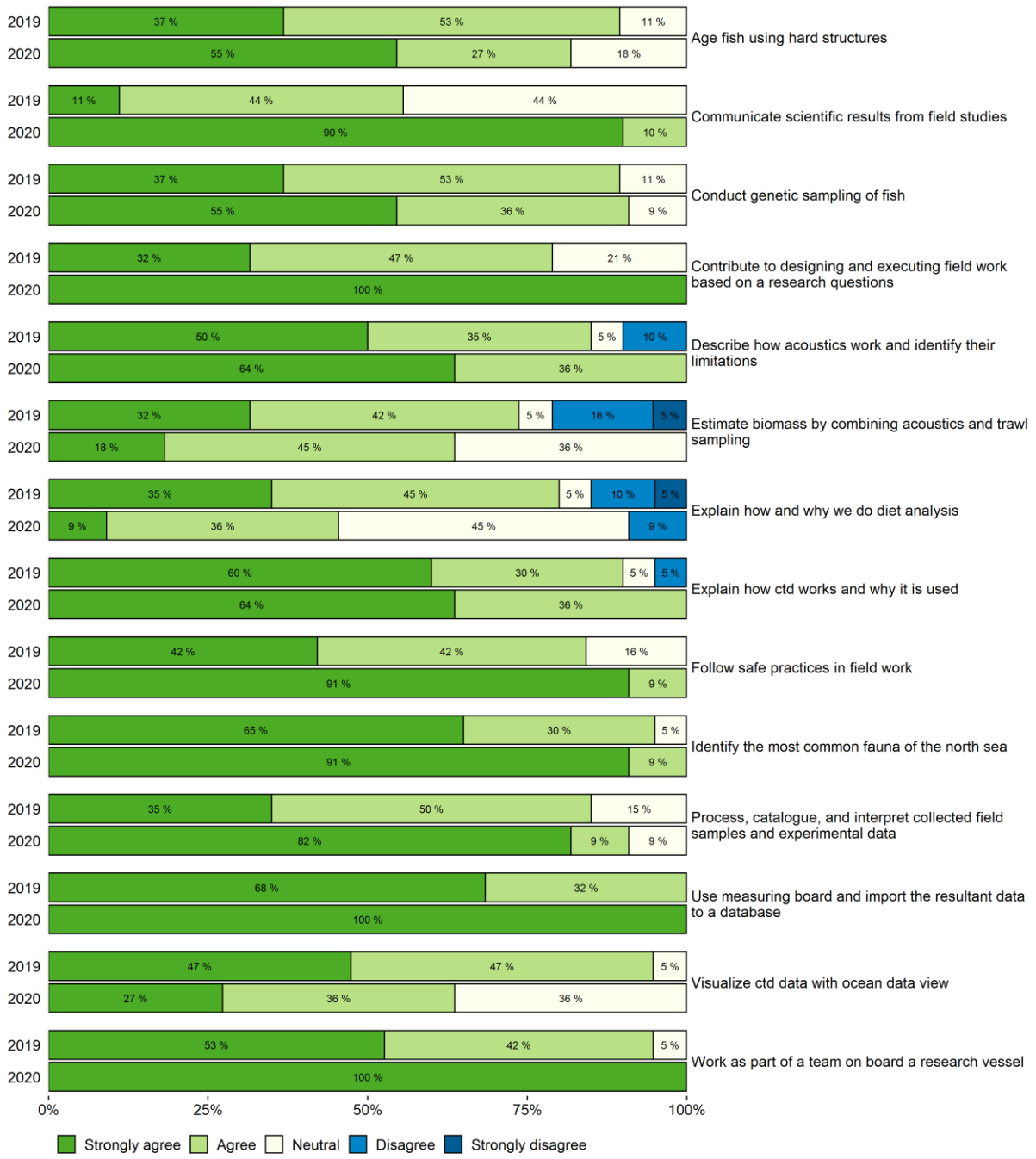

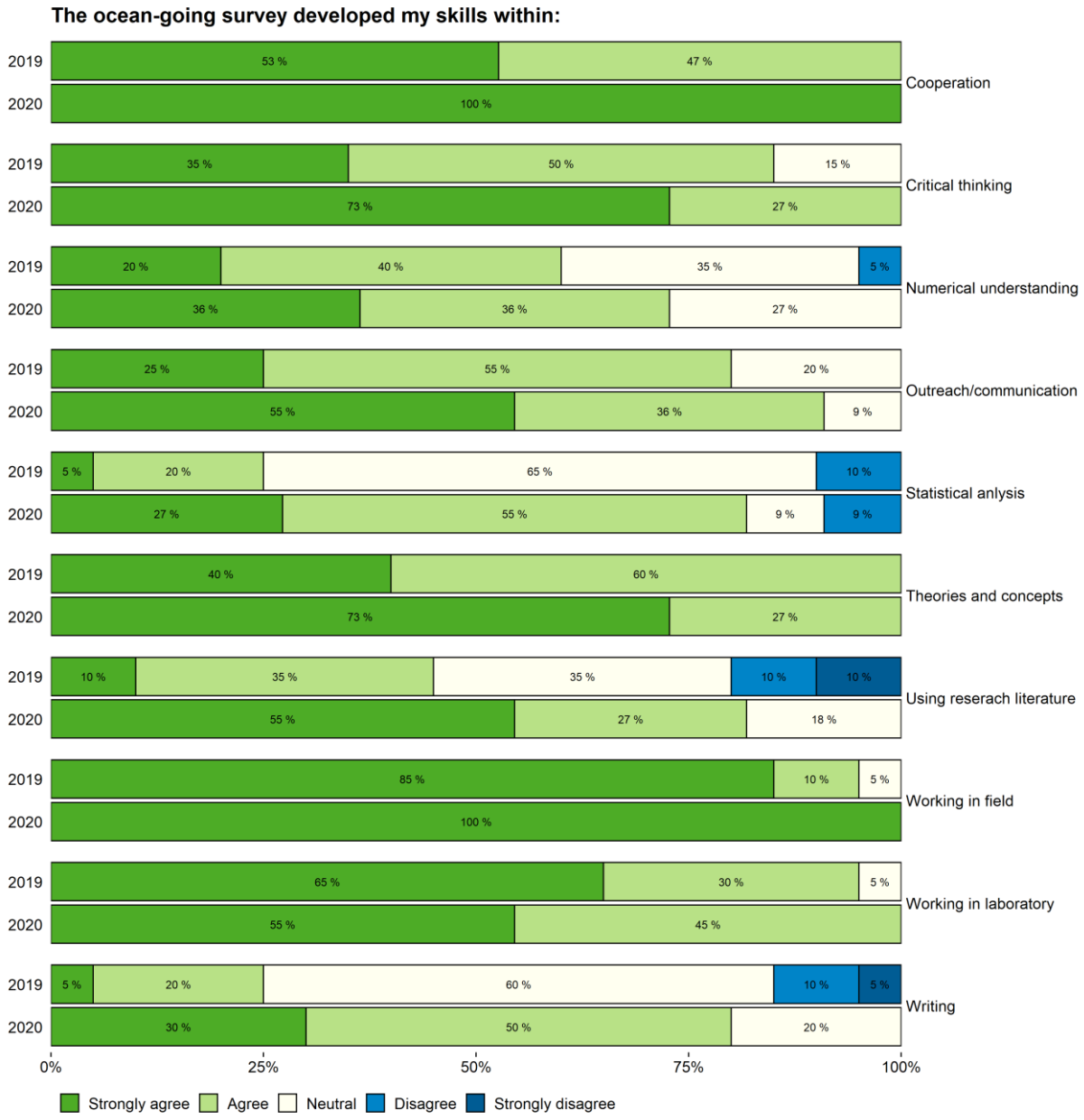
The ocean-going survey developed my skills within:
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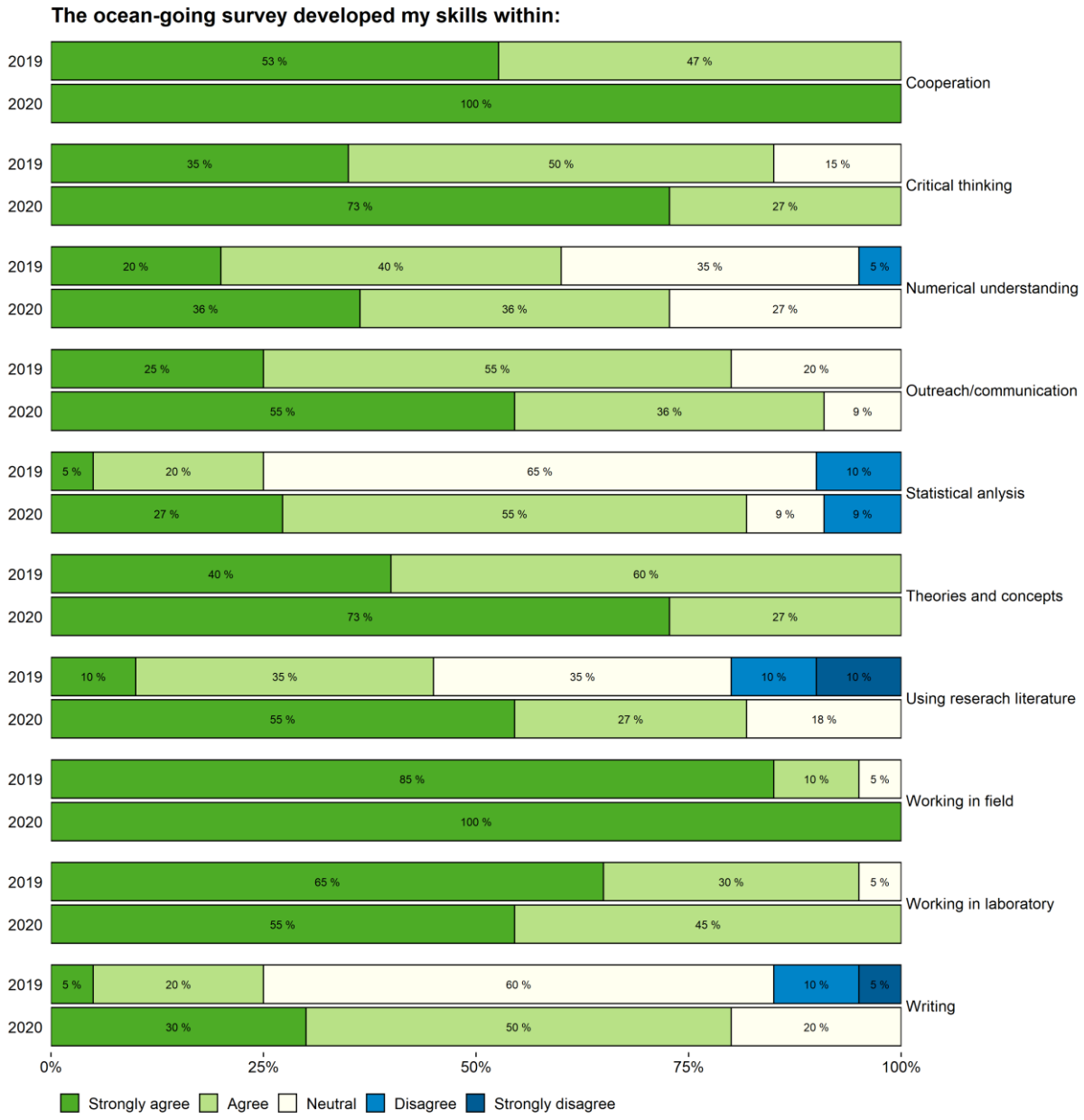
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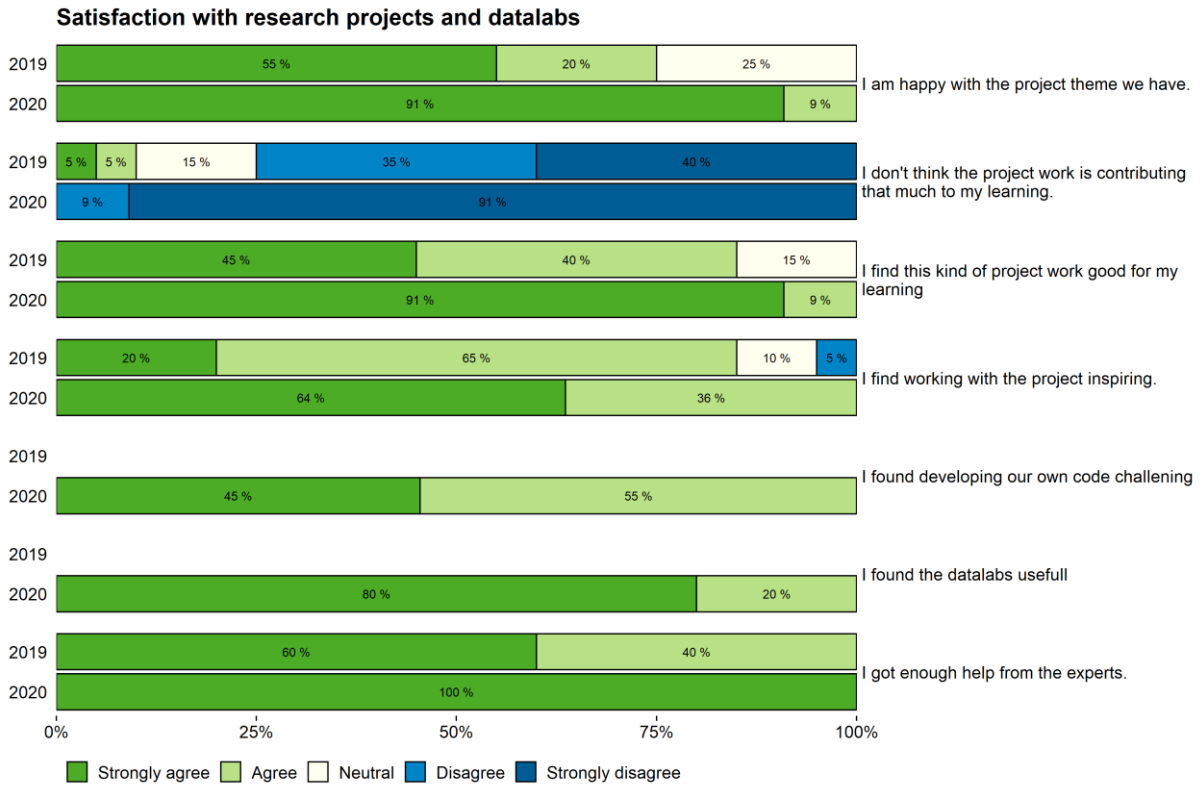
Satisfaction with research projects and datalabs
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I am happy with the project theme we have.
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I don't think the project work is contributing that much to my learning.
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I find working with the project inspiring.
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I found developing our own code challening
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I found the datalabs usefull
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I got enough help from the experts.
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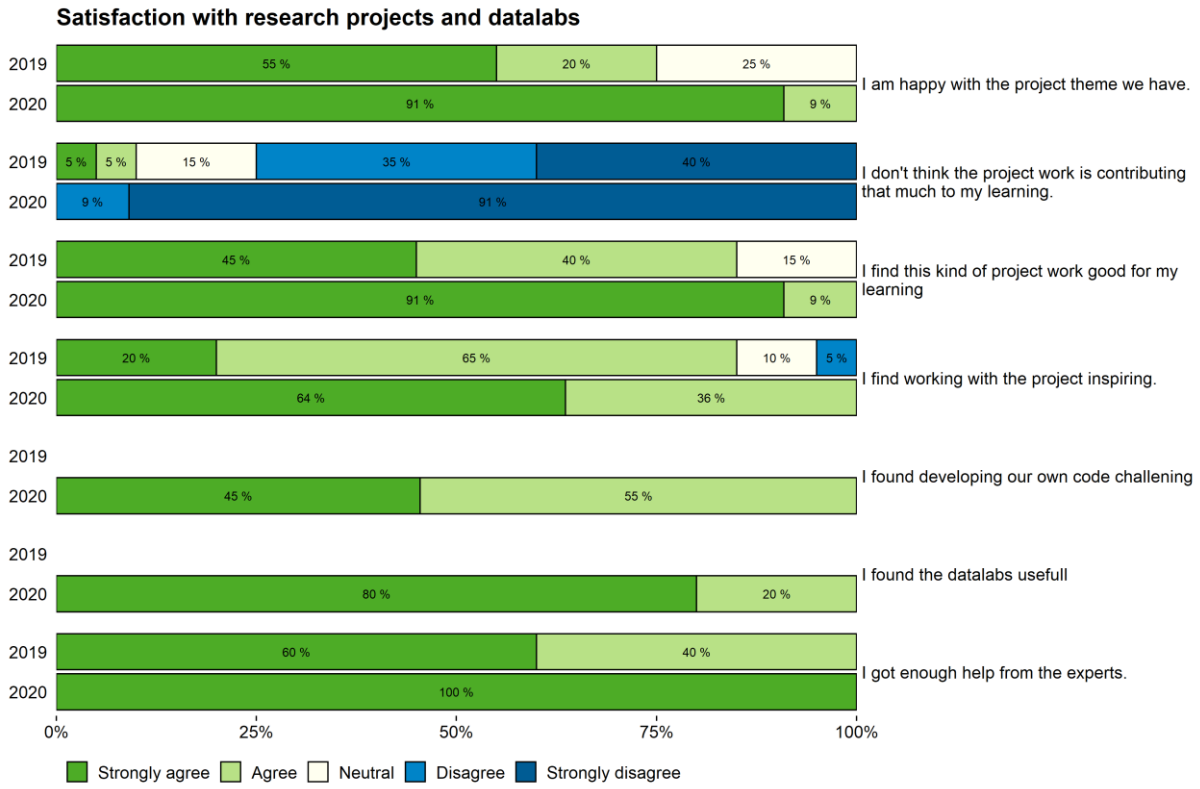
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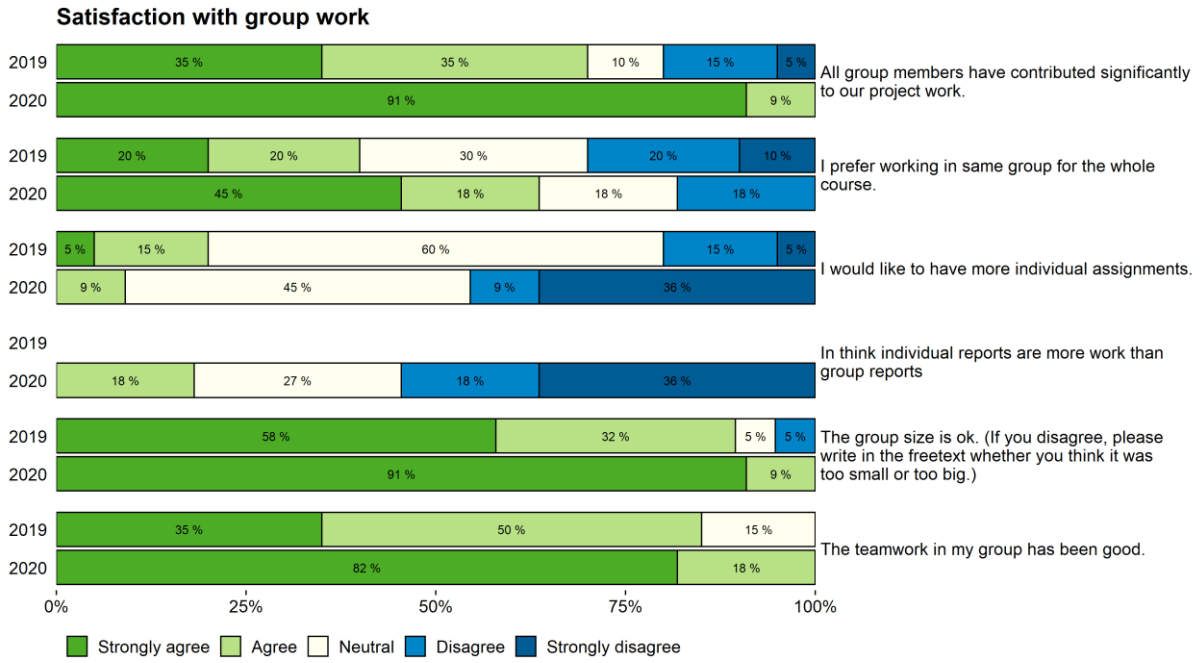
Satisfaction with group work
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All group members have contributed significantly to our project work.
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I prefer working in same group for the whole course.
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I would like to have more individual assignments.
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In think individual reports are more work than group reports
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The group size is ok. (If you disagree, please write in the freetext whether you think it was too small or too big.)
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The teamwork in my group has been good.
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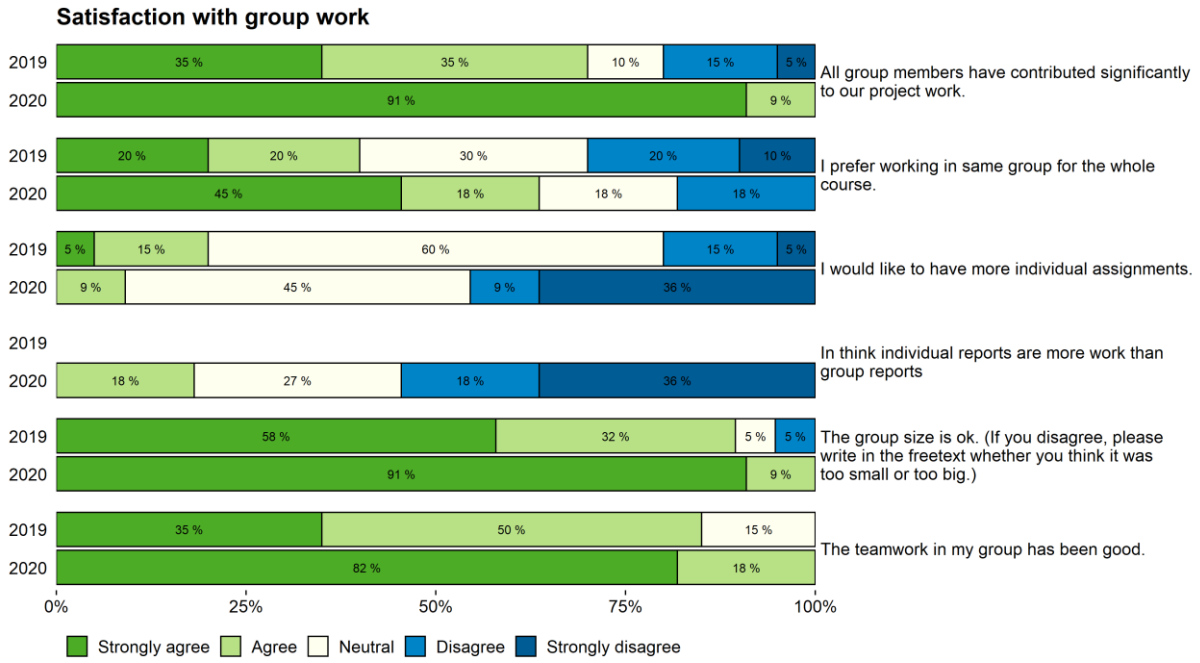
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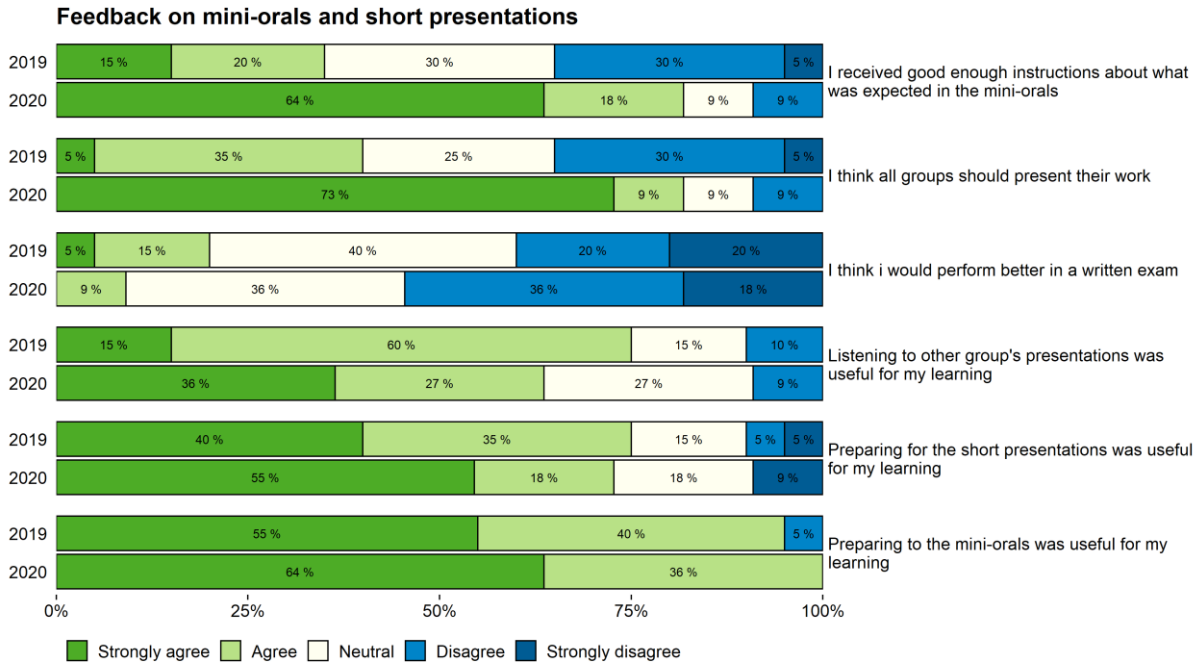
Feedback on mini-orals and short presentations
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I received good enough instructions about what was expected in the mini-orals
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I think all groups should present their work
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I think i would perform better in a written exam
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Listening to other group's presentations was useful for my learning
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Preparing for the short presentations was useful for my learning
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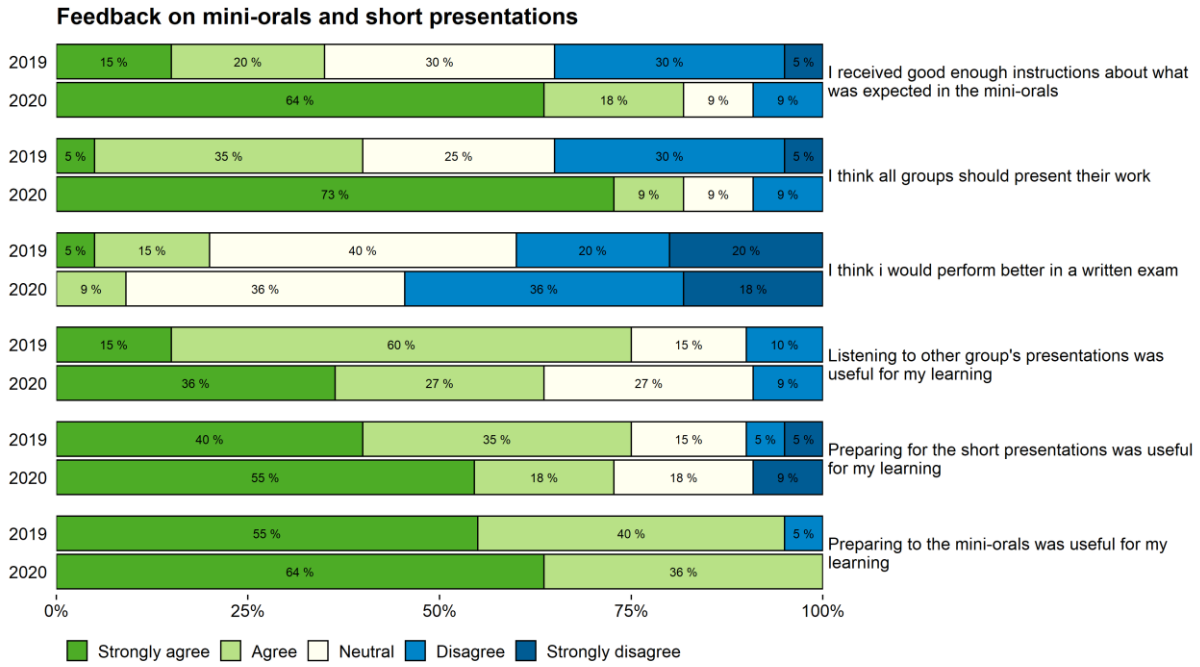
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Disagree
Strongly disagree

BIO325: OCEAN-GOING SURVEY

Survey manual 2020

This manual introduces the intended learning outcomes of the survey, how they will be assessed, and presents a provisional survey plan.

Tom Langbehn
Department of Biological Sciences
University of Bergen

UNIVERSITY OF BERGEN

Free-text student feedback

Q:	What was good with this module? (Keywords: course materials, teaching methods, lectures, projects, discussions, practical work, assignments, exams, feedback...)
A:	I think the lectures, projects and practical work was relevant regarding my education and career. I think the workload was good. The practical exercises onboard the boat and before/after motivated be to work more.
A:	To be able to go on a field trip is very helpful in regard of seeing the theory in practice, which makes it easier to learn. Additionally, being in a group during the North Sea report have been good, so that we can split the workload and be able to figure out how to work well in a group. I think Tom has been very helpful during this module - both in regard of giving the needed information and getting help when needed.
A:	The cruise was very well organised and efficiently run. The data labs were extremely helpful, both from the advice given in relation to the task at hand but also for developing one's own skill set in R and using this in later projects.
A:	Everything
A:	The cruise to the North Sea was an excellent learning experience. The teaching methods were great as we got to learn the database used, and also how to digitally measure our catch. The cruise was a great way of teaching. Lectures has been good and very informing as well. Feedbacks on our research plan was very helpful.
A:	The methods we used were relevant for our future study. We learned a lot about how it is to work on a boat, planning a research plan, what to do when things don't go as planned. The exams were good and well explained on what was expected to pass. The lectures both before and during the cruise was informative and helpful for what we were going to do. The discussions with the teachers were very helpful and I feel like this helped me a lot in understanding what we were doing.
A:	The research trip was fantastic, cannot think of a better way to learn as much as we did. The hands-on approach led me to learn a lot very rapidly. By the assignments being split into different parts, we also got a good workload spread throughout the semester.

Contents

	The feedback we got on the research plans were very helpful.
A:	Field, group work, social aspects, achievable amounts of work. It was nice to learn how to use digital measuring methods with the iPad and all.
A:	I think everything is good in this module. A bit much work before the survey compared to the fjord students, but it made me prepared for the assignments on board and expectations. Teaching methods, lectures, practical work, exams, and the projects are good! I like that we have a group report and not an individual report (even though that would have been easier and faster, since group work takes some time and especially now). I am really happy with this module!
A:	I really enjoyed the continuous assessment, as well as the practical work.
A:	I have learnt a lot in this module, for which I am very content and grateful.
A:	Communication and feedback have been one of the highlights of this module since both were excellent.
	Professors were great, as well as their teaching and cooperation skills. The lectures have been well prepared, as well as the feedback, exams, and presentations, which have made a fully assurance that the students gain the knowledge expected.

Q:	**What could be improved with this module? (Keywords: course materials, teaching methods, lectures, projects, discussions, practical work, assignments, exams, feedback...)**
A:	I do not have any suggestions.
A:	I thought the Benthic fauna coursework was very vague and did not have clear guidelines. I know several students emailed asking about this and all received different responses. As such, I changed my report structure from the correct format to the incorrect format because of advice from emails. Stronger guidelines/expectations would help prevent this kind of confusion reoccurring
A:	it was very time consuming, too many assignments and presentations, I think we worked really hard.
A:	Having lectures in the lab was not too good, as it was hard to see the PowerPoint, and therefore follow the lecture - but this accounts more for the other modules in the BIO325 course, as we have not really had any lectures in module 3 (other than on the boat).
A:	I feel like the most difficult thing with this was making sense of the data using tools like R. Even though most of us have BIO300B at the same time I felt like we do not really have the knowledge yet to do this pat well on our own and it required a lot of help from the teachers.

	I do not know how this can be improved. But other than this I cannot really find anything that need to be improved, I am really happy with what we did and what I have learned.
A:	One thing which might improve it is if we did the small presentations prior to going out to sea. I say this because it was difficult to prepare/hold presentations at sea. And I think it might be helpful to have thought more about this in advance.
A:	This mostly applies for the other modules but stop with the lectures in labs. It is so hard to see and hear. Considering that it is technically 5 credits, it is a bit time consuming.
A:	Maybe let the students decide how is presenting and what they are presenting, I think that is better than just chose one person. That made me extra nervous, and I perform worse when it is like that!
A:	I would have loved to rotate a little bit more in the tasks that we had to complete after we got the fish from the trawl and into the fish lab. I feel like I could have had slightly more practice in identifying maturation stages and extracting Otoliths. I also feel like it would be nice if all students in the course assist with the data collection of not only their group but all groups (I feel like the maturation group had a lot more lab work after the cruise since they had to read the otoliths, this work could have been split as well).
A:	I believe that maybe a brief presentation in the boat in what regards the wildlife expected to encounter (both fish and other) would help the students be familiarized with it since day 1. Little flaws or ways to improve this module, since in my opinion it has been a great scientific experience. Perhaps a bit more of emphasis in the otoliths aging before the cruise (like a lab practical on it).

Q:	**Were some of the learning outcomes particularly easy or particularly difficult to reach? If yes, why?**
A:	I think it was a little bit hard to properly understand the CTD and the acoustics - Maybe if more of us could have seen how the CTD worked and looked a little bit more on the acoustics at out different sampling sites, this would have helped. But I am still happy with what we learned.
A:	I feel like it got easier the more we did it, so I do not think anything was particularly difficult, but it was not easy either. But I just think we got better at it as time went by.
A:	The CTD and diet analysis, just because we did not really do it beyond an introduction to them.
A:	ODV was a bit difficult at first but turned out to be fairly easy when I followed the digital instructions.
A:	The things that are fun are in general easier to learn. I enjoyed everything and therefore it was easier to learn. With this learning method that was used on the boat

	I think it is easy to follow and pay attention, and therefore easier to learn.
A:	The knowledge regarding otoliths aging, the statistical analysis on R and the usage of the software Ocean Data View are the only things that may have been difficult to reach. For the rest, everything has been rather easy, but not because it was easy itself but because of how well it has been taught to the students.

Q:	**What could be improved in order to help the students to better reach the learning outcomes?**
A:	Having a better look at the acoustics at our different sampling sites.
A:	I am not sure; I feel like I learned a lot. And the only thing preventing us on the cruise was bad weather, and I do not believe that is in your control to improve. But maybe make it so that even though we are split in to three groups make them more connected. Because I feel like I know about our topic way more than the others. It felt a little disconnected between the different learning outcomes of the different groups.
A:	I honestly think it is good already. Maybe engaging students more in lectures, just ask questions that are easy to make us pay attention.
A:	As I wrote above, I did not learn about the diet analysis. So, I would like to learn that (do not know when we were thought this)?
Q:	**Comments (structure of the data labs etc.):**
A:	I found developing our own code very challenging, however I think it was very useful and I am glad that we did not just get the code from Tom. I think Tom has been great help in the data labs!
A:	I feel like they are very good, and helpful.
A:	The data labs worked surprisingly well over zoom but think it would have been even nicer to do it in person if covid had allowed it.
A:	Having the data lab online was sometimes even better than in person I think since every one of the groups had no difficulties looking at the screen. However, it was mostly one person looking and the other people watching that person code.
A:	I believe the data labs online have been quite different in terms of how they would have been face to face (probably better). It would have been great maybe to have a small assignment on R in which everyone should get the same graphs for example, to ensure everyone understood how to interpret and work with the data.
A:	More than one practical in otoliths and Ocean Data View, since it was more like an anecdotical thing. The data labs should be in person, and maybe with a common assignment of every student to ensure that they have understood how to interpret the data and work with it on R?
A:	The data labs have been the best considering the co-vid situation. Tom is not only a good teacher but also, he works hard for his students when they are stuck or can't come up with a solution for a problem.

Q:	Comments about working in groups (what worked/what could have been done differently):
A:	Individual reports feel like less work if the group you are in is not communicating well. In this module out group work has been good and therefore a group report seems like less work than doing an individual report.
A:	All things considered in Covid times I think our group worked well. I think the level of overlook that was given was enough to guide each groups project with getting involved enough to the point where each group was just doing what they were told. Maybe progress meetings between the groups so everyone as a whole can see how far everyone has got, enabling cross group help could work. However, as it is already a busy semester, I can understand why this would be difficult to implement.
A:	I think it worked very well and I am happy with our work. I do not think I could have been in a better group. We were all working hard and motivating each other.
A:	I think that individual reports are more work simply because you do not have anyone to bounce ideas off. The work just becomes more manageable and higher quality as a group paper.
A:	I think that 3 people are slightly better than 4. Reports are less work on paper because the work is divided, but it are more work with planning and stuff.
A:	I like that we do not have the same group for the whole course, you get to know the people better and I like that I was I one group the first two weeks and another on the survey! Individual assignments are easier and faster done, but I do not mind group work.
A:	Working in a group was nice since you learned how to collaborate. Because of the "quarantine," we were forced to use online communication tools which allowed us to gain another skill
A:	There might be a way of interacting with other group's topics, so everyone can get the knowledge of everyone instead of mainly the topic assigned to your group and a glimpse of the others.

Q:	Comments on the competence demonstrations on board:
A:	they were more than good enough for me to learn what I was supposed to and gave me confidence to preform them on my own in the future if that is required.
A:	The fish exam would have been better if we did not have to find the names on the non-alphabetical list. But otherwise, I think it was good. Might have been helpful to have the presentations before going out to sea.

Q:	Comments on the knowledge-transfer:
A:	I think the knowledge transfer was very useful, but some improvements would make it more successful. I feel like the groups did not have much planned in beforehand and therefore it was a little bit messy.
A:	I think the knowledge transfer we received from the fjord student did not make us learn something new.
A:	I think it was ok, but I do not think I will remember as much of the other groups work. Since it was only one day. I think it should be split in to shorter days but have them over a few days.

A:	I think I have said most of what I wanted. But I have to say that three teachers in the course was making the whole experience even better. I am very happy with what they did and how they helped us. So, keep up the good work professors and cruise leaders (Tom :)).
A:	The North Sea to fjord knowledge transfer I feel was more successful than the other, but feedback from the other students were that it was not that helpful for their learning.
A:	1 day is enough
A:	I did not learn that much from the fjord students; I mean two groups had the about the same presentation (that did not have that much new information for me). That was a bit bad planed. but I learned how to use the plankton equipment they had with them. I think our knowledge day was better, and I hope they learned something!
A:	I am not sure if you mean the knowledge transfer from North Sea to fjord, or vice versa. I feel generally that the knowledge transfer was successful, however I believe that being on the research cruise is not the same as having one day of student showing you what has been done. I felt like a lot of fjord students who could not go to the North Sea because of space limitations, were sad about not seeing the fish when they came out of the troll and working with them for several days. Even though I was pleasantly surprised how well the fjord students where able to remember the ~45 different species. I am sure that the knowledge will not be faced in the same way as it is in our minds. The knowledge exchange from the fjord students was nice but, a lot of what was shown was repetition, still I think it would have been nice to also explore the fjord ecosystems
A:	I believe the ocean-going students did a great job in the knowledge transfer, but I believe that the fjord knowledge transfer was not at all useful, even some parts could be considered as a waste of time.

Q:	**This is the last box, where you can write anything you still want to add about your thoughts and experiences regarding the ocean-going survey-module of BIO325:**
A:	It was good fun and a great way for people to become introduced to their masters and also the lecturers and professors who can help them with their thesis. I do think that in the master's descriptions there should be a warning about this course. I know many international students are very surprised at the speed at which they are expected to go on these field trips with very little warning. Just including a little bit of information on the course timetable would help manage their expectations and help them become more settled in their new city easing their stress levels.

A:	I think that post-covid the students should not be split in fjord and North Sea. What we learn and how we work is so vastly different. Rather I think that shifts can be implemented to reduce the amount of people in the lab at any given time. I feel the split of assignment has also split the group in a way and also that most of the students wanted to do North Sea, so it does not seem fair to let only some students do it. Also, the grading criteria is pretty different for fjords and North Sea.
A:	Tom just mentioned that you are considering splitting the groups for the next year. I would not recommend it, since I heard from the fjord group that doing all the measuring for the trawl in a group of 4 was somewhat difficult. (to little people, if split in day and night shift). Also, I think that if you cannot make sure that all the students are able to join the cruise which they have the most interest in ... it would be not fair to let fate decide what knowledge you will get. It is true that I felt like we were the perfect no of people on the cruise with 11 students and 3 supervisors. I could not imagine having even more people in the fish lab it would be a mess. But on the other hand, we also had to limit the number of research questions from 6 to 3.