Analysis of courses FCB3081-FCB3084, 2023, Higher Seminar in DNA/RNA Biology I-IV

Conducted according to the KTH's *General Course Analysis Template – 2019-04-15*

0. Author (Name, email)

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1. Description of the course evaluation process

Describe the course evaluation process. Describe how all students have been given the possibility to give their op inions on the course. Describe how aspects regarding gender, and disabled students are investigated.

FCB3081-4 are PhD levels seminar courses organized at the department of Gene Technology (GTE) at KTH. Beyond the course, the seminars serve as departmental platform for meeting with colleagues and sharing on-going research. This course evaluation was conducted using an online platform Socrative, which enables anonymous web-based course evaluation, and considering all the course participants (FCB3081-4) as a single group. The reason for choosing Socrative is that the single seminar series (called DNA club) consists of four separate courses (FCB3081-4), each administrated in two sets of student cohorts, those who started in spring, and those who started in the autumn. I established the Socrative-based course evaluation the previous year (2022), and here, made minor modifications to the questionnaire. The changes made are mainly due to introducing a new PI-talk concept for the 2023 and re-organizing the questions. The questionnaire followed the KTH's guidelines and strategy, being adopted to the PhD level seminar courses. Figure 1 below lists the questions asked and how they relate to KTH's LEQ, blended learning, and to the classification strategy of questions at KTH (https://intra.kth.se/polopoly_fs/1.933205.1600689782!/LEQ_v314_slutversion_en.pdf).

Q nr.	Question	Q type*	Scaled
1	The atmosphere on the course was open and inclusive	KTH_LEQ__d	KTH 5-1 (A-E)
2	The course was challenging in a stimulative way	KTH_LEQ__c	KTH 5-1 (A-E)
3	I was able to learn by collaborating and discussing with others	KTH_LEQ__n	KTH 5-1 (A-E)
4	This course supported my PhD work	mod_e	KTH 5-1 (A-E)
5	I received relevant feed-back and suggestions to my projects	mod_j	KTH 5-1 (A-E)
6	I participated actively in the discussions	mod_m	KTH 5-1 (A-E)
7	The course was organized in a hybrid format. How much of the seminars did you follow in the room versus Zoom?	hybridFormat	5-1 (A-E)
8	To me, the possibility to attend the course via Zoom is:	hybridFormat	5-1 (A-E)
9	I find participating the seminars via Zoom (following the seminars, interactions, questions) to be:	hybridFormat	5-1 (A-E)
10	I find the PI talks:	PI talks	5-1 (A-E)
11	On average, how many hours per week did your work with the course (including scheduled hours)	KTH_LEQ__bg	open-ended
12	What was the best aspect of the course?	KTH_LEQ	open-ended
13	What would you suggest to improve?	KTH_LEQ	open-ended
14	How could the zoom experience be improved?	AV_hybridFormat	open-ended
15	Is there anything else that you would like to add?	KTH_LEQ	open-ended

KTH 5-1 (A-E) scaled:
A = Totally agree = 5
B = Partially agree = 4
C = I don't know = 3
D= Partially disagree = 2
E = Totally disagree = 1
A-E indicated below
A-D indicated below
A-E indicated below
A-E indicated below

* bg = background, a-n explained in KTH questionnaire and its clarifications: https://intra.kth.se/polopoly_fs/1.933205.1600689782!/LEQ_v314_slutversion_en.pdf

Figure 1. Questions asked and their relation to KTH's LEQs and strategy.

In brief, the evaluation queried the atmosphere in the course, learning experiences, student experienced workload, experiences with blended learning, opinions on the new PI-talks, best aspects, and suggestions for improvement. The evaluation was carried out on Dec 20th, 2023, as the last seminar of the year. Since the evaluation has been collected outside of KTH's official site, transparency was ensured by i) sharing the results openly for the course participants and the department, and ii) discussing the results during the first seminar of the following year 2024. In this way, every student can ensure that their responses are included in the report. The raw results of the course evaluation are accessible with the following link (see sheet named "Dec2023"): **http://tinyurl.com/DNAclubCourseE**

In total, 12 students answered the evaluation form, which makes the response ratio (12/23*100%) = 52 %. Since the course evaluation has been gathered and analysed collectively for courses FCB3081-4, a single course analysis has been created for all these four courses.

2. Description of meetings with students

Describe which meetings that has been arranged with students during the course and after its completion. (The outcomes of these meetings should be reported under 7, below.)

Interactions with the students occurred once-a-week. During the course, students had the opportunity to interact with one another, the course teacher, and other seminar participants. In the course, we aim for open and inclusive atmosphere where everyone can feel safe to be who they are and get support in their unique stage of PhD studies. The main learning outcome of this seminar course is sharing and discussing science in a constructive and forward-looking manner. Feedback for students is given both on a peer-level and by the teacher, primarily *via* discussions after the presentations. After each talk, there is dedicated time for discussions, questions, and reflections to which all the participants are expected to constructively engage in.

3. Course design

Describe briefly the course design, the constructive alignment (intended learning objectives, learning activities, assessment, and how they interact), and the development that has been implemented since last course offering

Each course runs a full academic year and gives three credits. The student can be enrolled into the course early spring or early autumn. To gain credits, the PhD student needs to participate at least 80% of the seminars and present twice; once in the spring, once in the autumn. After completed FCB3081, the student can enroll in FCB3082. After completing FCB3082, the student can enroll to FCB3083, and finally, to FCB3084. Hence, during four years of PhD studies, a student can participate a single (FCB3081) or up to four courses (until FCB3084). The seminar and course events for FCB3081-FCB3084 are the same (link for course schedule, see the sheet for 2023: ***https://tinyurl.com/DNAclubHT24***). The seminar presentations, discussions, and the peer feedback is expected to mature and improve through the courses. The increase in expectations is reflected in the learning outcomes, where basic (FCB3081), broad and specialized (FCB3082), good (FCB3083), and substantial (FCB3084) knowledge, for the subject matters are expected.

3.1. Learning activities

The course comprises approximately 80 full-time study hours and takes the form of weekly science seminars. The seminars address current trends in research focusing on nucleic acids (DNA and RNA) where doctoral students' own results, plans and ideas are presented, critically reviewed, discussed and given feedback. The course literature follows current trends in large-scale DNA sequencing and adjacent fields such as genomics, transcriptomics and bioinformatics. The doctoral students present their own research and provide feedback on each other's presentations.

3.2.Intended learning objectives

After completion of the course the student should be able to:

FCB3081:

- Show basic knowledge, both broad and specialized, in the overall subject area of biotechnology.
- Show basic ability to present, critically examine and discuss scientific papers in the subjects of biotechnology with emphasis on the scientific subject area of the course.
- Show basic insights of academic authorship and the international scientific publishing landscape with relevance to the scientific subject area of the course.
- Demonstrate basic ability identify, discuss and reflect on ethics and sustainability aspects in the research that is discussed within the framework of the subject area of the course.

FCB3082:

- Show both broad and specialized knowledge in the overall subject area of biotechnology.
- Show the ability to present pedagogically, critically examine and discuss scientific papers in the subject of biotechnology with emphasis on the scientific subject area of the course.
- Show insight into, and basic ability to apply, academic authorship and the international scientific publishing landscape with relevance to the scientific subject area of the course.
- Show the ability to identify, discuss and reflect on ethics and sustainability aspects in the research that is discussed within the framework of the subject area of the course.

FCB3083:

- Show in-depth knowledge, both broad and specialized, in the overall subject area of biotechnology.
- Demonstrate good ability to present pedagogically, critically examine and discuss scientific papers in the subject of biotechnology with emphasis on the scientific subject area of the course.
- Demonstrate good insight into, and the ability to apply, academic authorship and the international scientific publishing landscape with relevance to the scientific subject area of the course.
- Show good ability to identify, discuss and reflect on ethics and sustainability aspects in the research that is discussed within the framework of the subject area of the course.

FCB3084:

- Show substantial in-depth knowledge, both broad and specialized, in the overall subject area of biotechnology.
- Demonstrate qualified ability to present pedagogically, critically examine and discuss scientific papers in the subject of biotechnology with emphasis on the scientific subject area of the course.
- Demonstrate deep insight into, and good ability to apply, academic authorship and the international scientific publishing landscape with relevance to the scientific subject area of the course.

- Demonstrate qualified ability to identify, discuss and reflect on ethics and sustainability aspects in the research that is discussed within the framework of the subject area of the course.

3.3. Assessment

Throughout the course, active learning is emphasized, and theoretical background combined with student-driven presentations and discussions.

REQUIREMENTS*:* To pass the course, ***students must attend 80% of the seminars and present their own research twice.*** Students are engaged into active learning *via* presentations, discussions, and seminars by visiting researchers.

3.4. The development implemented from the previous year

The main change from the previous year was introducing PI-talks. As a change from two years back, the seminars were organized as blended-learning, i.e. held at site but with a possibility to attended *via* zoom. I continued querying the experiences with the blended-learning and added a question on how students experienced the PI-talks.

4. Students' workload

Are the students working to the expected extent in relation to the course credits? If there is a significant difference from the expected, what can be the reason?

According to KTH (and EU), 1.5 ECTS corresponds to one week of fulltime studies, i.e. 40 hours of work per week (*https://www.kth.se/en/studies/exchange/general/courses/courses-for-exchange-students-1.455770*). Hence, a course of 3 ECTS is expected to require 80 h of work.

Based on course participants' answers to the evaluation form, the experience of the workload was according to the expectation. While the highest experience of the workload was 3 h per week (3 h* 40 weeks = 120), the lowest experience was 1 hour (40 h). The average of the answers was 1.8 h / week, which adds up to be very close to the 80 h per course expectation.

5. Students' results on the course

How have the students succeded in the course? If there is a significant difference compared to previous course of ferings, what can be the reason?

Overall, the students performed very well on the course and most followed the course scheme without delays. The activity and interest of the students remained high throughout the course, manifested by the answers to the course evaluation, as well as attendances beyond the required 80%. The quality of presentations remained high and the discussions were constructive and helpful.

6. Summary of students' opinions

Summarize the outcome of the questionnaire, as well as opinions emerging at meetings with students.

Overall, this course was evaluated very positively, as demonstrated with the 1-5 (low-high) scale of the LEQ6-mimicking questions. The scores obtained ranged between 4.2 and 5.0 (Figure 2). In this analysis, I did not separate the scores by gender. However, the good scores with low variation indicate similar answers across genders.

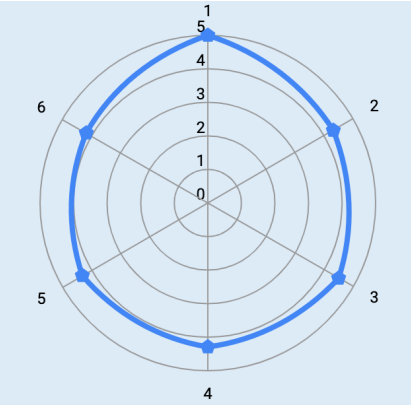

Figure 2. Distribution of the answers to the LEQ6 -mimicking questions. The answers are distributed to scale 1-5, where 1 means totally disagree, 3 is neutral, and 5 totally agree. The question number is shown on the outer rim, the score on the vertical axis (from the origo to the top). The questions are:

1. The atmosphere on the course was open and inclusive (score 5.0)
2. The course was challenging in a stimulative way (score 4.3)
3. I was able to learn by collaborating and discussing with others (4.5)
4. This course supported my PhD work (score 4.3)
5. I received relevant feed-back and suggestions to my projects (4.3)
6. I participated actively in the discussions (score 4.2)

The students seemed to appreciate the open and inclusive atmosphere (score 5 from every single evaluator), ability to present and learn from others (average score 4.5), and engagement into the discussions and feedback (average score 4.3). Some example answers for "What was the best aspect of the course":

"Communicate ans get to know other student's projects. Receiving peer review for own project."

"The relaxed atmosphere"

"Getting inspired and seeing the diversity of my peers' projects."

"Widening the horizon from other's presetation"

"That we can participate via zoom and on-site. And the PI talks + fika!"

7. Students' answers to open questions

What do students say in response to the open questions?

Overall, the answers were very positive, reflecting the scores in the radial graph (Figure 2). My assessment is that the positive responses continue to reflect the open and inclusive atmosphere we have at the department and among the PhD students. The suggested improvements were scarce, pointing out that i) discussions could be more active and that ii) the topics could be wider. Examples below:

"The discussion can be more active.

"I would suggest that there was an increase in interactivity in some way. To have it shift a bit from the current "just listening" to participating more, maybe the presenter submitts two questions on their talk that everybody tries to answer in the end. It's not necessarily something the course needs, but it could be fun?"

"DNA club is quite dominated by spatial transcriptomics, and I wish the course focused more on other types of DNA/RNA research. I of course realize that this is because of the many students from ST presenting. I wish there would be more seminar series to choose from (outside of this course)."

For the future round, I will continue asking all the participants to engage into discussions, placing specific focus on the active zoom participation.

8. Overall impression

Summarize the teachers' overall impressions of the course offering in relation to students' results and their evaluation of the course, as well as in relation to the changes implemented since last course offering.

Overall, I am really happy on how the course has taken shape and continues to attract PhD students from GTE and the department of Protein Sciences (PRO). The PI talks were well-received and gathered a large audience from the GTE and the National Genomics Infrastructure (NGI). The main goal of the seminar and courses continues to be providing a friendly, inclusive, and inspiring platform for the PhD students and staff to share the excitement and challenges of research. Example replies to question "Is there anything else you would like to add?":

"It's been a very good edition of the course this term and I hope you are able to get even more PI's to give a talk during the coming spring!"

"Thanks for this semester!"

"I am happy for the current set-ups."

9. Analysis

Is it possible to identify stronger and weaker areas in the learning environment based on the information you have gathered during the evaluation and analysis process? What can the reason for these be? Are there significant difference in experience between: - students identifying as female and male? - international and national students? - students with or without disabilities?

In this analysis, I did not split the query results based on the student background. After obtaining the evaluation results, I went them through and discussed every point with the students (first seminar of the following year 2024). These discussions confirmed that the students enjoy receiving constructive feedback and ideas on their project, and the opportunity to discuss their work. The addition of PI talks was appreciated and met with enthusiasm.

Beyond the KTH 's standard questions, I queried the zoom experience and impressions on the PI talks. To improve blended-learning, I queried how many participated the seminars via zoom, at site, or both (Figure 3) and how the zoom participation was experiences (Figure 4). As was the case last year, all the students had used both opportunities (Figure 3). Compared to last year, however, the attendance frequency in zoom had increased. Based on the answers and follow-up discussions, the zoom was experienced important and helpful, without disturbing the participation (Figure 4). As a result, I will maintain the blended learning. The participation *via* zoom was considered feasible, and raising hands, chat functions, and just unmuting were frequently used to communication. The hybrid format has proved to worked well, partially due to the excellent audio-video system in alfa3 seminar room Big.

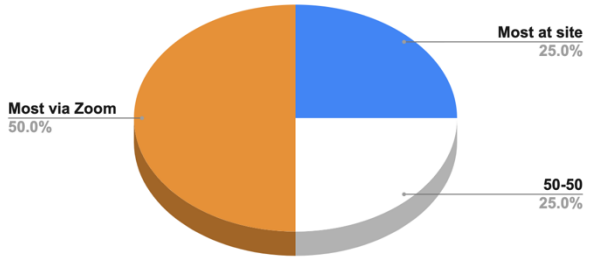

Figure 3. Attendance to the seminars in room (at Campus Solna) versus zoom. Students we asked the following question: "How much of the seminars did you follow in the room (at site) versus Zoom?" The options for answers were as follows: A) All at site, B) Most at site, C) 50-50, D) Most via Zoom, E) All via Zoom.

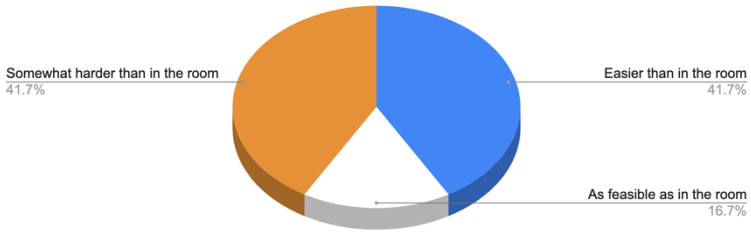

Figure 4. Zoom experience. Students we asked the following question: "I find participating the seminars via Zoom to be: A) Easier than in the room, B) As feasible as in the room, C) Somewhat harder than in the room, D) Difficult, E) Nearly impossible." Answers to A-C were obtained.

Regarding the addition of PI-talks, I posed a single question (Figure 5). Every respondent reviewed the PI-talks positively, seeing them either stimulating or useful. As per the responses and positive feedback from the course participants and beyond, the PI-talks will continue the following year.

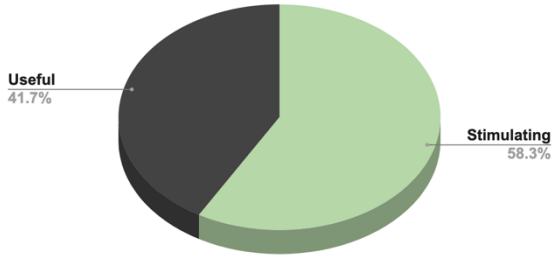

Figure 5. Experience of PI-talks. Students we asked the following question: "I find the PI-talks:" The options for answers were as follows: A) Stimulating, B) Useful, C) Whatever, I'm there for the fika, D) Distraction, E) Waste of time, give the slot to PhD students/postdocs.

10. Prioritized course development

What aspects of the course should be developed primaily? How can these aspects be developed in short and long term?

No major course developments will be added to the next year. The PI-talks and blended-learning will continue. More emphasis will be placed on involving everyone into the discussions, including the participants in the zoom.