

An approach to improve the learning outcome among bachelor students in nutrition

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Background and aims

The bachelor program in clinical nutrition at the University of Bergen is quite new, and there have been a few challenges regarding the organizing and fulfilment of this study program. Firstly, there is a lack of permanent staff teachers with a background as dieticians and consequently it is difficult for the administrators and lecturers involved in the study program to keep a complete record of all themes addressed in the various topics herein. Secondly, it is highly desirable to have clinical issues on the agenda to a larger extent during the education process, but unfortunately there is no capacity or logistics to include the students more directly in the clinic at the hospital or at other suitable institutions at the moment.

During the study program the bachelor students take part in three series of seminars, one each year. These seminar series are quite open relative to themes and therefore serves as a surrogate for clinical practice, leading students to work independently but supported by various input from the teachers. Topic evaluation from students participating in NUTR210, which is a seminar for students at the third year of this bachelor program in nutrition, revealed that there was some confusion and relatively low learning outcome due to the design of the course. Although students wanted a more consistent theme throughout, the original purpose of this kind of seminar series has been to gain knowledge around various topics. Thus, a more feasible approach may be to get the students more actively involved in the teaching process by guiding them instead of merely telling them.

Thus, the aim was to restructure the plan throughout the semester to include the students in more active learning, but at the same time keep the possibility of including various topics in the seminar.

Practical implementation

During this seminar, the lectures were structured in work packages by theme, allowing several subsequent lectures related to each other (**Supplement A: Lecture plan**). Students were constantly encouraged to play an active role at the seminars.

At the first lecture, the students were introduced to scientific search motors and other sources for relevant literature, and they were provided with some articles related to an upcoming group task. They were given ten days to read through this background literature and were told to have an entrance test on the upcoming lecture after this time period.

At the upcoming lecture, ten days later, the students received a multiple choice test based on the articles they had read (**Supplement B: Multiple choice questionnaire**). This test was performed individually during 10 minutes, and subsequently in groups of 4-5 students during a 15 minutes discussion within the groups. Each group was provided with a scratch card in order to use an immediate feedback assessment technique [1]. When the students in a group agreed on an answer, they were told to scratch off the covering corresponding to A, B, C, or D (according to the corresponding alternative answer). A correct answer was indicated by a star as shown in **Figure 1**. The groups got scores according to the following scheme: four points and full score for a correct answer at first try; two points for a correct answer at second try; one point for a correct answer at third try; or zero points if the correct answer was revealed after all four windows had been exposed. After the test was finished, all questions and answers were discussed in plenum.

IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IFAT™)

Name _____ Test # _____

Subject _____ Total _____

SCRATCH OFF COVERING TO EXPOSE ANSWER

	A	B	C	D	Score
1.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
2.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
3.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
4.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
5.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
6.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
7.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
8.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
9.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
10.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
11.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
12.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
13.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
14.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
15.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
16.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
17.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
18.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
19.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
20.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
21.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
22.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
23.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
24.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
25.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Figure 1. Multiple choice questionnaire

<http://www.epsteineducation.com/home/about/Default.aspx>

Followed by this, an assignment was presented for the groups, which was supposed to be solved with the curriculum in mind. The rest of this and the subsequent lecture during the following week the student groups were set to work with this assignment, under supervision from the course coordinators. After two weeks, the students presented their work as an oral presentation supported by a power point presentation. They were also encouraged to forward the presentation by e-mail to the course coordinators for feedback prior to presenting their work.

After completing the group task, the students had seminars under two big headlines during the rest of the lectures: “Nutrition and Medicine” and “Translational nutritional science” (**Supplement A: Lecture plan**). The group task was included during the first part of the semester in order to give the students a "kick-start" and providing an easier opening for further discussion on subsequent themes.

Although this seminar did not have a traditional final exam, there were certain requirements to the participating students. At least 80% of the lectures/seminars were mandatory. Everyone also had to pass the entrance test based on the articles provided to the students at the first lecture, and they had to be actively involved in the group assignment and presentation.

Course evaluation

Overall, the purpose of this seminar is to provide a research-based approach to nutrition, with a strong emphasis on academic breadth, interdisciplinary elements and active participation from the students. This seminar series is the third of its kind during the three year bachelor program in nutrition, which differs somewhat from other topics which typically have a more established curriculum and lectures that are interrelated.

A total of 19 students were registered and all students completed and passed the course. The announced test served its purpose, and the students were overall well prepared, and showed great commitment in the plenary discussions. The students had the opportunity to evaluate the course by answering a simple questionnaire consisting of 12 questions (of which nine with alternative answers and three with optional text) (**Supplement C: Report from student evaluation**). Only seven out of the total 19 participating students responded to the student

evaluation. The fact that there were few respondents may in part have been due to the questionnaire being distributed in the middle of a busy exam period.

The overall impression of the course was evaluated as satisfactory by the students. The purpose of the topic appeared to be somewhat unclear. Students were positive to the group assignment being organized early in the semester, which was an advantage compared to later exams. Overall, the students were satisfied with the lectures, although some reported varying quality. They were mostly happy with the group assignment where all groups got the same task, but some would prefer each group to solve a unique assignment. Some students wanted a more clinical approach. Consistently they report about an appropriate workload and a good learning outcome.

The curriculum at this course differs from one year to the next, since the aim is to include relevant topics which are up-to-date in relation to nutritional research. The syllabus is thus largely based on scientific articles, as well as any relevant supplemental literature. Based on the students' evaluation, more detailed information should have been given initially regarding the purpose of this course as well as a more thorough introduction to the theme within the current semester, including a clear and straightforward presentation of the assignment. This will be kept in mind when planning the schedule for next year. One should also consider presenting different themes or subtasks for each student group and maybe assess whether they should have more individual tasks rather than work in groups (or a combination if feasible).

Furthermore, next year there will be even more emphasis on how to write and present a scientific project, including how sources should be critically evaluated and how to refer scientific work in a proper manner. The students will have a huge advantage of this

knowledge when writing their bachelor thesis, which they do simultaneously with the current course.

Conclusion

By restructuring a course which is part of the bachelor's program in nutrition, the students were successfully more directly and actively involved in the learning process, and the learning outcome was overall improved. Furthermore, the student evaluations provided useful information for the course coordinator to be able to improve the course even more.

References

1. Epstein, M.L. and G.M. Brosvic, *Immediate Feedback Assessment Technique: multiple-choice test that "behaves" like an essay examination*. Psychol Rep, 2002. **90**(1): p. 226.

Supplement A: Lecture plan

Nr.	Tema	Foreleser	Dato	Tid / Sted
Bibliotekkurs – obligatorisk				
1	Kilder for vitenskapelig informasjon om ernæring Utdeling av pensum til gruppearbeid	Jutta Dierkes, prof.	Tirsdag 3. mar	13:15 – 15:00 Biblioteket
Kostholdet i verden				
2	Methods for assessing dietary pattern	Jutta Dierkes, prof.	Fredag 6. mar	10:15 – 12:00 HUS: B307
Gruppearbeid				
3	Inngangstest fra pensumlitteratur Presentasjon av problemstilling Gruppearbeid del 1 (veiledet)	Jutta Dierkes, prof. Ottar Nygård, prof. Elin Strand, forsker	Fredag 13. mar	10:15 – 12:00 HUS: B307
4	Gruppearbeid del 2 (veiledet)	Jutta Dierkes, prof. Ottar Nygård, prof. Elin Strand, forsker	Mandag 23. mar	10:15 – 12:00 HUS: B307
5	Presentasjon av gruppearbeid	Ottar Nygård, prof. Elin Strand, forsker	Fredag 27. mar	10:15 – 12:00 HUS: B307
Ernæring og medisin				
6	Mikrobiota og fekal mikrobiota transplantasjon	Trygve Hausken, prof.	Fredag 10. apr	10:15 – 12:00 HUS: B307
7	Ernæring og medisin: noen eksempler Psykofarmaka og ernæring	Jutta Dierkes, prof. Erik Johnsen, FA	Fredag 17. apr	10:15 – 12:00 HUS: B307
8	Farmakologi: hva er relevant for ernæringsfysiologer	Per Magne Ueland, prof.	Fredag 24. apr	10:15 – 12:00 HUS: B306
Translasjonell ernæringsforskning				
9	Introduksjon i nutrigenomics	Johan Fernø, forsker	Fredag 8. mai	10:15 – 12:00 HUS: B307
10	Introduction translational science in nutrition / Biomarkers and nutrition-gene interaction	Ottar Nygard prof. Elin Strand, forsker	Fredag 22. mai	09:15 – 12:00 HUS: B307

Supplement B: Multiple choice questionnaire

Multiple choice spørsmål, inngangstest til pensum i NUTR210 13. mars 2015:

1. Kan man si at man har en generell mangel på vitamin D i verdensbefolkningen?

- A. Ja, men mangelen er kun uttalt for den eldre del av befolkningen
- B. Ja, men mangelen er kun uttalt hos barn
- C. Ja, uavhengig av aldersgruppe og kjønn
- D. Ja, men kun hos barn og eldre

Riktig svar: C.

2. Hvilken forbindelse i blodet er regnet for å være den mest pålitelige markøren for vitamin D status?

- A. $1,25(\text{OH})_2\text{D}_3$ (1,25 Dihydroxyvitamin D_3)
- B. $25(\text{OH})\text{D}$ (25-hydroxyvitamin D)
- C. Cholecalciferol D_3
- D. $1,24,25(\text{OH})_3\text{D}_3$

Riktig svar: B.

3. Et økt nivå i blodet av vitamin D markøren (fra forrige spørsmål) er hos barn blitt assosiert med:

- A. Lavere forekomst av Type 1 diabetes
- B. Høyere forekomst av Type 1 diabetes
- C. Lavere forekomst av overvekt
- D. Høyere forekomst av overvekt

Riktig svar: A.

4. Hvilket serumnivå av vitamin D markøren (fra spørsmål 2) regnes for å være tilstrekkelig ifølge US Institute of Medicine?

- A. >30 nmol/l
- B. >50 nmol/l
- C. >75 nmol/l
- D. >100 nmol/l

Riktig svar: B.

5. Hvilken av følgende faktorer påvirker i **minst** grad vitamin D status?

- A. Sesong
- B. BMI
- C. Etnisitet
- D. Alder

Riktig svar: B.

6. Hva er hovedkilden til vitamin D for mennesker?

- A. Kosttilskudd
- B. Sollys
- C. Matvarer naturlig rik på vitamin D
- D. Berikede matvarer

Riktig svar: B.

7. Hvilken av følgende matvarer er **ikke** en god **naturlig** kilde for vitamin D:

- A. Kjøtt
- B. Eggeplomme
- C. Fet fisk
- D. Kornprodukt

Riktig svar: D.

8. Hvorfor er vitamin D inntaket generelt høyere i USA og Canada enn i Sentraleuropa?

- A. Pga at de spiser mer kjøtt
- B. Pga at de spiser mer fisk
- C. Pga mer bruk av tilskudd
- D. Pga mer sol

Riktig svar: C.

9. Hva er den biologisk aktive formen av vitamin D?

- A. $1,25(\text{OH})_2\text{D}_3$ (1,25 Dihydroxyvitamin D_3)
- B. $25(\text{OH})\text{D}$ (25-hydroxyvitamin D)
- C. Cholecalciferol D_3
- D. $1,24,25(\text{OH})_3\text{D}_3$

Riktig svar: A.

10. Hvilken av følgende matvarer er vanligvis **ikke** beriket med vitamin D?

- A. Brød
- B. Melk
- C. Mineralvann
- D. Smør

Riktig svar: C.

11. Hvor stor effekt kan man forvente dersom man beriker mat med vitamin D?

- A. En økning av $25(\text{OH})\text{D}$ i serum med ca. 1-2 nmol/L per $1\mu\text{g}$ inntak av vitamin D
- B. Ingen effekt av berikning, pga at det er sollyset som gir størst utslag
- C. En økning av $1,25(\text{OH})_2\text{D}_3$ i serum med ca. 1 nmol/L per $1\mu\text{g}$ inntak av vitamin D
- D. En økning av $25(\text{OH})\text{D}$ i serum med ca. 5 nmol/L per $1\mu\text{g}$ inntak av vitamin D

Riktig svar: A.

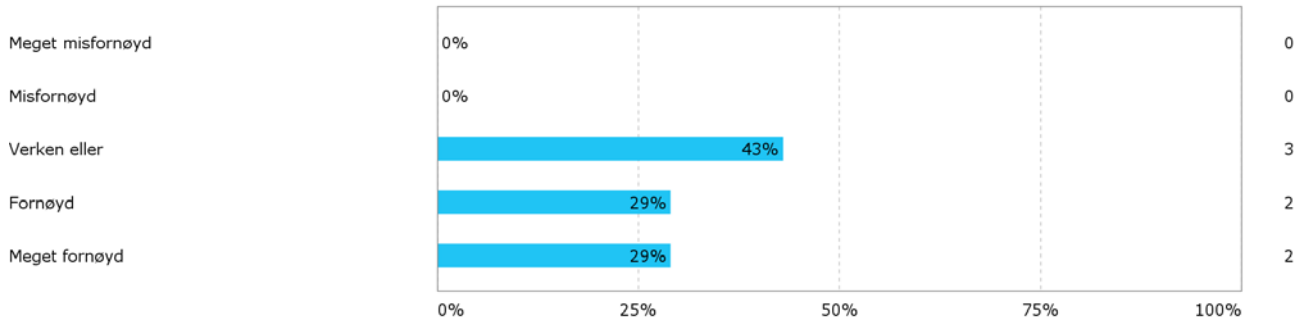
12. Hvilke av følgende faktorer er **ikke** medvirkende til en mulig vitamin D toksisitet?

- A. Høye doser av vitamin D tilskudd over lang tid
- B. Leversykdom
- C. Overeksponering av sollys
- D. Nyresykdom

Riktig svar: C.

Supplement C: Report from student evaluation

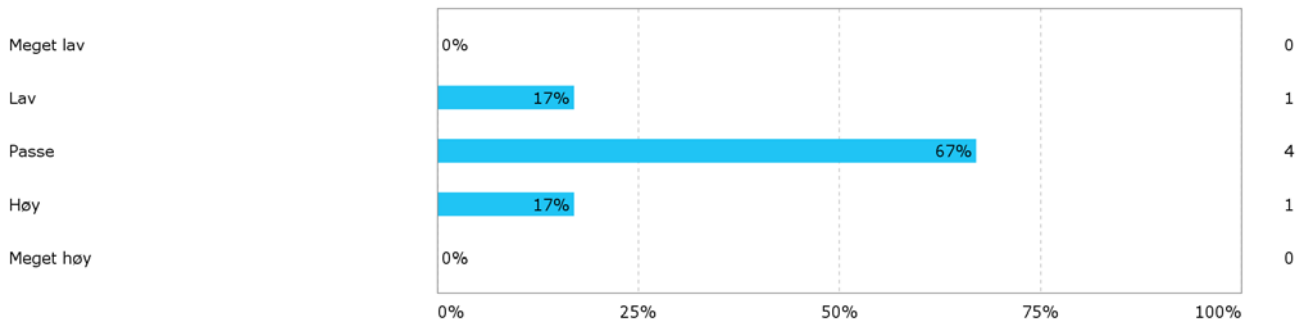
Hvor fornøyd er du med emnet som helhet?



Hva var du fornøyd/misfornøyd med? Kom gjerne med konkrete forbedringsforslag.

- Det passet veldig bra at prosjektoppgaven ble lagt såpass tidlig i semesteret. Veldig greit da mai er hektisk med bacheloroppgave og eksamen.
- kunne vært mer engasjerte forelesere.
- Mange spennende temaer, god evalueringsmetode. Litt varierende kvalitet på forelesningene.
- Fornøyd: Interessante temaer i forelesningene.
Misfornøyd: At alle gruppene hadde samme tema på fremføringen.
- Temaet for seminaret burde komme bedre frem. Noen av seminarene ble litt "tilfeldige".
Fornøyd med gruppearbeidet, og at dette ble gjennomført i starten av seminarene slik at det ikke kom sammen med innlevering av bachelor og eksamen i mai.

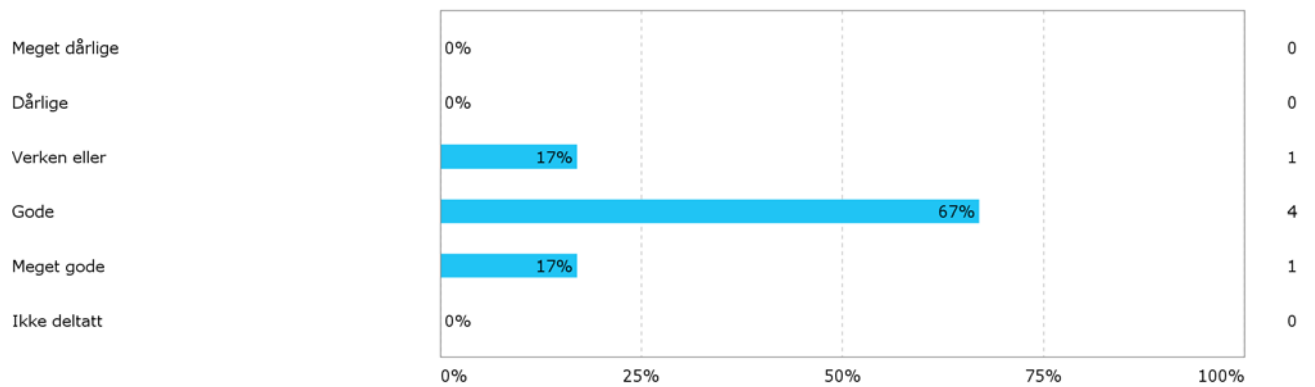
Hvordan følte du arbeidsmengden på dette kurset var? (Gjerne i forhold til andre emner på UiB)



Utdyp gjerne hva som var tidkrevende/hva som kunne vært brukt mer tid på.

- Det har ikke vært veldig stor arbeidsmengde, men det passer bra da det bare er et 5 poengsfag. Bacheloroppgaven som er 10 poeng, føles mye større beregnet ut ifra arbeidstid, så alt i alt passer det fint.
- lite praktisk, veldig mye teori.

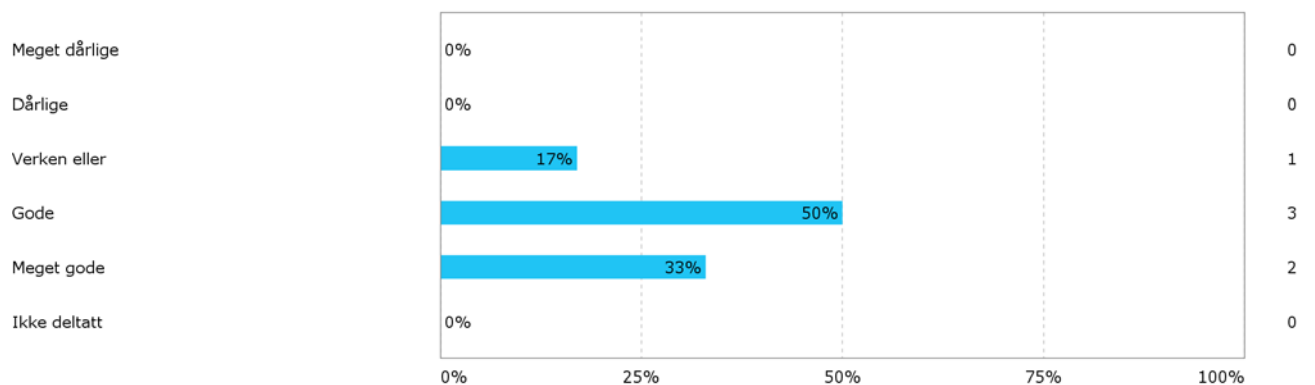
Hva synes du om forelesningene i dette emnet?



Hva var bra/dårlig? Hva kan forbedres?

- Det var noe bra av og til, men stort sett ikke imponerende
- Generelt gode, men litt varierende kvalitet på forelesere.
- De fleste var lærerike, men samtidig noen det er vanskelig å følge med i det blir et dypt dykk inn i et spesifikt emne vi ikke har hatt noe særlig om fra før.

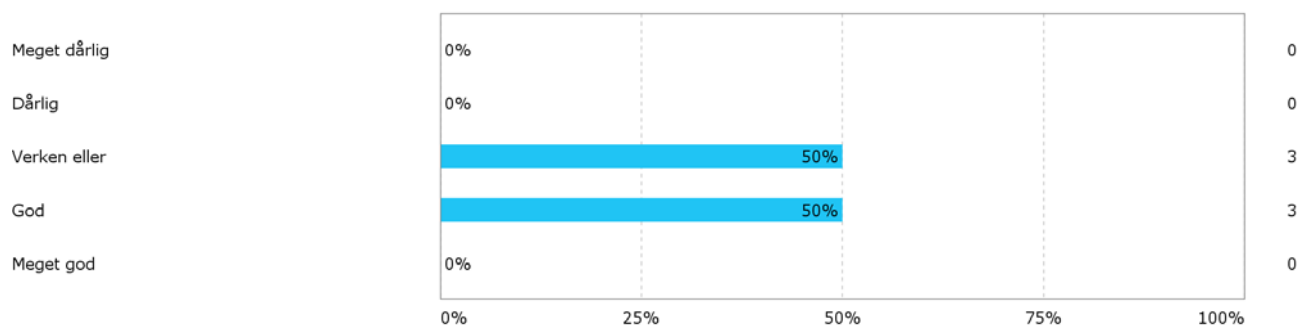
Hva synes du om studentpresentasjonene?



Hva var bra/dårlig? Hva kan forbedres?

- Alle gruppene gjorde et godt arbeid og en god presentasjon, men det hadde vært mer interessant dersom vi hadde hatt ulike temaer.

Hva synes du om semesteroppgaven?



Hva var bra/dårlig? Hva kan forbedres?

Har du noen kommentarer om opplegget i dette emnet kontra mer "tradisjonelle" kurs med forelesninger/skriftlig eksamen?

- Veldig greit med litt variasjon! :)
- Veldig god løsning på evaluering! Passet godt å ha noe litt mindre tidkrevende i travel bachelortid, pluss at man virkelig leste artiklene og lærte seg innholdet, og sammen med å lage presentasjonen fikk god innsikt i emnet (i dette tilfellet vitamin D berikning).
- Det er bra vi har seminar som et avbrekk fra de mer tradisjonelle forelesningene. Kunne vært ennå mer oppgaver å jobbe med i timene, og mer klinisk rettet.

Har du andre kommentarer til emnet?

Har du noen kommentarer til evalueringen?

- Veldig bra, det som er sagt i forrige kommentar

Samlet status

