Report - IL2230 - 2021-01-21

Respondents: 1
Answer Count: 1
Answer Frequency: 100.00%

Please note that there is only one respondent to this form: the person that performs the course analysis.

Course analysis carried out by (name, e-mail):

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DESCRIPTION OF THE COURSE EVALUATION PROCESS
Describe the course evaluation process. Describe how all students have been given the possibility to give their opinions on the course. Describe how aspects regarding gender, and disabled students are investigated.

The course evaluation is a continuous process throughout the execution of the course. I usually stay after each lecture to answer questions from students and ask feedback from them about the course activities.

The course evaluation survey was sent out to all students on 2020-12-12 and finished on 2020-12-22. This was after the last course teaching /learning activity. Students got plenty of time to answer before the Christmas. I also sent two reminders to students.

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.)

We have two course representatives, one male student and one female student. We had one course meeting at the middle of the course and another course meeting (1.5 hours) after the examination on January 21, 2021. We discuss every aspect of the course operation and ask for feedback from the students. In the second course meeting, we have gone through the course evaluation results and discussed the feedback together.

COURSE DESIGN
Briefly describe the course design (learning activities, examinations) and any changes that have been implemented since the last course offering.

This is the second offering of a newly developed course starting from HT19. This course is a specialized course tailoring for students studying the Embedded Systems master program (especially for the Embedded Platform track) and those students who are interested in hardware acceleration
of deep learning algorithms.

In this course run, the course consists of 11 lectures, 3 labs, and 2 seminars. In the seminar, students are partitioned into groups to present latest research papers, one group (4-5 students) presenting one paper. The course examination includes two parts: the lab part with Pass/Fail and the written
examination with grades (A-F) which is then the course grade (if all labs passed).

I have implemented the following changes, most of which follow my last course analysis.

(1) Enrich the lab documents by including more details and give more instructions for the labs. Here all labs are revised. In particular, Lab 3 is re-designed to have 3 possibilities. Students can select one of the 3 options.

(2) Add one more seminar. Last year, we had one seminar. This year we were able to include two seminars.

(3) The reading list is updated with latest state-of-the-art papers.

(4) Add one guest lecture on AI accelerator activities at KTH.

THE STUDENTS' WORKLOAD
Does the students' workload correspond to the expected level (40 hours/1.5 credits)? If these is a significant deviation from the expected, what can be the reason?

The course is offered in Period 2, Autumn term (HT 2020). The learning period spans over 10 weeks, with 50% of learning pace. The nominal workload is 20 study hours per week. In total, it is 200 study hours, worth of 7.5 ECTS credits. According to the student survey , the average number of study hours (estimated workload) is about 15-16 hours per week. Some students spent a bit more time and some a bit less. Overall, the course workload can be considered reasonable.

(A small note: Two students out of the 24 respondents wrote their study hours as 3-5 hours per week. This might be a mistake due to excluding the scheduled hours, because only by scheduled hours, it is already more than 3-5 hours per week. This leads to possibly under-estimate the study hours.)

THE STUDENTS' RESULTS
How well have the students succeeded on the course? If there are significant differences compared to previous course offerings, what can be the reason?

There are 45 registered students. 43 of the 45 students attended the first written examination.

The examination questions are designed to assess the intended learning outcomes with a reasonable level of difficulty. The examination uses the criteria-based evaluation.

The results are 5 As, 24 Bs, 11 Cs, 2 Ds and 1 Fx. This year students show greater interest in this course and spent good efforts in learning. The good results are a reflection of their efforts. The well-performing students in the examination showed better performance (in answering questions, handling labs and seminar presentations) during lectures, labs and seminars.

STUDENTS´ANSWERS TO OPEN QUESTIONS
What does students say in response to the open questions?

The students are very positive to the course. They seem to have enjoyed the lectures, labs and seminars, and in particular, overall the group work.

In answering the best aspect of the course, we see the following answers:

+ About lectures:

. The professor gave us a really detailed explanation for every class.
. The lectures explained things quite clearly.
. wide range
. General and insightful introduction of neuron network.
. The best aspect was we were able to learn about different research works done related to the area. Moreover, since hardware part of the course is still research topic, learning something from now will enable us to get involved in the area for the future works.
. Guest lecture too! It was mind blowing - although too much information and lot of which I did not understand but to know that such awesome research is going on at KTH, feels really good that I am studying at a great place.

+ About Labs

. the labs are organized well
. The labs are good.
. Different types of lab work. First was VHDL - which I had never ever worked with before so it is not at least alien to me anymore. Second being
intro to CNNs - learning that even a simple python program can help build a basic NN and classify simple images - super fun!
. The best thing is that we can pick from 3 lab topic according to our own background.

About Grouping and group work, learning environment

. The group work!
. And lastly, random grouping - least headache of who to pair up the team with, saved a lot of time.
. I was able to learn to code different neural networks. Hands-on experience and the room to grow were the best part of this course.
- Group randomly, that give me an opportunity to work with different students.

About seminars:

. By implementing the seminars of published papers it felt like you really study in a developing field, which were exciteing
. I like the idea and organization of the seminars.
. There are two attractive seminars, in which we can read many interesting papers and learn lots of new knowledge.
. The seminars are interesting
. And preparing opposition questions for the seminars - gave a flavor of thesis opposition.

Others:
. The workload was very fair, Lab manuals were for the most part very clear (and if they weren't, then the teacher was very flexible when it came
to differing outcomes). Both teachers in the course were very open and ready to help if any questions arose. The TA was very patient and did a

fine job. The lecturer had very loose deadlines and updated them (extended them) whenever any misunderstanding arose (which is an excellent trait that more lecturers should have). Having 'LAB' slots where the only point of them is to actually check if people are on the right track with their work, is an excellent way to rectify any misunderstandings of the objectives. The flexibility in choosing LAB3A/B/C is a great way

to give the student flexibility. Last but not least: It is great to study state-of-the-art hardware designs!

In answering "What would you suggest to improve?"

About the seminars. One student is commenting "I really liked having them but 4 hours (and that twice!) is just far too much." "But overall a nice course!". We discussed this issue with course representatives and TA in the second course meeting. We would like to keep this 4-hour setting, as I explained later in Good practices.

The students expressed opinions in different aspects. Some extracts from different students: "I felt that the first lab really lacked instructions."; "the theory part of the course is relatively not enough"; "May there be more simple and concrete examples? The case studies in lectures are so complex and difficult to understand." "I think there should be more specific examples in the lectures." "Please have previous exam papers for reference - that really helps a lot in preparation."

In answering "Is there anything else you would like to add?"

One student commented: "I am glad I took this course - this topic is very hot in embedded systems now-a-days. At least now having this knowledge, however small I can explore these topics further on my own for all kinds of applications. It will help prepare us for the future and widen our employment options hopefully. We should have more interesting courses like this in our Masters. I am happy that this was my last course of Masters Program before thesis :)
Even though it was carried out online - course was managed perfectly!"

"Nothing of note. Thanks for the course!"

SUMMARY OF STUDENTS' OPINIONS
Summarize the outcome of the questionnaire, as well as opinions emerging at meetings with students.

The students appreciate the teacher and TA's efforts in all the course activities. They like the lectures, labs and seminars. There are some good practices from student opinions (both the survey and the course meetings) to be summarized here.

Good practices:

(1) Multiple groups with random assignment of group members. This increases possibilities to work with more students and don't have to worry about who to work with. This is especially important during the covid-19 caused difficulty in social activities.

(2) Keep seminar presentations in one session. Even though it is a bit long (4 hours), it is a collective learning environment and students are able to know all presented papers. If it is run in two sessions, only half of the presentations are available for each student. Also, the teacher can only participate in one session, and give comments to presentations in one session. After all, it is not un-unusual to have a full morning or afternoon lectures (2 lectures, each lasting 2 hours, amounting to 4 hours).

(3) Multiple lab options for students to select according to interest and background

(4) Lecture slides with a summary slides are very much appreciated.

On the improvement side, the students want to have more instructions in lab, more examples and exercises.

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.

The course evaluation uses the full Learning Experience Questionnaire (LEQ) which has 22 questions. 24 of the 45 registered students have answered the LEQ. The response rate is 53.33%.

The student responses to the three categories of the learning experience in Meaningfulness - emotional level, Comprehensibility - cognitive level, Manageability - instrumental level, are quite positive. The total average score of the three categories in the 7-scale system is 6.07 for HT20 (6.27 for HT19), which is still pretty good. See the details below.

Meaningfulness - emotional level. 6 questions. Average scores for Q1 to Q6:
HT20 [6.5, 6.2, 6.2, 5.7, 5.9, 6.3] Average: 6.133
HT19 [6.6, 5.9, 6.4, 6.5, 6.0, 6.8] Average: 6.37
Comprehensibility - cognitive level. 10 questions. Average scores for Q7 to Q16:
HT20 [6.4, 6.0, 6.5, 6.4, 6.5, 5.9, 5.5, 5.6, 6.1, 6.4] Average: 6.13
HT19 [6.3, 6.2, 6.4, 6.3, 6.7, 6.3, 6.0, 5.8, 6.5, 6.3] Average: 6.28
Manageability - instrumental level. 6 questions. Average scores for Q17 to Q22:
HT20 [5.6, 5.4, 6.2, 5.7, 6.3, 6.3] Average: 5.916
HT19 [5.6, 5.5, 6.9, 5.9, 6.4, 6.6] Average: 6.15

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?

The responses to each statement are scored from -3, -2, -1, 0 (neutral), 1, 2, 3, X (no standing), corresponding to score 1 (-3) to 7 (+3). There are no big variations across the answers. The highest score is 6.5, while the lowest is 5.5.

The statements receiving highest scores 6.5 and 6.4 are listed as follows.
1. I worked with interesting issues (6.5)
7. The intended learning outcomes helped me to understand what I was expected to achieve (6.4)
9. I understood what the teachers were talking about (6.5)
10. I was able to learn from concrete examples that I could relate to (6.4)
11. Understanding of key concepts had high priority (6.5)
16. The assessment on the course was fair and honest (6.4)

The number of statements receiving 5.5 is only 1, i.e., "13. I understood what I was expected to learn in order to obtain a certain grade." This indicates more information about the examination needs to be given, even though the intended learning outcomes are stated on the Canvas website from the beginning.

The detailed scores are listed for reference.

In Category 1, the score vector is [6.5, 6.2, 6.2, 5.7, 5.9, 6.3]

Meaningfulness - emotional level
Stimulating tasks
1. I worked with interesting issues (6.5)
Exploration and own experience
2. I explored parts of the subject on my own (6.2)
3. I was able to learn by trying out my own ideas (6.2)
Challenge
4. The course was challenging in a stimulating way (5.7)
Belonging
5. I felt togetherness with others on the course (5.9)
6. The atmosphere on the course was open and inclusive (6.3)

In Category 2, the score vector is [6.4, 6.0, 6.5, 6.4, 6.5, 5.9, 5.5, 5.6, 6.1, 6.4]

Comprehensibility - cognitive level
Clear goals and organization
7. The intended learning outcomes helped me to understand what I was expected to achieve (6.4)
8. The course was organized in a way that supported my learning (6.0)
Understanding of subject matter
9. I understood what the teachers were talking about (6.5)
10. I was able to learn from concrete examples that I could relate to (6.4)
11. Understanding of key concepts had high priority (6.5)
Constructive alignment
12. The course activities helped me to achieve the intended learning outcomes efficiently (5.9)
13. I understood what I was expected to learn in order to obtain a certain grade (5.5)
Feedback and security
14. I received regular feedback that helped me to see my progress (5.6)
15. I could practice and receive feedback without being graded (6.1)
16. The assessment on the course was fair and honest (6.4)

In Category 3, the score vector is [5.6, 5.4, 6.2, 5.7, 6.3, 6.3]

Manageability - instrumental level
Sufficient background knowledge
17. My background knowledge was sufficient to follow the course (5.6)
Time to reflect
18. I regularly spent time to reflect on what I learned (5.4)
Variation and participation
19. The course activities enabled me to learn in different ways (6.2)
20. I had opportunities to influence the course activities (5.7)
Collaboration
21. I was able to learn by collaborating and discussing with others (6.3)
Support
22. I was able to get support if I needed it (6.3)

There are no significant differences in experience between: male/female students identifying, international/national students, students with /without disabilities. Per disability, one student commented: "There is basically nothing to comment on this perspective, the most reading part of the course (seminars) got a good amount of time to read and make the presentation."

PRIORITIZED COURSE DEVELOPMENT

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

For the next course round, the following improvements will be done according to the student feedback (both the survey and course meetings with course representatives) and self-evaluation of the teaching/learning activities.

(1) For group work, it is important to ensure good contributions from everybody. Next year we will ask each student to write an individual contribution summary for each and every group work and include it in the lab report and presentation slides.

(2) Important information will be clarified earlier on the Canvas home page, for example, information about the examination. How to use the Canvas discussion board will be clarified from the beginning of the course.

(3) Define more exercise problems for the students to practice. Due to constant interest in the course, the students want to do more exercises. The exercise compendium will be enriched next year.

As a continuous effort, in the long run, the latest research results will be brought up to the course to keep the course really up to date, enrich the labs and make them both interesting and challenging.