

Are learning outcomes affected by course intensity and workload?

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ABSTRACT: University courses may be organized as parallel semester courses, or as sequential intensive courses ranging from a few weeks to several months. The duration variability in intensive courses may provide a workload that is not in line with the intentions of the European Credit Transfer System, ECTS. The objective of the current study was to analyse how intensity (hours per day) varied across 10 ECTS courses of different duration, and to compare the expected and experienced total workload from the perspective of the students and the course coordinators. The study include a descriptive analysis of workload in 44 intensive 10 ECTS master/PhD courses at The University Centre in Svalbard (UNIS) in Longyearbyen, Norway. Seven courses was analysed more thoroughly to find out if there was a discrepancy between the expected and experienced working hours for the students. In addition, the course coordinators of 14 courses were asked about their expectation of student working hours during their courses. The study revealed that 10 ECTS courses at UNIS had an overall workload exceeding the ECTS specifications with 2-88%. There was little difference in workload between courses; hence a short course will be more intensive. Both students and course coordinators underestimated the amount of working hours needed per day, and 6-10 hours was the dominant expectation. The expected intensity corresponded well to the work intensity the students experienced. Despite the discrepancy between theoretical ECTS workload, the course coordinators' expectation, and the student's expectation and experience, only a few students and coordinators suggested that more time was needed for the course. Students generally experienced to get the amount of learning activities they expected, with slightly more lectures and less lab activities. The results indicates that 10 ECTS courses at UNIS exceed the total workload expected according to the ECTS standard. The duration of such courses should be at least five weeks in order to have a course intensity that are in line with the ECTS system and for students to achieve the learning outcomes defined for the course.

1 INTRODUCTION

As a result of the Bologna process a standardized ECTS credit system for higher education was produced (ECTS User's Guide 2009). The number of ECTS credits assigned for a course should be «based on the workload students need in order to achieve expected learning outcomes». This means that all type of activities in a course (lectures, lab, field work, reading, exam etc.) counts when assigning the ECTS value (ECTS User's Guide 2009, Raaheim 2013). The ECTS system states that one ECTS should equal 25-30 working hours. This means that a 10 ECTS course should consist of about 250-300 working hours, usually calculated as 267 hours. A 10 ECTS course in any university using this system should thus involve a similar workload model in order to reach the learning outcomes of the courses. Nosair and Hamdy (2017) argue that the ECTS system is a better credit system than e.g. the American credit system, due to its focus on student-centred learning and learning outcomes, as well as its transferability of credits within and between institutions.

University courses can be organized in many ways, and some argue that shorter courses may suffer from insufficient time for learning which may lead to a reduction of deeper learning among students (Karjalainen *et al.* 2006, Biggs and Tang 2011). At the same time it is evident that intensive teaching formats have become more and more used (Davies 2006), both in regular courses and in summer- and field schools.

The objective of the current study was to investigate if the perceived learning outcome for students depended on the duration and total workload in intensive courses. This includes investigating whether the course fulfilled the expectations of the students, and if there was a discrepancy between the expected and experienced workload and course intensity. We assumed that there would be a difference

in the student feedback based on course duration in weeks, and that course coordinators of the shortest courses would expect students to work longer days than what the students expected. In order to reduce the intensity we expected the students to suggest the courses to be extended in their feedback after the course.

2 METHODS

The overall descriptive analyses of the 10 ECTS courses included the amount of lectures, seminars, field days, lab work, literature and assessments including exams and reports. In addition, the course semester and whether the course was held by permanent teaching staff or an adjunct staff member were classified. To investigate the total course workload, the catalogue data on lectures, seminars, lab- and fieldwork were recalculated in hours. Together with information on curriculum pages and course assessment (written, oral, reports), a workload model modified from Karjalainen et al. (2006) was benchmarked with a standard ECTS workload norm of 267 hours. The calculation included 44 UNIS master/PhD courses (biology, geology, geophysics, technology), and ranged in course length from two to seven weeks. Course intensity was defined as working hours per day, using a five days week.

Seven 10 ECTS courses with four to six weeks length during the spring semester 2017 was investigated in more detail. Students were invited to participate in two anonymous, electronic surveys. In the first pre survey we asked about their expectations of the workload and learning outcomes of the course. The survey was provided 14 days before the course started. Two weeks after the courses, a second post survey on experienced workload and perceived learning outcomes were performed in the same way. The students did not identify themselves, nor had a participant number, preventing us from linking individual pre and post responses. We received 94 responses prior to the courses and 50 responses after the courses, with uneven response rate among courses.

A survey among the course coordinators of 10 ECTS courses at master/PhD level in the spring semester 2017 was used to evaluate the motivation and planning perspective of the teachers, as well as their expectance of student working hours. We received responses from 14 courses coordinators.

We have complemented our findings with simple statistics which analyses of whether course duration impacted the responses. ANOVA and t-tests were used, even if assumptions on normality and variance in some cases may be violated, partly due to low sample sizes.

3 RESULTS

The 10 ECTS courses had on average 31 hours scheduled lectures (range 15-63), 17 hours seminars (range 0-60), 18 hours lab (range 0-95) and 59 hours fieldwork (range 0-140). In addition, the students had on average 432 curriculum pages (range 150-800), and many courses had project reports and/or lab reports, usually as a part of the course assessment. According to the data in the course catalogue, the estimated workload was on average 374 hours (range 273-502); indicating that all courses had a workload higher than the ECTS norm, ranging from 2-88% over the norm.

Except for the courses with length 2 and 7 weeks ($n=1$ for each), there was little difference in workload as a function of course length (Fig. 1a). Spring semester courses had a slightly higher workload compared to summer and autumn, and faculty staff slightly higher than adjunct staff, but this had no significant effect on the total workload. Teaching and reading accounted for 1/3 of the workload each, while preparation and course assessment took approximately 20% and 10% of the time, respectively (Fig. 1a). Teaching workload varied between course lengths, with the highest teaching workload on 4.5 weeks courses, this variation could be explained in terms of field workload (Fig. 1b). With a low variability in the total workload, the course intensity increased in shorter courses, and Fig. 1c demonstrates the theoretical intensity given a constant workload during five working days per week. The results indicated that some of the courses between 4 and 6 weeks were close to the ECTS norm (the dotted line). Shorter course length did however lead to longer working days, and in order to have less than 10 hours work per day the course length needs to be >five weeks (Fig. 1c).

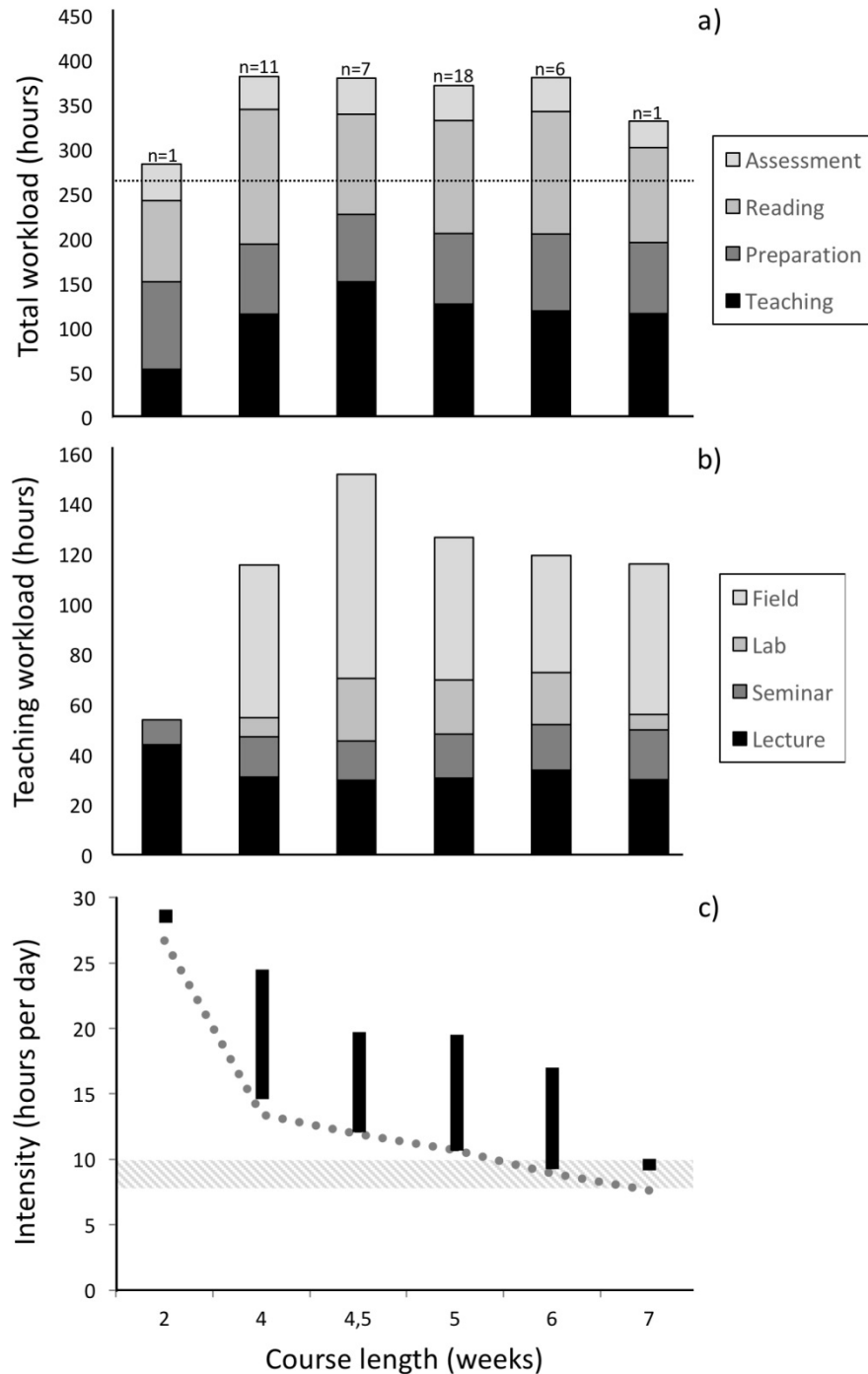


Fig. 1. Workload estimates of 44 courses (10 ECTS) with 2-7 weeks course length; a) Total workload (hours), b) Teaching workload (hours), and c) work intensity based on total course length and 5 days week. The dotted line in a) represent the ECTS norm (267 hours), the bars in c) represent the range of daily intensity, the grey dotted line in c) represent the ECTS norm, and the horizontal shaded area represent a 8-10 hours working day.

The students' expected workload varied from 4-6 hours per day to >12 hours per day, but more than half of the students expected to work less than 10 hours per day, on average 7.7 hours (Fig. 2a). The duration of the course did not differ among the categories of expected workload ($F_{4,89}=1.4$, $p=0.24$). Furthermore, master versus PhD level, nor gender explained any significant part of the variability in expected workload. 43% of the students expected to have scheduled teaching during the weekends. Course duration did not explain expectations of work during the weekend (t-test: $p=0.81$).

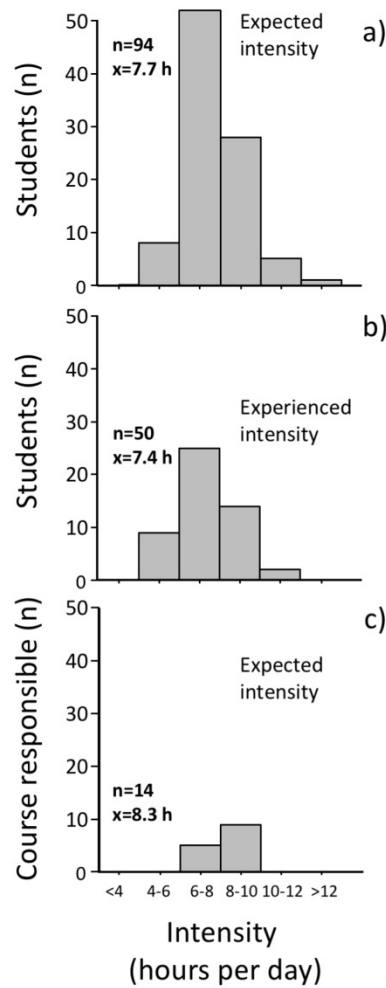


Fig. 2. Expected and experiences work intensity by students and course coordinators in intensive 10 ECTS courses; a) Expected intensity of students responding to a pre-course survey, b) Experienced intensity of students responding to a post-course survey, and c) Expected workload by the course coordinators. n is numbers of observation and x is average hours.

The students main motivation for studying at UNIS was reported to be that the course did «fit well with the rest of my studies» (30 %) or «to experience field work in the Arctic» (24%). The students' experienced workload ranged from 4-6 hours to 10-12 hours per day, but with most responses for relatively normal working days, on average 7.4 hours (Fig. 2b). There was little difference between expected and experienced workload, and course duration did not differ among the workload categories for experienced workload ($F_{3,46}=0.26$, $p=0.86$). 46% of the respondents (belonging to 4 of 7 courses) experienced scheduled on campus activities during weekends. A majority of the students (58%) saw no need to change the duration of the course they had taken, but 38% would prefer it longer. Hardly anyone would prefer it shorter. Their view did not depend on course duration (ANOVA: $F_{3,46}=1.6$, $p=0.19$). 40% of the students reported that they did not have sufficient time to read the curriculum. Course duration did not differ significantly between those that reported sufficient time and those reporting too little time to read the curriculum (t-test: $p=0.61$). The experienced time and focus given to the different learning activities were mostly as the student had expected it (Fig. 3), but with more theoretical lecture (Fig. 3a), and less lab work (Fig. 3b) than expected.

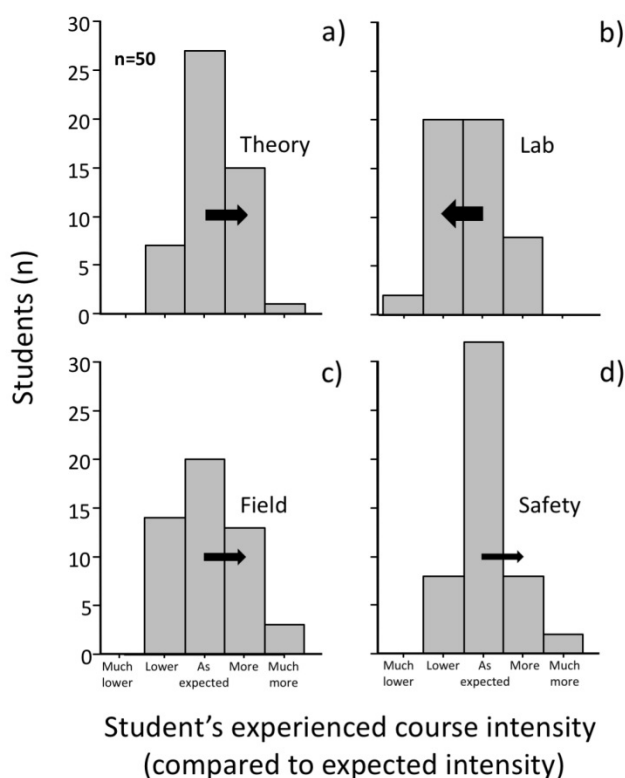


Fig. 3. Experienced intensity (compared to expectations) of students responding to a post-course questionnaire ($n=5$); a) in theory lectures, b) in lab work, c) in field work, and d) in Arctic safety training. The arrows in the figure represent the direction and the quantity of the workload compared to the expectations.

The course coordinators ($n=14$) were generally satisfied with the duration of the course, nine stating it worked well, four stated it was hectic, whereas one stating it was very hectic, independent of course length. Only one coordinator considered to increase the course length. Four coordinators regularly scheduled campus learning activities on weekends, but only those running a four or five week courses. Most coordinators ($n=9$) expected the students to work slightly long days (8-10 hours), but there was no relationship between course duration and expected working day.

4 REFLECTIONS

The descriptive analyses of the 10 ECTS courses did not reveal any major differences in workload between courses of different length. The calculation of workload model, which is modified from Karjalainen et al. (2006), is strongly affected by the factors used to recalculate e.g. lecture hours, curriculum pages and fieldwork into total workload hours. Karjalainen *et al.* (2006) points out that the factors must be modified by experience, and our model is adapted to UNIS by Dahl *et al.* (2016). The UNIS courses are more field based compared to other university courses, and this may affect the results. The actual workload may also deviate from the model if the students experience less or more teaching actual hours than indicated in the catalogue. In addition, six of the courses of 4-6 weeks had pre-assignments not included in the model. However, independent of the calculations, the results showed that the total workload was relatively similar over different course lengths, indicating that the intensity of the courses are higher in shorter courses compared with longer ones. The results also demonstrated that the UNIS courses are well within the ECTS norm, and the work load may be reduced for some courses. The results raise a question if the learning outcome may be reduced when the course period is so short that students have to work long days. Our model indicates that a 10 ECTS course should be at least five weeks to have less than 10 hours work per day.

Austin and Gustafson (2006) found that intensive courses led to higher grades compared to the same course being taught throughout a full term. They also claim that the best learning outcome is perceived in courses of four weeks. From our study we found that most students were satisfied with the course length and the experienced workload. We had expected to find student feedback stating that the courses at UNIS was too intensive and that their perceived learning outcome suffered from this. However, our results did not reveal such findings, which might be explained if other elements

encourage and engage students at UNIS during long working days. This could be factors as small groups, close contact with the course coordinators or exciting field work, which we assume create a learning environment and a group dynamic that will be regarded as positive with high engagement. Scott (2003) suggested that such atmospheric factors could be of great importance when explaining why intensive course formats lead to better performances. Students attending courses at UNIS have relatively high economic and academic «costs», as they often participate in courses at their primary institution at the same time. Since more than half of the students stated that there were academically related reasons for them to attend the UNIS course, we consider this as an important factor to underline the engagement and group dynamics in UNIS courses. Lee and Horsfall (2010) highlights the social factors of intensive course as important for students and teaching staff's positive opinion, including team cohesiveness, sense of responsibility for peers, friendship, and motivation. However, they also showed that some students thought the intensive courses had a high workload.

Even if many of the UNIS courses had a high intensity, this may be compensated for by using pre- or post-assignments, and such means are not taken into account in our analysis. This includes. Our model does also not include weekend teaching. However, only four of the 14 coordinators planned weekend activities, indicating that most likely UNIS courses do not schedule weekends in order to compensate for high intensity. Two students commented on the amount of literature: «*The first weeks of the course was very busy and quite exhausting because of the long days. Which left little time for reading through literature*». Another commented that «*Regarding the intense week of seminars (which btw was very inspiring and informative), I found the reading list too long. From my view, this resulted in reading a lot but understanding not so much*». One of the teaching staff member state that «*An intensive course provides good opportunities for keeping it focused, to establish close relationships among the students and between the students and the main teacher(s)*». On the contrary another teacher wrote that «*4 weeks is too short to really provide students with a high-output and high-quality course. It would be beneficial for teachers and for UNIS, but in sum I think 4 weeks is at least one week to short*».

5 SUMMARY

Our study focused on the discrepancies relating to workload in intensive courses, including differences in expectations of students and coordinators with regards to workload and intensity, predicting that students of the shortest intensive courses were not satisfied with their learning outcome due to high intensity. The analyses did not support the prediction of a lower learning outcome in the most intensive courses. Students and course coordinators seem generally satisfied with the course length, the workload, intensity and the perceived learning outcome. We still emphasis that the group dynamics and the learning environment may be of large importance for students to achieve the intended learning outcomes. Our study suggest that 10 ECTS intensive courses at UNIS should be at least five weeks in order to be in line with the ECTS norm and to give students and teachers time to read, teach and reflect upon the course content.

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