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#03

TOWARDS AN ANALYSIS OF STUDY HABITS OF UNIVERSITY STUDENTS

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ABSTRACT

This paper looks at the study workload for a sample of undergraduate students during 30 min intervals over 7x24 hours. Students at the Danmarks Tekniske Universitet in Denmark and the Universidad de los Andes in Bogotá, Colombia, took part in the experiment, which focused on physics and mathematics students. Detailed data was obtained for the total study workload, the study workload during the day and during the week, the different study activities, and the differences in workload between different students. Significant differences are found between the study practices of the students at the two institutions. Further work is required to make adjustments to the teaching and learning programmes.

KEYWORDS

Study load, workload, student activities, daily averages, weekly averages, undergraduate students, physics, mathematics.

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INTRODUCTION

A recent study by Arum and Roksa (2011) discusses the inability of many college students to develop key skills such as critical thinking, complex reasoning and written communication. Since one factor to consider is the amount of time that students devote to these practices, it is important to take students' workload into account when planning teaching and learning sequences (Greenwald & Gillmore, 1997; Kember, 2004).

This paper looks specifically at mathematics/physics learning and the question addressed is: How much time, on average, do students spend on course-related work and how is it distributed? We designed a scheme to obtain detailed data on study habits and applied it to students from the Universidad de los Andes, Bogotá (UniAndes) and the Danmarks Tekniske Universitet (DTU). Preliminary results will be reported here.

EXPERIMENTAL DESIGN

One could address the study of students' work habits in two ways: by picking a random selection of undergraduates studying a variety of different degrees, or by choosing students studying a particular subject and asking them to provide data for all their curricular activities. Following previous efforts, we have taken the second approach (Christensen et al., 2009). Selected students at each university were asked to record their study activity for each half-hour for 24 hours a day and 7 days a week. This exercise was carried out every day for several weeks. Each student was given a spreadsheet to mark their study activities, divided into two groups according to their scheduled or independent character. Scheduled activities are organised by the teacher and take place at the university:

Lectures	Attending lectures.
Assignm. uni	Doing assignments/solving problems in class.
Groupwk. uni	Doing groupwork in connection with classes.
Exercises	Doing practical (hands-on) work/lab work.

On the other hand, independent activities usually take place at home:

Read befr.	Reading textbook material before it has been presented in class.
Read after	Reading textbook material after it has been presented in class.
Read wout	Reading textbook material not presented or discussed in class.
Assignm. hm.	Doing assignments/problem solving outside class.
Groupwk. hm.	Doing groupwork outside class.

The data for the students at UniAndes comes from fresh research carried out in autumn 2011. Results are reported from two groups of students: Group 1 (9 students), who were all studying Physics 1, and Group 2 (9 students), who were all studying Physics 2. Both courses are compulsory for these students. The data for the students at DTU comes from a study carried out in 2007 (Christensen et al., 2009), which reports the results of two groups of students: Group A (12 students) were taking a course which is compulsory for mechanical engineering and semi-compulsory for chemical engineering; Group B (13 students) were taking a course related to microtechnology, a selective subject for several engineering programmes.

SOME FINDINGS

When one looks at the total study load of the undergraduate students who took part in the experiment, there is little difference between the two groups at the same university: a 1.3

hour/week difference for UniAndes and a 3.3 hours/week difference for DTU. The average time spent on UniAndes students' physics courses is almost the same for both Physics 1 and Physics 2: 12.6/11.9 hours/week. These students, with an average total workload of 46.7 hours/week, study 50 % more than the DTU students.

On the other hand, while there are small differences between mathematics and physics subjects for the DTU students, UniAndes students spend twice the amount of time working on mathematics courses than on physics courses. This implies that there is less time left for other degree courses.

Now we look at the study load both during the day and throughout the week. Figure 1 show the average study load for students at both universities over a 24-hour period. The distribution of the study load during the day is similar for students in both countries, with the UniAndes curve usually above the DTU curve at all times, due to the larger amount of workload for UniAndes students discussed above.

One may also note that the working day starts earlier and ends later in Colombia (there are already classes at 7 am, and it is not uncommon to have scheduled activities after 5 pm). The data indicates that lunchtime (usually around noon) is similar in both countries, but there may be an alternative option for Colombian students around 2 pm. Furthermore, Danish students tend to reduce their activity around dinnertime, 6 pm, and then increase it slightly afterwards.

Figure 2 shows the distribution of work throughout the week. It should be noted that Monday was a public holiday in Colombia, when UniAndes students had to enrol. Apart from this exception, UniAndes students have a similar (but heavier) work distribution to DTU students throughout the week.

Next we consider the different study activities. Figure 3 shows the distribution of different study activities. There is not much difference between UniAndes and DTU students with respect to the absolute time spent on scheduled activities: 17-20 hours/week – but the UniAndes students spend most of the time attending

Figure 1. Study load during a 24-hour average day for students at UniAndes and DTU.

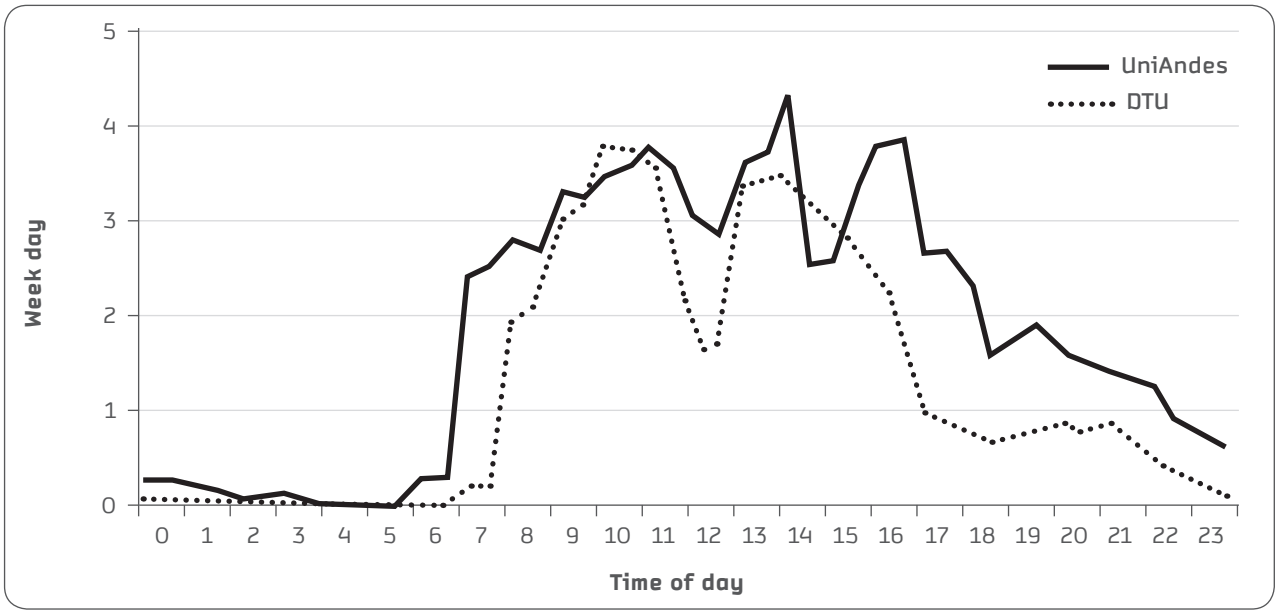


Figure 2. Absolute study load throughout the week for students at UniAndes and DTU.

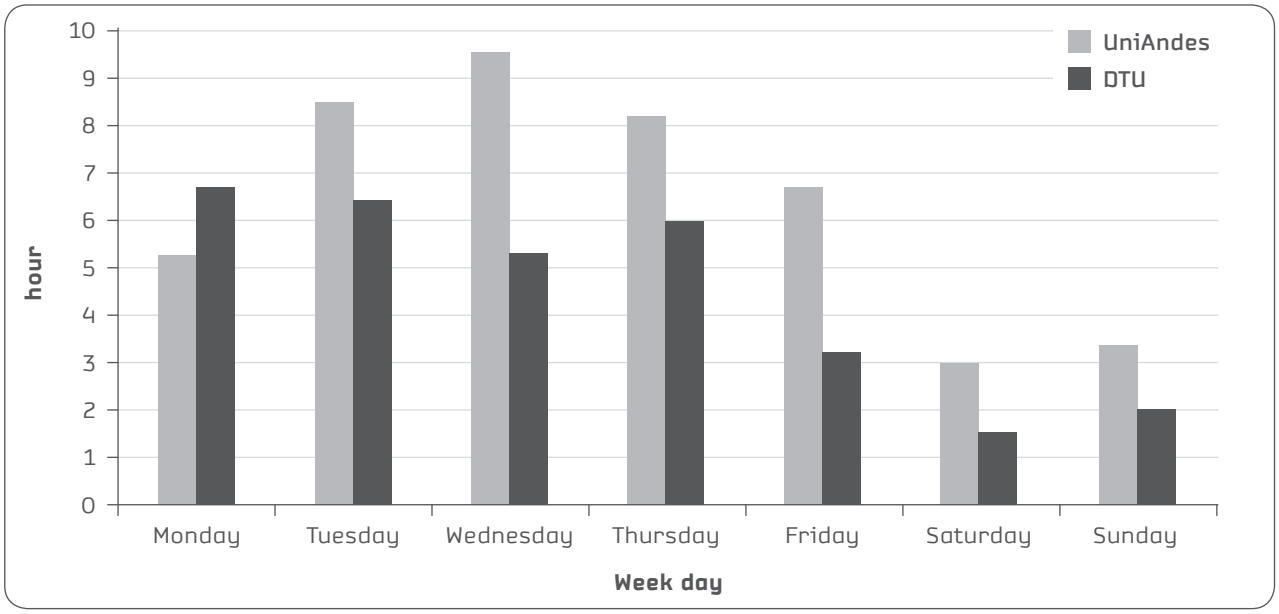
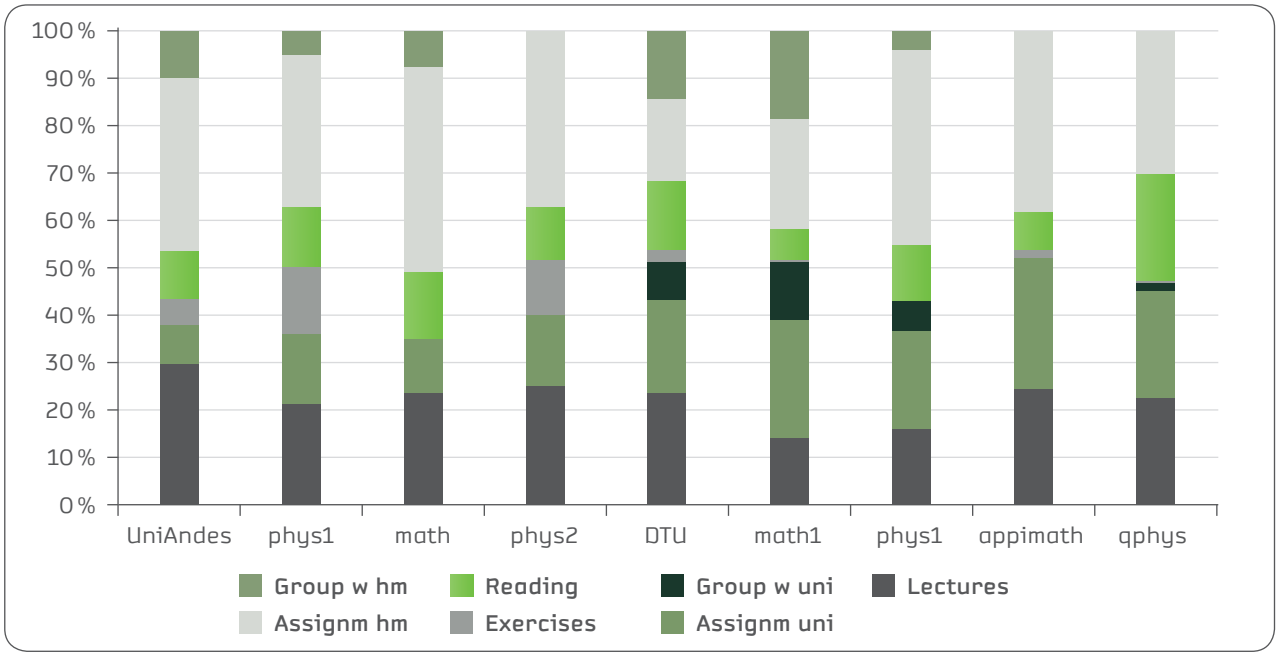


Figure 3. Relative distribution of different study activities. Dark shades: scheduled activities; light shades: independent activities.



lectures; they spend almost twice as much time attending lectures as their DTU counterparts: 14.0 compared to 7.5 hours/week. In contrast to this there is a big spread for time spent on independent activities, the UniAndes students spend almost twice at much time working at home in comparison with the DTU students: 26 versus 14 hours/week – but the extra time is used almost exclusively for doing assignments/ solving problems; for the UniAndes students, more than half the time spent on independent activities is spent on doing assignments. There

is no significant difference in the time spent on reading (4.7/4.6 hours/week) or on group work (4.2/4.3 hours/week). The DTU students spend very little time on practical work, but it should be remembered that the UniAndes students had separate lab courses in physics.

Finally, we bring together the main results of the present investigation:

- The UniAndes students study on average 50 % more than the DTU students, who study far less than the official DTU expectation.
- For physics courses the relative study load corresponds to the average total load, but the load for mathematics courses is higher – especially at UniAndes.
- The UniAndes students start earlier in the morning and continue later in the afternoon; and whereas the DTU students have three more clearly defined work periods, there are no clear breaks for lunch and dinner for the UniAndes students.
- The UniAndes students work more at the weekend. For UniAndes students there is also a dip on Friday, but it is not as clear as it is for the DTU students, who appear to be heading towards a 4 -day working week.
- The UniAndes students spend 44 % of their study time on scheduled activities, whereas the DTU students spend 54 % on scheduled activities, and they spend less time on independent activities.
- 67 % of the UniAndes students' study time is spent on two activities: attending lectures and doing assignments at home. DTU students spend only 41 % of their time on these two activities and spread their time more equally over different study activities.
- For the UniAndes students there is little difference in the time each one spends on scheduled activities, but there are significant differences in the time they spend on individual activities.

CONCLUSIONS

The findings for UniAndes students are close to what is expected by the university regulations. For the DTU students the registered study load is clearly below what is formally expected – especially for the total load and for the load in the physics courses.

At the Universidad de los Andes, many physics lecturers believe that undergraduates do not prepare sufficiently for the recitation class, perhaps about one hour on average. This research shows that the students on average use 1.3-1.5 hours/week for reading before and after physics classes, which is even less than what the lecturers expect – but similar to the results related to the physics courses at DTU. So you cannot design a class on the assumption that students have prepared for the class. The question is: How can one set up online activities to promote reading?

However, the problems sessions are more demanding and students have to spend one or two hours a day solving problems. In all, physics professors expect that good students spend about 10-12 hours/week on these subjects. But there is quite a large dispersion among student numbers, as a fraction of the students spend much less than that.

The UniAndes students spend on average approximately twice as much time attending lectures as the DTU students - 14.0 hours/week compared to 7.5 hours/week. This may indicate that lecture-based teaching is still deeply rooted at University de los Andes, which could have two opposite effects: a tradition with many face-to-face hours with lecturers may require big changes to adapt to online activities. On the other hand, the traditional lecture system may be ripe for changes to adapt to the challenges of future graduates.

On average, 21st-century students spend little time on reading – in total a little more than 4 hours/week for both UniAndes and DTU students. This may favour e-learning, since traditional linear textbook reading is replaced/supplemented here by the more chaotic online reading, which modern students have grown up with.

The quantitative data discussed in this paper is an example of the detail with which one can analyse and compare students' study habits. How undergraduate students spend their time every hour is just a measure of their priorities and attitudes towards their subjects. Other measures are the qualifications obtained, and in particular the extent to which they improve the corresponding skills (critical reading, problem solving, argumentation and synthesis, etc.). Further detailed work along these lines is needed if one wishes to improve the overall quality of the teaching and learning process.

On a final note, the data obtained and the comparative strategy for analysis used in this paper could also be carried out for online undergraduate students, such as those at UOC (Universitat Oberta de Catalunya).

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