RELATION BETWEEN PERCEPTION OF COURSE ELEMENTS AND OVERALL IMPRESSION: EVIDENCE FROM 4 015 SURVEYS

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ABSTRACT

This paper aims at understanding the role of different elements of courses in the learning experience of students. To do so, we analyze the results of 4015 surveys systematically collected from seven departments over ten years. We use the Overall Impression stated in the survey as an indicator of students' learning experience and we investigate the relationship between scores of course elements and students' Overall Impression. The relationships are studied using regression analyses (i.e., fixed-effects models calibrated with the panel data). We also assess the differences across departments and the effect of the pandemic on these results. The greatest effect on Overall Impression is associated with Teaching, Learning Structure, and Assessment (each +1.0 point adds respectively +0.40, +0.23, and +0.19 to the Overall Impression), followed by Learning Outcomes (+0.11), Administration (+0.08), Previous Knowledge (+0.04), Literature (+0.04), Grade (+0.03), High Workload (-0.02), and Low Workload (-0.10), for the full data set. An interesting finding points out a five times difference between courses with "lower than expected" and "higher than expected" Workload. Also, surprisingly, the findings suggest that online teaching during the pandemic has only little effect on the studied relationship. The findings contribute to the literature by assessing students' perception of course elements and their effect on their overall impression of a course. The results shall be used to improve the interpretation subprocess of the course evaluation process at the university, by, e.g., contributing to information support in improving the courses, opportunity to compare individual results of a survey to statistical average for a relevant unit (e.g., department), identifying weak elements of several courses in the same unit and targeted improvement of those. Further research is needed to understand the relationship between students' perception of the course and their long-term learning.

KEYWORDS

CEQ, course evaluation, student perception, teaching during pandemic, regression analysis

INTRODUCTION

Course evaluation is a very common procedure in higher education which takes place in different formats and having different purposes (Richardson, 2005). In Sweden, the process is enforced by law, and every higher educational institution is responsible for implementing it by its own. Partly triggered by the significant changes in the teaching routine caused by pandemic (which presumably affected the perception of courses by the students), but also in line with the challenges presented in the literature and simply due to pure curiosity, in this paper we investigate what the overall impression of students consists of. We do it by outlining systematic relation between course elements and the *Overall impression* of courses from student perspective. We investigate overall picture, but also specific differences across departments; we also consider the effect of the pandemic on all these levels of analysis.

LITERATURE REVIEW

Student evaluation of courses in higher education

Students' feedback in various forms collected during and/or after the courses about the courses themselves, teaching and teachers, programs, departments, institutions, learning, etc., is used all around the world for formative and summative purposes and is a popular topic for debates among academics. Common purpose of such feedback is to identify students' satisfaction or gain feedback about students' experience. It is a complex question whether "*satisfaction should be a desirable outcome of higher education*". (Richardson, 2005) A focus on students experience is coined by Ramsden (1991) as Course Experience Questionnaire (CEQ), and has been since frequently adopted in the literature and in practice. Despite the debate, such type of feedback is believed to generate a "diagnostic evidence" usable for improvement of the courses (Richardson, 2005), yet many issues are associated with its usefulness and usability (Borch et al., 2020; Nasser & Fresko, 2002; Richardson, 2005).

Common issues associated with collecting students' feedback are related to focus on a particular course rather than a program level; value of the parameters in the questionnaire; timing of data collection (in particular, before and after examination); inclusiveness of the questionnaire for different students; importance of the response rate; seriousness of the students' attitude (Richardson, 2005). Such issues associated with the process itself lead to another challenge related to using the results of the evaluation.

Collecting feedback is only one side of the issue, an equally important process is the interpretation of this feedback – making it usable and useful. Richardson (2005) points out that usability of the feedback is often limited since teachers often do not know how to properly process it. The lack of instruction nullifies an otherwise very significant initiative. For example, Nasser and Fresko (2002) found that "*apparently few instructors make use of course evaluation results in order to improve instruction*".

One day COVID came

Many consequences of the pandemic were forecasted correctly when the pandemic was just taking off for the first time. In higher education, questions about challenges of teaching creative and practical disciplines was one of many on agenda. (Sahu, 2020) Many more publications have followed while pandemic continued. Few publications address how the pandemic affected the students' perception of courses in higher education identifying both negative and positive consequences for students, as according to their perception. For example, Garris and Fleck (2022) observed that shifting to online affected the perception of the courses negatively, *"…the courses became less enjoyable, less interesting, decreased in learning value, facilitated less attention and effort, and incorporating less cultural content…"* Banovac et al. (2021) found that the students of anatomy course felt negative about lack of "*interaction with other students, followed by the interaction with student teaching assistants and teaching staff*". Warfvinge et al. (2022) found that the students were dissatisfied with receiving less feedback from the teachers and had more difficulties to fully understand course requirements. But every medal has two sides, and Garris and Fleck (2022) also identified flexibility of new style of courses to be perceived positively among the students. Banovac et al. (2021) found that "*recorded video lectures were perceived as extremely helpful for studying*" and students were willing to keep the same format of lectures for the following courses. Assessing engineering education, finding by Revilla-Cuesta et al. (2021) pointed towards improvement in students' understanding of theoretical concepts, explained likely by the exceptionality of the situation and dedication of teaching staff to prepare good online teaching material in the extraordinary situation. Warfvinge et al. (2022) found that the students appreciated that the assignments became more in-depth during the pandemic (less about pure facts-memorizing).

COURSE EVALUATION IN SWEDEN

Course evaluation as a legal requirement

The student course evaluation is a legal requirement in Sweden legislated in Chapter 1 Section 14 of the Higher Education Ordinance issued on 4 of February, 1993 (*The Higher Education Ordinance (1993*). The Section reads as follows:

"Higher education institutions shall enable students who are participating in or have completed a course to express their experiences of and views on the course through a course evaluation to be organised by the higher education institution. The higher education institution shall collate the course evaluations and provide information about their results and any actions prompted by the course evaluations. The results shall be made available to the students. Ordinance (2000:651)".

Every institution is responsible for development and implementation of the evaluation process as well as communicating the results of the evaluation and respective improvements. The goal of the evaluation is not explicitly described in the Higher Education Ordinance (1993:100), however, becomes evident if to compile other laws in the higher education. Based on the compilation by Lund University (2022), *"…it is evident that quality enhancement work is a shared concern for both staff and students…. The same act stipulates that students shall be entitled to exercise influence over courses and study programmes. In addition, the University shall encourage students to actively participate in the further development of education. In so way, the course evaluation is one way through which students are given the opportunity to exercise influence"*.

Course evaluation at Chalmers

All the courses where more than ten active participants are registered are to be evaluated by the students through the course evaluation process, both Bachelor and Master. Detailed description of the course evaluation process is available on Chalmers webpage (*Course Evaluation | Chalmers Studentportal*, 2023 (accessed 15 Jan 2023)). The page provides detailed information about purpose and process and students' role in the course evaluation. Students' role and importance of their opinions are emphased: "*Students attending a course can give us highly valuable input on how well we succeed in conveying the content of the course and how other aspects surrounding the course works*". Student representative, selected centrally randomly, have an opportunity to accept the role or to reject it, volunteers can be asked to occupy the vacant places. Three meetings take place: (1) in the beginning of the course the representatives are briefed about the course evaluation process; (2) in the middle of the course the representatives are gathered to convey to the teachers how the course is going on and if there are any problems to be reported (prior to this meeting the rest of the students is asked to communicate their opinions and needs to the representatives); (3) finally, after the course is over the representatives are gathered to discuss the results of the survey which was sent to all the students after the course was over. At this last meeting the course leader and the program leader are present, and a constructive discussion is facilitated. A thank-you voucher for the university bookstore worth 200 SEK (appx 15-20 EUR) is given to the student representatives that have performed their duties.

The course survey was introduced in 2013 and has been only slightly modified over years. In 2014 a question aiming to identify whether a respondent was a degree student from Chalmers or from elsewhere e.g., an Erasmus student, was removed. A few years later, a question about work environment was introduced, in 2022 – one more question about equality.

METHOD

Data description

The data for this study come from the course evaluation surveys done between 2013 and 2022. The survey questions follow and are complemented with data from the courses such as grades at the end of the course, if the course was delivered during the pandemic.

Survey questions, version from 2021/2022 academic year:

1. Prerequisites / Prior knowledge (PK): I had enough prior knowledge to be able to follow the course (1 – disagree completely, to 5 – agree completely);
2. Learning outcomes (LO): The learning outcomes clearly describe what I was expected to learn in the course (1 – disagree completely, to 5 – agree completely);
3. Learning (1 – disagree completely, to 5 – agree completely):
    a. The course structure (as divided into lectures, exercises, lab sessions, simulations etc.) is appropriate in order to reach the intended learning outcome of the course (LS);
    b. The teaching worked well (LT);
    c. The course literature (including other course material) supported the learning well (LL);
4. Examination / Assessment (AS): The assessment (including all compulsory elements, exams, assignments etc.) tested whether I had reached the intended learning outcomes of the course (1 – disagree completely, to 5 – agree completely);
5. Course administration (CA): The course administration (information during the course, course memo, course homepage etc.) worked well (1 – disagree completely, to 5 – agree completely);
6. Working environment (WE): The organization, content and teaching of this course have been designed and executed so that everyone can feel included, welcome and seen (1 – disagree completely, to 5 – agree completely);
7. Workload (W): The organization, content and teaching of this course have been designed and executed so that everyone can feel included, welcome and seen (1 – too low, 3 – (optimal), to 5 – too high);
8. Overall impression (OI): What is your overall impression of the course (1 – very poor, to 5 – excellent)?
9. How has the interaction between students and teachers worked in this course?
10. If the course has contained group activities (lab sessions, simulations, group work, projects, or other types of cooperation between students): How have group roles and cooperation between students worked?
11. What should be kept for the next round of this course?
12. Is there anything that should be changed for the next round of this course, and if so: How?

The variable *Final grade* (within a year to allow for re-exam) was added to the dataset, all values of zero were replaced by missing data as an average grade of zero was considered not realistic, instead it can be an error when entering the grades into the system. 37 observations had a grade of zero.

The Workload variable was divided into two variables, one for low workload and one for high workload as those can have a different effect on the overall impression of the course. To do so, the variable was separated using 3 as breaking point (i.e., optimal), and then scaled to have values between 1 and 5 as for the other variables. The transformation is based on the following expressions:

$$WL = \begin{cases} \frac{3-W}{2} * 5, if\ W < 3 \\ 0, if\ W > 3 \end{cases} \quad (1)$$

$$\mathrm{WH} = \begin{cases} 0, \mathrm{if\ W} < 3 \\ \frac{\mathrm{W}-3}{2} * 5, \mathrm{if\ W} > 3 \end{cases} \quad (2)$$

The paper estimates a set of regression models based on the panel data from the course evaluations. A fixed-effects model is estimated using the within regression estimator (within courses) and reporting standard errors that are robust to some misspecifications by allowing some intragroup correlation.

Seven departments are included in the study: (1) The Department of Computer Science and Engineering (CSE); (2) Architecture and Civil Engineering (ACE; (3) Technology Management and Economics (TME); (4) Mechanics and Maritime Sciences (MMS); (5) Mathematical Sciences (Math); (6) Department of Physics; the department was merged with Physic Fundamentals (7). All departments offer Bachelor-, Master- and Doctoral-level education.

Model development

The data obtained from the surveys correspond to unbalanced panel data measured for nine panels with one year as time difference between panels. A set of regression models is calibrated using fixed-effects which uses within regression estimators to account for a same course being measured over the years; and reporting robust standard error which allow intragroup correlation between observations (i.e., courses). The model is calibrated using Stata ("Fixed-, between-, and random-effects and population-averaged linear models," 2022). The general form of the model is shown in equation (3):

$$y_{it} = \alpha + \boldsymbol{\beta} \boldsymbol{X}_{it} + \boldsymbol{\lambda} \boldsymbol{\delta_n} + \boldsymbol{\theta}(\boldsymbol{\delta_{it}} \boldsymbol{X}_{it}) + \boldsymbol{v}_i + \varepsilon_{it} \quad (3)$$

Where,

Y_n: is the overall impression of course *i* taught on period *t*,
α : The intercept,
$\mathbf{X_{it}}$: A vector of continuous variables (i.e., scores of course elements, course average grade) specific to course *i* and year *t*,
β : A vector of estimable parameters for continuous variables,
$\boldsymbol{\delta_{it}}$: A vector of binary variables denoting the Department owning the course (0 if not, 1 if yes for each Department), or whether the course was taught during the pandemic (0 if not, 1 if yes),
λ : A vector of estimable parameters for the binary variables,
θ : A vector of estimable parameters for the interactions between binary variables and continuous variables,
$\boldsymbol{v}_i$: A unit-specific error term constant for every course *i*
ε_n : A random disturbance term, assumed to be uncorrelated with itself, uncorrelated with **X**, uncorrelated with $\boldsymbol{v}$ and homoscedastic with mean 0.

RESULTS

Descriptive analysis

Table 3 shows the descriptive statistics for the courses for each of the departments included in the study. The data include 4015 students' evaluations of 1 115 courses from 2013 to 2022 for seven different departments: 549 from ACE, 852 from CSE, 460 from MMS, 911 from Math, 331 from Physics, 25 from Physic Fundamentals (PF), and 887 from TME.

Table 3: Descriptive analysis of course elements and attributes

Architecture and Civil Engineering				
Variable	**Obs**	**Mean**	**Min**	**Max**
Pandemic	549	35%	0	1
Grade	542	3,5	1,4	5,0
# of respondents	549	28,0	11,0	141,0
Previous knowledge	549	4,2	2,7	5,0
Learning outcomes	549	4,0	1,8	4,9
Structure	549	3,9	1,5	5,0
Teaching	549	3,9	1,2	5,0
Literature	549	3,8	1,8	5,0
Assessment	549	4,0	1,6	5,0
Administration	549	3,9	1,3	5,0
Low workload	549	0,1	0,0	2,1
High workload	549	0,9	0,0	4,5
Overall impression	549	3,9	1,2	4,9
# of students	549	71,3	14,0	310,0

Computer Science Engineering				
Variable	**Obs**	**Mean**	**Min**	**Max**
pandemic	853	23%	0	1
new_grade	842	3,0	0,1	4,8
Respondents	853	33,2	11,0	103,0
Previous knowledge	853	4,2	2,1	4,9
Learning Outcomes	852	4,1	2,3	4,9
Structure	852	4,0	2,2	4,9
Teaching	852	3,8	1,9	5,0
Literature	852	3,7	1,9	4,9
Assessment	852	4,0	1,9	4,9
Administration	852	4,1	1,4	5,0
Low workload	852	0,0	0,0	1,8
High workload	852	0,9	0,0	3,6
Overall impression	852	3,8	1,6	5,0
Number of students	853	86,2	12,0	238,0

Mechanics and Maritime Science				
Pandemic	460	35%	0	1
Grade	456	3,1	0,8	4,8
# of respondents	460	22,7	11,0	88,0
Previous knowledge	460	4,1	2,3	4,9
Learning outcomes	460	4,1	1,8	5,0
Structure	460	4,0	1,3	5,0
Teaching	460	4,0	1,2	5,0
Literature	460	3,9	1,6	5,0
Assessment	460	4,1	2,1	5,0
Administration	460	4,1	1,2	5,0
Low workload	460	0,0	0,0	1,6
High workload	460	0,9	0,0	4,1
Overall impression	460	4,0	1,3	5,0
# of students	460	65,5	16,0	309,0

Mathematics				
Pandemic	911	21%	0	1
Grade	905	2,7	0,7	5,0
# of respondents	911	39,1	11,0	135,0
Previous knowledge	911	4,1	2,0	5,0
Learning outcomes	911	4,0	2,3	4,9
Structure	911	3,9	1,4	5,0
Teaching	911	3,8	1,3	5,0
Literature	911	3,8	1,2	4,9
Assessment	911	4,0	1,8	4,9
Administration	911	4,2	1,7	5,0
Low workload	911	0,0	0,0	1,7
High workload	911	0,8	0,0	4,3
Overall impression	911	3,8	1,3	4,9
# of students	911	109,7	4,0	386,0

Physics				
Variable	**Obs**	**Mean**	**Min**	**Max**
Pandemic	331	21%	0	1
Grade	330	3,1	0,1	4,7
# of respondents	331	30,7	11,0	97,0
Previous knowledge	331	4,3	2,4	5,0
Learning outcomes	331	4,0	2,9	4,9
Structure	331	4,0	2,3	4,8
Teaching	331	3,9	1,3	4,9
Literature	331	3,6	1,8	5,0
Assessment	331	4,0	2,1	4,8
Administration	331	4,1	0,0	4,9
Low workload	331	0,1	0,0	2,1
High workload	331	1,0	0,0	4,4
Overall impression	331	3,8	1,7	4,8
# of students	331	84,7	7,0	229,0

Fundamental Physics				
Variable	**Obs**	**Mean**	**Min**	**Max**
Pandemic	25	0%	0	0
Grade	25	3,0	1,0	4,8
# of respondents	25	34,5	11,0	71,0
Previous knowledge	25	4,4	3,9	4,9
Learning outcomes	25	4,1	2,9	4,6
Structure	25	4,1	2,7	4,7
Teaching	25	4,2	2,4	5,0
Literature	25	3,7	2,1	4,6
Assessment	25	4,1	3,4	4,7
Administration	25	4,2	1,7	4,9
Low workload	25	0,1	0,0	1,2
High workload	25	0,7	0,0	2,2
Overall impression	25	3,9	1,8	4,9
# of students	25	82,7	5,0	202,0

Technology Management & Economics				
Pandemic	887	21%	0	1
Grade	879	3,6	0,1	5,0
# of respondents	887	26,4	11,0	94,0
Previous knowledge	887	4,4	2,3	5,0
Learning outcomes	887	4,0	1,6	4,9
Structure	887	3,9	1,9	4,9
Teaching	887	3,8	1,5	5,0
Literature	887	3,8	1,9	4,9
Assessment	887	3,9	1,8	4,9
Administration	887	4,1	1,6	4,9
Low workload	887	0,1	0,0	2,8
High workload	887	0,8	0,0	4,8
Overall impression	887	3,8	0,0	5,0
# of students	887	68,6	10,0	245,0

Average number of respondents varies between the departments, with the lowest being 22.7 (MMS) and highest 39.1 (Math). For math department, the classes are also one of the largest,

reaching 135 students (only ACE has larger courses: 141 students). The minimum number of students is always 11 as it is a threshold for using the *Course survey*.

Many observations were collected from the courses taught in pandemic time, from 21% of all observations (Math, TME, Physics) to 35% in ACE. Interestingly, the response rate on average is higher during the pandemic than during none-pandemic time. Fundamental Physics existed as a separate department until 2015 and later was merged into Physics, that is why there are no observations from the pandemic time.

The maximum average grade of a class reaches the possible maximum of 5 points. It is observed for ACE, Math and TME. For other departments the maximum average grade reaches 4.7 or 4.8. The overall impression score varies between 4.8 and 5.0. Interestingly, in cases when the class average grade reaches 5.0, the overall impression is always lower (Math, ACE) with the only exception of TME (both are 5.0). Also, for CSE and MMS overall impression reaches 5.0 (only in these two cases), when the average class grade does not reach its maximum of 5.0.

The scores for the workload were normalized (see (1) and (2)). For all departments the normalized score for the "high workload" is about twice as large as the "low workload", with another interesting specific that the highest (4.8) and the lowest (2.8) workload is observed at the same department, TME. The least deviation to the lower side in the workload is observed for Fundamental Phys (1.2) followed by MMS (1.6), Math (1.7), and CSE (1.8), and the least deviation to the higher side is observed in Fundamental Physics (2.2).

Modeling results

Four different models were estimated. The "Based Model" estimated the overall impression as dependent variable, and the course elements evaluated in the survey as well as if the course was taught during the pandemic as independent variables. The "Department Model" included the variables in the "Base Model" and assessed binary variables designating the Department that owns the course, only statistically significant variables (at the 5% level) were kept in the model. The "Dept & Elements" included the interaction between Department variables and the different course elements. Finally, the "Dept & Pandemic" assessed the interaction between the pandemic, the course elements, and the different departments. All the models have a "R^2 within" of 0.86 meaning that about 86% of the variance of the overall impression is explained by the variance of the independent variables. The number of students and respondents for the surveys were included in all the models but the models revealed that they were not statistically significant to explain the score on the overall impression of the course, thus they were excluded from the models.

Table 4: Modeling results

Variables		Base model		Department		Dept & Elements		Dept & Pandemic	
		Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Intercept		-0,53	-8,57	-0,59	-9,35	-0,54	-8,68	-0,54	-8,71
Course elements	*Previous knowledge*	0,04	2,21	0,03	2,20	0,03	2,12	0,03	2,06
	Learning outcomes	0,11	5,48	0,11	5,49	0,12	5,59	0,12	5,63
	Structure	0,22	10,34	0,22	10,34	0,24	11,64	0,24	11,52
	Teaching	0,40	26,83	0,40	26,77	0,40	26,86	0,40	26,85
	Literature	0,04	3,54	0,04	3,48	0,03	1,93	0,03	2,15
	Assessment	0,18	14,90	0,18	14,90	0,19	15,17	0,19	15,41
	Administration	0,08	5,77	0,08	5,72	0,08	5,75	0,08	6,49
	Workload too low	-0,10	-3,58	-0,10	-3,59	-0,10	-3,64	-0,10	-3,52
	Workload too high	-0,02	-3,18	-0,02	-3,20	-0,02	-3,22	-0,02	-2,98
	Grade	0,03	3,46	0,03	3,45	0,03	3,24	0,03	3,16
Department	*ACE*			0,21	3,80	0,13	2,01	0,14	2,12
	MMS			0,08	13,38				
	TME			0,13	2,20				
	*ACE*Structure*					-0,01	-2,74	-0,02	-4,06
	*TME*Structure*					-0,08	-2,71	-0,07	-2,56
	*TME*Literature*					0,08	3,39	0,07	3,18
Pandemic	*Pandemic*	0,00	-0,29	0,00	-0,28	0,01	0,78		
	*CSE*Pandemic*							-0,33	-2,42
	*CSE*Pandemic*Admin*							0,06	1,99
	*Math*Pandemic*Admin*							-0,01	-2,58
	*Physics*Pandemic*Workload_High*							-0,07	-2,54
Fixed-effects regression statsitics									
	Observations	3978		3978		3978		3978	
	Number of groups	1105		1105		1105		1105	
	F-stat	0,00		0,00		0,00		0,00	
	Corr(u_i, Xb)	0,15		0,07		0,15		0,15	
	R2 within	0,86		0,86		0,86		0,86	
	R2 between	0,92		0,90		0,92		0,92	
	R2 overall	0,90		0,88		0,90		0,90	
	sigma_u	0,16		0,17		0,16		0,16	
	sigma_e	0,16		0,16		0,16		0,16	
	rho	0,48		0,52		0,48		0,48	

The “Base Model” showed that all the course elements assessed in the survey play a statistically significant role in explaining the overall impression of a course. The element that has the largest effect on the overall impression is how well the teaching worked, i.e., each extra point in this element is likely to increase the overall impression by 0.40. The structure of the course and the assessment are also important elements as each point in those elements can increase the overall impression by around 0.20 points. The learning outcomes and administration can improve by almost another 0.10 points the overall impression per point on those elements. The students’ perception of previous knowledge and the literature as well as their grade do not have such an important effect on the overall impression of the course (about 0.04 points on the overall impression per point on these elements or per point on the grade). An interesting finding is that a lower workload can affect five times more the overall impression of the course than a high workload. It is also noteworthy that the pandemic did not play a statistically significant effect on the overall impression (t-stat=-0.29).

The “Department” model added additional insight as it showed that ACE, TME and MMS courses tend to have a better overall impression than others (0.21, 0.13 and 0.08 respectively).

The "Dept & Elements" model revealed some differential effects of score on some course elements by Department. For TME and ACE courses, the course structure is less important than for other departments. Basically, while for other Departments a point in course structure is likely to increase the overall impression by 0.24, for TME and ACE it is likely to increase the overall impression only by 0.16 and 0.23 respectively. The results also show that for TME courses, a better impression in the course literature is likely to lead to 0.08 additional points in the overall impression (getting the same importance as clearly stated learning outcomes).

The "Department & Pandemic" model showed that—although the pandemic did not play a generic effect—the course elements had a different effect during the pandemic for different Departments. For CSE the overall impression decreased by 0.33 during the pandemic, but courses where students had a better impression of the administration during the pandemic lead to a better overall impression (i.e., 0.06 points for each point gained on administration). For Physics, the overall impression was affected even more by a high workload during the pandemic (i.e., each point in higher workload led to a loss of 0.07 points in the overall impression of the course).

DISCUSSION

Systematic relation between course elements assessed during the course evaluation process allows to position the elements in hierarchy. Such systematic way of seeing the results adds extra credibility to "diagnostic evidence" of the evaluation (Richardson, 2005) as it becomes clear what the exact relationship between each element's perception and the overall impression is. The systematicity allows to tackle other issues, too. For example, in the current way of the process execution there is no sub-process that would show an individual course in relation to its own history or in relation to other similar courses (e.g., courses at the department), while such analysis may help to compare courses (or course instances) based on multiple paraments and relate them to one another, and perhaps to identify weak points for certain group of courses (e.g., lower than university level satisfaction with administration at a department may be identified and addressed). It is also important to know the difference related to the subjects being taught at different units, as the content may require different approach to teaching. For example, we observed that Literature plays more important role for TME department, which is one of few departments that have several courses in management. Again, as Richardson (2005) summarised, seriousness of the students' attitude towards the course survey is an issue, and such results as obtained in this research may be disseminated to students as one measure to increase their interest and involvement into the process and by this to increase the response rate. Another issue found by Nasser and Fresko (2002) related to low usability of the results of such surveys may be addressed by providing a tool for the staff based on such and similar analysis that would allow in an easy manner to learn more about what the resulting grades per each element actually mean, and perhaps through that increase the usage of the results.

Results for courses taught during pandemic time do not differ greatly from the rest of the results. One interesting observation is that the response rate was slightly higher for that period than for the rest of data, which, as Revilla-Cuesta et al. (2021) concluded, may be associated with the exceptionality of the situation and its interestingness.

However, one important limitation to our findings is that the results only show relationship about *perception* of every element discussed, and as noted by Richardson (2005), it is questionable whether "satisfaction should be a desirable outcome of higher education". The research shall be further continued to investigate, how the *perception* of course elements relate to *learning*.

PRACTICAL IMPLICATIONS

First important implication is that having a large dataset for over 10 years for all over departments, there is a lot more opportunities to be used to learn about the Course evaluation process to fine-tune it and increase its value.

Other practical implications directly following from our research follow. A very surprising results related to the workload, namely double number of responses for “high workload” compared to “low workload” may mean that more difficult courses are better appreciated than easy courses. It however also may have to do with the issue related to the scale (see (1) and (2)) and be explained by a measurement bias. This hypothesis, together with the fact that the questions have been kept in the survey for 10 years with only subtle modifications, suggest that the questions of the survey may need to be revised and reformulated, by consulting academic literature both for content but also for survey measurement technique and associated biases.

On a greater level, as the process is enforced by the law, a clarification to the law may help to align understanding of the process among universities. Universities acting under the same law shall benchmark. It is evident that in some institutions there has been a lot of work done on fine-tuning the process, there is an opportunity to share the expertise with each other.
As it is now, the law enforces to provide an opportunity for students "…*to express their experiences of and views on the course*…", while the word “experience” is now missing in the title of the process “Course evaluation”, which may be misleading if a respondent is not very clear about the purpose.

CONCLUSIONS

The study provides curious details about relation of evaluation of course elements by students in university and the overall impression about the course. Statistical results from 4015 surveys on how course elements perception relate to the overall impression about the course, specific for seven department varying in the subjects they teach, and for the pandemic time where a change in the structure of the relation was expected (but was not really identified) – are significant and timely contributions to CEQ research field. Several practical implications result from the study including suggestions to nuance the law script to focus on closer to the students' experiences and *learning process*, rather than open for interpretation “course”. The study also contains critical point of view on the course evaluation process that has been implemented more than 10 years ago with only minor changes along the way. This study unrevealed an armful of opportunities to learn more about the course evaluation process, that shall be investigated through conducting further research. In addition, this and such research has a direct practical contribution to improvement of the process.

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