




Effectiveness of the Use of Open-Ended Questions in Student Evaluation of Teaching in an Engineering Degree

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Abstract:

Purpose: The purpose of our research is to show the point of view of the members of the Board concerning advantages, disadvantages and effectiveness of open ended questions used as a complement to closed response questionnaires.

Design/methodology/approach: In this paper, we will describe a pilot experience carried out at a Spanish public university where a short questionnaire with open ended questions was launched, and students were invited to comment on their perception of the teaching received.

Findings: The response return rate (about 35%) was relatively high compared to other online closed response questionnaires delivered. Moreover, the students' comments provided valuable information which made the members of the Board of the Engineering Degree chosen reflect. Their reflection was evidence based and led to initiatives and actions to improve the quality of teaching, as well as to get an extensive view of the Degree.

Practical implications: Findings reveal that the information retrieved can also be used in multiple ways such as formative feedback or even for improvement of courses and instruction.

Originality/value: Student evaluation of teaching is a powerful tool for continuous teaching improvement but the information provided by conventional closed response questionnaires may not be sufficient.

Keywords: teaching evaluation, higher education, student satisfaction, teaching improvement, open-ended questions

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1. Introduction

Student evaluation of teaching is the systematic process in which school leaders periodically critique teachers' work performance based on student feedback (Lejonberg, Elstad & Christophersen, 2018). Although initially considered a highly controversial topic, teaching evaluation has long been seen as an integral part of good professional practice in Higher Education institutions (Hounsell, 2003). While also serving personnel evaluation purposes, student evaluation of teaching can potentially contribute to teachers' professional development by providing useful feedback (Lejonberg et al., 2018), being a way of emphasizing both the course and the instructor's strengths and areas for improvement (Abdelhadi & Nurunnabi, 2019).

The purpose of teaching evaluation should determine the best suited feedback gathering methods, and the two purposes cited above – personnel evaluation and teaching improvement – may require different types of data (Wolfer & Johnson, 2003). Whereas an overall summary of teaching ability would be important for administrative purposes, reflective instructors willing to improve their teaching would benefit most from rich information on their areas of strength and weakness (Wolfer & Johnson, 2003). Smylie (2014) recommends teaching evaluation systems to be explicitly linked to developmental purposes in order to have beneficial effects.

Studies on teaching evaluation focus mainly on quantified methodology to assess teachers (Ernst, 2014). Student evaluation of teaching surveys are inexpensive, easy to conduct, and less time consuming than other approaches (Villanueva, Brown, Pitterson, Hurwitz & Sitomer, 2017). However, standard questions may be very general, hence not revealing a precise opinion (Llorent-Bedmar & Cobano-Delgado-Palma, 2019). Therefore, aiming for improving instruction, it is important to maximise the information from student feedback (Abdelhadi & Nurunnabi, 2019), which could be obtained by combining quantitative and qualitative methods. Adopting this combined strategy, the inside out approach – with teachers and administrators on the inside, assuming to know what students want and expect from our institutions – would be complemented by thinking outside in, listening to the students' voice to understand their difficulties and address the problematic aspects of teaching performance (Tricker, Rangecroft & Long, 2005).

In this study, Action Research methodology has been used to describe an experience carried out at an Engineering School at a public university, founded in 1968 in Spain. In 2016, an open response questionnaire was first launched to gather information on the students' perception of the teaching process.

2. Student Evaluation of Teaching: Literature Review

The use of evaluation in Higher Education to examine and improve teaching quality is increasing. Aiming to serve its purpose, evaluation requires an understanding as for what is to evaluate, how to evaluate it, what data should be collected in order to do it and, finally, how to implement teaching improvements based on what has been found (Morgan, 2008). In some countries, governments use the information provided by students to assess the performance of Higher Education institutions aiming to improve teaching quality, promote good practice and even reward the best performing institutions (Shah & Nair, 2009).

There is no definite method to effectively evaluate teaching in Higher Education, because there are considerable variations both across institutions and disciplines (Villanueva et al., 2017). Some practices frequently referenced are peer review –usually consisting of in-class observation and review of materials–, teacher self-evaluation, exit and alumni evaluations, and student mid-course and end-of-course evaluation (Villanueva et al., 2017; Wolfer & Johnson, 2003). It is generally recognized that multiple sources of evidence should be used in assessing teaching effectiveness (National Research Council, 2003), in order to cover all dimensions of teaching and the course (Hill, Ball & Schilling, 2008). Taking into consideration multiple sources of evidence (from students, peers or mentors, and different collection methods), the strengths of each could compensate for the weaknesses of the rest, therefore leading to a diagnosis about teaching effectiveness that is more accurate than those based on a single source (Berk, 2005). This synergistic effect is most evident when peer ratings are coupled with student evaluations, since these practices cover the aspects of teaching that students are unable to evaluate (Berk, 2005). Whereas students are the best source of feedback regarding the quality of student-teacher interactions, peers are most capable of discussing on content expertise, instructional design and assessment methods (Iqbal, 2013).

Student evaluation of teaching at the end of the course is the most common method used for evaluating teaching and courses (Villanueva et al., 2017). Students' feedback provides a rich insight on teaching and course success since, being experienced learners, students are familiar with the elements that help them reach academic success by facilitating their learning process (Blair & Valdez-Noel, 2014). Therefore, the perception that students have on their courses and from their learning experience is a valuable source to evaluate teaching quality in universities (Abdelhadi & Nurunnabi, 2019).

Student evaluation of teaching is aimed to measure the instructor effectiveness and the quality of instruction. Being in a position to judge particular aspects of teaching and the classroom (Villanueva et al., 2017), students can provide meaningful and useful information about their learning experience, which serves mainly two purposes: (1) administrative and personnel decisions and (2) instructor and courses' individual improvement by bringing the teaching community a new value (Crumbley & Reichelt, 2009; Hujala, Knutas, Hynninen & Arminen, 2020). Therefore, the evaluations that students provide both on courses and teachers can promote remarkable improvement in Higher Education practice (Blair & Valdez-Noel, 2014).

Many and varied ways of assessing student satisfaction are being used by Higher Education institutions such as an informal face-to-face chat between the tutor and the student, and more formal written questionnaires (Tricker et al., 2005). Measures range from qualitative semi-structured measures to standardized exclusively quantitative measures (Wolfer & Johnson, 2003). Although all the methods available are valuable tools for gathering information about the students' learning experience (Gaba & Dash, 2004) closed-ended quantitative questionnaires are the most frequent method for teaching evaluation and often the only one, as has been repeatedly reported in literature (Wolfer & Johnson, 2003; Villanueva et al., 2017). This method is popular partially because the measurement process is easy and simple, the students only have to fill in forms that require little class time (Hornstein, 2017; Villanueva et al., 2017). Data can be recorded automatically, numerical results are extremely easy to compare among teachers, departments and faculties (Llorent-Bedmar & Cobano-Delgado-Palma, 2019), as well as between the lecturers and their department (Hornstein, 2017).

However, some disadvantages have been reported on this quantitative approach to student satisfaction. Despite the reliability of the method, if most teachers at a university are rated as 'excellent', still 50% of them will be under the median score, which leads to demotivation and loss of performance (Hornstein, 2017). For administrative decision making, it would be enough to know if the instructor does not exceed some maximum percentage of unsatisfactory ratings according to a minimum score below which teaching effectiveness would be considered insufficient.

The apparent precision of numerical scores obtained from quantitative tools may mistakenly imply high precision in the measurement (Wolfer & Johnson, 2003). Research supports the validity of student evaluations for making rough distinctions among instructors (exceptional – adequate – unacceptable), but not for making finer distinctions. As stated by McKeachie (1997), small numerical differences are unlikely to distinguish between competent and incompetent teachers. As a particular example, Wolfer & Johnson (2003) found a very limited range of actual scores for their quantitative test, which made it difficult to identify meaningful distinctions among instructors. Moreover, the unidimensional nature of the instrument made it difficult to identify deficits in performance patterns, and hence both the individual improvement and the planning for training. These authors concluded that the test failed both for administrative decision making and teaching improvement purposes.

Averages of student ratings appear objective simply because they are numerical, but a single numerical measure cannot capture all relevant aspects of an instructor's teaching ability (Crumbley & Reichelt, 2009). Calculating the means of categories leads to uninterpretable results (Hornstein, 2017). It has been argued that student evaluation of teaching should not be used as a continuous rating scale, but rather a discrete standard that should be met (McKeachie, 1996).

Additional concerns relate to the actual content of the questionnaire, which should only feature well formulated items. This is crucial to properly measure the student satisfaction with the teacher performance (Moreno-Murcia, Silveira & Belando, 2015). In the literature, some of the items found in university questionnaires have been described as unsuitable, irrelevant and poorly thought on (González-López & López-Cámara, 2010;

Llorent-Bedmar & Cobano-Delgado-Palma, 2019). The poorly formulated wording, including more than one variable per item, or being too general that they may be irrelevant to a particular class, deprives the teachers of accurate feedback to improve their teaching. Moreover, students may get confused as they may not know whether they are evaluating the course or the instructor (Villanueva et al., 2017). In some questionnaires, students are asked about aspects which do not depend on the task of the teacher directly or indirectly (Llorent-Bedmar & Cobano-Delgado-Palma, 2019). There is also concern that factors unrelated with teaching quality, such as the size of the class, has an influence on the students' evaluation (Villanueva et al., 2017).

Focusing on instructor behaviours instead of on the fundamental interaction with the students, some quantitative tests may not provide the type of information needed for teaching improvement. A teaching strategy may be highly valued by a group of students and not by others, which is why the teaching behaviour should not be the focus, but how it fits within a class (Wolfer & Johnson, 2003). The emphasis on tutors' concerns limits the opportunity for students to express their own ideas because they are not able to respond to questions which have not been asked (Tricker et al., 2005). Some closed-ended questionnaire items may not cover issues that are really important for students because they may reflect a teacher-centred or researchers' preconceived framework (Grebennikov & Shah, 2013). In fact, these tools fail to cover important aspects of the teaching process which are not mentioned in the predefined set of questions, which could be substantially explored from students' reviews (Lin, Zhu, Zhang, Shi, Guo & Niu, 2019). For this reason, teaching improvement would highly benefit from detailed students' feedback about what is working and not working, much more than it does from standardized evaluation instruments (Wolfer & Johnson, 2003).

Quantitative and qualitative information should complement each other to cover a wide range of students' perceptions on their learning experience (Grebennikov & Shah, 2013). Quantitative analysis can be used to test the validity of qualitative insights while qualitative work can be used as preparation for quantitative work, to explore the phenomenon in as much detail as possible (Douglas, Douglas, McClelland & Davies, 2015). Thus, open-ended comments are likely to point at the reasons for quantitative results which may differ from those assumed by researchers (Palermo, 2003). Douglas et al. (2015) gathered hand-written narratives of the learning experience of 350 students, who were asked to report on both good and bad experiences. The narratives provided a rich source of data to help a Faculty identify what causes student satisfaction and dissatisfaction. This was compared with the traditional quantitative method to gather student feedback on specific areas of teaching, and some new determinants of quality were identified. Douglas, McClelland and Davies (2008) compared a qualitative information gathering method with the traditional quantitative surveys, and found the synergy between the two, which is especially useful to deeply understand the students' experience. Grebennikov & Shah (2013) reported on how a time series of qualitative data generated by students' feedback surveys can help one university improve student's experience by examining what worked well and what needed readjustment.

Llorent-Bedmar and Cobano-Delgado-Palma (2019) critically analysed the student satisfaction surveys used at Spanish public universities, and found that from a total of 711 items, only 29 were open-ended questions. These authors advise for the inclusion of open-ended questions to allow students to express their opinions freely, which would enable for the collection of more accurate and useful data. While quite many studies have been published on quantitative questionnaires in the Spanish Higher Education context (Fernandez & Mateo, 1992; Segura-Egea, Zarza-Rebollo, Jiménez-Sánchez, Cabanillas-Balsera, Areal-Quecuty & Martín-González, 2020; López-Gavira & Omoteso, 2013; Gallifa & Batallé, 2010; Humanes-Humanes & Roses-Campos, 2014), less research has focused on how to collect and process qualitative information. Rodríguez-Gómez, Ibarra-Sáiz, Gallego-Noche, Gómez-Ruiz and Quesada-Serra (2012) used a survey tool to analyse assessment at universities, where some open-ended questions, which were answered by a minority of the sample, helped analyse the quantitative data. Marin-García & Atarés-Huerta (2014) coded and summarized the information provided by first year university students on their perceptions, to present a list of good and bad teaching practices. Mattos-Medina, Prados-Megías and Padua-Arcos (2013) reported on the students' perceptions in the specific context of the Physical Education Degree. Both in Spanish universities and in a general international context, it seems obvious that the qualitative information provided by students is being insufficiently exploited. Students' comments are usually reliable and significant, and provide rich data for reflective lecturers to realize what is actually happening in the classroom, how they are being

perceived and understood by their students, and ultimately how effective their teaching is (Levin, 2000). Despite the potential of qualitative data for teaching improvement, the use of comments collected through students' surveys is still insufficient, and the literature on their analysis is still limited (Grebennikov & Shah, 2013; Tricker et al., 2005).

This paper is based on a pilot experience carried out at an Engineering School to obtain qualitative information from students. We aimed to research and analyse the point of view of the members of the Engineering School Board when gathering information through open response questionnaires in order to implement actions for continuous improvement in teaching quality. Having analysed the comments made by two members of the Board, via an individual interview on open ended questions in an online questionnaire for student evaluation of teaching, the advantages and disadvantages of open response questionnaires were revealed. Thus, our research question in this paper is: Is it effective to include open ended questions to improve the information retrieved from conventional closed response questionnaires in student evaluation of teaching?

3. Methodology

The method chosen for our study was *Action Research*, where researchers get involved in the experiment through a participatory process of improvement and look for solutions from the inside. To this end, we have adapted a checklist from Marin-Garcia and Alfalla-Luque (2021) to follow the correct steps.

There are several participants in this action research. Two teachers (Authors 1 and 2) were involved in the literature review, acted as interviewers and performed the subsequent analysis of the data obtained from the interviews. Author 3, the only author teaching at that Engineering School, is the Director of the Degree chosen and acted as the reviewer of global methodology, solved discrepancies and was also interviewed (Person B). The other participants were: a member of the Board responsible of innovation (Person A), and the students filling in the open response questionnaire.

The first part of the questionnaire designed retrieved the basic information about students, such as academic year, age, gender (no personal data were asked for), and the second part allowed students to make comments about positive and negative aspects on each of their courses, overlaps in course contents or missing aspects. The questionnaire could be completed in a reasonably short time as most students feel reluctant to invest much time with additional activities that do not imply a minimum percentage of their course grades, particularly if this is non-class time. Opposite to the closed conventional questionnaires delivered by their Engineering School or the University, this open response questionnaire had to be filled in online after clicking on a link sent to them via email by the person leading the experiment.

Students were motivated to act as evaluators of the teaching received and of their instructors by completing an open response questionnaire to express their own opinion. They were informed about the purpose of the new type of questionnaire, availability of the outcomes, and possible benefits and effects on their Degree, not only for them but also for future students. Students were told that if they did not want to say anything, they could simply log in and close the questionnaire without adding anything on it. This tool was hosted on the institutional website at the Engineering School chosen for our research.

All data collected from the students' comments by using an online tool were processed and codified with a software package, Atlas.ti, supported by the *Grounded Theory* approach for efficient qualitative analysis of texts, audio and video data. Several dimensions and subcategories arose, and the theory obtained from the students' comments and perceptions of lived experiences resulted in valuable information for both the members of the Board in their Degree and university managers (Aznar-Mas, Atarés-Huerta & Marin-García, 2021).

Aiming to explore the advantages, disadvantages and effectiveness of open response questionnaires, the point of view of the members of the Board had to be analysed. To this end, Authors 1 and 2 had an individual interview with two of them. Both interviews were held individually at their office, in Spanish, with unlimited duration to allow for as many comments and opinions as possible. The information collected was processed and codified, and some excerpts were translated into English to support our findings.

The interview was based on the following questions:

1. Can you describe any problem or weakness you have discovered along the time in this Degree, not detected via conventional closed response questionnaires of student evaluation of teaching?
2. Why did you decide to change the assessment tool for the evaluation of teaching?
3. Why was an open response questionnaire chosen for innovation in the evaluation of teaching?
4. Who proposed this initiative?
5. How did students first react towards this new type of questionnaire?
6. Can you describe the rate of students' response to this new type of questionnaire?
7. How did teachers first react towards this new type of questionnaire?
8. Can you name advantages and disadvantages of these open response questionnaires?
9. Can you name improvement actions carried out in this degree, resulting from the information obtained from the open response questionnaires of student evaluation of teaching?
10. Can you name future improvements to be implemented, resulting from the comments and opinions provided by the students?
11. Is there anything you would like to improve or change in the new type of questionnaire (open response)?
12. Do you think this new type of questionnaire could be used in other Degrees, at other Higher Education institutions and universities?

4. Results and Discussion

4.1. Quantitative Analysis from the Open Response Questionnaire

Concerning the response rate and time invested in the experience, we will distinguish between the students filling in the questionnaire and the member of the Board who implemented this action for improvement and reported the outcomes.

Research has found that response rates have dropped significantly, as instruments for student evaluation of teaching are increasingly administered online (Ernst, 2014). A lower online response rate (about 10-15%) is largely due to students' differing feelings of obligation in the two formats. 374 students were sent an invitation to complete the questionnaire and, on this occasion, the response rate of students was about 35% of the total (131 students).

The data collected showed that the total number of words retrieved from the students' response was 8,163 and the average time of completion per student was between 2 to 15 minutes. Only 8.5% of the students invested more than 15 minutes, being 57 minutes the highest time for completion. Hence, it was verified that this procedure did not reduce the response rate as compared to the online format of the institutional questionnaire. Most of the comments dealt with positive and negative aspects of the teaching, whereas the response on overlaps in contents and missing items was extremely low and not significant for analysis.

Concerning the time invested by the Director of the Engineering Degree to process, analyse and disseminate results to the Engineering School members, it was approximately 30 hours.

As regards time investment in the processes of coding and analysis, it must be remarked that it has been of extreme value due to the amount of information gathered.

4.2. Qualitative Analysis from the Interviews

4.2.1. Phase I: Starting Point, Implementation and Acceptance

At the university where this experience was held, an institutional Likert scale questionnaire has been used for more than 30 years to assess student satisfaction with the teaching of all courses (Figure 1).

In the Engineering Degree of our research, some comments on incidents concerning teaching matters on some courses had arisen (*'We observed two or three specific issues'*) along the time. Rumours and comments on specific conflicts became frequent among students and even among some teachers. The situation was difficult to solve as there was not clear evidence of those facts. Person B, who was in charge of the coordination of studies, had the impression that relevant information was missing: *'We lacked relevant information on what students perceived in the courses'*, *'We had the impression that we did not get everything from the students' representatives'*, *'I stopped having meetings with teachers because only a few of them agreed,*

and it was as if they were just trying to justify themselves’. With the institutional closed response questionnaire, problems can be detected but it does not reveal their nature nor provides the information needed to act: ‘When you have detected a big problem, what you do not know is exactly what the problem is’, ‘I had some information but it was insufficient to allow me to act’.

ENCUESTA DE OPINIÓN DEL ALUMNADO SOBRE LA ACTUACIÓN DOCENTE DEL PROFESORADO
ENQUESTA D'OPINIÓ DE L'ALUMNAT SOBRE L'ACTUACIÓ DOCENT DEL PROFESSORAT
STUDENT QUESTIONNAIRE FOR THE ASSESSMENT OF TEACHERS' ACADEMIC PERFORMANCE
CURSO/CURS/ ACADEMIC YEAR

DATOS IDENTIFICATIVOS / DADES IDENTIFICATIVES / IDENTIFYING INFORMATION

Profesor/a - Professor/a - Teacher

Asignatura - Assignatura - Subject

Grupa - Grup - Group

CONTESTA CON SINCERIDAD, SI NO TIENES SUFICIENTE INFORMACIÓN, NO OPINES

CONTESTA AMB SINCERITAT, SI NO TENS PROU INFORMACIÓ, NO OPINES


PLEASE ANSWER THE QUESTIONNAIRE HONESTLY. IF YOU DO NOT HAVE SUFFICIENT INFORMATION, PLEASE DO NOT ANSWER THE QUESTION

INSTRUCCIONES BÁSICAS PARA LA CUMPLIMENTACIÓN DE LA ENCUESTA
INSTRUCCIONS BÀSIQUES PER A LA CUMPLIMENTACIÓ DE L'ENQUESTA / QUESTIONNAIRE INSTRUCTIONS

Para responder a las preguntas del cuestionario deberá realizar una marca nítida en forma de aspa (1). Recuerda que solo puedes hacer una marca por pregunta. Si hay más de una marca o tachaduras la respuesta quedará invalidada.

Per a respondre a les preguntes del qüestionari ha de realitzar una marca nítida en forma d'aspa (1). Recorda que tan sols pots fer una marca per pregunta. Si hi ha més d'una marca o ratllades, la resposta quedará invalidada.

Please clearly cross the appropriate box (1). Please select only one option per question. If more than one answer has been ticked or an answer has been crossed out, it will not be counted.



ESCALA DE VALORACIÓN / ESCALA DE VALORACIÓ / RESPONSE SCALE

<p><u>1</u></p> <p>TOTALMENT EN DESACUERDO</p> <p>TOTALMENT EN DESACORD</p> <p>STRONGLY DISAGREE</p>	<p><u>2</u></p> <p>MÁS BIEN EN DESACUERDO</p> <p>MÉS AVIAT EN DESACORD</p> <p>DISAGREE</p>	<p><u>3</u></p> <p>TÉRMINO MEDIO</p> <p>TERME MITJÀ</p> <p>NEITHER AGREE OR DISAGREE</p>	<p><u>4</u></p> <p>MÁS BIEN DE ACUERDO</p> <p>MÉS AVIAT D'ACORD</p> <p>AGREE</p>	<p><u>5</u></p> <p>TOTALMENT DE ACUERDO</p> <p>TOTALMENT D'ACORD</p> <p>STRONGLY AGREE</p>
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1	Parece dominar la materia que imparte Sembra dominar la matèria que imparteix The teacher has a good command of the subject being taught	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Resuelve dudas y cuestiones sobre la materia con claridad y precisión Resol dubtes i qüestions sobre la matèria amb claredat i precisió The teacher answers questions about the subject clearly and precisely	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Al inicio del curso proporciona información clara sobre la asignatura: objetivos, programa, metodología y criterios de evaluación A l'inici del curs proporciona informació clara sobre l'assignatura: objectius, programa, metodologia i criteris d'avaluació The teacher provides relevant information about the subject at the beginning of the course: objectives, contents, methodology, and assessment criteria	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Tiene una buena programación del ritmo de las clases y del tiempo dedicado a cada tema Té una bona programació del ritme de les classes i del temps dedicat a cada tema The teaching pace and the time allocated to each topic are adequate	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	La metodología empleada y las actividades realizadas en la asignatura ayudan a aprender al alumnado La metodologia emprada i les activitats realitzades en l'assignatura ajuden l'alumnat a aprendre The methodology adopted and the activities carried out contribute to student learning	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Los materiales utilizados y/o recomendados (bibliografía, documentos, recursos didácticos, etc.) son de gran ayuda para el aprendizaje de la asignatura Els materials utilitzats i/o recomanats (bibliografia, documents, recursos didàctics, etc.) són de gran ajuda per a l'aprenentatge de l'assignatura The materials used and/or recommended (bibliography, documentation, teaching resources, etc.) are helpful for learning this subject	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Contribuye a crear un buen clima de trabajo y anima a los alumnos a participar en las clases Contribueix a crear un bon clima de treball i anima els alumnes a participar en les classes The teacher contributes to a positive working environment and encourages students to actively participate in the classroom	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Su manera de explicar consigue motivar al alumnado y despertar el interés por la asignatura La seua manera d'explicar aconsegueix motivar l'alumnat i despertar l'interès per l'assignatura His/her teaching methodology motivates students and awakens their interest in the subject	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Teniendo en cuenta las limitaciones, pienso que el profesor que imparte esta asignatura debe considerarse un buen profesor Tenint en compte les limitacions, penso que el professor que imparteix aquesta assignatura ha de considerar-se un bon professor All things considered, I think that the teacher of this subject should be regarded as a good teacher	1	2	3	4	5
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

OPINIÓN SOBRE EL CONJUNTO DE LOS MATERIALES DE ESTA ASIGNATURA DISPONIBLES ON-LINE.
OPINIÓ SOBRE EL CONJUNT DELS MATERIALS D'AQUESTA ASSIGNATURA DISPONIBLES EN LÍNIA.
OPINION ON THE SET OF MATERIALS AVAILABLE FOR THIS COURSE ONLINE.

Los materiales docentes habilitados on-line (PoliformaT u otros espacios on-line oficiales en la UPV) por esta asignatura son coherentes con los contenidos del programa, representan una importante ayuda para su aprendizaje y para alcanzar los objetivos de la asignatura.
 Els materials docents habilitats en línia (PoliformaT o altres espais virtuals oficials a la UPV) d'aquesta assignatura són coherents amb els continguts del programa, i representen una important ajuda per al seu aprenentatge i per a assolir els objectius de l'assignatura.
 The teaching materials available online for this particular course (PoliformaT or other official online services at the UPV) are coherent with the content of the syllabus and provide key support during the learning process to help achieve the goals established for the course.

1 2 3 4 5

Gràcies per tu col·laboració / Gràcies per la vostra col·laboració / Thank you for your co-operation

Figure 1. Conventional Likert questionnaire used at the Universitat Politècnica de València (Spain) to assess student satisfaction

Person B considered necessary to verify those comments in order to solve conflict and act: *'I needed to be able to verify things but, above all, to be able to have evidences', 'The end-of-term questionnaire provided me with very little qualitative feedback', 'I lacked details, many details'*. Yet, more qualitative information was needed: *'There were issues that I was missing'*.

Meetings with students and teachers held in the past were not the solution, as students' representatives did not seem to express the general voice but some personal ideas: *'It was often unclear whether the opinion they conveyed was a personal opinion or on behalf of others'*. As for teachers, problems did not seem to be clearly stated and some facts seemed to be omitted. Therefore, actions taken afterwards were clearly ineffective.

Issues and conflict affecting some teachers and courses had to be solved soon and two more reasons motivated the implementation of the open response questionnaire. Firstly, Person B was very much aware that there were several teachers with excellent teaching practice: *'I did not just want to be able to act in cases where I observed negative matters'* Person B wanted to reward those teaching professionals who were doing a really good job and with whom students were totally satisfied: *'I wanted to be able to congratulate the teachers who were striving for good teaching'*. Secondly, Person A stated that accreditation agencies needed clear information about all degrees, and evidences of all matters were required. Quality was a priority, not only for the sake of accreditation but also for the institution and its prestige: *'The quality of the Degrees had to be verified'*.

From this starting point, aiming to prioritize teaching quality, Person B proposed the use of an open response questionnaire to collect qualitative information from students' perceptions and lived experiences from the teaching received: *'It was Person B's initiative to launch this kind of open response questionnaire to get a more qualitative view'*. Person B proposed the initiative to all members of the board at the Engineering School and obtained their total support to start: *'Everyone told me it was a great, great idea and I boosted it'*.

The questionnaire was hosted on the institutional website at the Engineering School. At first, only positive and negative aspects concerning each course were asked: *'The first time, I only asked about positive aspects and aspects that could be improved in each course'*. Later, Person A suggested to include questions on overlaps in contents and missing items in the students' academic curriculum: *'I suggested that, in some way, more objective items could be introduced such as gaps and overlaps'*. Students were persuaded to give honest and useful feedback.

Along the implementation of this new questionnaire different attitudes emerged. Students did not trust this tool, probably because they did not believe that their response was going to be accepted nor imagined members of the board or teachers changing contents, their type of instruction or their materials. On the other hand, students who were satisfied with the teaching received might not feel the need to complete the questionnaire considering 'No answer' as probably *'There is nothing to highlight, either positively or negatively'*, which means: *'I am satisfied'* or *'Why do I have to log in if I'm not going to say anything?'* as they do not have anything relevant to comment (Ravelli, 2000). These two facts could explain some of the reasons for a low response rate, hence information could be missed.

Moreover, not all teaching professionals accepted this new tool easily in the beginning, because they did not like being observed and compared to others in a public way.

4.2.2. Phase II: Processing of Information, Dissemination of Outcomes, Actions Taken, Reflection on the Experience

Once the data had been gathered and processed, Person B compared them to those of the closed response questionnaire so as to detect any discrepancies or errors: *'I do check that there is nothing strange in the questionnaires, that is, that I want to congratulate someone who has obtained a 2 (low score) in the institutional questionnaire' 'First I verify everything'*. Reports were prepared from the data collected and sent to both teachers and students: *'I make a report that I upload to Sakai for the students, and for the teachers'*. Members of the board, colleagues and students shared the same information: the report of the data from the questionnaire of all courses in the Degree: *'I send the report via email to the person responsible of the course'*. Person B acknowledged that the information obtained is not always easy to handle when conflict must be solved: *'There are things that, ... you say: "This is going to blow out" ... and sometimes I wish I had not known because they are not easy to handle'*.

The information provided by open response questionnaires is a powerful tool for continuous improvement of studies and provide rich information on students' learning difficulties and challenges. Students' comments let reveal which actions should be prioritized. In the interviews, both members of the board agreed on the effectiveness of the instrument for continuous improvement of the degree. In this respect, some specific actions have already been taken, whereas others will be implemented in a near future. Some details about those actions were provided. Participants in the teaching/learning process were informed about the outcomes of the open response questionnaire and this caused some changes.

Teachers were informed about the students' perceptions from their lived experiences about gaps or issues, if any, thus providing teachers with information to analyse and handle them: *'Students are telling you that between your model and what they need to learn there is a gap; and that you should think about how to reduce it'*. Some overlaps in course contents were solved: *'It has allowed us to detect overlaps'*. Students were satisfied because their voice was heard and were able to either congratulate or criticize their teachers' instruction. Members of the board received information about conflicts already solved and others where they had to act: *'I give them a report'*. It was also relevant to have information about potential problems that could emerge in a near future and anticipate their solving: *'Evidences for the Board to act appear'*.

Person B showed remarkable satisfaction with this action of improvement: *'I think this is what I have to do and, moreover, I like doing it. I think that, basically, I do like it because it keeps me motivated'*. However, it takes a long time to process, analyse and handle: *'It is time-consuming for me, ... the long hours of meetings that I have with the students, which are derived from this; the analysis of these things and what comes out of it'*. One of the things Person B enjoys most is congratulating teachers: *'Congratulations, I can see you feel satisfied, I want you to be in this Degree, I do want to have teachers like you in our Degree'*.

4.2.3. Phase III: Advantages and Disadvantages of Both Types of Questionnaires

The two members of the Board shared the opinion that both types of questionnaires are necessary as they both have advantages and complement one another: *'Each of them has its advantages', 'They are complementary'*. The advantages and disadvantages of the two types of questionnaires, mentioned by the two members of the Board who were interviewed are shown below (Figure 2).

	Advantages	Disadvantages
Closed Response Questionnaires	<ul style="list-style-type: none"> . are useful . are diverse . give precise information on specific dimensions . take a short time to be answered . are done in class time 	<ul style="list-style-type: none"> . have a limited number of items . have a low response rate . aim at a global level of satisfaction with the teaching received . lack of details on the dimensions selected . may lack relevant information
Open Response Questionnaires	<ul style="list-style-type: none"> . allow creativity . allow a larger number of dimensions to be analysed . may provide non expected dimensions . give qualitative information . provide a larger amount of details . allow respondents to express positive facts as well as criticism . are made online . have an acceptable 35% response rate (Person B) . provide enough information to take actions for improvement . provide a rich analysis of teaching and instruction . are useful to keep a record of incidents along the time . allow to detect new cultural profiles in the new student generations . allow to detect the level of academic demand . allow to detect changing attitudes towards teaching and instruction . allow to detect changes in classroom dynamics . allow to detect excellence in teaching . allow to anticipate some problems . allow to enhance teaching talent management 	<ul style="list-style-type: none"> . are done in non-class time . take more time to be filled in . may show extreme perceptions . have a low response rate (Person A) . may offend teachers, by revealing personal conflict to colleagues . are announced via institutional email, which is not often read by many students . require a larger time to process and analyse

Figure 2. Advantages and Disadvantages of Closed Response and Open Response Questionnaires, reported by the members of the Engineering School Board who were interviewed

4.2.4. Phase IV: Future Improvements in the Questionnaires of Student Evaluation of Teaching

Both interviews provided interesting suggestions on how to include additional open ended questions to improve the effectiveness of closed response questionnaires on student evaluation of teaching and implement them in the future. Person A, claiming the need for complete information, proposed to include a question on the opinion teachers had about their students: *'A process like this has to evaluate the opinion of all, of both sides', 'Teachers are never asked about their opinion on their students', 'Not all information is available'*. Person A also suggested to include a sort of suggestion box for students to propose any type of improvement: *'Some other questions could be added, to have a wider scope. Of course, students should also suggest areas for improvement as in a suggestion box'*. As only students who have attended lectures should answer the questionnaires, Person A proposed the introduction of a question about student participation in order to know about their involvement: *'The student's involvement in the course is also a valuable information'*.

Person B proposed to fill in the open response questionnaire in class time in a computer laboratory to enhance participation and increase the response rate: *'It could be an opportunity to see what happens, to detect any change in participation'*. Another proposal was to include this activity as a part of the assessment tasks of some courses related to continuous improvement to analyse the participation of students: *'It would be great to have this experience in courses related to continuous improvement, customers' needs, or Marketing, as another type of assessment activity'*.

Some limitations should be pointed out in our paper: practices based on gathering students' feedback on their teaching experience are fully dependent on the students' involvement in the evaluation process. The low response rate of online student evaluation questionnaires poses one of the main limitations for the collection of representative data. It is, then, paramount having students feel that their voice is heard, while also making them understand the impact that their opinions could have on future initiatives for continuous improvement in their Degrees. In our research, students were thoroughly informed and motivated and about 35% response rate was obtained, which is remarkably high for an online questionnaire.

Nevertheless, one could think that a 35% response rate is not a high percentage as there many students who do not provide any comments. Yet, that rate depends very much on the context the online questionnaire has been delivered. It must be noted that our university statistics reveal that institutional questionnaires on any Degree (5 closed response questions that need a few minutes to be answered) are usually completed by fewer than 15% of the students. Thus, having a 35% response rate in our open-ended questions, which provide a lot of qualitative information, could be considered a good result as they allow to detect some issues, their origin, and to enhance initiatives to be taken by the members of the Engineering School Board to improve the quality of the Degree. It would be relevant to add research on how this return rate could be furtherly increased. More studies are needed to elucidate the reasons behind discrepancies in the return rate due to the type of delivery, either on paper or online.

It would also be interesting, for further research, to contrast this experience of open response questions included in questionnaires of student evaluation of teaching, with those implemented by other universities so as to have a wider overview of the situation. However, the present paper presents the experience of including questions which are more specific than simply a "leave a comment" section; students must write on four topics which are relevant for the management of a university Degree: their positive and negative perceptions of the courses taken, as well as the overlaps in course contents and the missing matters found in those courses.

The focus of this study is on how this evaluation method proved to be effective for the members of the Engineering School Board. In future research, the perception of usefulness from the students' perspective should also be addressed. Perceived usefulness most likely affects students' engagement in the evaluation process, hence findings on this topic would likely provide some justification for low response rates. Another reason for this could be that students who are happy and satisfied with the teaching they have received would not find it useful to fill in the questionnaire, as they do not have anything relevant to add.

Another limitation of the study stems from the inherent subjectivity of data codification. This cannot be fully solved, as researchers have to work with perceptions of lived experiences of human beings. This could be avoided if there was a larger group of researchers involved in the processing and analysis of the data retrieved. However, a corpus of 8,163 words was analysed for this paper, which is a fairly feasible number of words within the context of

qualitative analysis. CAQDA software packages used for codification were available so as to make the coding process easier in case of mass response and provide reliability when using multiple coders.

The interviews were done in Spanish and translated into English for the present research. This could imply a little loss of meaning in the reporting of results, but not in the analysis.

5. Conclusion

Without information on how a system is working there can be no evidence of improvement, hence effective measurement is a prerequisite for any quality improvement process (Newall & Dale, 1991). A combination of techniques can make up for the deficiencies of student conventional questionnaires to get a comprehensive overview of the teaching at Higher Education institutions. In this respect, we have described an experience carried out in an Engineering Degree to analyse, from the point of view of the Board, the advantages, disadvantages and effectiveness of open response questionnaires as a complement to closed response questionnaires.

An open response questionnaire has offered a broader view and a larger amount of qualitative information which has proved to be very valuable for teaching improvement initiatives in the Engineering Degree chosen. Although there is still some room for readjustment, this practice has been highly appreciated by the teaching professionals and members of the Board. Since 2016, the open response questionnaire has been delivered every year, hosted on the institutional website, and actions have been taken based on the information retrieved. This type of open response questionnaires could also be used in any other Higher Education institutions or universities and as suggested by Marshall (2022) they could also allow to redefine the quantitative dimensions used in the student assessment of teacher performance.

University managers should take all this information into account as decisions and initiatives made after reflecting on it can have a real impact on the transformation of Higher Education institutions and universities. Benefits obtained through the utilization of open response questionnaires, though being time consuming, would have to become a paramount task for any institution deeply involved in continuous improvement so as to reach excellence and quality.

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