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Improving Teaching Quality In Higher Education: A Practitioner's Guide To Using Formative Teaching Analysis Poll

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Improving Teaching Quality in Higher Education: A Practitioner's Guide to Using Formative Teaching Analysis Poll

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ABSTRACT

Teaching Analysis Poll (TAP) has become an increasingly popular tool for evaluating teaching quality and enhancing student learning outcomes in higher education. It requires, however, additional human resources. This paper presents a modified version for easy implementation: Formative Teaching Analysis Poll (FTAP). It can be used by an individual educator and is nonetheless an effective practical method for practitioners in higher education to improve their teaching quality and enhance the learning experience of their students.

Based on a review of literature and personal experience using FTAP, in this paper we provide an overview of the underlying methodology of FTAP, its benefits, and how it can be effectively implemented in higher education. FTAP involves collecting formative feedback from students on various aspects of teaching and learning methods, formats, and quality. It may include instructional methods, course design, and student engagement. The collected data is then analysed to identify areas of improvement and to inform teaching practice.

This paper highlights the benefits of FTAP for educators, including the provision of valuable feedback and means to implement it into an ongoing course. FTAP not only contributes to enhance teaching performances but is a powerful instrument to involve students and learners in the design and creation of a learning environment based on their needs. Illustrated with a case example, we show how by actively engaging in the learning process students reflect on their individual needs and take ownership for their education. In conclusion, this paper provides practitioners in higher education with an experience based, practical guide to evaluate their pedagogical and didactical approach, improve teaching quality, and enhance student learning experiences.

1 INTRODUCTION

Current developments in engineering education have taken more account of the nature of professional activities in engineering. As Hadgraft (2017) shows, this is reflected in a paradigm shift in curriculum development away from 'first teach the fundamentals' towards 'start by engaging with the engineering problems'. On the didactical level, this development follows the 'shift from teaching to learning' (Barr and Tagg 1995) and strengthens student-centred teaching approaches (van den Beemt, van de Watering, and Bots 2023; Hadgraft and Kolmos 2020). Putting students at the centre means granting them greater self-determination and a higher degree of autonomy in the learning process. They do not determine what they learn, but how they learn in order to become mature learners (van Uum and Pepin 2023; Wright 2011; Jones 2007). At best, this is reflected in assessment and feedback, which is not summative but formative (Hoidn 2016).

For educators, another question arises: How can we ensure that teaching addresses the needs of learners? In other words, how can we continuously evaluate whether pedagogical and didactical goals are being achieved?

As a method for interim evaluation, the use of a Teaching Analysis Poll (TAP) has gained relevance since 2010, especially in German-speaking countries (Franz-Özdemir, Reimann, and Wessel 2019). In the following, we present this method and in particular address the obstacles to its implementation. On this basis, we make a proposal on how educators can implement this method in a low-barrier way. We argue that our modification as Formative Teaching Analysis Poll (FTAP) is particularly suitable to accompany engineering courses in higher education. We show this by means of an example and derive recommendations for action when implemented by engineering educators.

2 FORMATIVE TEACHING ANALYSIS POLL

2.1 Teaching Analysis Poll

Teaching Analysis Poll is a qualitative method for the interim evaluation of a course that focuses on learners and their learning process. Unlike quantitative, educator-centred final evaluations, TAP allows the results to be integrated into the ongoing course and to initiate adjustments in the conception or choice of methods (Stockmann 2016). An external person is involved in the implementation, e.g. from the evaluation department of the university. This person takes over moderation in the following three-stage process and is required because the educator must be absent during the first phase. In this first phase, the moderator leads a group discussion among learners, which is structured by the following three questions:

1. What aspects of this course help you learn? Please be specific.
2. What aspects of this course impede your learning? Please be specific.
3. What suggestions do you have for improving your learning in this course? Please be specific.

The results are then prioritised by learners and prepared by the moderator for the second phase.

The second phase consists of an evaluation discussion between educator and moderator. During the third phase, learners and educator discuss the results and, if necessary, derive measures for the remainder of the semester. These may also be documented in an agreement (Franz-Özdemir, Reimann, and Wessel 2019; Weiß 2019).

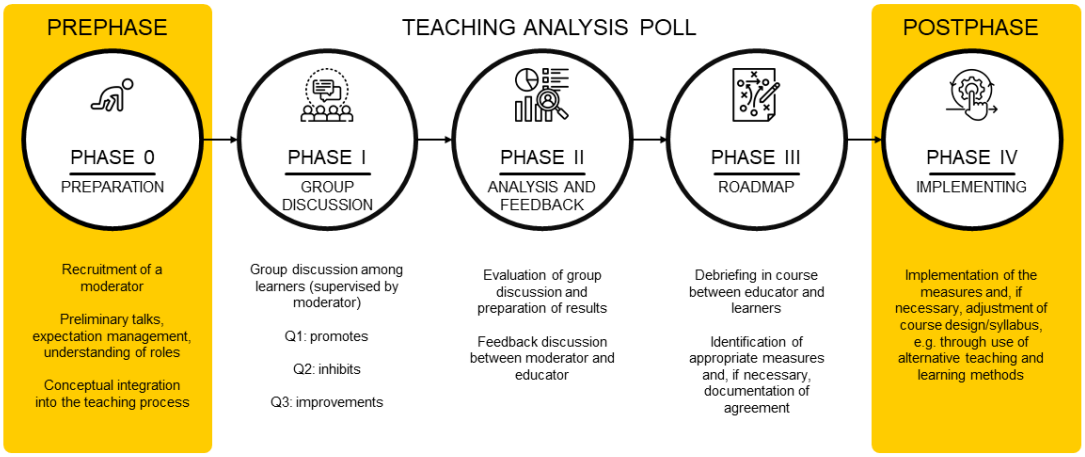

Fig. 1. Phases of Teaching Analysis Poll

Advantages of this method are obvious. It allows educators to assess their pedagogical assumptions and didactic concepts against the actual learning processes of their students, to identify needs for action and to derive measures. At the same time, this method lowers barriers for students to criticise because they do not have to fear being sanctioned for their criticism due to the involvement of a moderator as intermediary and absence of the educator during the discussion. After all, the educator is usually the same person who assesses learners' performances. Another advantage is that students are seen as equal partners in teaching and learning processes and are also given responsibility for successful design (Franz-Özdemir, Reimann, and Wessel 2019).

On the other hand, this method imposes high demands on the implementation, which can pose considerable obstacles. The biggest obstacle is undoubtedly finding a person to function as moderator. Although the literature consistently refers to institutions entrusted with quality assurance in teaching (Franz-Özdemir, Reimann, and Wessel 2019; Weiß 2019; Frank, Fröhlich, and Lahm 2011), human resources in particular are limited in these institutions as well. In our own university, for example, we approached various bodies and, despite numerous requests, were unable to recruit a person to moderate. This experience was decisive for the adaptation of the method as proposed in this paper. Another obstacle is the fact that this method requires an interruption of the syllabus in the ongoing semester. This makes sense from a conceptual point of view but can lead to undesirable interruptions particularly when educators apply student-centred teaching methods. For example, interruptions in the work on a problem-based project can lead to undesirable effects for the learners, of

which a lack of commitment to the TAP may be merely the most obvious effect. For educators, these interruptions require a strict adherence to their semester planning, syllabus, and a reduction in content. Accordingly, educators need to be convinced of the benefits of the method, which in turn can be an obstacle for first-time implementation. Finally, we observe a limitation of the method in the one-time intervention. Due to the high effort involved, TAP does not allow for iterations and therefore does not permit any statements about the effectiveness of the measures taken subsequently.

2.2 Development of Formative Teaching Analysis Poll

We responded to the obstacles for implementing TAP and adapted the method to be able to use it in a more accessible way. The following six criteria were decisive:

1. Implementation of TAPs should not depend on the availability of (human) resources outside the course.
2. The method should be formative. Here, we understand formative evaluation as an evaluation process that goes beyond a one-time intervention.
3. The method should be applicable without interrupting ongoing learning. Thereby we want to ensure that learner-centred methods can unfold their didactic potential unhindered. We argue that student-centred methods benefit more from accompanying reflection than from interrupting evaluation. This makes the method suitable for use in a variety of engineering education courses.
4. The method should also be able to reflect and evaluate adjustments made based on prior feedback. Its accompanying character should enable educators to institutionalise it as an iterative process.
5. Educators must ensure that students are involved as equal partners in designing the learning environment and are taken seriously as experts for their (respective individual) learning processes.
6. To avoid censorship effects by not using an external moderator, there must (also) be a channel for anonymous feedback.

For TAP to fulfil these criteria, we had to find a way to integrate an evaluation not only as interim evaluation, but also as an accompanying process with the teaching and learning process. Here we coupled the method with another format, a learning journal. A learning journal is a written documentation of one's learning process that emphasises reflection on learning over the content learned (Park 2003; Johannsen 2021). Although we provide guiding questions for learners, we do not specify content or length of entries. For educators, we recommend using a digital tool because it allows asynchronous access to content by learners and educators alike. In addition, it features methodological overlaps with TAP. Using it as part of a FTAP is unique in that the questions of a TAP concerning (1.) helping, (2.) impeding, and (3.) improvable

aspects are integrated here.[2] This allows educators to obtain feedback on each past session before the next one. Any other individualised feedback tool is, of course, equally suitable if it is used regularly by learners and evaluated by educators. Web-based instruments that allow anonymised data entry are particularly suitable for this purpose. Alternative easily used tools include ether pads or online whiteboards. All that needs to be ensured is participation to such an extent that the results can neither be individualised nor become meaningless due to the low number of contributions.

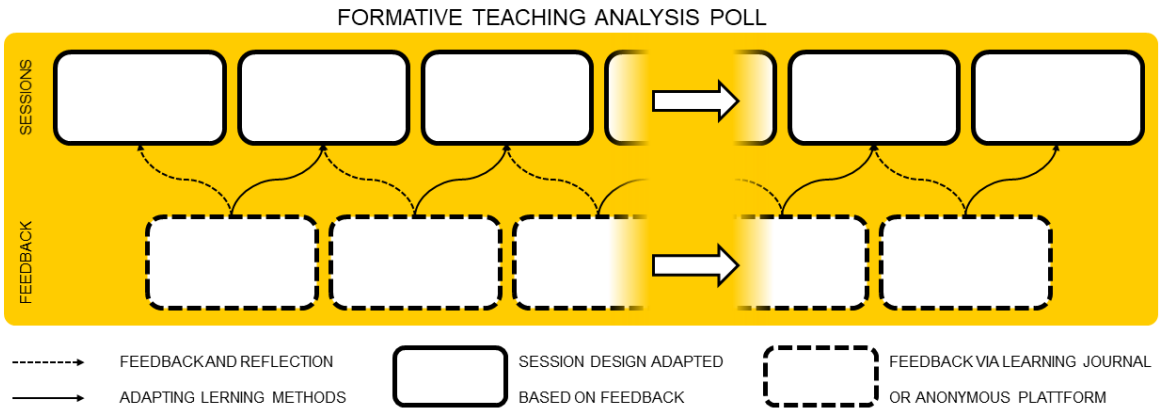

Fig. 2: Iterating Phases of Formative Teaching Analysis Poll (here in combination with Learning Journal)

Results can then either be systematically evaluated or used as a channel to pragmatically identify any need for action. Either way, each analysis should be based on a methodological approach. Due to reduced effort and with the aim of creating the best possible learning environment, especially when teaching and learning methods are used in which an educator has little experience, there is much to be said for the latter, pragmatic evaluation. In our experience, the time needed for each weekly evaluation is about one hour for a course with thirty learners. This is a reference value from which individual variations are possible. We found that it is good practice to always select the most important results at the beginning of each session and report them back. This allows learners to correct misinterpretations and to think about improvements on their own. They also experience that their contributions (can) have consequences for their own learning process. By making feedback loops an integral part of the course, the process character of FTAP is considered. In a final session reserved for discussion and reflection, we reflect on the course. As part of this reflection, an evaluation of the FTAP also takes place. We provide an insight into these results under 3.1 in the context of the case example. In addition, we conduct a summative (and therefore educator-centred) final evaluation. It is, of course, optional to use the final session in this way as it is optional to conduct an evaluation at the end.

[2] TAP can also be combined with management methods such as the stop-start-continue approach and made productive for higher education teaching (Hoon et al. 2015).

2.3 Evaluation

To investigate whether FTAP is effective and achieves the goals we set, we used the example of a course offered every semester and conducted a group discussion in the final session for a preliminary evaluation. As this session did not focus on the FTAP method, but rather reflected on the course, we decided to conduct a qualitative analysis. We evaluated the results of group discussions as well as entries from learning journals and anonymous feedback channels using a qualitative content analysis based on (Gläser and Laudel 2013). This analysis includes the contributions of eighty-seven learners. Because this paper is a practical report, we will limit subsequent comments to a poignant presentation within the framework of the following case example using illustrative statements. This also results in limitations of this evaluation, given that the focus is on FTAP and its implementation strategies.

3 IMPLEMENTATION

3.1 Case Example

FTAP was applied and evaluated in the course *Engineering for Impact*. It is an interactive seminar in which students use transdisciplinary methods to develop innovative, technology-based solutions for societal challenges. We use a variety of formats and methods to establish a practical relevance and to pave the road towards application in the spirit of the beforementioned paradigm shift in engineering education. Most notably is an involvement of guest experts from practice, who hold workshops with students in which they apply methods and tools to further develop their respective projects. As part of the assessment, students write a paper describing the problem in a scientific way and explain their solution in an oral presentation. As part of the assignment, they reflect on the social impact, identify stakeholders from the fields of science, business, society as well as politics and develop a communication strategy with suitable measures for implementation. We have published an exemplary demonstration in cooperation with Fraunhofer-Gesellschaft (Johannsen and Schraudner 2022).

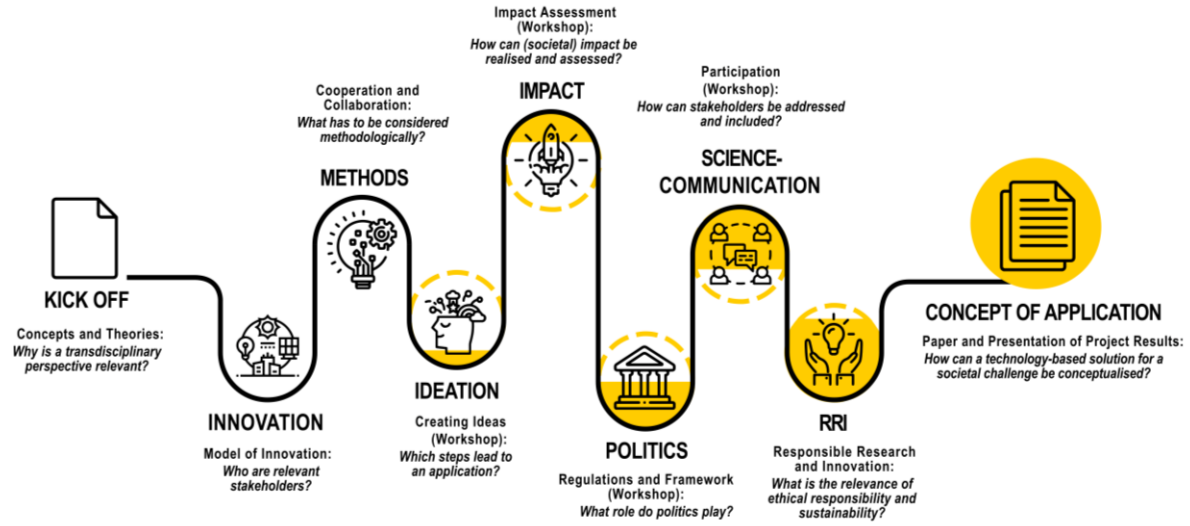

Fig. 3: Simplified Syllabus of this Case Example

Feedback we received from students we interpreted against the background of their project work. Overall, the evaluation has resulted in various clusters, three of which we present here as examples. In the following figure, the clusters are named and then illustrated with the students' own statements. All translations are our own.

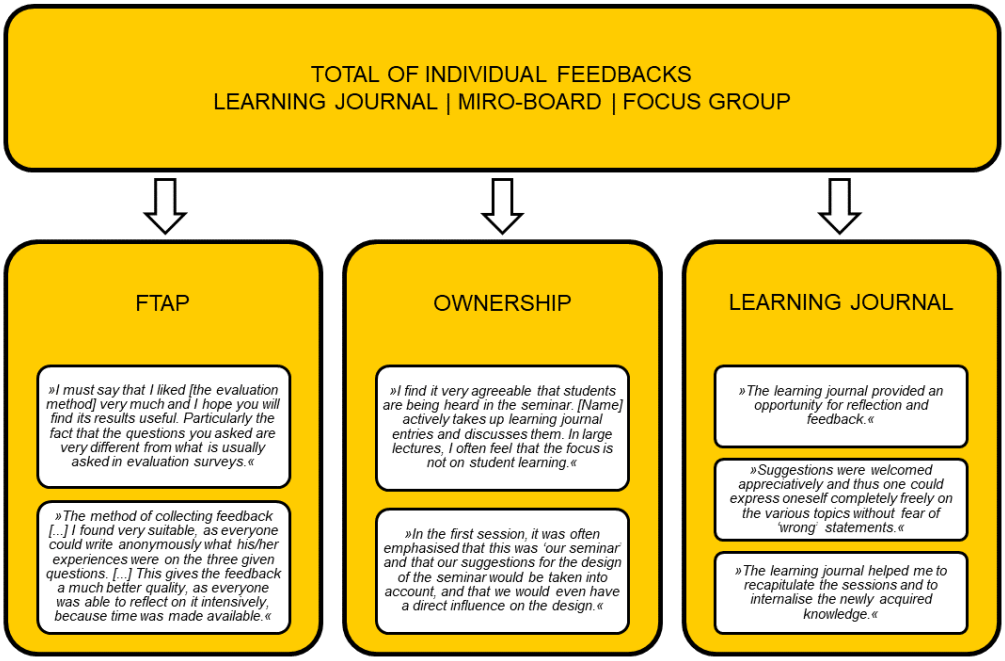

Fig. 4: Selected Results of Qualitative Evaluation with Exemplary Statements

The first cluster concerns FTAP, which is the subject of this paper. It is not an independently evaluated object, so not all students refer to this format. Nevertheless, it was repeatedly taken up and, above all, the inclusion of feedback in the course was a constructive contribution to its design. This is exemplified by the first statement, in which a student emphasises its usefulness. The second quote refers to the possibility of giving direct but anonymous feedback. Here, the contribution emphasises the quality of the feedback, which benefits from this integrated format because it makes it easy to accept it as an integral part of the course. As a result, students recognise its benefits, develop reflective capacities, and engage more willingly in reflective activities. This is in line with results of Power and Tanner (2023).

The second cluster refers to the role of students as co-creators of the course. The first quote highlights the function of learning journals as a channel for feedback for the design of a supportive learning environment by using feedback in iterative cycles to adapt used methods and formats in the course to needs of learners. While this quote is taken from a retrospective point of view, i.e. at the end of the semester, the second quote is taken from an entry in a learning journal following the first session at the beginning of the semester. It emphasises the importance of involving students from the beginning, taking them seriously as experts for their learning and sharing responsibility for designing their learning environment. Our results, hence, are in line with results of similar approaches (Zhang 2022).

A third cluster provides exemplary quotes about using learning journals as a format. We chose to present these results, because it played a key role in our conception, although it is not necessary for the implementation of an FTAP and can be replaced by other channels. Its particular benefit arises from the fact that students not only provide feedback, but are also given supporting structures, for example through guiding questions, which help them to achieve a more sophisticated level of reflection, both in terms of a critical appraisal of the content as well as the pedagogical and didactical framework (Hatton and Smith 1995). Here, too, appreciative interaction and a high degree of transparency about adjustments in the course helped to improve the learning environment, promote learning successes, and thus contribute to better results in the course overall. Transparency not only includes the implementation of measures, but also a justified rejection of student suggestions if these cannot be implemented.

3.2 Recommendations for Action

The path to this innovative, formative teaching evaluation can be taken without much effort. Those who want to introduce FTAP in their courses merely need time within the course, and willingness to engage in criticism, and make adjustments in collaboration with learners to improve their learning environment. We conclude by summarising our recommendations for educators who want to go down this path and plan to use FTAP in engineering education.

1. This format is based on voluntary participation of both educators and learners and serves the purpose of aligning expectations and needs of educators and learners alike. Handle results with due confidentiality.
2. Be prepared to (partly) give up control and share responsibility with learners.
3. Allow time not only to take in learner feedback but also to discuss it with them and derive appropriate adjustments from it.
4. Find a format that is compatible with the learning management systems (LMS) currently in use and does not require any additional preparation on either the educator's or the learners' part.
5. Be appreciative and take learners seriously as experts for their learning process.
6. Be transparent about both the changes you implement and the suggestions you discard.

Our experience is in line with Frank, Fröhlich, and Lahm (2011) that educators who show a sincere interest in successful learning in their course and who approach establishing an appropriate learning environment with scholarly curiosity benefit the most from FTAP. In this respect, it is a matter of attitude, because those who are as ambitious about investigating ways to improve their teaching as they are about their own research are embarking on the wonderful journey of improving engineering education together with learners through FTAP.

4 SUMMARY AND ACKNOWLEDGMENTS

FTAP is a method that allows formative evaluation of courses and provides formative feedback for educators, stimulates reflection, and promotes exchange between educators and learners to create a supportive learning environment and to increase learning success. Thereby, it can be ensured that education effectively addresses needs of learners as well as achieving pedagogical and didactical objectives. Considering that engineering education is undergoing a paradigm shift with more student-centred teaching and learning approaches, this ongoing alignment is of great importance. Therefore, FTAP is particularly suitable for educators who want to adapt their teaching and experiment with new formats, because it contributes to quality assurance with its iterative and agile stages.

Our special thanks are extended to the participants of the course *Engineering for Impact* at Technische Universität Berlin for their cooperative, open, and constructive participation, through which we learned with and from each other.

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