FROM STUDENTS' EVALUATION OF AI TEACHING TO TEACHERS' SKILLS ENHANCEMENT

Hajer Berhouma, Yosr Ghozzi

Departments TIC-Training of Trainers, Electromechanical Department, ESPRIT School of Engineering

ABSTRACT

For a while, training needs were identified by supervising teachers based on a personal effort using a short-term and punctual strategy. Programmed training could respond to current teachers' needs, with practical and hands-on training that can be applied directly with students and organized on site. Despite supervising teachers' efforts to implement targeted training programs, there are discrepancies between student opinions and teaching objectives. This finding remains valid and stems from the fact that training needs have never emerged from the results of student evaluation of teaching (SET) survey. Through this paper, our aim is to start from the SET process to generate training needs for Training of the Trainers (ToT) programs for a better-quality teaching that is effective for both teachers and students involved in the curriculum. In fact, the process of the SET begins by collecting students' opinion on AI teaching through many questions. Responses are related to different degrees of students' satisfaction. After that, an analysis of results is done with different indicators such as a visualization of results by class, by course or by teacher. For each indicator, measures are used to determine if it is necessary to take decisions by proposing adequate training. The selection of an indicator with measures is considered as a scenario. Scenarios can be defined by combining more than one indicator. The execution of these scenarios leads to recommendations for future professor's training. In this way, we can consider that we are aiming to achieve standards 9 and 10 by addressing standard 12.

KEYWORDS

Student Evaluation of Teaching, AI courses, Generating training needs, Skills enhancement, Standards: 9, 10, 12

TRAINING OF TRAINERS FOR TEACHER'S PROFESSIONAL DEVELOPMENT

Teaching is one of the areas of professional activity of university teachers, alongside research, supervision, and university administration. In most higher education systems, teachers in higher education are trained almost exclusively in research, which means that their expertise in other areas of their professional activity is usually developed in workplaces and educational spaces with, on the one hand, teachers via available sharing channels and on the other hand

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students conferring on various learning situations to adapt to a dynamic and sometimes restrictive professional environment.

Historically, a teacher's professional development has depended on mechanisms such as reflective practice through the systematic analysis of his or her actions and experiences with a view to identifying principles that can guide any future improvement action (Brookfield, 1992; Calderhead, 1992; Kolb, 1984; Schön, 1983; Zeichner & Liston, 1996). With the evolution of research in this field, the professional development of university teachers essentially consists in the construction of competencies and identity transformations in work situations during a career (Paquay and al., 2010). In a system where teacher training is institutionally unformalized, professional development is primarily a matter of voluntary intervention. Indeed, university teachers devote time to reflecting on their practices and their impact on student learning to draw out principles that will help them build their pedagogical knowledge base.

This area of research is attracting growing interest in higher education institutions, which are increasingly keen to promote ToT programs to improve the quality of teaching and learning and meet the challenges of student-centered learning (Gaebel, B.M. and al., 2018). In addition, studies have identified the characteristics of effective professional development programs based on a review of recent studies of professional development models (Darling-Hammond and al., 2017), describing the types of professional development that lead to robust professional learning, improved teaching, and deeper student learning. On the other hand, other research focuses on ToT programs assessment by teachers. These methods involve the identification of certain key design factors with reference to well-defined indicators to facilitate the understanding and conceptualization of tasks and activities that should receive greater attention when designing a faculty professional development program (Muammar and Alkathiri, 2021). At our level, our study is rather interested in generating teacher training needs before the design of programs dedicated to them based on the students' evaluations of teaching.

GENERATING TRAINING NEEDS FROM THE STUDENTS' EVALUATIONS OF TEACHING

Despite efforts to support teachers' professional development, the SET has been reduced to an isolated bureaucratic procedure, disconnected from a global approach to quality that values and supports teaching (Cashin, 1996; Bernard and Bourque, 1999, Fontaine, 2009; Younès and al. 2012). To date, the SET procedure is limited to a collection of individual assessments, blurring singular points of view and discrepancies by reducing them to satisfaction statistics for sharing feedback with students to complete the evaluation procedure of the teachings on their side. And yet, the procedure feeds on different forms of sharing, the pooling of meaning between the different actors -students, teachers, managers-. Indeed, student feedback obtained within the SET framework can yield information that is most helpful to teachers, particularly when combined with other data like exam results, the teacher's own annotations, or teaching experts' observations (Bernard and al., 2000; Coggi & Maccario, 2009; Paulsen, 2002; Smith, 2008).

A more recent analysis of the scientific and expert literature shows that the SET can become one of the strategies to support the professional development process of university teachers and thus act in complementarity with other strategies such as the steering and monitoring committee, the council of the direction of studies or research applied to university education (Berthiaume and al., 2011; Younès and al., 2017; Fernandes and al., 2023). Through our study, we have based ourselves on literature models to reconcile methods of generating training

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needs for trainers with the basic principles of the design of the SET model, for quality teaching, through an experimental sample specific to AI teaching.

Indeed, we present the results of the SET, through a reliable program evaluation method to implement a systematic and continuous improvement based on continuous program evaluation results (Standard 12) and consequently refine the pedagogical and technical skills of the teacher with a view to improving learning. Further, and based on these results, we provide evidence of systematic and continuous improvement (a) to set up a process for generating teachers' teaching skills (Standard 10) and, (b) to systematically support the development of teachers' skills to best meet the needs of accompanying students in a dedicated context (Standard 9).

THE INTENT OF OUR APPROACH

We have discussed in earlier parts how SET and ToT processes directly affect the quality of teaching. We have concentrated on how these two activities might interact because they have the same goal, which will enhance teaching practices. This concept is illustrated in figure 1. We have only developed one direction of interaction in our work, which is the determination of necessary training through student response analysis.
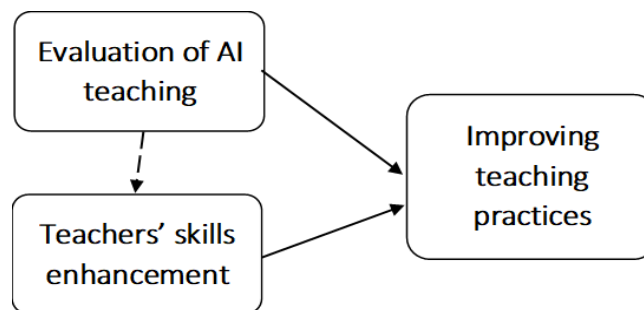

Figure 1. Intent of our approach

Our study is reserved for the analysis of feedback from students who follow AI courses aimed at generating training needs for teachers responsible for teaching the targeted courses.

METHODOLOGY

Although the interaction between the two activities in Figure 1 appears simple, Figure 2's description of the process reveals that it involves numerous consecutive steps. We have implemented components for some steps to provide some outcomes automatically. That's why this process is considered partially automated. The sections that follow will cover further details.

Following the process of gathering data from an online assessment platform, indicators are chosen in the predefined scenarios through a visualization step. After that, we go through these scenarios to start the data analysis step manually. Lastly, we move on to generating recommendations for the training needed.
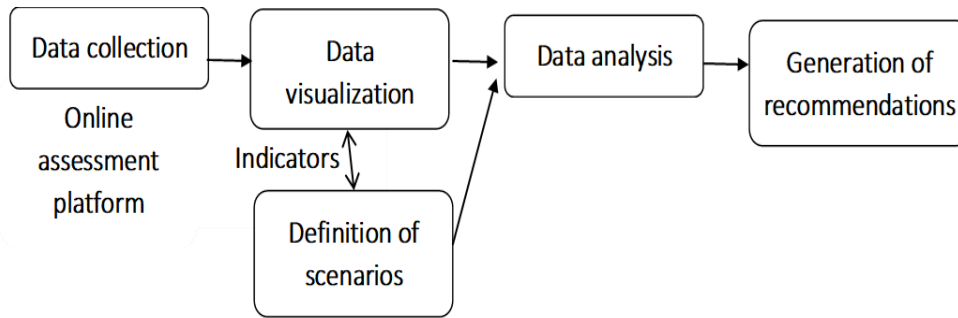
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Figure 2 Process of our methodology

Data collection

The information was gathered using a numerical survey that students were given at the end of their study session. This survey corresponds to every course offered during this period. However, we have limited our attention to AI courses. The following is a description of the technical and pedagogical aspects of teaching that are covered in this survey:

Table1. Survey for SET

1. Course presentation (module sheet, learning outcomes, and assessment methods)	1 2 3 4
2. Adopted pedagogy (method, justification, response to questions, and rhythm)	1 2 3 4
3. Adapting learning activities to satisfy the course's goals (innovation and pertinence)	1 2 3 4
4. The course-related workload (in hours) outside the scheduled class time per week	1 2 3 4 5 6 7 8
5. Accomplishment of learning objectives (mastery of the learning outcomes specified in the module sheet)	1 2 3 4
6. Availability of teaching resources in the classroom	1 2 3 4

1 Very dissatisfied	2 Dissatisfied	3 Satisfied	4 Very satisfied

Data visualization

The students' responses to the courses are automatically displayed. The visualization is presented based on various indicators to assist the analysing process. To get an idea of the overall number of answers for each question and the proportion of responses for the six levels of satisfaction we could start by launching a global visualization. After that, the visualization can only refer to the teacher indicator to get insight into the corresponding answers for each of their courses. To select a particular course for the teacher in question, we can add the indicator Course in a third step. Other indicators, such as Class or level of study, can be also employed.

Scenarios

As previously noted, by specifying a certain visualization sequence, combinations of indicators are available. A scenario is described as an ordered set of indicators with a minimum percentage of answers for each question. A scenario with multiple indicators is considered

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complex. For instance, the indicators Teacher-Course could create a complex scenario. If the goal is to confirm the degree of satisfaction with the adopted pedagogy (question 2 of the survey), we set a minimum response rate of 60% for the level of satisfaction 3: Satisfied (at least 60% of the course participant choose this specific answer). This indicates the rate of satisfaction of the pedagogy that a particular teacher has chosen for a particular course.

Data analysis

The data analysing step is conducted manually by applying a scenario on the visualized data. As mentioned before, scenarios have a minimal response rate based on how satisfying a query is. Future training recommendations will be defined if the response rate obtained falls below the minimum required and relates to a scenario with indicators such as Teacher or Course.

CASE STUDY

After one semester of education, our school has just begun using the survey found in section 2-1 for SET (Standard 12). As mentioned, we have automatically created a visual representation of the data using several indicators. There were 820 students that completed the survey in total, and 3476 course assessments were completed. By following these steps (Figure 3), we have implemented the process shown in Figure 2.
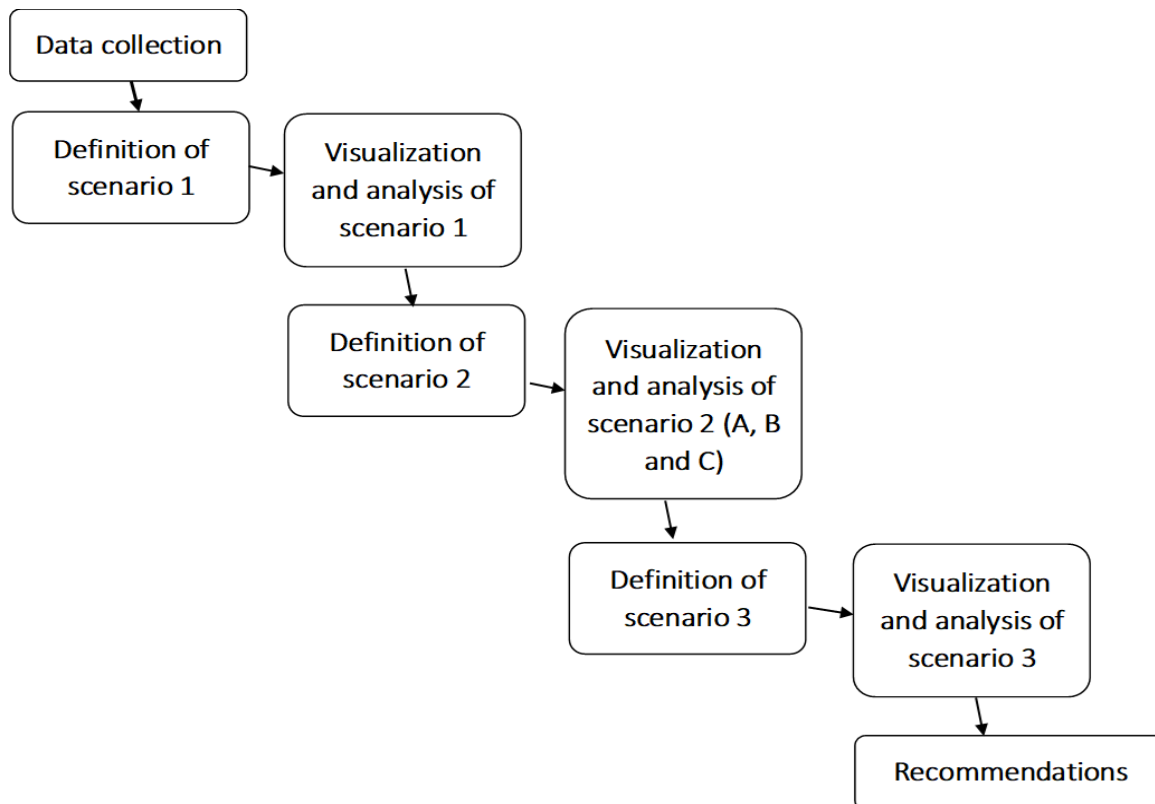

Figure 3. Steps of the case study

We only observed one instance of an AI course in our case study. Our goal is to analyse the percentage of students who are satisfied with the pedagogical aspects. Consequently, for

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questions 2 (see table 1), the minimal rate of satisfaction (level 3 and 4 of the table 1) was defined at 60%. This scenario was constructed to give a general overview of the adopted pedagogy of this course.

Table 2. Scenario 1 of the indicator Course

Indicator	Question	Level of satisfaction	Rate of the level of satisfaction
Course AI	2. Adopted pedagogy (method, justification, response to questions, and rhythm)	3- Satisfied 4- Very satisfied	60%

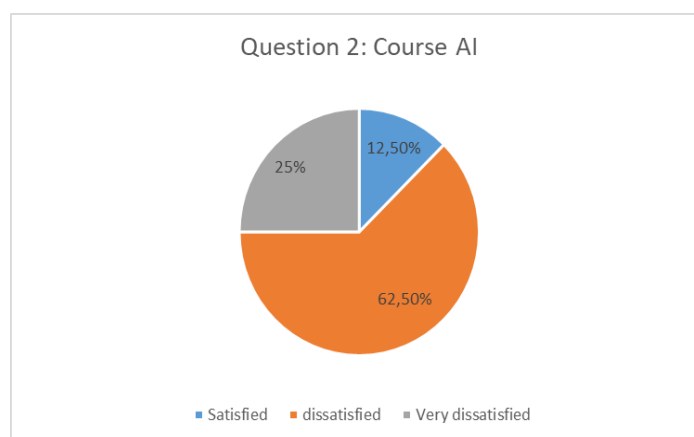We have obtained a rate of satisfaction equal to 12.5% as shown in Figure 3 below.

Figure 3. Visualization of scenario 1

This is an extremely low rate. For this reason, we have attempted to analyse the associated teachers' evaluations for these six fifth-level classes. Three of our teachers—A, B, and C—are involved in this teaching.

We can estimate that these teachers need their pedagogy to be improved for the specified targeted AI course. We created another scenario with the indicator Teacher to confirm this assumption. A summary of each teacher's pedagogical aspect is provided by this scenario.

Table 3. Scenario 2 of the indicator Teacher

Indicator	Question	Level of satisfaction	Rate of the level of satisfaction
Teacher "Sample of teacher"	2. Adopted pedagogy (method, justification, response to questions, and rhythm)	3- Satisfied 4- Very satisfied	60%

We have obtained these three results below.

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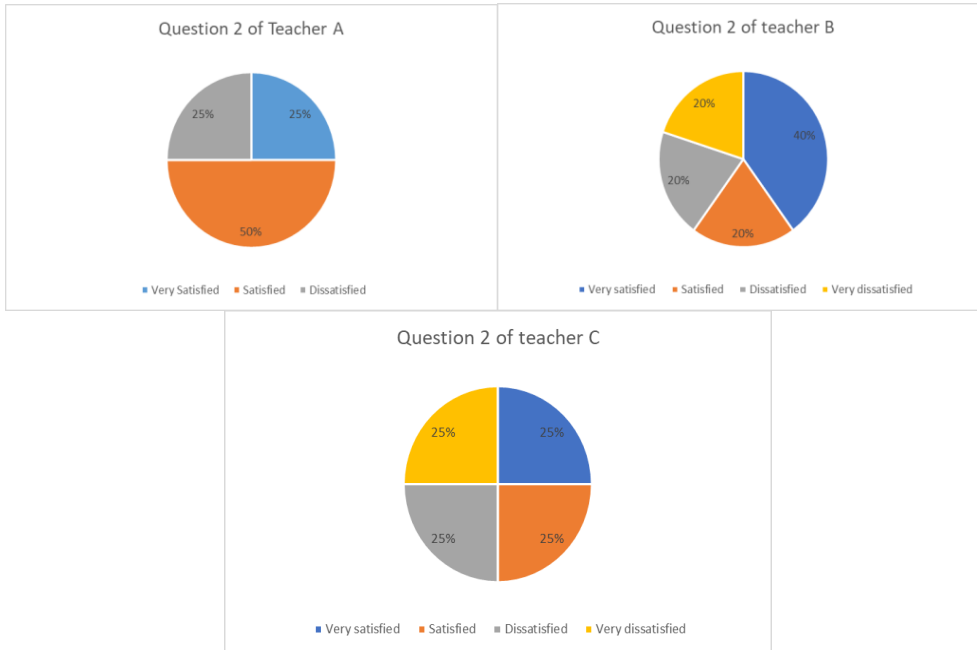
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Figure 4. Visualization of scenario 2

We can draw the conclusion that, in comparison to teachers A and B, teacher C needs assistance in acquiring more pedagogical skills.

We use the following complex scenario to validate our assumption. We have completed our analysis of Teacher C on Class 3 of 5th level.

Table 4. Scenario 3 of the indicators Course and Class

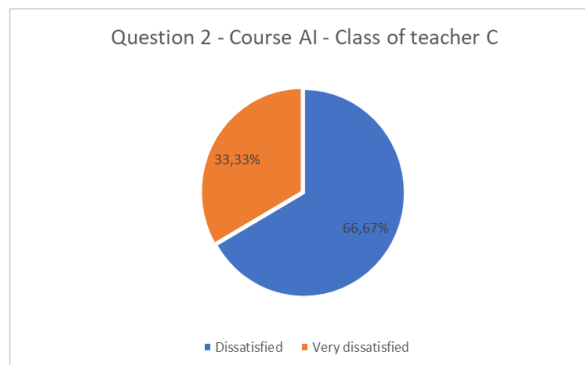| Indicator	Question	Level of satisfaction	Rate of the level of satisfaction
Course AI And then Class 3 of the 5th level	2. Adopted pedagogy (method, justification, response to questions, and rhythm)	3- Satisfied 4- Very satisfied	60%

The obtained results are the following:

Figure 5. Visualization of scenario 3

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Considering this, we can recommend that teacher C participate in the upcoming pedagogical training program. According to this finding, teachers A and B might not undergo the same training and might need to undergo other training programs by conducting other scenario analyses focusing on other aspects of the SET survey.

DISCUSSION

The result we obtained was beneficial because, Teacher C being a former recruit was not necessarily concerned by specific pedagogical training. This fact was rectified by the results obtained using our training needs generation process for teaching improvement requiring need opportunities to develop and improve these competencies (Standard 10) in order to have the capacity to help students achieve a deeper working understanding of the relevant disciplinary fundamental (Standard 9). These results are then cross-referenced with the students' assessment's retrospection process established by teachers at the end of each evaluation session for the purpose of continuous improvement of student training programs through considering the program's effectiveness and efficiency in reaching its intended goals (Standard 12). Moreover, the obtained recommendations are insufficient to be used on their own for planning further trainings. They need to be combined with other strategies, including manager and teacher feedback.

CONCLUSION

This article presents a mechanism for ToT generating needs based on the SET. The state of the art of earlier research on ToT and course evaluation served as the foundation for this methodology. By using this methodology on an actual case study, we were able to determine recommendations for future teacher trainings. We focused on the pedagogical aspect of AI modules, which is the subject of this case study. As a perspective, to have an exhaustive overview of the trainings needed we must focus on other elements like technical skills. It is also necessary to take a range of courses. As potential future research directions, we also propose evaluating the effectiveness of training interventions in teacher education. We will also focus on how these training programs will be implemented effectively.

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BIOGRAPHICAL INFORMATION

Hajer Berhouma teaches software engineering at ESPRIT. She is currently in charge of the training of trainers' department. She holds an MSc and is an expert in software engineering. Having attended several Tunisian universities, she has over eighteen years of experience working in the field of education development. Software engineering and teacher professional development are two of his research and development interests.

Yosr Ghozzi has a PhD and teaches computational mechanics at ESPRIT. She holds an MSc in continuous learning enhancement and is developing a research work in teacher training as part of a work-study scheme for an engineering school. She has over twelve years of experience working in the field of education development. She is currently following an EMBA program to support digital innovation in management.

Corresponding author

Hajer Berhouma
ESPRIT (Ecole Supérieure Privée
d'Ingénierie et de Technologies)
1, 2 rue André Ampère - 2083 - Pôle
Technologique - El Ghazala
Hajer.berhouma@esprit.tn

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