

Student perspectives inspiring change: The vital role of surveys

Perspectivas estudiantiles que inspiran cambios: El rol vital de las encuestas

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Abstract

The absence of simple feedback mechanisms that consider the interest of students hinders the updating of curricula. This impediment is exemplified in the Software Security Technologies course, taught in the last semester of the Information and Communication Technologies Engineering programme. For this study, the descriptive cross-sectional method was adopted, which is characterised by data being collected at a single point in time and at a single point in time. The method was applied in 2022-1, using a convenience sample of 34 students who participated voluntarily. The results obtained support the curricular updating strategy for continuous improvement, in alignment with the institutional development programme of the Tecnológico Nacional de México (TecNM) and to meet CACEI requirements. New course topics were introduced based on the results obtained, including the implementation of Artificial Intelligence as a coaching tool for collaboration and exploration in the development of the final case study.

Update, Syllabus, Survey

Resumen

La ausencia de mecanismos sencillos de retroalimentación que tengan en cuenta el interés de los estudiantes obstaculiza la actualización de los programas de estudio. Este impedimento se ejemplifica en el curso de Tecnologías de Seguridad del Software, impartido en el último semestre del programa de Ingeniería en Tecnologías de la Información y la Comunicación. Para este estudio, se adoptó el método descriptivo transversal, que se caracteriza porque los datos se recolectan en un solo momento y en un solo tiempo. El método se aplicó en 2022-1, utilizando una muestra de conveniencia de 34 estudiantes que participaron voluntariamente. Los resultados obtenidos apoyan la estrategia de actualización curricular para la mejora continua, en alineación con el programa de desarrollo institucional del Tecnológico Nacional de México (TecNM) y para cumplir con los requisitos del CACEI. Se introdujeron nuevos temas del curso con base en los resultados obtenidos, incluyendo la implementación de la Inteligencia Artificial como herramienta de coaching para la colaboración y exploración en el desarrollo del caso de estudio final

Actualización, Programa de estudio, Encuesta

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Introduction

Taking into consideration what is established in the work programme 2022 published on 21 January of the same year and which was based on the Institutional Development Programme 2019-2024 published on the website of the Tecnológico Nacional de México (TecNM) and which shows the priority projects based on the strategic axes of the same and to which the research refers is specifically axis 1 whose name is "Educational quality, coverage and comprehensive training", which establishes the general objective of strengthening the quality of the educational offer, considering two lines of action: the first is to improve the quality, relevance and evaluation of the undergraduate and postgraduate academic programmes towards a level of international competition, and the second is to improve the level of qualification of the academic staff.

As such, line of action 1 indicates that the TecNM's educational model is to be updated and the second one is the self-evaluation of the educational programmes at undergraduate level, which is why it considers the application of surveys to strengthen and consider the students' perspective, specifically for the subject of Software Security Technologies.

Considering what Rodríguez Lagunas, J., Leyva Piña, M., & Hernández Vázquez, J. (2020) mention that the university reforms of the last two decades in Mexico have as their main objective to promote the modernisation and quality of education. To this end, measures have been incorporated to promote modern higher education institutions (HEIs) capable of meeting the new demands of society (ANUIES, 2000) 2018).

Vaillant, 2016 as cited in Huanca Ramírez (2023) considers that it is a mission of each teacher for the improvement of the performance of a suitable institution to make decisions appropriate to the reality of the group to reform and establish organisational activities or pedagogical planning that should be directed to the achievement of optimal educational competences in favour of the acquisition of learning.

Quezada Cáceres, S. & Salinas Tapia, C. (2021) summarise that effective feedback is incipient in the freedom of teaching in Mexican universities where any process of change is gradual, since the perception of the student and the teacher about co-responsibility in learning must be transformed, by emphasising the benefits such as having the possibility of knowing different ways in which the same problem is contextualised, understood and solved, which can be achieved through qualitative, quantitative and timely feedback (Elizondo, J. & Gallardo, K. (2018). Together, Harks, Rakoczy, Hattie, Besser et al., 2014) cited in Quezada Cáceres, S. & Salinas Tapia, C. (2021) mention that, although there is a concern for implementing the practice of feedback, it must be systematised and adopted as linked to the entire teaching-learning process.

Therefore, sustainable feedback is recursive in nature when it is delivered through cycles, providing an opportunity to correct erroneous knowledge that leads to improvement, with the support of clear criteria that allow for calibrated self-assessment. In this way, metacognitive processes are generated, involving feedforward feedback to improve the current task and meet future learning needs.

The teacher must consider the student in the feedback as an ally to jointly build strategies to improve levels of understanding, explicit and tacit (Boud, D. & Molloy E. (2012); effective feedback should allow students to actively participate in the process of understanding intended objectives to self-assess their own work and develop strategies (Hattie & Timperley, 2007) that allow them to improve.

Furthermore, Maldonado *et al* (2023) externalise that it is crucial to consider all stakeholders, including teachers, students, parents and the wider community, where collaboration and open communication are key to addressing challenges and maximising the benefits of such changes and that constant reflection and evaluation of outcomes are essential to making informed decisions in the field of educational administration.

Development

The methodology used was that of (Hernández Sampieri R., Fernández Collado, C. Méndez Valencia, S., Mendoza Torres, C. P. (2014), who point out that descriptive studies "seek to specify the important properties of people, groups, communities or any other phenomenon that is subjected to analysis", a descriptive study is conducted since information was obtained about the phenomenon under study, describing the situation and identifying its different elements, analysing and interpreting them using a survey, limiting the sample to the students of the subject.

The central problem is the lack of implementation of mechanisms that during and at the end of the subjects allow enriching the study programmes, since instruments are applied, but these only evaluate the teacher, and do not consider elements that allow improving the study programmes, and even this survey has not been updated according to the new needs that are arising day by day in the society in which students and graduates develop. The updating of study plans and programmes should be considered in a constant and periodical way that is in line with the new changes that are taking place in the way of teaching and achieving learning for the students, as well as considering the current technological innovations, the way of life of the students, the environment in which they develop and the way in which organisations are evolving.

In the particular case of the Instituto Tecnológico de Tlalnepantla (ITTTLA) and specifically in the career of Engineering in Information Technology and Communications, the speciality of Software Engineering is taught and where one of its subjects is Software Security Technologies and is where the survey was applied to know the opinion of students regarding the subject, it should be noted that an analysis of the curriculum of the career and specialties was also carried out in different aspects such as: The results of this analysis are set out in another document, one of the results of which was considered for this article, which indicates that the generic study programmes have not been updated in accordance with the new needs of organisations and technological advances, and the one corresponding to the specialities is revised every 3 years.

In this regard it is important to mention that the study plans and programmes were generated and implemented in the institute from 2008 and to date they have only been updated since 2013 so it can be seen that they have a 10 year lag where there have been changes such as new forms of work, the pandemic, new information and communication technologies, computer equipment, new requirements of legal and governmental entities.

That is why it is important to consider all those involved and participants in order to improve the professional training of the ICT engineer, as well as the elements and the environment where they develop in order to include the new needs that contribute to their professional profile, including soft skills, the use of information and communication technologies, computer equipment and software management that will allow them to fully develop in their organisational environment.

The application of the survey was carried out at the end of the semester after the delivery of the final evaluation in a way that allowed the student to evaluate and express their opinions with the freedom and security that it would not influence their final evaluation.

For the survey, the Google form was used so that the student could answer at the time and place he/she found himself/herself and was limited to only one answer, the questions were elaborated in a general way as a test essay and contained the following questions:

1. What is your general opinion of the course?
2. How do you consider the overall content of the course?
3. How do you consider the theoretical content of the course?

Very good () Good () Fair () Poor () No comment ()

4. How do you consider the practical work done during the course?

Very good () Good () Good () Fair () Poor () No comment ()

5. Did the course contribute to your professional training? Yes () No () No ()

6. Do you consider the updating of the content of the course important for your professional training? Yes () No () No ()

In which units and topics. Indicate topics to be included.

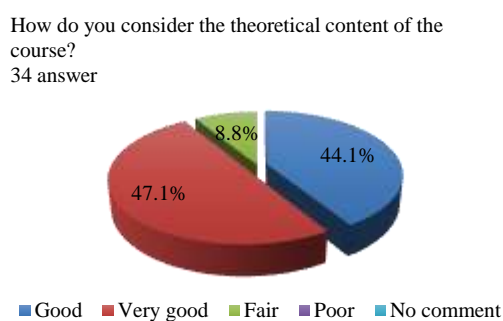
7. Give your opinion of the course This question was considered optional so that the student could express whatever he/she wished in it and even if he/she wished to include his/her name and control number he/she could do so, since the survey was carried out anonymously but only for the members of the subject.

The sample of students for this first test case were those enrolled in the subject being these for the period 2022-1 a total of 34 where a convenience sampling approach was used due to the size of the sample and the availability of participants (Johnson, 2015; Smith & Brown, 2018), with a non-probability sample of 39 students of the corresponding period. It is important to indicate that along with the survey, observation was also applied to analyse the behaviour of the students, since the time of the pandemic had passed and the application of the survey was carried out when the students returned to the classroom, which is interesting to see the results in a later analysis.

Results

Based on the application of the survey, the following results were obtained:

For the first question "How do you consider the theoretical content of the subject" the following results were obtained which are shown in graph 1.



Graph 1 Question 3

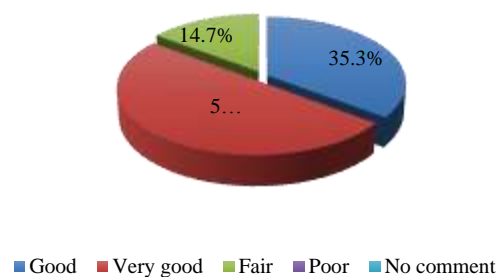
Source: Own Elaboration

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For this question a diversity of opinions can be observed, but with the highest percentage being very good (47.1%) followed by good with 44.1%, so that the opinion of the theoretical part of the course is considered good and very good by the students with a total of 91.2%, which indicates that for them the content of this speciality subject is very good and good, confirming that the development of the speciality is still valid for them due to its 3-year duration.

With regard to the internships, the following result was obtained, as shown in graph 2.

How do you consider the practical work done during the course?
34 answer



Graph 2 Question 4

Source: Own Elaboration

In this question, the student is asked how he/she considers the practices carried out during the course, and as can be seen in figure 2, the results of the practices indicate very good with 50% and good with 35.3% at this point it is important to highlight that there were no negative answers and no comments, so that in this aspect it was reflected to integrate more practices for all units of the course, in addition to the student shows interest in doing more practical exercises thus strengthening their skills as a future professional.

Did the course contribute to your professional training?
Yes () No ()
34 Answers



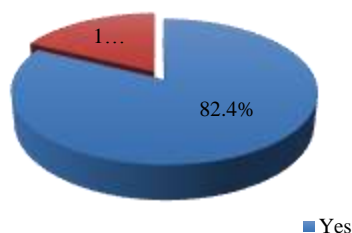
Graph 3 Question 5

Source: Own Elaboration

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In the question shown in graph 3, it can be seen that there were 100% affirmative responses, which confirms that the speciality subject has the basis for improving the professional profile and that its content is contributing to the degree programme. Continuing with the results obtained, graph 4 shows that students show interest in the updating of their professional training syllabuses, and as can be seen, the answers show that 82.4% consider this activity to be important.

Do you consider the updating of the content of the course important for your professional training?
Yes () No ()
34 Answers



Graph 4 Question 6

Source: Own Elaboration

In this question a section was included for the student to express in a better way what he/she wants to see improved in his/her subject programme, where some of the answers to this question are grouped in the following figure 1.

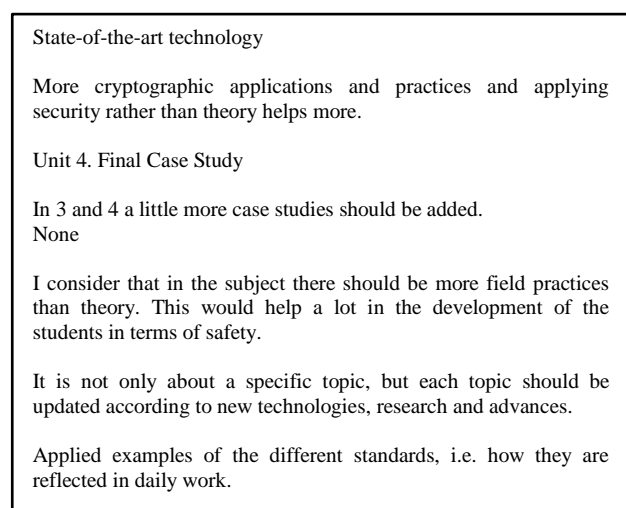


Figure 1 Supplement to Question 6

Source: Own Elaboration

The content of the answers is already being considered in the teaching of the subject and was updated in the syllabus, together with the inclusion of new practices up to the use of artificial intelligence, for which the survey will be applied again and the results obtained will be compared.

Finally, the last question regarding the opinion of the course is shown in figure 2.

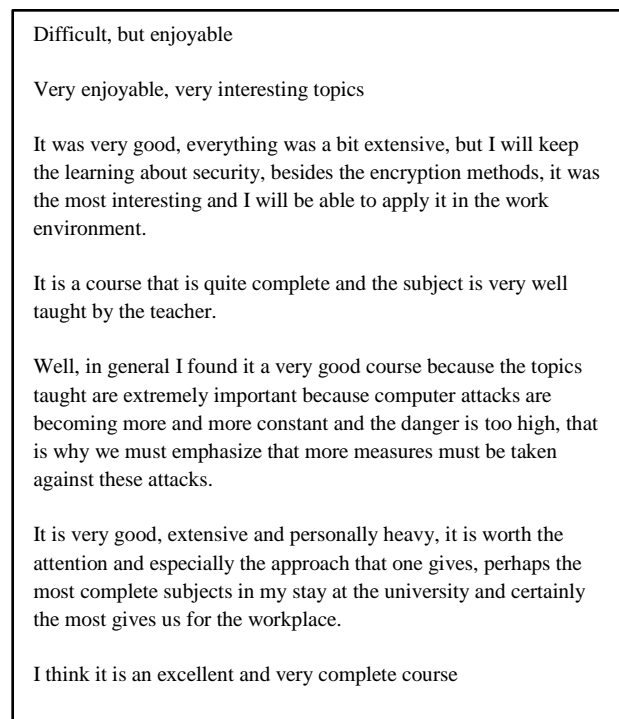


Figure 2 Question 7

Source: Own Elaboration

With regard to the question about the opinion of the course, it is still considered that it is taught by the teacher of which the students also refer to the fact that the laboratory where the subject is taught has been improved in order to allow the new practices proposed for the subject to be carried out.

Conclusions

By carrying out complementary surveys that refer to the syllabus and not only to the teacher as a strategy for continuous improvement, it was possible to integrate and improve the programme by considering the opinions of the students in order to include new subjects, new practices and thus meet the objectives set out in the Institutional Development Programme 2019-2024 published on the website of the Tecnológico Nacional de México (TecNM) and comply with the requirements of the CACEI accreditation. The application of strategies such as the one carried out allowed us to consider the opinions of the students and to act collaboratively, considering that they are immersed in a globalised world with great technological advances, so that the updating of the programmes will allow them to improve their skills and be more competitive in their professional performance.

The results obtained were integrated into the final report that is delivered with the final evaluations that were integrated into the official transcript of grades, this report was shown to the Academy of Systems and Computing in order that other teachers adopt the survey for the continuous improvement of the study programmes of the career and update if necessary these along with the professional profile and competencies of these.

Allowing the student to freely express their opinions allows for the improvement of the student's curriculum considering that it was an important strategy to request it after their final evaluation so that the student expresses their training needs more clearly and that it should be considered continuously and not only in certain periods.

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