Analysing student satisfaction with teaching strategies in vocational education

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Abstract

Purpose – Pedagogical and digital innovation in vocational education training (VET) is scarce as well as research on the subject. The pandemic may have prompted a modernization of VET that needs to be examined with a focus on the main subjects: the students. The purpose of this paper is to analyse students' perspectives on henceforth VET pedagogies. We aim to investigate students' perspectives and satisfaction regarding the didactic strategies and teaching modalities they experience to inform further trends in VET.

Design/methodology/approach – A quantitative and cross-sectional study was conducted, gathering the views of 460 Catalan VET students through a questionnaire. Data were analysed descriptively and applying the generalised linear model (GLM) mediation model to address the specific aims detailed below.

Findings – The findings show that the most frequent and preferred teaching strategies are lecturing and active learning, while situated learning is found to be less frequent and preferred. Face-to-face is the preferred teaching mode for all teaching strategies. The internship modality does not affect students' satisfaction with teaching strategies, while the professional brunch does.

Research limitations/implications – The limited responses gathered and the impact of the pandemic on the students' views limit the widespread applicability of the results. Future work must collect data from a broader sample and within a context of normality to determine current pedagogies and the use of digital technologies in VET.

Originality/value – Literature on VET pedagogies is scarce, and little is known about the predictable boost that the pandemic gave to the digitalisation and pedagogical modernisation of VET. Our study sheds light on the shift towards combined teaching strategies with a particular focus on active learning.

Keywords Teaching strategies, VET, Digital technologies, Student satisfaction

Paper type Research paper

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Introduction

Under the human capital theory, education is conceived as a capital investment and the return must be greater than the resources invested. According to Benson (1978), one of the assumptions of this theory is that education helps develop working skills. Current data on upper secondary and tertiary education enrolment and employment reveal that in the OECD countries 75.3% of people with upper secondary studies aged 25–64 are employed, compared to 85.4% of people of the same age with tertiary studies (OECD, 2022a). In the Spanish context, there has been an increase in enrolment in vocational education and training (henceforth VET [1]) since 2017, representing 22.2% of the population in 2021 (CaixaBank, 2022a). Nevertheless, tertiary education is the most common level of education among 25–34 year-olds, with a total of 49% of the population in that age bracket enrolled (OECD, 2022b).

Data reveal that VET has a positive reputation in Europe (68% of EU-28 respondents and 70% of Spain respondents) (Cedefop, 2017). It is widely believed that students in VET learn skills needed by employers (86% of EU-28 respondents and 88% of Spanish respondents) and that VET allows people to find a job quickly (67% of EU-28 and 48% of Spanish respondents). However, there is also a general perception that students with low grades are oriented towards VET (75% of EU-28 and 68% of Spanish respondents). Although VET is undervalued at the EU level, it is hypothesised that the pandemic may have forced a rethink regarding the value of VET when it comes to the need for skilled workers (Harris and Clayton, 2020).

One of the reasons why VET studies are undervalued is the quality of teaching (Ramasamy *et al.*, 2021). Several countries use teaching methods as one of the criteria for evaluating the quality of vocational education (Cedefop, 2011). In this regard, the evidence shows that innovations in pedagogy and digital technologies are limited in VET (European Commission, 2020). That being said, however, teachers generally believe they are innovative (80% of positive responses in a TALIS survey), even if this percentage diminishes as the education level increases (OECD, 2019).

Vocational pedagogy is an under-researched field (Cedefop, 2015). The literature and conceptualisation of what constitutes teaching practices are both broad and ambiguous, with various terms employed to refer to how teachers teach, including teaching strategies, pedagogical strategies, teaching methods, didactic strategies and instructional methods. In this article, we use the term "teaching strategies" to refer to the didactic methods used by teachers to orchestrate learning.

Teaching strategies in VET

There is limited research on teaching strategies implemented in VET. For instance, Schaap *et al.* (2017) studied the teaching strategies related to negotiating meaning used by vocational education teachers. Their results showed a greater use of "checking" and "intervening" rather than "diagnosing" activities. Comparing by occupation, the studies "Information and Communication Technology" used more "intervening" activities, while "Social Work" used more "checking". Casinillo and Guarte (2018) analysed various teaching strategies, including lectures with lab sessions, computer-assisted lessons, peer tutoring, modelling and teaching demos, oral recitation and reporting and group work. "Modelling and teaching demo" and "group work" predominated. Interestingly, students perceived all teaching strategies very favourably, the best rated being "lecture with lab sessions", followed by "oral recitation and reporting". No correlation was found between students' perception of teaching strategies and academic performance, however.

One focus of interest when analysing teaching strategies in VET is their effectiveness. The literature demonstrates that effective teaching strategies impact students' engagement and academic achievement (Casinillo and Guarte, 2018; Ko *et al.*, 2017; Kyriakides *et al.*, 2013; Niittylahti *et al.*, 2021). Amaechi and Chinujinim (2016) proved that even traditional methods

are used to teach practical skills in technical and vocational education and training (TVET); indeed, the most effective methods for addressing those skills are demonstration methods, enquiry and projects and assignments. Furthermore, Lucas *et al.* (2012) reported a range of methods oriented towards experimental learning that proved effective in VET. They concluded that high-quality vocational education requires a context of practical problem-solving and a blend of methods, vindicating the use of experiential learning combined with feedback, questioning, application, reflection and theoretical explanations.

The few studies presented above report evidence that traditional methods are still implemented in VET nowadays, despite all conclusions expressing the need for more effective practices and a renewal of vocational pedagogies. In the context of Catalonia, a "dual" modality has recently been implemented in vocational education. This modality emphasises practical and experiential learning by combining school-based and company-based learning. Jansen and Pineda-Herrero (2019) pointed out that certain indicators, such as completion rates or job placement, could be considered as benefits when analysing the dual mode. In this regard, Mora *et al.* (2022) found that dual vocational training in Catalonia positively affects grades and reduces the student drop-out rate. Likewise, for the German case, Scholten and Tieben (2017) stated that TVET helps students enter the labour market more easily. However, Barrientos Sánchez *et al.* (2020) warned that these indicators must be analysed using a critical focus, making gender gaps and unequal participation in the productive sectors visible as well as the contractual conditions that the student body has access to. That being said, there is a consensus that a good connection between VET and companies favours a better transfer of skills and knowledge acquisition (Louw and Katznelson, 2019; Polidano and Tabasso, 2014).

Trends on teaching strategies

A growing number of authors have lately argued for new pedagogies and uses of digital technologies in VET, with some studies calling for more flexible forms of teaching. Zhao and Ko (2020) advocated flexible learning environments that facilitate group work and interactivity with the use of workshops and simulated activities, while Eiríksdóttir and Rosvall (2019) found that the most common practices among VET teachers in Sweden are individualisation and task-related skills and suggested more group work and classroom discussions. Hartyányi *et al.* (2018) demonstrated that the flipped classroom strategy facilitates flexible learning in a work-based and real-life context. Finally, Campaña-Jiménez *et al.* (2019) argued for the need to use diverse teaching methods and strategies combined with technologies for active, participatory and constructive learning in vocational education.

There is a growing interest in technology-mediated contexts in vocational education. Usach Pérez *et al.* (2020) compared two modalities of teaching delivery in VET (face-to-face and distance) and found no differences in the quality of teaching, even though face-to-face students performed better. A post-pandemic study in Indonesia and Malaysia revealed that online learning provides flexibility in teaching in VET (Ana *et al.*, 2021). After surveying VET teachers, García-de-Paz and Santana (2021) determined that the emergency situation facilitated building an environment for virtual education that would prove useful beyond the pandemic. Contrarily, an extensive study conducted by Yuk-Kwang *et al.* (2021) revealed that students who experienced online vocational education during the pandemic criticised the teaching support, feedback and assessment received. Furthermore, Pooja (2021) identified a need for change in adopting digital technologies in VET to amplify learning. In this regard, data show that vocational teachers are actively advancing in their digital competences (Sudirman, 2019), although levels would still appear to be low (Moreno-Guerrero *et al.*, 2021).

Avis *et al.* (2021) discussed the implications of the pandemic for VET in terms of the new skills needed for future jobs and the digitalisation of education. They concluded that it is essential to redefine the skills learners need to develop for work and life and that the curricula therefore be redesigned to meet these needs. Similarly, McGrath *et al.* (2022) called for a transformation of VET to develop critical capabilities oriented to sustainable human development. In the same vein, the OECD (2021) confirmed that vocational education is crucial in recovering from the pandemic since it provides opportunities for up-skilling and re-skilling the population towards sustainable human development. That being said, however, it also highlighted the need for responsive and flexible vocational education systems. Calero and Rodríguez-López (2020) emphasised the need to improve students' cross-disciplinary competences and, consequently, introduce new teaching approaches.

The VET of the future

The VET system must be sensitive to economic and labour market changes, and it is necessary to anticipate workplace skills to train future workers to adapt to new situations (Calero López and Rodríguez-López, 2020). Furthermore, VET must be capable of transforming itself to become an agent of transformation towards the future (Avis, 2020; McGrath *et al.*, 2022). On the one hand, various international organisations have proposed new guidelines to reimagine future VET to fit these needs. By way of example, UNESCO (2020) has defined trends shaping the future of technical and vocational education, including the sector's digitalisation, the development of cross-disciplinary and applied skills and the growing value of pedagogy. They state that teachers need training in pedagogy to build learners' practical and applied skills and recommend training in the practical use of digital technologies. The 2020 Council of the European Union (2020) recommended that governments rethink VET to make it learner-centred, offer diverse teaching modalities, be flexible and offer modular pathways. In this regard, Cedefop (2022) envisages the future of VET and characterises it as: (1) learning outcomes and competence-based approaches; (2) flexible learning pathways through modularised and unit-based approaches; (3) a reduction in the number of qualifications and (4) increased flexibility and individualisation.

On the other hand, the COVID-19 pandemic brought with it one of the greatest and most transformative recent changes in the economy and labour market (Fassbender, 2022), a transformation that has contributed to generating new job demands. Cedefop (2023) points out that between 2020 and 2030 the sectors with the highest growth in the EU27 will be: (1) accommodation and food; (2) health and social care and (3) ICT services. Specifically, in Spain, the most demanded professions are: health (17.5%); administration and management (13.99%) and computing and communications (12.33%) (CaixaBank, 2022b). Challenges for the future of VET linked to this scenario are especially relevant for the ICT and health sectors (CEDEFOP, 2022).

The aim of the present research was to analyse students' perspectives on teaching strategies used in the context of VET in Catalonia, with a particular focus on the professions of health and ICTs. The research questions that have oriented the study are as follows:

RQ1. According to students, what teaching strategies are applied in vocational education?

RQ2. What is the level of satisfaction among vocational education students with the teaching strategies employed?

RQ3. What differences are there in students' satisfaction with teaching strategies according to the teaching mode employed in the professional field studied?

RQ4. What differences are there in students' satisfaction with teaching strategies according to the teaching mode in relation to the internship modality?

This study is part of the project "Ser FP en españa: trayectorias de éxito y valor social en la Formación Profesional", which aims to highlight the value of VET in society by investigating the digitalisation and modernisation of VET within this context. A quantitative study was conducted in the context of Catalonia. The main contribution of this study is to prove that VET is slowly shifting from lecture-based teaching to a combination of lecturing and active learning. The pandemic seems to have significantly impacted students' views on using digital technologies and learning in the context of companies and visiting experts.

Method

Participants and sample

A quantitative methodology and cross-sectional design were implemented in this study. An online questionnaire was administered to a sample of VET students at the end of the 2021–2022 academic year (May 2022). During this period, the school year completely returned to face-to-face teaching mode. However, for those in the second year of their studies, the previous year combined remote and face-to-face teaching. Participants in this sample experienced two types of internship: (1) work training programmes – henceforth "FCT" – which is a professional module carried out at a company and (2) dual vocational education – henceforth "dual" – which is a modality of VET combining learning at the educational centre and a company.

A non-probabilistic sampling technique was used to select potential participants. A total of 372 public secondary education and VET centres from Catalonia were selected using an intentional approach. The online questionnaire was distributed via the directors of the centres to students and was anonymous. Students were given two weeks to answer the questionnaire. A total of 597 students responded. The valid (complete) response was 77.0%, corresponding to a final sample of 460 VET students. This sample corresponded to 0.2% of the latest VET enrolment data in Catalonia for the 2021/22 academic year (total of 179,693; 22.8% in health studies and 13.5% in computer science studies). Table 1 shows the main characteristics of the sample (valid cases).

Research instrument

The research tool comprised an *ad hoc* questionnaire in Spanish inspired by the classification of teaching strategies proposed by Noguera and Valdivia (2022) and Quesada-Pallarès *et al.* (2019). The instrument was validated by three VET teachers in Catalonia with over 10 years' experience using the content validity approach (Delgado-Rico *et al.*, 2012). The items were refined according to the responses gathered in relation to uniqueness, relevance and importance of items.

Variable	Distribution
Gender	37.2% females and 55.7% males
Age	Mean 19.0 years and standard deviation 4.7 years
Internship	49.1% FCT; 24.1% dual and 25.0% not in internship
ISCED level	48.9% intermediate VET programmes (ISCED 354) and 49.8% advanced VET programmes (ISCED 554)
Professional field	26.3% Computer science; 26.3% Administrative management; 23.9% Health; 6.7% Image and sound; 2.4% Physical education and sports; 2.0% Trade and marketing; 2.0% Energy and water; 1.1% Mechanical manufacturing; 1.3% Sociocultural and community services; 1.3% Electrical and electronic; 1.7% Installation and maintenance; 0.7% Tourism and hospitality management; 0.4% Food industry; 0.9% Extractive industries; 0.2% Ceramic and glassmaker; 0.2% Agriculture; 0.2% Graphic Arts and 1.1% Others

Source(s): Authors' own data

Table 1.
Sample distribution

The questionnaire was composed of a first section requesting demographic information, which mainly included multiple-choice items (age, gender, type of training cycle, course, professional field, internship, attendance and use of technologies in the internship). The second section was based on a selection of 15 teaching strategies. The aim here was to determine how many of the teaching strategies were usually employed, which had probably changed because of the state of emergency, which remained in the "new normality" of the VET studies, and to what degree students were satisfied with the teaching strategies and the teaching mode (face-to-face or remote) employed by the VET teachers. Five items were provided for each (regarding frequency, satisfaction and mode), to be evaluated on a five-point frequency scale (from 0 = Never to 4 = Always), a satisfaction scale (from 0 = Not at all to 4 = Totally) and teaching delivery mode (face-to-face, remote/distance, I have not experienced it). Table 2 shows the instrument's dimensions, variables and items.

Data analysis

Data were analysed using Jamovi v2.3.13, ensuring their normality. Descriptive analyses were conducted to address the first two specific aims. Following that, the strategies were grouped into four dimensions (Lecture, Situated learning, Autonomous learning and Active learning). A validation process was then conducted by 11 educational researchers and VET professionals.

To address the two specific aims, the GLM mediation model technique with maximum likelihood regression was applied for each type of teaching strategy, grouped by dimension. This technique was selected due to the complexity of the model and the sample size, which allowed us to approach the aim in an exploratory way.

More specifically, to explore the effect of professional field (IV1 or Independent variable: IV1a = Computer science and IV1b = Health) and type of internship (IV2: IV2a = Dual; IV2b = FCT) on teacher strategy satisfaction (DV or Dependent variable: DVa = Lecture; DVb = Situated learning; DVc = Autonomous learning and DVd = Active learning), GLM mediation models were applied, using teaching strategy frequency of use – face-to-face (IVMa Independent variable mediator a) or remote (IVMb Independent variable mediator b) –

Dimension	Variables	Items
Teaching strategies	1. Lectures 2. Debates and discussions 3. Practical exercises 4. Challenge-based learning 5. Problem-solving 6. Analysis and discussion of real-life experiences and situations 7. Flipped classroom (previous autonomous work and active work in class) 8. Group work 9. Oral presentations by students 10. Simulated professional activity 11. Visits by professionals 12. Visits to companies 13. Individual or group tutoring 14. Doubt resolution 15. Autonomous learning	Frequency – How often have you experienced them during this course? – How often have you experienced them face-to-face? – How often have you experienced them remotely? Satisfaction – To what extent did you enjoy experiencing them? Teaching delivery mode – Which teaching delivery model (face-to-face or remote) do you prefer for each teaching strategy?

Table 2.
Description of the instrument

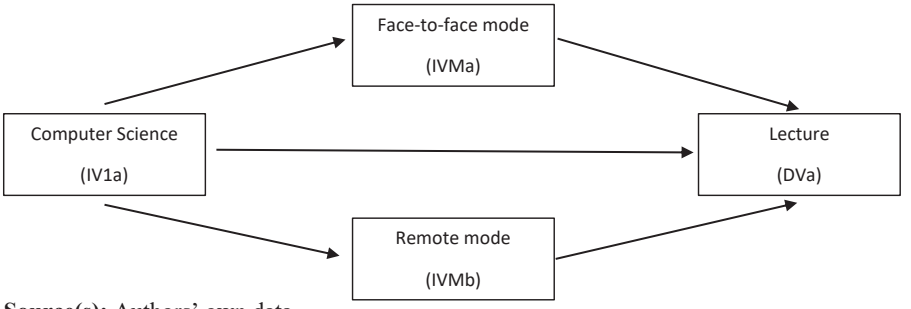
Note(s): The instrument information has been translated into English for publishing purposes only
Source(s): Authors' own data

as mediators. This meant that four different mediation models – based on the four different DVs – were computed for each IV (1 or 2), using both IVM. The result was eight mediation models related to the professional field and eight mediation models related to the internship; a total of 16 mediation models were therefore computed (see Figure 1 as an example). Confidence intervals (IC) were employed using the Delta method.

Our study has two main methodological limitations that merit consideration. Firstly, the sample was limited to and collected within the context of Catalonia. Future work should gather data from a broader audience. And secondly, data were collected during the pandemic but after lockdown, which might have negatively affected students' opinions. This study could be repeated in subsequent academic years.

Findings

The first approach to the data consisted in analysing students' perspectives on teaching strategies applied to their VET studies; Table 3 shows the frequency of experience of these



Source(s): Authors' own data

Figure 1. GML mediation model using Computer science (IV1a) and Lecture (DVa) as an example

Teaching strategies	Overall frequency Mean (SD)	Overall frequency face-to-face Mean (SD)	Overall frequency remotely Mean (SD)	Overall satisfaction Mean (SD)
1. Lectures	2.42 (1.00)	2.89 (1.06)	1.03 (1.06)	2.42 (1.07)
2. Debates and discussions	1.75 (1.08)	2.23 (1.31)	0.81 (1.03)	2.05 (1.18)
3. Practical exercises	2.64 (1.03)	2.87 (1.07)	1.18 (1.15)	2.64 (1.11)
4. Challenge-based learning	1.81 (1.07)	2.25 (1.25)	0.92 (1.07)	2.12 (1.24)
5. Problem solving	2.13 (1.00)	2.47 (1.16)	1.10 (1.13)	2.26 (1.14)
6. Analysis and discussion of real-life experiences and situations	1.93 (1.07)	2.28 (1.23)	0.97 (1.13)	2.25 (1.23)
7. Flipped classroom	1.76 (1.14)	2.05 (1.31)	1.03 (1.10)	1.78 (1.26)
8. Group work	2.44 (0.96)	2.70 (1.04)	1.32 (1.17)	2.31 (1.13)
9. Oral presentations by students	2.10 (0.98)	2.53 (1.15)	0.88 (1.09)	2.00 (1.15)
10. Simulations of professional activity	1.83 (1.09)	2.17 (1.29)	0.84 (1.06)	2.15 (1.26)
11. Visits by professionals	1.35 (0.98)	1.17 (1.33)	0.80 (1.01)	2.03 (1.35)
12. Visits to companies	0.89 (1.04)	1.11 (1.33)	0.53 (0.91)	1.46 (1.51)
13. Individual or group tutoring	1.83 (1.12)	2.21 (1.33)	0.90 (1.12)	2.11 (1.26)
14. Doubt resolution	2.35 (1.03)	2.58 (1.11)	1.24 (1.17)	2.51 (1.13)
15. Autonomous learning	2.19 (1.04)	2.41 (1.14)	1.44 (1.25)	2.25 (1.12)

Source(s): Authors' own data

Table 3. Frequency of use and satisfaction with teaching strategies

strategies. As can be observed, the strategies most experienced by students were practical exercises, followed by group work and lectures. Visits by external professionals and visits to companies stand out as the teaching strategies experienced less by students, followed closely by debates and discussions.

With regard to the teaching delivery mode in which these strategies were applied (face-to-face or remote), students reported lectures and practical exercises as being teaching strategies more experienced face-to-face, whereas visits by external professionals and visits to companies were experienced less in this delivery mode. As for remote teaching, students pointed out autonomous learning and group work as being most common, while visits by external professionals and visits to companies were again experienced less. Regarding satisfaction, overall students claimed to be more satisfied with doubt resolution and practical exercises, while visits to companies and the flipped classroom were the two strategies with the lowest satisfaction among VET students.

In order to facilitate more complex analyses, teaching strategies were grouped into four categories. Table 4 presents how they were classified as well as their frequency of use and students' satisfaction with them. The most frequent were found to be teaching strategies that follow a lecturing approach (overall and in face-to-face), while strategies that foster situated learning were the least frequent. Under the remote teaching mode of delivery, autonomous learning was experienced most and situated learning least. Overall, students were more satisfied with lectures and less so with situated learning.

When students were asked about which teaching delivery mode they preferred to experience for the teaching strategies mentioned, all of them preferred face-to-face over remote (see Table 5). The best-rated strategies for face-to-face were practical exercises, followed by group work and lectures. The worst rated were visits to companies, followed by visits by professionals and the flipped classroom. One finding of note was that not all students experienced all of the teaching strategies. Indeed, more than 37% of students had never experienced visits to companies, around 14% had never experienced the flipped

Table 4.
Frequency of use and satisfaction with teaching strategies grouped by dimensions

Teaching strategies dimensions	Teaching strategies	Overall frequency Mean (SD)	Overall frequency face-to-face Mean (SD)	Overall frequency remotely Mean (SD)	Overall satisfaction Mean (SD)
A. Lecture	Lectures; doubt resolution	2.39 (0.88)	2.76 (0.95)	1.09 (0.94)	2.44 (1.00)
B. Situated learning	Analysis and discussion of real-life experiences and situations; visits by professionals; visits to companies	1.51 (0.81)	1.85 (0.99)	0.79 (0.85)	1.98 (0.97)
C. Autonomous learning	Simulations of professional activity Autonomous learning; Individual or group tutoring	2.01 (0.86)	2.30 (1.05)	1.17 (1.02)	2.18 (1.01)
D. Active learning	Debates and discussions; Practical exercises; flipped classroom; challenge-based learning; problem solving; group work; oral presentations by students	2.08 (0.74)	2.44 (0.88)	1.02 (0.86)	2.15 (0.84)

Source(s): Authors' own data

Teaching strategies	Modality of the strategy preferred by students (% of students) Face-to-face	Remotely	Not experienced
1. Lectures	96.2%	0%	3.2%
2. Debates and discussions	91.4%	0%	8.6%
3. Practical exercises	97.3%	0%	2.7%
4. Challenge-based learning	88.5%	0%	11.5%
5. Problem solving	93.7%	0%	6.3%
6. Analysis and discussion of real-life experiences and situations	92.7%	0%	7.3%
7. Flipped classroom	86.2%	0%	13.8%
8. Group work	97.0%	0%	3.0%
9. Oral presentations by students	93.5%	0%	6.5%
10. Simulations of professional activity	88.9%	0%	11.1%
11. Visits by professionals	84.2%	0%	15.8%
12. Visits to companies	62.3%	0%	37.7%
13. Individual or group tutoring	90.6%	0%	9.4%
14. Doubt resolution	95.3%	0%	4.7%
15. Autonomous learning	93.7%	0%	6.3%

Source(s): Authors' own data

Table 5. Teaching strategy modality chosen by students

classroom or been visited by external professionals and around 11% had never experienced challenge-based learning or simulations of professional activity in class.

In order to respond to the final research question in our study, we selected two of the professional fields, as mentioned in the Methods section. Exploring the effect of professional field (IV1) and type of internship (IV2) on teacher strategy satisfaction (DV) was carried out by applying GLM mediation models, using teaching strategy frequency with regard to being used face-to-face (IVMa) or remotely (IVMb). Table 6 provides an overview of the information drawn from the tested models.

The results show that neither of the internship modalities (dual or FCT) had an effect on students' satisfaction with the teaching strategies used ($p > 0.05$). This means that the type of internships chosen by the student (regular internship or dual mode) did not affect their satisfaction with the teaching strategies used by teachers in the classroom.

In contrast, the results also show that both professional fields had an effect on students' satisfaction with some of the teaching strategies ($p \leq 0.05$). Basically, those students enrolled in VET studies related to computer science showed a decrease in their satisfaction with teaching strategies using situated learning ($p = 0.031$) when these were experienced face-to-face ($p = 0.05$).

Examining students in the professional field of health, the findings suggest that the teaching delivery mode experienced by students in relation to these teaching strategies did have an impact on their satisfaction, with the exception of active learning ($p > 0.05$). Students' satisfaction with lecturing ($p = 0.013$), situated learning ($p = 0.011$) and autonomous learning ($p = 0.002$) increased when these strategies were experienced face-to-face ($p = 0.007$; $p = 0.032$; $p < 0.001$, respectively). Only when students experienced situated learning remotely ($p = 0.013$) did their satisfaction with the experience decrease significantly.

Discussion

The purpose of this paper was to analyse students' perspectives on VET pedagogies. According to the European Commission (2020), and contrary to the perspectives expressed

Independent variable	Dependent variable	Total effect	p value	95% IC	Indirect effect (95% IC)
Professional field: IV1a Computer science	DVa = Lecture	0.0111	0.922	−0.211; 0.233	
	DVb = Situated learning	−0.2623	0.031	−0.500; −0.024	Face-to-face: −0.1525, p = 0.05 (−0.305; 0.001)
	DVc = Autonomous learning	−0.0202	0.877	−0.277; 0.089	
	DVd = Active learning	−0.0529	0.590	−0.245; 0.139	
Professional field: IV1b Health	DVa = Lecture	0.2907	0.013	0.061; 0.521	Face-to-face: 0.1472, p = 0.007 (0.034; 0.255)
	DVb = Situated learning	0.3189	0.011	0.072; 0.566	Face-to-face: 0.1719, p = 0.032 (0.014; 0.329) Remotely: −0.0681, p = 0.013 (−0.122; −0.014)
	DVc = Autonomous learning	0.4200	0.002	0.153; 0.687	Face-to-face: 0.263; p < 0.001 (0.121; 0.404)
	DVd = Active learning	0.1910	0.062	−0.009; 0.392	
Internship: IV2a Dual	DVa = Lecture	−0.0489	0.494	−0.026; 0.125	
	DVb = Situated learning	0.2156	0.069	−0.017; 0.448	
	DVc = Autonomous learning	0.0283	0.825	−0.222; 0.279	
	DVd = Active learning	0.1262	0.196	−0.065; 0.317	
Internship: IV2b FCT	DVa = Lecture	0.1357	0.171	−0.059; 0.329	
	DVb = Situated learning	−0.0292	0.781	−0.235; 0.177	
	DVc = Autonomous learning	0.2125	0.058	−0.007; 0.432	
	DVd = Active learning	0.1149	0.179	−0.053; 0.283	

Table 6.
Summary of GLM Mediation models tested

Source(s): Authors' own data

by teachers in a TALIS survey (OECD, 2019), our results confirm that traditional pedagogies are still applied in VET nowadays. Our findings are aligned with those of Lucas *et al.*'s (2012) approach to effective experimental learning. Even though lectures remain central in face-to-face teaching, they are combined with practical exercises and group work. In line with the results reported by Casinillo and Guarte (2018), the participants in our study preferred a combination of active learning (e.g. practical exercises and group work) and lectures. These findings are in accordance with current trends in VET in relation to active learning, group work and practical learning (Campaña-Jiménez *et al.*, 2019; Eiríksdóttir and Rosvall, 2019; Zhao and Ko, 2020).

Although the literature highlights the need for companies and VET to connect in order to improve skills and knowledge acquisition, in this study, teaching strategies linked to

situated learning are the least experienced and worst rated. Overall, respondents showed a preference for the teaching strategies they had experienced most and a lesser preference for those they had experienced least. This might indicate that satisfaction is connected to the frequency with which teaching strategies are applied; however, the reason behind it is not clear. For instance, students who experienced teaching strategies such as visits to companies and visits by professionals could have engaged in situations in which company staff were indeed untrained educators. This could have impacted the quality perceived from these teaching and learning situations, compared to those involving VET practitioners trained as educators. Furthermore, it was found that the type of internship (FCT or dual) did not impact students' satisfaction with teaching strategies. The literature search showed that the dual modality benefits students' grades and labour market insertion (Mora *et al.*, 2022; Scholten and Tieben, 2017). In this study, a third of the sample was enrolled in dual education (24.1%) or had experienced an internship (49.1%). We would suggest that the lack of the usual expected benefits of practical education in a work atmosphere found in this study may be linked to the negative effects that the pandemic had on internships: relocations, rescheduling and online work (Setiyawan and Kurniawan, 2021).

Recent years have been turbulent ones for education. The participants in this study studied during the pandemic, which involved uncertainty and experiencing intensive use of digital technologies. The "new normality" (the period the students were asked about) maintained the need for remote teaching and learning combined with face-to-face instruction. The participants indicated that the teaching strategies most used in remote teaching are autonomous learning and group work. In addition, they did not prefer any teaching strategy experienced in the remote mode. The fact that autonomous learning was prioritised and students preferred all teaching strategies face-to-face suggests a negative experience with remote teaching, as previously evidenced in similar studies during the same period (Yuk-Kwang *et al.*, 2021). This might be explained by the following considerations: (1) VET centres offered a fast response to an emergency, probably with a lack of teaching digital competence, scarce digital infrastructure, and a lack of digital devices at their disposal and (2) the prioritisation of autonomous learning probably responded to a traditional view of virtual teaching focused on the delivery of content and self-study. Under normal conditions, virtual learning can benefit flexibility and be seen as positive by students.

Nevertheless, the analysis we have conducted in relation to the professional fields which returned the most responses (computer science and health science) showed a relationship between teaching delivery mode, teaching strategies and rate of satisfaction. In computer science, when situated learning was experienced face-to-face, student satisfaction decreased. We would suggest that this might be due to their need to use digital technologies in real-life situations in line with their future job context not being met in the face-to-face modality. According to UNESCO (2020) and Pooja (2021), there is a need to digitalise VET to respond to job demands, especially in the ICT sector. In contrast, in the field of health science, student satisfaction increased in lectures and situated and autonomous learning. Although it is unclear why students are less satisfied with active learning in the face-to-face mode, this might be linked to the traditional teaching strategies they are accustomed to (World Health Organisation, 2013).

Conclusion

This study sheds light on the current landscape of VET pedagogies from students' perspectives. The literature review conducted for this study revealed that very few studies have investigated the use of teaching strategies in VET, eight years after Cedefop (2015) already stated that research on VET pedagogies was scarce. The main contribution of this research was to prove that VET is slowly shifting from lecture-based teaching to a combination of lecturing and active learning, in accordance with trends and the needs of

future vocational education (Campaña-Jiménez *et al.*, 2019; UNESCO, 2020). The findings underscore the importance of aligning teaching strategies with students' preferences to enhance satisfaction and engagement.

Furthermore, the need for digital competence and infrastructure in VET institutions is emphasized, especially in light of the growing importance of digital technologies in various professional fields. In our study, and similarly to Yuk-Kwang *et al.*'s (2021), the pandemic seems to have significantly impacted students' views of using digital technologies and learning in connection with companies. We envisage that these negative perspectives will turn positive once technologies are used effectively to maximise learning opportunities, as found in previous studies (Ana *et al.*, 2021; García de Paz and Santana, 2021).

Moreover, the study highlights the varying impacts of teaching strategies on student satisfaction across different professional fields. For instance, in computer science, the need for real-life application of digital technologies was not fully met in face-to-face learning, suggesting a gap between educational practices and industry demands. Conversely, in health science, students showed higher satisfaction with a mix of traditional and active learning approaches.

Overall, this research underscores the importance of adapting VET pedagogies to meet the evolving needs of students and industries, particularly in the context of digitalization and changing educational landscapes.

Future research should investigate the use of digital technologies in VET beyond the pandemic in a broader context from the perspective of both teachers and students. A prospective research opportunity entails the analysis of digital competencies in VET, taking into account both the perspectives of teachers and students. Additionally, the potential use of digital technologies to support flexible and student-centred learning paths warrants further exploration.

Furthermore, it is recommended that an investigation be conducted to discern the variances between teachers' self-perception of their innovative use of digital technologies and their effectiveness when applied in real contexts. In addition, it is of great importance to gain an understanding of teachers' comprehension of innovative teaching practices and to what extent they represent a renewal of traditional practices. Moreover, it is suggested to analyse the quality of teaching methods and delivery modes supported by digital technologies and to generate standards, indicators or quality frameworks to this end.

Finally, specific studies should be conducted on internships and dual education to determine the impact of practical learning on students' satisfaction, grades and employability. Educational practices involving situated learning should be enhanced, particularly focusing on training activities in practice centres. Studies are needed to explore the most effective practices where both contexts (the educational centre and the practice or work environment) are interconnected and mutually beneficial. Further research and efforts to bridge the gap between theory and practice in VET are crucial for enhancing student learning experiences and preparing them for successful transitions into the workforce.

Note

1. VET is defined by Eurostat (2021) as "the training in skills and teaching of knowledge related to a specific trade, occupation or vocation in which the student or employee wishes to participate".

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