Linking Statistics Education to Professional Practice: An Experiential Learning Approach in Economics and Business Degrees

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Abstract

The teaching of Statistics in Economics and Business degrees still faces the challenge of linking theoretical content with real-world applications, even as data availability and demand for analytical skills grow. Many students perceive Statistics as abstract and disconnected from professional practice, which reduces motivation, understanding, and the ability to apply methods to real problems.
To address this gap, the University of Oviedo implemented an innovative activity within the institutional initiative Professionals in the Classroom. In the course Introduction to Economic Statistics, students attended a session led by a senior statistician from the Asturian Society of Economic and Industrial Studies (SADEI).
The session highlighted the role of official statistics in economic and social analysis and included practical workshops using real data for business and public-sector decision-making. The design follows research on higher education innovation, which stresses active and contextualized learning and shows that real-world contexts improve attitudes toward Statistics.
Previous studies also indicate that collaboration with professionals enhances experiential learning, motivation, and students' perception of the practical usefulness of statistical methods when such activities are aligned with course objectives. A student satisfaction survey reported very positive evaluations and high overall satisfaction, suggesting that professional engagement initiatives effectively strengthen motivation and meaningful learning in Statistics education.

Keywords: *Applied statistics, Higher education innovation, industry-academia collaboration.*

1. Introduction

Statistics plays a central role in the training of economists and business graduates: it provides the analytical tools to interpret economic reality, make decisions and communicate empirical evidence based on data. However, despite the growing importance of data and the demand for analytical skills in the labour market, the teaching of this subject continues to face the problem that students tend to perceive it as extremely theoretical and abstract knowledge, completely disconnected from professional practice, which negatively affects their motivation, conceptual understanding and, ultimately, their ability to transfer statistical methods to real-life situations (Garfield et al., 2008).
This gap between theory and practice is not, of course, exclusive to statistics—it affects many quantitative subjects in the social sciences—but it is particularly pronounced in this field. The formal nature of its content, the density of the mathematical language used, and the frequent absence of applications to specific economic problems contribute to generating negative attitudes that, far from disappearing with the advancement of studies, tend to become entrenched (Gal and Ginsburg, 1994; Onwuegbuzie and Wilson, 2003).
The literature on innovation in higher education has identified various ways to address this gap. Among them, the experiential learning approach (Kolb, 1984) and the incorporation of external professionals into the classroom have received increasing attention for their ability to promote learning and give practical meaning to curricular content (Coleman, 2013; Ormrod, 2004). Existing evidence suggests that the participation of experts from the world of work not only increases student motivation but also strengthens their perception of the usefulness of what they have learned and facilitates the construction of more lasting and transferable knowledge (Kirby and Turner, 2024).

It is in this context that the experience described and analysed in this paper is framed. For several years, the University of Oviedo has been developing an institutional initiative called Professionals in the Classroom, aimed at integrating the perspective of external experts into the ordinary development of undergraduate degrees. During the 2024-2025 academic year, this initiative took shape in the field of statistics through the collaboration of a professional statistician from the Asturian Society of Economic and Industrial Studies (SADEI) in the subject Introduction to Economic Statistics. The activity combined an introductory lecture on official statistics with two practical workshops on the use of real data in decision-making and was very well received by the students according to the results of the satisfaction survey conducted for this purpose.

This article therefore has two objectives: firstly, to describe in detail the design, implementation process and pedagogical characteristics of the experience; and secondly, to evaluate its impact on student perception and satisfaction based on data from the survey conducted. The paper is structured as follows: section 2 reviews the theoretical background and relevant literature on teaching statistics and experiential learning. Section 3 describes the institutional context and the design of the activity. Section 4 addresses the specific implementation of the experience, and sections 5 and 6 present the results and conclusions of the work, respectively.

2. Theoretical Framework

Concern about university students' attitudes towards statistics has a long history in the specialist literature. Since the earliest studies, such as those by Roberts and Bilderbeck (1980) and Wise (1985), numerous studies have documented the prevalence of so-called 'statistical anxiety'—understood as the set of feelings of concern, fear and unease that arise when encountering statistical content—and its negative impact on academic performance and willingness to use these tools in subsequent professional practice (Onwuegbuzie and Wilson, 2003; Cruise et al., 1985).

In the specific field of Economics and Business degrees, Garfield et al. (2008) identify the lack of real-world context as one of the most relevant factors explaining these negative attitudes. The authors point out that when students do not perceive the connection between the statistical procedures they learn and the problems they aspire to solve in their future careers, motivation declines sharply and learning tends to be reduced to superficial memorisation of formulas and algorithms—without conceptual understanding or the ability to apply them. This situation is particularly paradoxical when one considers that the demand for analytical skills by organisations has only grown in recent decades, driven by the proliferation and growing importance of data.

Added to this is another factor: statistics, unlike other disciplines, requires students to simultaneously integrate mathematical skills, reasoning ability, and the ability to understand results. This multidimensionality of statistical learning makes conventional teaching strategies insufficient for developing a genuine understanding of the discipline (Biggs et al., 2022).

Considering the theory of experiential learning, Kolb (1984) proposes that learning occurs through a cycle that integrates concrete experience, reflective observation, abstract conceptualisation, and active experimentation. From this perspective, the mere transmission of theoretical content is insufficient: for meaningful learning to occur, students must have the opportunity to experiment, reflect and apply the concepts that give them meaning.

The application of this approach to different degree subjects, including statistics, has given rise to an approach that includes strategies such as the use of projects with real data, the incorporation of case studies, and even the invitation of professionals from outside the classroom (Cobb, 1992; Chance and Rossman, 2006). In all these cases, the common element is the contextualisation of learning in situations that reproduce, faithfully, the real conditions in which students will have to use statistical knowledge once they enter the labour market.

Biggs et al. (2022), in their proposal for constructive alignment, emphasise precisely the importance of designing learning activities that align with expected learning outcomes and assessment methods. In the case of Statistics Applied to Economics and Business, this implies that teaching activities should reproduce, as far as possible, the type of reasoning expected of a professional in the field: knowing how to identify the problem, select the necessary data, apply the appropriate statistical method, and interpret the results in economic or business terms.

The literature on the participation of external experts in university teaching yields consistently positive results, although it also raises some methodological cautions that should be kept in mind. Coleman (2013), in a study focusing specifically on the presence of professional statisticians in higher education classrooms, concludes that this strategy helps to increase student motivation, improve their understanding of the practical relevance of statistical content, and reduce the gap between academic training and the demands

of the labour market. The author stresses, however, that the impact depends largely on the degree of curricular integration of the activity: isolated interventions, without explicit connection to the course content, tend to produce more superficial and shorter-lasting effects.
Similarly, Ormrod (2004) points out that exposing students to professional models activates learning mechanisms that reinforce both motivation and perceived self-efficacy. From the perspective of social cognitive theory (Bandura, 1986), observing a professional who applies statistical tools to solve real economic problems can help students construct a more concrete and manageable representation of statistics, which in turn can have positive effects on their willingness to invest effort in learning.
More recently, Kirby and Turner (2024) analysed the impact of guest speakers—both in-person and virtual—in the context of business degrees, confirming that their well-planned incorporation, aligned with the course objectives, produces significant improvements in students' perception of the usefulness of the content and their own ability to apply it. The authors identify the following factors, among others, as key to success: the suitability of the expert's profile to the disciplinary context of the course, the structuring of the intervention around specific cases or problems, and the possibility for students to interact with the expert through questions or guided exercises.
These findings are consistent with the principles of instructional design based on situated learning theory (Lave and Wenger, 1991), which emphasises the importance of learning through authentic practices or, at least, in environments that realistically reproduce their essential characteristics. The participation of an active professional in the university classroom creates, albeit temporarily, a zone of contact between the academic community and the professional community.

3. Experience Design

The experience described in this paper was developed within the framework of the ‘Professionals in the Classroom’ initiative, promoted by the University of Oviedo with the aim of enriching the training of university students by incorporating experts from the professional world into the ordinary dynamics of undergraduate courses. This initiative responds to a widely shared concern in the Spanish university system about the need to strengthen links between universities and the labour market, in line with the recommendations and guidelines for competency-based learning.
The programme establishes an organisational framework that facilitates collaboration between university lecturers and external professionals, regulating aspects such as the selection of experts, coordination prior to the activity, the integration of the intervention into the curriculum and the evaluation of results. Participation in the initiative is voluntary for teaching staff, who propose experts based on the most appropriate profile for the content and objectives of their subjects; the institution, for its part, provides the necessary administrative and communication support and manages the formal recognition of the collaboration of external professionals.
The subject on which the experiment was implemented is Introduction to Economic Statistics, a compulsory subject taught in the first years of several undergraduate degrees in Economics and Business at the University of Oviedo. The main objective of the course is to provide students with the fundamentals of statistical reasoning and basic descriptive and inferential methods, with special attention to their application in the analysis of economic and business phenomena. Its placement in the first years of the degree programmes makes it a particularly sensitive subject from the point of view of student attitudes: students often arrive with negative expectations or a limited perception of its relevance to their education and professional future.
The activity took place during the 2024-2025 academic year and was coordinated by the teaching staff responsible for the subject. The selection of SADEI as a collaborating institution was based on criteria of both thematic relevance—SADEI is the statistical body of reference for the Asturian economy and produces and disseminates a wide range of official statistics of direct relevance to regional economic analysis—and institutional and territorial proximity, factors that reinforce the connection between the course content and the economic environment in which students are likely to develop their professional activity.
The design of the experience was geared towards achieving four main objectives, derived both from the analysis of the students' needs and from the principles of experiential learning reviewed in the previous section. Firstly, the aim was to increase students' motivation to learn statistics by showing them in a direct and observable way the relevance of this discipline in the daily professional practice of a professional statistician. Secondly, it sought to illustrate recent developments in the use of data and applied statistical analysis, with reference to official statistics and their role in economic and public policy decision-making. Thirdly, the activity sought to strengthen students' perception of the practical usefulness of the course content, establishing explicit links between the statistical methods explained in the course and their applications in business and public administration contexts. Finally, the aim was to offer students an initial

approach to the type of decisions, dilemmas and reasoning that characterise the work of a statistics professional, thus contributing to the construction of an emerging professional identity.
The activity was organised around three main blocks that combined the transmission of information with the active participation of the students. The first block consisted of an introductory lecture by the guest speaker, focusing on presenting the role of official statistics in the economic information system—with special attention to the statistics produced by SADEI on the Asturian economy—and illustrating through specific examples how statistical indicators are used in business decision-making, territorial planning, and public policy design. The main purpose of this block was to establish the frame of reference and motivate students by directly connecting the statistical concepts of the subject with their real-world applications.
The second and third block took the form of practical workshops. In the second, a business decision-making scenario was presented that required the interpretation of fictitious statistical data, so that students could experience, in a guided manner, the process of statistical analysis applied to a specific management problem. The third block replicated this dynamic in the public sector using real data, employing regional economic development indicators to illustrate the logic of statistical analysis in the context of public policy evaluation.
The activity was specifically designed so that each of its three blocks would be linked to the specific content of the course programme, enabling students to clearly identify the correspondence between what they had learned in the regular classroom and what they observed in the expert's intervention. This curricular alignment, which the literature identifies as one of the determining factors for the success of this type of experience (Coleman, 2013; Kirby and Turner, 2024), was coordinated prior to the activity between the teacher responsible for the subject and the guest professional.

4. Experience Implementation

Firstly, prior to the session, the teaching staff informed the students about the activity, contextualizing it within the framework of the ‘Professionals in the Classroom’ initiative and establishing an explicit connection with the subject's syllabus. The aim of this preliminary presentation was to prepare the students cognitively and motivationally, activating the prior knowledge necessary to take advantage of the intervention and generating positive expectations about the usefulness of the experience.
The session took place during the regular class time, without the need to modify the weekly course schedule. This integration into the usual classroom dynamics—unlike extraordinary activities that require travel or schedule changes—facilitated student participation. The first block, which was expository in nature, was conducted in a participatory manner that allowed students to ask questions and participate in the debate on the applications of official statistics. The guest speaker presented the SADEI's system for producing and disseminating statistics in an accessible and contextualised manner, illustrating the use of this data in the analysis of the Asturian economy with specific cases and projecting visualisations and statistical tables that the students were able to compare with the types of representations worked on in the regular classes for the subject.
The two practical workshops that made up the second and third blocks were organised around materials prepared specifically for the occasion, based on data provided by SADEI. In the business decision-making workshop, students worked with sectoral indicators and regional economic activity data to inform a series of business management decisions. On the other hand, in the public sector workshop, labour market, demographic and social welfare indicators were used to illustrate the process of evaluating a regional public policy measure. In both cases, the guest professional guided the analysis, pointed out the limitations of the data, and introduced practical considerations—regarding the availability, frequency of updates, and comparability of statistics—that significantly enriched the more formal analysis worked on in the course.
A distinctive feature of the implementation was the care taken in the interaction between the guest professional and the students. Far from adopting a one-way lecture format, the session actively encouraged questions, case discussions, and the exchange of views on the implications of the data presented. This dynamic was consistent with the available evidence on the formats of external expert interventions that have the greatest impact on learning (Kirby and Turner, 2024).
Finally, as an evaluation of the experience, participating students had to respond to a satisfaction survey structured around four main items: overall satisfaction with the Professionals in the Classroom activity, satisfaction and usefulness of the content covered, satisfaction with the external expert's presentation, and assessment of the usefulness of the expert's visit. Each item was rated on a numerical scale from 0 to 10, and there was also the option to add open-ended qualitative comments. The survey was administered through the University of Oviedo's institutional platform, which guaranteed the anonymity of the responses and facilitated data collection and processing

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5. Experience Results

The satisfaction survey was completed by students from various groups on the course 'Introduction to Economic Statistics' across different Economics and Business degree programmes, all of whom took part in the activity described. Although the sample size is small—a factor that limits the generalisability of the results and which will be discussed in greater detail in the section on limitations—the data obtained provide valuable information on the perceptions of the participating students and are consistent with the findings of similar studies in the specialist literature (Coleman, 2013; Kirby and Turner, 2024).

The participants came from different groups within the course, taught by different lecturers, which brings a degree of diversity to the sample and allows for the possibility that the assessments reflect perceptions that are relatively independent of the specific classroom context. The survey was completed on a voluntary and anonymous basis, which minimises social desirability bias.

The results of the satisfaction survey are set out in Table 1, which presents the basic descriptive statistics—minimum value, maximum value and arithmetic mean—for each of the four items assessed.

Table 1. Descriptive statistics from the satisfaction survey (0–10 scale)

Item	Min	Max	Mean
Overall satisfaction with the activity	5	10	8.44
Satisfaction with and usefulness of the content	4	10	8.00
Satisfaction with the expert's presentation	8	10	9.33
Benefits of having an external expert visit	5	10	8.11

Source: own elaboration.

The data reveal that students have rated the experience very positively. Firstly, overall satisfaction with the 'Professionals in the Classroom' initiative averages 8.44 out of 10, with scores ranging from 5 to 10. This average score, which far exceeds the threshold for high satisfaction, is consistent with the results reported in similar studies on initiatives to bring external professionals into the university classroom (Coleman, 2013; Kirby and Turner, 2024) and suggests that the activity was perceived as an experience of significant added value by the majority of participating students.

Secondly, satisfaction with the usefulness and the content covered has an average score of 8.00, with a slightly wider range (4–10) than the other items. This wider range could be interpreted as indicative of greater variability in students' perceptions of the relevance of the content—variability that could be related to differences in prior statistical knowledge, the class group of origin, or individual expectations regarding the activity. However, the resulting average remains high and allows us to conclude that the content was rated positively by the participating students.

The item receiving the highest average score is, significantly, satisfaction with the guest expert's presentation, with an average of 9.33 points and a range of 8 to 10. This result is particularly significant for several reasons. On the one hand, it confirms the importance of the external expert's profile and communication skills as a determining factor in the success of this type of experience, in line with the methodological recommendations in the literature (Coleman, 2013). On the other hand, the high consistency of the ratings—all students awarded a score of 8 or higher—suggests that the quality of the SADEI professional's presentation was consistently perceived positively by the student body, regardless of other contextual variables.

Finally, the usefulness of the external expert's visit received an average score of 8.11 -range (5–10)-. The relative proximity of this item to those concerning overall satisfaction and satisfaction with the content suggests that the assessment of usefulness is consistent with overall satisfaction, with no significant discrepancies observed between the two dimensions. This pattern, moreover, is common in the literature on the evaluation of innovative teaching experiences (Biggs et al., 2022).

A combined analysis of the four items allows us to draw some interesting conclusions regarding the impact of the experience. Firstly, it is noteworthy that the most highly rated aspect—the expert's presentation—is precisely the one that most directly embodies the experiential component of the activity: the opportunity to observe and listen to a practising professional who applies statistics in her day-to-day work. This result supports the hypothesis, well-established in the literature, that exposure to professional role models constitutes a highly effective mechanism for motivation and learning in the context of quantitative disciplines (Ormrod, 2004; Bandura, 1986).

Secondly, the relatively low minimum scores for the items relating to satisfaction with the content and the usefulness of the visit—4 and 5, respectively—suggest that a minority of students did not perceive the activity as particularly useful or relevant. Although the small sample size prevents definitive conclusions

from being drawn about the causes of this variability, some plausible hypotheses can be suggested: the possibility that some students attended the session with expectations that were not well aligned with its design, the influence of the group context, or individual differences in interest in applied statistics versus methodological statistics.

Thirdly, the overall consistency of the results with the findings in the specialist literature—and in particular with the work of Coleman (2013) and Kirby and Turner (2024)—lends credence to the interpretation that the positive ratings reflect a genuine impact of the activity on students' motivation and perception of its usefulness, rather than merely a novelty effect or a courtesy response. The robustness of this impact, however, can only be rigorously assessed by tracking the attitudes of participating students over time and comparing them with control groups, which constitutes a particularly interesting avenue for future research.

6. Conclusions

This paper has described and evaluated an experiential learning initiative within the 'Introduction to Economic Statistics course at the University of Oviedo, centred on the participation of a professional statistician from SADEI as part of the 'Professionals in the Classroom' initiative. The results of the satisfaction survey conducted among the participating students are consistently positive, with averages exceeding 8 out of 10 across all assessed items and a particularly high score for satisfaction with the expert's presentation (M=9.33).

These results suggest, firstly, that bringing external professionals into the university classroom—when done in a planned manner, with appropriate alignment with the curriculum and careful coordination between the lecturer and the guest expert—constitutes an effective strategy for increasing students' motivation to learn statistics and for strengthening their perception of the practical usefulness of the course content. Secondly, the experience illustrates the viability and relevance of the experiential learning approach in Economics and Business degree programs, where the integration of theoretical training and professional practice is a priority pedagogical objective. Thirdly, the University of Oviedo's 'Professionals in the Classroom' initiative proves to be a suitable institutional framework for the development of this type of experience, as it provides the organizational support and formal recognition necessary to ensure that collaboration between university teaching staff and external professionals is sustainable and systematic.

From a curriculum design perspective, it therefore seems advisable that this type of activity should not be viewed as a one-off, exceptional intervention, but rather as a regular component of teaching planning in applied statistics courses—and, more generally, in quantitative subjects that aim to develop analytical skills directly transferable to the labour market. The systematization of the experience, the consolidation of collaborative networks with local institutions and businesses, and the progressive refinement of the pedagogical design constitute, in this regard, the pillars upon which the future development of the initiative should be structured.

The study does, however, have limitations that should be acknowledged: the small sample size limits the generalisability of the results—although their consistency with the literature lends them plausibility—; the absence of a control group prevents the specific effect of the intervention from being isolated from other contextual factors; and the immediate nature of the survey does not allow for an assessment of the long-term impact on learning or the transfer of statistical skills to new contexts.

Finally, it is worth noting that beyond the specific context of Economic Statistics, the experience described in this study offers elements that can be transferred to other quantitative disciplines within social science degree programmes—such as Financial Mathematics, Econometrics or Data Analysis—where the gap between theoretical training and professional practice poses similar pedagogical challenges. The systematisation and dissemination of these experiences, within the framework of institutional initiatives such as the one described, constitute a significant contribution to the advancement of teaching innovation in higher education.

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