

Bridging Statistics Education and Professional Practice in Economics and Business Degrees

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Abstract

Statistics plays a key role in Economics and Business programmes, yet students often perceive it as abstract and disconnected from professional practice, which can reduce motivation and hinder knowledge transfer. Research on teaching innovation highlights the value of active and contextualized approaches to improve engagement in quantitative subjects (Biggs et al., 2022). In statistics education, negative attitudes are frequently linked to limited real-world context and weak exposure to authentic applications (Garfield et al., 2008). Previous studies suggest that involving external professionals can foster experiential learning and strengthen transversal skills such as decision-making and critical thinking, particularly when activities are well aligned with course objectives (Coleman, 2013; Kirby & Turner, 2024; Ormrod, 2004). To address these challenges, an external-expert session was introduced in the course Introduction to Economic Statistics within the Professionals in the Classroom initiative at the University of Oviedo. The session was co-led by a senior statistics officer from the Asturian Society for Economic and Industrial Studies (SADEI) and aimed to demonstrate the professional relevance of key statistical concepts through applied examples. The activity consisted of an introductory presentation on the role of official statistics in economic and social analysis, followed by two short workshops focused on business investment decisions and public-sector prioritization using demographic and socioeconomic data. Student feedback collected through a satisfaction survey was highly positive, indicating that professional engagement enhances perceived relevance and supports learning outcomes in introductory statistics courses.

Keywords: statistics education, higher education innovation, professional engagement

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Introduction

Statistics constitutes a fundamental component in the education of graduates in Economics and Business, as it equips students with the analytical tools required to interpret economic phenomena, support decision-making processes, and communicate empirical evidence based on data. Nevertheless, despite the expanding availability of data and the increasing demand for quantitative skills in the labour market, Statistics teaching continues to face a persistent challenge: students often regard the subject as highly abstract and detached from professional practice. This perception has been shown to undermine motivation, limit conceptual understanding, and hinder the transfer of statistical knowledge to real-world contexts (Garfield et al., 2008).

Although the tension between theoretical content and practical application is common across many quantitative disciplines within the social sciences, it appears to be especially pronounced in Statistics. The formal structure of the subject, the intensive use of mathematical language, and the frequent lack of explicit links to applied economic problems can foster negative student attitudes that tend to persist over time rather than diminish as studies progress (Gal & Ginsburg, 1994; Onwuegbuzie & Wilson, 2003).

Research on innovation in higher education has proposed several strategies to narrow this gap between theory and practice. In particular, experiential learning approaches (Kolb, 1984) and the incorporation of external professionals into academic settings have attracted considerable attention due to their potential to promote deeper learning and assign practical meaning to curricular content (Coleman, 2013; Ormrod, 2004). Empirical evidence suggests that collaboration with professionals from the world of work not only increases student engagement, but also reinforces perceptions of relevance and supports the development of more durable and transferable forms of knowledge (Kirby & Turner, 2024).

Against this background, the present paper analyses a teaching innovation developed within the institutional initiative Professionals in the Classroom at the University of Oviedo, which seeks to incorporate external expertise into undergraduate teaching. During the 2024–2025 academic year, this initiative was applied to the subject Introduction to Economic Statistics through the participation of a professional statistician from the Asturian Society of Economic and Industrial Studies (SADEI). The activity combined an introductory session on the role of official statistics with two practical workshops focused on the use of real data to support decision-making processes. According to the results of a satisfaction survey administered to participants, the initiative was very positively received by students.

Accordingly, this article pursues two main objectives. First, it provides a detailed description of the design, implementation, and pedagogical features of the experience. Second, it evaluates its impact on students' perceptions and satisfaction based on the analysis of survey data. The remainder of the paper is structured as follows. Section 2 reviews the relevant literature on statistics education, experiential learning, and professional engagement. Section 3 outlines the institutional context and the design of the activity, while Section 4 describes its implementation. Sections 5 and 6 present the results and the main conclusions, respectively.

Theoretical Framework

Concerns regarding university students' attitudes toward Statistics have been widely documented in the specialist literature for several decades. Early studies by Roberts and

Bilderbeck (1980) and Wise (1985) already pointed to the existence of what later research conceptualised as statistical anxiety, defined as a combination of feelings of fear, tension, and apprehension when dealing with statistical content. Subsequent research has consistently shown that this phenomenon negatively affects both academic performance and students' willingness to engage with statistical tools in their future professional practice (Cruise et al., 1985; Onwuegbuzie & Wilson, 2003).

Within Economics and Business programmes, the work of Garfield et al. (2008) identifies the scarcity of meaningful real-world context as one of the most influential factors explaining these negative attitudes. When students fail to recognise how statistical procedures relate to the types of problems they expect to encounter in their professional careers, motivation tends to decline markedly. As a result, learning is often reduced to the mechanical memorisation of formulas and algorithms, with limited conceptual understanding and little capacity for practical application. This situation is particularly striking given that organisational demand for analytical and data-related skills has continued to increase, fuelled by the growing availability and strategic value of data.

An additional challenge arises from the intrinsic characteristics of Statistics as a discipline. Unlike other subject areas, statistical learning requires the simultaneous integration of mathematical competence, logical reasoning, and the interpretation of results within a substantive context. This multidimensional nature makes traditional teaching approaches less effective in fostering deep understanding, highlighting the need for instructional strategies that move beyond content transmission (Biggs et al., 2022).

From the perspective of experiential learning theory, Kolb (1984) argues that learning is most effective when it follows a cyclical process involving concrete experience, reflective observation, abstract conceptualisation, and active experimentation. Under this framework, purely theoretical instruction is insufficient for meaningful learning to occur; instead, students must be given opportunities to actively engage with concepts, reflect on their use, and apply them in relevant contexts.

The application of experiential learning principles to Statistics education has led to the adoption of a range of pedagogical strategies, including project-based work with real datasets, the use of case studies, and the involvement of external professionals in teaching activities (Chance & Rossman, 2006; Cobb, 1992). A common feature of these approaches is the contextualisation of learning in scenarios that closely resemble the professional environments in which statistical knowledge will later be used.

In parallel, Biggs et al. (2022) emphasise, through their model of constructive alignment, the importance of ensuring coherence between learning outcomes, teaching activities, and assessment methods. Applied to Statistics in Economics and Business degrees, this implies designing educational experiences that replicate key aspects of professional reasoning: identifying relevant problems, selecting appropriate data, applying suitable statistical techniques, and interpreting results within an economic or business framework.

Research on the integration of external experts into university teaching has generally reported positive outcomes, while also highlighting important design considerations. Coleman (2013), in a study specifically focused on the participation of professional statisticians in higher education, concludes that such initiatives can enhance student motivation, clarify the practical relevance of statistical content, and reduce the disconnect between academic instruction and

labour market demands. However, the author cautions that these benefits are strongly conditioned by the degree of curricular integration, noting that isolated or poorly connected interventions tend to generate only short-term and superficial effects.

Similarly, Ormrod (2004) argues that exposure to professional role models activates learning processes related to motivation and perceived self-efficacy. Drawing on social cognitive theory (Bandura, 1986), observing professionals applying statistical tools to real economic problems can help students develop more concrete and accessible mental representations of Statistics, thereby increasing their willingness to engage with the subject.

More recent evidence provided by Kirby and Turner (2024) reinforces these conclusions. Their analysis of guest speakers in Business degree programmes, both face-to-face and online, shows that well-planned interventions aligned with course objectives lead to significant improvements in students' perceptions of content relevance and their confidence in applying acquired knowledge. Key factors identified include the relevance of the expert's professional profile, the organisation of the intervention around specific cases or problems, and opportunities for student interaction through questions or guided activities.

Taken together, these findings are consistent with the principles of situated learning theory (Lave & Wenger, 1991), which highlight the importance of learning through authentic practices or environments that realistically mirror them. The temporary presence of an active professional in the university classroom can thus be understood as creating a meaningful point of contact between the academic and professional communities, fostering more situated and relevant learning experiences.

Experience Design

The teaching experience analysed in this study was developed within the framework of the Professionals in the Classroom initiative, promoted by the University of Oviedo as a strategy to enrich undergraduate education through the systematic incorporation of professionals from outside academia into regular teaching activities. This programme is rooted in a broader concern within the Spanish university system regarding the need to strengthen connections between higher education and the labour market, in line with competency-based learning approaches and employability-oriented educational policies.

The initiative provides an institutional structure that facilitates collaboration between university lecturers and external professionals by regulating key aspects such as expert selection, prior coordination, integration of the activity into the curriculum, and subsequent evaluation. Participation is voluntary for academic staff, who identify and propose professionals whose profiles are considered particularly suitable for the learning objectives and content of their courses. The university, in turn, offers administrative and logistical support and manages the formal recognition of the external professional's contribution.

The experience was implemented in the course Introduction to Economic Statistics, a compulsory subject taught in the early stages of several undergraduate degrees in Economics and Business at the University of Oviedo. The course aims to introduce students to the fundamentals of statistical reasoning and to basic descriptive and inferential techniques, with a clear emphasis on their application to economic and business-related phenomena. Given its position at the beginning of the degree programmes, the subject plays a crucial role in shaping students' initial attitudes towards Statistics. Many students enroll with preconceived negative

beliefs or a limited understanding of the subject's relevance to their future academic and professional trajectories.

The activity took place during the 2024–2025 academic year and was coordinated by the teaching staff responsible for the course. The Asturian Society of Economic and Industrial Studies (SADEI) was selected as the collaborating institution due to its strong thematic relevance, being the main reference body for official statistics on the Asturian economy, and its institutional and territorial proximity. These factors were considered especially valuable in reinforcing the link between course content and the regional economic environment in which many students are likely to pursue their professional careers.

The design of the experience was guided by four main objectives derived from both the identified needs of students and the principles of experiential learning discussed in the previous section. First, the activity sought to enhance student motivation by making the professional relevance of Statistics visible through direct interaction with a practicing statistician. Second, it aimed to illustrate current developments in applied data analysis, particularly the use of official statistics in economic analysis and public policy decision-making. Third, the activity was intended to strengthen students' perception of the practical usefulness of the course by explicitly linking statistical methods taught in class to their applications in business and public administration contexts. Finally, it aimed to provide students with an initial exposure to the types of reasoning, decision-making processes, and professional challenges characterising the work of statisticians, thereby contributing to the early formation of a professional identity.

The activity was structured into three main components combining information delivery with active student participation. The first component consisted of an introductory session led by the invited professional, which focused on explaining the role of official statistics within the economic information system. Particular emphasis was placed on the statistics produced by SADEI and their use in business decision-making, territorial planning, and public policy design. This initial session aimed to establish a meaningful reference framework and to motivate students by clearly connecting the statistical concepts addressed in the course to real-world applications.

The second and third components were organised as practical workshops. The second component presented a simulated business decision-making scenario based on fictitious statistical data, allowing students to engage, in a guided manner, with the process of statistical analysis applied to a management-related problem. The third component followed a similar structure but focused on the public sector, using real data and regional economic development indicators to illustrate how statistical analysis informs public policy evaluation.

A key feature of the experience was the explicit alignment between each of the three components of the activity and the specific content of the course syllabus. This design choice enabled students to clearly identify the correspondence between the statistical methods learned in regular lectures and their application during the expert-led sessions. Such curricular alignment, highlighted in the literature as a critical factor for the effectiveness of professional engagement initiatives (Coleman, 2013; Kirby & Turner, 2024), was ensured through prior coordination between the course instructor and the invited professional.

Experience Implementation

Prior to the activity, students were informed by the teaching staff about the purpose and structure of the session, which was explicitly framed within the Professionals in the Classroom initiative. This initial briefing also clarified the connection between the expert's intervention and the contents of the course syllabus. The intention of this preparatory stage was to activate relevant prior knowledge, situate the activity within the broader learning objectives of the subject, and foster positive expectations regarding its potential usefulness.

The session was conducted during regular class time, without requiring any modification to the established weekly schedule. This smooth integration into the usual teaching dynamics facilitated student attendance and engagement, avoiding many of the logistical barriers often associated with extracurricular activities. The first part of the session adopted an expository format but was delivered in an interactive manner that encouraged student participation. During this block, the external expert presented the system used by SADEI for the production and dissemination of official statistics, explaining its functioning in an accessible and context-sensitive way. The presentation was illustrated with concrete examples related to the Asturian economy and supported by visual materials such as statistical tables and data visualisations, which students could readily relate to the representations used in their regular Statistics classes.

The second and third parts of the session were organised as practical workshops based on materials specifically prepared for the activity using data provided by SADEI. In the workshop focused on business decision-making, students analysed sectoral indicators and regional economic activity data in order to support a series of management-related decisions. The workshop centred on the public sector followed a similar structure, using labour market, demographic, and social welfare indicators to illustrate the evaluation of a regional public policy measure. In both cases, the guest professional guided students through the analytical process, highlighted the limitations of the available data, and introduced practical considerations related to data availability, update frequency, and comparability. These aspects enriched the more formal statistical analysis typically addressed in the course.

A key element of the implementation was the emphasis placed on fostering interaction between the students and the invited professional. Rather than following a one-directional lecture model, the session actively promoted questions, discussion of cases, and the exchange of viewpoints regarding the interpretation and implications of the data examined. This interactive format is consistent with evidence identifying student–expert interaction as a critical factor in the effectiveness of professional engagement activities in higher education (Kirby & Turner, 2024).

Finally, the experience was evaluated through a student satisfaction survey administered after the session. The questionnaire consisted of four main items assessing overall satisfaction with the Professionals in the Classroom activity, perceived usefulness and relevance of the content addressed, satisfaction with the external expert's presentation, and the overall usefulness of the expert's visit. Each item was rated on a numerical scale ranging from 0 to 10, and students were also given the opportunity to provide open-ended qualitative comments. The survey was administered via the University of Oviedo's institutional online platform, ensuring respondent anonymity and facilitating systematic data collection and analysis.

Experience Results

The satisfaction survey was completed by students enrolled in different groups of the course Introduction to Economic Statistics across several Economics and Business degree programmes, all of whom participated in the activity described above. Although the number of responses was limited, a factor that constrains the generalisability of the findings and will be addressed in more detail in the section on limitations, the data obtained offer relevant insights into students' perceptions of the experience and are consistent with results reported in previous studies on similar initiatives (Coleman, 2013; Kirby & Turner, 2024).

An additional strength of the sample lies in the diversity of participating students, who were drawn from different class groups taught by different instructors. This heterogeneity reduces the likelihood that the evaluations were driven by a single teaching context or instructor-specific effects. Moreover, the voluntary and anonymous nature of the survey helps to mitigate potential social desirability bias and supports the credibility of the responses.

Table 1 summarises the main descriptive statistics for each of the four items included in the survey, reporting minimum and maximum values as well as arithmetic means on a scale ranging from 0 to 10.

Table 1

Descriptive Statistics From the Satisfaction Survey (0–10 Scale)

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

Source: Own elaboration.

Overall, the results indicate very positive student evaluations of the experience. Mean overall satisfaction with the Professionals in the Classroom activity reached 8.44 points, with relatively high ratings across respondents. This level of satisfaction is well above commonly used thresholds for positive evaluation and aligns with findings from previous research on the integration of external professionals in university teaching (Coleman, 2013; Kirby & Turner, 2024), suggesting that the activity was perceived as providing substantial added value.

Perceived satisfaction with, and usefulness of, the content covered by the activity yielded a mean score of 8.00. Although this item showed greater dispersion than the others, with responses ranging from 4 to 10, the average rating remains clearly positive. The wider range may reflect heterogeneity in students' prior statistical knowledge, expectations regarding the activity, or differences across class groups, but does not undermine the overall favourable assessment of the content.

The highest-rated dimension was satisfaction with the guest expert's presentation, which achieved a mean score of 9.33 and a narrow range between 8 and 10. This result is particularly noteworthy. First, it underscores the importance of the professional's profile and communication skills as key factors influencing the effectiveness of such initiatives, in line with the recommendations highlighted in the literature (Coleman, 2013). Second, the consistency of the ratings suggests that students' positive perception of the expert's contribution was largely independent of individual or contextual differences.

The perceived benefits of hosting an external expert also received a high mean score of 8.11, with values ranging from 5 to 10. The close alignment between this item and those measuring overall satisfaction and content-related satisfaction indicates coherence in students' responses, with no major discrepancies between general appreciation of the activity and its perceived usefulness. Such consistency is commonly observed in evaluations of innovative teaching practices and is considered an indicator of internal validity (Biggs et al., 2022).

A combined interpretation of the four survey items allows for several relevant insights. First, the fact that the highest ratings correspond to the expert's presentation reinforces the central role of the experiential component of the activity, namely, direct exposure to a practising professional who routinely applies statistical tools in real contexts. This finding supports well-established arguments in the literature regarding the motivational and educational value of professional role models in quantitative disciplines (Bandura, 1986; Ormrod, 2004).

Second, the presence of comparatively lower minimum scores in the items related to content usefulness and overall usefulness of the visit suggests that a small subset of students did not find the activity particularly relevant. While the limited sample size precludes definitive conclusions, several plausible explanations can be considered, including mismatches between individual expectations and the design of the activity, differences in interest between applied and more methodological aspects of Statistics, or group-specific contextual factors.

Finally, the convergence of the present results with previous empirical evidence, particularly that reported by Coleman (2013) and Kirby and Turner (2024), supports the interpretation that the positive evaluations reflect a genuine impact of the activity on students' motivation and perceptions of relevance, rather than a short-lived novelty effect or a courtesy bias. Nevertheless, a more robust assessment of impact would require longitudinal designs and the inclusion of comparison groups to examine whether these attitudinal effects persist over time, an issue that constitutes a promising direction for future research.

Conclusion

This study has presented and assessed an experiential learning initiative implemented in the course Introduction to Economic Statistics at the University of Oviedo, based on the participation of a professional statistician from the Asturian Society of Economic and Industrial Studies (SADEI) within the framework of the Professionals in the Classroom programme. Evidence from the student satisfaction survey indicates consistently high levels of approval across all evaluated dimensions, with average scores above 8 out of 10 and particularly strong ratings for the quality of the expert's presentation ($M = 9.33$).

Taken together, these findings suggest several relevant conclusions. First, they indicate that the structured involvement of external professionals in university teaching, when carefully planned, aligned with the curriculum, and coordinated between lecturers and guest experts, can serve as an effective mechanism for enhancing student motivation in statistics courses and reinforcing perceptions of the practical relevance of statistical content. Second, the experience provides empirical support for the applicability of experiential learning approaches in Economics and Business degree programmes, where reducing the gap between academic knowledge and professional practice constitutes a key pedagogical objective. Third, the Professionals in the Classroom initiative at the University of Oviedo emerges as an appropriate institutional framework for sustaining this type of collaboration, offering the organisational support and formal recognition necessary to ensure continuity and scalability.

From a curriculum design perspective, these results suggest that professional engagement activities should not be conceived as isolated or exceptional events, but rather as an integral component of teaching strategies in applied statistics courses. More broadly, they highlight the potential value of systematically embedding such experiences in quantitative subjects aimed at developing analytical skills with direct relevance to the labour market. In this regard, the consolidation of stable partnerships with local institutions and organisations, together with the progressive refinement of pedagogical design, appear as central elements for the future development of the initiative.

Several limitations of the study must nevertheless be acknowledged. The relatively small sample size restricts the generalisability of the findings, although their consistency with existing literature lends them credibility. In addition, the absence of a control group prevents a clear identification of causal effects attributable solely to the intervention, and the use of an immediate post-activity survey does not allow for an assessment of longer-term impacts on learning outcomes or the transfer of statistical competencies to new contexts.

Despite these limitations, the experience described has implications that extend beyond the specific context of Economic Statistics. Similar challenges concerning the perceived distance between theoretical instruction and professional application are present in other quantitative disciplines within the social sciences, such as Financial Mathematics, Econometrics, or Data Analysis. The systematisation and dissemination of initiatives of this kind, particularly when supported by institutional programmes like Professionals in the Classroom, therefore represent a meaningful contribution to the advancement of teaching innovation in higher education.

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