



Experiences of Spanish visiting professors teaching environmental engineering in Italy

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Abstract— A level of awareness of educational differences between home and host institutions when acting as a visiting professor is useful for proper teaching. The aim of this research is to identify and discuss the differences between countries regarding university teaching in engineering, based on the experiences of two Spanish visiting professors that had recently followed academic stays in Italy to teach environmental engineering. Differences between institutions were identified by brainstorming, analyzed qualitatively by cross-coding, and validated by two other visiting professors in engineering. The differences were grouped into four categories: general aspects, class development, interaction with students, and evaluation. It was found that prior knowledge of timetables, the distribution of classes and tutorials, the evaluation procedure, and the level of formality in the teacher-student relationship are key for proper class development. Likewise, quality teaching implies prior knowledge of the students' level and the support of visual elements for an adequate level of understanding, thus overcoming the language barrier. These aspects are discussed from a generic perspective, so they can be useful for future teachers acting as visiting professors in engineering. Finally, it is worth mentioning that the support of their colleagues at the host university was always key for successful teaching in the opinions of all the visiting professors.

Keywords— university teaching, visiting professor, course planning, class development, student-professor interaction, evaluation system, between-country differences.

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Experiencias de profesores visitantes españoles enseñando ingeniería medioambiental en Italia

Resumen- El conocimiento de las diferencias educativas entre las instituciones de origen y de acogida cuando se actúa como profesor visitante es útil para una enseñanza adecuada. El objetivo de esta investigación fue identificar y discutir las diferencias entre países en relación con la docencia universitaria en ingeniería, a partir de las experiencias de dos profesores visitantes españoles que habían realizado recientemente estancias académicas en Italia para enseñar ingeniería medioambiental. La identificación de las diferencias entre instituciones se efectuó mediante una lluvia de ideas, las cuales fueron analizadas cualitativamente mediante codificación cruzada, y validados por otros dos profesores visitantes en ingeniería. Las diferencias se agruparon así en cuatro categorías: aspectos generales, desarrollo de la clase, interacción con los estudiantes y evaluación. Se encontró que el conocimiento con antelación de los horarios, de la distribución de clases y tutorías, del procedimiento de evaluación, y del nivel de formalidad en la relación profesor-alumno, son claves para un adecuado desarrollo de las clases. Del mismo modo, una docencia de calidad implica el conocimiento previo del nivel del alumnado y el empleo de elementos visuales para un adecuado nivel de comprensión, salvándose así la barrera del idioma. Estos aspectos se

discuten desde una perspectiva genérica, por lo que pueden ser útiles para futuros profesores que actúen como profesores visitantes en ingeniería. Por último, cabe mencionar que el apoyo de los colegas de la universidad de destino fue siempre clave para el éxito de la docencia en opinión de todos los profesores visitantes.

Palabras Clave— docencia universitaria, profesor visitante, planificación de cursos, desarrollo de clases, interacción alumno-profesor, sistema de evaluación, diferencias entre países.

1 Introduction

The university has among its objectives the training of future professionals in very specific fields of knowledge. This specificity not only refers to generic fields such as law, medicine, and engineering, but also to their specialized branches [1]. The success of a university training largely depends on the university professors, who are responsible for sharing the requisite knowledge for future professional careers [2].

For student learning to be successful, university professors, regardless of their fields, need appropriate background experience in very different dimensions, sometimes at some distance from the nature of the concepts they have to explain [3]:

- First, university professors are expected to possess solid knowledge and to understand the concepts they may be teaching [2].
- Second, university professors have to know how to explain the concepts in simple and understandable ways [4], [5]. To do so, it is essential to use accessible yet rigorous language and be aware of any previous training of their students [6].
- Third, university professors are expected to know how to communicate with students, so that relationships of trust and respect can emerge [7]. In doing so, the students will be willing to share their doubts at the right time and in the right way [8], [9].
- Fourth, university professors need to know how to promote learning, *i.e.*, to create learning environments where interest and motivation are cultivated among

students, fostering effective consolidation of conceptual understanding [4], [10]. Thus, adequate class development is essential.

 Finally, university professors must know how to evaluate [11]. The evaluation procedure must be appropriate and must be adjusted to the concepts addressed throughout the course [12], [13].

In inter-university relations, the "visiting professor" accepts an invitation to teach at an academic institution other than the one at which that professor is contracted [14]. The stay of a visiting professor usually responds to the specialized training needs of students, leading to invitations to scholars within very specific fields of knowledge [15]-[17]. The opportunity for stays often arise between institutions of different countries, with the aim of increasing internationalization [18].

An invitation to be a visiting professor often confers some prestige and can be regarded as an honor in recognition of previous academic effort [18]. It likewise entails institutional responsibility, as the invitation from the host institution implies some trust that the visiting professor will leave a good image as a competent professor [19]. The task is a complex one, because although the visiting professor may, for example, be perfectly knowledgeable of certain engineering concepts that must be taught, there are many other key aspects for a successful academic stay such as the student backgrounds, levels of basic training, institutional organization, and evaluation [20]. In a word, a visiting professor can very quickly feel beyond the "comfort zone" of the home institution.

A bibliographic search revealed a mere 23 scientific publications within the field of engineering up until the summer of 2024 in which the term visiting professor was mentioned. Moreover, the publications were basically brief communications on personal experiences and reports from host institutions on various activities of scholars who were at times acting as visiting professors [21].

The authors found no scientific paper in which the teaching challenges of a visiting professor regarding planning, contact with students, and evaluation are systematically addressed. However, it is important to highlight the various areas within which a visiting professor may have difficulty adjusting, so that with the right preparation those areas may become less of a barrier to teaching at the host institution [22].

In this paper, some aspects that visiting professors might like to consider for successful teaching at a host institution are addressed. These aspects are focused on the planning of courses and classes, the relationships with the students, and the evaluation system. To do so, the personal experiences of two engineering professors affiliated with the University of Burgos, Spain, during their stays as visiting professors at the University of Padova, Italy, were analyzed.

All the differences regarding university teaching between both countries are identified and discussed. The hope is that future visiting professors may find pointers towards the areas that deserve special attention before teaching at a host institution.

2 Materials and methods

2.1 Participants and teaching framework

Two Spanish professors, affiliated to the Department of Civil Engineering of the University of Burgos, Spain, and members of the "SUstainable CONStruction (SUCONS)" research group, participated in this study. Both are experts in sustainable construction and the reuse of waste in construction materials, areas that are also their main lines of research. At their home institution, the courses they teach are related to hydraulic and structural calculations and building design, as well as sustainability courses related to the design of green spaces and environmental impact assessment. Teaching is exclusively in Spanish and predominantly to students of that nationality.

As a result of the good relationship and joint work of the SUCONS research group with the "Structural Analysis and Design" research group of the Department of Civil, Environmental and Architectural Engineering [Ingegneria Civile, Edile e Ambientale] (ICEA), University of Padova, Italy, the two professors were invited to work there as visiting professors over the 2022/2023 academic year. Both were, therefore, affiliated to ICEA, teaching courses on the two-year Master's Degree in Environmental Engineering related to their teaching and research at the University of Burgos. Thus, one taught 3 ECTS on the 2nd-year course "Recycling and Reuse of Raw Materials" during November and December 2022, while the other professor taught 4 ECTS on the 1st-year course "Design of Structures for Environmental Protection" during May and June 2023. The official language of this Master's course is English. An average of 20 students, not only from Italy, but also from France, Iran, India, Pakistan, and Morocco, attended the face-to-face classes.

2.2 Data collection and analysis

The objective of this study is to identify and to discuss multiple aspects related to the differences between university teaching in Spain and in Italy, aside from class-related content. Thus, the experiences of the two Spanish visiting professors at the University of Padova, Italy, were evaluated. Data collection and analysis were performed in four stages, as detailed in Fig. 1.



Figure 1. Temporal distribution of data collection and analysis. Source: The authors.

First, an informal meeting was held between both visiting professors at the end of their stays, brainstorming any aspects of teaching unlike usual practice in Spain that might have caught their attention. During the talk, all the points were noted down on paper.

After this first meeting, a qualitative analysis through cross-coding of the main teaching-related aspects that each professor had mentioned were classified into different thematic groups [23].

Four coding categories were defined, based on previous studies of the authors [24], which were: (1) "General aspects", which included aspects that affected teaching as a whole; (2) "Class development", i.e., teaching practice that influenced the flow of a class and the availability of the necessary resources; (3) "Interaction with students", i.e., how to relate to students both inside and outside the classroom; and (4) "Evaluation", which included all teaching practice related to the assignment of student grades. The classification of each aspect in each group was a separate task for each professor, to avoid subjectivity and to guarantee classification reliability [25], which was confirmed by the 97% percentage agreement achieved [26].

The classification of those aspects that each professor assigned to a different group was discussed until a reasoned agreement was reached.

A second meeting was then held in which the professors explained in 3-4 lines of text the notable differences between Spain and Italy for each aspect of teaching practice that had been identified. At that meeting, each aspect of teaching practice was addressed in its respective thematic group, so that no concepts were mixed up and so that the interrelationships between the aspects of the same thematic group could be clarified [27]. This enabled a better delimitation and clearer explanation of the teaching differences found [27].

Finally, the different aspects of teaching practice between the two countries that the visiting professors had noted during their stays were identified through a qualitative analysis of all their texts. The aspects detected were verified and validated by two university engineering professors who had also acted as visiting professors.

Both were affiliated to the University of Padova, Italy, and had experience as visiting professors in Spain and France, respectively. In this way, it was ensured that the conclusions reached were not due to the analysis of a specific case but had a broad validity framework, thus giving consistency to the results and providing clarifications [24], [28]. Written consent to participate in this study was obtained.

3 Results and discussion

3.1 General aspects

The thematic group "General aspects" was composed of six aspects of teaching practice, as shown in Fig. 2. The aspects of teaching practice that affected specific dimensions were assigned to the other thematic groups.



Figure 2. Summary of teaching practice addressed in the thematic group *"General aspects"*. Source: The authors.

3.1.1 Language

The first identifiable aspect was the language used in the classroom. It was of course an expected issue, as different languages are spoken in both countries. Although the visiting professors taught in Spanish, in Spain, the classes were taught in English, in Italy. Therefore, visiting professors were prepared to prevent this from being a major teaching barrier. Apart from the need of competent English skills, the visiting professors were trained in the technical language of their courses and prepared notes with extensive graphic support to ease students' understanding. It should also be noted that sufficient competence in English for the purposes of teaching at the host institution was among the reasons why both professors were selected to become visiting professors, so that the concepts of the courses could be conveniently explained in a non-native language. This is usually a problematic issue when acting as a visiting teacher in a country with a different native language than the home country [16]. However, teaching in English when implemented at the institution very clearly offers the opportunity to promote internationalization, among both students and faculty staff [15].

3.1.2 Programming of course contents

Course content programming is fundamental, to prepare adequate timeframes within which to explain each concept and to progress through the curricular content at an appropriate pace [24]. The professor must therefore ascertain the available teaching hours and class timetabling to plan the course content before the classes begin [29]. The two visiting professors identified two aspects that affected curricular programming:

- In Europe, each university course is assigned a number of ECTS credits. Furthermore, the number of teaching hours available to the professor *per* ECTS can vary between countries [30]. In Spain, 1 ECTS corresponds to 9 teaching hours, while in Italy, for this specific Master program, it is 8 teaching hours. Visiting professors should know that information before beginning the course, if they are to organize their teaching.
- Differences between both countries were also found regarding the point in time at which the class timetables are established. At the University of Burgos, Spain, the timetables of all courses are fixed in June/July, before the

start of the academic year in September, so that they are known well in advance. At the University of Padova, Italy, the timetables were set between one and two months before the start of the course, at the beginning of the corresponding semester. So, less time was available for precise temporal course-content organization [29].

3.1.3 Class-timetable flexibility

The need to change class timetables may occasionally arise throughout the course for all professors, including visiting professors, because of personal reasons. Changes may also be so that teaching can end earlier and students have extra time to prepare for exams [27], and for practical activities and field trips that complement theoretical classes [31]. On the one hand, the professor can propose changes to the class timetable in Italy, having only to consult with the students. On the other hand, class timetabling in Spain is much stricter, as it is necessary to liaise with the institution, at least at the University of Burgos. Class timetabling cannot be changed without following procedures at both universities, although greater flexibility at the University of Padova facilitates the organization of activities and field trips with consecutive class hours and interlinked classes [31].

Moreover, it is strictly mandatory at the University of Padova to compile a class diary, indicating every professor the date, time, and course content of their classes, which has to be shared with the departmental director at the end of the course for approval. There is no similar mechanism for monitoring teaching activity at the University of Burgos due to the stricter procedures to modify the timetabling.

3.2 Class development

The thematic group "Class development" included the teaching aspects shown in Fig. 3. They can be divided into two sub-groups depending on whether they were or were not directly related to the students.



Figure 3. Summary of teaching aspects addressed in the thematic group "Class development". Source: The authors.

3.2.1 Aspects unrelated to students

Three aspects unrelated to the students were considered key for adequate class development, especially during the first days of teaching of the visiting professor.

First, classroom opening routines should be emphasized. In both Spain and Italy, the doors of the classrooms are always open at the start of a class. In Italy, however, some classrooms are not exclusively used for teaching, but also for meetings, conferences, *etc.* and it is the professor who has to collect the key from the staff room or a colleague and who has to open the classroom door when the class is held. Visiting professors familiar with this situation, so that the beginning of the class is neither delayed nor disturbed [32].

Second, the teaching times and breaks within one teaching hour and their distribution are relevant aspects to adjust to the established timetables to cover all curricular content [29]. The distribution of class time and breaks differ in both countries and is more flexible in Italy. At the University of Burgos, Spain, a 5-minute break has to be implemented at the start of a teaching hour, followed by 50 minutes of teaching time, and finally another 5-minute break. The teaching and break times at the University of Padova, Italy, were 45 and 15 minutes, respectively, which can be freely distributed at the discretion of the professor.

Differences in the use of projectors were found between the two countries that, if not foreseen, might complicate their use among visiting professors. An HDMI-to-VGA adapter is needed in some classrooms at the University of Burgos, if the professors are without the VGA-connection type. In addition, professors must have their own remote control to turn on the projectors. At the University of Padova, all the classrooms were equipped with HDMI connections, with remote control also available in some classrooms, although often found locked away in a cupboard, with a key that at times had to be requested from the administrative staff.

3.2.2 Aspects related to students

Knowledge of student characteristics is a fundamental part of good teaching, so that professors adjust the speed and methodology of their explanations [19]. The two visiting professors also highlighted differences in teaching aspects related to the behavior of students in both countries.

The first notable aspect was the widespread use of tablets at the University of Padova, Italy, for class follow-up among students. Therefore, the notes provided by the visiting professors for class follow-up and subsequent study were viewed on screen and never printed out by the students.

As a result, the notes should be adapted to this kind of electronic device [33].

Another relevant aspect was the base knowledge level of each student, something that university professors can gauge well when teaching at their home institutions, as they will at least know the study modules that their degree-course students had followed [22]. However, collegial support is essential, if that information is not readily available to a visiting professor and not easily consulted at the host institution [14]. The situation was even more complex in this particular case. As highlighted in Fig. 3, the students of both visiting professors at the University of Padova, Italy, were of a markedly international nature. It meant that even the university professors were not fully aware of the base knowledge levels of their students. In that type of situation, asking questions or setting short tests during the initial classes can give insight into baseline student knowledge of the course concepts [34].

The use of a language other than the native one hinders both the fluidity and the depth of conceptual explanations from the professors that might influence student understanding [16]. Thus, the visiting professors of this study in Italy recalled giving much slower explanations, while using a projector and a blackboard for viewing images and schemes that enhanced their students' conceptual understanding. This language issue may also cause that there were fewer student responses to classroom questions from the professors [35].

3.3 Interaction with students

The thematic group "Interaction with students" included the teaching aspects of student-initiated interaction, mainly related to doubts and out-of-class meetings. These aspects are summarized in Fig. 4.



Figure 4. Summary of teaching aspects addressed in the thematic group "Interaction with students". Source: The authors.

3.3.1 Communication characteristics

Regarding the mode of communicating with the students, the visiting professors reported that the students frequently communicated in person in both countries. However, the use of e-mail was also very widespread in both countries for solving simple doubts quickly and efficiently [36].

The main difference between both countries was the way the student approached and talked to a professor. Studentprofessor relations are more respectful and of far greater formality in Italy than in Spain. The greater formality found in Italy is considered to reinforce clear roles for both professors and students [37], although it can potentially hinder the performance of teaching activities where informal exchanges can also favour learning [12], such as simply answering the professor's in-class questions.

3.3.2 Doubts in the class context

Students normally raise doubts over the concepts covered in class and wish to deepen their understanding of a specific concept. Resolving those doubts is key when, for example, teaching the practical components of engineering [38]. Thus, the visiting professors had frequently remarked on those sorts of doubt in both countries, which the students could raise during, immediately before, and after the class. Differences were detected between both countries:

- Generally, the doubts that students raised in class at the University of Burgos, Spain, were greater in number than in Padova. In addition, they are asked in more spontaneous ways. Both aspects imply a higher number of class interruptions.
- Doubts that the students at the University of Padova might raise were conditioned by the more formal attitudes towards teaching staff in Italy [37]. Thus, fewer doubts are posed during the class, and the moment to ask them is also more carefully chosen, resulting in fewer interruptions and an explanation delivered at a more constant speed [37]. However, the visiting professors were asked more questions at the end of the class.

3.3.3 Interaction outside the classroom

Student-professor interaction outside class is also key for clarification on concepts and assignments [39]. Students sometimes need to resolve complex doubts in tutorials outside class time.

The visiting professors conducted tutorials outside class to respond to student requests at both institutions. No differences were found in their frequency, so doubt resolution in the class context was presumably also successful [38]. However, differences were found in the way these meetings were arranged. The professors at the University of Burgos, Spain, have to define a weekly tutoring timetable at the beginning of the course. No such timetable is established at the University of Padova, Italy, so the duration of the tutorials outside class time is previously agreed with each student.

If requested, exam revisions can also be an ideal framework to resolve student doubts, which can arise even when checking for errors [40]. In Spain, there is low student attendance at exam revisions which students mainly use to check whether their grades are correct and to try to increase them. However, attendance at exam revisions is higher in Italy, even among students who pass the exam, with students showing greater interest in their errors and what the correct answer should have been. This attitude may be linked to a greater interest of students in the course [25], [34], although it may also be due to the opportunities that there are for students in Italy, unlike in Spain, to repeat the exam so as to improve upon their earlier grade.

3.4 Evaluation

The last thematic group defined from the indications of both visiting professors was *"Evaluation"*.

This group had the highest number of teaching aspects, of which a visiting professors must be aware, in order to conduct fair evaluations of the students' work [4]. Those aspects are summarized in Fig. 5.



Figure 5. Summary of teaching aspects addressed in the thematic group "Evaluation". Source: The authors.

3.4.1 General approach

The first aspect to highlight is the applicable criteria for defining the number of items (exam and/or projects) and their relative weight, through which the final course grade is obtained. Moreover, the professors must also adequately define the dates for handing in assignments or taking exams, and the course content addressed in each item [29]. The visiting professors found that the same evaluation items were used in both Spain and Italy: projects, homework, partial exams, and final exams. However, the division of the weight of each one is different. While at the University of Burgos, each item can account for a maximum of 40% of the final grade of the course, at the University of Padova, Italy, the entire final grade of the course may correspond to a single item.

3.4.2 Conducting exams

Visiting professors detected several aspects that need to be considered to prepare an exam, the approaches to which differed between both countries:

- Regarding the exam types, exams are invariably written in Spain, although oral exams might be held in very extraordinary situations. Both oral and written exams are common in Italy.
- In both countries, the dates and the classrooms for the mid-term exams were set after the professor had consulted with the students, although professors are highly encouraged to fix them before the beginning of the course for a better organization. The procedure in Italy was the same for the final exams. Nevertheless, at the University of Burgos, Spain, the dates and classrooms of the final exams had been fixed before the beginning of the academic year, the previous June/July, at the same time as the course timetables, which allows for lower flexibility [40].
- Finally, all students enrolled on the course can sit the exam in Spain, without the need for any prior registration.

In Italy, students must register prior to the exam, thereby confirming their willingness, which leads to a deeper reflection of the students on this issue [34].

3.4.3 Grading

The grading scales vary widely among countries [41]. Grades are assigned in Spain on a scale of 0-10 points, with 5 points sufficient for a pass, and a decimal point is also sometimes used. However, in Italy, grades are on a scale from 0 to 30 points, with a pass grade set at 18 points, with no decimal points. Visiting professors must be familiar with the grading system of the country to evaluate the projects and exams of their students in a fair manner [17].

3.4.4 Other issues related to exams

Visiting professors also need to know the number of final exams they have to set during the course. In that regard, very notable differences were found between both countries:

- In Spain, there are only two calls *per* course, so there are only two final exams. In addition, in principle, only students who have not passed in the first call are allowed to take the second call. Students who wish to improve their grade in the second call have to submit a reasoned request to the professor for a decision.
- In Italy, there are at least four final exams *per* course, which students are free to take. It implies that the exam can be retaken several times if the student fails or if wanting to improve upon the last grade. Clearly, having multiple opportunities and greater flexibility to retake exams makes it easier for students to organize their work [24], but it can also cause them to make less effort from the outset [42].

Finally, visiting professors should also consider the time during which the exams at the host universities must be kept for possible claims or national quality evaluations [43]. At the University of Burgos, Spain, the stipulated time is 2 years, while it is 10 years at the University of Padova, Italy.

4 Conclusions

Serving as a visiting professor at a foreign university is some recognition of past achievement. However, it is also a responsibility, as the visiting professor usually wishes to teach adequately at the host institution. To do so, the visiting professor should bear in mind multiple teaching aspects that may differ between home and host institutions. These aspects are addressed in this paper through the experiences of two visiting professors of environmental engineering affiliated to the University of Burgos, Spain, on a stay at the University of Padova, Italy, which are shown in Fig. 6 and can be summarized as follows:

- From a general approach, visiting professors need to know the number of teaching hours sufficiently well and in advance, as well as their timetables, for effective planning of the temporal distribution of the course contents.
- Visiting professors should be informed about teaching and breaks during class and their distribution. In this way,

teaching can be given as initially planned, and welladjusted to the class timetabling at the host institution.

- Visiting professors should define the students' base knowledge level beforehand or during the first classes, in order to guarantee adequate understanding of the concepts. In addition, if teaching is conducted in a language other than the native one, more graphic support through both blackboard and projector and slower explanations will assist proper understanding. In this way, the teacher can overcome the difficulty of explaining often complex engineering concepts in a foreign language.
- Visiting professors should adapt to the usual formality level in the student-professor relationship at the host institution, as well as to set times for raising doubts during class, outside class time, in tutorials, and during exam revisions. Tutorial timetables, if necessary, and set times for exam revisions based on the expected student attendance should be established.
- Visiting professors should be informed of all the necessary aspects for a fair student-work evaluation, such as the type and timing of exams, or the possibility of students for improving grades.



Figure 6. Overall summary. Source: The authors.

The aspects identified may be useful for future visiting professors, so that they can know in advance the aspects to be addressed for adequate teaching at the host institution. Furthermore, continuous and fluid communication between visiting professors and colleagues at the host institutions is key to the success of their teaching. Thus, the initial explanations of the members of the host institutions when welcoming the visiting professors must emphasize the most relevant aspects, and they must be continuously available for clearing up doubts.

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6 Conflict of interest

The authors declare no conflict of interest.

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