

## **Innovation linked with SDGs: Citizen Science projects to foster competencies for participation in the Digital Society**

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### ***Abstract***

*This paper describes the design of an innovative approach to teaching and learning academic communication and intercultural linguistics in the English Studies field to foster competencies for participation in the Digital Society. More specifically, we describe the learning outcomes, sequence of tasks and assessment of competencies for an itinerary of collaborative multimodal online tasks focused on the creation of a Citizen Science (CS) project linked with SDGs. These tasks drew on a genre-based pedagogy and task-based learning in connection with language and digital competencies. We conclude that the integration of CS and SDGs in the educational objectives of the course enables us to embrace the digital transition by promoting open and innovative education and training in transversal skills, digital and intercultural communication, language mediation and English.*

**Keywords:** *English teaching; citizen science; sustainable development goals; digital communication; transversal competencies; genre pedagogy.*

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## **1. Introduction**

Society is in the midst of a paradigm shift driven by the green and digital transitions and accelerated by the socio-economic impact of the COVID-19 pandemic. As a result, bold skills agendas are proposed in Europe to drive the transition towards a climate-neutral economy and a digital society. For example, the new European Skills Agenda (European Commission, 2020) set objectives that highlight the key role of skills (e.g. entrepreneurship, learning-to-learn, digital competence, etc.) to boost the employability of citizens, and generate growth and participation in society. Similarly, the European Digital Competence Framework for Citizens (DigiComp, Carretero et al., 2017) is a tool for measuring 21 competencies grouped in 5 areas of digital skills (information and data literacy, communication and collaboration, digital content creation, safety, problem-solving). This tool has the potential to help with self-evaluation, setting learning goals, identifying training opportunities and job search and thus enable citizens to take advantage of the possibilities offered by a digital society. Both the new European Skills Agenda and the DigiComp put forth skills needed to achieve the UN 2030 Agenda for Sustainable Development Goals (SDGs, UNESCO 2019). All these agendas require innovative education and training through the full embracement of the green and digital transitions in higher education institutions. At this moment, there is a unique opportunity to critically rethink models of higher education to empower students by providing them with the skills, competencies and values needed to think and act green so that economic, social and technological progress does not destroy nature.

In this paper, we present the design of an innovative approach to teaching and learning academic communication and intercultural linguistics through Citizen Science in a university course in the field of English Studies. We describe the design of an itinerary of collaborative multimodal online tasks focused on Citizen Science (CS) projects linked with SDGs. To design these tasks, we drew on a genre-based pedagogy (Swales, 2004) and communicative language teaching approaches linked with language and digital competencies (Chong & Reinders, 2021). The integration of CS and SDGs in the course educational objectives was intended to promote open and innovative education and skills that should be prioritized in higher education. Thus, this study aimed to make learners aware of the societies they are engaged with and create interactive learning environments that connect context with learning through digital competence, intercultural communication, transversal skills, and English language competence.

## **2. Context of the study**

Citizen Science (CS) projects linked to SDGs were incorporated into a university course offered in the field of English Studies. This optional course is open to undergraduate students in the 3rd and 4th year of the English Studies degree program and to graduate students

enrolled in the English curriculum strand of a master's program in secondary education and doctoral students working on digital and multimodal genres. The educational objectives of the course cover a range of topics related to the critical analysis of written and spoken genres in the field of humanities and social sciences. The analysis of these genres is approached from a discursive, multimodal, digital, and intercultural perspective, thus seeking to develop students' academic literacy skills by widening their genre repertoires and enabling them to create these genres in English. Collaborative pair and group work, the use of technology in connection with the development of research skills in linguistics, social science methods such as surveys and language communication and mediation competencies in English are some of the dimensions integrated into the teaching and learning process of this course.

However, this course requires innovation to prepare graduates to face a two-fold challenge: first, to improve their scientific literacy and achieve the SDGs of the 2030 Agenda for the democratization of science, accessibility and citizen participation; and second, to understand the affordances and limitations of digital communication in Web 2.0 and social media for the dissemination of disciplinary knowledge to non-specialized audiences. CS is an approach to science communication that seeks to involve citizens as active members of the research process (Fecher & Fieske, 2014) and therefore, it provides an excellent context for exploring ways of delivering digital communication, inclusive programs, and the syllabus transformations needed to meet the SDGs concerning the democratization of science and citizen participation. CS projects are multimodal online texts or digital genres that take advantage of Internet affordances to inform, educate, and persuade the general public to get involved in the identification and classification of research data. This digital genre is in line with open science practices, which are claimed to lead to increased trust and interest in science, a stronger science-society relationship, and improvement in public scientific literacy (Bonney et al., 2009). Hence, its inclusion is critical for the digital communication and communication in foreign language skills required for full online citizenship.

### **3. Genre pedagogy and methodological design**

Genre pedagogy was adopted to teach CS projects as text types. Genre is defined as a rhetorical category of discourse with a communicative purpose (Swales, 2004) or "socially recognized ways of using language" (Hyland, 2007, p. 149). Genre pedagogy enables the teaching of writing scientific discourse and text types likely to be found in a particular target context. In particular, it facilitates the understanding of the text-specific rhetorical purposes and language expressions to achieve these purposes in the context of use, as opposed to a focus on form (i.e. syntactic structures, vocabulary) and composing in the teaching of writing. Therefore, a genre-based approach to teaching CS projects makes writing outcomes and expectations clear: it aids students to understand not only their main rhetorical structure, but also their main purpose (to obtain as much information as possible with the help of the

public), their discursive features (to inform the public as clearly as possible about what needs to be done) and multi-semiotic strategies (to persuade the public to attract their interest with textual and visual elements) (Bateman, 2008).

The genre-based tasks are planned around the range of online texts students will need to use in the target context of CS. The methodology employed for the design of genre-based learning tasks is a communicative approach to the teaching of foreign languages, namely technology-mediated task-based learning (Chong & Reinders, 2021; Tomlinson, 2012). Thanks to this approach, we can introduce authentic materials and real-world communicative situations that students can analyze and critically revise to, later on, involve them in the creation of similar tasks after familiarizing them with the genre conventions. Furthermore, to familiarize themselves with rhetorical demands or genre conventions, students will work with a small corpus of CS projects related to topics such as climate change, health, and wellbeing. CS projects are hosted in the digital environment; hence, ICTs and open access software are integrated to promote active and collaborative methodologies for both the completion of these multimodal online tasks and the assessment of transversal (digital) skills.

## **4. Syllabus development**

### ***4.1. Learning objectives***

The genre-based tasks are supported by a double premise. On the one hand, digital communication is an essential competence for working in online communities: the online communicator is a mediator. On the other hand, online communication is a tool capable of enabling large-scale participation in science and raising awareness about the main socio-economic problems that influence society from the perspective of global initiatives such as the UN 2030 Agenda for Sustainable Development Goals. More specifically, the following educational aims have been established:

- to introduce an emerging digital genre used for science dissemination.
- to foster skills such as critical thinking and autonomous learning of the linguistic resources, discourse, and register features of the genre of CS projects.
- to analyze how CS projects inform, teach, and persuade citizens to collaborate with research tasks (e.g. data collection and analysis).
- to emphasize the value of CS and SDGs for the democratization of science, accessibility and citizen participation that leads to scientific literacy.
- to understand the affordances and limitations of digital communication in Web 2.0 for disseminating disciplinary knowledge to non-specialized audiences.
- to build a framework for developing and measuring transversal skills (i.e. theoretical and applied linguistics knowledge; advanced linguistic competence in English;

searching, analyzing, and processing information; intercultural competence; the critical understanding of social and cultural reality and its representation).

#### **4.2. Sequence of tasks**

The following four collaborative multimodal online tasks that combine a variety of skills and texts which form “constellations” (Swales, 2004) in the target context were designed:

1. The first task is a WebQuest. In this online task students have to search, manage and evaluate information related to CS.
2. The second task builds on the information of the first one and relies on qualitative research methods to carry out a survey on Google Forms.
3. The third task is a corpus linguistics workshop or data-driven learning (DDL) task where students are required to use open software and techniques common in the digital humanities to analyze recurrent linguistic and register features in the CS corpus. The corpus is written in English and gathered from the EU-Citizen.Science platform (<https://eu-citizen.science/projects>).
4. The fourth and final task implies more complexity for the students since they must produce their own multimodal digital text (blog) using Google Sites. Students are expected to apply the theoretical frameworks learned in class and use different online resources. This task aims to assess effective digital communication, communication in English (C1 level), teamwork, and critical thinking.

This task sequence seeks to help students develop an understanding of the context of CS and the ways texts can be used to realize situated communicative purposes in this target context as well as to integrate writing and reading skills.

#### **4.3. Assessment of competencies**

Current theories of language assessment highlight the importance of moving away from vague descriptors often found in analytic scoring rubrics such as “adequate knowledge of syntax” and assessing student writing against clear performance criteria. To select the standards of performance for each task we relied on the language mediation descriptors of the Common European Framework of Reference for Languages (CEFR, Council of Europe, 2020), given that mediation is clearly involved in digital communication. The CEFR defines mediation as the “co-construction of meaning in interaction” and mediation strategies may include “linking to previous knowledge, amplifying the text, streamlining text, restructuring text in the appropriate discourse culture, breaking down complicated information, visually representing information and adjusting language” (North & Piccardo, 2016, p. 457). All of these strategies can be found in CS projects. Table 1 shows examples of “can-do” descriptors (or learning outcomes) linked to each of the four tasks and their corresponding digital competence area according to the DigiComp framework (Carretero et al., 2017).

**Table 1. Descriptors for self-, peer- and teacher assessment**

<b>Task</b>	<b>“Can-do” mediation descriptors</b>	<b>DigiComp framework</b>
Task 1 Webquest	<p>Can rely on writing the relevant points included in propositionally complex but well-structured texts within their professional, academic, and personal interests (e.g. information from an article, website).</p> <p>Can select relevant detailed information and arguments on complex, abstract topics from multiple oral and written sources in researching an area for a project.</p>	<p>Information and data literacy</p> <p>Communication and collaboration</p>
Task 2 Survey	<p>Can interpret and describe clearly and reliably the salient points and details contained in complex diagrams and other visually organized information on complex academic or professional topics (e.g. diagrams/visual data collected as part of a research project).</p> <p>Can mediate during an interview, conveying complex information, and posing clarification and follow-up questions as necessary.</p> <p>Can establish a supportive environment for sharing ideas and practice by providing clear explanations and encouraging people to explore and discuss the issue they are encountering, relating it to their experience.</p> <p>Can exploit software to create a survey.</p>	<p>Information and data literacy</p> <p>Communication and collaboration</p> <p>Digital content creation</p> <p>Safety</p> <p>Problem-solving</p>
Task 3 DDL corpus Workshop	<p>Can interpret and present various forms of empirical data from texts within their professional, academic, and personal interests (e.g. information from an article, website).</p> <p>Can exploit open software to analyze language (e.g. high frequency words, language patterns, semantic prosody).</p>	<p>Information and data literacy</p> <p>Communication and collaboration</p> <p>Digital content creation</p> <p>Safety</p> <p>Problem-solving</p>
Task 4 Blog	<p>Can compare, contrast, synthesize and report in writing information and viewpoints contained in different sources (e.g. surveys, blogs, documentaries, web talks, papers in academic journals), reconstructing arguments and accounts in a coherent presentation.</p> <p>Can exploit information and arguments from several sources to discuss a specialized topic glossing with evaluative comments and adding their opinion.</p> <p>Can recognize the intended audience of a text, style, and register.</p> <p>Can make abstract concepts accessible by visually representing them (e.g. infographics, tables) facilitating understanding by highlighting the relationship between ideas (e.g. problem-solution, compare-contrast).</p> <p>Can make information in a complex written text (e.g. a scientific article) more accessible by presenting the content in a different genre and register.</p>	<p>Information and data literacy</p> <p>Communication and collaboration</p> <p>Digital content creation</p> <p>Safety</p> <p>Problem-solving</p>

The descriptors and competence areas were used to design rubrics for self- and peer-assessment of the transversal skills involved in each task. Self- and peer-assessment enable reflection, which is one of the main strengths of the teaching-learning process in genre pedagogy since students are encouraged to consider the tasks and the criteria used for judging their performance. The same performance standards will be applied by the teacher to judge each task performance and provide feedback.

## 5. Conclusion

We have reported on the design of an itinerary of collaborative multimodal online tasks focused on Citizen Science projects linked with SDGs. This approach to teaching and learning through genre analysis, corpus linguistics, and technology-mediated tasks sought to foster critical thinking and skills development for participation in the Digital Society in a university course in the field of English Studies. The aim was to introduce students to a new way of communicating science to promote citizen engagement in science-making practices supported by digital resources. The proposed topics in this project bring to the foreground the social reality that we live by promoting open access policies, science democratization, and collaborative practices between scientists and the lay public. We consider this modest study as an example of good practice that can be reduplicated in other teaching contexts since it works with transversal and interdisciplinary knowledge from the scientific and humanities disciplines. The competencies promoted through the multimodal online tasks are regarded by students as necessary in their future careers and will empower them to participate as responsible citizens in the sustainable development of our society.

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