

Article

Understanding Economic, Social, and Environmental Sustainability Challenges in the Global South

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Abstract: In an increasingly complex world, students of economics, business, and management must learn how to combine financial objectives with social and environmental aims. To that end, institutions, teachers, and curricula have a growing need for multidisciplinary approaches to reinforce education for sustainable development. This study presents a pilot project consisting of an innovative online simulation designed to help students understand the challenges that countries and companies from the Global South are facing to balance economic, social, and environmental objectives under sustainability criteria. This research uses quantitative and qualitative data provided by the students to assess the effectiveness of the methodology. The results indicate the usefulness of the methodology in helping students comprehend economic complexities in the Global South, as well as to assist them in acquiring key cognitive, skill-based, and affective educational outcomes. The combination of three active-learning methodologies (role-play, collaborative-learning, and inquiry-based learning) proved to be of high value to address sustainability-related issues in higher education and help students develop 21st-century skills.



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1. Introduction

One of the consequences of modern globalization has been the significant shift in manufacturing and production from developed countries in the Global North to developing countries in the Global South, hence altering the international economic geography [1]. In this respect, the rising role of southern actors has been partially responsible for redefining global value chains (GVCs) and global production networks (GPNs) and, consequently, countries from the Global South have acquired greater prominence in international trade in recent decades. These transformations have led to larger-scale exchanges between developing nations, complex industry relocation processes, and an overall growth in CO₂ emissions [2]. Furthermore, they have also drawn attention to the need for a fuller understanding of how these dynamics can affect trade in an increasingly globalized world [3]. This imperative has become even more apparent in the wake of the COVID-19 pandemic, which has confronted states and humankind with multiple challenges, unthinkable years ago, and highlighted the weaknesses, limits, and paradoxes of the world economic structure [4,5]. The decrease in production and transportation caused by the containment measures implemented by many countries has reduced industrial waste, lowered greenhouse gas emissions, and improved air quality [6,7]. Nevertheless, despite the beneficial environmental effects, these policies have also negatively affected many businesses, increasing unemployment, reducing household income, and aggravating poverty and inequality [8]. This situation has revealed the intricacies and fragility of GVCs, highlighting the economic, social, and environmental dimensions of human activity [9], as well as the importance of protecting ecosystems and preserving biodiversity [10].

There is widespread recognition that higher education institutions need to play a prominent role as drivers of change for sustainability. In this context, universities are increasing efforts to include sustainability-related topics within their study plans [11,12], but the scope of how these issues are addressed differs according to educational level and knowledge area, and there is still room for improvement in many courses and programs [13,14]. Therefore, it becomes essential to adapt and improve economics, business, and management study plans to guarantee that graduates in these areas develop the necessary knowledge and skills to address the connection between strategic economic sectors, social needs, and the environment if they are to transform original ideas into successful projects under sustainability criteria [15–20]. To that end, it is vital to implement pedagogical methodologies grounded in a critical viewpoint with regard to the effects of economic decisions from a global standpoint, including diverse world views and narratives to capture diversity and enhance education for sustainable development (ESD) [21]. Against this backdrop, this study addresses the following two research questions:

- RQ 1: How can we help students understand the complexity of economic interactions in consideration of sustainability criteria?
- RQ 2: To what extent can active-learning methodologies assist students in achieving key cognitive, skill-based, and affective learning outcomes for ESD?

To answer these questions, this article presents an innovative teaching and learning method that consists of an online simulation of economic interactions between different actors from the Global South, designed to highlight the challenges in balancing economic, social, and environmental aims under sustainability criteria. This pilot activity was applied in the course ‘Economics of the Global South’ as a way of encouraging students to practically apply the theoretical knowledge that they acquired during the course, thus reinforcing their assimilation of economic, social, and environmental concepts. To analyze how this educational method impacted the students’ perceptions about the entanglements involved in economic decisions, social needs, and environmental sustainability, as well as their opinion regarding the methodology’s effectiveness for educational purposes, the authors used quantitative and qualitative information provided by the students in pre- and post-simulation surveys and one essay. The findings show that students found the role-play simulation an effective tool to achieve core educational objectives for ESD, and that these kinds of practical activities increased their awareness of economic complexities and their potential effects on people’s lives and the environment. This understanding is a crucial step in developing the educational strategies required to help students acquire the 21st-century skills expected of graduate students.

This paper makes several contributions to the literature. First, it presents an inventive teaching and learning approach designed to bolster students’ comprehension of economic interactions from a sustainability perspective, with a particular focus on the Global South. In this vein—and despite the growing importance of the developing countries from this region in recent decades—this experience is unique insofar as no one online simulation has been used before to recreate the complexities of Global South economics. Given the increasing importance of the Global South in shaping global economic interactions [22], and taking into consideration the need to analyze these process under sustainability criteria [23,24], this is a crucial issue for students in the abovementioned knowledge areas. Second, it offers some interesting findings and proposals about the serviceability of role-play simulations in the acquisition of essential learning outcomes in online settings, while making the experience enjoyable for students. Third, by combining the ‘transformer’ and ‘thinker’ roles that teachers may adopt [25,26], this study makes its own contribution to addressing the challenge of transforming higher education into a real tool for change by highlighting how role-play activities can be used to foster acquisition of key educational outcomes for ESD.

The features and results of this educational approach are presented in the following five sections. In the first, the authors discuss the importance of active learning methodologies to enhance education for sustainable development. The characteristics and devel-

opment of the simulation are explained in the Section 3. The subsequent section presents the methodology used to assess the effectiveness of the teaching and learning method. This is followed by a presentation of the main findings related to the students' perceptions about the economic complexity in the Global South and the applicability of this educational method to their learning experiences. Finally, the article concludes by discussing the implications of this teaching and learning framework vis-à-vis increasing student awareness about sustainability issues.

2. Active Learning to Enhance Key Learning Outcomes for Education for Sustainable Development

Higher education institutions must play a pivotal role in transforming education into a real tool for change. In this context, it is crucial to assure that students in economics, business, and management comprehend the challenges in addressing sustainability issues from an economic, social and environmental standpoint [27,28]. Hence, it is vital to raise students' awareness of the responsibility they must take in bringing about change and fostering sustainability in their in personal life and professional responsibilities [29].

Against this backdrop, teaching and learning methodologies that require the students take an active role in their own learning, such as by developing their autonomy and independence, offering them the opportunity to reflect on their present and future responsibilities, fostering collaboration and discussion with their classmates, or enhancing self-fulfillment through attaining educational goals in a personalized or self-paced way, are powerful ways to increase student engagement and motivation within ESD [30]. Active learning strategies such as case studies, service learning, teamwork, role-play activities, collaborative learning, and problem-based tasks or projects are powerful to achieve these objectives [31–33], and can effectively increase student awareness regarding sustainability issues reflected in the 2030 Agenda and the Sustainable Development Goals (SDGs) [34]. These methodologies include a variety of techniques that emphasize information transmission and skill development, which can be applied to put the students at the center of the learning experience, rather than simply leaving students in a passive position. Therefore, active learning is an effective approach to help students develop key cognitive, skill-based, and affective learning outcomes. In line with this, previous research highlights that when educators use active learning methodologies in their teaching, it contributes to increasing the students' motivation, engagement, and satisfaction [35], and this may explain the broad agreement about the value of experiential teaching and learning techniques related to ESD [36].

Inquiry-based or problem-based learning (PBL) can be a useful methodology to fulfil the gap between the abilities that graduates acquire during their college experience and those expected by their future employers [37]. Games and simulations are another example of active learning methodologies that can be used to create student-centered learning environments in which they are required to apply theoretical knowledge in a practical way to tackle multiple challenges and solve real-world problems. These techniques require students to deal with changing scenarios in which they must deal with the intricacies and complexities of the real world and face the outcomes of their actions [38]. Additionally, this kind of active learning methodology puts the students at the center of the learning process, helping them acquire expected learning outcomes and objectives in different ways [39]. The effectiveness of these educational strategies relies on the fact that educators can adjust the educational environment, producing a framework in which students can engage in a real-life situation, as an alternative to simply asking them to study a topic from a theoretical standpoint [40]. Therefore, by requiring students to play certain roles and use their abilities and skills to functionally solve real-world problems, these strategies allow students to engage in a learning process that enhances the practical use of acquired theoretical knowledge [41]. In this regard, these educational tools create a comfortable and enjoyable educational environment for the students, hence, positively affecting their motivation, engagement, and satisfaction [35]. Games and simulations have been largely used in higher education to achieve key cognitive, skill-based, and affective learning

outcomes, especially in economics, business, management, and marketing [42]. Moreover, core sustainability-related issues such as perceptions, attitudes, and values can be effectively addressed with this sort of active-learning approaches [34,43].

In line with this, there are many features from information and communications technology (ICT) that can be used to design and implement active-learning activities for educational purposes [44,45]. From this perspective, taking into consideration that educational experience is defined by social and personal processes based on the active participation of students within the learning community [46], ICT can be used to design a computer-supported collaborative learning (CSCL) environment which can help students to be immersed in a real-world situation. Indeed, one of the main benefits of the educational methodology presented in this research is that it allows the students to receive information about their peers' actions and apply it to their own learning needs, hence improving the overall learning experience of the group, which is a crucial element to guarantee a fruitful learning process in a cooperative environment [47]. Therefore, the combination of these active-learning strategies can transform economics, business, and management study plans into valuable means to produce real change and assist students' work towards economic, social, and environmental sustainability [29,48].

To effectively meet these objectives, curricula in economics, business, and management are advancing towards an ESD approach conceived to enhance the attainment of the essential skills and competencies that are expected of graduates today [43,49]. The lack of consensus among researchers and educators regarding how the economic, social, cultural, and environmental spheres of sustainability are interrelated gives rise to diverse perspectives about sustainable development in higher education [50]. In addition to this, several perceptions regarding how these issues must be addressed within courses and degrees coexist, influencing student views and awareness regarding sustainable development and its economic, social, and ethical implications [18]. In this context, it is commonly accepted that teaching and learning about sustainability can be challenging for educators, since it is a multidisciplinary and diverse topic which may be understood in different ways within specific pedagogies [48]. This might explain why student awareness about sustainability issues is heterogeneous [51], emphasizing the challenges involved in improving understanding about social, economic, and environmental concerns among graduates [52]. However, much still remains to be done in higher education, as current curricula tend to be fragmented between disciplines, making it difficult to address ESD from a comprehensive perspective [53]. In this context, despite the fact that many universities are giving increasing prominence to sustainability-related issues [54], ESD may not always appeal to students [30]. This is a major concern for higher education institutions, as they look for educational methodologies designed to foster student engagement and satisfaction [45,55].

3. Material and Methods

To put this framework into practice, a Sustainability Challenges Simulation (SCS) was designed and implemented in the 'Economics of the Global South' course, part of the B.A. degree in Global Studies in a Spanish university. Different active-learning methodologies have been previously combined to teach economics, business, and management in higher education [42,56,57]. This role-play activity combined collaborative learning and problem-based learning in an online setting to help students understand economic, social, and environmental challenges in the Global South, while fostering acquisition of key cognitive, skill-based, and affective educational objectives to foster sustainable, green sensibilities among students, in particular regarding issues related to business knowledge, environmental impact, and social justice [56]. The aim of this active-learning methodology was to help the students understand how GVCs and GPNs work; the challenges faced by countries from the Global South that are trying to improve their economic, social, and environmental status; as well as examples of strategies based on the circular economy framework that can be applied to reduce the overall impact and improve sustainability.

To represent the challenges that countries face in managing economics while trying to improve their society without increasing damage to the environment, we used the Doughnut Economics (DE) framework [57]. This approach constitutes a powerful tool to contextualize the challenges faced by countries as they attempt to balance social needs with a respect for biophysical limits [58,59]. It is a conceptual framework based on concentric circles to represent the fact that economic activities rely on the use of natural resources to satisfy social needs. This framework is defined by two circles: an inner circle that represents the social foundations (the minimum levels that every country should meet to guarantee the well-being of citizens), and an outer circle which denotes the ecological ceiling (the environmental limits beyond which lies and overshoot of pressure on the planetary life-giving systems). Between these two limits lies ‘an ecologically safe and socially just space for humanity’ [57] (p. 45). One crucial element to succeed in the major goal of ‘bringing all of humanity into that safe and just space’ [57] (p. 45) is to transform the economy into a regenerative and distributive one. For this reason, the simulation incorporated also several elements of the circular economy (CE) approach [60,61], which promotes a comprehensive framework focused on finding ways to reuse products and materials for as long as possible in closed-loop systems designed to foster resource productivity and system sustainability [62,63]. The core idea of the CE is to identify ways to implement loops within the production process by reusing materials as much as possible, hence optimizing supply chains by adding value to the different transformation steps while at the same time increasing the sustainability of the whole chain. However, while this approach is increasingly being taken into consideration in higher education curricula, research, and institutional dynamics, there is still room for improvement [64–67]. Therefore, the study presented in this article combines the DE and CE approaches to fill a gap in understanding and provide an analytical framework with which students can analyze global supply chains and economic interactions between countries in the Global South, in addition to being sensitized to the effects of economic decisions on society and the environment [68,69].

For the simulation, each individual student was assigned to represent one of five actors with specific characteristics and objectives: countries, companies, financial institutions, international organizations, and civil society organizations. In total, six countries, six companies, six financial institutions, two international organizations, and two civil society actors were represented in the role-play activity. Each player used a toolkit that consisted of a spreadsheet with several tools (charts) designed to monitor their performance, manage their status, and make decisions during the simulation. The toolkit included core charts, which reflected the specific features of each kind of actor, and instrumental charts for making calculations. For the sake of simplicity, only monetary units were used, and prices were flexible (See the Supplementary Materials for an example of the toolkit for the five actors).

3.1. Countries

The six countries in the simulation—Brazil, Cameroon, India, Malaysia, Morocco, and Uzbekistan—represent regions from the Global South. The status of each country was defined according to the DE framework, and the goal was to engage in economic interactions with other players as means to improve the social foundation while reducing environmental pressure. To do so, the students could implement several public policies by paying the corresponding implementation costs (measured as a share of their gross domestic product, GDP). To facilitate the role-play activity, the DE framework was simplified by including only four environmental boundaries (CO₂ emissions, blue water, ecological footprint, and material footprint) and four social foundations (equality, education, income, and life expectancy), that were quantified using data from the *A Good Life For All Within Planetary Boundaries* website [70]. Additionally, for the sake of simplicity, the variables were adapted to show the status of the country using a percentage, which represented the overshoot regarding the biophysical limits or the shortfall in terms of the expected social foundations.

The setting was reflected in the country's toolkit, which included five charts. The first, a status chart, contained data on the initial and final scenarios, represented using a radial graph to show the eight dimensions included in the simplified version of the DE framework. The toolkit also included other charts to monitor the budget, manage production and imports (products and units acquired to companies) and industry (number of companies based in the country). The countries had three ways to obtain the funding required to implement the necessary public policies to improve their social and environmental status: GDP growth, taxes (paid by companies), and international aid. It also included a chart with a list of products owned by the six countries and the combination of products required to manufacture new ones. Since the prices of all the goods were flexible, the countries and companies negotiated to agree on the quantities and prices of the exchanges. Only countries knew the number of units they have for each product. Regarding public policy implementation, students in charge of a country had to contact the classmates representing the international organizations, who explained the range of available options and their social and environmental effects. To implement any of these options, the countries had to pay the assigned costs, represented by a share of their GDP. In addition, to encourage the exchange of products between countries, for every manufactured product imported from another country, each country received an extra 2% to apply to one dimension of their status.

3.2. Companies

The private sector was represented by companies and financial institutions, with a focus on the crucial role that the private sector must play in bringing about change and fostering sustainability [71]. Six companies representing key economic sectors were recreated in the simulation: agriculture, transportation, information and communication, machinery, textiles, and pharmaceuticals. Their objective was twofold: to increase revenue and to improve social and environmental sustainability by implementing circular innovations in their production processes. To achieve these goals, the participants interacted with the other players, in their capacity as countries and companies, to buy and sell products (either basic goods from countries or manufactured products from companies) and to manufacture new products, increase supply, or obtain revenue (when a company bought goods from a country, it was represented as if the company was based in that country). In all cases, transactions were done through financial institutions, which applied a fee to every transaction based on an interest rate. To improve their production processes, companies reached out to civil society, which offered them potential circular innovations designed to upgrade their supply chains by making them more sustainable. These innovations had specific implementation costs (defined by a share of the company's budget) and generated different effects for the company and the host country: every innovation implemented by a company increased its revenue by 2% for subsequent operations and caused the country's GDP to rise by 1%.

These interactions were managed using the five charts in the company's toolkit. The first represented a production panel, with a list of five potential manufactured products and the corresponding combination of the two components required for their production. The second was a portfolio chart that reflected expenses, revenue, and total budget; the third corresponded to a manufacturing panel to monitor quantities and costs of production processes; the fourth depicted a circular economy panel to monitor the implementation of circular innovations; and the fifth was a simple production chain outline with the different stages of the production process, which allowed the students to monitor the implementation of circular innovations. It also included the same chart reflecting the products owned by each country and the combination of required products to manufacture.

3.3. Financial Institutions

The other actor in the private sector were financial institutions (FI), whose overall objective was to increase profits and improve corporate social responsibility (CSR). To

obtain revenue, they managed monetary transfers between companies and countries, applying a fee to each transaction in the form of an interest rate. Every FI could choose from among three different interest rates. Of the final value that resulted from applying this fee, 50% represented the FI's profit and the other 50%, the taxes that the purchasing company paid to the host country. FIs also sought to improve their CSR by helping companies be more sustainable. This was recreated by the fact that every circular innovation implemented by a company was rewarded by a 1% reduction in the interest rate. Additionally, there were some differences between the FIs, defined by whether they focused on companies producing certain products or on transactions affecting specific regions from the Global South, and they could modify the initial interest rates to make it cheaper for companies that produced certain products or operated in specific regions to make transactions. The status of the financial institutions was defined by their revenue and the number of circular innovations implemented by the companies. To recreate this, the FI toolkit included five charts: a status chart, a trade panel to monitor exchanges between companies and countries; a budget panel to manage the revenue from the transactions, a financial panel to control fees and taxes; and a circular economy chart to monitor companies implementing circular innovations and number of them.

3.4. International Organizations

The fourth type of actor in the simulation were international organizations (IO), whose main role was to help countries improve their social and economic status by offering them a set of public policies and monitoring their implementation. These policies could generate several social and environmental effects, and to implement them, the countries had to spend a share of their GDP. Countries paid this amount to international organizations as a way of representing the government's public spending to tackle environmental problems and improve the social foundation. Therefore, these payments increased the IO's budget. International organizations could also help countries by sending them international aid in the form of money transfers. The IO toolkit comprised five charts: a public policy agenda which included the set of available policies and their social and environmental effects (for the sake of simplicity, some of the policies affected only one dimension, while other had consequences on two); a public policy strategy chart to help the students calculate the implementation cost for every policy; a public policy portfolio to monitor the implementation of public policies; a budget chart to manage transactions with countries; and a development agenda to manage the redistribution of money between countries via international aid. There were two international organizations in the simulation, one with a social focus and another with an environmental focus, which offered different public policies according to their targets.

3.5. Civil Society Organizations

Finally, for the sake of simplicity, the role of the civil society organizations (CSO) concentrated on cooperating with the private sector by asking companies to make their production processes more sustainable. To that end, they offered companies a set of circular innovations to make their supply chains more sustainable, seeking to become circular. To implement these innovations, companies had to pay a share of their budget to the CSOs, which represented the investments required to improve the productive processes and constituted the CSO's budget. The status of the civil society organizations was then defined by the kind and number of circular innovations implemented by the companies and the number of companies seeking to become more sustainable. To manage this, CSOs had four charts: a circular economy agenda, reflecting the range of available circular innovations; a circular economy strategy, to help the students calculate the implementation cost for every circular innovation; a circular economy portfolio, to monitor the implementation of circular innovations; and a budget. Consequently, the international and civil society organizations played similar roles, with the difference being that the former focused on interacting with countries to help them improve their social and environmental dimensions, while the latter

helped companies become more circular. The characteristics of this setting are presented in Table 1.

Table 1. Simulation structure.

Actors	Main Objectives	Status (Defined by)	Dynamics	Specific Tools
Countries	Improve status from the Doughnut Economics perspective	Performance according to the Doughnut Economics perspective GDP	Implement public policies to reduce environmental pressure and improve social foundations	Budget Production Imports Industry
Companies	Improve status from the circular economy perspective	Performance according to the circular economy perspective Revenue	Implement circular innovations to improve production processes and transform linear processes into circular models	Production Portfolio Manufacturing Circular economy Production chain
Financial Institutions	Increase profits and social value	Number of circular innovations Revenue	Manage transactions between companies and countries	Trade Budget Financial Circular economy
International Organizations	Help countries improve their status vis-à-vis the Doughnut Economics perspective	Development public policies	Manage the implementation of public policies by countries	PP agenda PP strategy PP portfolio Budget Develop. agenda
Civil Society	Ask companies to improve their production processes to become circular	Circular innovations	Manage the implementation of circular innovations by companies	CE agenda CE strategy CE portfolio Budget

Source: prepared by the authors.

Before the simulation, each student received the corresponding toolkit and a document with detailed instructions about their role. To encourage collaborative learning, the simulation was divided into a combination of eight profile and global rounds. In the profile rounds, the students representing the same kind of actor met together to discuss their specific status, debate possible options, and review the consequences of the decisions made in each round. In the global rounds, the students could meet with all the other players and interact with them as established by the simulation rules. The first six profile and global rounds lasted 20 min each. Round seven consisted of a shorter profile meeting in which the students had five minutes to prepare a two-minute presentation summarizing their results. Finally, in round eight, each player presented their results to the rest of the class. The entire simulation lasted around three hours, including 30 min at the beginning to explain the rules and dynamics of the activity and answer any questions.

The purpose of the activity was to provide the students with a practical experience to help them apply theoretical knowledge in a practical way and foster reflection on sustainable development through interactions between different actors under the umbrella of Doughnut Economics and the circular economy. There were no winners or losers in the simulation and the final result did not have any effect on the students' grades, but the final status between the players representing the same actor was compared and discussed in the last round, giving each student a chance to showcase their result.

The Microsoft Teams platform was used to run the simulation, because it allows users to create a general meeting room with a hub where the teachers could communicate with all the students in conversations and share documents with them. Additional rooms could also be built for students representing the same profile to meet during the profile rounds. Finally, participants could engage in group interactions and individual conversations, as well as ask for the instructor's advice to clarify any questions that arose during the rounds. The teachers monitored the simulation, managing the time for each round and helping

the students. In addition to this, the students could use other platforms to communicate with their classmates, as long as they participated in the general conversations during the global rounds.

4. Methodology

The study worked with quantitative student-reported data from the two surveys conducted before and after the simulation, and qualitative information gathered through an essay to analyze the effects of the educational methodology on their learning experience. The two surveys applied a 7-item Likert scale in which 1 represented 'strongly disagree' and 7 'strongly agree', as used in previous research [39,72–75]. Of the 22 students who participated in the pilot experience, 21 took part in both the pre- and post-simulation surveys and were therefore included in all the comparative analyses. To assess the students' perceptions regarding the complexity of economic interactions in the Global South, the authors conducted a twelve-question survey before and after the simulation. A paired *t*-test was applied to compare the changes in their perceptions and assess the effect of the educational methodology. This study also included an eighteen-question post-simulation survey to assess the students' perceptions about the effectiveness of the teaching and learning methodology to foster acquisition of essential cognitive, skill-based, and affective learning outcomes for ESD. This survey was structured into four clusters. Cluster 1 included four statements regarding cognitive learning outcomes; cluster two included four statements focused on skill-based abilities; cluster three contained six statements regarding the student's perception; and cluster four had four statements regarding student's enjoyment and satisfaction. The questions included in this survey were designed to address the key learning outcomes usually pursued with games and simulations in higher education [42].

Additionally, after the simulation was over, the students were required to write a short essay in which they explained their experience during the simulation, analyzed their actor's performance, taking into consideration the theoretical framework used in the course and simulation, and discussed the effectiveness of the methodology for core learning outcomes [76]. They had to submit the text before participating in the closing session of the course, which consisted of a debriefing activity during which they shared their impressions with their peers to benefit from different points of view and reflections. The qualitative information provided in this essay was used by the authors to interpret the quantitative information gathered with the two surveys.

5. Results and Discussion

As regards the students' perception about complexity of economic interactions in the Global South, and the challenges that countries face in trying to perform within social and environmental limits, the findings confirm that, overall, the students perceived economic interactions in the Global South as more complex after participating in the simulation. Additionally, they declared a better understanding of the DE and CE approaches, as well as a higher perception of their usefulness and applicability. These findings prove that the educational strategy generated an effect on the student's understanding of economic interactions and how theoretical frameworks can be applied in a practical way to analyze and understand real-world settings, in line with previous findings [35,58]. The detailed results showed significant changes for all six issues. The results are presented in Table 2.

Table 2. Students' perceptions about the complexity of economic interactions in the Global South.

Statements	Before			After			df	Cohen's d	Sig.
	N	M	SD	N	M	SD			
1. The Doughnut Economics and circular economy frameworks are useful when analyzing economic interactions.	21	4.76	0.89	21	5.43	0.93	20	0.22	-
2. Countries have enough tools to improve their performance regarding the Doughnut Economics framework.	21	4.14	1.42	21	3.9	1.55	20	-0.16	-
3. There is a trade-off between environmental boundaries and social foundations (it is difficult to succeed in both dimensions).	21	3.71	0.96	21	4.33	0.97	20	0.64	*
4. Countries compete to attract companies (to induce them to set up their factories in their country).	21	4.81	1.17	21	5.38	1.16	20	0.49	-
5. It is difficult for countries to implement public policies to improve their performance in accordance with the Doughnut Economics framework.	21	3.95	1.28	21	4.86	1.39	20	0.68	*
6. Companies pressure countries to lower environmental regulation and social protection standards.	21	4.52	1.03	21	5.05	1.07	20	0.66	*
7. Companies compete to gain access to markets (to set up their factories in specific countries and sell their products).	21	5.14	1.53	21	5.38	1.43	20	0.16	-
8. Civil society plays an important role in fostering the Doughnut Economics and circular economy approaches.	21	4.67	0.86	21	5.48	0.93	20	0.9	**
9. It is important for companies to innovate and try to become circular.	21	4.62	1.12	21	5.29	1.19	20	0.58	-
10. It is difficult for companies to implement initiatives to improve their performance in accordance with the circular economy framework.	21	3.71	1.19	21	4.67	1.24	20	0.52	-
11. Economic interactions between countries and companies in the Global South are complex.	21	5.48	0.68	21	5.86	0.48	20	0.65	*
12. Using a common framework (Doughnut Economics, circular economy) is useful when addressing problems and trying to solve economic, environmental, and social needs.	21	4.62	1.6	21	5.67	1.62	20	0.65	*

Source: prepared by the authors. Notes: ** Significant at the 0.01 level (two-tailed); * significant at the 0.05 level (two-tailed).

The students became more aware of the potential trade-off between social and environmental aims, in that they perceived the difficulties involved for the countries to be successful with both dimensions. Accordingly, they also argued that implementing public policies to improve the overall status in accordance with the Doughnut poses a challenge, which proves the usefulness of the methodology to enhance critical thinking and scientific reasoning [77,78]:

'They (Doughnut Economics and circular economy frameworks) are not complex to understand, but what is complex is implementing policies in accordance with the models, because in the real world many actors and factors are involved (. . .) and companies and countries have to take them into account.' (Student 1).

The students also acquired a greater awareness of the pressure exerted by companies on countries to lower environmental regulation and social protection standards, compared to what they had thought before participating in the simulation. This may reflect their understanding about the role the private sector needs to play in transforming the economy, and the barriers that economic competitiveness may pose to overcoming this challenge, in line with previous experiences [71]:

'The exercise allowed me to take a closer look at the web of interconnections between the several different players that are present in this process. And as there is such a diversity of players, there is also a huge diversity of preferences and perspectives (. . .). I noticed how hard it is to come to terms with institutions and companies that are profit-oriented and might not be interested in long-term measures that do not benefit them economically.' (Student 2).

Additionally, they said that their understanding about the complexity of economic interactions between countries and companies in the Global South was higher after the experience, but at the same time they had a higher appreciation of the Doughnut Economics and circular economy frameworks when trying to understand reality and meet economic, environmental, and social needs [67,79]:

‘I think that the simulation was great to apply the complexity of the theory (. . .) because it allowed us to see how interests are contradictory between all the actors (. . .) So, the simulation helped me realize that (. . .) without incentives (. . .) some countries do not act in that way and need to be helped and encouraged on the way to reconcile social, economic, environmental, and political issues.’ (Student 3).

Finally, the largest change was reported regarding their awareness of the role that civil society could play in promoting change in the public and private sectors. This may be because the role of civil society was not properly emphasized during the course and therefore appeared as a relatively new element in the simulation. Nevertheless, the educational methodology highlighted the essential, challenging role that organizations from civil society play in achieving real change [64,65]:

‘Through this exercise I could see that no matter the strengths, the barriers tend to play a bigger role. The most outstanding challenge that I faced was to convince companies that it was worth investing in circular innovations in the environmental area. I think this is because of the lack of visible short-term benefits behind these actions.’ (Student 4).

This study also included an eighteen-question survey after the simulation to assess the students’ perceptions about the usefulness of the methodology regarding the acquisition of essential cognitive, skill-based, and affective learning outcomes for ESD. The results are presented in Table 3.

Table 3. Students’ perceptions about the usefulness of the simulation to reach essential learning outcomes.

Scheme	N	M	Min.	Max.	SD	Agree (%)	Strongly Agree (%)
Cognitive							
1. The online simulation helped me better understand the theoretical and practical contents of the subject.	21	5.52	1	7	1.6	38	29
2. Doing this type of simulation at the end of the course is beneficial, since it provided me with an overall view of the subject.	21	6.05	1	7	1.4	28	48
3. After the simulation, I feel that I can apply the acquired knowledge in a practical way to analyze and solve real problems.	21	5.57	1	7	1.54	38	29
4. The simulation helped me understand economic interactions in the Global South.	21	5.71	1	7	1.65	33	38
Skill-based							
5. The online simulation is useful in terms of developing managerial skills (i.e., time management, critical thinking, organization, decision making, etc.).	21	5.43	1	7	1.86	33	33
6. The online simulation is useful in terms of developing different communication skills (i.e., public speaking, negotiation, reflection, debate, etc.).	21	5.76	2	7	1.37	29	38
7. Online simulations are useful in terms of improving technological skills.	21	5.48	2	7	1.47	43	24
8. The teaching and learning process was improved by using ICT.	21	4.95	2	7	1.43	38	10
Affective (Perception)							
9. I now have a better idea of the complexity involved in making decisions to improve sustainability performance.	21	6.38	5	7	0.8	24	57
10. Activities such as the simulation increase interest in the subject.	21	6.24	2	7	1.14	43	47
11. By participating in the simulation, I feel that I have learned more in the course.	21	5.62	2	7	1.43	38	29
12. The teaching method used in this course makes it easier to learn about the subject than traditional lectures.	21	6.24	4	7	0.94	24	52
13. After the simulation, I realized that there are some concepts that I need to study more and I will.	21	5.48	1	7	1.69	38	28
14. Participating in this activity before the exams helped me identify areas where I need to study more.	21	5.62	1	7	1.4	43	24
Affective (Enjoyment and Satisfaction)							
15. The online simulation made the course more enjoyable.	21	5.67	2	7	1.53	38	33
16. Complementing traditional lectures with simulations makes the learning experience more interesting and enjoyable.	21	6.24	3	7	1.22	5	66
17. I am satisfied with the teaching in this course.	21	6.05	3	7	1.16	38	43
18. My experience in this course increased my interest in the degree.	21	5.67	1	7	1.65	24	43

Source: prepared by the authors.

Regarding the extent to which the simulation fostered cognitive learning outcomes, 67% of the students agreed or strongly agreed that ‘the simulation helped me better understand the theoretical and practical contents of the subject.’ In addition, 76% of the participants stated that they agreed or strongly agreed that the simulation ‘provided

me with an overall view of the subject.’ Regarding the applicability of the theoretical knowledge, 67% agreed or strongly agreed with the statement: ‘after the simulation I feel that I can apply the acquired knowledge [. . .] to analyze and solve real problems.’ Additionally, 71% of the students agreed or strongly agreed that ‘the simulation helped me understand economic interactions in the Global South.’ These relatively high declared perception about the usefulness of the methodology to positively affect cognitive learning outcomes is in line with similar previous findings [80,81]. Overall, the students recognized the educational value of the simulation regarding cognitive learning objectives, as the following excerpt captures:

‘It was thanks to the simulation that I realized the extent of this theory’s difficulties and the problems we may face while implementing it. As students (. . .) we only see the ideal face of the theory, which, as such, works perfectly. By doing this kind of practical exercise we realized that theory is not that easy in practice, and in fact, we were able to figure out that the process is very complex.’ (Student 5).

Promoting the acquisition of skill-based learning outcomes was one of the main purposes of this educational strategy, and the results proved that the simulation was quite successful in achieving this goal. In that regard, the results show that the students perceived the simulation as an appropriate method for this purpose. More precisely, 66% agreed or strongly agreed that the ‘simulation is useful in terms of developing managerial skills,’ while 67% said that they agreed or strongly agreed with the statement, ‘the simulation is useful in terms of developing communication skills.’ In line with this, 67% of the participants agreed or strongly agreed that ‘online simulations are useful in terms of improving technological skills,’ as this participant attested:

‘Overall, this kind of simulation, together with the rest of the practical activities related to technology that we did throughout the semester, turned out to be useful in terms of adapting to these resources, all in all. Our technological needs have increased due to the conditions produced by the global pandemic and so have our skills.’ (Student 6).

Finally, helping students develop essential affective learning outcomes was another objective of this strategy. Overall, the students’ perceptions were relatively high. Regarding the ‘perception’ dimension of affective learning outcomes, 81% of the students agreed or strongly agreed that ‘I now have a better idea [of how] to improve sustainability performance.’ Concerning the usefulness of the simulation in this specific course, 90% of the participants agreed or strongly agreed that ‘activities such as the simulation increase interest in the subject,’ while 67% agreed or strongly agreed that ‘by participating in the simulation I feel that I have learned in the course.’ With regard to the effectiveness of the simulation to help students better understand the course contents, 76% said they agreed or strongly agreed that ‘the teaching method [. . .] makes it easier to learn about the subject than traditional lectures,’ 66% agreed or strongly agreed that ‘after the simulation [. . .] I need to study more and I will,’ and 67% stated that they agreed or strongly agreed that ‘participating in this activity [. . .] helped me identify areas where I need to study more.’ Overall, the simulation was also shown to improve student enjoyment and satisfaction. In this context, 71% of the participants agreed or strongly agreed that ‘the simulation made the course more enjoyable,’ and 71% agreed or strongly agreed that ‘complementing traditional lectures [. . .] makes the learning experience more interesting and enjoyable.’ Finally, regarding the student’s overall satisfaction with the educational approach, 81% agreed or strongly agreed that ‘I am satisfied with the teaching in this course,’ and 67% stated that they agreed or strongly agreed that ‘my experience in this course increased my interest in the degree.’ The following student’s statement reflect on this satisfaction experienced:

‘These kinds of activities push and motivate us to see the knowledge we are acquiring in a practical way. Moreover, it is important because it allows us to see the potential we might have in the future if we are able to harness our skills and gifts and how beneficial that can be for society in general (. . .). I think these exercises are nothing less than brilliant and motivational.’ (Student 7).

6. Conclusions

Overall, the results of this research indicate that role-play activities and simulations can be a part of transforming economics, business, and management curricula into powerful tools to achieve real change [29,42,48]. These findings are in line with the existing literature, which has shown that active-learning methodologies are useful when creating positive learning environments [35,55], and assist students in developing essential competences and skills [38,82,83]. More precisely, our results confirm previous findings regarding the potential of simulations to enhance acquisition of crucial managerial skills, communication skills, technological skills, increase student's satisfaction and enjoyment, and help them better understand theoretical knowledge and its practical application to address real-world problems, taking into consideration sustainability criteria [84].

In addition to this, our method also proved to be highly effective when integrating sustainability content into discussions of the economics of the Global South, which helps demonstrate the crucial role that teachers must play in bringing about change in sustainability education. In this context, the methodology demonstrated its effectiveness in improving the students' understanding of the multidimensional nature of sustainability and its relationship with core economic sectors, along with the consequences that economic decisions have in the environmental and social spheres [85]. It also showed the importance of identifying and addressing essential learning outcomes in economics, business, and management, and the beneficial role that simulations can play in the acquisition of essential cognitive, skill-based, and affective learning outcomes in education for sustainable development [86,87].

Nevertheless, this study has some limitations. First, the global economic interactions that take place in the real world are much more complex than what can be recreated in the classroom using a role-play simulation. Second, the relatively small size of the sample offers useful, but limited quantitative and qualitative information about the usefulness of the teaching and learning method. Even though the results are promising, it would be interesting to repeat the simulation and gather more information to analyze the effectiveness of the methodology in deeper detail. However, implementing this kind of simulations in relatively smaller groups makes it easier for educators to guarantee interaction between all participants and achieve the expected learning outcomes. This is even more important in CSCL settings, since online interaction between participants is more difficult than in face-to-face contexts. Consequently, two issues are of particular interest for further research; a longer simulation would allow students to analyze interactions between different stakeholders in deeper detail, and also richer data could be gathered during subsequent applications of this educational strategy, making it feasible to better analyze its effectiveness. Despite these constraints, the simulation made it possible to address economic interactions in the Global South regarding sustainability criteria both successfully and practically, and clearly made it easier for the students to acquire crucial learning outcomes. The innovative teaching and learning method presented in this study, therefore, clearly advances education for sustainable development by providing an effective active-learning method that can be used in economics, business, and management courses.

Supplementary Materials: The following are available online at <https://www.mdpi.com/article/10.3390/su13137201/s1>, Simulation toolkit (spreadsheets).

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