More than morals: a simulation that supports sustainable management education

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Abstract

Purpose – We explore how sustainable management education (SME) can help prepare future leaders to manage crises effectively. Precisely, the intricacies of articulating moral and economic imperatives for businesses in a manner that engages students in sustainable behavior are a serious challenge for SME. We study how to integrate reminders of moral and economic imperatives in a socially responsible investment (SRI) stock-picking simulation created for SME.

Design/methodology/approach – Adopting an experimental design, we analyzed how the reminders affected the average environment social governance (ESG) integration in the portfolios of 127 graduate students in finance over a twelve-week period.

Findings – Our results show how essential it is to balance the two imperatives. The highest level of sustainable investment is attained when utilizing both reminders.

Practical implications – Our findings have practical implications for implementing and organizing SME in business schools to educate responsible leaders who are able to effectively manage crises. Learning responsible management is most effective when students are exposed to the inherent tension between moral and economic imperatives. Hence, our findings corroborate the win-win conception of SME.

Originality/value – No management decision study has experimentally measured the effects of SME practices on students’ actual behavior. Our research fills this gap by complementing previous studies on the effectiveness of teaching practices, first by drawing on behavioral sciences and measuring changes in students’ actual sustainability behavior and second by introducing moral and economic imperatives into an innovative teaching resource (TR) dedicated to SME.

Keywords Behavioral sciences, Sustainable management education, Economic and moral imperatives, Environment social governance, Experimental method, Stock-picking simulation

Paper type Original article

1. Introduction

Education is one of the principal ways to achieve more responsible and sustainable organizations [4th sustainable development goal (SDG)] and hence a more sustainable world (United Nations, 2015). Recent legislation in the field of sustainability education reflects this approach. France (Jouzel, 2022) and Spain (Real Decreto 822/2021, 2021) have affirmed the role of higher education in the environmental, economic, social, societal and ethical transformation of society. Business schools must consequently train future responsible managers (Cole and Snider, 2019; Stough et al., 2018). By 2023, over 880 schools had signed the Principles for Responsible Management Education (PRME) (United Nations, 2023), which aims to promote responsible leadership and sustainability among management-related institutions of higher education (Assumpção and Neto, 2020). The field of sustainable management education (SME) prepares future managers for responsible decision-making. The SME literature disseminates knowledge about educational practices, mainly descriptions of SME practices (Figueiró and Raufflet, 2015). Recently, conceptual frameworks have been developed to better understand and improve SME practices (Figueiró et al., 2022; Pizzutilo and Venezia, 2021; Setó-Pamies and Papaoikonomou, 2016). After reviewing 20 years of SME literature, Cullen (2017) concluded that more research is...
needed on how students perceive sustainability issues and how teaching affects their views. Yet few studies have measured the effects of sustainability education on students (Cullen, 2017; Rusinko, 2010). Prado et al. (2020) compared the effectiveness of simulations and case studies in SME teaching using a questionnaire on student perceptions. Wersun et al. (2019) explored the perceived progression of students’ knowledge, skills, attitudes and sustainability mindset after their use of Wikirate, a collaborative open-source platform that analyzes companies’ environmental, social, and governance (ESG) performance. Scant research has examined how SME practices affect student behavior. To address this research gap, our study adopts an experimental approach inspired by the behavioral sciences (Hallsworth, 2023) to examine changes in students’ actual sustainability behavior. It thus contributes to the broader literature on the effectiveness of SME practices.

An implicit goal of SME is to equip students to balance moral and economic imperatives. This means enabling them to integrate environmental, social and ethical aspects, along with financial considerations, into their decisions (Aragon-Correa et al., 2017). Finding this balance is necessary because it prepares future managers to address ethics, responsibility and sustainability (Stough et al., 2022). This goal is also challenging, as management education has traditionally focused on economic imperatives.

Among the elements that contribute to the effectiveness of SME, teaching resources (TRs) are important because they are relatively rare. TR can have a strong impact on students (Figueiró and Raufflet, 2015; Prado et al., 2020) however, they do not always satisfy teachers and instructors (Aragon-Correa et al., 2017). These resources must allow the transmission not only of theoretical knowledge about sustainability but also of “practical knowledge,” which has a powerful impact on the behavior of students and future managers (Bennis and O’Toole, 2005; Wersun et al., 2019). This article thus seeks to answer the following question:

What matters the most, moral or economic imperatives, in a sustainable management (SM) TR intended for responsible managers?

Answering this question not only advances SME research, but innovatively bridges this research with behavioral sciences and decision theory. This integration is novel in its approach and offers a fresh perspective to enable business schools to implement SME in order to train responsible managers who adopt SM practices, by shedding light on the complex integration of moral and economic imperatives in effective TRs.

We have also developed a unique stock-picking simulation TR, a creative tool that distinguishes our work within the SME literature. This simulation stands out as it allows us to empirically examine different balances between moral and economic imperatives with students and evaluate its effectiveness by studying how students’ sustainability behavior changes. We thus respond to the call by Aragon-Correa et al. (2017) to “work to create engaging, innovative, and effective teaching materials that both provide a business case for sustainability as well as illustrate the moral and ethical imperatives tied to sustainable business practices” (p. 470).

1.1 Effective teaching resources in SME

To build an effective TR, we used the theoretical framework of Setó-Pamies and Papaoikonomou (2016), complemented by that of Figueiró et al. (2022). These key authors in the SME literature claim that the successful integration of sustainability in management education requires a holistic approach, in which TR is one of the interdependent elements (see Table 1).

Figueiró et al. (2022) break down the institutional level of Setó-Pamies and Papaoikonomou (2016) into contextual and organizational dimensions. Although the terms used in the two frameworks are very similar, we use Setó-Pamies and Papaoikonomou (2016) terms in this paper.
To enhance the learning of SM, we have designed a TR that belongs to the instrumental level. According to Setó-Pamies and Papaikonomou (2016) and Figueiro et al.’s (2022) frameworks, we also need to consider the institutional and curricular levels. The institutional level should provide a mission, vision and values as well as strategic planning and incentives that favor SME, which are necessary conditions for constructing effective resources. Below we will review the literature on the curricular and instrumental levels in order to make the most relevant choices for the construction and implementation of our resource.

1.1.1 *The curricular level.* One debate regarding curricula is whether SM should be a stand-alone course or integrated into specialty courses (Setó-Pamies and Papaikonomou, 2016). This choice is related to the question of adopting a disciplinary or multidisciplinary approach to SM (Figueiró et al., 2022; Setó-Pamies and Papaikonomou, 2016).

Traditionally, implementing SME in management schools has implied creating general courses dedicated to SM within curricula (Beringer et al., 2008; Michaelson, 2016). This form of implementation, which considers SME from a top-down perspective, is probably the easiest to achieve, but it is not neutral. It views SM as a field in its own right, as a new function or entity in organizations. The big risk is therefore of teaching a compartmentalized vision of sustainability, of making it a matter for specialists who are almost solely responsible for the social and environmental performance of their organizations.

To avoid this type of risk, we adopt a holistic vision of sustainability. Taking sustainability into account in managerial behavior is a shared responsibility that will let us avoid disciplinary silos (Filho et al., 2019). A holistic understanding of sustainability is consistent with the issues inherent to the complexity of sustainability, their origins in different fields (Kolb et al., 2017; Kurland et al., 2010), and the balance that must be found between teaching sustainability to “improve the world” and increasing firms’ economic performance (Aragon-Correa et al., 2017). With these sustainability characteristics in mind, Aragon-Correa et al. (2017) offered five recommendations to guide the creation and evaluation of an effective TR. The first of these recommendations is that sustainability education and the TR used for this purpose be highly interdisciplinary. This interdisciplinarity can be construed as students’ ability to mobilize knowledge outside of their discipline. Thus, interdisciplinarity, i.e. the holistic nature of SM, can ease SM integration within disciplinary fields. The implementation of sustainability in specialty courses fosters relationships between the discipline and sustainability in all its dimensions (economic, societal, environmental) (Amaeshi et al., 2019; Annan-Diab and Molinari, 2017; Tasdemir and Gazo, 2020). In particular, this form of implementation has the advantage of reinforcing the credibility of sustainability among students, who are often wary of concepts that seem remote or even disconnected from the expertise they gain in a business school.

1.1.2 *The instrumental level.* This level concerns teaching strategy, pedagogical objectives, methodology and TRs (Figueiró et al., 2022; Setó-Pamies and Papaikonomou, 2016).

To study the integration of sustainability into a specialty course, we have chosen the field of finance, a discipline that has integrated sustainability only weakly (Rasche et al., 2013). Finance requires a high degree of knowledge, skills and expertise in responsible investment (Oulton, 2019). Moreover, Finance is often perceived as exemplifying the excesses of shareholder governance. Even though it is a field with ethical issues (Gandz and Hayes, 1988),

<table>
<thead>
<tr>
<th>Frameworks</th>
<th>Levels/Dimensions of holistic approach</th>
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<tbody>
<tr>
<td>Setó-Pamies and Papaikonomou (2016)</td>
<td>Institutional</td>
</tr>
<tr>
<td>Figueiro et al. (2022)</td>
<td>Contextual</td>
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<td></td>
<td>Organizational</td>
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<td>Source(s): Table by authors</td>
<td>Curricular</td>
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<td></td>
<td>Instrumental</td>
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<td>Pedagogical</td>
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</tbody>
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**Table 1.** The interdependent elements for integrating sustainability into management education
there are many sustainable practices. Socially responsible investment (SRI), microcredit, entrepreneurial finance and financing of the social and solidarity economy are all initiatives within finance that seek more sustainable governance. In this research, we use SRI to integrate sustainability into a finance course.

SRI consists of asset management, a key theme in finance courses. It is also a rapidly growing form of investment in which investors use ESG-related criteria to construct their portfolios. It represents 24% of assets under management in Europe (€2 billion), with an increase of over 65% since the beginning of 2021 (Quantalys, 2021). In the USA, assets under management using sustainable investment strategies surpassed $8.4tn at the end of 2021 (US SIF Foundation, 2022). The world’s leading investment funds and their partners are now signatories to the United Nations Principles for Responsible Investment (Crifo and Forget, 2013), a sign of commitment to SRI and the development of expertise in this form of investment (van Duuren et al., 2016).

Addressing SRI in a finance course involves focusing on ESG information about assets. ESG ratings are widely used despite their shortcomings, which include failing to capture the real-world sustainability impact of investments (Popescu et al., 2021). ESG ratings compile numerous extra-financial performance indicators for companies with a numeric score. They thus materialize the “broad and global” approach that a sustainability TR should take (Aragon-Correa et al., 2017). In SRI, investors use ESG ratings as a complement to financial information, which is typically focused on solvency, liquidity and profitability. This complementary information helps to control risk (van Duuren et al., 2016), improve financial performance (Revelli, 2017; Revelli and Viviani, 2015), or screen assets for consistency with their moral values (Friede et al., 2015). Thus, SRI is suitable for achieving the targeted teaching output of integrating moral issues in a professional area (Felton and Sims, 2005).

SRI also lends itself to the creation of an engaging TR. Aragon-Correa et al. (2017) distinguished articles, videos and cases, databases, books, simulations and applications. Regarding the latter two tools, we use the generic term “simulation,” which has been defined as an artificial environment created to manage the experiences of an individual or a team with reality (Bell et al., 2008). Simulations often provide students with realistic environments to measure the effectiveness of their work (Dahlin et al., 2015). As with traditional asset management, investment simulations can be “sustainable.” By providing the ESG ratings of the assets in the investment universe, such a simulation exposes students to a situation where they draw on their financial and extra-financial expertise in order to build the best-performing portfolio possible. Educators can measure the increase in ESG assets in student portfolios, a proxy that demonstrates sustainability-related behavior along with the effectiveness of the TR.

Simulations also allow for repeated sequential choices that let students test their judgment and observe the effects of their actions. In addition, they are entertaining, which boosts students’ engagement (Prado et al., 2020). Thus, activating an emotional component in the learning process enhances learning, which is important for teaching sustainability (Brunner and Urenje, 2012; Dieleman and Huisingsh, 2006).

An SRI simulation in a finance course appears to be an innovative and relevant TR for the training of responsible managers. First, SRI illustrates sustainability and its main characteristics. Second, simulation provides the main components of a successful learning context (Jain et al., 2022). In addition, SRI simulation is a convenient way to share practical knowledge about sustainability (expert know-how, situational decision-making, personal synthesis of experience feedback, etc.).

This TR will also serve to measure students’ responsible behavior and to experimentally test different balances between moral and economic imperatives. Based on the literature, we propose three predictions that link the moral imperative and the economic imperative to changes in students’ actual responsible behavior.
1.2 The drivers of responsible behavior in an SRI simulation

Integrating moral and economic imperatives is one of the key challenges in SME (Aragon-Correa et al., 2017). By bridging SME with the current behavioral and decision-making literature, we develop predictions to guide how both imperatives can be balanced in an SRI simulation to promote responsible behavior – fundamental moral questions about responsible management practices.

Aragon-Correa et al. (2017) argue that an effective TR needs to ask fundamental questions. In sustainability education, some of the most important questions for students arise in a sequence. Once students are aware of a moral issue, the first fundamental question will probably be whether to act responsibly. Many may consider this question trivial, but the heterogeneous nature of ethical thought systems can be challenging. For example, someone who adheres to a meritocratic school of thought might be less likely to act on information about labor issues or poverty, while someone with strong moral beliefs about collectivist values might be less likely to act when individual liberties are threatened. Another fundamental question is how to act as a responsible manager. The answer will probably be very specific to the management task and require much practical experience.

Models of the ethical decision-making process frequently construe increased awareness of the moral dimension as a prerequisite of a decision to behave responsibly (Craft, 2012; Hofmann et al., 2007, 2008). Increased moral awareness in managerial decision-making can also contribute to students’ ethical development (Gandz and Hayes, 1988). Moral awareness is the ability to interpret a situation as being moral. It is present in the early stages of the decision-making process, such as in the issue-contingent model (Jones, 1991). In this model, the recognition of the moral issue, i.e. moral awareness, precedes moral judgment, moral intent and finally moral behavior.

Empirical studies have demonstrated the importance of moral awareness. A series of experiments reminding the public of the existence of moral standards resulted in an increase in contributions to social good, a reduction in cheating and more responsible consumption (Mazar et al., 2008; Verschuere et al., 2009). In these studies, participants who were reminded of the Ten Commandments were less likely to cheat in subsequent tasks. The psychological explanation given by the authors is that people try to maintain a positive image of themselves (self-concept maintenance) and that the danger of a negative self-image is more salient when moral values are conscious. This idea is further corroborated by the finding that behaving responsibly improves people’s self-image (Ariely et al., 2009; Bénabou and Tirole, 2010).

To summarize, we predict that raising awareness of the moral imperative enhances finance education. Aware students can ask the fundamental questions that will promote more responsible behavior in the SRI simulation.

**Prediction 1.** Investment behavior in responsible assets increases when the simulation raises participants’ awareness of the moral imperative.

1.2.1 The economic imperative and individual incentives. People increase their efforts when this benefits them individually. They also do so when efforts lead to a morally desirable outcome and higher individual rewards. When their compensation is tied to implementing environmentally friendly policies or reducing turnover, managers will direct their efforts towards those objectives. Evidently, when there is a business case for being responsible, managers act responsibly.

In a business context, incentives for responsible management are likely to reflect an instrumental approach to corporate social responsibility (CSR) (vs a normative approach) (Freeman, 1999; Spitzbeck, 2013). Not acting morally responsible is also economically irresponsible and a bad management practice (Kotler and Nancy, 2008). Thus, contracts should tie managerial incentives to responsible practices. In fact, SRI draws on the
established positive relationship between ESG criteria and the economic performance of portfolios (Revelli and Viviani, 2015). Economic concerns are also relevant to education. In their review of recommendations for effective, responsible management education resources, Aragon-Correa et al. (2017) argued, in line with the instrumental view, that there must be a clear concern for business success and the goal of economic performance. Therefore, we posit the following prediction.

Prediction 2. Investment behavior in responsible assets increases when the simulation raises participants’ awareness of the economic imperative.

1.2.2 Tensions between economic and moral imperatives. When using resources for responsible management education, tensions may arise between the moral imperative to save the world and the pragmatic approach to economic performance (Aragon-Correa et al., 2017). Professionals will be uncertain about their practices if they cannot grasp the two topics and their interrelations while they are students. Therefore, students need precise arguments and a clear perspective on points of friction between the two imperatives. In turn, education professionals must understand how and when to emphasize one or the other topic and how to articulate the relationship between them.

Behavioral research has found that individuals increase their responsible behavior when it is associated with an economic incentive and that economic incentives can be at odds with other sources of motivation (Bénabou and Tirole, 2010). For example, the effect of economic incentives diminishes when individuals hope to gain a reputation for behaving responsibly. Ariely et al. (2009) found that when people can contribute more to a charity by pressing buttons on a keyboard, they will press faster when: (1) they also receive money for each keystroke or (2) the number of keystrokes is made visible, i.e. known to peers. The important finding, however, is that the two effects are not cumulative. Specifically, when people receive money and this is also known to their peers, people reduce their efforts and contributions to charity are lower. The authors term this a crowding-out of pro-social behavior that is at odds with profit motives.

We know little about the effects of the tensions between moral and economic imperatives in management education and student behavior. It seems plausible to predict interactions between stressed moral (Prediction 1) and economic (Prediction 2) imperatives in educational settings. We explore this interaction in our SRI simulation by either reducing or stressing those tensions.

1.2.3 Contributing factors in responsible management learning. We propose that forming responsible management habits is akin to regular exercise or hygiene, with empirical evidence supporting habit formation in various behaviors (Lally et al., 2008), including personal finance (Whitebread and Bingham, 2013), charitable donations (Rosen and Sims, 2009) and gym attendance (Acland and Levy, 2013). Time, as a factor, likely influences SRI behavior. Altruism, a key driver of pro-social behaviors such as SRI (Riedl and Smeets, 2017), is measured through the public goods game, following Fehr and Gächter (2000). Additionally, age and sex impact financial behavior (Capon et al., 1996) and SRI investments. Younger, female and better-educated individuals are more inclined toward SRI (Chan, 1999; Diamantopoulos et al., 2003; Laroche et al., 2001; Lee, 2009).

To summarize, our study carves out a unique position at the intersection of behavioral sciences and management education. We aim to serve as a conduit between these disciplines, in order to inform effective teaching methodologies for responsible management. To ground our findings in empirical evidence, we adopted experimental methodologies that clarify the causality embedded within responsible management education, a methodological approach endorsed in the social sciences by Falk and Heckman (2009).
2. Method

Our methodological approach consists in using an experimental stock market simulation. It seamlessly aligns with Kolb’s (2014) framework of experiential learning, which emphasizes the profound impact of learning through experience. Ruben (1999) argues that simulations, as forms of experiential learning, can effectively circumvent some of the constraints associated with traditional teaching methods. According to Heuer (2009), simulations address the challenge of more fully integrating sustainability into the curriculum, notably by providing a more concrete linkage between strategy and the natural environment. This integration of sustainability can be particularly useful in bridging the gap between practice and theory. Regarding the choice of an experimental behavioral methodology, we have adopted a similar approach to that of Dobrescu et al. (2015), who implemented game-based learning in an experimental setting. This experiential learning-based methodological framework, coupled with an experimental behavior methodology, is both effective and suitable. It aligns with current educational best practices and provides an efficient way to connect behavioral science and management decision theory to practical applications in SMEs.

We conducted our experiment in an environment situated at the institutional level of Setó-Pamies and Papaoikonomou (2016) and that integrates the contextual and organizational dimensions of Figueiró et al. (2022). Joint efforts from the school, the faculty and corporate partners were necessary to implement the simulation and our experiment. The ascending faculty initiative met descending strategic objectives, as suggested by Rusinko’s matrix approach (Rusinko, 2010).

More specifically, institutional support allowed us to integrate a stock-picking simulation into our finance curriculum. Backed by the full participation of the finance department and necessary information technology (IT) support, we ran the simulation for an extended period, involving all our postgraduate finance students. Moreover, strategic alliances, particularly with Amundi, Europe’s leading asset management firm, enriched the learning experience. Amundi offered students access to analyst reports, weekly market briefs and conference calls. In addition, students had the opportunity to visit Amundi’s trading floor and interact with experienced portfolio managers, thus gaining practical industry insights.

2.1 Procedure, sampling and measurements

The 127 graduate students who took part in the four-month simulation were on average 23 years old and 44% were women. All students had previously attended introductory undergraduate courses on sustainability in management. The mandatory course covered asset management and provided detailed scoping notes for the simulation. Each student was required to put into practice their theoretical training on how to build and manage a portfolio of stocks over four months in 2019. For ecological validity, the students’ goal was to maximize the risk-adjusted performance of their portfolio. The investment universe was EURO STOXX 600 and at least 80% of the virtual €100,000 initially available to each student had to be invested three weeks after the beginning of the simulation.

Basic financial information (market prices and financial statements) was available on the website developed for the simulation. It was supplemented by the ESG ratings for each stock in the investment universe. Amundi, the asset manager that collaborated in setting up the simulation, provided the ratings, given on a scale from 0 to 100. The average rating of the investment universe, weighted by market capitalization, was 56.03%.

As shown in Figure 1, the simulation project proceeded through several distinct stages, each with specific tasks and objectives. These stages included pre-simulation preparation, simulation kick-off, an ongoing simulation period with portfolio management activities and meetings, a post-simulation phase including debriefing and a visit to the Amundi trading floor and finally, a data collection and analysis phase.
The simulation platform closely mimicked real-world trading platforms. To carry out a transaction, students needed to enter the symbol of the desired security, the number of shares they intended to buy or sell and the limit price for the execution of the order. The platform updated account balances and portfolio performance each trading day after the markets closed. A scoreboard displaying the names of the ten best-performing portfolios on the platform reinforced student engagement. To motivate students, we also graded participation in the simulation through a report submitted by each student during the simulation. To make the experience more vivid, students were provided with institutional newsletters throughout the simulation. These newsletters, typically sent to Amundi’s corporate clients, include market analyses and updates.

During the simulation, we organized two meetings with Amundi. The first meeting, held at the start of the simulation, introduced the students to investment decisions from the asset managers’ standpoint. The second meeting, scheduled midway through the simulation, allowed students to discuss their strategies and portfolio performance with industry professionals.

Following the simulation, we conducted a debriefing session to reflect on the experience and outcomes. The students who managed the ten best-performing portfolios and the ten most responsible portfolios earned a visit to Amundi’s trading floor.

2.2 Experimental manipulations

In order to manipulate the moral and economic imperative (Prediction 1 and Prediction 2), the study followed a two-by-two between-subjects experimental design ($2 \times 2$), i.e. students saw a message reminding them of the moral imperative or not (2) and a reminder of the economic imperative or not (2). The materials used to manipulate economic and moral imperatives were adapted from the study by Heimann and Lobre-Lebraty (2018). We split the 127 students into four experimental groups. Each time they logged into the investment simulation platform, students received (1) a message and an image reminder of moral imperatives, (2) a message and an image reminder of economic imperatives, (3) both messages or (4) a filler message.

2.3 Measurement of responsible behavior

Table 2 provides an example of a student portfolio and the data used to calculate the ESG integration ratings.

To measure the students’ responsible behavior in the simulation accurately, we employed three distinct measures, each contributing to a quality and comprehensive assessment of ESG rating integration in their portfolios.

First, we calculated the sum of the weighted ESG ratings of the assets in the students’ portfolios every week:

![Flowchart illustrating the different stages of the simulation, from pre-simulation training, through ongoing portfolio management activities, to post-simulation analysis and debriefing](source(s): Figure by authors)
\[
\text{ESG}_{\text{Grade}} = \frac{\sum \text{ESG}_i \text{ Score} \times \text{Capital invested in } i}{\text{Total capital invested}}
\]

where:

1. The ESG score is the ESG score of company \( i \) in the portfolio.
2. Capital invested in company \( i \) is the amount of capital invested in the company at a given time.
3. Total amount invested is the total amount of capital invested in all companies in the portfolio at a given time.

This formula calculates the average ESG score of the portfolio by taking into account the weight of each company in the portfolio based on the capital invested in it. A higher ESG integration score indicates a higher overall ESG performance of the portfolio.

Second, we used a formula that calculates ESG integration by taking the sum of all capital invested in companies that have been rated A or B for their ESG practices and dividing that by the total amount of capital invested:

\[
\text{ESG}_{\text{AB}} = \frac{\sum \text{Capital invested in A or B rated companies}}{\text{Total capital invested}}
\]

Finally, we used a variable to indicate the presence or absence of ESG-rated companies in a portfolio, which is a key aspect of measuring the level of ESG integration according to the following logic:

\[ \text{IF (number of EFG \text{ rated companies in portfolio} = 0) THEN 1 ELSE 0.} \]

Because of the onboarding process and three-week time frame for constructing portfolios, we used the last nine weeks in our analysis.

<table>
<thead>
<tr>
<th>Name</th>
<th>( N )</th>
<th>Price</th>
<th>Position</th>
<th>Position (% PF)</th>
<th>Position (% assets)</th>
<th>ESG rating</th>
<th>Weighted ESG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beiersdorf AG</td>
<td>20</td>
<td>103.35</td>
<td>2,067</td>
<td>1.85%</td>
<td>4.51%</td>
<td>40</td>
<td>1.81</td>
</tr>
<tr>
<td>Deutsche boerse AG</td>
<td>40</td>
<td>141.9</td>
<td>5,676</td>
<td>5.09%</td>
<td>12.39%</td>
<td>60</td>
<td>7.44</td>
</tr>
<tr>
<td>Erste group bank AG</td>
<td>20</td>
<td>30.08</td>
<td>601.6</td>
<td>0.54%</td>
<td>1.31%</td>
<td>60</td>
<td>0.79</td>
</tr>
<tr>
<td>Ferrovial SA</td>
<td>50</td>
<td>25.7</td>
<td>1,285</td>
<td>1.15%</td>
<td>2.81%</td>
<td>60</td>
<td>1.68</td>
</tr>
<tr>
<td>Heineken NV</td>
<td>20</td>
<td>96.78</td>
<td>1,923.5</td>
<td>1.73%</td>
<td>4.32%</td>
<td>60</td>
<td>2.54</td>
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<tr>
<td>Intesa sanpaolo SPA</td>
<td>350</td>
<td>318.6</td>
<td>765.1</td>
<td>0.69%</td>
<td>1.67%</td>
<td>80</td>
<td>1.34</td>
</tr>
<tr>
<td>Koninklijke ahold NV</td>
<td>100</td>
<td>22.84</td>
<td>2,284</td>
<td>2.05%</td>
<td>4.99%</td>
<td>80</td>
<td>3.99</td>
</tr>
<tr>
<td>Protosien sat.1 SE</td>
<td>100</td>
<td>12.49</td>
<td>1,249</td>
<td>1.12%</td>
<td>2.73%</td>
<td>40</td>
<td>1.09</td>
</tr>
<tr>
<td>Thales SA</td>
<td>200</td>
<td>96.78</td>
<td>19,356</td>
<td>17.34%</td>
<td>42.26%</td>
<td>80</td>
<td>33.81</td>
</tr>
<tr>
<td>UCB SA</td>
<td>20</td>
<td>66.78</td>
<td>1,335.6</td>
<td>1.20%</td>
<td>2.92%</td>
<td>60</td>
<td>1.75</td>
</tr>
<tr>
<td>Veolia environnement</td>
<td>210</td>
<td>23.35</td>
<td>4,903.5</td>
<td>4.39%</td>
<td>10.71%</td>
<td>60</td>
<td>6.42</td>
</tr>
<tr>
<td>Vinci SA</td>
<td>50</td>
<td>86.79</td>
<td>4,399.5</td>
<td>3.89%</td>
<td>9.48%</td>
<td>60</td>
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</tr>
<tr>
<td>Cash</td>
<td>65,800</td>
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<td>65,800</td>
<td>58.96%</td>
<td>NA</td>
<td>NA</td>
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</tr>
</tbody>
</table>

**Note(s):** The sum of the weighted ESG ratings of invested assets is 68.34%  
**Source(s):** Table by authors

Table 2.  
Example of a student portfolio in week 1  
Supports sustainable management education
3. Results

Table 3 provides summary statistics for the variables measured in the simulation. On average, the weighted ESG grades were at 61.65, above the investment universe average, suggesting that the students focused on ESG practices. The average weighted proportion of A- or B-rated companies in the portfolios was 48.16, and only 12% of the portfolios contained EF-rated companies. This indicates that the sample is well diversified and balanced in terms of sustainability. On average, the portfolios were profitable, earning a return of €3,004, well below the Eurostoxx 6.8% return for the period. Finally, students kept on average €10,062 in cash, demonstrating that they were effectively managing their portfolios and taking a strategic approach to their investments. These characteristics make the sample well suited to studying SME practices in finance.

3.1 Simple effects of reminders of the moral and economic imperative

Prediction 1 was that reminders of the moral imperative increase ESG integration, and Prediction 2 was that reminders of the economic imperative increase ESG integration into student portfolios. To test our hypotheses, we adopted a regression approach similar to that of Groening and Kanuri (2018). This analytical technique is particularly well suited to our research as it allows for precise quantification of the impact of moral and economic imperatives on ESG integration. The three regression models used to examine the relationship between ESG practices and the variables are presented in Table 4.

Models 1 and 2 used ordinary least squares (OLS) regression to analyze the relationship between ESG practices and the independent variables — Economic Message, Moral Message, Public Goods Game, Age and Gender — and a dummy coded Week variable to control for the effect of time. Model 3 (logistic) used logistic regression to investigate the relationship between ESG grade and the same independent variables. The regression models for ESG_grade and ESG_AB show low predictive power, as indicated by their $R^2$ (0.1 and 0.1, respectively) and adjusted $R^2$ values (0.1 and 0.05 respectively) and strong statistical significance (both $F$-statistics have $p < 0.01$). As Ozili (2022) noted in the context of social science research, the primary goal is not necessarily to predict human behavior, but rather to ascertain whether specific predictors have a significant effect on the dependent variable. Thus, a low $R$-square value can be acceptable provided that some of the explanatory variables are statistically significant. The model for ESG_EFG is a logistic regression, and

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Pctl. 25</th>
<th>Pctl. 75</th>
<th>Max</th>
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</thead>
<tbody>
<tr>
<td>ESG_grade</td>
<td>1,143</td>
<td>61.65</td>
<td>15.17</td>
<td>21.26</td>
<td>51.62</td>
<td>71.93</td>
<td>100.00</td>
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<tr>
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<td>48.16</td>
<td>11.83</td>
<td>20.1</td>
<td>39.57</td>
<td>56.73</td>
<td>88.26</td>
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<tr>
<td>ESG_EFG</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>EFG</td>
<td>138</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No EFG</td>
<td>1,005</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NetLiqValue (€)</td>
<td>1,143</td>
<td>103,004</td>
<td>5,190</td>
<td>92,497</td>
<td>99,241</td>
<td>106,093</td>
<td>119,790</td>
</tr>
<tr>
<td>Cash (€)</td>
<td>1,143</td>
<td>10,162</td>
<td>2,394</td>
<td>1,932</td>
<td>8,824</td>
<td>11,932</td>
<td>15,230</td>
</tr>
<tr>
<td>PublicGood</td>
<td>1,143</td>
<td>5.79</td>
<td>2.76</td>
<td>1</td>
<td>4</td>
<td>8</td>
<td>10</td>
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<tr>
<td>Age</td>
<td>1,143</td>
<td>22.53</td>
<td>1.47</td>
<td>19</td>
<td>21</td>
<td>23</td>
<td>27</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Man</td>
<td>71</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>56%</td>
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<tr>
<td>Woman</td>
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<td></td>
<td>44%</td>
</tr>
</tbody>
</table>

Table 3. Descriptive statistics for variables including ESG, NetLiqValue, Cash, PublicGood, Age and Gender.

Note(s): N, mean, SD, min/max, 25th/75th percentiles and gender/EFG distribution are shown.
Source(s): Table by authors.
although its log likelihood and Akaike Inf. Crit. values are not as good as the OLS models, it still shows significant results ($p < 0.01$) for the variable Economic Message.

The results of models 1 and 2 indicate that an Economic Message ($\beta = 7.1, p < 0.01$; $\beta = 4.5, p < 0.01$) and high altruism scores in the Public Good Game ($\beta = 0.5, p < 0.01$; $\beta = 0.3, p < 0.01$) have a significant positive effect on the ESG grade. Conversely, Age and a Moral Message do not have a significant effect on ESG integration. The results also show that Gender ($\beta = 1.8, p < 0.05$; $\beta = 1.4, p < 0.05$) has a positive and significant effect on the ESG grade, suggesting that portfolios managed by women tend to have higher ESG integration.

Model 3 showed that the Economic Message ($\beta = 0.7, p < 0.01$) has a positive and significant effect on the ESG grade. The results suggest that none of the other variables, namely Age, Gender, Moral Message and Public Goods Game ($\beta = 0.04, p = \text{n.s.}$), have a significant effect on ESG integration as measured by ESG_EFG.

### 3.2 Effects of the joint reminders of moral and economic imperatives

To explore the tensions that can arise when moral and economic messages are presented jointly, we included the interaction term between Economic and Moral Messages. This analysis is particularly suitable for elucidating the nuanced effects of these variables on each other. The resulting regression models (OLS on ESG_grade (4), OLS on ESG_AB (5) and logistic on ESG_EFG (6)) are presented in Table 5.

Overall, the models have satisfactory explanatory power for the dependent variables ESG_grade, ESG_AB and ESG_EFG, respectively. Whereas the $R^2$ coefficients of the models (0.1 for both ESG_grade and ESG_AB) suggest that only 10% of the variation in ESG scores is explained by the predictor variables, the adjusted $R^2$ is also 0.1, which indicates that the models are not overfitting the data. Again, we follow Ozili (2022) and proceed to interpret the models despite the relatively low coefficients. Additionally, the F-statistic values (9.5 for ESG_grade and 6.0 for ESG_AB) are significant at $p < 0.01$, implying that the models have sufficient explanatory power. The Akaike Information Criterion (AIC) value of 826.5 for
Model 3 suggests that the model is not too complex, because a lower AIC value generally indicates a better fit.

The interaction effect of the joint economic imperative message and the moral imperative message is consistent across all models (4, 5, 6) with a significant effect size, \( p < 0.001 \). The magnitude of the interaction effect (7.9, 5.4 and 1.5) suggests that the relationship between the economic imperative message and ESG integration is moderated by the moral imperative message. This is further corroborated in the interaction effect illustrated in Figure 2, which plots the marginal effects of reminders on ESGGrade from model 4.

In a nutshell, our analysis validated Prediction 2 that displaying messages about the economic imperative has a significant positive effect on students’ ESG integration. However, we did not find support for Prediction 1, that sending messages about the moral imperative has similar effects. More interestingly, we observed a positive effect of joint messages about the two imperatives that is robust and consistent across different model specifications. Specifically, we affirmed that the positive effect of reminders of the economic imperative can be reinforced when reminders of the moral imperative are also used. Additionally, we find that students with high altruistic personality traits, as measured by the public goods game, integrate ESG more actively in their portfolios. Finally, we demonstrated that portfolios managed by women tend to have better ESG practices.

4. Discussion
Our research started by asking what matters the most, moral or economic imperatives, in a SM TR built to train responsible managers. Our main and most important finding is that economic imperatives matter, because either a reminder of the economic imperative or a combination of the moral and economic imperatives leads to increased sustainability behavior, i.e. higher ESG ratings in the portfolios. What both theory and practitioners should note is that focusing solely on the moral imperative without reference to the economic imperative is not effective and could even be counterproductive.
4.1 Theoretical contributions and implications

Our research findings contribute to the literature by highlighting the nuanced role that economic and moral imperatives play in shaping the responsible management practices of finance students. We validate the economic imperative view (Aragon-Correa et al., 2017; Revelli and Viviani, 2015; Spitzeck, 2013) by demonstrating the substantial positive effect of emphasizing the economic advantages of ESG integration. This reinforces the existing understanding that individuals increase their efforts when it improves their economic situation, while extending the finding to the realm of sustainable finance and responsible management education.

However, our results did not support the view that the moral imperative alone, i.e. raising awareness of ethical and societal concerns (Craft, 2012; Hofmann et al., 2007, 2008), would significantly influence investment behaviors in responsible assets. This finding, contrasting with our initial Prediction 1, emphasizes the nuances involved in moral decision-making, as described by Aragon-Correa et al. (2017). Nevertheless, our study suggests that the simultaneous application of moral and economic imperatives significantly enhances ESG integration, demonstrating that raising moral awareness (Jones, 1991), coupled with the instrumental approach to CSR (Freeman, 1999; Spitzeck, 2013), can effectively promote responsible behavior.

The exploration of the tensions between moral and economic imperatives, a topic relatively under-researched in management education, has enhanced our understanding of their interaction. Bénabou and Tirole’s (2010) proposition of responsible behavior being associated with an economic incentive is validated in our findings, yet the crowding-out effect they describe is not apparent in our results. Instead, our results support the synergistic interaction between the moral and economic imperatives, suggesting a complementary rather than conflicting relationship. This discovery follows Aragon-Correa et al.’s (2017) recommendation for professionals to understand when and how to balance these
imperatives and provides essential insight into how to design a TR that effectively stimulates responsible management behavior.

4.2 Implications for practice
Our study not only aligns with current practices in SME, but also offers actionable managerial implications that bridge the gap between research and practical application in business schools. Our results are relevant for implementing and organizing SME to help to train responsible managers. We show that teaching responsible management is most effective when we presented students with the inherent tension between moral and economic imperatives. This finding complements the research of Heimann and Lobre-Lebraty (2018) and provides an empirical validation of Aragon-Correa et al.’s (2017) claim that “[t]he combination of moral imperative with the practicalities of business decision-making are key components in the creation of good resources for teaching sustainability in management” (p. 474). Hence, our findings corroborate the win-win conception of SME.

Practically, this conception of SME implies that teachers should take advantage of examples and illustrations of companies that boast most economic and moral achievements. For instance, they could highlight companies that use environmental or social practices as a source of differentiation in their business model (Patagonia, The Body Shop, Weleda, El Naturalista, etc.). Another practical implication is that a win-win conception argues in favor of teaching sustainability in specialty courses such as finance, human resource management (HRM) and marketing rather than in solely CSR-dedicated courses. Indeed, it seems easier and more natural to teach about the business case of sustainability when drawing on concrete examples of traditional managerial practices. Finally, the win-win conception is probably best taught by professionals, whose accounts students deem more trustworthy and realistic.

4.3 Limitations and future research
Of course, our study is not without limitations. First, the choice of finance students may call the external validity of the results into question. Although the topic of investing provides a real opportunity to explore the tensions and synergies between moral and economic imperatives, the participants in this situation may have different learning expectations and backgrounds or specific characteristics that influence their behavior. For example, Stella et al. (2022) showed that high levels of financial literacy and financial happiness heighten individuals’ sensitivity to all components of CSR. Second, the results for Prediction 1 and Prediction 2 are not necessarily independent of the TR type (e.g. our simulation versus a case study or research article). Finally, a possible explanation for the lack of effect of moral reminders on ESG integration is that ethical investment willingness is positively related to perceived moral intensity (Lin et al., 2018). Therefore, stronger manipulations of the moral imperative may yield a different result.

Our findings also open up promising avenues for future research. One is to investigate the interactions between moral and economic imperatives across varied educational and professional contexts. For example, researchers could conduct similar experiments with students in marketing or supply chain management to consolidate or add nuance to our findings. Another perspective for future research is to conduct a more granular analysis of the SM business case (synergy of moral and economic imperatives) and the tension in teaching approaches. For example, testing of different levels of moral and economic imperative reminders could allow researchers to investigate thresholds or nonlinear effects on students.

In conclusion, our research adds value to the field of management science by empirically demonstrating that the most effective approach for SME is to combine moral and economic reminders in TR. This approach highlights the dual importance of both moral considerations...
and economic motivations in promoting sustainable practices with business students. By incorporating both types of reminders, schools and faculty can effectively motivate future managers to make sustainable choices and drive the implementation of long-term, sustainable and responsible strategies.

References


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