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Exploring the Impact of Sustainable Entrepreneurial Role Models on Students' Opportunity Recognition for Sustainable Development in Sustainable Entrepreneurship Education

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Abstract: The transformation toward a sustainable economy is considered one of the most effective measures to accelerate the achievement of the United Nations' Sustainable Development Goals for 2030. Sustainable entrepreneurs contribute to this transformation by identifying and exploiting business opportunities based on sustainability challenges such as biodiversity loss. Recognizing a business opportunity to achieve sustainable development characterizes the beginning of the sustainable entrepreneurial process. Sustainable entrepreneurship education (SEE) aims to foster skills, knowledge, and attitudes to accomplish tasks within this complex process. Role models are a common pedagogical instrument in educational settings, such as SEE at higher education institutions, where sustainable entrepreneurs are integrated into the curriculum to enhance learning outcomes. Given the limited research on SEE for secondary education, an exploratory study is conducted to investigate the effects of sustainable entrepreneurial role models on opportunity recognition for sustainable development. A total of 136 secondary school students participated in a program that guided them through the first steps of the sustainable entrepreneurial process. A total of 68 students were non-randomly assigned to sustainable entrepreneurial role models, providing support and feedback. During the program, groups of 3–5 students generated opportunity ideas ($n = 35$) for sustainable development. The quality of the opportunity ideas is explored by a qualitative content analysis. The obtained data is further analyzed for statistical group differences. The findings indicate the potential positive effects of sustainable entrepreneurial role models on idea generation for sustainable development. The results can advise educators and researchers on the design and investigation of SEE for secondary education.

Keywords: sustainable entrepreneurship education; opportunity recognition for sustainable development; sustainable entrepreneurial role models; secondary education



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1. Introduction

To address global issues such as climate change, social injustice, and environmental degradation, the United Nations established 17 Sustainable Development Goals (SDGs), with a target for achievement by 2030 [1]. The Global Sustainable Development Report of 2023 serves as a mid-term review of progress toward these goals [2]. The report emphasizes that continuing with a business as usual, predominantly characterized by inequality and environmental destruction, will likely result in failing to meet the SDGs. Furthermore, the report identified the transition to a sustainable and equitable economy as one of three critical areas with the potential to accelerate the achievement of the goals.

Sustainable entrepreneurs who contribute as change agents through innovative market solutions to tackle global sustainability challenges are considered crucial for this transformation [3–5]. Sustainable entrepreneurship is defined as the process of discovery or,

creation, and exploitation of business opportunities to develop and successfully implement innovative goods and services with environmental, social, and economic value on the market [3,6–9]. In process-oriented definitions of sustainable entrepreneurship, the founding process consistently involves recognizing business opportunities through discovery or creation, evaluating or examining these opportunities, and ultimately exploiting them to achieve sustainable development [3,6–9]. Opportunity recognition for sustainable development is thus a fundamental phase in the sustainable entrepreneurial process [10].

The statement, “We call upon all businesses to apply their creativity and innovation to solving sustainable development challenges.”, in Agenda 2030 identifies the private sector, from small enterprises to multinational corporations, alongside governments and civil society, as the actors that are capable of delivering sustainable development through innovations such as environmentally friendly technologies [1] (p. 29). Startups mainly succeed in identifying viable business opportunities related to SDG 3 (good health and well-being), SDG 9 (industry, innovation, and infrastructure), and SDG 12 (responsible consumption and production) [11]. In addition to entrepreneurial activity in these most frequently targeted areas, private sector solutions are also created for SDGs that offer few opportunities for entrepreneurs and whose improvement primarily relies on governmental efforts, such as SDG 16 (peace, justice, and strong institutions) [11].

The research on entrepreneurial opportunity is driven by the question of why some individuals are able to identify opportunities [12] for themselves (first-person belief) or someone else (third-person belief) [13]. The central constructs that explain individual differences in identifying third- and first-person opportunities include motivation and knowledge [13]. Several factors influence whether sustainable development opportunities (“opportunities that sustain the natural and/or communal environment as well as provide development gain for others”) [14] (p. 639) are recognized by an individual. The subsequent introduction presents a model for the opportunity recognition of sustainable development, focusing on third-person opportunity beliefs. Models for recognizing first-person opportunities for sustainable development are not further considered (e.g., [15]).

1.1. Conceptual Model of Recognition of Sustainable Development Opportunities

The first conceptual model, developed by Patzelt and Shepherd [14], identifies two central factors—motivation and knowledge—that influence whether an individual recognizes a sustainable business opportunity for someone. The model suggests that individuals with knowledge about the social and natural environment, the perception of threats to this environment, and the motivation to develop gains for others are more likely to recognize entrepreneurial opportunities for sustainable development. Entrepreneurial knowledge, such as customer needs, reinforces the relationship between those factors [14].

1.1.1. Motivation

Based on Ryan and Deci’s self-determination theory [16], Patzelt and Shepherd [14] argue that the perception of a threat to personal well-being (to the basic psychological needs of competence, relatedness, and autonomy) through unsustainable development increases the likeliness that people are intrinsically motivated to recognize opportunities for sustainable development. Therefore, the desire for self-determination to secure psychological well-being represents a personal gain. An individual’s sensitivity to identifying opportunities for sustainable development will increase with the perceived lack of personal and societal competence to achieve the necessary sustainable development [14]. Likewise, an opportunity for sustainable development is more likely to be identified when an individual perceives their connection to people of other generations or nations as endangered (need for relatedness) [14]. An individual who perceives their action options as threatened by unsustainable developments is also more likely to recognize opportunities for sustainable development, reflecting a need for autonomy [14]. According to Patzelt and Shepherd [14], the likelihood of recognizing an opportunity for sustainable development is further increased by altruistic motivation, as empathy and sympathy for people and

animals heighten attention toward others' problems. The positive connection between the motivational aspects (perceived personal threats and altruism) and the likelihood of recognizing an opportunity for sustainable development is enhanced by entrepreneurial knowledge [14].

1.1.2. Knowledge

Sustainable entrepreneurs must possess both entrepreneurial knowledge and knowledge of social and environmental problems to recognize business opportunities for sustainable development [14].

Patzelt and Shepherd [14] propose that entrepreneurial knowledge acts as a moderating condition, enhancing the likelihood of identifying a business opportunity for sustainable development when confronted with a sustainability problem. Knowledge of economic conditions, including markets, constraints, or opportunities to serve markets through legal regulations or trends, and understanding customer problems are essential for identifying business opportunities [17,18]. It is likely, however, that entrepreneurial knowledge alone is insufficient for identifying business opportunities that enable social, environmental, and economic gains beyond the entrepreneur [14].

Market failures such as negative externalities or information asymmetries, which lead to unsustainable consumption and production behaviors, contribute to sustainability issues and, as such, generate business opportunities for the creation of innovative business models and technologies [17]. According to Patzelt and Shepherd [14], knowledge about environmental and social problems such as air pollution or the loss of indigenous culture facilitates recognizing opportunities for sustainable development.

1.2. Empirical Refinements of the Conceptual Model

The conceptual model by Patzelt and Shepherd [14] has been empirically investigated in various studies using quantitative and qualitative approaches, yielding mixed results. Choongo et al. [19] found only partial evidence for the effect of altruism within the conceptual model in a quantitative study on managers of mining companies in Zambia, attributing this to differences between the developmental context (Texas) and the application context of the model.

A qualitative interview study by Hanohov and Baldacchino [20] applied the model to eight sustainable entrepreneurs in Germany and found largely empirical support. An exception is motivation through perceived threat, as anticipated in the conceptual model. Instead, the authors note that motivation for personal gains, such as the desire to be self-employed, is a driving factor [20]. The authors extend the model by further investigating how sustainable entrepreneurs increased their entrepreneurial knowledge and knowledge of natural and communal environments prior to the recognition of an opportunity for sustainable development. Sustainable entrepreneurs acquire entrepreneurial knowledge by initiating and managing projects and working in the thematic field relevant to the desired business opportunity [20]. Knowledge of environmental issues is gained through time abroad, reading the information in newspapers, socialization within the family, or sustainability movements.

The explorative empirical study by Ploum et al. [21] refines the altruistic element as a motivational aspect of Patzelt and Shepherd's conceptual model [14] by incorporating pro-environmental values [22] and moral competences (normative and strategic action competence), which are described as moral antecedents for opportunity recognition for sustainable development [23].

Eller et al. [24] developed a processual model of sustainable opportunity identification by combining the conceptual model by Patzelt and Shepherd [14] with the overall sustainable entrepreneurship process described by Belz and Binder [6]. Identifying an opportunity for sustainable development is understood as a process within the sustainable entrepreneurial process [24]. The linear process model of opportunity identification emphasizes two transitions and the potential influencing factors regarding the transitions.

The process starts with the identification of a sustainability issue. A solution in the form of an idea intended to address the problem is generated only if there is an awareness of the adverse consequences of the problem. The authors use the entrepreneurial attitude to explain the subsequent transition from the solution to sustainable opportunity recognition. In their model, entrepreneurial attitude replaces the role of entrepreneurial knowledge in the original model by Patzelt and Shepherd [14], as the authors assume that their sample, with an average age of 25 years, possesses little entrepreneurial knowledge.

Sarma et al. [25] conducted a qualitative interview study with 12 sustainable entrepreneurs in the United States of America and Canada. Contrary to Hanohov and Baldacchino [20], they found that all sustainable entrepreneurs were motivated to recognize sustainable business opportunities because they perceived threats to themselves or other species. Additionally, they identified other sources of knowledge, such as formal or non-formal education or entrepreneurial parents. In the context of the COVID-19 pandemic, they added the aspect of resilience, which motivates the continuation of sustainable businesses [20].

In summary, conceptual and empirical studies address motivational and knowledge-related aspects to identify the prerequisites for recognizing sustainable business opportunities. Some authors question to what extent opportunity recognition can be developed through teaching [26]. In an experimental study, Eller et al. [24] found, however, that providing information can create conditions that facilitate the process of opportunity identification for sustainable development.

1.3. Fostering Opportunity Recognition for Sustainable Development

In this context, SEE appears to be particularly suitable to foster the identification of business opportunities for sustainable development. SEE integrates entrepreneurship education and education for sustainable development [26]. Research on SEE develops and investigates methods and contents to successfully teach and learn the necessary competences to accomplish tasks within the sustainable entrepreneurial process [27–29]. In research on opportunity recognition for sustainable development, different pedagogical strategies are used to stimulate opportunity recognition.

Baggen et al. [30] (p. 738) stimulate students to identify business opportunities for sustainable development by setting the following task: “Imagine that you are asked to give input for business ideas for new start-ups in the area of sustainable development. These business ideas can concern people, planet and/or profit, and may lead to social, environmental and/or economic gains. What ideas for new start-ups come up in your mind?” In advance, students receive information on the principle of sustainable development and various related examples.

Ploum et al. [21] stimulated opportunity recognition for sustainable development using an online learning tool, which encouraged students to identify business opportunities for an existing company based on a case description. The students were tasked with developing ideas to improve the company’s business model [21].

Eller et al. [24] stimulated opportunity recognition for sustainable development through two distinct interventions. The awareness of adverse consequences to facilitate the transition from the problem to the solution identification is stimulated by assigning students to read and summarize a text on the negative impacts of various sustainability issues. Subsequently, the students were asked to identify and explain solutions for the identified problems. The authors observed that the intervention significantly enhanced awareness of the adverse consequences of sustainability issues and that problem identification significantly affected solution identification in cases of heightened awareness.

The entrepreneurial attitude, aimed at promoting the transition from the solution to opportunity identification, is stimulated by assigning students to read a text on the benefits of self-employment and note undesirable or desirable consequences of being self-employed. Finally, the participants were required to identify the solutions that qualified as sustainable opportunities and provide descriptions. The authors observed that the intervention signifi-

cantly enhanced entrepreneurial attitude and that, in cases of heightened entrepreneurial attitude, solution identification has a significant effect on opportunity identification.

1.4. Sustainable Entrepreneurial Role Models as Pedagogical Instrument

None of the three studies used role models to promote opportunity recognition for sustainable development. Role models are defined as “individuals who influence role aspirants’ achievements, motivation, and goals by acting as behavioral models, representations of the possible, and/or inspirations” [31] (p. 4). Role models are advocated for entrepreneurship education (e.g., [32]) and education for sustainable development (e.g., [33]). The call for role models is justified by their positive effects, which are empirically examined against the backdrop of established theories such as Ajzen’s theory of planned behavior [34], Ryan and Deci’s self-determination theory [16], or the social learning theory by Bandura [35].

Studies examining influential life events that shape the environmental action of adolescents (e.g., [36,37]) and adults (e.g., [38,39]) have demonstrated the beneficial impact of role models in fostering pro-environmental attitudes and behaviors. Accordingly, international research on significant life experiences has identified that, alongside nature experiences, role models are the most critical factors shaping the environmental concerns of adults [33]. Stern et al. [33] argue that role models contribute to fulfilling basic psychological needs by, for example, providing constructive feedback instead of judgment, sharing knowledge and support, and thereby enhancing individuals’ intrinsic motivation.

Role models such as self-employed parents significantly influence students’ self-efficacy and/or perceived behavioral control and, ultimately, entrepreneurial intention [40,41]. This effect might be attributed to the positive influence that role models have on the knowledge and skills required to accomplish tasks in the entrepreneurial process [41]. Public entities have long advocated using entrepreneurs as role models in educational settings to promote entrepreneurship [42]. For decades, it has been a well-known approach in university and business school settings (e.g., [43,44]).

However, a systematic review by Brüne and Lutz [45] on the effects of entrepreneurship education at schools does not identify research on the effects of role models. The authors recommend further investigation into the effects of role models, for example, on pupils’ confidence and the preservation of the benefits and challenges of an entrepreneurial career. A systematic review by Lin et al. [46] on the planning and evaluation of entrepreneurship programs in schools suggests integrating interactions between entrepreneurial role models and students through collaboration between schools and businesses to incorporate interventions into a larger entrepreneurial ecosystem.

In sustainable entrepreneurship research, the implementation and use of role models are also suggested and applied. Vuorio et al. [47], in their study on the drivers of entrepreneurial intentions toward sustainable entrepreneurship, suggest using role models in higher education to provide positive experiences and improve students’ attitudes and intentions toward sustainable entrepreneurship.

Bernhardt et al. [48] implemented role models into their pedagogical framework through transdisciplinary cooperation between universities and businesses to contribute to real-world orientation and facilitate the learning experience. The authors argue that by interacting with and observing role models, students can adopt aspects of the entrepreneurial mindset, ultimately leading to changes in their behavior. Three pedagogical methods are introduced for this purpose and presented subsequently in the order of increasing effort for implementation.

Due to their personal experience, guest lectures by role models can provide authentic impressions and information that teachers without such professional expertise cannot incorporate into their lessons. Thereby, role models can enhance students’ motivation to act on their own (sustainable entrepreneurial) projects.

Excursions to sustainable businesses enable students to discuss the challenges and opportunities encountered by experienced sustainable entrepreneurs. The interaction with enthusiastic role models “has great potential to give inspiration for students’ own start-ups

and to lower the barrier for taking own action. Students realized that great projects can develop simply from an idea.” [48] (p. 130).

The authors describe coaching by role models as particularly valuable to facilitate the development of students’ sustainable entrepreneurial projects. Role models can address support needs as mentors by offering advice and questioning students’ assertions, leveraging their practical experience in overcoming sustainable entrepreneurial challenges. Specifically, during the idea-generation phase, such coaching can support students.

Similar to the three studies mentioned above on opportunity recognition for sustainable development, which implemented pedagogical measures to stimulate opportunity identification [21,24,30], the works of Vuorio et al. [47] and Bernhardt et al. [48] focus on tertiary education. This aligns with the general profile of SEE, which is almost exclusively developed and examined within tertiary educational settings [26,49].

Despite the successful integration of role models in SEE tertiary education, there has been no transfer to other educational levels. The present work employs an empirically explorative research design to investigate the implementation of sustainable entrepreneurial role models as a pedagogical instrument to promote opportunity recognition for sustainable development in secondary education. The following research question is addressed: Do sustainable entrepreneurial role models in sustainable entrepreneurship education (SEE) impact the opportunity recognition for sustainable development among secondary school students? The research contributes to the advancement of SEE for secondary education settings by developing a design for an educational program that aligns with the process-oriented framework of competences for sustainable entrepreneurship developed by Foucrier and Wiek [27]. The first two phases represent the necessary competences for sustainable entrepreneurs to manage startup-related tasks [27]. In the context of a spiral curriculum for competency development, the first two phases of the framework are adapted for designing an educational program in secondary education. The results provide numerous indications for future explanatory studies, as this exploratory study yields evidence of the promoting effect of sustainable entrepreneurial role models on opportunity recognition for sustainable development.

2. Materials and Methods

An exploratory study was conducted to investigate the effect of role models as a pedagogical instrument in SEE for secondary education on opportunity recognition for sustainable development. The educational materials and the research design are described below.

2.1. Sample and Setting

Eight classes from six schools volunteered in the study in response to calls for participation sent to ninety-five secondary schools in Baden-Württemberg, Southern Germany. The sample encompassed all German secondary education school types. During the program from April to May 2023, students were enrolled in either the eighth, ninth, or tenth grades. Most students visited the ninth grade (64.0%), followed by grade eight (28.7%) and grade seven (6.6%). One student (0.7%) did not state the school grade.

The program was implemented in the mandatory subjects of social studies or economics. A total of 169 students participated in one or more of the three sessions of the educational program on sustainable entrepreneurship. Data were collected from $N = 136$ students present during the final session. Thirty-three students did not attend the final session and dropped out due to personal issues, including illness or school transfers.

The gender distribution of the participants is illustrated in Figure 1a. The division between male ($N = 69$), female ($N = 52$), and diverse ($N = 2$) was 50.7%, 38.2%, and 1.5%, respectively. Thirteen students did not specify their gender (9.6%). Figure 1b depicts the age distribution. Most students (41.2%) were 15 years old; 27.2% were 14; 9.6% were 16; and 7.4% were 13 years old. One student (0.7%) was 12 years old, and one stated that they were 20 years old. Eighteen students did not specify their age.

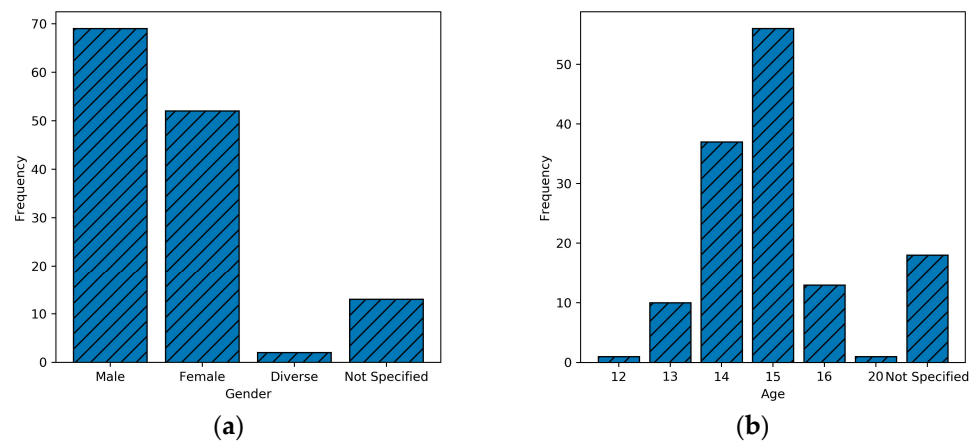


Figure 1. Demographic data of participants present during data collection in the final session of the educational program on sustainable entrepreneurship: (a) gender distribution of students; (b) age distribution of students.

2.2. Research Design

Given the limited research about sustainable entrepreneurial role models as pedagogical instruments for secondary education, an exploratory study was conducted. Two non-randomized groups were formed, including four school classes and sixty-eight students each. The intervention group, comprising 68 students, was assigned to a sustainable entrepreneurial role model (independent variable). The comparison group, comprising 68 students, conducted the program without role models. To ensure the comparability of the groups, classes were assigned to a role model based on the type of school and class grade.

The qualitative data created by students, comprising descriptions and illustrations of opportunity ideas for sustainable product, process or service innovations, were analyzed through structured qualitative content analysis. The resulting numerical data were then examined for group differences by statistical group comparison.

2.3. Design of the Educational Program

The educational program on sustainable entrepreneurship includes six lessons, which are structured into three sessions, each lasting 90 min. The program's design is aligned with the process-oriented framework of competences for sustainable entrepreneurship developed in 2019 by Focurier and Wiek [27]. It is the only competence framework for sustainable entrepreneurship built on the entrepreneurial process [49]. The framework was selected due to its real-world orientation, considering the context-dependency of competences [50]. In this regard, group work is chosen as the students' primary social form of interaction, reflecting the fact that two-thirds of all startups are founded by teams [51].

The competence framework lists the knowledge, skills, and attitudes required to accomplish tasks within the sustainable entrepreneurial process [27]. It is structured in a five-stage process model, considering discovery, planning, start-up, build-out, and consolidation phases. The framework was developed to design and assess higher education programs [27]. In the context of a spiral curriculum for competence development, the first two phases of the framework were adapted for an educational program in secondary education, as they represent the necessary competences for sustainable entrepreneurs to manage startup-related tasks. A detailed description of the design for the educational program can be found in Appendix A.

2.4. Implementation of the Educational Program

Prior to the program, all teachers participated in a one-hour online training. The training comprised information on the program's vision, current sustainable development challenges, sustainable entrepreneurship, and the content and aim of each session. Teachers

were provided with all educational material, comprising digital and analog components such as videos, worksheets, and instructions for every session. Teachers within the intervention group were informed about the on-demand and consultative nature of the interaction between students and role models.

Each of the four classes of the intervention group was administered one role model. The role models participated in the final session of the program. The class teacher who taught the program lessons welcomed the role model. The teacher informed the students about the role model's purpose as a supporter during idea generation and a feedback provider at the end of the session. Throughout the educational program, students operated in work groups of 3–5 people, equaling three to five work groups per class.

At the beginning of the final session, role models introduced themselves and their sustainable businesses. During the session, the role models acted supportively and provided advice. Therefore, role models did not instruct but responded to questions from students or asked themselves. In this manner, all work groups in a class had multiple interactions with a role model. The session ended with a short presentation of the opportunity idea each work group had developed during the session. Additionally, to classmates and teachers, the role models gave feedback on each business idea's potential and possible improvement. The opportunity ideas were not rated or ranked, and students were not offered incentives.

Apart from the absence of role models, the SEE program for the comparison group was identical to that of the intervention group. Instead of the role models, the teachers implementing the program were available to assist the students with questions and support needs and provide feedback.

Description of the Sustainable Entrepreneurial Role Models

Three sustainable enterprises volunteered in the study in response to calls for participation in 36 sustainable companies in Southern Germany. Companies were contacted if they corresponded to the definition of sustainable entrepreneurship and, therefore, had identified and exploited business opportunities by developing and implementing innovative services and products on the market that offer social, ecological, and economic value to stakeholders [3,7–9]. Building on a sustainable funding motive, these enterprises were established between 2005 and 2020. The companies pursued sustainable business objectives in different branches, from mobility to food and supplements. Three role models were founders, and one was employed in sustainability management and represented the founder. Two role models were women, and two were men.

2.5. Measures

Opportunity recognition for sustainable development is measured by different approaches. As detailed below, an operationalization of opportunity recognition is conducted using the concept of opportunity ideas. Business opportunity ideas or venture ideas are understood as “[...] imaginary combination of product/service offering, markets, and means of bringing these offerings into existence” [52] (p. 683). The generation of a venture—or business opportunity idea introducing a new product or service to a market—lies at the beginning of the opportunity recognition process [53,54]. Success depends on an individual's ability to identify an idea for a product, process, or service, solving a market need [55]. Opportunity recognition processes are influenced by various factors [12], such as motivation [13], knowledge [18], and experience [56].

The review of the existing literature regarding the effect of role models in sustainability, entrepreneurial, and sustainable entrepreneurial studies indicates that the interaction with sustainable entrepreneurial role models will positively influence the motivation and knowledge of the pupils. Consequently, a measurable difference between the opportunity ideas of the intervention and the comparison group is expected to be measured.

Baggen et al. [30] measure business ideas for start-ups in the context of sustainable development. The authors aim to determine the individuals' ability to identify ideas for products or services that address a market need. To achieve this, three scoring factors are employed,

namely fluency, concreteness, and flexibility, inspired by Guilford's [57] classification of individual creativity. The authors analyzed the degree to which participants developed ideas across different categories of sustainable development (flexibility), the number of ideas possible to visualize (concreteness), and the number of ideas (fluency) by counting comprehensible responses. Baggen et al. [30] justify their approach based on the advantages of performance analyses compared to the limitations of self-assessment methods.

Ploum et al. [21] follow the analysis approach outlined in Baggen et al. [30] and assess opportunity recognition for sustainable development by counting and analyzing the ideas that participants developed based on a case description of a company. Ideas for a sustainable product, service, or process are counted when they meet the sustainability criterion, hence aligning with at least one sustainable business model archetype as defined by Bocken et al. [58]. The comprehensibility and concreteness of ideas are evaluated on a scale from 1 to 5. Flexibility is determined by categorizing ideas into sustainable business model archetypes, with one idea potentially belonging to multiple categories. Ploum et al. [21] emphasize that the content analysis of ideas assesses the potential for idea implementation.

Eller et al. [24] (p. 1391) measure sustainable opportunity identification in a field study through self-reporting by asking participants, "[...] how many of your solutions seemed promising as a business opportunity in general?". The question is preceded by two questions that pertain to the number of identified social and environmental problems and, subsequently, the number of identified solution ideas for these problems. The authors argue for self-reporting the number of recognized opportunities because these are considered predictors of business creation [59] and are positively associated with product innovativeness [60]. In a related experiment, Eller et al. [24] extracted the number of identified business opportunities from bullet-point descriptions provided by participants. Independent raters assess fluency, allowing for six environmental and six social ideas.

2.5.1. Quality of Opportunity Ideas for Sustainable Development

In this study, the collection of self-reported data was not employed to avoid the limitations mentioned by Baggen et al. [30]. Instead, a performance assessment was conducted by qualitatively evaluating the final opportunity idea for sustainable development, created by groups of 3–5 students. A quantitative assessment of comprehensible opportunity ideas for a sustainable product or service, as in Baggen et al. [30] or Ploum et al. [21], was not feasible with secondary school students' data. This was due to the limited information individual students provided on solutions for their sustainability problem developed during the planning phase using creativity techniques. Hence, most of these solutions would have been excluded from a qualitative analysis as non-comprehensible. Only the opportunity idea for sustainable development, introduced in the final presentation, provided sufficient visual and textual information that external parties could interpret. Therefore, opportunity recognition for sustainable development is measured by a qualitative content analysis of opportunity ideas for sustainable development.

Various approaches exist for assessing the quality of opportunity ideas [61], ranging from evaluating originality, customer appeal, and usefulness [62] to assessing customer benefit, feasibility, and novelty [63] and analyzing innovativeness [64]. The present study will assess the quality of an opportunity idea based on its usefulness and innovativeness.

Usefulness of Opportunity Ideas for Sustainable Development

The impact of enterprises on the economy, environment, and society is made transparent in sustainability reports based on data like energy consumption or workplace accidents following the standards introduced, for instance, by the Global Reporting Initiative [65]. In the context of business ideas, no such data is available. Other possibilities involve the evaluation of the implementation of SDGs in enterprises [66]. These evaluations are often conducted through content analysis of mission or vision statements (e.g., [67]) or annual

reports (e.g., [68]). The student's final presentations include information such as the group's vision statement, enabling a comparable analysis.

In the present study, the usefulness dimension of the quality of an opportunity idea is measured by analyzing student drawings and written descriptions for SDGs addressed in their idea for a sustainable product or service innovation. Therefore, the idea's potential to contribute to one or more SDGs will be analyzed. According to Agenda 2030, the SDGs and their targets should be understood as an "indivisible" holistic concept that is "universally applicable" [1] (pp. 1,13). Consequently, companies can impact all SDGs, even though some SDGs may not be directly implementable by businesses [69].

Innovativeness of Opportunity Ideas for Sustainable Development

Processes such as the enhancement of existing business models or the development of new business models, in the case of startups, for instance, through developing a product, service, or process innovation, can establish a competitive advantage and are understood as business model innovation [70]. A business model innovation is considered sustainable when it is designed to achieve sustainable development by generating positive or reduced negative environmental or social impacts, enhancing the company's prosperity, including the stakeholders, or implementing features that foster sustainability across the elements of the business model [70]. The student's drawings and descriptions include business model information about the envisioned product or service innovation, distribution channels, and potential consumers that share these characteristics and can, therefore, be understood as sustainable business model innovations.

The innovativeness dimension of the quality of the opportunity ideas is assessed by categorizing the idea for a sustainable product or service innovation according to the archetypes of business models for sustainability. Business models were developed as a concept for the rapid communication of complex business ideas [71]. Business models represent, in a simplified form, the elements of "value proposition, value creation and delivery and value capture" [70] (p. 402).

2.6. Data and Data Collection

Qualitative data of $n = 35$ opportunity ideas for sustainable development generated by $N = 136$ students were collected during the educational program carried out between April and May 2023. The opportunity ideas include the students' drawings and written descriptions of a product or service innovation. The documents served students as a means to communicate their final opportunity idea for sustainable development during the final presentation in the planning phase.

Each opportunity idea resembles the collaborative effort of a workgroup of three to five students. All work groups were able to deliver drawings and descriptions of opportunity ideas. Therefore, no group was excluded because of missing data. In the intervention group, $n = 17$ opportunity ideas, and in the comparison group, without role models, $n = 18$ opportunity ideas were developed. The collected data were digitized and transferred into the software MAXQDA 2022 [72] for a qualitative content analysis, as explained in the following section.

2.7. Data Analysis

In the present study, the recognition of third-person opportunities for sustainable development is examined because, due to the lack of vocational training or higher education and the absence of legal business capacity under the age of 18, it is assumed that most opportunity ideas identified by the target group (secondary students) cannot yet be exploited.

2.7.1. Qualitative Content Analysis

The quality (usefulness and innovativeness) of the opportunity idea for sustainable development was analyzed using a structuring qualitative content analysis, according

to Mayring [73]. The content-analytic category system was deductively derived from the identified theory. The presence of content in drawings and descriptions of students' opportunity ideas referring to a category was coded in the software MAXQDA [72].

To assess the usefulness of an opportunity idea, all 17 SDGs, along with their corresponding 169 targets [1], were transferred into the content-analytic category system. The 17 SDGs were listed as main codes, and the 169 targets as sub-codes. Each category could be assigned only once per opportunity idea. Primarily, the targets (sub-codes) were coded except for SDG 13. If a reduction in CO₂ emissions was addressed in the opportunity idea, SDG 13 was coded, as no specific target is mentioned for this purpose. An inductive adaptation to the research material was made by removing targets (sub-codes) that could not be identified in any opportunity ideas. To analyze group differences, the codes were summarized, resulting in a usefulness score per opportunity idea.

To assess the innovativeness of an opportunity idea, the sustainable business model archetypes were transferred into the content-analytic category system as main codes. Sustainable business models can be categorized into nine archetypes. The classification relies on the orientation of the underlying innovation, such as encouraging sufficiency by introducing slow fashion [74]. By distinguishing innovations based on their primary impacts on the environmental (maximize material and energy efficiency, closing resource loops, substitute with renewables and natural processes), social (deliver functionality rather than ownership, adopt a stewardship role, encourage sufficiency), or economic (repurpose for society/environment, inclusive value creation, develop scale-up solutions) aspects, the archetypes are further divided into three subcategories [58,74,75]. As in Ploum et al. [21], the present study also allowed for the multiple categorizations of an opportunity idea into several archetypes. This aligns with Lüdeke-Freund et al. [74], who indicate that archetypes are mixed within a model to generate sustainability values. To analyze group differences, the codes were summarized, resulting in an innovativeness score per opportunity idea.

For the assessment of the reliability of the category system, the interrater agreement was analyzed using a 20% sample of the collected data [76]. Two trained raters independently applied the codebook to seven opportunity ideas for sustainable development. The interrater agreement was found to be substantial for the two constructs, with a Cohen's Kappa coefficient (κ) of .67 for innovativeness and (κ) .72 for usefulness, indicating a substantial level of agreement between raters [77]. The remaining 28 opportunity ideas for sustainable development were coded by one rater.

2.7.2. Statistical Group Comparison

For further exploration of the potential effects of sustainable entrepreneurial role models, the numerical data obtained through qualitative content analysis were transferred into the software SPSS version 21.0 [78] for statistical analysis [76]. A Shapiro–Wilk test was employed on the whole sample to assess the normality of the data distribution. The test is particularly well-suited for small samples and assesses whether a dataset significantly differs from a normal distribution [79]. The test was performed for both dependent variables in each group. The distribution of the innovativeness score of the comparison group significantly deviated from normality, with a *p*-value of .024. This result suggests that the data are not normally distributed.

To assess differences between the two independent samples of opportunity ideas for sustainable development generated in the intervention group with role models (*n* = 17) and the comparison group without role models (*n* = 18), a Mann–Whitney U test was calculated. The data meet the assumptions necessary for calculating the Mann–Whitney U test. The test is appropriate for independent and small sample sizes when the data do not meet the assumptions of normality, and the distributions of the two groups have a similar shape [80]. The direction of the difference was determined by calculating and comparing the medians of the intervention and comparison group.

3. Results

The following scores, presented in Table 1 (intervention group) and Table 2 (comparison group), were obtained through qualitative data analysis. The tables describe the opportunity ideas developed by students and the corresponding innovativeness and usefulness scores derived by coding students' drawings and descriptions of their product, process, or service innovations.

Table 1. Overview of the intervention group's opportunity ideas for sustainable development, assessed on innovativeness and usefulness.

Opportunity Ideas Intervention Group		Innovativeness Score	Usefulness Score
1.	Local bazaar for secondhand textiles with a donation section, preventing textile waste and offering affordable clothing.	5	13
2.	Compact paper recycling machine for on-site workplace use; reducing transportation and new paper consumption.	3	10
3.	App to enhance accessibility/visibility of local secondhand shops, preventing textile waste and offering affordable clothing.	5	16
4.	Incentive-based app, rewarding proper fast-food packaging disposal with points redeemable at eco-friendly stores, preventing incorrect disposal and supporting sustainable stores.	5	15
5.	Recycling station for waste, preventing pollution.	2	14
6.	Reusable shipping bags made from textile waste, limiting single-use plastic in textile delivery and reducing textile waste.	5	15
7.	Informative app, encouraging conscious meat consumption.	4	14
8.	App for locating unpackaged food, reducing single-use plastic consumption.	5	14
9.	Collection and recycling system for used textiles, reusing textile fibers and reducing textile waste.	4	12
10.	Shop for trading and selling used items such as toys, extending product lifespan, and offering affordable goods.	6	18
11.	Repurposing glass bottles into vases as an alternative to selling new vases, reducing resource consumption.	3	9
12.	Multifunctional student ID (library, transport, and food) from renewable materials, reducing paper waste, and improving student resource access.	7	20
13.	Patient-friendly, plant-based medications in powder form, reducing medical waste.	3	13
14.	System for refilling ink for different applications, reducing waste and single-use plastics.	5	14
15.	Reusable fast-food packaging made from renewable resources, reducing single-use plastics.	5	15
16.	Reusable glass bottles for healthy flavor tablets, preventing juice pouch packaging waste, and eliminating beverage transport	3	18
17.	Locally produced mesh bags made from recycled hop wire, reducing waste and plastic consumption.	3	16

Table 2. Overview of the comparison group’s opportunity ideas for sustainable development, assessed on innovativeness and usefulness.

Opportunity Ideas Comparison Group		Innovativeness Score	Usefulness Score
1.	Additional collection containers for disposing of bottle caps, improving recycling.	1	9
2.	App for paper consumption tracking, promoting conscious paper use.	3	10
3.	Refillable lip gloss system, reducing single-use plastic.	3	12
4.	Packaging made from recycled nutshells, replacing paper cartons.	2	7
5.	Workshop for refurbishing used items, extending product lifespan, and offering affordable goods	5	15
6.	More precise packaging, reducing packaging waste.	1	10
7.	App supporting proper waste disposal, improving recycling	1	9
8.	Fair for meat alternatives, promoting reduced meat consumption.	5	12
9.	Self-powered air filter, improving air quality.	3	11
10.	App and mobile trash bin supporting proper waste disposal, improving recycling	1	9
11.	Suspension railway, reducing traffic congestion.	3	7
12.	CO ₂ filter, reducing carbon emissions.	1	6
13.	Specialized boat for ocean cleaning, reducing marine debris.	2	8
14.	Deposit trash bin supporting proper waste disposal, improving recycling	3	12
15.	Reusable candy packaging made of metal, reducing single-use plastic.	3	10
16.	Refillable make-up palette, reducing single-use plastic.	3	11
17.	Refurbishment and rental of used bicycles, reducing waste, and fostering sustainable transport.	4	13
18.	Hat designed to double as a bag, preventing single-use plastic bags.	2	9

3.1. Usefulness of Student Opportunity Ideas

Regarding the usefulness dimension, 33 different SDG targets were coded within the sample to assess the quality of an opportunity idea for a sustainable product or service innovation. Each opportunity idea potentially contributed to a minimum of 6 and a maximum of 20 different SDGs. On average, the opportunity ideas for sustainable development addressed 12.17 distinct SDGs.

The intervention group (Table 1) demonstrated higher usefulness scores ranging from 9 to 20, with a student ID concept receiving the maximum score (Idea 12). The usefulness scores in the comparison group (Table 2) were more moderate and varied from 6 to 15, with a workshop idea receiving the highest score (Idea 5).

The intervention group demonstrated higher usefulness scores, suggesting that their opportunity ideas potentially contributed to more SDGs, indicating higher idea quality. In contrast, the comparison group presented valuable ideas but had a narrower range of usefulness scores. These scores were also lower on average compared to the intervention group, thereby indicating lower idea quality.

Figure 2 presents the frequency distribution of usefulness scores for opportunity ideas for sustainable development within the intervention and comparison group. The intervention group’s ideas demonstrate a wide range of usefulness scores, with a notable frequency at the higher end of the scale, particularly between scores of 14 and 20. The comparison group’s ideas are more concentrated around the mid-range of the scale, with the highest frequency observed at a usefulness score of nine.

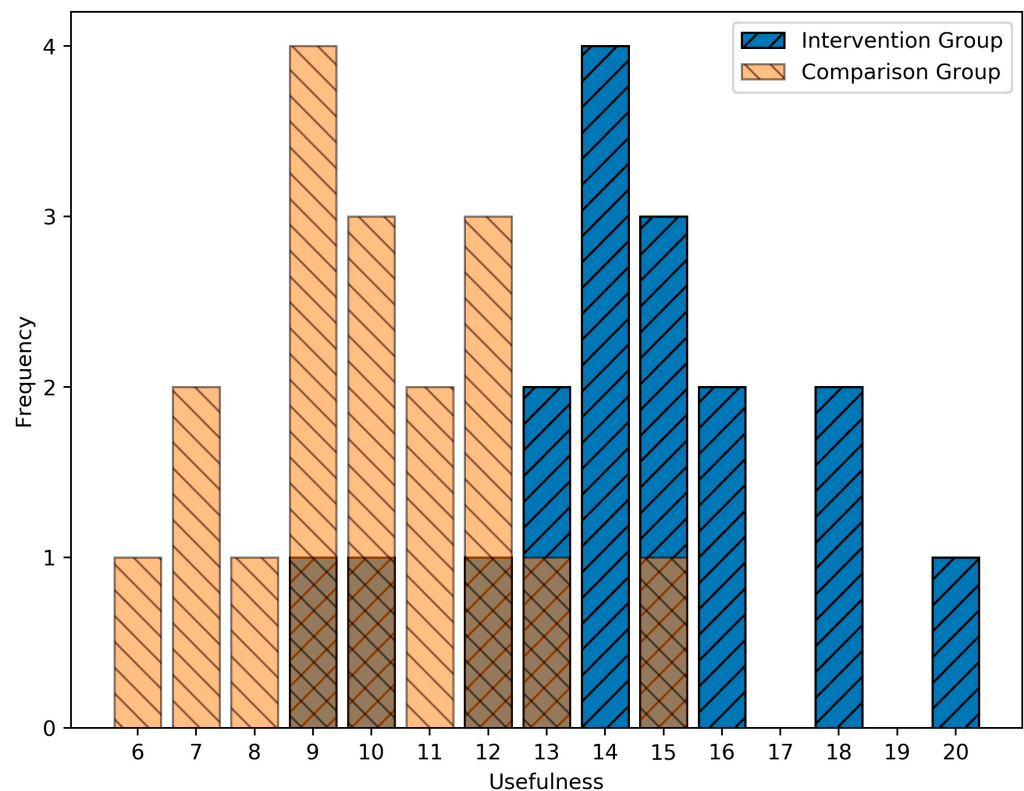


Figure 2. Comparative analysis of usefulness scores of opportunity ideas for sustainable development between the intervention and the comparison group.

The Mann–Whitney U test confirms the differences between the intervention and comparison group. The results of the statistical group comparison indicate a significant difference between the usefulness score of opportunity ideas for sustainable development generated by students in the intervention group and the comparison group. The students in the intervention group had significantly higher values of usefulness (mean rank 25.09) than students in the comparison group without role models (mean rank 11.31), $U = 32.50$, $z = -4.00$, $p < .001$ (two-tailed), $r = -.68$.

3.2. Innovativeness of Student Opportunity Ideas

Regarding the innovativeness dimension, seven different archetypes of sustainable business models were coded within the sample to assess the quality of opportunity ideas for sustainable product or service innovations. No opportunity idea integrated fewer than one or more than seven different archetypes. On average, opportunity ideas for sustainable development incorporated 3.4 distinct sustainable business model archetypes.

The intervention group (Table 1) exhibited diverse opportunity ideas for sustainable development with a broader range of innovativeness scores, starting from a score of two and peaking at a score of seven for the multifunctional student ID concept (Idea 12). The comparison group (Table 2) presented ideas with lower innovativeness scores, starting from a score of one and capped at a score of five for the workshop idea focused on refurbishing used items (Idea 5).

A broader range of innovativeness is created by adopting more sustainable business model archetypes, suggesting a greater variety of business model innovations and thereby indicating higher quality of opportunity ideas within the intervention group. While the comparison group presented valuable ideas, they generally had lower innovativeness scores, indicating a more conservative approach to combining sustainable business model archetypes for potential sustainability impact.

Figure 3 illustrates the frequency distribution of innovativeness scores for opportunity ideas for sustainable development within the intervention and comparison group. The in-

intervention group exhibits a broader distribution, with a substantial number of ideas scoring at the higher end of the innovativeness scale, particularly at a score of five. Conversely, the comparison group's frequency peaks at a lower innovativeness score of three, with fewer ideas reaching the higher scores.

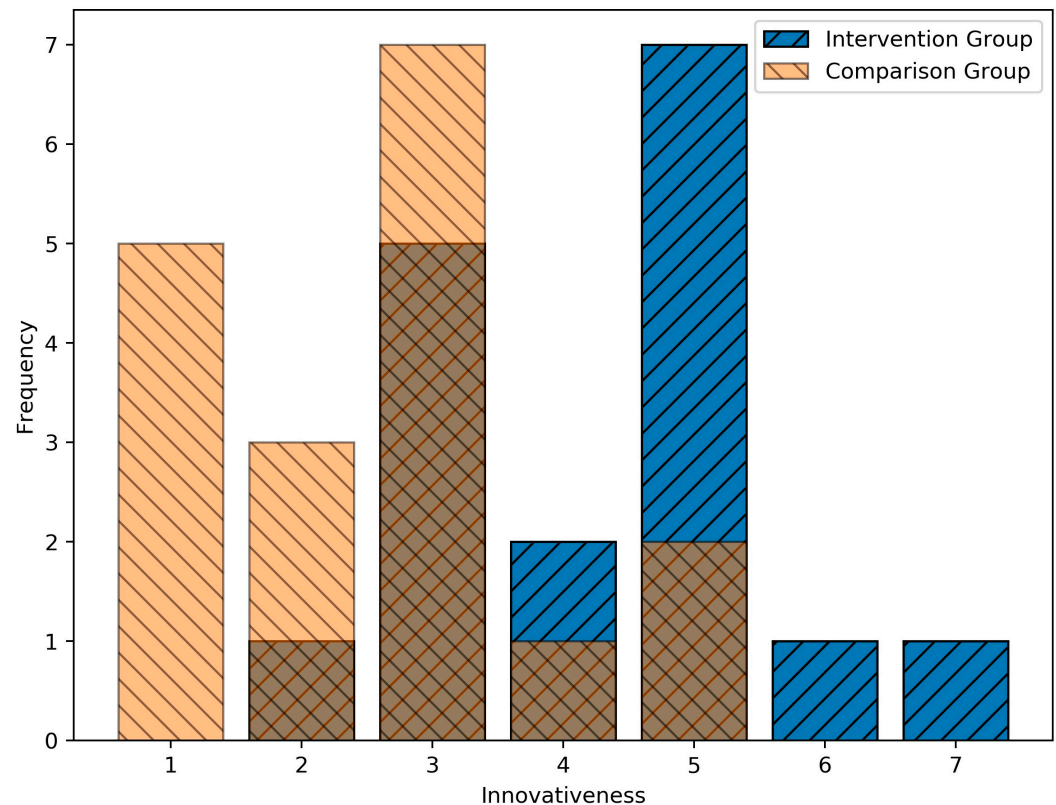


Figure 3. Comparative analysis of innovativeness scores of opportunity ideas for sustainable development between the intervention and the comparison group.

The Mann–Whitney U test confirms the differences between the intervention and comparison group. The results of the statistical group comparison indicate a significant difference between the innovativeness score of opportunity ideas for sustainable development generated by students in the intervention group and the comparison group. The students in the intervention group had significantly higher values of innovativeness (mean rank 23.71) than students in the comparison group without role models (mean rank 12.61), $U = 56.00$, $z = -3.31$, $p < .001$ (two-tailed), $r = -.56$.

4. Discussion

Achieving the goals for sustainable development by 2030 requires immense efforts from the governmental, societal, and private sectors [1]. However, the range of SDGs addressed by entrepreneurs is limited. In Germany, the highest entrepreneurial activity is observed in SDG 9 (Industry, Innovation, and Infrastructure), SDG 3 (Good Health and Well-being), and SDG 12 (Responsible Consumption and Production), while other goals are scarcely considered in ventures [11]. Education is one of three key strategies to facilitate the successful implementation of the SDGs in the private sector [66]. Students currently in educational institutions possess the potential, within a few years, to act as change agents [81], addressing sustainability issues by developing and implementing useful and innovative sustainable business ideas, whether they are employed in an organization or leading their enterprise.

Successfully managing complex tasks in the sustainable entrepreneurial process, such as opportunity recognition, requires specific competences [27]. Competence-oriented SEE

programs must be developed and implemented to provide entrepreneurs with the knowledge, skills, and attitudes necessary to recognize business opportunities for sustainable development. Diepolder et al. [49] identified a significant shortfall in the incorporation of competence frameworks for SEE interventions. The design of the SEE program presented in this study is based on the process-oriented framework of competences for sustainability entrepreneurship by Focurier and Wiek [27]. Thereby, the present study provides insights into the process-oriented design and implementation of SEE programs. By developing a SEE program for secondary school students, the study also addresses the research and implementation gap of SEE for secondary education [49].

By developing a SEE program that particularly emphasizes the discovery and planning phases of the sustainable entrepreneurial process, this study contributes to the call for “systematic education” to enhance the perception of sustainable entrepreneurial opportunities [82] (p. 525). Implementing the first two phases of the sustainable entrepreneurial process in the instructional design also establishes a real-world context. This real-world relevance is further intensified by integrating sustainable entrepreneurial role models [48]. Students can be inspired and motivated by these role models, who introduce new mindsets as sustainability experts [83]. Role models have already been successfully implemented as a pedagogical instrument in SEE at the university level. However, there is a lack of transfer to other educational levels thus far.

The present work employs an empirically explorative research design to investigate the following research question: do sustainable entrepreneurial role models as a pedagogical instrument in sustainable entrepreneurship education (SEE) impact opportunity recognition for sustainable development among secondary school students?

4.1. Influence of Sustainable Entrepreneurial Role Models on the Quality of Opportunity Ideas

The content analysis of the opportunity ideas ($n = 35$) generated by secondary school students ($N = 136$) revealed that both the intervention and comparison group were able to recognize opportunity ideas for sustainable development. Each proposed idea integrated at least one sustainable business model archetype, demonstrating a foundational level of sustainability consideration in identified opportunity ideas for product, process, and service innovations. The results show that every identified opportunity idea for sustainable development addressed a minimum of six SDGs, reflecting a potentially substantial contribution of the envisioned product and service innovations toward sustainable development.

The subsequent analysis of group differences between SEE settings with sustainable entrepreneurial role models and settings without role models provides initial information about the effect of the pedagogical instrument. So far, sustainable entrepreneurial role models have been applied in SEE settings at tertiary educational institutions [48]. However, no comparative or control group was applied then, which would allow for a causal inference about the students’ improved performance. The results of the present exploratory study indicate that incorporating sustainable entrepreneurial role models as a pedagogical instrument might significantly differentiate the quality (innovativeness and usefulness) of identified opportunity ideas, respectively, opportunity recognition for sustainable development by students in the intervention group from the comparison group.

4.1.1. Sustainable Entrepreneurial Role Models Influence on Usefulness

The intervention group’s interaction with role models is associated with higher average usefulness scores for the identified opportunity ideas. This implies that students who interacted with sustainable entrepreneurial role models identified opportunity ideas for sustainable product or service innovations that could potentially contribute to achieving more SDGs and, therefore, could be considered higher quality. This indicates the potential positive impact of role models on students’ capacity to generate opportunity ideas that are more aligned with the SDGs and perceived as more beneficial for sustainable development. In contrast, the comparison group’s ideas did not achieve high usefulness scores, suggesting

that the absence of support from sustainable entrepreneurial role models might limit the perceived impact of their opportunity ideas for sustainable development.

The significant difference between the two groups indicates that incorporating sustainable entrepreneurial role models into SEE programs at the secondary level could positively impact the identification of more useful opportunity ideas and, therefore, the recognition of more impactful business opportunities for sustainable development.

4.1.2. Sustainable Entrepreneurial Role Models Influence on Innovativeness

The intervention group's interaction with role models is associated with higher average innovativeness scores for the identified opportunity ideas. The results of the exploratory study design indicate that interaction with sustainable entrepreneurial role models enables students to identify opportunity ideas for product, process, and service innovations in more diverse sustainability orientations. The support of role models might have contributed to the student's ability to integrate a greater variety of sustainable business model archetypes. The opportunity ideas of students in the intervention group could potentially impact not just one but multiple sustainability issues and, therefore, could be considered higher quality. Without the support of role models, the comparison group generated ideas that were, on average, less innovative, which may indicate a more conventional approach to problem-solving in the context of sustainability.

The significant difference between the two groups indicates that incorporating sustainable entrepreneurial role models into SEE programs at the secondary level could positively impact the identification of more innovative opportunity ideas and, therefore, the recognition of more impactful business opportunities for sustainable development.

4.2. Influence of Sustainable Entrepreneurial Role Models on Individual Factors

The higher quality (usefulness and innovativeness) of the opportunity ideas for sustainable development in the intervention group may be attributed to the influence of sustainable entrepreneurial role models on factors determining individual differences in opportunity recognition for sustainable development. The conceptual model from Patzelt and Shepherd [14] identifies two central factors—motivation and knowledge—influencing whether an individual recognizes a sustainable business opportunity. Considering this framework, the subsequent discussion will address the potential influence of sustainable entrepreneurial role models on these two factors.

4.2.1. Sustainable Entrepreneurial Role Models Influence on Knowledge

In the initial phase of the sustainable entrepreneurial process, knowledge of sustainability issues, relevant economic sectors, and entrepreneurial alertness are crucial for transforming sustainability problems into sustainable business opportunities [27]. However, the international PISA assessments indicate that over 40% of students lack familiarity with entrepreneurship [84] and are not confident in explaining economically driven global sustainable development issues [85]. The assistance of experienced individuals who offer opportunity-related information increases the likelihood of less experienced persons identifying business opportunities [17]. As experienced individuals, sustainable entrepreneurial role models may increase opportunity recognition for sustainable development within the intervention group by answering opportunity-related questions during the mentoring.

Despite the majority of students reporting self-efficacy in discussing or explaining social and environmental sustainability issues, two-thirds of students struggle with cognitive tasks on sustainable development, indicating a gap between knowledge and its application [85]. Addressing the SDGs is a complex challenge that necessitates balancing conflicting priorities and leveraging synergies against uncertainty about long-term outcomes [86]. Individuals with careers in sustainability can equip future sustainability professionals with insights on applying knowledge to manage these complex sustainability issues successfully [83]. By sharing information on identifying sustainability problems and entrepreneurial approaches to address these issues during mentoring sessions, sustainable

entrepreneurial role models can support the opportunity identification for sustainable development in the intervention group.

4.2.2. Sustainable Entrepreneurial Role Models Influence on Motivation

The PISA study results indicate that students are familiar with global threats such as climate change, poverty, or malnutrition but are not motivated to contribute to sustainable development through active actions [85]. Whether people act to reduce the threat depends on their belief in their ability to mitigate it [87] and on their conviction that their actions can make a difference [85]. Weis et al. [88] assume that the perceived complexity of global problems likely leads to the assessment that individuals can hardly contribute to solving these issues.

The motivational theory of role modeling, as proposed by Morgenroth et al. [31], offers an explanation for how role models might influence students' beliefs. This motivational theory is considered one of the most influential in role model research [89], examining how the perception of role model attributes, such as similarity, affects an individual's motivational processes [31]. According to Morgenroth et al. [31], role models serve as behavioral models, representations of what is possible, and sources of inspiration. Thereby, sustainable entrepreneurial role models in the intervention group might influence the personally perceived probability of success in a specific task and the desirability of achieving the goal, for instance, due to anticipated professional rewards. This, in turn, affects where goals are set and how vigorously they are pursued. Therefore, sustainable entrepreneurial role models potentially contribute to an improved opportunity recognition for sustainable development in the intervention group.

5. Limitations

Due to the exploratory design of the study, causal relationships between the use of sustainable entrepreneurial role models and opportunity recognition for sustainable development among secondary school students cannot be established. Further experimental studies are required to demonstrate the effectiveness of sustainable entrepreneurial role models in the SEE for the K-12 classroom and beyond. Groups of students mentored by conventional entrepreneurs or sustainability experts from non-governmental institutes can serve as control groups. Comparing the opportunity recognition for sustainable development between control and intervention groups can enhance the validity of the study's results.

The quality of ideas in this study was determined by analyzing the usefulness and innovativeness of opportunity ideas for sustainable development. However, Kier and McMullen [61] note that idea generation as a creative performance historically encompasses usefulness and novelty. The investigation of novelty was not feasible, as a measurement through determining the low frequency of individual ideas [90] could not be conducted within the small sample size ($n = 35$). The diversity of ideas was influenced by students' value-based selection of sustainability issues. Learners were not restricted in choosing a sustainability problem, for instance, through case descriptions (e.g., [21]).

An alternative analysis of novelty through expert raters was not conducted due to the lack of sustainability professionals with expertise across the broad spectrum of industries students considered in their opportunity ideas. Preliminary investigations suggest that the evaluation of business ideas by artificial intelligence (AI), in the form of chatbots, does not significantly differ from the ratings of human experts when accurately prompted [91]. Supporting or substituting expert ratings with AI applications could enable a novelty assessment despite resource constraints. These limitations can serve as a basis for designing future research endeavors, such as those outlined in the following section.

6. Further Research

The present study examines the impact of role models on students' accomplishments of the first two phases of the sustainable entrepreneurial process. Scientific monitoring of mentoring throughout the entire process, up to opportunity exploitation, could be feasible at the secondary level. For instance, through integrating science subjects in product development (e.g., [92]) and subsequent distribution in student-run businesses (e.g., [93]). Deeper engagement with one's opportunity idea for sustainable development and the experience of the entire sustainable entrepreneurial process could alter the sustainable entrepreneurship intention. The final implementation of developed product or service innovations through their direct distribution as part of a student-run business can be explained by first-person opportunity beliefs [14]. Investigating first-person opportunity beliefs can provide insights into whether students have recognized a sustainable opportunity idea for themselves.

Within the SEE program, during the discovery phase, students explored sustainability issues they encountered in their environment. Sustainable entrepreneurial role models supported students in developing solution ideas in the subsequent planning phase. According to Eller et al. [24], there is a stochastic relationship between the number of identified problems and solutions, as well as between solutions and sustainable opportunities. Future research could explore how sustainable entrepreneurial role models influence the outcomes of the process steps of opportunity recognition for sustainable development rather than just the result. The quantitative analysis of student outcomes from the process phases can provide insights into how integrating role models before the planning phase, in the discovery phase, affects the number of identified sustainability problems and, therefore, is advisable.

Students' previous experiences impact the outcomes of entrepreneurship education programs [45]. These prior experiences also shape the perceived quality of contacts and collaboration with entrepreneurial role models [45]. The perception is influenced by the experienced competence of the role models, their similarity to the role aspirants, and the attainability of their success [94]. Capturing the perceived quality of sustainable entrepreneurial role models against the backdrop of students' prior experiences can provide vital information to establish guidelines for structuring collaboration between students and role models and to provide criteria for selecting role models. Insights into the quality of the collaboration between students and sustainable entrepreneurial role models can be obtained through self-reporting methods or observing their interactions. The analysis of support and feedback conversations between learners and role models could be conducted through videography [95].

Students are more likely to be influenced by role models they perceive as similar to themselves [96]. Similarity is based on shared demographic characteristics, such as gender, or psychological characteristics, such as struggles [97]. Particularly when students doubt their abilities (e.g., to discover and exploit a sustainable business opportunity), perceived similarity with peers who have completed this task can positively influence self-efficacy and achievement [98,99]. Future research can clarify whether the role modeling of peers, such as those successfully leading a sustainable student enterprise, has a different effect on students' opportunity recognition for sustainable development. This could provide information enabling targeted adjustments to sustainable entrepreneurial education programs.

7. Conclusions

This study addresses the research and implementation gap of SEE for secondary education by developing a competence-oriented educational program, integrating sustainable entrepreneurial role models. The detailed description of the implementation of the discovery and planning phase, the initial stages of the sustainable entrepreneurial process, provides practitioners and researchers with guidance for further developing and applying SEE programs at secondary schools. The qualitative content analysis of opportunity ideas for sustainable development suggests that secondary school students can be successfully

fostered to recognize opportunities for sustainable development within SEE programs—a goal previously pursued mainly at the university level [21,24,30].

The results of the statistical group comparison between the settings with and without sustainable entrepreneurial role models show significant differences: Students in the intervention group scored higher in innovativeness (mean rank 23.71) and usefulness (mean rank 25.09) compared to those in the comparison group (innovativeness mean rank 12.61, usefulness mean rank 11.31). The differences between the two groups indicate that incorporating sustainable entrepreneurial role models into SEE programs at the secondary level could positively impact the identification of more useful and innovative opportunity ideas and, therefore, the recognition of more impactful business opportunities for sustainable development. The presence of sustainable entrepreneurs as role models and advisors in the initial phases of the sustainable entrepreneurial process could positively influence student motivation and knowledge acquisition.

The results suggest that incorporating sustainable entrepreneurial role models in SEE at the secondary level may significantly enhance students' opportunity recognition for sustainable development. Thus, the study offers insights into the design principles of a SEE, which may have the potential to contribute to the achievement of the United Nations' SDGs.

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Data Availability Statement: The data presented in this study are available upon request from the corresponding author. The data are not publicly available due to the ongoing study.

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Appendix A

Design of the discovery phase: In the discovery phase, sustainable entrepreneurs draw on their values and experiences to address sustainability problems or needs with an entrepreneurial solution [27]. Since not all sustainability issues can be addressed through entrepreneurial means, entrepreneurs leverage their entrepreneurial alertness to identify specific problems and needs that have the potential to be transformed into opportunities, analyze their sector-specific knowledge, and perform market research [27]. For the design of the educational program, this phase is implemented as described in Table A1.

Table A1. Description of the sustainable entrepreneurs' actions executed during the discovery phase and the transfer into the educational intervention.

Session	Sustainable Entrepreneurial Action	Educational Transfer
1.	The entrepreneurs identify environmental, social, and sustainability needs during the discovery phase [27]. Opportunity recognition is facilitated as entrepreneurs leverage their 'experience corridor' [100], reflecting upon experiences accumulated throughout their professional or personal lives [10]. Enhanced knowledge and the perception of threats increase an entrepreneur's likelihood of recognizing opportunities for sustainable development [14].	Educational videos present global sustainability challenges, particularly SDG 12 (responsible consumption and production) and SDG 13 (climate action). Following this, students reflect on their experiences with the local effects and causes of these sustainability issues.
	Entrepreneurs gather knowledge about business model innovation to apply the appropriate structure for their business opportunity in the subsequent planning phase [27].	Introduction of local, sustainable businesses as case studies for entrepreneurial solutions to sustainability issues. Students engage in an analysis of these enterprises based on sustainability criteria.
2.	Based on their values, entrepreneurs select a sustainability challenge that can be addressed through entrepreneurial activity [27].	Tasks encourage students to reflect on their values, interests, and strengths.
	Entrepreneurs recognize the interconnectedness of the economy with other systems in the domains of people, planet, and profit, enabling them to address the complexity of sustainability challenges [29,101].	Building upon the selected sustainability challenge, students are encouraged to analyze the groups of people associated with the sustainability issue. This includes, for example, persons who contribute to or are affected by the issue throughout the product life cycle.
	Entrepreneurs use their interpersonal skills to access resources within their networks to identify demands or resources of stakeholders and forecast trends to uncover opportunities [102], which only arise when a market need, available goods or services, and mechanisms to connect them coexist [103].	Students explore their social networks to identify persons affected by their sustainability problem or who possess expertise in this area through leisure or professional activities. The identified individuals are examined using investigative methods (e.g., interviews, observations) to gather information about the needs of possible customers or local supply options.

Design of the planning phase: During the planning phase, sustainable entrepreneurs develop business concepts considering economic, social, and environmental aspects (triple-bottom-line principle) [27]. The planning phase is not completed within the design of the educational program. The remaining tasks, along with the associated competences, could be the subject of future lessons. For instance, creating a triple-layered business model canvas [104] could be used to visualize the students' business model. For the design of the educational program, this phase is implemented as described in Table A2.

Table A2. Description of the sustainable entrepreneurs' actions executed during the planning phase and the transfer into the educational intervention.

Session	Sustainable Entrepreneurial Action	Educational Transfer
3.	During the planning phase, sustainable entrepreneurs develop a vision for their company [27].	Students define a vision shared between all work group members to guide them through the session.
	Divergent thinking among entrepreneurs significantly impacts venture growth by fostering innovative business ideas [105].	Creativity techniques stimulate divergent thinking, thereby promoting the generation of various ideas [106]. Students employ creativity techniques to develop innovative and useful solutions for their sustainability problem.
	Social skills—compromising or team collaboration—are essential for sustainable entrepreneurs [101].	The groups select one opportunity idea from many identified solutions by methodically evaluating the quality of the ideas against defined criteria [106]. The objective process is designed to facilitate compromise finding.
	Sustainable entrepreneurs use their communication skills during the planning phase to present the value of their product or service innovation to stakeholders, such as customers [27].	Students draw the identified opportunity idea to present their envisioned product or service innovation. In preparation for the presentation, further information about the opportunity idea is summarized in writing, including the functioning of the visualized product or service, potential consumers, distribution channels, the initial problem, and the group's vision statement. Each work group presents their opportunity idea to the class at the end of the session. The individualized feedback received by the audience provides chances for learning and improvement of the visualized business idea [107].

References

1. United Nations. *Transforming Our World: The 2030 Agenda for Sustainable Development*; United Nations: New York, NY, USA, 2015; pp. 1–39.
2. Miranda, J.J.; Scholz, I.; Agard, J.; Al-Ghanim, K.; Bobylev, S.N.; Dube, O.P.; Hathie, I.; Kanie, N.; Madise, N.J.; Malekpour, S.; et al. *Global Sustainable Development Report 2023: Times of Crisis, Times of Change: Science for Accelerating Transformations to Sustainable Development*; United Nations: New York, NY, USA, 2023; ISBN 978-92-102941-4.
3. Dean, T.J.; McMullen, J.S. Toward a Theory of Sustainable Entrepreneurship: Reducing Environmental Degradation through Entrepreneurial Action. *J. Bus. Ventur.* **2007**, *22*, 50–76. [\[CrossRef\]](#)
4. Farny, S.; Binder, J. Sustainable Entrepreneurship. In *World Encyclopedia of Entrepreneurship*; Dana, L.-P., Ed.; Edward Elgar Publishing: Cheltenham, UK, 2021; ISBN 978-1-83910-414-5.
5. Schaltegger, S.; Wagner, M. Sustainable Entrepreneurship and Sustainability Innovation: Categories and Interactions. *Bus. Strategy Environ.* **2011**, *20*, 222–237. [\[CrossRef\]](#)
6. Binder, J.K.; Belz, F.-M. Sustainable Entrepreneurship: What It Is. In *Handbook of Entrepreneurship and Sustainable Development Research*; Kyrö, P., Ed.; Research Handbooks in Business and Management; Edward Elgar Publishing: Cheltenham, UK; Northampton, MA, USA, 2015; pp. 30–70. ISBN 978-1-78347-994-8.
7. Cohen, B.; Winn, M.I. Market Imperfections, Opportunity and Sustainable Entrepreneurship. *J. Bus. Ventur.* **2007**, *22*, 29–49. [\[CrossRef\]](#)
8. Hockerts, K.; Wüstenhagen, R. Greening Goliaths versus Emerging Davids—Theorizing about the Role of Incumbents and New Entrants in Sustainable Entrepreneurship. *J. Bus. Ventur.* **2010**, *25*, 481–492. [\[CrossRef\]](#)
9. Pacheco, D.F.; Dean, T.J.; Payne, D.S. Escaping the Green Prison: Entrepreneurship and the Creation of Opportunities for Sustainable Development. *J. Bus. Ventur.* **2010**, *25*, 464–480. [\[CrossRef\]](#)
10. Belz, F.M.; Binder, J.K. Sustainable Entrepreneurship: A Convergent Process Model. *Bus. Strategy Environ.* **2017**, *26*, 1–17. [\[CrossRef\]](#)
11. Horne, J.; Recker, M.; Michelfelder, I.; Jay, J.; Kratzer, J. Exploring Entrepreneurship Related to the Sustainable Development Goals—Mapping New Venture Activities with Semi-Automated Content Analysis. *J. Clean. Prod.* **2020**, *242*, 118052. [\[CrossRef\]](#)
12. George, N.M.; Parida, V.; Lahti, T.; Wincent, J. A Systematic Literature Review of Entrepreneurial Opportunity Recognition: Insights on Influencing Factors. *Int. Entrep. Manag. J.* **2016**, *12*, 309–350. [\[CrossRef\]](#)
13. McMullen, J.S.; Shepherd, D.A. Entrepreneurial Action and the Role of Uncertainty in the Theory of the Entrepreneur. *Acad. Manag. Rev.* **2006**, *31*, 132–152. [\[CrossRef\]](#)
14. Patzelt, H.; Shepherd, D.A. Recognizing Opportunities for Sustainable Development. *Entrep. Theory Pract.* **2011**, *35*, 631–652. [\[CrossRef\]](#)
15. Cannatelli, B.; Ferri, L.M.; Pedrini, M.; Molteni, M. Recognizing First-Person Opportunities for Sustainable Development. In *Handbook of Entrepreneurship and Sustainable Development Research*; Kyrö, P., Ed.; Edward Elgar Publishing: Cheltenham, UK, 2015; pp. 197–208. ISBN 978-1-84980-824-8.
16. Ryan, R.M.; Deci, E.L. Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being. *Am. Psychol.* **2000**, *55*, 68–78. [\[CrossRef\]](#)
17. Ozgen, E.; Baron, R.A. Social Sources of Information in Opportunity Recognition: Effects of Mentors, Industry Networks, and Professional Forums. *J. Bus. Ventur.* **2007**, *22*, 174–192. [\[CrossRef\]](#)
18. Shane, S. Prior Knowledge and the Discovery of Entrepreneurial Opportunities. *Organ. Sci.* **2000**, *11*, 448–469. [\[CrossRef\]](#)
19. Choongo, P.; Van Burg, E.; Paas, L.; Masurel, E. Factors Influencing the Identification of Sustainable Opportunities by SMEs: Empirical Evidence from Zambia. *Sustainability* **2016**, *8*, 81. [\[CrossRef\]](#)
20. Hanohov, R.; Baldacchino, L. Opportunity Recognition in Sustainable Entrepreneurship: An Exploratory Study. *Int. J. Entrep. Behav. Res.* **2018**, *24*, 333–358. [\[CrossRef\]](#)
21. Ploum, L.; Blok, V.; Lans, T.; Omta, O. Exploring the Relation between Individual Moral Antecedents and Entrepreneurial Opportunity Recognition for Sustainable Development. *J. Clean. Prod.* **2018**, *172*, 1582–1591. [\[CrossRef\]](#)
22. Shepherd, D.A.; Patzelt, H.; Baron, R.A. “I Care about Nature, but . . .”: Disengaging Values in Assessing Opportunities That Cause Harm. *Acad. Manag. J.* **2013**, *56*, 1251–1273. [\[CrossRef\]](#)
23. Ploum, L.; Blok, V.; Lans, T.; Omta, O. Educating for Self-Interest or -Transcendence? An Empirical Approach to Investigating the Role of Moral Competencies in Opportunity Recognition for Sustainable Development: Business Ethics: A European Review. *Bus. Ethics A Eur. Rev.* **2019**, *28*, 243–260. [\[CrossRef\]](#)
24. Eller, F.J.; Gielnik, M.M.; Wimmer, H.; Thölke, C.; Holzapfel, S.; Tegtmeier, S.; Halberstadt, J. Identifying Business Opportunities for Sustainable Development: Longitudinal and Experimental Evidence Contributing to the Field of Sustainable Entrepreneurship. *Bus. Strategy Environ.* **2020**, *29*, 1387–1403. [\[CrossRef\]](#)
25. Sarma, S.; Attaran, S.; Attaran, M. Sustainable Entrepreneurship: Factors Influencing Opportunity Recognition and Exploitation. *Int. J. Entrep. Innov.* **2022**, *25*, 56–69. [\[CrossRef\]](#)
26. Schadenberg, D.; Folmer, E.; Long, T.B. Sustainable Entrepreneurship Education. In *De Gruyter Handbook of Sustainable Entrepreneurship Research*; De Jong, G., Faber, N., Folmer, E., Long, T., Ünal, B., Eds.; De Gruyter: Berlin, Germany, 2023; pp. 63–82. ISBN 978-3-11-075615-9.

27. Foucrier, T.; Wiek, A. A Process-Oriented Framework of Competencies for Sustainability Entrepreneurship. *Sustainability* **2019**, *11*, 7250. [[CrossRef](#)]
28. Klapper, R.G.; Fayolle, A. A Transformational Learning Framework for Sustainable Entrepreneurship Education: The Power of Paulo Freire's Educational Model. *Int. J. Manag. Educ.* **2023**, *21*, 100729. [[CrossRef](#)]
29. Lans, T.; Blok, V.; Wesselink, R. Learning Apart and Together: Towards an Integrated Competence Framework for Sustainable Entrepreneurship in Higher Education. *J. Clean. Prod.* **2014**, *62*, 37–47. [[CrossRef](#)]
30. Baggen, Y.; Kampen, J.K.; Naia, A.; Biemans, H.J.A.; Lans, T.; Mulder, M. Development and Application of the Opportunity Identification Competence Assessment Test (OICAT) in Higher Education. *Innov. Educ. Teach. Int.* **2017**, *55*, 735–745. [[CrossRef](#)]
31. Morgenroth, T.; Ryan, M.K.; Peters, K. The Motivational Theory of Role Modeling: How Role Models Influence Role Aspirants' Goals. *Rev. Gen. Psychol.* **2015**, *19*, 465–483. [[CrossRef](#)]
32. Fellnhöfer, K. Entrepreneurship Education Revisited: Perceived Entrepreneurial Role Models Increase Perceived Behavioural Control. *Int. J. Learn. Chang.* **2017**, *9*, 260. [[CrossRef](#)] [[PubMed](#)]
33. Stern, M.J.; Frenslley, B.T.; Powell, R.B.; Ardoin, N.M. What Difference Do Role Models Make? *Investigating Outcomes at a Residential Environmental Education Center. Environ. Educ. Res.* **2018**, *24*, 818–830. [[CrossRef](#)]
34. Ajzen, I. *Attitudes, Personality and Behavior*; Dorsey Press: Chicago, IL, USA, 1988; ISBN 978-0-335-15342-8.
35. Bandura, A. *Social Foundations of Thought and Action: A Social Cognitive Theory*; Prentice-Hall Series in Social Learning Theory; Prentice-Hall: Englewood Cliffs, NJ, USA, 1986; ISBN 978-0-13-815614-5.
36. Arnold, H.E.; Cohen, F.G.; Warner, A. Youth and Environmental Action: Perspectives of Young Environmental Leaders on Their Formative Influences. *J. Environ. Educ.* **2009**, *40*, 27–36. [[CrossRef](#)]
37. Schelly, C.; Cross, J.E.; Franzen, W.; Hall, P.; Reeve, S. How to Go Green: Creating a Conservation Culture in a Public High School through Education, Modeling, and Communication. *J. Environ. Educ.* **2012**, *43*, 143–161. [[CrossRef](#)]
38. Chawla, L. Life Paths into Effective Environmental Action. *J. Environ. Educ.* **1999**, *31*, 15–26. [[CrossRef](#)]
39. Chawla, L. Childhood Experiences Associated with Care for the Natural World: A Theoretical Framework for Empirical Results. *Child. Youth Environ.* **2007**, *17*, 144–170. [[CrossRef](#)]
40. Amofah, K.; Saladrighes, R. Impact of Attitude towards Entrepreneurship Education and Role Models on Entrepreneurial Intention. *J. Innov. Entrep.* **2022**, *11*, 36. [[CrossRef](#)]
41. BarNir, A.; Watson, W.E.; Hutchins, H.M. Mediation and Moderated Mediation in the Relationship among Role Models, Self-Efficacy, Entrepreneurial Career Intention, and Gender. *J. Appl. Soc. Psychol.* **2011**, *41*, 270–297. [[CrossRef](#)]
42. Directorate-General for Enterprise and Industry. *European Competitiveness Report 2008*; European Commission: France, Paris, 2009; ISBN 978-92-79-09773-7.
43. Blenker, P.; Christensen, P.R. Hunting the Entrepreneurial Expertise: Entrepreneurs in Education. In *Handbook of Research in Entrepreneurship Education, Volume 3*; Fayolle, A., Ed.; Edward Elgar Publishing: Cheltenham, UK, 2010; ISBN 978-1-84980-668-8.
44. Katz, J.A. Managing Practitioners in the Entrepreneurship Class. *Simul. Gaming* **1995**, *26*, 361–375. [[CrossRef](#)]
45. Brüne, N.; Lutz, E. The Effect of Entrepreneurship Education in Schools on Entrepreneurial Outcomes: A Systematic Review. *Manag. Rev. Q.* **2020**, *70*, 275–305. [[CrossRef](#)]
46. Lin, J.; Qin, J.; Lyons, T.; Sekiguchi, T. Planning and Evaluating Youth Entrepreneurship Education Programs in Schools: A Systematic Literature Review. *Entrep. Educ.* **2023**, *6*, 25–44. [[CrossRef](#)]
47. Vuorio, A.M.; Puimalainen, K.; Fellnhöfer, K. Drivers of Entrepreneurial Intentions in Sustainable Entrepreneurship. *Int. J. Entrep. Behav. Res.* **2018**, *24*, 359–381. [[CrossRef](#)]
48. Bernhardt, J.; Schaad, G.; Boman, J.; Ambros, M.; Činčera, J.; Biberhofer, P. *Joint CASE Report on Cooperation between Higher Education Institutions and Companies and Evaluation of Regional Pilots*; The European Commission: Brussels, Belgium, 2017; pp. 1–180.
49. Diepolder, C.S.; Weitzel, H.; Huwer, J. Competence Frameworks of Sustainable Entrepreneurship: A Systematic Review. *Sustainability* **2021**, *13*, 13734. [[CrossRef](#)]
50. Wilhelm, S.; Förster, R.; Zimmermann, A. Implementing Competence Orientation: Towards Constructively Aligned Education for Sustainable Development in University-Level Teaching-And-Learning. *Sustainability* **2019**, *11*, 1891. [[CrossRef](#)]
51. Bormans, J.; Privitera, M.; Bogen, E.; Cooney, T. *European Startup Monitor 2019/2020*; European Commission: Graz, Austria, 2019.
52. Davidsson, P. Entrepreneurial Opportunities and the Entrepreneurship Nexus: A Re-Conceptualization. *J. Bus. Ventur.* **2015**, *30*, 674–695. [[CrossRef](#)]
53. Vogel, P. From Venture Idea to Venture Opportunity. *Entrep. Theory Pract.* **2017**, *41*, 943–971. [[CrossRef](#)]
54. Wood, M.S.; Williams, D.W.; Grégoire, D.A. The Road to Riches? A Model of the Cognitive Processes and Inflection Points Underpinning Entrepreneurial Action. In *Advances in Entrepreneurship, Firm Emergence and Growth*; Corbett, A.C., Katz, J.A., Eds.; Emerald Group Publishing Limited: Leeds, UK, 2012; Volume 14, pp. 207–252. ISBN 978-1-78052-900-4.
55. Baggen, Y.; Mainert, J.; Lans, T.; Biemans, H.J.A.; Greiff, S.; Mulder, M. Linking Complex Problem Solving to Opportunity Identification Competence within the Context of Entrepreneurship. *Int. J. Lifelong Educ.* **2015**, *34*, 412–429. [[CrossRef](#)]
56. Davidsson, P.; Honig, B. The Role of Social and Human Capital among Nascent Entrepreneurs. *J. Bus. Ventur.* **2003**, *18*, 301–331. [[CrossRef](#)]
57. Guilford, J.P. *The Nature of Human Intelligence*; McGraw-Hill: New York, NY, USA, 1967; ISBN 978-0-07-205135-3.
58. Bocken, N.M.P.; Short, S.W.; Rana, P.; Evans, S. A Literature and Practice Review to Develop Sustainable Business Model Archetypes. *J. Clean. Prod.* **2014**, *65*, 42–56. [[CrossRef](#)]

59. Gielnik, M.M.; Frese, M.; Kahara-Kawuki, A.; Wasswa Katono, I.; Kyejjusa, S.; Ngoma, M.; Munene, J.; Namatovu-Dawa, R.; Nansubuga, F.; Orobia, L.; et al. Action and Action-Regulation in Entrepreneurship: Evaluating a Student Training for Promoting Entrepreneurship. *Acad. Manag. Learn. Educ.* **2015**, *14*, 69–94. [\[CrossRef\]](#)
60. Gielnik, M.M.; Krämer, A.-C.; Kappel, B.; Frese, M. Antecedents of Business Opportunity Identification and Innovation: Investigating the Interplay of Information Processing and Information Acquisition: Business Opportunity Identification. *Appl. Psychol.* **2014**, *63*, 344–381. [\[CrossRef\]](#)
61. Kier, A.S.; McMullen, J.S. Entrepreneurial Imaginativeness in New Venture Ideation. *Acad. Manag. J.* **2018**, *61*, 2265–2295. [\[CrossRef\]](#)
62. Dahl, D.W.; Chattopadhyay, A.; Gorn, G.J. The Importance of Visualisation in Concept Design. *Des. Stud.* **2001**, *22*, 5–26. [\[CrossRef\]](#)
63. Poetz, M.K.; Schreier, M. The Value of Crowdsourcing: Can Users Really Compete with Professionals in Generating New Product Ideas? *J. Product. Innov. Manag.* **2012**, *29*, 245–256. [\[CrossRef\]](#)
64. Zhao, M.; Hoeffler, S.; Dahl, D.W. Imagination Difficulty and New Product Evaluation. *J. Product. Innov. Manag.* **2012**, *29*, 76–90. [\[CrossRef\]](#)
65. Global Reporting Initiative. The Global Leader for Impact Reporting. Available online: <https://www.globalreporting.org> (accessed on 1 December 2023).
66. Palau-Pinyana, E.; Llach, J.; Bagur-Femenías, L. Mapping Enablers for SDG Implementation in the Private Sector: A Systematic Literature Review and Research Agenda. *Manag. Rev. Q.* **2023**, *73*, 1–30. [\[CrossRef\]](#)
67. Ali, S.; Hussain, T.; Zhang, G.; Nurunnabi, M.; Li, B. The Implementation of Sustainable Development Goals in “BRICS” Countries. *Sustainability* **2018**, *10*, 2513. [\[CrossRef\]](#)
68. Gunawan, J.; Permatasari, P.; Tilt, C. Sustainable Development Goal Disclosures: Do They Support Responsible Consumption and Production? *J. Clean. Prod.* **2020**, *246*, 118989. [\[CrossRef\]](#)
69. Frey, M.; Sabbatino, A. The Role of the Private Sector in Global Sustainable Development: The UN 2030 Agenda. In *Corporate Responsibility and Digital Communities*; Grigore, G., Stancu, A., McQueen, D., Eds.; Palgrave Studies in Governance, Leadership and Responsibility; Springer International Publishing: Cham, Switzerland, 2018; pp. 187–204. ISBN 978-3-319-63479-1.
70. Geissdoerfer, M.; Vladimirova, D.; Evans, S. Sustainable Business Model Innovation: A Review. *J. Clean. Prod.* **2018**, *198*, 401–416. [\[CrossRef\]](#)
71. Zott, C.; Amit, R.; Massa, L. The Business Model: Recent Developments and Future Research. *J. Manag.* **2011**, *37*, 1019–1042. [\[CrossRef\]](#)
72. VERBI Software MAXQDA 2022; Publisher: Berlin, Germany, 2021.
73. Mayring, P. *Qualitative Inhaltsanalyse: Grundlagen und Techniken*; 13, überarbeitete Auflage; Beltz: Weinheim, Germany; Basel, Switzerland, 2022; ISBN 978-3-407-25898-4.
74. Lüdeke-Freund, F.; Massa, L.; Bocken, N.; Brent, A.; Musango, J. *Business Models for Shared Value. Main Report*; Network for Business Sustainability South Afrika: Cape Town, South Africa, 2016; ISBN 978-0-620-70726-8.
75. Ritala, P.; Huotari, P.; Bocken, N.; Albareda, L.; Puumalainen, K. Sustainable Business Model Adoption among S&P 500 Firms: A Longitudinal Content Analysis Study. *J. Clean. Prod.* **2018**, *170*, 216–226. [\[CrossRef\]](#)
76. Döring, N.; Bortz, J. *Forschungsmethoden und Evaluation in den Sozial- und Humanwissenschaften*; Springer-Lehrbuch; Springer: Berlin/Heidelberg, Germany, 2016; ISBN 978-3-642-41088-8.
77. Landis, J.R.; Koch, G.G. The Measurement of Observer Agreement for Categorical Data. *Biometrics* **1977**, *33*, 159. [\[CrossRef\]](#)
78. IBM Corp. *IBM SPSS Statistics for Macintosh, Version 29.0*; IBM Corp.: Armonk, NY, USA, 2022.
79. Shapiro, S.S.; Wilk, M.B. An Analysis of Variance Test for Normality (Complete Samples). *Biometrika* **1965**, *52*, 591. [\[CrossRef\]](#)
80. Mann, H.B.; Whitney, D.R. On a Test of Whether One of Two Random Variables Is Stochastically Larger than the Other. *Ann. Math. Statist.* **1947**, *18*, 50–60. [\[CrossRef\]](#)
81. Lindner, J. Entrepreneurship Education for a Sustainable Future. *Discourse Commun. Sustain. Educ.* **2018**, *9*, 115–127. [\[CrossRef\]](#)
82. Kuckertz, A.; Wagner, M. The Influence of Sustainability Orientation on Entrepreneurial Intentions—Investigating the Role of Business Experience. *J. Bus. Ventur.* **2010**, *25*, 524–539. [\[CrossRef\]](#)
83. Cavallaro, M.C.; Boucher, M.; Steelman, T.A. Sustainability Champions: Role Models in Sustainability Graduate Education. In *Handbook of Theory and Practice of Sustainable Development in Higher Education*; Leal Filho, W., Mifsud, M., Shiel, C., Pretorius, R., Eds.; World Sustainability Series; Springer International Publishing: Cham, Switzerland, 2017; pp. 329–342. ISBN 978-3-319-47894-4.
84. OECD. *PISA 2018 Results (Volume IV): Are Students Smart about Money?* OECD: Paris, France, 2020; ISBN 978-92-64-45285-5.
85. OECD. *PISA 2018 Results (Volume VI): Are Students Ready to Thrive in an Interconnected World?* OECD: Paris, France, 2020; ISBN 978-92-64-27174-6.
86. Pradhan, P.; Costa, L.; Rybski, D.; Lucht, W.; Kropp, J.P. A Systematic Study of Sustainable Development Goal (SDG) Interactions. *Earth’s Future* **2017**, *5*, 1169–1179. [\[CrossRef\]](#)
87. Stern, P.C. New Environmental Theories: Toward a Coherent Theory of Environmentally Significant Behavior. *J. Soc. Issues* **2000**, *56*, 407–424. [\[CrossRef\]](#)
88. Weis, M.; Reiss, K.; Mang, J.; Schiepe-Tiska, A.; Diedrich, J.; Roczen, N.; Jude, N. *Global Competence in PISA 2018. Einstellungen von Fünfzehnjährigen in Deutschland zu Globalen und Interkulturellen Themen*; Waxmann Verlag GmbH: Münster, Germany, 2020; ISBN 978-3-8309-4300-6.

89. Ahn, J.N.; Hu, D.; Vega, M. “Do as I Do, Not as I Say”: Using Social Learning Theory to Unpack the Impact of Role Models on Students’ Outcomes in Education. *Soc. Personal. Psychol. Compass* **2020**, *14*, 1–12. [CrossRef]
90. Plucker, J.A.; Qian, M.; Wang, S. Is Originality in the Eye of the Beholder? *Comparison of Scoring Techniques in the Assessment of Divergent Thinking*. *J. Creat. Behav.* **2011**, *45*, 1–22. [CrossRef]
91. Meijer, B. A Comparative Analysis of Human and A.I. Feedback on Business Idea Evaluation. Bachelor’s Thesis, University of Twente, Enschede, The Netherlands, 2023.
92. Gilje, Ø.; Erstad, O. Authenticity, Agency and Enterprise Education Studying Learning in and out of School. *Int. J. Educ. Res.* **2017**, *84*, 58–67. [CrossRef]
93. Bundesministerium für Wirtschaft und Klimaschutz StartGreen@School. Available online: <https://www.unternehmergeist-macht-schule.de/DE/Initiativen/StartGreen-at-School/steckbrief.html> (accessed on 1 December 2023).
94. Bandura, A.; Walters, R.H. *Social Learning and Personality Development*, 1st ed.; Holt Rinehart and Winston: New York, NY, USA, 1963.
95. Atar, C.; Seedhouse, P. A Conversation-Analytic Perspective on the Organization of Teacher-Led Clarification and Its Implications for L2 Teacher Training. *Int. J. Instr.* **2018**, *11*, 145–166. [CrossRef]
96. Schunk, D.H.; Usher, E.L. Social Cognitive Theory and Motivation. In *The Oxford Handbook of Human Motivation*; Ryan, R.M., Ed.; Oxford University Press: Oxford, UK, 2019; pp. 9–26. ISBN 978-0-19-066645-3.
97. Gladstone, J.R.; Cimpian, A. Which Role Models Are Effective for Which Students? *A Systematic Review and Four Recommendations for Maximizing the Effectiveness of Role Models in STEM*. *Int. J. STEM Educ.* **2021**, *8*, 59. [CrossRef]
98. Schunk, D.H.; DiBenedetto, M.K. Motivation and Social Cognitive Theory. *Contemp. Educ. Psychol.* **2020**, *60*, 101832. [CrossRef]
99. Schunk, D.H.; DiBenedetto, M.K. Self-Efficacy Theory in Education. In *Handbook of Motivation at School*; Wentzel, K.R., Miele, D.B., Eds.; Routledge: Abingdon, UK, 2016; p. 21. ISBN 978-1-317-68126-7.
100. Corner, P.D.; Ho, M. How Opportunities Develop in Social Entrepreneurship. *Entrep. Theory Pract.* **2010**, *34*, 635–659. [CrossRef]
101. Biberhofer, P.; Lintner, C.; Bernhardt, J.; Rieckmann, M. Facilitating Work Performance of Sustainability-Driven Entrepreneurs through Higher Education: The Relevance of Competencies, Values, Worldviews and Opportunities. *Int. J. Entrep. Innov.* **2019**, *20*, 21–38. [CrossRef]
102. Venkataraman, S.; Sarasvathy, S.D.; Dew, N.; Forster, W.R. Reflections on the 2010 AMR Decade Award: Whither the Promise? *Moving Forward with Entrepreneurship As a Science of the Artificial*. *Acad. Manag. Rev.* **2012**, *37*, 21–33. [CrossRef]
103. Bernhardt, J.; Elsen, S.; Lintner, C.; Biberhofer, P.; Rammel, C.; Schmelz, D.; Ambros, M.; Rieckmann, M.; Bockwoldt, L.; Cincera, J.; et al. *CASE Needs Analysis. Summary. Findings on Competencies for Sustainability-Driven Entrepreneurship. Based on Interviews with Partners from Sustainability-Driven Enterprises and Universities*; Free University of Bolzano, Terra Institute: Bolzano, Italy, 2015; pp. 1–28.
104. Joyce, A.; Paquin, R.L. The Triple Layered Business Model Canvas: A Tool to Design more Sustainable Business Models. *J. Clean. Prod.* **2016**, *135*, 1474–1486. [CrossRef]
105. Gielnik, M.M.; Frese, M.; Graf, J.M.; Kampschulte, A. Creativity in the Opportunity Identification Process and the Moderating Effect of Diversity of Information. *J. Bus. Ventur.* **2012**, *27*, 559–576. [CrossRef]
106. Meinel, M.; Voigt, K.-I. What Do We Really Know about Creativity Techniques? A Review of the Empirical Literature. In *Series on Technology Management*; World Scientific (Europe): London, UK, 2017; Volume 27, pp. 181–203. ISBN 978-1-78634-200-3.
107. Blank, S.; Dorf, R. *The Startup Owner’s Manual. 1: The Step-by-Step Guide for Building a Great Company*, 1st ed.; K&S Ranch: Pescadero, CA, USA, 2012; ISBN 978-0-9849993-0-9.

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