

Coaching Concept to Improve the Sustainability Impact of Students' Startup Ideas in an Early Stage



Philipp Preiss, Katja Puteanus-Birkenbach, and Claus Lang-Koetz

Abstract As part of entrepreneurship education, since 2018 the “Startup Summer Camp” with a focus on “Sustainable Innovation” is offered at Pforzheim University. This Startup Summer Camp is designed to enable students to develop a sustainable oriented business model within 6 days. Hence, lectures and impulses on the goals of sustainable development are given. Methods for sustainability impact assessment are taught and the students are then guided through applying them on a specific innovation idea. These elements are part of the coaching concept developed.

This chapter describes the coaching concept and presents the results of a survey regarding the effectiveness of coaching on sustainability aspects. Therefore, the following two research questions are to be answered within this study:

- How aware are the students of sustainability issues and can their level of knowledge regarding sustainability topics be increased with the coaching?
- Are the students able to design their startup idea in a more sustainable way and/or estimate the level of the impact on sustainability?

The results of the survey show that within a very compact coaching session, an important and applicable understanding of the complexity and urgency of sustainable development can be created and applied to an innovation idea.

Keywords Entrepreneurship education · Startup · Sustainability

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1 Introduction

Entrepreneurship is primarily known for achieving economic benefits. The term entrepreneurship originally comes from the French word “entreprendre,” which means “to undertake something” or “to take into one’s own hands” (Fueglistaller et al., 2016). The “megatrend of sustainability” (Zukunftsinstitut, 2018), in terms of environmental and social aspects as pressing issues affecting the current global system, points out that entrepreneurship should not only be based on the creation of economic wealth. This has led to the emergence of the concept of “sustainable entrepreneurship,” which has gained a lot of attention in recent years (Terán-Yépez et al., 2020).

Evaluating and selecting business or innovation ideas is an important part of startup processes. In addition to traditional aspects such as implantation effort and market attractiveness, the potential impact on different aspects, especially environmental aspects such as climate change or biodiversity loss, but also social aspects such as impacts on jobs and health, should be considered at an early stage. Hence, the Green Startup Monitor 2022 (Fichter & Olteanu, 2022) illustrates the importance and potential of green startups. *“Achieving a positive social or environmental impact is important to more than three quarters of startups in Germany. Just under a third are already making targeted and active contributions to the 17 Sustainable Development Goals (SDGs) of the United Nations. Green start-ups now form a significant part of the start-up scene and innovation activity in Germany.”* These concerns are gaining attention in the context of sustainable development and the United Nations Sustainable Development Goals (SDGs). Startups are a key driver of change in the economy (Fichter & Olteanu, 2021). They can help to implement the politically set sustainability goals. The 17 SDGs (EC, 2017) are to be achieved by 2030. Technological progress opens up new opportunities. At the same time, our experience shows that the mega-trend of sustainability motivates many students to act.

In this context, connecting sustainable development and entrepreneurship education plays an important role. This is also shown in the literature: the importance of sustainability awareness is mentioned (Hsu & Pivec, 2021) and adding sustainability to entrepreneurship education has been called for (Amatucci et al., 2013). There seem to be links between sustainability education and entrepreneurs’ attitudes (Lourenço et al., 2013) and in general, the importance of training in sustainable entrepreneurship is mentioned (Kummitha & Kummitha, 2021). In a European research project, training units for green venturing were developed, which can help students solve innovation challenges (Hjelm et al., 2022).

However, the question is how sustainability issues can be integrated into existing entrepreneurship education formats and what impact can be achieved. Hence, the following two research questions were addressed within our study:

- How aware are the students of sustainability issues and can their level of knowledge regarding sustainability topics be increased with the coaching?
- Are the students able to design their startup idea in a more sustainable way and/or estimate the level of the impact on sustainability?

These questions are addressed in a specific entrepreneurship education format, the so-called “Startup Summer Camp Sustainable Innovation” (cf. Preiss et al., 2022), which was offered in 2021 for the fourth time in cooperation with the “GründerWERK—Centre for Entrepreneurship at Pforzheim University” and the Institute for Industrial Ecology (INEC) at Pforzheim University.

The term “Sustainable Innovation” is used because not only economic success is the aim of the innovation but also ecological and social aspects are considered. To find a unique definition of “Sustainable Innovation” is difficult. A reason may be the fact that researchers from many different disciplines have picked up this and similar topics (Boons & Lüdeke-Freund, 2013). However, for example, Tello and Yoon (2008) defined sustainable innovation as *“the development of new products, processes, services and technologies that contribute to the development and well-being of human needs and institutions while respecting natural resources and regeneration capacities.”*

Our coaching concept was developed to enhance conventional entrepreneurship education formats from a sustainability perspective. This is demonstrated in the summer camp sustainable innovation, which has been held at Pforzheim University every September since 2018. The summer camp is intended to enable students to develop a business model within a 6 days full-time course (from 9 am to 6 pm). For the students, the objective is to be enabled to create a more sustainable startup idea by conducting an approximately eight-hour training session on the topic of creating a sustainable startup idea within this week. Hence, the students did not work on the technological aspects of their innovations in depth. The startup ideas have been relatively pre-mature in the past. However, if more mature startup ideas come along, we are also prepared to provide input, e.g., from the staff at Pforzheim University.

The aim of the impact evaluation described in this chapter is to evaluate the effectiveness of the sustainability coaching concept, to reconsider the design of the concept, and to subsequently improve the sustainable entrepreneur education measures.

2 Coaching Concept

The core objective of the summer camp is that students should be able to use the “Design Thinking” method (Ueberschick et al., 2015) to design a business idea and a business model for a business project.

The schedule for the whole week is illustrated in Fig. 1. It starts at 9 am in the morning and ends at 6 pm in the evening with additional “after-work events” such as a founder talk or a keynote on sustainable art, etc.

At the end of the course, the students should be able to design a business model correctly, write it down in a “Business Model Canvas” (Osterwalder & Pigneur, 2011) and present it professionally in a team in front of a jury of experts. This gives the students insights into various concepts and tools.



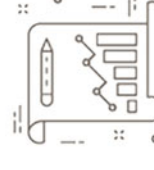
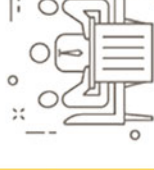




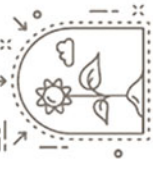




<p>..... START. TRY. FLY!</p>						
Monday	Research	Tuesday	Wednesday	Thursday	Friday	Saturday
						
<p>... Lunch Breaks ...</p>						
Teambuilding	Sustainable Inno. 1	Lean Startup 1	Sustainable Inno. 2	Business Model	Final Pitch	
						
<p>6pm closing remarks or alternative programs such as founder talks. Saturday: Award Ceremony</p>						

Fig. 1 Schedule of the startup summer camp sustainable innovation (GründerWERK, 2019)

The teaching and learning concept is characterized by an action-oriented (action learning) 6-day summer camp. The curriculum starts with team building. The UN sustainable development goals are used as a starting point for the development of ideas. Through short keynote speeches by the lecturers, the students are led from basic knowledge to detailed knowledge and, in the final product, to a modified “Business Model Canvas” with detailed comments. This “Business Model Canvas” is iteratively adapted in the follow-up period through research and initial prototype market tests with explanatory comments.

The focus of the summer camp lies on “Sustainable Innovation.” Hence, lectures and impulses on the goals of sustainable development are given in addition. A main focus is the integration of life cycle assessment (Rebitzer et al., 2004; ISO 14040, 2006; Hauschild et al., 2018), assessment of social aspects, estimation of the contribution regarding SDGs, life cycle thinking (Life Cycle Initiative, 2021), and eco-design [see, e.g., DIN SPEC 59 (2010), Brezet and van Hemel (1997), and Tischner et al. (2000)]. This gives the students the opportunity to learn about how to regard sustainability impact, experiment with the theme, and develop their own “sustainable business idea.” To support the impulse lectures and the subsequent exercises, a guidebook was created (Preiss et al., 2022) and provided together with other working material as a handout. The evaluation tool “Green Check Your Idea” (Lang-Koetz et al., 2020) is presented and applied in parts to the students’ ideas.¹ This is used to convey an understanding of the complexity of the emergence of environmental impact, taking into account the complete life cycle.

The sustainability coaching concept developed² comprises four blocks (see Fig. 2) that can be carried out in a period of about 8 h. At the summer camp, these are distributed to the second and the fourth day (see Fig. 1). It is based on a roughly developed startup idea that is then to be considered from a sustainability perspective. For this, small groups (up to approx. six people are suitable) work together on an idea. The blocks of the coaching concept will be described in the following.

The coarse analysis consists of two blocks: First, an introduction to sustainable innovation is given by providing knowledge on the topics of sustainability and Life Cycle Thinking. Approaches to sustainability management including assessment methods and typical implementation measures are presented. The stakeholder analysis is introduced as a method (Bourne & Walker, 2005). The students carry out an initial stakeholder analysis of the innovation idea they have developed. This is done with the help of a worksheet.³ This includes the five most important stakeholders

¹The tool can be used free of charge at the website <https://www.green-check-your-idea.com> (last access: 08.06.2022).

²An intermediate status of the coaching concept was presented by Annika Reischl at the “G-Forum Conference 2020” (Reischl et al., 2020). In the meantime, feedback from students and further improvements have been implemented (Preiss et al., 2022).

³The worksheets are available for download at https://www.hs-pforzheim.de/studium/im_studium/design_factory/nachhaltigkeitscoaching

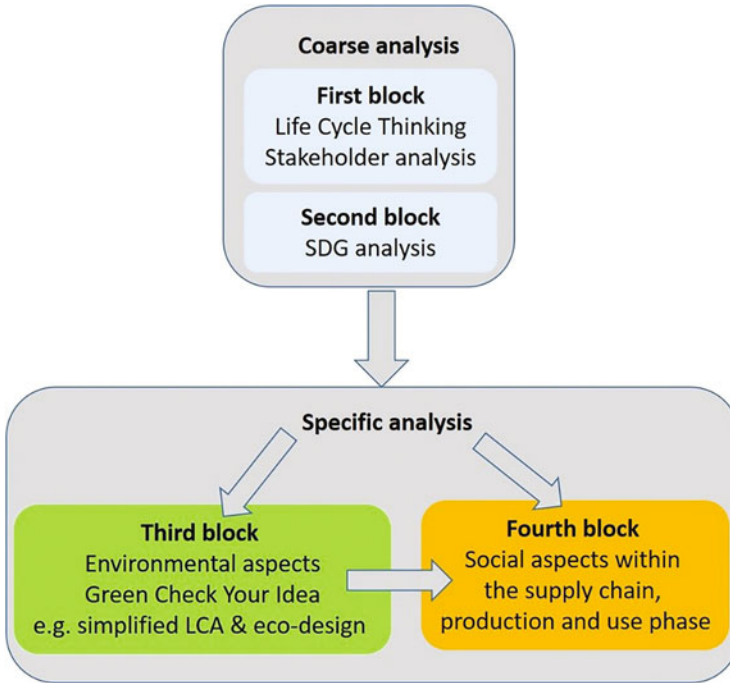


Fig. 2 Overview of the blocks of the coaching concept (based on Reischl et al. (2020))

with their interests, impacts, and interactions on the startup idea as well as strategies for dealing with them.

In the second block of the course analysis, different perspectives of sustainability are shown and the United Nations Sustainable Development Goals (SDGs) are presented. The students are introduced to the SDGs in different ways. First, they play a card game (EDA, 2017), where comparisons are made between different countries and for different SDGs. The participants were also inspired by contributions to “Art & Sustainability,” a special presentation of the SDGs with artwork on 17 posters developed by Adis Ahmetasevic, a student of visual communication at Pforzheim University. In addition, informational posters with an overview of the individual SDGs and selected facts and indicators are shown. The participants then have to identify three goals that are most relevant to their own startup idea. With the help of a further worksheet, the identified goals, the relation to the idea, and possible positive and negative effects of the idea on the respective SDG are documented. This also creates awareness of the fact that there are often trade-offs between economic, ecological, and social aspects.

The specific analysis consists of blocks 3 and 4 of the coaching: The third block addresses the ecological aspects of the innovation idea.⁴ First, the foundations of life cycle thinking (Life Cycle Initiative, 2021) and life cycle assessment (ISO 14040, 2006) are presented to the students. With the help of worksheets and the handout (Preiss et al., 2022), the participants finally carry out the steps of a life cycle assessment for their own startup idea, as far as this is possible: Process steps of resource supply, manufacturing, or logistics processes are determined and described on the corresponding worksheet. The next step is to identify inputs (e.g., raw materials, operating materials, or energy consumption) for the processes as well as outputs (e.g., product output, scrap, waste, emissions to air) from these. In this first analysis, qualitative data often has to suffice, whereas quantitative data should be used when available. Checklists and examples support the participants (Preiss et al., 2022). Finally, guiding questions are used to draw attention to potential environmental impacts, which serve to uncover hotspots in the life cycle of one's own idea.

In the next step, awareness is raised on how to immediately or continuously improve the sustainability performance of the startup idea in a very pragmatic way: Principles of eco-design for the most environmentally friendly product development are presented [see e.g. DIN SPEC 59 (2010), Brezet and van Hemel (1997), and Tischner et al. (2000)]. In Fig. 3, there is an example of recommended eco-design principles displayed.

Participants then receive a set of cards with eco-design principles assigned to the different life cycle phases. On each card, one principle is explained. The teams read through the cards and select three relevant principles for their own startup idea. These are finally documented on a worksheet. In a group discussion, they determine how these principles can be applied to their own startup idea and get feedback from the coaches.

Finally, the fourth block of the coaching concept takes a closer look at the social effects of the startup idea regarding the upstream processes of the supply chain or the product use. Foundations and methods for evaluating social impacts according to the "Product Social Impact Assessment" (PSIA-methodology) (Goedkoop et al., 2018) are presented. The participants then carry out a simplified social impact analysis regarding their startup idea. On a further worksheet template, they have to reconsider already collected data regarding important life cycle stages and allocate relevant stakeholders to it. The students have to conduct their assessment based on information from a quick Internet research and "expert guesses." They then choose the most relevant social topics, derive performance indicators, and determine a corresponding reference scale based on the checklists from Goedkoop et al. (2018). Finally, the students are asked to discuss and review potential improvement measures to increase the reference scales, if possible.

⁴The approach and methodology of this third block of coaching was discussed and tested with startups and larger companies and implemented in the online tool "Green Check Your Idea" (Lang-Koetz et al., 2020).



Fig. 3 Example of recommended eco-design principles (Umwelttechnik BW GmbH & INEC, 2019)

3 Method

3.1 *Application of the Sustainability Coaching Concept*

The sustainability coaching concept was applied in the undergraduate course “Startup Summer Camp Sustainable Innovation” at Pforzheim University. The course is open to students from all bachelor programs (from the Design School, Engineering School and Business School) and Bachelor’s, as well as Master’s students. The students have to apply by handing in a letter of motivation and a short description of their own business idea as well as a CV. Participants are then selected by assessing the quality of the business idea description and the sustainability and innovation potential of the submitted business idea. Furthermore, the composition of the students should enable interdisciplinary collaboration by a mix of faculty/program affiliation, age, and master’s as well as bachelor’s degree programs. During the week the activities include team building, design thinking, and the concept of lean startup. At the end, the students receive pitch training so that they present their idea to a jury consisting of professors, startups, and entrepreneurs. In and after the course, the students will be able to use the framework method Design Thinking to design a business idea and a business model for a sustainable business project in a reasonable way in terms of content and to coordinate the individual components, write it down formally in a Business Model Canvas, and pitch it professionally in a team in front of a jury of experts.

The application of the methods from the individual blocks of the sustainability coaching concept took place in groups with up to six students. At the end of each block, the results were presented to other participants in the context of peer feedback and discussed together. After the “coarse analysis” (first and second blocks), it is possible that the participants have discovered a particular relevance of ecological or social aspects, depending on the type of startup idea. Therefore, a special focus could be placed on ecological or social aspects during the specific analysis (third and fourth blocks).

Coaches and Lecturers

The teaching and learning concept is characterized by an action-oriented (action learning) approach. The starting point is the students’ own startup ideas. The six most interesting ideas are followed up. The selected ideas are developed from basic knowledge to detailed knowledge through the short lectures of the instructors. On the one hand, there is a team of five coaches who are permanently on-site. These coaches also provide input presentations and lectures, e.g., on design thinking and sustainability assessment. There are also additional keynotes, e.g., on financing a startup, and a final team coaching to refine the business model with another seven special external experts, e.g., from professional management units.

In 2021, only 20 students could be accompanied in presence at the location of the GründerWERK in Pforzheim (due to the Covid pandemic). In the previous year, 30 students participated. The study programs of the students ranged from mechanical engineering, different degree courses of the Design School, to degree courses in

Table 1 List of startup ideas developed by the students

Group	Participants	Startup idea
1	2	Consulting regarding environmental issues for small companies
2	2	Highly efficient and local natural cosmetics
3	4	Urban community garden
4	5	Fitness training based on electromagnets
5	3	Device to recycle filaments from and for 3D printing
6	4	Popup-workshop to make people, and especially pupils, aware of the options to repair or recycle things instead of disposing of them

business administration, e.g., with a focus on resource efficiency management or life cycle and sustainability. Hence, as intended, a quite interdisciplinary group of students could work together.

The 20 students arranged themselves into six groups. The startup ideas are depicted in Table 1.

3.2 *Assess the Impact of Sustainability Coaching on Students' Sustainability Knowledge, Awareness, and Attitudes*

Based on the coaching concept for improving the sustainability of startup ideas described above, a survey with a questionnaire to evaluate the evolution of the “impact” on the students on knowledge, awareness, and attitude has been conducted. The survey was developed along the lines of the “evaluation of training programs” by Kirkpatrick and Kirkpatrick (2006). Before and after the coaching, the students were asked for concrete factual knowledge. After the coaching, in addition, the students were asked whether they liked the coaching and the different methods.

First, we conducted a survey at the very beginning of the week of the startup summer camp in order to have the “reference status quo” of knowledge and awareness of different sustainability aspects.

As described above, the students listened to several impulse lectures and applied and practiced the knowledge obtained in the course: The students had to apply the information in different group exercises and discussions in order to raise awareness and apply the findings to their startup idea. At the end of the startup summer camp, we repeated the survey in order to have a new status of knowledge and awareness on different sustainability aspects. We also repeated the survey after 3 months again to check how long-lasting the effect of the coaching was.

The questions posed are listed in Table 2. They are distinguished into questions (a) reflecting on the motivation to participate to the startup camp with a focus on sustainable innovation, (b) reflecting on basic knowledge about sustainability, and (c) revealing the knowledge regarding different topics of the keynotes during the lecture by a self-assessment.

Table 2 List of questions

(a) Self-assessment—reflecting the motivation to participate to the “Startup Summer Camp—Sustainable Innovation”
Can you imagine founding a startup?
Can you imagine founding a startup in the next 3 years?
What is the importance of sustainability for your startup idea?
(b) Questions on basic knowledge about sustainability
How many Sustainable Development Goals (SDGs) are there?
In which year should these Sustainable Development Goals be achieved?
(c) Self-assessment on different relevant sustainability topics
The following questions ask for a self-assessment on a scale between zero and five, whereas <i>zero</i> means “I have no idea” and <i>five</i> means “I am an expert in this topic”
How would you rate your knowledge of sustainability in startups?
How would you rate your knowledge of Eco-Design?
How would you rate your knowledge of social sustainability?
How would you rate your knowledge of life cycle assessment?
How would you rate your knowledge of Sustainable Development Goals?

4 Results

4.1 Results of the Impact Evaluation of the Coaching Concept on Knowledge, Awareness, and Attitude of the Students

The results of the impact evaluation are based on the responses of the participants. While all 20 participants responded to our questionnaire at the beginning, 18 participants responded at the end of the week. However, 3 months after the summer camp, only eight students answered the questionnaire. In the following tables and figures, the results for each questionnaire are normalized and expressed as a percentage of the participants. Therefore, the results for the questionnaire after 3 months have to be interpreted with caution.

With the first part of the questionnaire, we are asking for the motivation of the participants. The statements about whether or not they can imagine founding a startup—in general or, within the next 3 years, respectively—are listed in Table 3.

The results in Table 3 show that the participants of the startup camp are quite motivated to found a startup. Moreover, it is notable that the commitment even increased after the coaching week. The commitment of the participants after 3 months is much lower, if “no response” also means “no commitment.” Only 8 out of the 20 students answered this questionnaire. Therefore, assuming the 12 who did not answer may have lost their interest in founding a startup, the share of students still determined to found a startup has decreased considerably, i.e., only five or six out of 20 still express their commitment to found a startup.

In Fig. 4, the answers to the question, “What is the importance of sustainability for your startup idea?” are displayed. There are three answer alternatives—in

Table 3 Results on the question of whether or not the students can imagine founding a startup “sometimes”, and more concrete, within the next 3 years

n = 20	Yes (%)	Maybe (%)	No (%)	No response (%)
<i>Can you imagine founding a startup?</i>				
Before coaching	80	20	0	0
After coaching	90	0	0	10
After 3 months	30	10	0	60
<i>Can you imagine founding a startup in the next 3 years?</i>				
Before coaching	70	20	10	0
After coaching	80	10	0	10
After 3 months	25	15	0	60

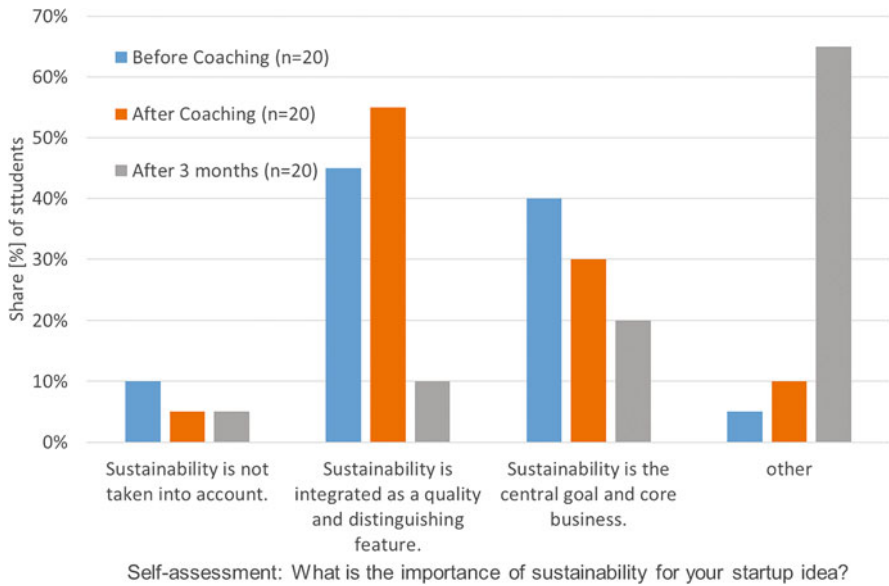


Fig. 4 What is the importance of sustainability for your startup idea?

addition, the students could choose the option “other” to express the answer in own words. This category also includes the students who did not respond to the question. It is especially interesting to see that after the week of the self-assessment, the relevance of the sustainability aspect has somewhat decreased. We interpret this to mean that the students have become aware of the complexity of the startup idea; i.e. they have found out that there are other aspects relevant to the success of the startup idea besides the sustainability aspects. On the other hand, it should be taken into account that the original startup idea has developed further in the course of the coaching week and that certain reorientations have occurred.

In Table 4, the share of correct answers to two questions on basic knowledge about sustainability are displayed (however, at the end of the week only 18 and after

Table 4 Questions on basic knowledge about sustainability—% correct answers

	Start of the week n = 20 (%)	End of the week n = 18 (%)	After 3 months n = 8 (%)
In which year should the Sustainable Development Goals be achieved?	65	94	100
How many Sustainable Development Goals are there?	85	100	100

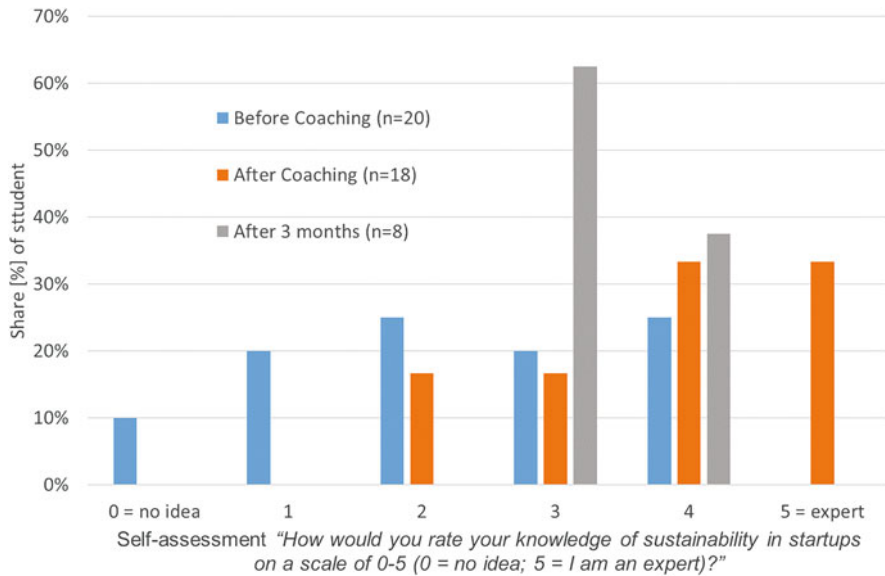


Fig. 5 Evolution of shares regarding the self-assessment on “How would you rate your knowledge of sustainability in startups on a scale of 0–5 (0 = no idea; 5 = I am an expert)?”

3 months only 8 answered the questionnaire). It shows that there was already considerable knowledge about the SDGs (Sustainable Development Goals). As these were explained and applied quite exhaustively in exercises, the students were able to answer these questions with a very high percentage of correct answers after the week, but also after 3 months.

Figure 5 shows the development of the shares in the self-assessment to the question “How would you rate your knowledge of sustainability in startups on a scale from zero to five (zero means ‘I have no idea’; five means ‘I am an expert’).” On the one hand, there is a clear shift from lower values to higher values after 1 week of coaching. On the other hand, after 3 months, there is a more modest self-assessment to be observed. However, it has to be noted that four of the students who had used a value of five for their self-assessment before the coaching did not participate after 3 months. Moreover, two of the ones who have used a value of five then gave a value of three or four, respectively, as their self-assessment. The

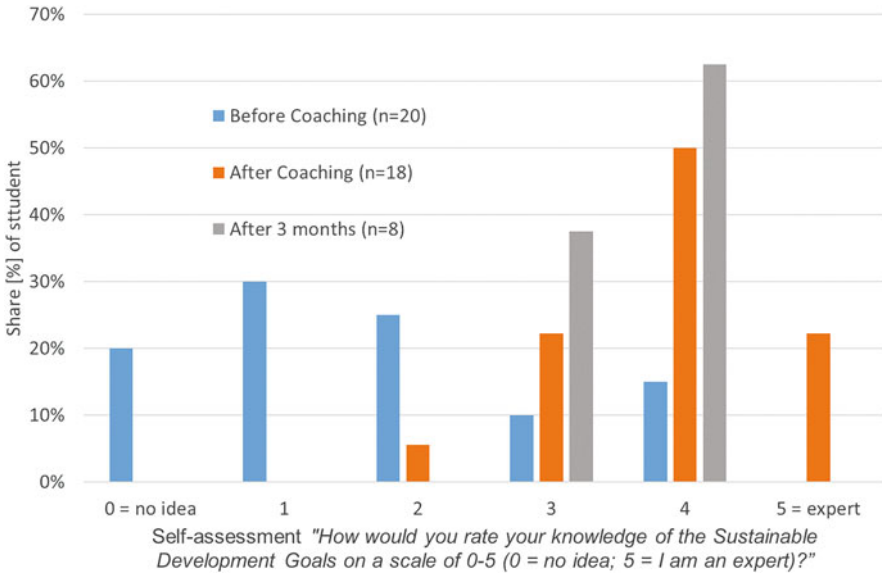


Fig. 6 Evolution of shares regarding the self-assessment on “How would you rate your knowledge of the Sustainable Development Goals (SDGs) on a scale of 0–5 (0 = no idea; 5 = I am an expert)?”

relatively high number of students who applied a value of five regarding their expertise on the “knowledge of sustainability in startups” could be explained with a quite high self-confidence immediately after the coaching. However, there was a kind of more realistic self-assessment after another 3 months.

The results in Fig. 5 are similar to the results in Fig. 6 because the topic “sustainability in startups” is very closely related to the Sustainable Development Goals (SDGs).

It is interesting to compare the results from Figs. 5 and 6 with the results regarding the “knowledge of Eco-Design” depicted in Fig. 7 and the results on “knowledge of social sustainability” depicted in Fig. 8. In particular, with regard to eco-design, the knowledge before the coaching was lower compared to the “sustainability in startups.” After coaching, self-confidence increased, but only at an intermediate level, but with a smaller distribution of differences between participants.

Regarding “social sustainability,” some students associated the term “social” with “social media” before coaching and felt appropriately familiar with it. After the input from the lectures, students had a much better insight into the relatively broad spectrum of social sustainability topics after the coaching.

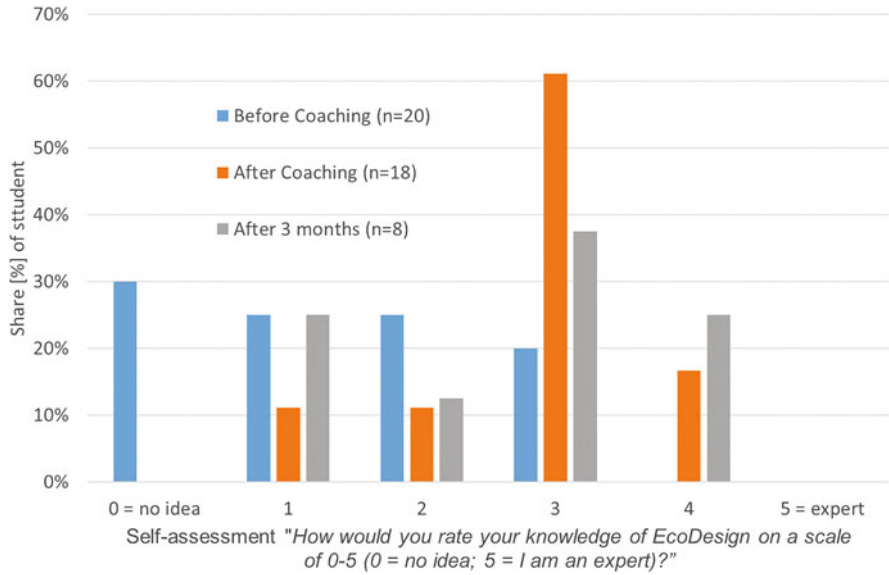


Fig. 7 Evolution of shares regarding the self-assessment on “How would you rate *your knowledge of Eco-Design* on a scale of 0–5 (0 = no idea; 5 = I am an expert)?”

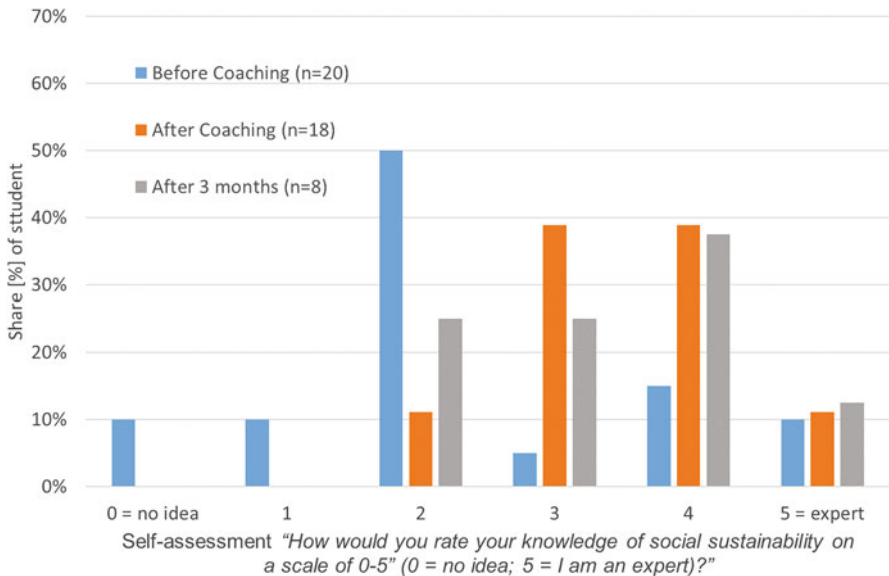


Fig. 8 Evolution of shares regarding the self-assessment on “How would you rate *your knowledge of social sustainability* on a scale of 0–5 (0 = no idea; 5 = I am an expert)?”

5 Discussion and Conclusion

Our research was conducted within the course of the “Startup Summer Camp on Sustainable Innovation,” a 1-week intensive education format to teach and practice entrepreneurship methods for students at the bachelors’ level at a German university. This lecture is aimed at students interested in developing a startup idea and intended to draw attention to the opportunities offered by the megatrend of sustainability, using “best practice” examples and raising awareness of the complexity of the interrelationships between various aspects of sustainability:

We developed a new education format and applied it in the past couple of years: a coaching concept to consider sustainability aspects integrated into the existing “conventional” entrepreneurship education format.

The transfer of know-how and the method training in combination with the exercises enabled the participants of the coaching to take sustainability aspects into account when developing startup ideas.

The effectiveness of the format was shown by conducting surveys among the students who participated in the course once.

While the contribution to the scientific literature on entrepreneurship is rather limited, we see a practical contribution to entrepreneurship education since the coaching concept can be applied in existing courses easily.

The results of the survey show that before the coaching many participants lacked knowledge about important sustainability aspects. However, it has also been demonstrated that within the very compact coaching session, an important and applicable understanding of the complexity and urgency of sustainable development can be created and applied.

Hence, it seems that the application of the coaching concept was successful and enabled the students to learn about and improve the sustainability impact of their startup idea. This should enable the students to become entrepreneurs or intrapreneurs of tomorrow who consider and improve sustainability aspects in their ideas.

However, our study has major limitations:

- It was only conducted with a limited number of students at Pforzheim University, a German university of applied sciences (where courses are taught with a more practical focus and all bachelor’s students have to spend one semester as an intern in a company as part of the standard curriculum).
- The students selected for the course were selected in an application process. Participants were then selected by assessing the quality of the business idea description and the sustainability and innovation potential of the submitted business idea. Furthermore, the composition of the students should enable interdisciplinary collaboration by a mix of faculty/program affiliation, age, and master’s as well as bachelor’s degree programs. Hence, they are probably more motivated to found a startup and show some basic foundations on the concept of sustainability as average students. Therefore, they do not represent the general body of students at German universities.

- The questions asked can only partially address all aspects of the research questions posed. In addition, a larger share of the students participating in the class did not take part in the part of the survey conducted 3 months after the course.

Due to these limitations, the two following research questions *in italic* posed at the outset of this study cannot fully be answered but could be addressed partially:

a) *How much are the students aware of sustainability issues and can the level of knowledge regarding sustainability topics be increased with the coaching?*

The results, especially the comparison of the answers in Figs. 5, 6, 7, and 8 at the beginning with the answers directly at the end of the week, show a clear improvement of the level of knowledge regarding sustainability topics.

b) *Are the students able to design their startup idea in a more sustainable way and/or estimate the level of the impact on sustainability?*

This question cannot be answered clearly. The methods learned during the coaching and practice helped the students to gain qualitative insights into the possible sustainability impact of their startup idea. In particular, for the “physical part” of the startup ideas, first action points to improve the identified impacts were planned. The startup idea was adapted as much as possible or in some cases completely changed. So, we can conclude that there is at least a higher probability that the startup idea can be made more sustainable.

It became clear that our study could only be seen as exploratory due to a limited number of participants. Further research should be conducted with a more sound empirical basis. Also, the research questions could be addressed in more depth by conducting interviews with the participants. It would also be interesting to analyze the further development of the startup ideas over time and determine how the methodological input from the sustainability coaching has influenced the potential sustainability impact of the startup ideas. This will be applied to the startup teams that are supported and promoted by us in the long term. The sustainability coaching will flow into the general coaching and mentoring program at Pforzheim University. If this is successful, we plan to offer sustainability coaching beyond the borders of Pforzheim University.

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