



## **STATISTICAL ANALYSIS REPORT**

### **Results of Testing Teaching Effectiveness in the Erasmus+ Project “EFFectiveness Of Responsibility Teaching (EFFORT)”**

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# 1 INTRODUCTION

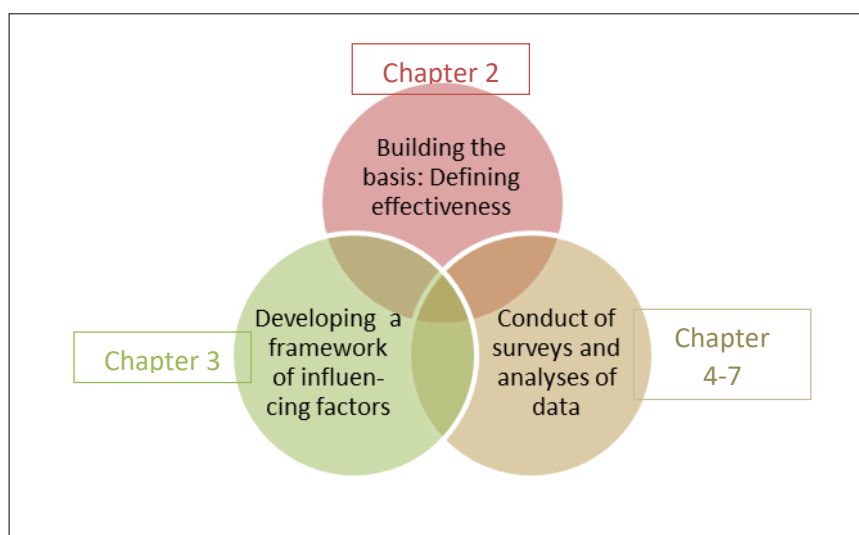
The Statistical Analysis Report is part of the “EFFORT (EFFectiveness Of Responsibility Teaching)” project, which is co-funded by the Erasmus+ Programme of the European Union and comprises a consortium of 6 European higher education institutions as well as 2 associated partners. The project deals with the development of 8 interrelated instruments (so called Intellectual Outputs, IOs) aimed at supporting higher education institutions in increasing the quality and effectiveness of their teaching in areas such as sustainability and responsibility. The report presented here builds one of those instruments, namely IO7. It seeks to give an overview on the effectiveness of several higher education courses/teaching formats<sup>1</sup> dealing with sustainability and/or responsibility as well as on factors potentially influencing their effectiveness. In literature various studies can be found that are already investigating the effectiveness of teaching formats related to sustainability and/or responsibility (e.g. Heiskanen et al. 2016; Marshall et al. 2018; Nousheen et al. 2020; Núñez-Andrés et al. 2022). However, as those are based on different understandings of what effectiveness means (e.g. Braßler & Sprenger 2021; Hiller Connell et al. 2012; Hsiao & Su 2021; Janmaimool & Khajohnmanee 2019; Tang 2018; Watson et al. 2019) and are applying different approaches to evaluate the effectiveness (e.g. Remington-Doucette et al. 2013; Ryu & Brody 2006; Segalàs et al. 2008), comparability between them is limited. In contrast, within this report, 15 different courses were tested using the same evaluation instruments, building on a common understanding of what being effective means. These courses were integrated at different European higher education institutions and are applying several teaching approaches and methods, including innovative ones.

The work that needed to be conducted in order to be able to reach the set goal of the Statistical Analysis Report can be divided into 3 parts: First, it was needed to build the basis by defining what teaching effectiveness means. Second, it was important to develop a framework that comprises factors that are potentially influencing this effectiveness. And third, 15 different teaching formats needed to be evaluated in terms of their effectiveness and influencing factors by gathering and analysing data. Based on this, the report is structured as following (see also Figure 1): In *chapter 2*, the understanding of the term “teaching effectiveness” as used throughout this report is introduced. In *chapter 3*, the developed framework of factors potentially influencing the effectiveness of teaching related to sustainability and/or responsibility is presented. *Chapter 4* deals with the methodological approach applied in order to test how effective sustainability- and/or responsibility-related courses are and what influences their effectiveness. It covers a presentation of the data collection instruments (i.e. surveys), the process of data collection and data preparation as well as a description of data analyses methods.

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<sup>1</sup> Within this report, the terms “course” and “teaching format” are used interchangeably.

Building on that, *chapter 5* describes the created dataset. In *chapter 6*, for each of the 15 tested courses, a brief description of the format and participating students is given and main statistical results in terms of their effectiveness are shown. After having presented the results of the statistical analyses of the individual teaching formats, *chapter 7* is dedicated to the comparison of the different courses as well as to the analysis of effectiveness influencing factors. Finally, a conclusion and final remarks are given in *chapter 8*.



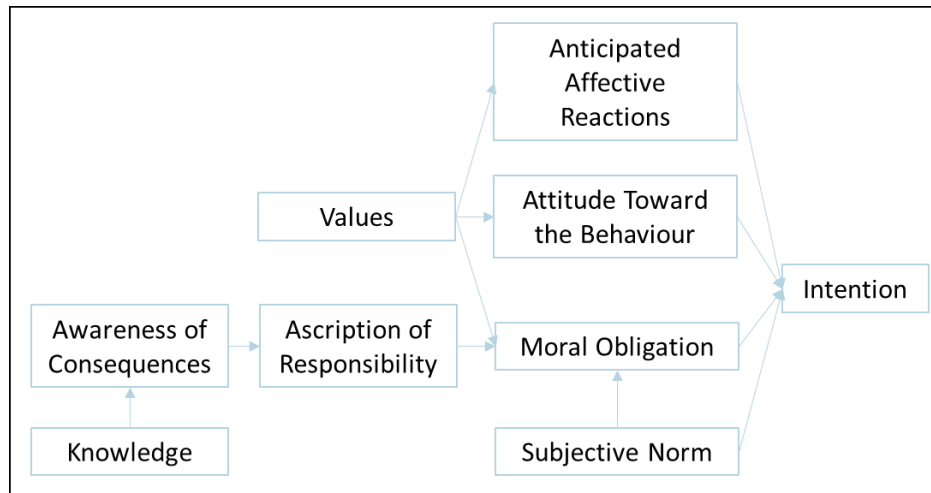
**Figure 1.1: Report Structure**  
Source: own representation

## 2 DEFINING TEACHING EFFECTIVENESS: THE UNDERLYING MODEL

As the Statistical Analysis Report aims at providing an overview on the effectiveness of several higher education sustainability- and/or responsibility-related courses as well as factors potentially influencing it, a clear and precise understanding of what effectiveness means within this context is needed as a starting point.

When developing an own understanding of the term “teaching effectiveness” in the framework of sustainability-, Corporate Social Responsibility- (CSR-), (business) ethics- and/or responsibility-related teaching, we were guided by the understanding of the UNESCO that “...Education for Sustainable Development (ESD) empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society for present and future generations” (UNESCO 2017, p. 7) and furthermore, as Felgendreher and Löfgren (2017) describe it, by the “...general idea that ESD should affect not only knowledge and skills among students per se but also their values and attitudes and, in the end, the students’ behaviour” (Felgendreher & Löfgren 2017, pp. 1-2). Based on these insights and with a focus on learners in their (future) role as managers/ leaders/

decision-makers<sup>2</sup>, we developed a model, which is used to define “teaching effectiveness” here (see Figure 2). The model covers a number of constructs that potentially drive a sustainable and responsible managerial/ leadership/ decision-making behaviour, including factors such as knowledge, values and attitudes. Within this report, *teaching is understood as being effective when it has a positive impact on one or more of these model constructs*.



**Figure 2.1: Model used for definition of “teaching effectiveness”**

Source: own representation based on Ajzen 1991; Klöckner 2013; Lülfs & Hahn 2014; McDonald 2014; Stern et al. 1999; Stern 2000 as well as own analyses

The model was developed based on the Theory of Planned Behaviour (Ajzen 1991) and other behavioural models used to explain ethical and sustainable behaviour such as the Value-Belief-Norm Theory (Stern 2000; Stern et al. 1999) and, in addition, empirically tested.

In more detail, the model contains the construct of behavioural intention, which is seen as a direct predictor of behaviour itself (Randall & Gibson 1991), as well as several constructs influencing this intention, either directly or indirectly. The constructs can be defined as following:

- The **behavioural intention** covers, in general, the “...individual’s intention to perform a given behaviour” (Ajzen 1991, p. 181). Against the background of focusing students’ managerial/ leadership/ decision-making behaviour as described above, the behavioural intention is defined here as the learner’s intention to act as a responsible leader or, in other words, to engage in various CSR-related activities (i.e. environmental, workplace-related, market-related and social CSR activities) (Feder & Weißenberger 2019). The CSR-related activities are thereby understood as “avoid harm behaviours”, representing “decisions and actions taken by managers to avoid harmful consequences for stakeholders and the larger society, [including the environment,] such as ...

<sup>2</sup> The special focus on individual learners in their (future) role as managers/leaders/decision-makers was chosen due to their high relevance for solving current and future sustainability-related issues.



avoiding discrimination in hiring practices, ... and avoiding environmental pollution” (Stahl & de Luque 2014, p. 238).

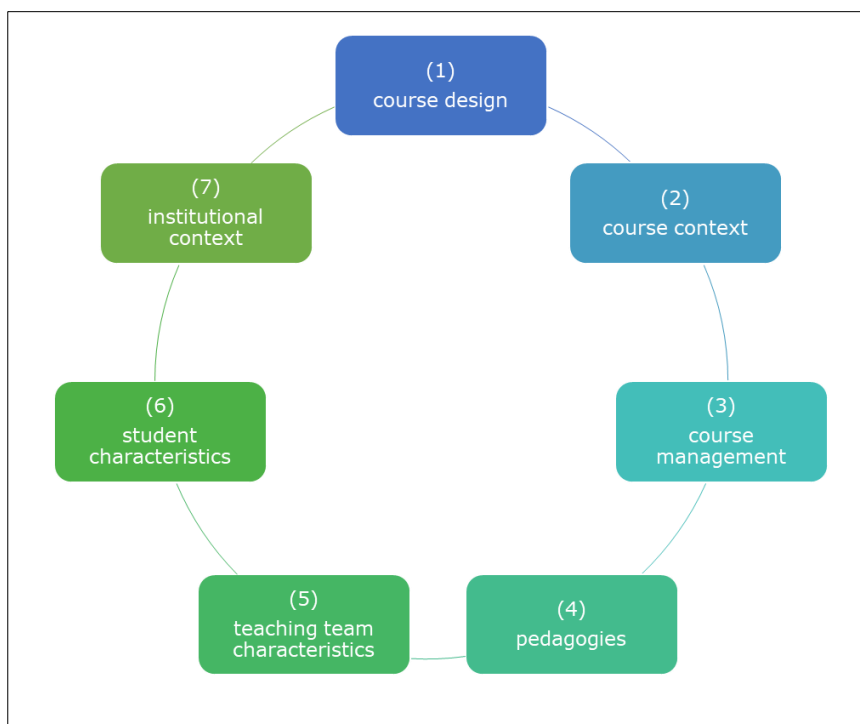
- The **attitude** construct, in general, “...refers to the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question” (Ajzen 1991, p. 188). Based on this, here it is defined as the degree to which a learner has a favourable or unfavourable evaluation or appraisal of acting as a responsible leader or respectively engaging in CSR-related activities.
- The **subjective norm** construct “...refers to the perceived social pressure to perform or not to perform the behavior” (Ajzen 1991, p. 188). “Subjective norms consist of a person’s beliefs about whether important others think he/she should engage in the behavior” (Conner 2020, p. 4). Within the model and report, this definition applies, with the behaviour in question being the student’s behaviour of acting as a responsible leader or respectively engaging in CSR-related activities.
- The **moral obligation** construct refers to “...personal feelings of moral obligation or responsibility to perform, or refuse to perform, a certain behavior” (Ajzen 1991, p. 199 based on Gorsuch & Ortberg 1983; Pomazal & Jaccard 1976; Schwartz & Tessler 1972). Based on this, the construct is understood in the model and throughout the report as covering a learner’s personal feelings of moral obligation or responsibility to engage in CSR-related activities or respectively to act as a responsible leader.
- **Anticipated affective reactions** “...emphasize self-conscious emotional states (e.g., regret, pride) with respect to how one expects to feel as a result of behavior engagement (action) or non-engagement (inaction...)” (Stevens et al. 2019, p. 332 based on Conner et al. 2013; Conner et al. 2015). Within the model and report different kinds of anticipated affective reactions of students are covered: **positive affective reactions resulting from action**, namely pride and satisfaction resulting from acting as a responsible leader or respectively engaging in CSR-related activities, as well as **negative affective reactions resulting from inaction**, namely regret and guilt resulting from not acting as a responsible leader or respectively not engaging in CSR-related activities.
- **Values**, as the next influencing factor, are in general defined as “...desirable transsituational goals, varying in importance, that serve as guiding principles in the life of a person or other social entity” (Schwartz 1994, p. 21). Within the report, we focus on the so called self-transcendence values, which comprise **biospheric values** that “...reflect a concern for the environment in itself...” as well as **altruistic values** that “...reflect a concern for the welfare and fair treatment of other human beings” (Bouman et al. 2018).

- The **awareness of consequences** generally represents whether an individual is aware of the negative consequences for, for example, other people or the environment caused by performing or not performing a specific behaviour (De Groot & Steg 2009; Spörrle & Bekk 2015). Building on this understanding, the construct is defined within the model and the report as a learner's awareness of negative consequences resulting from not acting as a responsible leader or respectively not engaging in CSR-related activities.
- The **ascription of responsibility** in general refers to a person's feelings of being responsible for the negative consequences resulting from the performance or non-performance of a specific behaviour (De Groot & Steg 2009; Spörrle & Bekk 2015). Based on this definition and in line with the above presented definition of the awareness of consequences construct, the ascription of responsibility is understood here as covering a learner's feelings of being responsible for the negative consequences that are caused by not acting as a responsible leader or respectively not engaging in CSR-related activities.
- Finally, **knowledge** referring to sustainability can be seen as a multidimensional construct (Liobikienė & Poškus 2019) comprising 2 dimensions: problem-based and solution-based knowledge (Bauer et al. 2018). While problem-based knowledge can thereby be defined as knowledge about sustainability-related problems, solution-based knowledge is understood as knowledge about possible solutions to those problems (based on Bauer et al. 2018; Zsóka et al. 2013). In line with this understanding, within the model and report the 2 sub-constructs of **problem knowledge**, covering knowledge about sustainability-related problems, and **concept knowledge**, representing knowledge about different concepts such as CSR and sustainability management which can be interpreted as solutions to sustainability-related problems in a more general sense, are used. Hereby, it should be emphasized that knowledge is understood in terms of subjective knowledge referring to the perceived or self-rated knowledge of learners (Aertsens et al. 2011).

### 3 FRAMEWORK OF IMPACT VARIABLES

After having described how teaching effectiveness is understood throughout this report, within this chapter light should be shed on factors that are potentially influencing this effectiveness. In the following chapters these factors are referred to as impact variables and they can be interpreted as elements that are influencing the impact a sustainability-, CSR-, (business) ethics- and/or responsibility-related course has on diverse model constructs introduced above (see chapter 2).

Based on a comprehensive literature analysis, partly completed together with the partners of the EFFORT project who developed the Self-Evaluation Tool EffSET (IO3), as well as based on conducted expert interviews, a framework of impact variables was developed. It comprises 52 impact variables classified in 7 dimensions, namely the design, context and management of a course, the pedagogies used in it, the characteristics of the teaching team as well as the participating students and, finally, the wider institutional context (see Figure 3).



**Figure 3.1: Framework of Impact Variables – Dimensions**

Source: own representation based on own analyses

The following table gives an overview on the single impact variables included in each of these dimensions:

<b>Dimension</b>	<b>Title of Impact Variable</b>	<b>Description of Impact Variable</b>
<b>Course design</b>	Learning objectives	Degree of consideration of sustainability, sustainable development, SDGs, social responsibility (SR) in learning objectives
	Course material	Degree of consideration of sustainability, sustainable development, SDGs, SR in course content and course material
	Diversity of teaching methods	Degree of diversity of teaching methods
	Consistency	Degree of integration/coordination of course's sustainability/SR learning objectives, content, material, teaching methods and teaching approaches with other courses in the study program
	Locality of contents	Degree of relating sustainability topics to local sustainability challenges
	Assessment	Consistency of assessment with learning objectives
	Workload	Total workload (in ECTS or hours)
	Stakeholder involvement	Degree of integration of stakeholders in the course concept and materials
<b>Course context</b>	Course size	Number of students in course
	Mode of teaching	Extent to which course is being taught in presence (vs. online)
	Voluntariness of course	Mandatory vs. elective vs. voluntary course
	Participants from different disciplines	Openness of course to students from different disciplines
	Facilities	Degree to which facilities reflect sustainability (e.g. green buildings) and are adequate for sustainability-related learning
	Embeddedness of course	Standalone course vs. integrated in a sustainability program
<b>Course management</b>	Updating of materials	Degree to which the course's sustainability/SR-related learning objectives, content, materials and outline are periodically updated and revised
	Controlling	Extent to which the course's sustainability/SR results are periodically reviewed and benchmarked with comparable courses in order to improve social responsibility and sustainability learning outcomes, teaching methods and teaching approaches
	Feedback	Quality and intensity of feedback given to students
	Coordination	Degree of cooperation with teaching teams of other courses of the study program in coordinating content, teaching methods, teaching approaches and course outlines
	Student involvement	Degree of involvement of students in definition of sustainability and SR learning objectives



Dimension	Title of Impact Variable	Description of Impact Variable
<b>Pedagogies*</b>	Student participation / activeness	Degree of activeness and engagement of students in the learning process
	Student collaboration / group work	Degree of interaction of students in social constellations (e.g. group, team, community) to solve shared tasks
	Student emotional involvement	Degree of evoking an emotional connection of students with the material or contents being learned
	Inter- / Transdisciplinarity	Extent to which students have the opportunity to transfer and recombine concepts and methods from different disciplines and create holistic solutions beyond single disciplines when exploring sustainability topics
	Student (self-)reflection	Extent to which students have opportunities to critically reflect on their knowledge, experiences, assumptions, beliefs, values, personal roles, attitudes or responsibilities in relation to sustainability issues
	Experience of real-life situations	Degree of firsthand experiences of students in real-world settings focused on solving actual sustainability problems/challenges
	Nature-related experiences	Degree of direct, multisensory experiences of students in the outdoor environment
	Stakeholder integration in the learning experience	Extent to which students have opportunities to identify stakeholders and their demands, to interact with them and to consider their expectations in finding solutions within tasks during the course work
	Integration between theory and practice	Extent to which students are given the opportunity to apply and reflect theoretical knowledge in practical contexts and, vice versa, to reflect and interpret practical experiences before the background of theoretical knowledge
<b>Teaching team characteristics</b>	Commitment teaching team/ the teacher	Degree of commitment of the teaching team to Education for Sustainable Development
	Research	Degree of active involvement of teaching team in sustainability/SR research
	Role model	Extent to which the teaching team acts as a role model for students in developing ethical, socially responsible and sustainable consciousness and behaviour
	Inspiration	Degree to which the teaching team inspires/motivates students
	Interest	Degree to which the teaching team is able to raise and increase interest in the topic
	Professional development and experience	Degree of experience and innovativeness of teachers in Education for Sustainable Development



Dimension	Title of Impact Variable	Description of Impact Variable
Student characteristics	Motivation for the course	Degree to which students find the course topic interesting, important for society and important for their own future profession
	Work experience	Length of work experience
	Lead experience	Length of lead experience
	Voluntary (environmental or social) work	Voluntary work in spare time (yes/no)
	Prior knowledge and consciousness on sustainability	Extent to which the students enrolled in the course have preliminary sustainability and social responsibility knowledge and consciousness adequate for the sustainable development aim and scope of the course
	Gender	Gender majority
	Age	Average age
	Level of studies	Bachelor vs. Master vs. MBA/EMBA vs. Doctoral
	Disciplinary affiliation	Affiliation of students in predefined areas (e.g. business, engineering)
	Nationality	Nationality of students
Institutional context	Governance	Existence and maturity of committees, boards, managers, offices, officers in charge to coordinate, implement and monitor the institution's sustainability and socially responsible actions
	Mission	Degree of endorsement of sustainability, Education for Sustainable Development and responsible values by the institution's mission and/or statute
	Strategy	Extent to which the institution's policies, strategies and guidelines ensure/ support the integration of sustainability and responsibility issues across the curricula and course programmes
	Partnerships	Time/intensity of cooperation/membership in international organisation(s) that support responsible/sustainable teaching/education (PRME, HESI, AASH, ...)
	Facilities	Extent to which the institution's premises, classrooms, real estate, and technical installations are adequate to develop a high level of sustainability and social responsibility competence in students
	Sustainability offer	Extent to which the institution offers study programmes focused on sustainability and social responsibility
	Involvement	Degree of participation of students in research and social/ ecological initiatives of the institution
	Research - staff	Extent to which the institution's academic staff is actively involved in sustainability/SR research
<p>* The impact variables contained in the category pedagogies ("pedagogical impact variables") represent important features and characteristics that are underlying different teaching approaches and/or methods recommended in literature for sustainability- and/or responsibility-related teaching. The overview of variables as well as definitions provided are based on Bustamante et al. (2022), where exact references for each definition can be found. Hereby, it needs to be taken into account that the definitions for the variables "student emotional involvement" and "integration between theory and practice" differ from the ones included there as they were updated. The definition of "student emotional involvement" is based here on Immordino-Yang and Faeth (2010), the definition of "integration between</p>		

theory and practice“ on Gerstung and Deuer (2021), Pham (2011) and Woo et al. (2012). The updated version is also used in the developed Guidelines of the EFFORT project (IO8).

**Table 3.1: Framework of Impact Variables – Variables**

Source: own representation based on own analyses

## 4 METHODOLOGY

The Statistical Analysis Report aims to present results concerning the testing of the effectiveness of several sustainability- and/or responsibility-related teaching formats as well as effectiveness influencing factors. In order to be able to gain insights on these questions, 2 types of surveys were conducted respective 15 different courses, data gathered in this way prepared and different statistical methods applied to analyse the prepared data. The 2 types of surveys comprised a survey of students using the so called “Controlling Tool” and a survey of lecturers using the so called “Self-Evaluation Tool EffSET”. Both the Controlling Tool and EffSET represent instruments developed in the framework of the EFFORT project, namely IO1 and IO3.

In the following, firstly, an overview on the 15 teaching formats included in the report will be given (chapter 4.1). Afterwards, data collection, i.e. the survey of students and lecturers (chapter 4.2), data preparation including i.a. data cleansing and merging (chapter 4.3) as well as data analyses methods (chapter 4.4) will be described.

### 4.1 Overview on teaching formats included in the report

Within the report, in total 15 different teaching formats are included that were carried out in different countries (e.g. Australia, Finland, Germany, Hungary) and under the responsibility of different higher education institutions (i.e. Budapest Business School, CBS International Business School, Hochschule für Wirtschaft und Recht Berlin, Lappeenranta-Lahti University of Technology, Murdoch University). All courses are dealing with sustainability, CSR, (business) ethics and/or responsibility. They are applying different teaching approaches and methods, based on which we classified them in 2 groups: throughout the report courses with less than 50% lecture are considered as innovative teaching formats, while courses with 50% lecture and more are being understood as more classical teaching formats.

The final selection of courses represented in the report includes the following:

- 3 innovative teaching formats that have been developed in the EFFORT project (IO4, IO5, IO6);
- 3 innovative teaching formats that have been developed in the ERASMUS+ project ISSUE, in which 3 partners of the project consortium were integrated;

- 5 further innovative teaching formats implemented at the higher education institutions of the partners of the project consortium;
- an innovative teaching format implemented at the Murdoch University which is an associated partner of the EFFORT project, as well as
- 3 more classical teaching formats implemented at the higher education institutions of 1 partner of the project consortium, namely the Budapest Business School.

The following table gives an overview on the courses and the responsible higher education institution for each. The teaching formats considered as innovative are highlighted in green, the formats considered as more classical in orange.

Responsible higher education institution	Course
CBS International Business School (CBS)	Future Scenarios for Sustainable Business Solutions (IO4)
	Business & Society
	Future Sustainability Manager Summer School (developed in the framework of the Erasmus+ project ISSUE)
	Environmental Impact Management
Hochschule für Wirtschaft und Recht Berlin (HWR)	Engaging for Sustainability (IO5) (conducted twice with some slight modifications in the course concept)
	Ethics in Business and Society
	International Week on Sustainability
Lappeenranta-Lahti University of Technology (LUT)	Innovation and Technology for Sustainable Future (IO6)
	21-day challenge (developed in the framework of the Erasmus+ project ISSUE)
Murdoch University	Business, Society, and the Environment (integrated in several groups without relevant differences)
Budapest Business School - University of Applied Sciences (BBS)	Business Ethics
	Responsible Management (with Escape Room) (the Escape Room was developed in the framework of the Erasmus+ project ISSUE)
	Responsible Management (without Escape Room) (integrated in several groups without relevant differences)
	Management of Value Creation Processes
	Responsible and Sustainable Company (integrated in several groups without relevant differences)

**Table 4.1: Overview on teaching formats included in the report**

Source: own representation



Finally, 3 points should be highlighted here. Firstly, the teaching format “Engaging for Sustainability” was conducted twice with some slight modifications regarding the course concept in the second implementation round (integrated based on feedback gathered from partners, students, and experts). Therefore, within the report the 2 rounds are investigated separately and results of them are also compared to each other (see following tables in chapter 4 and 5 as well as chapter 6.6). Secondly, the teaching formats “Business, Society, and the Environment”, “Responsible Management (without Escape Room)” and “Responsible and Sustainable Company” were each implemented in several groups without relevant differences in terms of teaching approaches, methods and contents between the different implementations. Therefore, for each of these 3 formats the according implementations were summarised and they are considered now as 3 “courses” for the effectiveness-related evaluations in the report (see chapter 6 and 7). Due to transparency reasons, however, in the following tables in chapter 4 and 5 numbers for the different subgroups are presented. Thirdly, as the titles imply, the courses “Responsible Management (with Escape Room)” and “Responsible Management (without Escape Room)” are mainly the same with the only relevant difference being the inclusion of the “60 Minutes to Save the World” Escape Room, which represents a special learning tool based on gamification that was developed in the framework of the Erasmus+ project ISSUE. This fact enables us to interpret the course that is not using the Escape Room as a control group for the one that is using it and compare results of both (see chapter 6).

## **4.2 Data collection**

### **4.2.1 Student survey**

As introduced above, 1 type of surveys that were conducted in order to gain insights on the effectiveness of courses as well as effectiveness influencing factors were surveys of students done with the Controlling Tool. The Controlling Tool is an instrument that was also developed within the framework of the EFFORT project (called IO1). It is based on the model presented in chapter 2 and comprises 2 standardized questionnaires that need to be completed by students in order to enable effectiveness evaluation of a course: a pre-course questionnaire that students have to fill out at the beginning and a post-course questionnaire that they have to fill out at the end of a course. The Controlling Tool is available in the form of online and paper-pencil-versions in 6 languages at <https://effort.lehre.hwr-berlin.de/results/controlling-tool>. The student survey discussed in this report was conducted by using online versions of the Controlling Tool in different languages with the UNIPARK software at the Hochschule für Wirtschaft und Recht Berlin. The survey period was October 2020 to December 2021.

The pre- and the post-course questionnaires contain the same questions for measuring the different model constructs presented in chapter 2<sup>3</sup>. This is done in order to enable the analysis of how students developed in regard to those constructs with an increase in them being understood as an indicator for the effectiveness of the course that is tested. In line with the argumentation presented by Feder and Weißenberger (2019), the constructs intention, attitude, moral obligation, subjective norm, awareness of consequences and ascription of responsibility are conceptualized according to a formative measurement approach, each containing 4 items referring to 4 components/dimensions of CSR engagement (i.e. environmental, workplace-related, market-related and social CSR activities). In addition, the construct problem knowledge is also conceptualized according to a formative measurement approach and relating to the 4 components/dimensions of CSR engagement. However, instead of using 1 item for the measurement of each component, 2 items are used. The other constructs (biospheric values, altruistic values, concept knowledge, positive affective reactions resulting from action and negative affective reactions resulting from inaction) are conceptualized according to a reflective measurement approach.

Besides the items measuring the model constructs, further questions on the following aspects are included in the questionnaires: in the pre-course questionnaires data referring to socio-demographic characteristics of students (e.g. nationality; age; gender<sup>4</sup>; study field, level and year; work experience) as well as students' prior experiences with courses related to ethics, sustainability or CSR and their motivation for the current course are collected. These are used to describe the characteristics of the sample(s) and furthermore to be analysed as effectiveness influencing factors (see chapter 3 and 7). In the post-course questionnaires data related to students' evaluation of the overall course, the methods used and the teaching team are gathered. In addition, the post-course questionnaires contain 2 questions asking students to evaluate the extent to which their problem and concept knowledge has increased compared to the beginning of the course. Finally, both questionnaires end with a question asking participants to generate a personal ID code which is used in order to match pre- and post-course questionnaires of each participant.

The pre-course tests should ideally be conducted at the beginning of the first session in class and the post-course tests at the end of the last session in class (except in cases where students are instructed to work on contents either before the first session and/or after the last session). This rule could not always be followed strictly. However, no problems from a quality viewpoint resulted from this.

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<sup>3</sup> It should be noted here that students completed a version of the Controlling Tool that contained some more variables than the one included in the report.

<sup>4</sup> The question on participants' gender is also included in the post-course questionnaire because it functions as a filter for the gender-specific questioning of values.

For most of the courses conducted, a response rate of 70% and in some cases, e.g. at the Murdoch University, a response rate of 50% was targeted. In some courses the set goals could not be met (see table 4.2). Various reasons may contribute to lower response rates:

- A low number of respondents was observed primarily in the autumn 2021 semester courses. One explanation is that the face-to-face courses were affected by the increasing Corona virus cases, which discouraged students from attending them.
- Due to the impacts of the pandemic (constraints in in-presence teaching), online teaching formats were overrepresented. This made it difficult to achieve the expected response rates, as students were not supervised in a physical room when completing the questionnaires.
- Some courses had a special format (e.g. “International Week on Sustainability”) that impeded reaching high response rates.
- In some courses, time could not be allocated in class for completing the questionnaires (due to different reasons such as university regulations), which made it difficult to achieve good response rates.
- A more general reason for low response rates in post-course surveys is that students keep dropping out during the course. Thus, the participation rate is higher at the beginning than at the end of the course.

The following table presents the number of respondents and response rates in the single conducted pre-course and post-course surveys. It also includes course IDs next to the course names, which are used at some points in the report.

Course		Number of respondents	Class size	Response rate
CBS International Business School (CBS), Cologne, Germany				
Future Scenarios for Sustainable Business Solutions (IO4), course ID: MC4				
	Pre-course	7	11	64%
	Post-course	6	11	55%
Business & Society, course ID: MC5				
	Pre-course	11	20	55%
	Post-course	1	20	5%
Future Sustainability Manager Summer School, course ID: AC15				
	Pre-course	17	29	59%
	Post-course	10	29	34%
Environmental Impact Management, course ID: AC16				
	Pre-course	13	19	68%
	Post-course	3	19	16%
Hochschule für Wirtschaft und Recht Berlin (HWR), Berlin, Germany				
Engaging for Sustainability (IO5) – first round, course ID: MC1				
	Pre-course	23	24	96%



	Post-course	23	24	96%
Engaging for Sustainability (IO5) – second round, course ID: MC8				
	Pre-course	28	31	90%
	Post-course	22	31	71%
Ethics in Business and Society, course ID: MC2				
	Pre-course	22	30	73%
	Post-course	23	30	77%
International Week on Sustainability, course ID: MC9				
	Pre-course	23	51	45%
	Post-course	5	51	10%
Lappeenranta-Lahti University of Technology (LUT), Lappeenranta, Finland				
Innovation and Technology for Sustainable Future (IO6), course ID: MC3				
	Pre-course	13	14	93%
	Post-course	12	14	86%
21-day challenge, course ID: MC7				
	Pre-course	22	22	100%
	Post-course	15	22	68%
Murdoch University, Murdoch, Australia				
Business, Society, and the Environment – Group 1 (Perth), course ID: IC1				
	Pre-course	3	40	8%
	Post-course	2	40	5%
Business, Society, and the Environment – Group 2 (Singapore), course ID: IC2				
	Pre-course	7	40	18%
	Post-course	0	40	0%
Business, Society, and the Environment – Group 3 (Dubai), course ID: IC3				
	Pre-course	10	40	25%
	Post-course	4	40	10%
Budapest Business School - University of Applied Sciences (BBS), Budapest, Hungary				
Business Ethics, course ID: AC8				
	Pre-course	29	50	58%
	Post-course	25	50	50%
Responsible Management (with Escape Room) , course ID: MC6				
	Pre-course	55	78	71%
	Post-course	57	78	73%
Responsible Management (without Escape Room) – Group 1, course ID: AC1				
	Pre-course	42	56	75%
	Post-course	27	56	48%
Responsible Management (without Escape Room) – Group 2, course ID: AC2				
	Pre-course	30	56	54%
	Post-course	24	56	43%
Management of Value Creation Processes, course ID: AC11				
	Pre-course	22	30	66%
	Post-course	13	30	39%
Responsible and Sustainable Company – Group 1, course ID: AC10				
	Pre-course	229	300	76%.
	Post-course	191	300	64%

Responsible and Sustainable Company – Group 2, course ID: AC12				
	Pre-course	70	102	69%
	Post-course	58	102	57%
Responsible and Sustainable Company – Group 3, course ID: AC13				
	Pre-course	367	436	84%
	Post-course	350	436	80%
Responsible and Sustainable Company – Group 4, course ID: AC14				
	Pre-course	264	309	85%
	Post-course	247	309	80%
Responsible and Sustainable Company – Group 5, course ID: AC3				
	Pre-course	209	226	92%
	Post-course	197	226	87%
Responsible and Sustainable Company – Group 6, course ID: AC4				
	Pre-course	14	27	52%
	Post-course	13	27	48%
Responsible and Sustainable Company – Group 7, course ID: AC5				
	Pre-course	111	150	74%
	Post-course	77	150	51%
Responsible and Sustainable Company – Group 8, course ID: AC6				
	Pre-course	39	30	130%
	Post-course	29	30	97%
Responsible and Sustainable Company – Group 9, course ID: AC7				
	Pre-course	56	66	85%
	Post-course	54	66	82%
Responsible and Sustainable Company – Group 10, course ID: AC9				
	Pre-course	72	80	90%
	Post-course	42	80	53%

**Table 4.2: Number of respondents and response rates in student survey**

Source: own analysis

#### 4.2.2 Lecturer survey

The second type of surveys that were conducted were surveys of lecturers using the Self-Evaluation Tool “EffSET” (IO3). EffSET was developed in the framework of the EFFORT project by the partners from the University of Bari Aldo Moro (Prof. Fabio Pizzutilo and Prof. Elisabetta Venezia) and is accessible here: <https://effort.lehre.hwr-berlin.de/results/self-evaluation-tool>. The EffSET tool is an Excel workbook with 2 distinct parts of Excel spreadsheets: one part is targeted towards the evaluation of the institution in terms of its maturity of sustainability/social responsibility integration. The other part is related to the evaluation of single courses. Overall, when working with the EffSET tool, evaluators rate more than 100 indicators. The variables of the tool contain information on the impact variables described in chapter 3.

The lecturer survey with the EffSET tool was conducted in spring 2022. The EffSET tool was sent by email to the lecturers of the courses tested with the student survey. After the evaluation of the course(s) and institution was completed, they returned the files. We were able to receive 15 answers. For the teaching formats “Business, Society, and the Environment”, “Responsible Management (without Escape Room)” and “Responsible and Sustainable Company” the tool was only completed once. This is due to the fact that each of these teaching formats was implemented in several groups without relevant differences in terms of teaching approaches, methods and contents and they are therefore considered each as “one course” within the report (see also chapter 4.1).

### 4.3 Data preparation

In order to prepare a comprehensive dataset that can be used for statistical analyses, containing the data collected with the student and the lecturer surveys, different works were necessary.

First, the dataset of the student survey was cleaned in regard to the following aspects:

- Questionnaires where students interrupted the survey and did not complete it to the end were deleted.
- Questionnaires where students took less time than expected to complete it in a good quality (i.e. less than 15 minutes for the pre-course questionnaire and less than 10 minutes for the post-course questionnaire) were deleted.

This resulted in the deletion of 573 cases in the pre-course survey data and 414 cases in the post-course survey data (see table below).

	Pre-course surveys	Post-course surveys
N before cleaning	1883	1624
N after cleaning not completed cases	1788	1458
N after cleaning not completed cases and cases that completed in a too short period of time	1310	1210

**Table 4.3: Cleaning of cases in the student survey**

Source: own analysis

Second, students’ pre-course-surveys needed to be matched with their post-course-surveys using an ID variable created by themselves during the completion of the questionnaires. Overall, the questionnaires of 872 students could be matched. As the use of the personal ID variable created by the students led to some errors, it was not possible to match all cases. In addition, some students participated only in either the pre-course or the post-course survey. The table below shows the number of students who participated in both surveys and could be matched as well as those who are only present in the pre-course or the post-course data.



	Case number	Percent
Pre only	438	26.6
Post only	338	20.5
Both	872	52.9
Total	1648	100.0

**Table 4.4: Matching of students' pre- and post-course surveys**

Source: own analysis

As some questions were only asked in the pre-course questionnaire, namely the questions on socio-demographic characteristics of students (except for gender), their prior experiences with courses related to ethics, sustainability or CSR as well as their motivation for the participation in the current course, a description of these aspects is not possible for students who only participated in the post-course survey. In line with that, the description of students' evaluation of the overall course, the methods used and the teaching team is systematically missing in the rest of the report for the students that are only present in the pre-course data because these questions were only asked in the post-course questionnaires.

Next, a comprehensive dataset was compiled by merging the dataset with the student answers with the lecturer survey dataset. The latter contains information about the courses and the institutional environments. These variables were added to the cases in the student dataset. Merging was done via an own created course ID variable (for the course ID variables see table 4.2).

Finally, different variables were cleaned and new variables based on them constructed where needed.

## 4.4 Data analyses

The analysis of data was conducted at 4 different levels:

- First, the effectiveness of single courses was analysed (see chapter 6).
- Second, the effectiveness of all courses considered together (i.e. teaching in general) was investigated (see chapter 7.1).
- Third, the effectiveness of innovative and classical teaching was compared (see chapter 7.2), enabled by merging all courses classified as innovative teaching formats into a "treatment group" and all courses classified as more classical teaching formats into a "control group".
- Fourth, the influence of impact variables was analysed (see chapter 7.3).

In Chapter 6 we compare the mean values of the model constructs (see chapter 2 for a description) in the pre-course survey and in the post-course survey without considering only observation pairs. The reasons for this are the partly low number of cases and rates in matching. This comparison is purely

descriptive. To test the statistical significance of pre-post-differences, we conducted Wilcoxon Signed Rank Tests. The reason for using this non-parametric test is the small number of cases in the courses. This statistical test is based on observation pairs. Therefore, all cases that participated only in the pre-course survey or the post-course survey were excluded from the test.

In Chapter 7 we worked with General Linear Models to answer different questions of interest:

- In Chapter 7.1 a one-way repeated measures MANOVA (including post-hoc univariate ANOVAs with repeated measures) was used to investigate the effectiveness of teaching in general.
- In Chapter 7.2 a repeated measures MANOVA (including post-hoc factorial ANOVAs with repeated measures) was used to compare the effectiveness of courses being classified as more innovative (“treatment group”) with courses being classified as more classical (“control group”).
- In Chapter 7.3 we focus on the impact variables. We analyse how single impact variables of the dimension student characteristics <sup>5</sup> (see chapter 3 for an overview) influence teaching effectiveness in general by using either a factorial ANOVA with repeated measures (in the case of gender, nationality, lead experience, voluntary work, and prior knowledge and consciousness on sustainability) or an ANCOVA with repeated measures (in the case of age, work experience, and motivation for the course). Furthermore, we test whether the differences between innovative and classical teaching formats looked at in chapter 7.2 may be influenced by the single impact variables, introducing them as controlled variables. This is done by conducting either a mixed factorial ANOVA with repeated measures (in the case of gender, nationality, lead experience, voluntary work, and prior knowledge and consciousness on sustainability) or a mixed factorial ANCOVA with repeated measures (in the case of age, work experience, and motivation for the course). Those latter conducted analyses are, in addition, in a last step also used to investigate whether differences exist in the effectiveness of innovative and classical teaching for different students based on their characteristics on the measured impact variables.

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<sup>5</sup> The analyses conducted focus on the impact variables of the dimension student characteristics as those were measured with the Controlling Tool and therefore enough cases are included in the dataset to do so. Impact variables from other categories were mainly measured with EffSET in the lecturer survey. The data gathered in this way could not be used since only tested 15 courses were tested. Therefore, the distribution was too small for statistical analysis to obtain meaningful results.



## 5 DATASET DESCRIPTION

Overall, the dataset comprises 1648 cases. The following table shows the frequencies of cases within the different courses tested.

		Pre only	Post only	Both	Total
<b>CBS International Business School (CBS), Cologne, Germany</b>					
Future Scenarios for Sustainable Business Solutions (IO4)	MC4	3	4	1	8
Business & Society	MC5	9	0	1	10
Future Sustainability Manager Summer School	AC15	8	3	5	16
Environmental Impact Management	AC16	8	3	0	11
<b>Hochschule für Wirtschaft und Recht Berlin (HWR), Berlin, Germany</b>					
Engaging for Sustainability (IO5) – first round	MC1	3	5	12	20
Engaging for Sustainability (IO5) – second round	MC8	8	7	7	22
Ethics in Business and Society	MC2	3	10	9	22
International Week on Sustainability	MC9	15	1	2	18
<b>Lappeenranta-Lahti University of Technology (LUT), Lappeenranta, Finland</b>					
Innovation and Technology for Sustainable Future (IO6)	MC3	1	4	7	12
21-day challenge	MC7	10	2	10	22
<b>Murdoch University, Murdoch, Australia</b>					
Business, Society, and the Environment – Group 1 (Perth)	IC1	1	0	2	3
Business, Society, and the Environment – Group 2 (Singapore)	IC2	5	0	0	5
Business, Society, and the Environment – Group 3 (Dubai)	IC3	10	2	2	14
<b>Budapest Business School - University of Applied Sciences (BBS), Budapest, Hungary</b>					
Business Ethics	AC8	5	8	12	25
Responsible Management (with Escape Room)	MC6	6	13	34	53
Responsible Management (without Escape Room) – Group 1	AC1	10	5	21	36
Responsible Management (without Escape Room) – Group 2	AC2	10	7	13	30
Management of Value Creation Processes	AC11	11	3	7	21
Responsible and Sustainable Company – Group 1	AC10	43	20	33	96
Responsible and Sustainable Company – Group 2	AC12	13	8	21	42
Responsible and Sustainable Company – Group 3	AC13	14	17	34	65
Responsible and Sustainable Company – Group 4	AC14	33	17	17	67

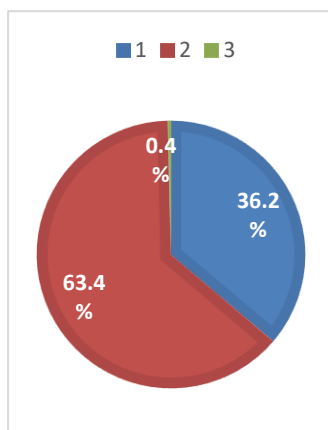
Responsible and Sustainable Company – Group 5	AC3	53	39	122	214
Responsible and Sustainable Company – Group 6	AC4	19	9	38	66
Responsible and Sustainable Company – Group 7	AC5	61	73	185	319
Responsible and Sustainable Company – Group 8	AC6	46	41	151	238
Responsible and Sustainable Company – Group 9	AC7	25	31	121	177
Responsible and Sustainable Company – Group 10	AC9	5	6	5	16
<b>Total</b>		<b>438</b>	<b>338</b>	<b>872</b>	<b>1648</b>

**Table 5.1: Frequencies of cases in tested courses**

Source: own analysis

As the following figures and tables show, most of the cases in the dataset are female, between 20 and 30 years old, Hungarian, Bachelor students, studying “business, administration and law”, and with some experience in work and volunteering. When having a look at the coming figures and tables, it should be taken into account that for the 338 “post only” cases information on the socio-demographic aspects (except for gender) was not available because questions on those aspects were only included in the pre-course questionnaire. Therefore, they are included as missing values in the dataset and influence as such percentages calculated.

### Gender:



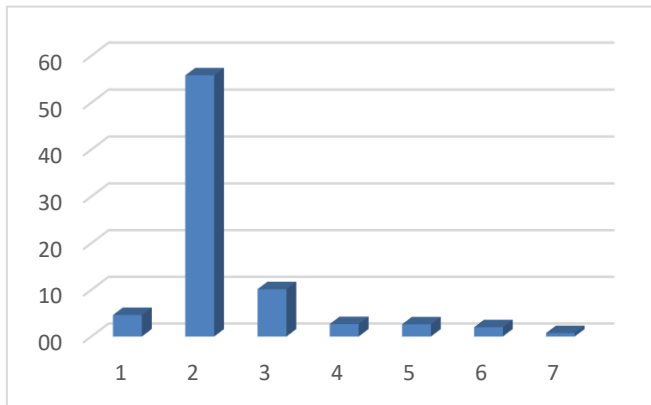
The dataset contains more females than males (around 2/3 to 1/3). Only 6 persons indicated „diverse“.

**Figure 5.1: Dataset description – Distribution according to gender**

Source: own analysis



**Age:**



Most of the cases are between 20 and 30 years old (around 55%).

**Figure 5.2: Dataset description – Distribution according to age**

Source: own analysis

**Nationality:**

Nationalities (N>10)		
	Freq.	%
American	10	0.6
Chinese	19	1.2
Finnish	11	0.7
French	17	1.0
German	71	4.3
Hungarian	1078	65.4
Indian	18	1.1
Other	85	5.2

A large number of cases are Hungarian.

**Table 5.2: Dataset description – Distribution according to nationalities**

Source: own analysis

**Study field:**

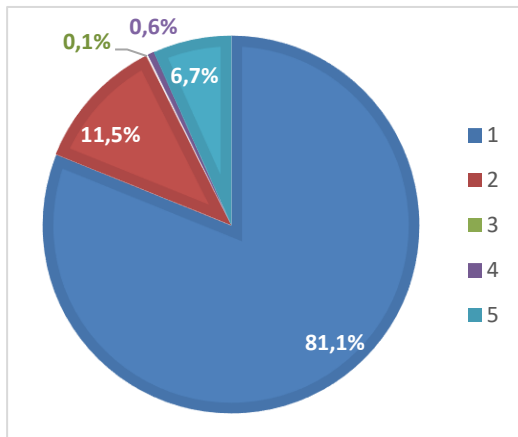
Study Fields (N>10)		
	Freq.	%
Education	12	0.7
Social sciences, journalism and information	14	0.8
Business, administration and law	1190	72.2
Engineering, manufacturing and construction	25	1.5
Services	23	1.4

Most of the cases study “business, administration and law” (72.2%).

**Table 5.3: Dataset description – Distribution according to study fields**

Source: own analysis

### Study level:



Most of the cases are Bachelor students (81.1 %).

**Figure 5.3: Dataset description – Distribution according to study level**

Source: own analysis

### Work Experience, Lead Experience, and Volunteering:

- Around 1/4 of the cases (26.8%) have no work experience.
- A little more than 1/4 of the cases (26.3%) have experience as a leader/supervisor.
- 2/5 of cases each have volunteered or not volunteered, the last 1/5 is composed of missing values.

Finally, the dataset has some limitations that should be highlighted here:

- Students with a Hungarian nationality are overrepresented in the dataset. This is a critical point of the dataset and the representativeness of the sample. It should be taken into account especially when comparing innovative and classical teaching formats as almost all classical courses were conducted in Hungary.
- The distributions of the individual items are mostly right-peaked. This raises questions about the extent to which social desirability influenced the response behaviour.
- Another disadvantage is that no real control groups could be collected. Although there were attempts to do this, it was only realisable in one case: the course "Responsible Management" was conducted once with and once without the implementation of the "Escape Room".

## 6 ANALYSES OF EFFECTIVENESS OF SINGLE COURSES

### 6.1 General remarks

This chapter presents the statistical evaluations of the individual courses in connection with a description of the teaching format. The data from the student survey is evaluated with the controlling tool and in the lecturer survey with the EffSET tool.

The analyses test the following hypotheses:

- Sustainability- and responsibility-related teaching has a positive impact on the intention of students to act as responsible leaders.
- Sustainability- and responsibility-related teaching has a positive effect on variables predicting the intention of students to act as responsible leaders.

In a first step we calculated and compared the mean values of the model constructs of the pre-course survey and the post-course survey. As participants in the pre- and the post survey are not necessarily the same as in the post survey, the comparison is only an indication for the impact of the teaching format.<sup>6</sup> For a statistical test of the differences between the participants in the 2 surveys, we used the Wilcoxon Signed Rank Test, a paired difference test that is based on ranks instead of means and allows to work with small sample sizes (see also chapter 4).

For each course, the subchapters are structured similarly.

- **Course description:** Firstly, the course concept is described and some data from the lecturer survey conducted with EffSET on the course concept is given as a context information. These data are summarised in a table.
- **Socio-demographic characteristics, student motivation and evaluation of the course:** Secondly, a brief description of the socio-demographic characteristics of the course, the motivation of the students and the evaluation of the course in the post-course surveys are provided.
- **Teaching effectiveness:** Thirdly, a description and analysis of the behavioural concepts are provided that give us an insight into the effectiveness of teaching.
- **Conclusions:** Finally, a brief interpretation of the data is given.

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<sup>6</sup> Of course, either increase nor decrease in the constructs are necessarily linked to the teaching, as other effects (e.g. other courses, influence of friends, external events) might have taken place.

## 6.2 Future Scenarios for Sustainable Business Solutions (IO4)

### 6.2.1 Dataset

Cases				
Pre only	Post only	Both	Total	Class size
3	4	1	8	11

**Table 6.1: Dataset — Future Scenarios for Sustainable Business Solutions**

Source: own analysis

- In total, 8 out of 11 students could be surveyed.
- Statistical analysis is limited as there are only 8 cases in the dataset. Only 1 person participated in both, the pre- and post-course, surveys.

### 6.2.2 Course description

The course provides a holistic picture of current social and ecological challenges as well as their implications for business sectors in the future. Through analysing developments and trends and through creative methods (e.g., improv and Lego Serious Play workshops), students develop future scenarios for business sectors and explore desirable futures. The teaching format aims to sensitize students towards the importance of clear visions for possible futures and the creation of compelling narratives for sustainable business development through the exploration of these possible future scenarios. Through analysis of retropolation and backcasting tools, students will then develop strategic implementation pathways for the respective business sectors. The main teaching methods applies in the course are vision building and group discussion, only 10 % is lecturing input. The course is considered as innovative teaching format.

<b>Official name of the course</b>	<b>Future Scenarios for Sustainable Business Solutions</b>
<b>University/country</b>	Future Scenarios for Sustainable Business Solutions, Germany
<b>Field of education</b>	Business, administration and law
<b>Primary topic of the SR/Sustainability part of the Course</b>	Sustainable Development
<b>Audience and level of studies</b>	Students (university students, including MBA), Master
<b>Group size</b>	11 (max. 20)
<b>Course duration</b>	13-16 weeks
<b>Credits</b>	6 ETC
<b>Delivery format</b>	100% in presence
<b>Main teaching methods</b>	10% lecture 20% group discussion 10% self-reflection task/exercise 50% vision-building exercise 10% gamification

**Table 6.2: Course description — Future Scenarios for Sustainable Business Solutions**

Source: own representation



## 6.2.3 Socio-demographic characteristics, student motivation and evaluation of the course

### Socio-demographic characteristics

Variable	Scale	Freq.
<b>Gender</b>	Male	2
	Female	6
<b>Age</b>	20-24	2
	25-29	2
<b>Nationality</b>	German	4
<b>Study level</b>	Master	4
<b>Field of Study</b>	Business, administration and law	4
<b>Work Experience</b>	Less or equal 1 year (<=1)	2
	(>1 and <=2)	1
	(>2 and <=3)	1
<b>Lead Experience<sup>7</sup></b>	Less or equal 1 year	2
<b>Volunteering</b>	No	3

**Table 6.3: Socio-demographic characteristics — Future Scenarios for Sustainable Business Solutions**

Source: own analysis

- Questions relating to socio-demographic characteristics - except the gender question - were only asked in the pre-course questionnaire, such that N=8 for gender and N=4 for the rest of the questions.
- **Gender:** There is a majority of female students.
- The **age** of the 4 students surveyed in the pre-course survey was between 20 and 29 years and they were studying to obtain a **Master's** degree. Their nationality was **German**.
- All students had **work experience**, but only 2 students surveyed stated that they have **leadership experience**.
- 1 of the students had **volunteered**.

### Student's prior experience and motivation

- Questions on experience and motivation were only asked in the pre-course-survey (N=4).
- All 4 students had already taken a course on sustainability.
- All 4 students agreed or strongly agreed that the topic was personally interesting and generally important for the society and that they thought they would need the knowledge and competencies in their future.

### Student's evaluation of course and teaching team

- Questions on students' evaluation of course and teaching team were only asked in the post-course-questionnaire (N=5).

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<sup>7</sup> The other 2 students did not have any lead experience.

- 4 students agreed or strongly agreed with the statement that the lecturer inspired and motivated them, 1 was undecided.
- All 5 students agreed or strongly agreed with the statement that the lecturer was a role model for them and that the lecturer was able to increase their interest in the topic.
- All 5 students liked the course and the teaching methods (they indicated “very much” or “rather much”).

#### 6.2.4 Teaching effectiveness

Since we could match only the questionnaires of 1 student, the mean values for all constructs of the pre-course survey (N=4) and the post-course survey (N=5) may refer to different students, such that the results of a comparison need to be treated with caution, and the Wilcoxon Signed Ranks Test could not be applied. The mean values for the pre-course and the post-course and the ranks are listed in the table below.

	Mean Values		Wilcoxon Signed Ranks Test		
	Pre-course	Post-course	Negative Rank	Positive Rank	Ties
<b>Intention</b>	3.5	3.7	0	0	1
<b>Positive affective reaction (action)</b>	3.4	4.3	0	1	0
<b>Negative affective reaction (inaction)</b>	3.2	4.2	0	1	0
<b>Attitude</b>	4.1	4.1	0	1	0
<b>Subjective norm</b>	3.9	4.3	0	1	0
<b>Moral obligation</b>	4.1	4.8	0	0	1
<b>Altruistic values</b>	4.4	4.4	0	1	0
<b>Biospheric values</b>	3.0	3.9	0	1	0
<b>Ascription of responsibility</b>	3.9	4.8	0	1	0
<b>Awareness of consequences</b>	4.3	4.6	0	0	1
<b>Concept knowledge</b>	3.5	3.8	0	1	0
<b>Problem knowledge</b>	3.3	3.1	1	0	0
Pre-course survey N=4, Post-course survey N=5 Wilcoxon Signed Rank Test: only students who participated in both surveys, N= 1					
Control Question					
	1 — Not at all	2	3	4	5 — Very much
<b>Difference concept knowledge</b>	0	1	0	3	1
* To what extent has your detailed knowledge of the concepts mentioned above increased compared to the beginning of the course? Post-course survey N=5					

**Table 6.4: Teaching effectiveness — Future Scenarios for Sustainable Business Solutions**

Source: own representation





## 6.2.5 Conclusions

All in all, the course seems to have had a positive effect on most of the model constructs, except for attitude, altruistic values (no impact at all) and problem knowledge (-0.2). The highest impact can be observed for negative affective reaction (+1.0), followed by positive affective reaction, biospheric values and ascription of responsibility. Interestingly, knowledge variables experienced either a decrease (concept knowledge, -0.2) or a modest increase (problem knowledge, +0.3) in comparison to other constructs. It seems that the course activated rather emotional, social or moral feelings instead of increasing specific knowledge aspects.

## 6.3 Business & Society

### 6.3.1 Dataset

Cases				
Pre only	Post only	Both	Total	Class size
9	0	1	10	20

**Table 6.5: Dataset – Business & Society**

Source: own analysis

- In total, 10 students out of 20 (class size) could be surveyed.
- Statistical analysis is limited as only 1 person participated in both surveys.

### 6.3.2 Course description

The relationship between Business and Society has been drastically changing in the last couple of decades. Globalization has provided a positive and a negative impact to the economy, environment, and society. Sustainable development has been demanded and widely recognized as a common crucial challenge. At the same time expected roles and responsibilities of corporations have been changing. This course focused on a new and strategic vision on the relationship between business activities and society. Students encountered various global/local movements and discussions on CSR and learned a broader and holistic perspective on Business and Society as well as studied the individual topics: environment, labor, human-rights, consumer and so on.

The module provides an overview on the role of companies in society in a national and international context. Basic concepts like Sustainability, CSR, Corporate Citizenship, Stakeholder Management and Ethical Management etc. are explained. Basic social ethical issues of sustainable entrepreneurship and social innovation are raised and discussed. Moreover, corporate responsibility in the context of different stakeholder relations are considered and illustrated by exemplary situations and cases. The module fosters ethical literacy and personal development.

The course is considered as innovative teaching format.

<b>Official name of the course</b>	<b>Business and society</b>
<b>University/country</b>	CBS International Business School, Germany
<b>Field of education</b>	Business, administration and law
<b>Primary topic of the SR/Sustainability part of the Course</b>	Responsible leadership
<b>Audience and level of studies</b>	Students (university students, including MBA), Bachelor
<b>Group size</b>	20 (max. 35)
<b>Course duration</b>	13-16 weeks
<b>Credits</b>	2 ECTS
<b>Delivery format</b>	100% in presence
<b>Main teaching methods</b>	30% lecture 20% group discussion 10% debate 15% in-class role play 20% case study 5% self-reflection task/exercise

**Table 6.6: Course description - Business & Society**

Source: own representation

### 6.3.3 Socio-demographic characteristics, student motivation and evaluation of the course

#### Socio-demographic characteristics

Variable	Scale	Freq.
<b>Gender</b>	Male	7
	Female	3
<b>Age</b>	20-24	9
	25-29	1
<b>Nationality</b>	German	8
	Indian	1
	Other	1
<b>Study Level</b>	Bachelor	10
<b>Study Year</b>	Second year	7
	Third year	1
	Fourth year	2
<b>Field of Study</b>	Business, administration and law	10
<b>Work Experience</b>	None	2
	Less or equal 1 year (<=1)	6
	(>1 and <=2)	1
	(>2 and <=3)	1
<b>Lead Experience</b>	Less or equal 1 year	2
<b>Volunteering</b>	No	6
	Yes	4

**Table 6.7: Socio-demographic characteristics – Business & Society**

Source: Own analysis

### Students' prior experience and motivation

- Questions on prior experience and motivation were only asked in the pre-course-survey (N=10).
- 2 out of 10 students had already taken a course on sustainability.
- 6 students agreed or strongly agreed that the topic was personally interesting, 4 students were undecided.
- All 10 students surveyed agreed that the topic was generally important for the society.
- 7 students agreed or strongly agreed that they thought they would need the knowledge and competencies in their future, 1 student was undecided and 2 strongly disagreed to the corresponding statement.

### Students' evaluation of course and teaching team

Only 1 person answered questions in the post-course questionnaire about the evaluation of the course. The evaluation was positive on the course and methods; additionally, the student agreed that the lecturer was able to increase his interest. There was no clear statement on questions of motivation, inspiration, and role model.

#### 6.3.4 Teaching effectiveness

Since we could match only the questionnaires of 1 student, and only 1 student participated in post-course survey, a statistical test for differences is not possible and the Wilcoxon Signed Ranks Test could not be applied. Nevertheless, for the sake of completeness, the mean values for the pre-course and the post-course and the ranks for the 1 student in question are listed in the table below.

	Mean Values		Wilcoxon Signed Ranks Test		
	Pre-course	Post-course	Negative Rank	Positive Rank	Ties
<b>Intention</b>	3.4	4.8	0	1	0
<b>Positive affective reaction (action)</b>	3.1	4.0	0	0	1
<b>Negative affective reaction (inaction)</b>	3.3	4.5	0	1	0
<b>Attitude</b>	4.2	5.0	0	1	0
<b>Subjective norm</b>	3.9	4.0	1	0	0
<b>Moral obligation</b>	3.7	5.0	0	1	1
<b>Altruistic values</b>	4.0	4.8	0	1	0
<b>Biospheric values</b>	2.7	4.0	0	1	0
<b>Ascription of responsibility</b>	3.8	4.3	0	1	0
<b>Awareness of consequences</b>	3.8	3.5	0	0	1
<b>Concept knowledge</b>	3.1	4.3	0	1	0
<b>Problem knowledge</b>	3.5	3.1	0	1	0
Pre-course survey N=10, Post-course survey N=1 Wilcoxon Signed Rank Test: only students who participated in both surveys, N= 1					

Control Question					
	1 — Not at all	2	3	4	5 — Very much
<b>Difference concept knowledge</b>	0	0	0	1	0
* To what extent has your detailed knowledge of the concepts mentioned above increased compared to the beginning of the course? Post-course survey N=1					

**Table 6.8 : Teaching effectiveness — Business & Society**

Source: own analysis

### 6.3.5 Conclusions

The course “Business & Society“ applies a variety of different methods and can be considered innovative and we would expect a clear impact of teaching on the model constructs. However, the dataset does not allow any meaningful conclusions about the effectiveness of the course.

## 6.4 Future Sustainability Manager Summer School

### 6.4.1 Dataset

Cases				
Pre only	Post only	Both	Total	Class size
8	3	5	16	25

**Table 6.9: Dataset – Future Sustainability Manager Summer School**

Source: own analysis

- In total, 16 students out of 25 (class size) could be surveyed.
- Statistical analysis is limited as only 5 students participated in both surveys.

### 6.4.2 Course description

The "Future Sustainability Manager" summer school program aims to provide an innovative approach to developing young adults into responsible (business) leaders. It's designed to have a lasting positive impact on participants. The objective is to leave them with the mindset and tools necessary to incorporate values and principles of sustainability in their (professional) future actions and decisions.

The course has been developed in the framework of the ISSUE Erasmus+ project. It is considered as an innovative teaching format.

<b>Official name of the course</b>	<b>Future sustainability manager summer school (ISSUE format)</b>
<b>University/country</b>	Future Sustainability Manager Summer School (ISSUE format); Germany
<b>Field of education</b>	Business, administration and law



<b>Primary topic of the SR/Sustainability part of the Course</b>	Corporate Social Responsibility
<b>Audience and level of studies</b>	Students (university students, including MBA), Master
<b>Group size</b>	25 (max. 25)
<b>Course duration</b>	1-4 weeks
<b>Credits</b>	6 ETCS
<b>Delivery format</b>	100% in presence
<b>Main teaching methods</b>	40% lecture 20% group discussion 10% case study 10% vision-building exercise 10% outdoor, nature-related experience 10% gamification

**Table 6.10: Course Description – Future Sustainability Manager Summer School**

Source: own representation

### 6.4.3 Socio-demographic characteristics, student motivation and evaluation of the course

#### Socio-demographic characteristics

Variable	Scale	Freq.
<b>Gender</b>	Male	4
	Female	12
<b>Age</b>	20-24	6
	25-29	5
	30-34	1
<b>Nationality</b>	Finnish	1
	German	4
	Hungarian	3
	Indian	1
	Other	4
<b>Study level</b>	Bachelor	4
	Master	8
	Doctorate	1
<b>Field of Study</b>	Business, administration and law	10
	Engineering, manufacturing and construction	2
	Other	1
<b>Work Experience</b>	None	3
	Less or equal 1 year (<=1)	3
	>1 and <=2	3
	>2 and <=3	2
	>5 and <=6	2
<b>Lead Experience</b>	Less or equal 1 year	1
	>1 and <=2	2
<b>Volunteering</b>	No	3
	Yes	10

**Table 6.11: Socio-demographic characteristics — Future Sustainability Manager Summer School**

Source: own analysis

### Socio-demographic characteristics

- Questions relating to socio-demographic characteristics - except the gender question were only asked in the pre-course questionnaire, such that N=16 for gender and N= 13 for the rest of the questions.
- **Gender:** There was a majority of female students in the course (12 out of 16).
- **Age:** Most students were between 20 and 29 years old.
- **Nationality:** There was a variety of different nationalities.
- Most of the students were studying for a **Master's degree** (8 out of 13 students). 4 students were pursuing a Bachelor's degree, 1 student is a PhD student
- **Study field:** Most respondents were studying business, administration and law.
- The data on **work experiences** ranges widely, as the above table shows.
- 3 out of 13 respondents indicated that they had **experience as a leader**.
- A large part of the respondents had already **volunteered** (N = 10).

### Students' prior experience and motivation

- Questions on experience and motivation were only asked in the pre-course-survey (N=13).
- 5 out of 13 students completed a course on sustainability before.
- All students surveyed found the topic interesting. They agreed and strongly agreed to the respective statement.
- 12 students found the topic generally important for the society. 1 student disagreed with the statement "*I believe the topic is generally important for the society*".
- All students thought that they would need the knowledge and competencies in their future profession. They agreed or strongly agreed to the respective statements "*I think that I will need the knowledge and competencies in my future profession*".

### Students' evaluation of course and teaching team

- Questions on students' evaluation of course and teaching team were only asked in the post-course-questionnaire (N=8)
- Almost all respondents of the post-course-survey found that the lecturer inspired and motivated them (they agreed or strongly agreed to the respective statements). 1 student was undecided.
- All respondents found that the lecturer was able to increase their interest in the topic.
- For almost all respondents, lecturer was a role model. 1 student was undecided.
- In the evaluation of the course and the methods, all students liked the course and the teaching methods. Only 1 student was undecided on the course evaluation.

#### 6.4.4 Teaching Effectiveness

Since only 5 students participated in both surveys, the results of statistical analysis are to be taken with caution. The Wilcoxon signed rank test requires 6 cases to determine statistical significance on a  $p < 0.05$ -level.

	Mean Values		Wilcoxon Signed Ranks Test			
	Pre-course	Post-course	Negative Rank	Positive Rank	Ties	p-value
<b>Intention</b>	3.7	4.1	0	4	1	<b>0.066*</b>
<b>Positive affective reaction (action)</b>	4.1	4.3	2	1	2	0.414
<b>Negative affective reaction (inaction)</b>	3.8	4.3	2	3	0	0.416
<b>Attitude</b>	4.8	4.9	1	2	2	0.564
<b>Subjective norm</b>	4.3	4.6	0	3	2	0.102
<b>Moral obligation</b>	4.5	4.8	1	1	3	0.655
<b>Altruistic values</b>	4.5	4.5	2	2	1	0.461
<b>Biospheric values</b>	4.7	4.8	1	3	1	0.257
<b>Ascription of responsibility</b>	4.7	4.6	1	1	3	0.665
<b>Awareness of consequences</b>	4.3	4.7	1	4	0	<b>0.078*</b>
<b>Concept knowledge</b>	3.5	4.5	0	4	1	<b>0.066*</b>
<b>Problem knowledge</b>	3.5	3.9	0	4	1	<b>0.068*</b>
* sign. at level 0.10; ** sign. at level 0.05 Pre-course survey N=13, Post-course survey N=8 Wilcoxon Signed Rank Test: only students who participated in both surveys, N=5						
<b>Control Question</b>						
	1 — Not at all	2	3	4	5 — Very much	
<b>Difference concept knowledge</b>	0	1	2	1	4	
* To what extent has your detailed knowledge of the concepts mentioned above increased compared to the beginning of the course? Post-course survey N=8						

**Table 6.12: Teaching effectiveness – Future Sustainability Manager Summer School**  
Source: own analysis

#### 6.4.5 Conclusions

Mean values of most of the model constructs – except ascription of responsibility - are at least slightly higher after the course than before. The highest increase can be observed for concept knowledge (+1.03), negative affective reactions (+0.49), problem knowledge (0.37) and intention (0.37). For questionnaires that could be matched, the positive increase is statistically relevant for intention, awareness of consequences and the 2 knowledge variables. All in all, we could deduce that the course had been effective and that there was an impact on the intention to act sustainably and responsibly and most of its predictor variables. This was also reflected by students' evaluation of the course and the lecturers.

## 6.5 Environmental Impact Management

### 6.5.1 Dataset

Cases				
Pre only	Post only	Both	Total	Class size
8	3	0	11	19

**Table 6.13: Dataset – Environmental Impact Management**

Source: own analysis

- In total, 11 students out of 19 (class size) could be surveyed.
- Statistical analysis is limited as none of the cases could be matched (pre-post-test).

### 6.5.2 Course description

The course provides a comprehensive introduction and contemporary analysis of the major concepts and methods of environmental management and industrial ecology. It provides a balance of theory, applications and examples to give students a grounding in the analysis and evaluation of business impacts on ecological systems and their effects. Students get to know current methods and tools of the fields as well as current practices and potentials. They will gain an understanding of material and energy flows in industrial systems. Looking at environmental impact management from a systems thinking approach, students will also acquire an understanding of how environmental systems and impacts are linked to social and economic aspects in a global perspective.

The course is considered as innovative teaching format.

<b>Official name of the course</b>	<b>Environmental Impact Management</b>
<b>University/country</b>	CBS International Business School, Germany
<b>Field of education</b>	Business, administration and law
<b>Primary topic of the SR/Sustainability part of the Course</b>	Environmental management
<b>Audience and level of studies</b>	Mixed (both Students and Professionals), Master
<b>Group size</b>	19 (25)
<b>Course duration</b>	13-16 weeks
<b>Credits</b>	3 ECTS
<b>Delivery format</b>	100% in presence
<b>Main teaching methods</b>	30% lecture 20% group discussion 10% debate 15% in-class role play 25% case study

**Table 6.14: Course description — Environmental Impact Management**

Source: own representation



### 6.5.3 Socio-demographic characteristics, student motivation and evaluation of the course

#### Socio-demographic characteristics

Variable	Scale	Freq.
<b>Gender</b>	Male	6
	Female	5
<b>Age</b>	20-24	2
	25-29	5
	30-34	1
<b>Nationality</b>	German	5
	Other	3
<b>Study Level</b>	Master	8
<b>Study Year</b>	Second year	8
<b>Field of Study</b>	Business, administration and law	8
<b>Work Experience</b>	None	2
	Less or equal 1 year (<=1)	1
	>1 and <=2	1
	>2 and <=3	3
	>5 and <=6	1
<b>Lead Experience</b>	Less or equal 1 year	1
	>2 and <=3	1
	>3 and <=4	2
<b>Volunteering</b>	No	6
	Yes	2

**Table 6.15: Social- demographic characteristics – Environmental Impact Management**

Source: own analysis

- As questions on socio-demographic characteristics – except the question on gender – were only asked in the pre-course survey, data is only available from 8 students (except gender with N=11).
- There was more or less an equal distribution between male and female students.
- The **age** of 7 students in the pre-course survey was between 20 and 29 years and 1 student was between 30-34 years old.
- The 8 respondents were studying business, administration and law to obtain a **Master's**-degree.
- Their nationality was mainly **German**. 3 students had another nationality.
- 4 of the students surveyed had **leadership experience**, 2 of them more than 3 years.
- 6 out of 8 students had **work experience**, only 2 students **volunteered**.

#### Student's prior experience and motivation

- Questions on experience and motivation were only asked in the pre-course-questionnaire (N=8).
- All 8 students had already taken a course on sustainability.
- All 7 students agreed or strongly agreed that the topic was personally interesting, all 8 students surveyed agreed that the topic is generally important for the society, but only 6 students agreed

or strongly agreed that they thought they would need the knowledge and competencies in their future.

### Students' evaluation of course and teaching team

- Questions on students' evaluation of course and teaching team were only asked in the post-course-questionnaire (N=3).
- 2 students found that the lecturer inspired and motivated them and that the lecturer was a role model for them, 1 student was undecided on both counts.
- All 3 students liked the course, but only 1 liked the teaching methods.

#### 6.5.4 Teaching effectiveness

Since there was no match of questionnaires, the Wilcoxon Signed Ranks Test could not be applied, and group differences could not be tested. The mean values for all constructs of the pre-course survey (N=8) and the post-course survey (N=3) may refer to different students, such that the results of a comparison are to be treated with caution.

The mean values for the pre-course and the post-course are listed in the table below.

	Mean Values		Wilcoxon Signed Ranks Test				
	Pre-course	Post-course	Could not be applied				
<b>Intention</b>	4.2	4.3					
<b>Positive affective reaction (action)</b>	3.9	4.5					
<b>Negative affective reaction (inaction)</b>	4.1	4.3					
<b>Attitude</b>	4.8	4.9					
<b>Subjective norm</b>	3.8	3.3					
<b>Moral obligation</b>	4.0	5.0					
<b>Altruistic values</b>	4.2	4.5					
<b>Biospheric values</b>	4.1	4.2					
<b>Ascription of responsibility</b>	4.2	5.0					
<b>Awareness of consequences</b>	3.9	4.9					
<b>Concept knowledge</b>	3.5	4.4					
<b>Problem knowledge</b>	3.4	3.8					
Pre-course survey N=8, Post-course survey N=3							
Control Question							
	1 — Not at all	2	3	4	5 —Very much		
<b>Difference concept knowledge</b>	0	0	1	0	2		
* To what extent has your detailed knowledge of the concepts mentioned above increased compared to the beginning of the course? Post-course survey N=3							

**Table 6.16 : Teaching effectiveness — Environmental Impact Management**

Source: own analysis

## 6.5.5 Conclusions

Overall, it appears that the course seems have had a positive effect on almost all dependent variables, with the only exception of subjective norm, which went down by 0.5 points. The highest increase was experienced for moral obligation and awareness of consequences (1.0 for both), as well as concept knowledge (0.9) and ascription of responsibility (0.8). In other words, this course seems to have had the biggest impact on the intellectual level (understanding the concepts, being aware of the consequences), whereas the effect on the emotional variables was less pronounced. This could be explained with the observation, that the level of most variables was already high at the beginning of the course. Given the small sample size, the results should be interpreted with caution.

## 6.6 Engaging for Sustainability (I05)

### 6.6.1 Dataset

	Cases				Class size
	Pre only	Post only	Both	Total	
<b>First round</b> (Course_ID: MC1)	3	5	12	20	25
<b>Second round</b> (Course_ID: MC8)	8	7	7	22	34

**Table 6.17: Dataset – Engaging for Sustainability**

Source: own analysis

- In total, 20 students out of 25 (class size) could be surveyed in the first round and 22 students out of 34 (class size) in the second round.

### 6.6.2 Course description

The course "Engaging for Sustainability" intends to create awareness for sustainability related problems, to make students question their values and behaviours and enable and to motivate them to contribute to a more sustainable world. It is taught within the second year of a cooperative Bachelor programme in Business Administration where students already have experience in working for a company. The course was created by linking 2 separate compulsory modules with 2 different lecturers: a module on service design with 5 ECTS and 44 in-presence teaching hours and a "core competency module" on responsibility for sustainability with 1 ECTS and 22 in-presence teaching hours.

Within the course, student teams consisting of 4 to 5 persons work on a real-life challenge brought in by an external partner (company or NGO). Challenges are designed in a way that they refer to sustainability issues and aim at contributing to selected sustainable development goals. The methodology for working on the challenge is service design. The two lecturers work as a team: one lecturer is facilitating the service design process, while the other lecturer provides short inputs on

sustainability, sustainable development, ethics, civil engagement and corporate responsibility and makes students reflect on their own responsibility and possibilities to contribute to the SDGs.

Students are asked to work and observe in the field and interact with stakeholders when possible, which aims at creating personal and emotional connection with stakeholders and the sustainability issue itself. The latter is supported by the requirement to analyse stakeholder needs and sustainability issues related to the project. Reflection tasks, beyond linking theoretical issues with project work, motivate students to question their beliefs and thoughts and think about their own role and capability to act responsibly.

The course concept was designed within the EFFORT project and slightly modified after having it conducted for the first time, based on feedback of partners, students and experts. Between other, new reflection tasks as well as a card game was integrated and the link between the two parts (service design challenge and core competency module) were emphasized.

The course is considered as innovative teaching format.

Official name of the course	Service design & engaging for sustainability*
University/country	Hochschule für Wirtschaft und Recht, Germany
Field of education	Business, administration and law
Primary topic of the SR/Sustainability part of the Course	Responsibility; Sustainable Innovation
Audience and level of studies	Students (university students, including MBA), Bachelor
Group size	First round: 25 (max. 50) Second round: 34 (max. 50)
Course duration	9-12 weeks
Credits	First round: 6 ECTS (second round: 5 ECTS)
Delivery format	80% synchronous distance learning** (second round 70%) 20% asynchronous distance learning*** (second round 30%)
Main teaching methods	<b>First round:</b> 33% lecture (second round 25%) 5% group discussion (second round 7%) 5% in-class role play (second round 3%) 5% case study (second round 3%), 34% sustainability-related consulting project (second round 35%) 5% self-reflection task/exercise (second round 5%) 5% interdisciplinary team teaching (second round 12%), 8% field trip (second round 10%)
* Module names in German: Service Design " Verantwortung für Nachhaltigkeit"	
**Educators and students interact at the same time from different physical locations	
*** Educators and students do not interact in real time	

**Table 6.18: Course description – Engaging for Sustainability**

Source: own representation

### 6.6.3 Socio-demographic characteristics, student motivation and evaluation of the course

#### Socio-demographic characteristics

Variable	Scale	Freq. first round	Freq. second round
<b>Gender</b>	Male	2	10
	Female	18	11
	Divers	0	1
<b>Age</b>	Below 20	7	4
	20-24	8	8
	25-29	0	2
	30-34	0	1
<b>Nationality</b>	German	15	14
	Other	0	1
<b>Study Level</b>	Bachelor	15	15
<b>Field of Study</b>	Business, administration and law	5	7
	Service management	10	8
<b>Work Experience</b>	None	0	6
	Less or equal 1 year (<=1)	20	2
	>1 and <=2	0	3
	>2 and <=3	0	1
	>3 and <=4	0	2
	>4 and <=5	0	1
<b>Lead Experience<sup>8</sup></b>	Less or equal 1 year (<=1)	1	0
	>1 and <=2	0	1
<b>Volunteering</b>	No	11	9
	Yes	4	6

Table 6.19: Socio-demographic characteristics – Engaging for Sustainability

Source: own analysis

- As questions on socio-demographic characteristics - except the question on gender - were only asked in the pre-course survey, data is only available from 15 students in both rounds, except gender, where N=20 for the first and N=22 for the second round.
- **Gender:** In the first round, more women than men attended the course. In the second round the gender distribution was more balanced.
- **Age:** Most students were younger than 24 in the first round, while the age distribution was more balanced in the second round.
- **Nationality:** The 2 courses were mainly attended by Germans. Only in the second round, 1 student with a different nationality took part.
- **Study Level:** Only Bachelor students attended the courses.

<sup>8</sup> The question about leadership experience was only asked of students with work experience. Only those who stated that they had leadership experience are listed here.



- **Field of Study:** Fields of study were “Business, administration and law” and “Service Management”.
- **Work Experience, experience as a leader, volunteering:** In the first round all students had less or equal 1 year work experience and 1 student had the experience as a leader. In the second round 6 students reported to have no work experience while the rest has experience between > 1 and 5 years; 1 student had the experience as a leader.
- **Volunteering:** In the first round 4 out of 15 students and in the second round 6 out of 15 students had volunteered.

### Students’ prior experience and motivation

- Since the questions to experience and motivation were only asked in the pre-course-questionnaire, N=15 in both rounds.
- In the first round, 2 students completed a sustainability and/or responsibility related course before attending the course. In the second round, this was the case for 5 students (*“Have you already completed one or more courses with content related to ethics, sustainability or corporate social responsibility (CSR)”?*)
- In both rounds, 9 out of 15 students surveyed were personally interested in the topic of the course. The respondents agreed and strongly agreed to the statement *“For me personally, the topic is interesting”*.
- 13 out of 15 students in the first round and 14 out of 15 found the topic generally important for the society. They agreed and strongly agreed to the statement *“I believe the topic is generally important for the society”*.
- 6 out of 15 students in the first round and 10 out of 15 students in the second round thought that they would need the knowledge and competencies in their future. They agreed and strongly agreed to the statement: *“I think that I will need the knowledge and competencies in my future profession”*.

### Student’s evaluation of course and teaching team

- Questions to the evaluation of the course were only asked in the post-course-questionnaire such that N=17 for the first round and N=14 for the second round.
- 12 out of 17 (71%) students agreed or strongly agreed with the statement that that the lecturer inspired and motivated them in the first round, while this is the case only for 8 out of 14 (60%) in the second round. Interestingly, a larger part, agreed or strongly agreed with the statement that the lecturer was able to increase their interest in the topic in the second round compared to the first round (first round: 12 out of 17 (71 %), second round: N=10 out of 14 (86 %)). Finally, while

in the first round, 10 students out of 17 (agreed or strongly agreed with the statement that the lecturer was a role model for them this was the case for no student in the second round. In the second round, nobody agreed or strongly agreed with this statement.

- In the evaluation of the course, 13 students (76 %) in the first round and 7 students (50 %) in the second round liked the course. Similarly, 14 students (84 %) liked the methods applied in the first round and 9 students (64 %) in the second round.

#### 6.6.4 Teaching Effectiveness

	Mean Values		Wilcoxon Signed Ranks Test			
	Pre-course	Post-course	Negative Rank	Positive Rank	Ties	p-value
<b>Intention</b>	3.6	4.0	2	9	1	<b>0.060*</b>
<b>Positive affective reaction (action)</b>	3.9	4.4	1	8	3	<b>0.012**</b>
<b>Negative affective reaction (inaction)</b>	3.3	3.8	3	9	0	<b>0.040**</b>
<b>Attitude</b>	4.4	4.5	5	5	2	0.589
<b>Subjective norm</b>	3.4	3.9	3	9	0	<b>0.070*</b>
<b>Moral obligation</b>	4.0	4.5	2	7	3	<b>0.091*</b>
<b>Altruistic values</b>	4.1	4.2	5	3	4	0.396
<b>Biospheric values</b>	3.1	3.5	1	5	6	0.238
<b>Ascription of responsibility</b>	4.1	4.4	2	6	4	<b>0.090*</b>
<b>Awareness of consequences</b>	3.6	3.8	5	5	2	0.331
<b>Concept knowledge</b>	2.2	3.7	0	11	1	<b>0.003**</b>
<b>Problem knowledge</b>	2.9	3.0	2	10	0	<b>0.015**</b>
* sign. at level 0.10; ** sign. at level 0.05 Pre-course survey N=15, Post-course survey N=17 Wilcoxon Signed Rank Test: only students who participated in both surveys, N= 12						
<b>Control Question</b>						
	1 — Not at all	2	3	4	5 —Very much	
<b>Difference concept knowledge</b>	0	1	3	11	2	
* To what extent has your detailed knowledge of the concepts mentioned above increased compared to the beginning of the course? Post-course survey N=17						

**Table 6.20: Teaching effectiveness – Engaging for Sustainability, first round**

Source: own analysis

	Mean Values		Wilcoxon Signed Ranks Test			
	Pre-course	Post-course	Negative Rank	Positive Rank	Ties	p-value
<b>Intention</b>	3.8	3.8	4	1	2	<b>0.098*</b>
<b>Positive affective reaction (action)</b>	4.0	3.8	2	2	3	1.000
<b>Negative affective reaction (inaction)</b>	3.5	3.5	3	3	1	0.753
<b>Attitude</b>	4.6	4.5	4	0	3	<b>0.059*</b>
<b>Subjective norm</b>	3.9	3.9	2	3	2	1.000
<b>Moral obligation</b>	4.1	4.1	4	1	2	0.216
<b>Altruistic values</b>	3.5	4.0	2	4	1	0.168
<b>Biospheric values</b>	3.2	3.4	2	3	2	0.480
<b>Ascription of responsibility</b>	4.0	4.0	3	2	2	0.336
<b>Awareness of consequences</b>	4.0	4.1	4	1	2	0.104
<b>Concept knowledge</b>	2.8	3.6	2	4	1	0.249
<b>Problem knowledge</b>	3.0	3.0	3	4	0	0.611
* sign. at level 0.10; ** sign. at level 0.05 Pre-course survey N=15, Post-course survey N=14 Wilcoxon Signed Rank Test: only students who participated in both surveys, N= 7						
<b>Control Question</b>						
	1 — Not at all	2	3	4	5 — Very much	
<b>Difference concept knowledge</b>	0	0	4	8	2	
* To what extent has your detailed knowledge of the concepts mentioned above increased compared to the beginning of the course? Post-course survey N=14						

**Table 6.21: Teaching effectiveness – Engaging for Sustainability, second round**

Source: own analysis

The tables above give an overview of the test results in both courses for all model constructs. They show the differences in the mean scores in the pre-course and post-course questionnaires as well as the results of the Wilcoxon Signed Ranks test (see chapter 5.4. for a description of the methodology). P-values are in bold and marked with an asterisk if they are statistically significant on a 10% basis (one asterisk) or 5% basis (2 asterisks).

The intention to act sustainably increased only in the first round: The mean values are higher in the pre-course survey than in the post course survey (+0.37); for cases where we were able to match pre- and post-survey data, this increase is statistically significant. Interestingly, in the second round we observe that – in average – the intention stayed the same. According to the Wilcoxon Signed Rank test there was even a decrease in the intention to act. The 0-hypothesis that there are no differences in the population is very unlikely for both courses (first round:  $p=0.06\%$ ; second round:  $p=0.098\%$ ).

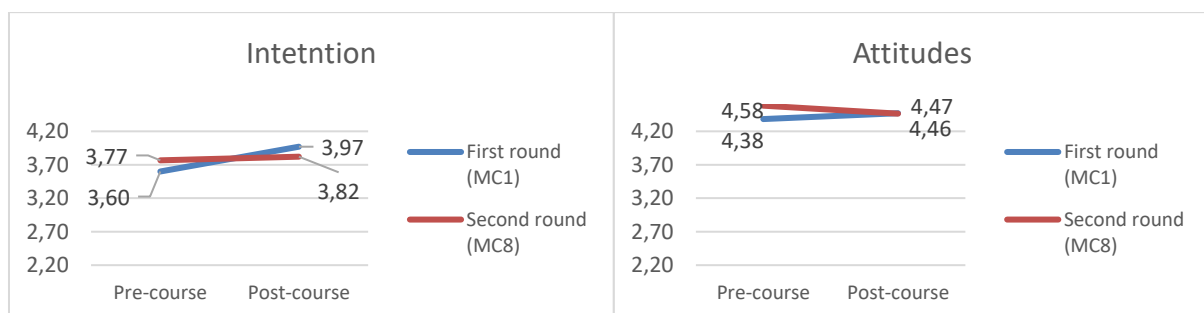
Looking at other model constructs (variables that according to our theoretical model directly or indirectly influence the intention to act responsibly), it is easy to see that the first round seems to have been clearly more effective than the second round. For the first round we observe an increase in the



mean values of all model constructs, and, according to the Wilcoxon Signed Ranks Test, a statistically significant difference between pre- and post-results for 7 out of 11 predictor variables. Differences between pre- and post-survey are most pronounced for problem and concept knowledge (+2.85 and +1.46 respectively), followed by positive and negative affective reactions (+0.56 and + 0.55 respectively). The hypothesis of a positive impact of the course on concept knowledge is also supported by the control question on concept knowledge: 13 out of 17 students stated that their concept knowledge had increased (very) much.

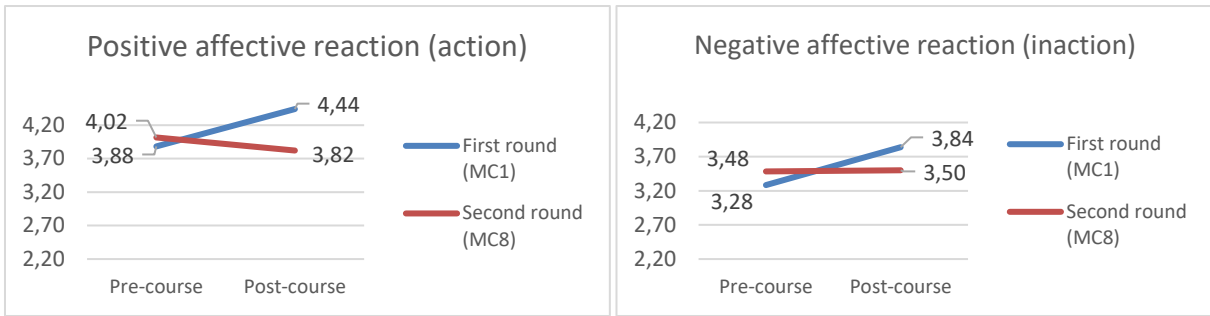
In the second round, we observe a few positive, but also negative changes in the mean values of the predictor variables. The most pronounced increase can be seen in the variable “concept knowledge” (+0.7)<sup>9</sup>, followed altruistic values (+0.6) and biospheric values (+0,2). At the same time, mean values for “attitude” and “positive affective reaction” are lower after the course than before. For “attitude”, this result is statistically significant (p=0.059) according to the Wilcoxon Signed Ranks Test calculated for the students who participated in both surveys (N=7). Other model variables do not exhibit changes that are worth mentioning.

A direct comparison of the development of mean values for model constructs for the 2 rounds can be seen in figure below. It is easy to see that increases are more pronounced in the first round. Interestingly, students participating in the second round — on average — reported higher “base” values at the beginning of the class than students participating in the first round of the course for almost all model constructs (except “altruistic values” and “ascription of responsibility”). This might be explained with the younger age and the lower degree of experience of students in the first round. It may also explain the lower effectiveness of the second round, as students already began at a high level on the scales of the model variables, making an increase more difficult.



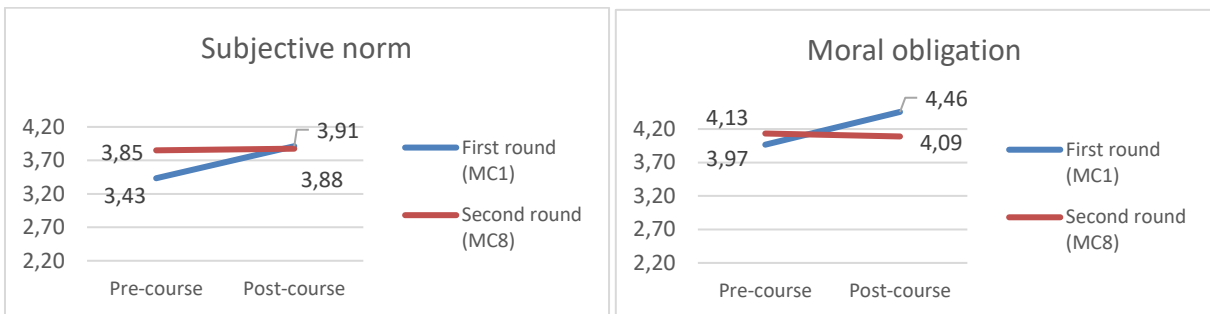
**Figure 6.1: Variables that influence the intention to act responsibly: intention, attitude – Engaging for Sustainability.**  
Source: own analysis

<sup>9</sup> Again, this result is confirmed by the control question on concept knowledge difference: 10 out of 14 students state that their concept knowledge has increased (very) much.



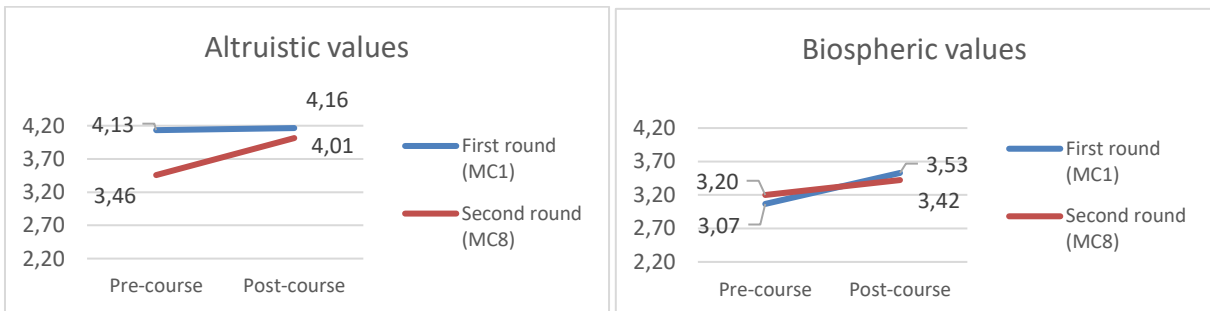
**Figure 6.2: Variables that influence the intention to act responsibly: positive affective reaction (action), negative affective reaction (inaction)– Engaging for Sustainability.**

Source: own analysis



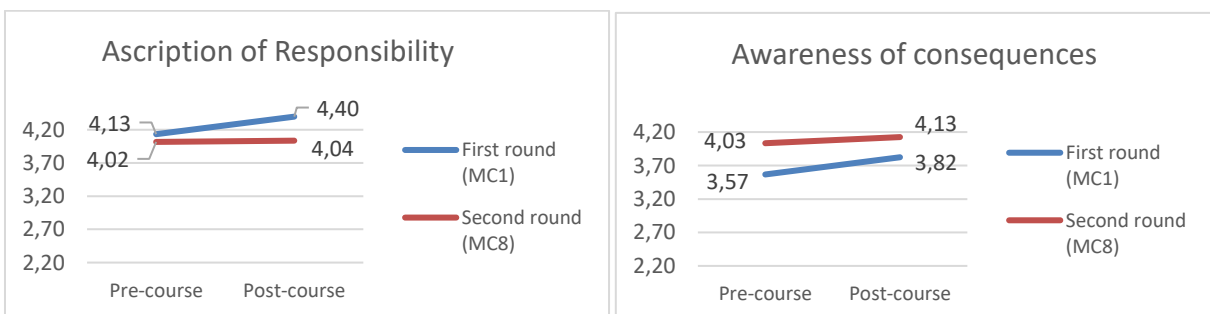
**Figure 6.3: Variables that influence the intention to act responsibly: subjective norm, moral obligation – Engaging for Sustainability.**

Source: own analysis



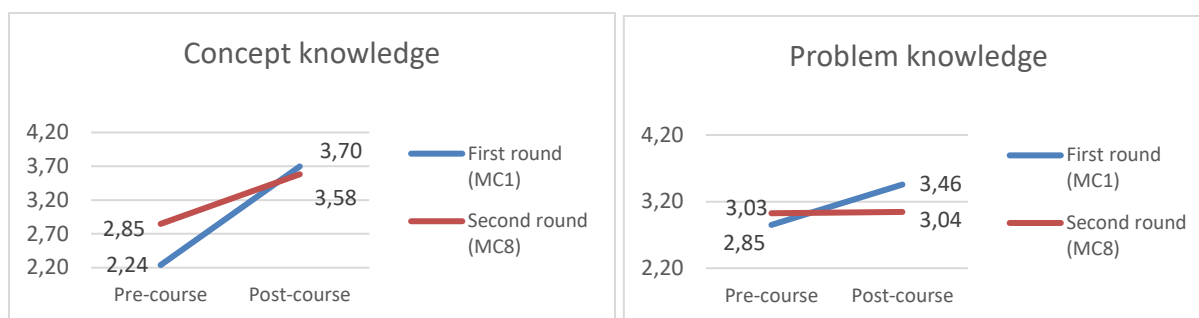
**Figure 6.4: Variables that influence the intention to act responsibly: altruistic values, biospheric values – Engaging for Sustainability.**

Source: own analysis



**Figure 6.5: Variables that influence the intention to act responsibly: ascription of responsibility, awareness of consequences – Engaging for Sustainability.**

Source: own analysis



**Figure 6.6: Variables that influence the intention to act responsibly: concept knowledge, problem knowledge – Engaging for Sustainability.**

Source: own analysis

## 6.6.5 Conclusions

The course “Engagement for Sustainability” is an innovative teaching format applying a variety of methods and approaches that have been shown to be suitable for sustainability and responsibility related teaching. The course has been tested twice, one time in fall 2020 and a second time in fall 2021, after having it slightly modified in line with expert and student feedback. The results of effectiveness teaching for the two rounds are very different. While most of the model constructs (including students’ intention to act responsibly) increased with the course in the first round, the result is mixed in the second round, where there are even negative effects on selected model constructs. In both rounds there is a pronounced positive effect on concept knowledge. In the first round, there also has been a clear effect on emotional constructs and constructs reflecting moral considerations.

We interpret the different results as follows:

- Different socio-demographic characteristics of the group (especially the significantly higher degree of women as well as the younger age of students in the first round) influenced the effectiveness of teaching.
- Values of model constructs were on average higher before the beginning of the course in the second than in the first round, making it more difficult to further increase these constructs by teaching.
- Effectiveness of teaching was also influenced by the lower capability of the teaching team to inspire and motivate students as well as the less positive evaluation of course and methods in the second round. Moreover, there was a pronounced difference between the two courses respective students feeling, if the teaching team would be a role model for them. As the teaching team did not change, we are not sure, what is the reason for this result.
- The increase of reflections confused students and increased their workload, leading to a negative impact on the general attitude towards the course. This observation is backed by qualitative feedback emphasizing a high workload of the course.

Differences in the success of the teaching method could also be due to differences in the course context and/or the challenges that students had to work on. More research is necessary to find correlations between institutional and course-specific impact variables and the effectiveness of a course.

## 6.7 Ethics in Business and Society

### 6.7.1 Dataset

Cases				
Pre only	Post only	Both	Total	Class size
3	10	9	22	25

**Table 6.22: Dataset – Ethics in Business and Society**

Source: own analysis

### 6.7.2 Course description

The course "Ethics in Business and Society" aims to introduce students to the topic of sustainability from different perspectives. In the first part, students are introduced to market failures as origins for environmental and / or social problems and discuss justice and distribution issues. In the second part, students learn about ethical theories and cultural aspects of ethics. Finally, the third part deals with Corporate Social Responsibility, including discussions about strategies and instruments for behaving more responsibly as a corporation. The course is taught in the last year of studies as an elective with 5 credit points over a period of 10 weeks. 2 teachers share the course. It involves gamification (prisoner-dilemma game, rent-seeking game), group discussion and debates, short case studies and lecture inputs. At the end of the class students are required to evaluate the CSR policies of a company and write this down in a report. Main teaching approaches employed are lecture-based learning, collaborative learning and active learning.

The course is considered as innovative teaching format.

<b>Official name of the course</b>	<b>Ethik in Wirtschaft und Gesellschaft</b>
<b>University/country</b>	Hochschule für Wirtschaft und Recht; Germany
<b>Field of education</b>	Business, administration and law
<b>Primary topic of the SR/Sustainability part of the Course</b>	Corporate Social Responsibility
<b>Audience and level of studies</b>	Students (university students, including MBA), Bachelor
<b>Group size</b>	25 (max. 50)
<b>Course duration</b>	9-12 weeks
<b>Credits</b>	5 ECTS
<b>Delivery format</b>	100% in presence
<b>Main teaching methods</b>	40% lecture 20% group discussion

	20% debate 18% case study 2 % self-reflection task/exercise
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**Table 6.23: Course description – Ethics in Business and Society**

Source: own representation

### 6.7.3 Socio-demographic characteristics, student motivation and evaluation of the course

#### Socio-demographic characteristics

Variable	Scale	Freq.
<b>Gender</b>	Male	11
	Female	10
	Divers	1
<b>Age</b>	20-24	9
	25-29	2
	30-34	1
<b>Nationality</b>	German	12
<b>Study level</b>	Bachelor	12
<b>Field of Study</b>	Business, administration and law	9
	Information and communication technologies (ICTs)	3
<b>Work Experience</b>	More than 1 year (>1) and less or equal 2 years (<=2)	22
<b>Lead Experience</b>	Less or equal 1 year (<=1)	5
<b>Volunteering</b>	No	4
	Yes	8

**Table 6.24: Socio-demographic characteristics – Ethics in Business and Society**

Source: own analysis

- Questions relating to socio-demographic characteristics - except the gender question - were only asked in the pre-course questionnaire, such that N=22 for gender and N= 12 for the rest of the questions.
- **Gender:** 10 respondents indicated to be male, another or 10 indicated to be female, 1 student stated to be divers.
- **Age:** 9 students were between 20 and 24 years old, 3 students were older.
- **Nationality:** All students who participated in the pre-course survey were German.
- All students who participated in the pre-course-survey aimed for a **Bachelor's degree**. 9 of them were studying business, administration and law, 3 of them information and communication technologies (ICTs)
- All students in the pre-course survey had more than 1 year and less than or equal to 2 years of **work experience**. 5 students had less or equal to 1 year **experience as a leader**, 8 students had already **volunteered**.

### Student's prior experience and motivation

- Questions on experience and motivation were only asked in the pre-course-questionnaire (N=12)
- 3 out of the 12 students who answered this question completed a course on sustainability before.
- 8 out of the 12 students who answered this question were personally interested in the topic of the course. They agreed and strongly agreed to the statement *"For me personally, the topic is interesting"*. 1 student disagreed, 3 were indifferent.
- 7 out of the 12 students who completed the survey found the topic generally important for the society. They agreed and strongly agreed to the statement *"I believe the topic is generally important for the society"*. 3 students were indifferent and 2 students disagreed or strongly disagreed.
- Only 5 of the 12 students surveyed thought that they would need the knowledge and competencies in their future. They agreed and strongly agreed to the statement: *"I think that I will need the knowledge and competencies in my future profession"*. 3 students were indifferent and 4 students disagreed.

### Students' evaluation of course and teaching team

- Questions on students' evaluation of course and teaching team were only asked in the post-course-questionnaire (N=19)
- 15 out of 19 (79 %) of the students surveyed found that the lecturer inspired and motivated them. 14 (74 %) students found that the lecturer was able to increase their interest in the topic. Only 6 students found that the lecturer was a role model for them. 10 students were undecided on that. 3 students disagreed or strongly disagreed with the statements that the lecturer inspired and motivated them, that the lecturer was able to increase their interest in the topic and that the lecturer was a role model for them.
- In the evaluation of the course and the methods, 14 students stated that they liked the course. The same is true for the methods.

#### 6.7.4 Teaching Effectiveness

The below table shows the mean values for the intention to act sustainably and the predicting model constructs before (N=12) and after the course (N=19) as well as the result of the Wilcoxon Signed Ranks Test for the 9 students that participated in the pre-course-survey and the post-course survey. It is easy to see that the intention to act sustainably increased on average after the course; the Wilcoxon Signed Ranks Test confirms the positive impact for the 9 students that participated in both surveys ( $p=0.048$ ).

Looking at the other model constructs (variables that according to our theoretical model directly or indirectly influence the intention to act responsibly), we observe noteworthy positive changes in the mean values for concept knowledge (+0.8)<sup>10</sup> and moral obligation (+0.7), followed by problem knowledge and ascription of responsibility (+ 0.3 resp.). The Wilcoxon Signed Ranks Test confirms a significant positive change for concept knowledge and moral obligation; additionally, subjective norm seems to have significantly increased when looking at the 9 students having participated in both surveys.

Interestingly, we also observe negative developments of mean values for some constructs, especially for altruistic values (-0.4), but also for attitude (-0.1) and positive affective reaction (-0.2). However, The Wilcoxon Signed Ranks Test does not discover any significant changes.

	Mean Values		Wilcoxon Signed Ranks Test			
	Pre-course	Post-course	Negative Rank	Positive Rank	Ties	p-value
<b>Intention</b>	3.6	3.8	2	7	0	<b>0.048**</b>
<b>Positive affective reaction (action)</b>	3.9	3.7	4	3	2	0.671
<b>Negative affective reaction (inaction)</b>	3.1	3.2	3	5	1	0.523
<b>Attitude</b>	4.4	4.2	1	5	3	0.140
<b>Subjective norm</b>	3.9	3.9	1	6	2	<b>0.071*</b>
<b>Moral obligation</b>	3.5	4.2	0	7	2	<b>0.017**</b>
<b>Altruistic values</b>	4.1	3.8	6	1	2	0.227
<b>Biospheric values</b>	3.3	3.4	3	3	3	0.739
<b>Ascription of responsibility</b>	3.9	4.2	1	5	3	0.140
<b>Awareness of consequences</b>	3.9	3.9	3	4	2	0.932
<b>Concept knowledge</b>	3.0	3.8	1	7	1	<b>0.017**</b>
<b>Problem knowledge</b>	3.1	3.4	2	6	1	0.159
* sign. at level 0.10; ** sign. at level 0.05 Pre-course survey N=12, Post-course survey N=19 Wilcoxon Signed Rank Test: only students who participated in both surveys, N= 9						
<b>Control Question</b>						
	Not at all	2	3	4	Very much	
<b>Knowledge concept difference</b>	0	0	5	9	5	
* To what extent has your detailed knowledge of the concepts mentioned above increased compared to the beginning of the course? Post-course survey N=19						

**Table 6.25: Teaching Effectiveness– Ethics in Business and Society**

Source: own analysis

<sup>10</sup> This result is confirmed by the control question on concept knowledge difference: 14 out of 19 students state that their concept knowledge has increased (very) much.

## 6.7.5 Conclusions

The course “Ethics in business and society” is an innovative teaching format, introducing students to the topic of sustainability from different perspectives. Though building also on lecture inputs (40 %), it applies a number of innovative teaching methods. Students to a major part expressed a high interest in the topic and considered the teacher as inspiring and motivating.

All in all, the course seems to have had a positive effect on the intention to act sustainably and responsibly as well as on the most important model constructs. The most pronounced effect has been observed on concept knowledge and moral obligation. Innovative methods and approaches possibly supported the positive impact of the course in general. It is difficult to explain the clearly negative development of the mean values of altruistic values, positive affective reaction and attitude – a deeper look into the data might give further insights.

## 6.8 International Week on Sustainability

### 6.8.1 Dataset

Cases				
Pre only	Post only	Both	Total	Class size
15	1	2	18	51

**Table 6.26: Dataset– International Week on Sustainability**

Source: own analysis

- In total, 18 students out of 51 (class size) could be surveyed.
- Statistical analysis is limited as only 2 students participated in both surveys.

### 6.8.2 Course description

The International Week on Sustainability is an intensive seminar which gives insight into different perspectives on sustainability (e.g. economic, legal, psychological, sociological) and that is open for all students from Berlin School of Economics and Law Berlin as well as for international students from its partner universities<sup>11</sup> of Berlin School of Economics and Law Berlin. It is divided into 2 parts – the first part composed, among other components, of seminars, (plenary) discussions field trips, corporate talks, a climate game, and the second part in which students are asked to solve a sustainability related challenge brought in by external partners (e.g. NGOs, companies) based on the service design method. Students need to hand in a report on the service design project as well as a self-reflection task. For the successful completion the 2 parts, 5 ECTS can be obtained.

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<sup>11</sup> Moreover, all students from German Universities can apply for participation.



The course is considered as innovative teaching format.

<b>Official Name of the Course</b>	<b>International Week on Sustainability</b>
<b>University/Country</b>	Hochschule für Wirtschaft und Recht; Germany
<b>Field of Education</b>	Business, administration and law
<b>Primary Topic of the SR/Sustainability Part of the Course</b>	Different perspectives on sustainability
<b>Audience and level of studies</b>	Students (university students, including MBA); Bachelor
<b>Group size</b>	51 (max. 50) <sup>12</sup>
<b>Course duration</b>	11 days
<b>Credits</b>	5 ETCS
<b>Delivery Format</b>	100% in presence
<b>Main teaching methods</b>	10% lecture 10% group discussion 5% in-class role play 35% sustainability-related consulting project 5% self-reflection task/exercise 10% interdisciplinary team teaching 10% field trip 10% vision-building exercises 5% gamification

**Table 6.27: Course description– International Week on Sustainability**  
Source: own representation

### 6.8.3 Socio-demographic characteristics, student motivation and evaluation of the course

#### Socio-demographic characteristics

Variable	Scale	Freq.
<b>Gender</b>	Male	5
	Female	13
<b>Age<sup>13</sup></b>	Below 20	1
	20-24	15
<b>Nationality</b>	American	8
	German	2
	Indian	1
	Other	6
<b>Study Level</b>	Bachelor	17
<b>Field of Study</b>	Arts and humanities	2
	Business, administration and law	12
	Engineering, manufacturing and construction	2
	Other	1
<b>Work Experience</b>	None	3
	Less or equal 1 year (<=1)	5
	>1 and <=2	6
	>2 and <=3	1

<sup>12</sup> 28 students participated in only in the 1st part, 9 students only in the 2nd part, and 14 students in both parts.

<sup>13</sup> There is 1 missing value which has been cleaned.

	>3 and <=4	1
	>4 and <=5	1
<b>Lead Experience</b>	Less or equal 1 year	2
<b>Volunteering</b>	No	9
	Yes	8

**Table 6.28: Socio-demographic characteristics – International Week on Sustainability**

Source: own analysis

- As questions on socio-demographic characteristics - except the question on gender - were only asked in the pre-course survey, data is only available from 17 students, except gender, where N=18.
- **Gender:** 13 out of 18 students were female.
- **Age:** Most students were between 20 and 24 years old. Only 1 student was younger.
- **Nationality:** Nationality varied widely. Of the main nationality groups in the dataset, 8 students were American, 2 German and 1 Indian. 6 students had another nationality (Nigerian, Taiwanese, Dutch, Czech, Ghanaian, and Puerto Rican).
- All students were **Bachelor's students**.
- Respective the **field of study**, a majority of students was studying business, administration and law.
- **Work experience** varied widely, most students had work experience less than 2 years; 2 students stated to have had **experience as leaders**.
- Approx. half of the cases (8 students) **volunteered** and the other half (9 students) did not.

#### **Student's prior experience and motivation**

- Questions on motivation were only asked in the pre-course-questionnaire (N=17)
- More than half of the students (11 students) completed a course on sustainability issues before.
- 16 out of 17 students were personally interested in the topic of the course. They agreed and strongly agreed to the statement "*For me personally, the topic is interesting*". Only 1 student was undecided.
- All students found the topic generally important for the society and thought that they would need the knowledge and competencies in their future. They agreed and strongly agreed to the respective statements.

#### **Students' evaluation of course and teaching team**

- Questions on students' evaluation of course and teaching team were only asked in the post-course-questionnaire (N=3).

- All 3 students surveyed found that the lecturers inspired and motivated them and that they were able to increase their interest in the topic. 2 students found that the lecturers were role models for them. 1 student was undecided.
- In the evaluation of the course and the methods all students surveyed liked the course and the methods. They agreed or strongly agreed to the respective questions.

#### 6.8.4 Teaching Effectiveness

Since only 2 students participated in both surveys, the statistical significance of differences in the two populations cannot be calculated. The mean values for the pre-course and the post-course and the ranks are listed in the table below, however, as the sample is different (17 respondents in the pre-course survey and 3 respondents in the post course survey), a comparison can only give an indication of a potential effect of the teaching format.

	Mean Values		Wilcoxon Signed Ranks Test		
	Pre-course	Post-course	Negative Rank	Positive Rank	Ties
<b>Intention</b>	3.7	3.8	0	2	0
<b>Positive affective reaction (action)</b>	4.3	4.2	0	1	1
<b>Negative affective reaction (inaction)</b>	4.0	3.7	0	2	0
<b>Attitude</b>	4.7	4.7	0	0	2
<b>Subjective norm</b>	4.2	4.6	0	1	1
<b>Moral obligation</b>	4.6	4.8	1	1	0
<b>Altruistic values</b>	4.4	4.3	1	1	0
<b>Biospheric values</b>	3.9	4.2	1	1	0
<b>Ascription of responsibility</b>	4.3	4.2	1	1	0
<b>Awareness of consequences</b>	4.1	4.3	0	2	0
<b>Concept knowledge</b>	2.9	4.2	0	2	0
<b>Problem knowledge</b>	3.4	3.8	0	2	0
Pre-course survey N=17, Post-course survey N=3 Wilcoxon Signed Rank Test: only students who participated in both surveys, N= 2					
Control Question					
	1 — Not at all	2	3	4	5 — Very much
<b>Difference concept knowledge</b>	0	0	1	1	1
* To what extent has your detailed knowledge of the concepts mentioned above increased compared to the beginning of the course? Post-course survey N=3					

**Table 6.29: Teaching Effectiveness – International Week on Sustainability**

Source: own analysis

Looking at the mean values for the different model constructs, it is easy to see that the most pronounced (positive) effect occurred for concept knowledge (+ 1.3), followed by problem knowledge (+ 0.5) and subjective norm (+0.3). The development of ranks (Wilcoxon Signed Ranks Test) supports this observation for problem and concept knowledge. Additionally we see an increase for both students for intention, negative affective reaction and awareness of consequences.

### 6.8.5 Conclusions

The International Week on Sustainability was an interdisciplinary intensive seminar covering many perspectives of sustainability and applying a wide array of teaching methods. As the International Week was a short-term programme lasting only 11 days, we did not expect any changes in the values of students, but would expect an increase in knowledge, as well as in model constructs such as awareness for consequences, moral obligation, subjective norm and also attitudes. As only 3 students participated in the pre-post survey, it is difficult to derive general conclusions that are backed by statistical data. However, it can be seen that for 8 out of 12 model constructs, the mean values are higher after the course than before, with pronounced increase for the 2 knowledge variables – an observation that confirms the results that we see for other teaching formats. As expected, we also observe higher values for subjective norm, moral obligation and awareness of consequences. Interestingly, the 3 students – on average did not report any change in their attitude towards sustainable behaviour, and even reported a decrease of their felt responsibility for sustainability issues.

The positive results of the survey are backed by qualitative feedback that the whole student group was asked to give at the last session of the International Week. This feedback was very positive – a number of students stated that the class was one of the best classes they had had and that they learned a lot about many sustainability issues.

## 6.9 Innovation and Technology for Sustainable Future (I06)

### 6.9.1 Dataset

Cases				
Pre only	Post only	Both	Total	Class size
1	4	7	12	14

**Table 6.30: Dataset– Innovation and Technology for Sustainable Future**

Source: own analysis

- In total, 12 students out of 14 (class size) could be surveyed.
- 7 students answered the pre-course-questionnaire and the post-course-questionnaire.

## 6.9.2 Course description

The course Innovation and Technology for a Sustainable Future is designed to improve understanding of the role innovation and technology play in sustainable development. This course goes beyond techno-utopianism and promotes a critical approach to technological innovation development in the context of sustainability. By the end of the course, students should be able to understand the challenges, benefits, and potential of developing engineering-driven solutions to sustainability problems; to evaluate the impacts of innovations and to forecast possible development trajectories for the future; and begin to create solutions to solve the complexities that relate to their adaptation as part of larger socio-technical and economic systems.

The course is delivered in an online format. Key theoretical and factual knowledge is transferred through short, pre-recorded lectures, expert interviews and recommended independent readings available for each week of the course on the learning platform. The main theoretical concepts discussed are disruptive technologies, design and management of sustainability-oriented/responsible innovations, impact assessment and stakeholder analysis, ethical issues related to sustainability and technological development, system change and transitions, as well as future studies.

Students are expected to get familiar with each lecture and the recommended materials at the beginning of the week, to be able to build upon the newly acquired knowledge in seminar sessions and in preparation of individual assignments at the end of each week. Key learnings are put to the test in individual assignments and seminar sessions with exercises utilising art-based, role-play and vision-building teaching methods that leave room for different interpretations and perspectives to be debated. In the main course project students integrate their learnings through a STEAM (Science, Technology, Engineering and Maths) approach in examining a specific disruptive technology in the context of the United Nation's Sustainable Development Goals to create their own visions of a more sustainable future in the form of a docufiction short film.

The course is considered as innovative teaching format.

<b>Official name of the course</b>	<b>Innovation and Technology for Sustainable Future</b>
<b>University/country</b>	Lappeenranta-Lahti University of Technology; Finland
<b>Field of education</b>	Engineering, manufacturing and construction
<b>Primary topic of the SR/Sustainability part of the Course</b>	Sustainability management
<b>Audience and level of studies</b>	Students (university students, including MBA), Master
<b>Group size</b>	14 (max. 30)
<b>Course duration</b>	5-8 weeks
<b>Credits</b>	3 ETCS

<b>Delivery format</b>	36% synchronous distance learning* 64% asynchronous distance learning**
<b>Main teaching methods</b>	10% lecture 20% in-class role play 20% vision-building exercise 50% arts-based teaching and learning method
*Educators and students interact at the same time from different physical locations ** Educators and students do not interact in real time	

**Table 6.31: Course description– Innovation and Technology for Sustainable Future**

Source: own representation

### 6.9.3 Socio-demographic characteristics, student motivation and evaluation of the course

#### Socio-demographic characteristics

Variable	Scale	Freq.
<b>Gender</b>	Male	3
	Female	9
<b>Age</b>	20-24	4
	25-29	3
	30-34	1
<b>Nationality</b>	Finnish	4
	French	2
	German	2
<b>Study Level</b>	Master	8
<b>Field of Study</b>	Business, administration and law	1
	Engineering, manufacturing and construction	7
<b>Work experience</b>	None	1
	Less or equal 1 year (<=1)	3
	>1 and <=2	1
	>2 and <=3	2
	>5 and <=6	1
<b>Lead Experience</b>	More than 1 year and less than or equal 2 years (>1 and <=2)	1
<b>Volunteering</b>	No	2
	Yes	6

**Table 6.32: Socio-demographic characteristics — Innovation and Technology for Sustainable Future**

Source: own analysis

- As questions on socio-demographic characteristics - except the question on gender - were only asked in the pre-course survey, data is only available from 8 students, except gender, where N=12
- **Gender:** 3/4 of the students were female.
- **Age:** 7 students had the age between 20 and 39, 1 student was older.
- **Nationality:** Half of the students was Finnish, 2 students were German and 2 were French.
- **Study Level and Field of Study:** All students were Master-Students and studied mainly engineering, manufacturing and construction. Only 1 student studied business, administration and law.

- **Work Experience, Experience as a leader, volunteering:** Work experience varied between “none” and less or equal 6 years. Only 1 respondent had experience as a leader. 6 out of 8 respondents had volunteered.

#### Students’ prior experience and motivation

- Questions on experience and motivation were only asked in the pre-course-questionnaire (N=8)
- 4 out of 8 students completed a course on sustainability before.
- 7 Students found the topic interesting and generally important for the society. They agreed and strongly agreed to the statements “*For me personally, the topic is interesting*” and “*I believe the topic is generally important for the society*”. Furthermore, 6 students thought that they would need the knowledge and competencies in their future profession. They agreed or strongly agreed to the statement “*I think that I will need the knowledge and competencies in my future profession*”).

#### Students’ evaluation of course and teaching team

- Questions on students’ evaluation of the course and the teaching team were only asked in the post-course-questionnaire (N=11)
- 8 out of 11 of the students found that the lecturer inspired and motivated them and that the lecturer was able to increase their interest in the topic (they agreed or strongly agreed to the respective statements). Only 2 students found, that the lecturer was a role model only for 2 students; 6 students disagreed or strongly disagreed with the respective statement.
- In the evaluation of the course and the methods, 8 of 11 students liked the course and the teaching methods.

#### 6.9.4 Teaching Effectiveness

In the calculation of the mean values, all students who participated in the pre-course-survey (N=8) and all the students who participated in the post-course-survey (N=11) were included. For testing the statistical relevance of these differences, we looked only at the students who participated in both surveys (N=7).

The results are summarized in the below table. According to this, the **intention** to act sustainably as a leader increases after the course. Mean values are higher after the course than before (+0.5)<sup>14</sup>, and

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<sup>14</sup> Differences to the the values in the table result from rounding procedures

the Wilcoxon Signed Ranks Test identifies statistically relevant differences in the two populations ( $p=0.039$ ).

Looking at the variables that are – direct or indirect – prescriptors of the 5 constructs that have a direct influence on the behavioural intention to act sustainably, a clear positive difference in mean values can be observed for the two **knowledge** variables (+0.4 for both) as well as for **positive affective reactions** (+0.2) and **subjective norm** (+0.2). For the students participating in both questionnaires, the difference between pre- and post is significant.

Some of the variables exhibit lower values after the course compared to the pre-course level, most pronounced for ascription of responsibility. However, these changes are not significant according to the Wilcoxon Signed Ranks Test.

	Mean Values		Wilcoxon Signed Ranks Test			
	Pre-course	Post-course	Negative rank	Positive rank	Ties	p-value
<b>Intention</b>	3.5	4.1	0	5	2	<b>0.039**</b>
<b>Positive affective reaction (action)</b>	4.1	4.3	0	5	2	<b>0.034**</b>
<b>Negative affective reaction (inaction)</b>	4.1	4.0	2	5	0	0.348
<b>Attitude</b>	4.8	4.6	3	2	2	0.783
<b>Subjective norm</b>	4.2	4.4	1	5	1	<b>0.043**</b>
<b>Moral obligation</b>	4.6	4.5	2	3	2	0.680
<b>Altruistic values</b>	4.3	4.2	1	3	1	0.131
<b>Biospheric values</b>	3.9	4.0	1	3	2	0.197
<b>Ascription of responsibility</b>	4.5	4.2	4	2	1	0.833
<b>Awareness of consequences</b>	4.4	4.5	0	6	1	<b>0.026**</b>
<b>Concept knowledge</b>	3.3	3.8	1	6	0	<b>0.062*</b>
<b>Problem knowledge</b>	3.4	3.8	1	6	0	<b>0.041**</b>
* sign. at level 0.10; ** sign. at level 0.05 Pre-course survey N=8, Post-course survey N=11 Wilcoxon Signed Rank Test: only students who participated in both surveys, N= 7						
Control Question						
	1 — Not at all	2	3	4	5 —Very much	
<b>Difference concept knowledge</b>	0	2	3	5	1	
* To what extent has your detailed knowledge of the concepts mentioned above increased compared to the beginning of the course? Post-course survey N=11						

**Table 6.33: Teaching Effectiveness- Innovation and Technology for Sustainable Future**

Source: own analysis



## 6.9.5 Conclusions

The course represents an innovative teaching format applying novel teaching methods, such as Art-based learning, vision building methods and role play. Most students were interested in the topic and positively evaluated the teaching team, the course and the methods applied.

The teaching seems to have been effective in terms of behavioral intention and 5 other model constructs. The most pronounced impact was observed for the knowledge variables, however, there was also an impact on in emotional factors (positive affective reaction) and social norms. One potential explanation for this positive result might be the combination of Art-based learning with STEM subjects, which add a humane sense making perspective to learning complex and uncertain issues.

## 6.10 21-day challenge

### 6.10.1 Dataset

Cases				
Pre only	Post only	Both	Total	Class size
10	2	10	22	22

**Table 6.34: Dataset – 21- day challenge**

Source: own analysis

- In total, 22 students out of 22 (class size) could be surveyed.
- Data could be matched for 10 students; 10 students answered only the pre-survey, and two students only the post survey. Caution should therefore be taken when comparing the means of pre-course and post-course data.

### 6.10.2 Course description

The course 21-day challenge aims to provide insights and awareness on the various sustainability-related topics derived from the 17 goals of the UN Agenda for Sustainable Development for 2030. This 1 ECTS course consists of 17 thematic videos, one for each of the 17 Sustainable Development Goals (SDGs), and related challenges. By watching the videos and accomplishing the related challenges, students can develop sustainable habits through an active gamified approach and learn more about everyday sustainability. The course is suitable for all disciplines. It has been developed in the framework of the ISSUE Erasmus+ project and is considered as innovative.

<b>Official name of the course</b>	<b>21-day challenge</b>
<b>University/country</b>	Lappeenranta-Lahti University of Technology; Finland
<b>Field of education</b>	Engineering, manufacturing and construction

<b>Primary topic of the SR/Sustainability part of the Course</b>	Sustainability management
<b>Audience and level of studies</b>	Mixed (both Students and Professionals), Master
<b>Group size</b>	22 (max. 24)
<b>Course duration</b>	1-4 weeks
<b>Credits</b>	1 ETC
<b>Delivery format</b>	10% synchronous distance learning* 90% asynchronous distance learning**
<b>Main teaching methods</b>	70% self-reflection task/exercise 30% gamification
*Educators and students interact at the same time from different physical locations ** Educators and students do not interact in real time	

**Table 6.35: Course description – 21- day challenge**

Source: own representation

### 6.10.3 Socio-demographic characteristics, student motivation and evaluation of the course

#### Socio-demographic characteristics

Variable	Scale	Freq.
<b>Gender</b>	Male	12
	Female	10
<b>Age</b>	20-24	6
	25-29	4
	30-34	5
	35-39	4
	40-44	1
<b>Nationality</b>	American	1
	Finnish	6
	French	1
	German	1
	Indian	3
	Other	8
<b>Study Level</b>	Bachelor	4
	Master	14
	Doctorate	1
<b>Field of Study</b>	Education	1
	Social sciences, journalism and information	1
	Business, administration and law	2
	Natural sciences, mathematics and statistics	1
	Information and communication technologies (ICTs)	1
	Engineering, manufacturing and construction	12
	Agriculture, forestry, fisheries and veterinary	2
<b>Work Experience</b>	None	2
	Less or equal 1 year (<=1)	3
	>1 and <=2	2

	>2 and ≤3	2
	>3 and ≤4	3
	>4 and ≤5	3
	>5 and ≤6	5
<b>Lead Experience</b>	Less or equal 1 year (≤1)	2
	>1 and ≤2	1
	>2 and ≤3	4
	>3 and ≤4	1
	More than 5 years	3
<b>Volunteering</b>	No	5
	Yes	15

**Table 6.36: Socio-demographic characteristics– 21- day challenge**

Source: own representation

### Socio-demographic characteristics

- As questions on socio-demographic characteristics - except the question on gender - were only asked in the pre-course survey, data is only available from 20 students, except gender, where N=22.
- **Gender:** There were slightly more males than females in the course.
- The **age** of the students in this course varied widely, ranging from 20 to 39 years. Please see the table above for more details.
- **Nationality:** Nationality varied widely too, with the biggest group being Finnish.
- **Study Field:** 12 out of 22 students studied engineering, manufacturing and construction. However, there were also students from other fields of study (education, social sciences, journalism and information, business, administration and law, natural sciences, mathematics and statistics, information and communication technologies (ICTs) and agriculture, forestry, fisheries and veterinary).
- There was a wide range of **Work Experience**. There were some students who had little work experience, and there were also some students who had extensive work experience. Furthermore, 10 out of 22 had experience as a leader, several of them for more than 2 years. 15 students already volunteered.

### Student's prior experience and motivation

- Questions on experience and motivation were only asked in the pre-course-questionnaire (N=20)
- 8 out of 20 students had already attended a course on sustainability.
- Almost all students found the topic interesting. They agreed and strongly agreed to the statement *"For me personally, the topic is interesting"*. 1 student disagreed with the statement.
- Almost everybody in the sample found the topic generally important for society. Only 1 student was undecided.

- 16 out of 20 students thought that they would need the knowledge and competencies in their future profession. They agreed or strongly agreed to the respective statements “*I think that I will need the knowledge and competencies in my future profession*”. 3 students were undecided and 1 student disagreed with the statement.

#### **Student’s evaluation of course and teaching team**

- Questions on students’ evaluation of the course and the teaching team were only asked in the post-course-questionnaire (N=12).
- 10 out of 12 students found that the lecturer inspired and motivated them (they agreed or strongly agreed to the respective statements). 2 students were undecided.
- 11 students found that the lecturer was able to increase their interest in the topic. 1 student disagreed with the respective statement.
- For 6 students the lecturer was a role model. 2 students were undecided and 4 students disagreed with the respective statement.
- In the evaluation of the course and the methods, 9 students liked the course and 8 students liked the teaching methods. 2 were undecided in each case. 1 student disliked the course and 2 students disliked the teaching methods.

#### **6.10.4 Teaching Effectiveness**

Overall, it seems that the course had positive effect on most model constructs. Looking at mean values, there is an increase in all variables except negative affective reaction. The increase is most pronounced for the two knowledge variables (+ 0.9 for concept knowledge and +0.8 for problem knowledge), and least pronounced for intention and attitude (+0.1 respectively). The positive effect in the model constructs is also reflected in the ranks calculated by the Wilcoxon Signed Ranks Test, however, the differences are only significant for the two knowledge variables.

The impact on knowledge can also be seen in the control question on knowledge: 9 out of 12 students found that the knowledge of the concepts related to CSR increased compared to the beginning of the course. 1 student was undecided and 2 respondents disagreed to the respective statement.



	Mean Values		Wilcoxon Signed Ranks Test			
	Pre-course	Post-course	Negative Rank	Positive Rank	Ties	p-value
<b>Intention</b>	4.0	4.1	2	6	2	0.159
<b>Positive affective reaction (action)</b>	4.4	4.7	1	4	5	0.498
<b>Negative affective reaction (inaction)</b>	4.2	4.0	4	4	2	0.778
<b>Attitude</b>	4.8	4.9	2	3	5	0.785
<b>Subjective norm</b>	4.3	4.5	3	3	4	0.916
<b>Moral obligation</b>	4.5	4.8	1	1	8	0.655
<b>Altruistic values</b>	4.3	4.5	2	3	5	0.336
<b>Biospheric values</b>	4.5	4.8	0	2	8	0.180
<b>Ascription of responsibility</b>	4.4	4.7	2	5	3	0.340
<b>Awareness of consequences</b>	4.3	4.5	2	2	6	1.000
<b>Concept knowledge</b>	3.2	4.1	1	8	1	<b>0.013**</b>
<b>Problem knowledge</b>	3.3	4.1	3	7	0	<b>0.059*</b>
* sign. at level 0,10; ** sign. at level 0,05 Pre-course survey N=20, Post-course survey N=12 Wilcoxon Signed Rank Test: only students who participated in both surveys, N= 10						
<b>Control Question</b>						
	1 — Not at all	2	3	4	5 — Very much	
<b>Difference concept knowledge</b>	0	2	1	5	4	
* To what extent has your detailed knowledge of the concepts mentioned above increased compared to the beginning of the course? Post-course survey N=12						

**Table 6.37: Teaching Effectiveness– 21- day challenge**

Source: own representation

### 6.10.5 Conclusions

The 21-day challenge is a course focused on sustainability-related topics derived from the 17 goals of the UN Agenda for Sustainable Development for 2030 which is to a major part delivered as asynchronous distance learning. It builds mainly on gamification, while at the same time disregards experiential and collaborative teaching methods and approaches.

Overall, the course seems to be effective, especially in terms of knowledge building. Effects on intention and other model constructs are positive for the population tested, however not significant. One possible explanation for the comparable low effectiveness of the course (see also chapter 6.17 for an overview) might be the lack of possibilities to discuss, reflect and exchange opinions. Although students have different cultural backgrounds, ages and experiences, the course does support interaction and collaboration. Another possible explanation is, that students participating in this voluntary course are all highly motivated and interested in the topic and begin already with relatively high “base” values in all model constructs – except for knowledge. Further research is necessary to better understand the effects of the course on students.

## 6.11 Business, Society, and the Environment

### 6.11.1 Dataset

Cases						
	Course ID	Pre only	Post only	Both	Total	Class size
Perth	IC1	1	0	2	3	40
Singapore	IC2	5	0	0	5	40
Dubai	IC3	10	2	2	14	40
	<b>Total</b>	<b>16</b>	<b>2</b>	<b>4</b>	<b>22</b>	<b>120</b>

**Table 6.38: Database– Business, Society, and the Environment**

Source: own analysis

- Data of three courses applying the same teaching format is merged.
- In total, 22 students out of 120 (total class size) could be surveyed.
- Due to the small sample size (only 4 students participated in both the pre-course and the post-course surveys), effects can only be an indication and are not statistically relevant.

### 6.11.2 Course description

<b>Official name of the course</b>	<b>MBS662 Business, Society &amp; the Environment</b>
<b>University/country</b>	Murdoch University; Australia
<b>Field of education</b>	Business, administration and law
<b>Primary topic of the SR/Sustainability part of the Course</b>	Corporate Social Responsibility
<b>Audience and level of studies</b>	Students (university students, including MBA), Bachelor
<b>Group size</b>	40 (max. 50)
<b>Course duration</b>	9-12 weeks
<b>Credits</b>	150 Hours (BUS122), 300 Hours (MBS662)
<b>Delivery format</b>	50% in presence 25% synchronous distance learning* 25% asynchronous distance learning**
<b>Main teaching methods</b>	25% lecture 20% group discussion 10% debate 25% case study 10% sustainability-related research project 10% self-reflection task/exercise
*Educators and students interact at the same time from different physical locations	
** Educators and students do not interact in real time	

**Table 6.39: Course description– Business, Society, and the Environment**

Source: own representation

The course is considered as innovative.

### 6.11.3 Socio-demographic characteristics, student motivation and evaluation of the course

#### Socio-demographic characteristics

Variable	Scale	Freq.
<b>Gender</b>	Male	12
	Female	10
<b>Age</b>	Below 20	1
	20-24	1
	25-29	3
	30-34	4
	35-39	5
	40-44	4
	45 and higher	1
<b>Nationality</b>	Chinese	1
	Indian	10
	Other	9
<b>Study Level</b>	Master	22
<b>Study Year</b>	First year	14
	Second year	4
	Third year	1
	Fourth year	1
<b>Field of Study</b>	Arts and humanities	1
	Business, administration and law	15
	Information and communication technologies (ICTs)	2
	Engineering, manufacturing and construction	1
	Services	1
<b>Work Experience</b>	None	4
	More than 3 years and less than or equal 4 years (>3 and <=4)	1
	>5 and <=6	1
	More than 6 years (>6)	14
<b>Lead Experience</b>	Less or equal 1 year	1
	>1 and <=2	2
	>2 and <=3	2
	>3 and <=4	2
	>4 and <=5	1
	More than 5 years	3
<b>Volunteering</b>	No	7
	Yes	13

**Table 6.40: Socio-demographic characteristics – Business, Society, and the Environment**

Source: own analysis

- As questions on socio-demographic characteristics - except the question on gender - were only asked in the pre-course survey, data is only available from 20 students, except gender, where N=22.
- **Gender:** There were 12 male and 10 female students in the dataset covering all 3 courses.

- **Age:** The age of the students showed a wide range, but was predominantly older than that of the students in the other courses surveyed. The above table provides an overview of the age structure in the Murdoch University dataset.
- **Nationality:** A large proportion of the respondents in the pre-course survey was Indian (N=10). 10 students had another nationality (Chinese, West Papuan, Australian, Singaporean, Tanzanian, Nigerian, Russian, and Filipino).
- **Study Level and Field of Study:** Since the course was a Master's course, all respondents were Master's students. Most students (15) studied business, administration and law.
- Many of the students had several years of **work experience**: 14 out of 20 respondents reported having more than 6 years of work experience. Of these, 11 students indicated having **experience as supervisors**. 13 out of 20 students had already done **voluntary work**.

#### Students' prior experience and motivation

- Questions on experience and motivation were only asked in the pre-course-questionnaire (N=20)
- 8 students had previously attended a course on sustainability before, 12 students had not.
- Approximately  $\frac{3}{4}$  (16 students) were personally interested in the topic of the course. They agreed or strongly agreed with the statement „*For me personally, the topic is interesting*“. 4 students were undecided.
- 15 respondents stated that the topic was generally important for the society. They agreed and strongly agreed to the statement “*I believe the topic is generally important for the society*“.
- 18 out of 20 respondents thought that they would need the knowledge and competencies in their future.

#### Students' evaluation of course and teaching team

- Questions on the evaluation of the course and the teaching team were only asked in the post-course questionnaire. Only 6 respondents participated in the post-course survey (N=6).
- All 6 respondents noted that their knowledge of the concepts related to CSR had improved compared to the beginning of the course and that the lecturer inspired and motivated them.
- 5 students felt that the lecturer had been able to increase their interest in the topic. 1 was undecided.
- 5 students considered the lecturer as a role model for them. 1 student disagreed with the corresponding statement (“*The lecturer is a role model for me*“).
- 5 students liked the course “very much“, 1 student was undecided. Also 5 students liked the teaching methods (they indicated “very much“ or the following category), 1 student stated not to have liked them.



### 6.11.4 Teaching Effectiveness

Since only 4 students participated in both surveys, statistical analysis is limited. The Wilcoxon signed rank test requires 6 cases to determine statistical significance on a  $p < 0.05$ -level.

	Mean Values		Wilcoxon Signed Ranks Test			
	Pre-course	Post-course	Negative Rank	Positive Rank	Ties	p-value
<b>Intention</b>	4.3	4.6	1	0	3	0.317
<b>Positive affective reaction (action)</b>	<i>The questions for positive affective reaction were not part of the questionnaire for Murdoch University</i>					
<b>Negative affective reaction (inaction)</b>	3.5	3.8	0	2	2	0.180
<b>Attitude</b>	4.5	4.6	1	1	2	1.000
<b>Subjective norm</b>	3.9	4.1	1	1	2	0.655
<b>Moral obligation</b>	4.6	4.7	0	0	4	1.000
<b>Altruistic values</b>	4.7	4.6	0	2	1	0.157
<b>Biospheric values</b>	4.4	4.2	0	2	2	0.157
<b>Ascription of responsibility</b>	4.1	3.7	1	1	2	0.655
<b>Awareness of consequences</b>	4.0	4.0	1	1	2	0.655
<b>Concept knowledge</b>	3.2	4.0	1	2	1	0.285
<b>Problem knowledge</b>	3.5	3.9	2	2	0	0.715
* sign. at level 0.10; ** sign. at level 0.05 Pre-course survey N=20, Post-course survey N=6 Wilcoxon Signed Rank Test: only students who participated in both surveys, N= 4						
<b>Control Question</b>						
	1 — Not at all		2	3	4	5 —Very much
<b>Difference concept knowledge</b>	0		0	0	2	4
* To what extent has your detailed knowledge of the concepts mentioned above increased compared to the beginning of the course? Post-course survey N=6						

**Table 6.41: Teaching Effectiveness – Business, Society, and the Environment**

Source: own analysis

A comparison of mean values of the model constructs shows, that values of 6 of the 11 model constructs tested in the course increased with the course, among them also the intention to take responsible business decisions. As in many other courses, the most pronounced increase can be seen in concept knowledge, followed by problem knowledge, behavioral intention and negative affective reaction. Negative effects are observable for ascription of responsibility as well as for altruistic and biospheric values.

### 6.11.5 Conclusions

While overall it is difficult to arrive at definitive conclusions given the small sample size, some observations can be offered here. The data identify that course objectives were met in terms of creating and raising awareness among students concerning sustainability and social responsibility. Given pre-existing student interest in the subject area, this has implications also for harnessing

students’ personal interest and connecting the impact of personal choices when it comes to sustainability impact on society.

Relevant here also is the importance of teaching staff who share the same passion and interest in sustainability and social responsibility and can thus be seen as critical to motivate students. Also important is that teaching staff are seen to be ‘walking their talk’ to be perceived as having both authenticity and authority. This can be seen as a critical facet of effective education in the sustainability and social responsibility space (see Corres et al. 2020).

Finally, given the cultural profile of the cohort, it is possible that comparisons with data from South Asia may be more appropriate.

## 6.12 Business Ethics

### 6.12.1 Dataset

Cases				
Pre only	Post only	Both	Total	Class size
5	8	12	25	28

**Table 6.42: Dataset – Business Ethics**

Source: own analysis

- In total, 25 students out of 28 (class size) could be surveyed.
- 12 students participated in both surveys.

### 6.12.2 Course description

The aim of the course “Business Ethics” is to familiarise students with the most important models in the field of business ethics and sustainable operations; to enable them to participate in corporate sustainability programmes through critical self-reflection; and to develop moral sensitivity and expand related expertise.

The 4 ECTS 16 teaching hours course consist of different teaching approaches and methods including lectures, group discussions, flipped classroom and self-reflective exercises, while students have to work in a project paper in self-study hours.

Business ethics is a field of science that deals with the ethical analysis of economic activities and systems of activities. This course is offered as part of the Postgraduate Specialist Training Programmes, and for this reason all students have a BA degree in different fields (such as in economics, education, law or engineering). They have knowledge and experience in corporate practice, but the ethical side of decision-making and working for a company have not been taught to them before. Responsibility is

primarily an ethical phenomenon, which is why this viewpoint emphasized in relation to CSR (Corporate Social Responsibility) and corporate sustainability. Speaking about ethics in a mainstream economics programme is still surprising and innovative in a sense, but as students' feedback show – after the acceptance of this topic – students understand why the topic is so important to deal with.

Thus, the course “Business Ethics” is innovative because it goes beyond the general debates of business ethics and debates focusing on ethical or moral dilemmas and decision-making by covering the most important concepts of sustainable and responsible business operations, i.e., the ethics of sustainability.

<b>Official name of the course</b>	<b>Business ethics</b>
<b>University/country</b>	Budapest Business School, Hungary
<b>Field of education</b>	Business, administration and law
<b>Primary topic of the SR/Sustainability part of the Course</b>	Business / corporate ethics
<b>Audience and level of studies</b>	Students (university students, including MBA), Postgraduate Specialist Training Programme
<b>Group size</b>	28 (max. 50)
<b>Course duration</b>	13-16 weeks
<b>Credits</b>	4 ECTS
<b>Delivery format</b>	40% synchronous distance learning* 60% asynchronous distance learning**
<b>Main teaching methods</b>	30% lecture 20% group discussion, 20% case study, 20 % self-reflection task/exercise 10% gamification
*Educators and students interact at the same time from different physical locations	
** Educators and students do not interact in real time	

**Table 6.43: Course description – Business Ethics**

Source: own representation

### 6.12.3 Socio-demographic characteristics, student motivation and evaluation of the course

#### Socio-demographic characteristics

Variable	Scale	Freq.
<b>Gender</b>	Male	19
	Female	6
<b>Age</b>	25-29	7
	30-34	2
	35-39	4
	40-44	4
<b>Nationality</b>	Hungarian	17
<b>Study Level</b>	Bachelor	3
	Master	4



	Other	10
<b>Field of Study</b>	Business, administration and law	16
	Engineering, manufacturing and construction	1
<b>Work Experience</b>	More than 1 year and less than or equal 2 years (>1 and <=2)	1
	>2 and <=3	1
	>3 and <=4	1
	>4 and <=5	3
	>5 and <=6	1
	More than 6 years (>6)	10
<b>Lead Experience</b>	Less or equal 1 year	5
	>1 and <=2	2
	>2 and <=3	2
	More than 5 years	3
<b>Volunteering</b>	No	16
	Yes	1

**Table 6.44: Socio-demographic characteristics– Business Ethics**

Source: own analysis

- As questions on socio-demographic characteristics - except the question on gender - were only asked in the pre-course survey, data is only available from 17 students, except gender, where N=25.
- **Gender:** The majority of respondents (19 students) were male. Only 6 students were female.
- **Age:** The age of the students varied greatly. In addition, the students were older compared to the other degree programmes. The youngest were between 25 and 29 years old. For more details, see the above table.
- **Nationality:** All students in the course were Hungarian.
- Most students are studying in the field of Business, administration and law and have at least a Bachelor degree.
- **Work experience** also varied widely, but most of the respondents (10) had more than 6 years of work experience. All students who participated in the pre-course survey had work experience.
- 12 of the students with work experience also had **experience as a leader**.
- Only 1 student had **volunteered**.

### Students' prior experience and motivation

- Questions on experience and motivation were only asked in the pre-course-questionnaire (N=17)
- 5 students had attended a course on sustainability before, 12 had not.
- 14 out of 17 of the students who participated in the pre-course survey found the topic of the course personally interesting. They agreed or strongly agreed with the claim "*For me personally, the topic is interesting*". 13 students found that the topic is generally important for the society.

Only 10 students thought that they would need the knowledge and competencies in their future profession.

### Students' evaluation of course and teaching team

- Questions on the evaluation of the course and the teaching team were only asked in the post-course questionnaire (N=17).
- 18 respondents found that the lecturer inspired and motivated them and that he/she was able to increase their interest in the topic.
- Only 10 respondents saw the lecturer as a role model. 8 students were undecided and 2 denied the corresponding statement (*"The lecturer is a role model for me"*).
- The majority liked the course (18 students) and the methods (16 students). They indicated "very much" or the following response category on the respective questions.

#### 6.12.4 Teaching Effectiveness

	Mean Values		Wilcoxon Signed Ranks Test			
	Pre-course	Post-course	Negative Rank	Positive Rank	Ties	p-value
<b>Intention</b>	3.8	4.0	1	6	5	0.101
<b>Positive affective reaction (action)</b>	4.1	4.2	2	6	4	0.421
<b>Negative affective reaction (inaction)</b>	3.6	3.6	6	4	2	0.645
<b>Attitude</b>	4.4	4.4	4	5	3	0.762
<b>Subjective norm</b>	3.9	4.1	2	6	4	0.477
<b>Moral obligation</b>	4.2	4.2	6	3	3	0.593
<b>Altruistic values</b>	3.8	4.0	3	8	1	0.152
<b>Biospheric values</b>	4.1	4.2	2	4	6	0.317
<b>Ascription of responsibility</b>	3.9	4.2	5	6	1	0.655
<b>Awareness of consequences</b>	3.7	3.9	4	7	1	0.893
<b>Concept knowledge</b>	3.0	3.7	2	8	2	<b>0.014**</b>
<b>Problem knowledge</b>	3.6	3.4	6	3	3	0.312
* sign. at level 0.10; ** sign. at level 0.05 Pre-course survey N=17, Post-course survey N=20 Wilcoxon Signed Rank Test: only students who participated in both surveys, N= 12						
Control Question						
	1 — Not at all	2	3	4	5 —Very much	
<b>Difference concept knowledge</b>	1	0	4	10	5	
* To what extent has your detailed knowledge of the concepts mentioned above increased compared to the beginning of the course? Post-course survey N=20						

**Table 6.45: Teaching Effectiveness— Business Ethics**

Source: own analysis

The above table shows the means of the pre-course survey and the post course survey. The Wilcoxon Signed Ranks Test was applied on the basis of those respondents who took part in both surveys (12 students).

The **intention** to act sustainably as a future manager seems to have increased after the course. Mean values are slightly higher after the course (+0.2), and also The Wilcoxon Signed Ranks Test shows an increase for most students, however, not significant.

Looking at the variables that directly or indirectly influence the behavioral intention, for most of the constructs – except problem knowledge – increases in the mean values are observable. The difference in mean values in concept knowledge most pronounced, and statistically significant ( $p=0.014$ ). This corresponds with the control question on concept knowledge: 15 out of 20 respondents to the post-course survey found that their knowledge of concepts related to CSR had improved compared to when they started the course.

### 6.12.5 Conclusions

The course “Business Ethics“ is an innovative course applying a variety of methods including group discussions, case studies and self-reflection tasks. Participants are in average elder than in the other courses that were tested and have work – and leadership experience. The majority of the respondents of the surveys were interested in the topic and felt themselves inspired and motivated by the teaching team. However, only concept knowledge increases significantly with the course, whereas other model variables – including the intention to act – exhibit only slight increases without statistical relevance. The comparably lower effectiveness of the course may be explained with the student characteristics – being elder they might be less receptive for changing behavioural variables such as values, norms or attitudes.

## 6.13 Responsible Management (with Escape Room)

### 6.13.1 Dataset

Cases				
Pre only	Post only	Both	Total	Class size
6	13	34	53	78

**Table 6.46: Dataset– Responsible Management (with Escape Room)**

Source: own analysis

- In total, 53 students out of 78 (class size) could be surveyed.
- 34 students participated in both surveys.

### 6.13.2 Course description

“Responsible Management“ is a Master's degree course for part-time students with 10 contact hours. The main objective of the course is to introduce students to the theoretical issues, theoretical and practical questions and dilemmas of responsible management, responsible and ethical leadership, and responsible corporate governance. It covers the following contents:

- Conceptual framework of ethics and economic ethics, linking ethics and economics, typical dilemmas and issues of ethics at micro (individual), meso (organisational) and macro (national, global) levels, professional ethics;
- The concept of corporate social responsibility, its evolution, theoretical and practical approaches;
- Modern management concepts and ethics, issues of managerial responsibility and irresponsibility;
- Social responsibility and global trends (e.g. UN global impact, responsible investment), industry specificities;
- Institutionalised frameworks and institutions of corporate responsibility, indicator systems used, the concept of corporate governance, sustainability and its areas in practice.

The course has been tested two times: One time including an Escape room with challenges related to the sustainable development goals and another time without the Escape room. The results in this chapter refer to the course including the Escape room. The course has been developed in the framework of the ISSUE Erasmus+ project. It is considered as innovative.

Official name of the course	Responsible Management (with Escape Room)
University/country	Budapest Business School; Hungary
Field of education	Business, administration and law
Primary topic of the SR/Sustainability part of the Course	Sustainability management
Audience and level of studies	Students (university students, including MBA), Master
Group size	78 (max. 50)
Course duration	13-16 weeks
Credits	3 ETC
Delivery format	100% in-presence
Main teaching methods	40% lecture 10% group discussion 20% debate 10% case study 10% self-reflection task/exercise 10 % gamification

**Table 6.47: Course description– Responsible Management (with Escape Room)**

Source: own representation

### 6.13.3 Socio-demographic characteristics, student motivation and evaluation of the course

#### Socio-demographic characteristics

Variable	Scale	Freq.
<b>Gender</b>	Male	19
	Female	34
<b>Age</b>	20-24	15
	25-29	16
	30-34	3
	35-39	3
	40-44	2
	45 and higher	1
<b>Nationality</b>	Hungarian	40
<b>Study Level</b>	Master	40
<b>Field of Study</b>	Business, administration and law	39
	Other	1
<b>Work Experience</b>	None	1
	Less or equal 1 year (<=1)	4
	>1 and <=2	11
	>2 and <=3	12
	>3 and <=4	2
	>4 and <=5	3
	>5 and <=6	2
	More than 6 years (>6)	5
<b>Lead Experience</b>	Less or equal 1 year	13
	>1 and <=2	3
	>2 and <=3	5
	>3 and <=4	1
<b>Volunteering</b>	No	24
	Yes	16

Table 6.48: Socio-demographic characteristics – Responsible Management

Source: own analysis

#### Socio-demographic characteristics

- As questions on socio-demographic characteristics - except the question on gender - were only asked in the pre-course survey, data is available from 40 students, except gender, where N=53.
- **Gender:** A majority was female (34 out of 53 respondents).
- **Age:** 31 students was between 20 and 29 years old, 9 students were older.
- **Nationality:** All students who participated in the pre-course survey were Hungarian.
- **Study Level and Field of Study:** All students in the course were aiming for a Master's degree and study business, administration and law (1 student in the pre-course survey could not be assigned to 1 of the study fields).
- Almost all students in the pre-course survey had **work experience**, only 1 had none. Work experiences ranged from less or equal 1 year to more than 6 years.



- Of the 40 students with work experience, 22 students had **experience as supervisors**. 13 of them had experience of less than or equal to 1 year, and 9 had experience of more than 1 year.
- **Volunteering**: 16 students who participated in the pre-course survey had volunteered, 24 had not.

### Students' prior experience and motivation

- Questions on experience and motivation were only asked in the pre-course-questionnaire (N=40)
- More than half of the respondents (26) had not taken part in a **course on sustainability before** 14 had done so.
- Most students (32 out of 40) agreed or strongly agreed with the statement (*"For me personally, the topic is interesting"*). 8 students were undecided, 1 student disagreed with the statement.
- 36 respondents agreed or strongly agreed to the statement *"I believe the topic is generally important for the society"*. 4 students were undecided.
- 22 respondents believed that they would need the knowledge and competencies in their future profession. They agreed or strongly agreed with the respective statements *"I think that I will need the knowledge and competencies in my future profession"*. 4 students disagreed with the statement and 14 students were undecided.

### Students' evaluation of course and teaching team

- Questions on the evaluation of the course and the teaching team were only asked in the post-course questionnaire (N=53).
- 42 students found that the lecturer inspired and motivated them (they agreed or strongly agreed with the respective statement *"The lecturer inspired and motivated me"*). 5 students were undecided.
- Almost all agreed or strongly agreed to the statement: *"The lecturer was able to increase my interest in the topic."* Only 1 student disagreed, and nobody was undecided.
- For 29 students, the lecturer was a role model. 11 students were undecided and 7 students disagreed with the respective statement. 1 of the 7 even strongly disagreed with the statement.
- In the evaluation of the course and the methods, a large proportion of the respondents (45) liked the course and the teaching methods. 2 respondents did not like the course, 1 of them did not like the methods at all.



### 6.13.4 Teaching Effectiveness

	Mean Values		Wilcoxon Signed Ranks Test			
	Pre-course	Post-course	Negative Rank	Positive Rank	Ties	p-value
<b>Intention</b>	3.9	4.2	6	21	7	<b>0.013**</b>
<b>Positive affective reaction (action)</b>	4.2	4.4	5	19	10	<b>0.002**</b>
<b>Negative affective reaction (inaction)</b>	3.9	4.0	11	18	5	0.263
<b>Attitude</b>	4.5	4.6	7	11	16	0.134
<b>Subjective norm</b>	4.2	4.3	9	15	10	<b>0.082*</b>
<b>Moral obligation</b>	4.2	4.4	10	16	8	0.255
<b>Altruistic values</b>	4.2	4.4	9	15	9	<b>0.076*</b>
<b>Biospheric values</b>	4.2	4.1	12	11	11	0.718
<b>Ascription of responsibility</b>	4.1	4.3	8	21	5	<b>0.025**</b>
<b>Awareness of consequences</b>	4.2	4.2	11	15	8	0.351
<b>Concept knowledge</b>	3.2	3.7	4	28	2	<b>0.001**</b>
<b>Problem knowledge</b>	3.4	3.8	9	23	2	<b>0.001**</b>
* sign. at level 0.10; ** sign. at level 0.05 Pre-course survey N=40, Post-course survey N=47 Wilcoxon Signed Rank Test: only students who participated in both surveys, N= 34						
<b>Control Question</b>						
	1 — Not at all	2	3	4	5 —Very much	
<b>Difference concept knowledge</b>	0	0	12	20	15	
* To what extent has your detailed knowledge of the concepts mentioned above increased compared to the beginning of the course? Post-course survey N=47						

**Table 6.49: Teaching Effectiveness– Responsible Management (with Escape Room)**

Source: own analysis

The above table shows the pre- and post-course means for all constructs in the model. All students who participated in the pre-course survey (N=40) and all students who participated in the post-course survey (N=54) were included in the calculation of the mean values. In order to test the statistical relevance of these differences, only the students who participated in both surveys were considered (N=34).

The intention to act sustainable as a future leader increased in a statistically significant manner after the course (p=0.013). Additionally, 6 of the 11 constructs that have a direct influence on the intention to act sustainably, increased significantly. Looking at mean values, the most pronounced increases can be observed for knowledge variables (+ 0.5 for concept knowledge and + 0.4 for problem knowledge), followed by intention (+ 0.3).



### 6.13.5 Conclusions

The course “Responsible Management” in combination with the Escape Room is an innovative course applying innovative teaching approaches such as debates, case studies, self-reflection tasks a gamification (especially the Escape Room). Respondents in this class were to a major part interested in the topic and evaluated positively the teaching team, the course itself and its methods. Most model constructs – including the intention for responsible and sustainable behavior as a manager – increased with the course in a statistically relevant manner.

## 6.14 Responsible Management (without Escape Room)

### 6.14.1 Dataset

Cases					
Course ID	Pre only	Post only	Both	Total	Class size
AC1	10	5	21	36	56
AC2	10	7	13	30	56
<b>Total</b>	<b>20</b>	<b>12</b>	<b>34</b>	<b>66</b>	<b>112</b>

**Table 6.50: Dataset– Responsible Management (without Escape Room)**

Source: own analysis

- The course took place two times with an identical course concept. Both courses were merged for the statistical evaluation.
- In total, 66 students out of 112 (total merged class size) could be surveyed.
- 34 students participated in both surveys.

### 6.14.2 Course description

The course is a Master's degree course for part-time students with 10 contact hours. The main objective of the course is to introduce students to the theoretical issues, theoretical and practical questions and dilemmas of responsible management, responsible and ethical leadership, and responsible corporate governance. Contents are similar to the course “Responsible Management with Escape Room” described in 6.13. However, the course does not include an Escape room and lecturing is the dominant teaching method. The course is considered here as “classical teaching approach”.

<b>Official name of the course</b>	<b>Responsible Management (without Escape Room)</b>
<b>University/country</b>	Budapest Business School; Hungary
<b>Field of education</b>	Business, administration and law
<b>Primary topic of the SR/Sustainability part of the Course</b>	Sustainability management

<b>Audience and level of studies</b>	Students (university students, including MBA), Master
<b>Group size</b>	56 (max. 51)
<b>Course duration</b>	13-16 weeks
<b>Credits</b>	3 ETCS
<b>Delivery format</b>	100% in presence
<b>Main teaching methods</b>	50% lecture 10% group discussion 20% debate 10% case study 10% self-reflection task/exercise

**Table 6.51: Course description– Responsible Management (without Escape Room)**

Source: own representation

### 6.14.3 Socio-demographic characteristics, student motivation and evaluation of the course

#### Socio-demographic characteristics

Variable	Scale	Freq.
<b>Gender</b>	Male	28
	Female	38
<b>Age</b>	20-24	18
	25-29	19
	30-34	3
	35-39	5
	40-44	6
	45 and higher	2
<b>Nationality</b>	Hungarian	54
<b>Study Level</b>	Master	54
<b>Field of Study</b>	Business, administration and law	54
<b>Work Experience</b>	None	1
	Less or equal 1 year (<=1)	7
	>1 and <=2	14
	>2 and <=3	7
	>3 and <=4	7
	>4 and <=5	2
	>5 and <=6	4
	More than 6 years (>6)	12
<b>Lead Experience</b>	Less or equal 1 year	15
	>1 and <=2	5
	>2 and <=3	2
	>3 and <=4	4
	>4 and <=5	2
	More than 5 years	3
<b>Volunteering</b>	No	30
	Yes	24

**Table 6.52: Socio-demographic characteristics – Responsible Management (without Escape Room)**

Source: own analysis

- As questions on socio-demographic characteristics - except the question on gender - were only asked in the pre-course survey, data is available from 54 students, except gender, where N=66.



- **Gender:** 28 respondents were male and 38 female.
- The **age** of the respondents varied widely, ranging from 20 to 45 years and older. However, most of the respondents (37) were younger than 30 years.
- **Nationality:** All students in the pre-course-survey were Hungarian.
- **Study level and Field of Study:** All respondents were **Master** students in the field of **business, administration and law**.
- Except 1 student, all respondents in the pre-course survey had **work experience**. Work experiences ranged from less or equal to 1 year to more than 6 years. See the above table for the distribution.
- **Experience as a supervisor** was present for 31 respondents.
- **Volunteering:** 30 respondents had not and 24 had volunteered.

#### **Students' prior experience and motivation**

- Questions on experience and motivation were only asked in the pre-course-questionnaire (N=54)
- 21 respondents had already attended a course on sustainability topics, 33 had not.
- 41 out of 54 respondents found the topic personally interesting. 6 students disagreed with the statement "*For me personally, the topic is interesting*", and 1 student strongly disagreed. 6 students were undecided.
- A majority (46) of respondents agreed or strongly agreed with the statement "*I believe the topic is generally important for the society*".
- Similarly, a major part (41) of the respondents thought that they would need the knowledge and competencies in their future profession. They agreed or strongly agreed with the respective statements "*I think that I will need the knowledge and competencies in my future profession*". 4 students disagreed or strongly disagreed and 9 students are undecided.

#### **Student's evaluation of course and teaching team**

- Questions on the evaluation of the course and the teaching team were only asked in the post-course questionnaire (N=46)
- 36 out of 46 students (78 %) found that the lecturer inspired and motivated them. 6 students disagreed or strongly disagreed with the respective statement ("*The lecturer inspired and motivated me*").
- 34 students (74 %) found that the lecturer was able to increase their interest in the topic (they agreed or strongly agreed to the respective statement: "*The lecturer was able to increase my interest in the topic*"). 3 students disagreed or strongly disagreed with the statement.

- For only 20 student (46 %) the lecturer was a role model. 20 students were undecided and 6 students disagreed or strongly disagreed with that statement “*the lecturer is a role model for me*”.
- These ratings were reflected in the evaluation of the course and the methods. 37 respondents (80%) liked the course and the methods.

#### 6.14.4 Teaching Effectiveness

	Mean differences		Wilcoxon Signed Ranks Test			
	Pre-course	Post-course	Negative Rank	Positive Rank	Ties	p-value
<b>Intention</b>	3.8	4.0	10	15	9	0.524
<b>Positive affective reaction (action)</b>	4.3	4.5	7	14	13	<b>0.056*</b>
<b>Negative affective reaction (inaction)</b>	3.5	3.8	7	16	11	<b>0.040**</b>
<b>Attitude</b>	4.5	4.6	8	13	13	0.210
<b>Subjective norm</b>	4.3	4.3	11	13	10	0.930
<b>Moral obligation</b>	4.2	4.3	8	15	11	<b>0.026**</b>
<b>Altruistic values</b>	4.0	4.2	8	20	5	<b>0.083*</b>
<b>Biospheric values</b>	3.9	4.0	3	11	18	0.136
<b>Ascription of responsibility</b>	4.1	4.2	12	11	11	0.541
<b>Awareness of consequences</b>	4.1	4.3	10	15	9	0.413
<b>Concept knowledge</b>	3.1	3.8	4	25	5	<b>0.000**</b>
<b>Problem knowledge</b>	3.4	3.7	9	20	5	<b>0.039**</b>
* sign. at level 0.10; ** sign. at level 0.05 Pre-course survey N=54, Post-course survey N=46 Wilcoxon Signed Rank Test: only students who participated in both surveys, N= 34						
Control Question						
	1 — Not at all	2	3	4	5 — Very much	
<b>Difference concept knowledge</b>	0	1	11	21	13	
* To what extent has your detailed knowledge of the concepts mentioned above increased compared to the beginning of the course? Post-course survey N=46						

**Table 6.53: Teaching Effectiveness–Responsible Management (without Escape Room)**

Source: own analysis

The table above shows the pre- and post-course means for all constructs of the model as well as the results of the Wilcoxon Signed Ranks Test for cases with matching pre-post questionnaires.

Compared to the course with the escape room, this course did not significantly increase the **intention** to act sustainably as a future leader. But significant improvements were found in 6 of the constructs that directly or indirectly influence this intention. These improvements are reflected in the differences of mean values of the pre- and post-survey. As in the course with Escape Room, the most pronounced improvements are observed for **concept knowledge (+0.7)**, followed by **negative affective reaction (+**

0.4) and **problem knowledge** (+ 0.2)<sup>15</sup>. Interestingly the increase in concept knowledge is higher than in the course with the Escape Room.

The clear increase in the knowledge variable is confirmed by the results of the control question related to knowledge: 34 of 47 surveyed students found that their knowledge of the concepts related to CSR increased compared to the beginning of the course, 11 students were undecided.

### 6.14.5 Conclusions

The course “Responsible Management” is a more classical teaching approach building mainly on lecturing, supplemented by case studies, group discussion and self-reflection tasks. It is hence still applying modern methods, however to a lower degree than the teaching formats presented before. It is a Master study programme with participants that usually have some work and partly also lead experience. Similar to the course with Escape Room, participants in this course were interested in the topic and felt motivated and inspired by the teaching team. Overall, the course seem to be effective in terms of an increase of an intention to act sustainably as well as in most of the predicting variables. However, only for 6 of the predictor variables the difference between pre- and post-values is significant. Similar to other courses, knowledge variables are affected most by the teaching format.

## 6.15 Management of Value Creation Processes

### 6.15.1 Dataset

Cases				
Pre only	Post only	Both	Total	Class size
11	3	7	21	30

**Table 6.54: Dataset – Management of Value Creation Processes**

Source: own analysis

- In total, 21 students out of 30 (class size) could be surveyed.
- 7 students participated in both surveys.

### 6.15.2 Course description

The course of “Management of Value Creation Processes” builds a framework for understanding the intricacies of managing value creation, from positioning products to attract consumer demand, motivating diverse workforces, leadership and change management, through to strategic interaction

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<sup>15</sup> Differences to the values exhibited in the table are due to rounding procedures.

with rivals in short and long-run battles for market share. Questions the course is finding answers include how a portion of the value-created can be captured as profits for distribution to shareholders and for re-investment in new innovation, and growth.

The course is offered in a lecture form which means that weekly topics are presented by the lecturer, but since the course is offered to masters' students, they are partaking in discussions related to theories, notions raised during lectures. With every topic there are case studies for discussion as well as students are required to do presentations regarding lecture topics. The exact topic of the presentations are chosen by the presenter student, and before the presentation discussed by the teacher.

Official name of the course	Management of value creation processes
University/country	Budapest Business School, Hungary
Field of education	Business, administration and law
Primary topic of the SR/Sustainability part of the Course	Sustainability management
Audience and level of studies	Students (university students, including MBA), Master
Group size	30 (max. 50)
Course duration	13-16 weeks
Credits	4 ECTS
Delivery format	100% in presence
Main teaching methods	50% lecture 10% group discussion 20% debate 10% case study 10% self-reflection task/exercise

Table 6.55: Course description – Management of Value Creation Processes

Source: own representation

### 6.15.3 Socio-demographic characteristics, student motivation and evaluation of the course

#### Socio-demographic characteristics

Variable	Scale	Freq.
Gender	Male	5
	Female	16
Age	20-24	13
	25-29	4
Nationality	Chinese	7
	Hungarian	5
Study Level	Master	18
Field of Study	Social sciences, journalism and information	1
	Business, administration and law	14
	Information and communication technologies (ICTs)	1





	Services	1
	Other	1
<b>Work Experience</b>	None	2
	Less or equal 1 year (<=1)	7
	>1 and <=2	3
	>2 and <=3	2
	>3 and <=4	2
	More than 4	2
<b>Lead Experience</b>	Less or equal 1 year	8
	>1 and <=2	1
	>2 and <=3	1
<b>Volunteering</b>	No	5
	Yes	13

**Table 6.56: Socio-demographic characteristics – Management of Value Creation Processes**

Source: own analysis

- As questions on socio-demographic characteristics - except the question on gender - were only asked in the pre-course survey, data is available from 18 students, except gender, where N=21.
- A large proportion of the respondents who took part in the pre-course survey indicated to be **female** (16), the rest were male (5).
- **Age:** The majority of respondents (13) were between **20 and 24 years** old. 4 students were between 25 and 29 years.
- **Nationality:** There was a great diversity in the nationalities of the course participants 7 students in the pre-course survey were Chinese, 5 students were Hungarian, and 6 students reported having another nationality.
- **Study level and Study Field:** All students were Master students, most of them (14) studying business, administration and law.
- Almost all respondents in the pre-course survey (16) had **work experience**, some even more than 4 years. 10 students also had **experience as supervisors**, although most of them (8) for less than or equal to 1 year.
- 13 out of 18 respondents had already volunteered.

#### **Students' prior experience and motivation**

- Questions on experience and motivation were only asked in the pre-course-questionnaire (N=18)
- Approx. 2/3 of the respondents (13) had already attended a course on sustainability issues.
- The majority of the respondents found that the topic was personally interesting (16 respondents), and generally important for the society (17 respondents) and thought that they would need the knowledge and competencies in their future (15 respondents). They agreed or strongly agreed with the corresponding statements. Only 1 or 3 students were undecided.

### Students' evaluation of course and teaching team

- Questions on the evaluation of the course and the teaching team were only asked in the post-course questionnaire (N=10)
- 9 out of 10 students, found that the lecturer inspired and motivated them. However, only 7 stated that the lecturer was able to increase their interest in the topic, 1 student even strongly disagreed with the corresponding statement and 2 students were undecided.
- 6 students indicated that the lecturer was a role model for them, 4 students were undecided.
- All 10 students who participated in the post-course survey liked the course and almost all of them (except 1 who was undecided) liked the methods.

### 6.15.4 Teaching Effectiveness

	Mean Values		Wilcoxon Signed Ranks Test			
	Pre-course	Post-course	Negative Rank	Positive Rank	Ties	p-value
<b>Intention</b>	3.7	3.5	5	2	0	0.121
<b>Positive affective reaction (action)</b>	4.2	3.7	5	2	0	0.127
<b>Negative affective reaction (inaction)</b>	3.8	3.7	4	3	0	0.799
<b>Attitude</b>	4.4	4.5	2	4	1	0.599
<b>Subjective norm</b>	4.4	4.0	3	1	3	0.141
<b>Moral obligation</b>	4.4	4.6	1	1	5	0.655
<b>Altruistic values</b>	4.4	4.1	4	1	2	0.138
<b>Biospheric values</b>	4.4	4.2	3	1	3	0.257
<b>Ascription of responsibility</b>	4.2	4.1	4	1	2	<b>0.074*</b>
<b>Awareness of consequences</b>	4.3	3.8	6	1	0	<b>0.051*</b>
<b>Concept knowledge</b>	3.4	4.0	2	5	0	0.310
<b>Problem knowledge</b>	3.6	3.8	4	3	0	0.671
* sign. at level 0.10; ** sign. at level 0.05 Pre-course survey N=18, Post-course survey N=10 Wilcoxon Signed Rank Test: only students who participated in both surveys, N= 7						
<b>Control Question</b>						
	1 — Not at all	2	3	4	5 — Very much	
<b>Difference concept knowledge</b>	0	0	0	5	5	
* To what extent has your detailed knowledge of the concepts mentioned above increased compared to the beginning of the course? Post-course survey N=10						

**Table 6.57: Teaching Effectiveness – Management of Value Creation Processes**

Source: own analysis

The above table shows the pre- and post-course survey means. Statistical significance was calculated only on the basis of those respondents who took part in both surveys (N=7).

As the table shows, the course was not able to significantly increase the intention to act sustainably among the course participants. The differences in the mean values to a major part negative, only the mean value of concept knowledge (+ 0.6) and – to a lower degree also problem knowledge (+ 0.2) experienced a considerable increase. This is reflected in the answers to the control question: Of the 10 students in the post-course survey, all found that their knowledge on sustainability issues increased after the course.

According to Wilcoxon Signed Rank Test there was even statistical significant decrease in the values of ascription of responsibility and awareness of consequences.

### 6.15.5 Conclusions

Although the participants in the course were young and motivated, the intention to act sustainably could not be increased through the course. Moreover, most variables predicting the intention to act responsible as a business leader were lower after the course than before. One reason could certainly be the use of a more classical teaching approach. Additionally, sustainability was only one part of the course, and other topics might have counteracted a potential impact of this course. Additionally, we should take into account that pre- and post-sample are difficult to compare, as there were partly different students participating in the survey.

## 6.16 Responsible and Sustainable Company

### 6.16.1 Dataset

Course ID	Cases				Course Size
	Pre only	Post only	Both	Total	
<b>AC10</b>	43	20	33	96	150
<b>AC12</b>	13	8	21	42	30
<b>AC13</b>	14	17	34	65	66
<b>AC14</b>	33	17	17	67	80
<b>AC3</b>	53	39	122	214	300
<b>AC4</b>	19	9	38	66	102
<b>AC5</b>	61	73	185	319	436
<b>AC6</b>	46	41	151	238	309
<b>AC7</b>	25	31	121	177	226
<b>AC9</b>	5	6	5	16	27
<b>Total</b>	<b>312</b>	<b>261</b>	<b>727</b>	<b>1.300</b>	<b>1.726</b>

**Table 6.58: Dataset – Responsible and Sustainable Company**

Source: own analysis

- 10 courses based on the same course concept were merged for statistical evaluation.
- In total, 1.300 students out of 1.726 (added class size) could be surveyed.

- 727 students participated in both surveys.

### 6.16.2 Course description

The course “Responsible and Sustainable Business” covers the most important concepts of sustainable/ responsible business operations. The aim of the course is to familiarize students with the most important models in the field and to enable them to participate in sustainability programs themselves. It is a course taught in a bachelor level for full-time students, with two hours of lectures per week. Contents include the following:

- The social context of responsible business operations;
- Strategy and business model, stakeholder management;
- Performance, output, impacts;
- Hungarian and Central European characteristics;
- Organizational integration of responsible business operations, management issues;
- Sustainable and responsible operation of SMEs;
- Integrated Reporting and Rankings;
- Responsible finance, responsible investment;
- Sustainability and responsibility risks;
- Social enterprises;
- Responsible consumption;
- Company Case Study.

The main teaching approach of the concept is lecturing, complemented by other teaching methods. The course is therefore considered as classical teaching format.

<b>Official name of the course</b>	<b>Responsible and Sustainable Company</b>
<b>University/country</b>	Budapest Business School, Hungary
<b>Field of education</b>	Business, administration and law
<b>Primary topic of the SR/Sustainability part of the Course</b>	Sustainability management
<b>Audience and level of studies</b>	Students (university students, including MBA), Bachelor
<b>Group size</b>	max. 300
<b>Course duration</b>	13-16 weeks
<b>Credits</b>	3 ECTS
<b>Delivery format</b>	100% in presence
<b>Main teaching methods</b>	60% lecture 10% group discussion 10% case study 10% self-reflection task/exercise 10% arts-based teaching and learning method

**Table 6.59: Dataset– Responsible and Sustainable Company**

Source: own representation

### 6.16.3 Socio-demographic characteristics, student motivation and evaluation of the course

#### Socio-demographic characteristics

Variable	Scale	Freq.	%
Gender	Male	452	34.8
	Female	844	64.9
	Diverse	4	0.3
Age	Below 20	63	6.1
	20-24	804	77.4
	25-29	94	9.0
	30-34	22	2.1
	35-39	22	2.1
	40-44	16	1.5
	45 and higher	8	0.8
Nationality	American	1	0.1
	Chinese	11	1.1
	French	14	1.3
	German	4	0.4
	Hungarian	959	92.3
	Indian	2	0.2
	Other	47	4.5
Study Level	Bachelor	1029	1.0
	Master	10	10
Field of Study	Education	11	1.1
	Social sciences, journalism and information	12	1.2
	Business, administration and law	984	1.2
	Other	32	1.2
Work Experience	None	414	39.8
	Less or equal 1 year (<=1)	267	25.7
	>1 and <=2	172	16.6
	>2 and <=3	71	6.8
	>3 and <=4	33	3.2
	>4 and <=5	21	2.0
	>5 and <=6	16	1.5
	More than 6 years (>6)	45	4.3
Lead Experience	Less or equal 1 year	203	19.5
	>1 and <=2	60	5.8
	>2 and <=3	28	2.7
	>3 and <=4	4	0.4
	>4 and <=5	10	1.0
	More than 5 years	10	1.0
Volunteering	No	504	48.5
	Yes	535	51.5

Table 6.60: Socio-demographic characteristics– Responsible and Sustainable Company  
Source: own analysis



- As questions on socio-demographic characteristics - except the question on gender - were only asked in the pre-course survey, data is available from 1039 students, except gender, where N=1300.

#### **Students' prior experience and motivation**

- Questions on experience and motivation were only asked in the pre-course-questionnaire (N=1039)
- 249 (24 %) had already attended a course on sustainability issues.
- The majority of the respondents found that the topic was personally interesting (82 %), and generally important for the society (91 %) and thought that they would need the knowledge and competencies in their future (79 %). They agreed or strongly agreed with the corresponding statements.

#### **Students' evaluation of course and teaching team**

- Questions on the evaluation of the course and the teaching team were only asked in the post-course questionnaire (N=988)
- 84 % of the students, found that the lecturer team inspired and motivated them and that the team was able to increase their interest in the topic.
- 45 % of the students indicated that the lecturer was a role model for them
- 88 % of the students who participated in the post-course survey liked the course and almost all of them liked the methods.

#### **6.16.4 Teaching Effectiveness**

The teaching format overall seems to have been effective in terms of having a positive impact on the intention to act sustainably as well as the prescribing variables. For almost all model constructs a slight increase in mean values as well as a significant change according to the Wilcoxon Signed Ranks Test is observable, most pronounced though for concept knowledge (+0.9) and problem knowledge (+ 0.3). The difference in mean values is, however, much lower than for other teaching formats and non-observable for subjective norm and ascription of responsibility.



	Mean Values		Wilcoxon Signed Ranks Test			
	Pre-course	Post-course	Negative Rank	Positive Rank	Ties	p-value
<b>Intention</b>	3.8	4.0	230	374	123	<b>&lt;0.001**</b>
<b>Positive affective reaction (action)</b>	4.2	4.4	208	324	195	<b>&lt;0.001**</b>
<b>Negative affective reaction (inaction)</b>	3.7	3.9	234	357	136	<b>&lt;0.001**</b>
<b>Attitude</b>	4.5	4.6	178	308	241	<b>&lt;0.001**</b>
<b>Subjective norm</b>	4.2	4.2	225	308	194	<b>&lt;0.001**</b>
<b>Moral obligation</b>	4.2	4.3	210	313	204	<b>&lt;0.001**</b>
<b>Altruistic values</b>	4.1	4.2	229	329	133	<b>&lt;0.001**</b>
<b>Biospheric values</b>	3.9	4.0	160	280	261	<b>&lt;0.001**</b>
<b>Ascription of responsibility</b>	4.2	4.2	220	308	199	<b>0.003**</b>
<b>Awareness of consequences</b>	4.0	4.1	281	323	123	<b>0.016**</b>
<b>Concept knowledge</b>	2.9	3.8	65	619	43	<b>&lt;0.001**</b>
<b>Problem knowledge</b>	3.3	3.6	196	467	64	<b>&lt;0.001**</b>
* sign. at level 0.10; ** sign. at level 0.05 Pre-course survey N=1039, Post-course survey N=988 Wilcoxon Signed Rank Test: only students who participated in both surveys, N= 727						
<b>Control Question</b>						
	1 — Not at all	2	3	4	5 —Very much	
<b>Difference concept knowledge</b>	4	24	166	489	305	
* To what extent has your detailed knowledge of the concepts mentioned above increased compared to the beginning of the course? Post-course survey N=988						

**Table 6.61: Teaching Effectiveness– Responsible and Sustainable Company**

Source: own analysis

### 6.16.5 Conclusions

The classical teaching format “Responsible and Sustainable Company” attracts mostly Bachelor Student from the area of Business, Administration of law. Though most model constructs exhibited higher values after than before the course, changes were very modest and most pronounced for knowledge variables. This is the case despite the fact, that students seems to be highly motivated and inspired and expressed a high interest for the topic. We might deduce from this that classical teaching seems to work well especially on knowledge building, but less on moral or emotional variables present in the model.

## 6.17 Summary

In the previous subchapter 15 courses<sup>16</sup> (one course twice) applying different teaching formats were described and analysed with regard to their potential to have a positive impact on students' intention to act sustainably and responsibly in their potential role as manager or leader and on variables that have been suggested to influence this behavioural intention (see chapter see chapter 2 for the theoretical discussion and overview of the model). For 9 of these courses sufficient data was collected to test if there are potential differences in the constructs before and after the course and if these are statistically relevant. For this we used the Wilcoxon Signed Ranks Test, which requires that we can match pre- and post course surveys of the respondents. Independent from this mean values of the constructs of the model were calculated for all students taking part of the pre- and/or post-survey and compared in order to see, if the post-course sample exhibits higher values in the model construct than the pre-course sample. As the population of the pre-course survey and post course survey is not necessarily the same, results of this comparison must be treated with caution and can only be an indication for the effect of the course.

Overall, for almost all teaching formats with a clear focus on sustainability and responsibility concepts positive effects either on intention or its prescribing variables have been observed. Only one course that integrated sustainability as one minor topic into a general class on strategic management ("Management of Value Creation") did not have any meaningful impact on any of the model constructs. From this observation we may derive, that teaching for sustainability and responsibility does have an effect on (intended) responsible leadership behaviour. The effect of teaching is in all cases most pronounced on the knowledge variables, especially on concept knowledge, and with some distance also on intention, positive affective reactions and moral obligation.

However, there have been differences in the degree of observed effectiveness and in the statistical relevance of the observed effects.<sup>17</sup> Within the chapters, a first interpretation of the results was given, hinting at a potential influence of age and gender (see for example results of the two tests of the course "Engaging for Sustainability"), the motivation and knowledge of students reflected partially in the scores of model constructs at the beginning of the class (see for example results of the 21 Day challenge) and/or of the teaching approaches and methods applied. For example, while the course "Ethics in Business and Society", which employs a number of innovative and suitable teaching methods, worked well in terms of effectiveness, this was not the case for the course "Business Ethics" relying more on classical methods.

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<sup>16</sup> The course "Engaging for sustainability) was tested twice as slight modifications in the concept has been made.

<sup>17</sup> Note that statistical significance also depends on sample size.



The table below contains only those courses for which sufficient data was collected and the significance of the differences could be calculated. The table merges the result of the calculation of differences of the pre- and post-survey (with student populations that do not perfectly match) as well as statistical relevance which was calculated for pairings (matched survey data) which is exhibited with one or two asterisks depending on the p-value that was calculated (\* sign. at level 0.10; \*\* sign. at level 0.05). Please note that the statistical relevance marked with the asterisks does not refer to the mean difference exhibited in the same cell, but to the result of the Wilcoxon Signed Ranks Test based on matched survey data.

	Cases both surveys	Intention	Positive affective reaction (action)	Negative affective reaction (in-action)	Attitude	Subjective norm	Moral obligation
Engaging for Sustainability (IO5) <sup>1</sup>	N=12	<b>0.37*</b>	<b>0.56**</b>	<b>0.55**</b>	0,09	<b>0.48*</b>	<b>0.49*</b>
Engaging for Sustainability (IO5, 2nd test) <sup>1</sup>	N=7	<b>0.05*</b>	-0,2	0,02	<b>-0.12*</b>	0,02	-0,04
Ethics in Business and Society <sup>1</sup>	N=9	<b>0.20**</b>	-0,18	0,18	-0,14	<b>-0.01*</b>	<b>0.64**</b>
Innovation for a sustainable future <sup>1</sup>	N=7	<b>0.57**</b>	<b>0.17**</b>	-0,08	-0,18	<b>0.19**</b>	-0,15
21-Day Challenge <sup>1</sup>	N=10	0,1	0,31	-0,27	0,09	0,2	0,28
Responsible Management (with Escape Room) <sup>1</sup>	N=34	<b>0.29**</b>	<b>0.26**</b>	0,11	0,17	<b>0.17*</b>	0,17
Responsible Management (without Escape Room) <sup>2</sup>	N=34	0,18	<b>0.17*</b>	<b>0.37**</b>	0,06	-0,01	<b>0.12**</b>
Management of value creation processes <sup>2</sup>	N=7	-0,14	-0,49	-0,07	0,16	-0,39	0,22
Business ethics <sup>2</sup>	N=12	0,17	0,07	0,07	0,04	0,19	0,03
Responsible and sustainable company <sup>2</sup>	N=727	<b>0.12**</b>	<b>0.14**</b>	<b>0.16**</b>	<b>0.07**</b>	<b>0.06**</b>	<b>0.08**</b>
	Cases both surveys	Altruistic values	Bio-spheric values	Ascription of responsibility	Awareness of consequences	Concept knowledge	Problem knowledge
Engaging for Sustainability (IO5) <sup>1</sup>	N=12	0,03	0,46	<b>0.26*</b>	0,26	<b>1.46**</b>	<b>2.85**</b>
Engaging for Sustainability (IO5, 2nd test) <sup>1</sup>	N=7	0,56	0,22	0,02	0,09	0,73	3,03
Ethics in Business and Society <sup>1</sup>	N=9	-0,37	0,05	0,29	0,01	<b>0.81**</b>	0,29
Innovation for a sustainable future <sup>1</sup>	N=7	-0,09	0,08	-0,27	<b>0.11**</b>	<b>0.43*</b>	<b>0.41**</b>
21-Day Challenge <sup>1</sup>	N=10	0,17	0,36	0,3	0,22	0.88**	0.82*
Responsible Management (with Escape Room) <sup>1</sup>	N=34	<b>0.19*</b>	-0,08	<b>0.17**</b>	-0,02	<b>0.53*</b>	<b>0.33**</b>
Responsible Management (without Escape Room) <sup>2</sup>	N=34	<b>0.22*</b>	0,18	0,09	0,14	<b>0.67**</b>	<b>0.22**</b>
Management of value creation processes <sup>2</sup>	N=7	-0,3	-0,26	<b>-0.14*</b>	<b>-0.56*</b>	0,62	0,18
Business ethics <sup>2</sup>	N=12	0,22	0,03	0,23	0,15	0,71	-0,15
Responsible and sustainable company <sup>2</sup>	N=727	<b>0.06**</b>	<b>0.15**</b>	<b>0.06**</b>	<b>0.07**</b>	<b>0.94**</b>	<b>0.28**</b>
<sup>1</sup> Innovative courses		<sup>2</sup> Classical courses					

**Table 6.62: Overview effectiveness of tested courses**

Source: own analysis

Comparing results of the different courses the following observations can be derived:

- Innovative teaching formats in general seem to work better in terms of (significantly) increasing the identified model constructs than classical one. This is also true for the classical course “Responsible and sustainable company”. Even if there is a significant positive increase for the paired data in all model constructs, the increase in mean values is partly very low.
- Courses seem to address different constructs: While some courses (e.g. “Engaging for Sustainability” and “Responsible Management with Escape Room”) address a variety of constructs, other courses are powerful in addressing moral constructs and/or knowledge constructs (e.g. Ethics in Business and Society)
- Knowledge variables seem to be impacted most by teaching. Additionally, among the variables that are impacted most and/or best by the courses tested are first and foremost knowledge variables, followed by intention, affective reactions and moral obligation. (Biospheric) values as well as ascription of responsibility seems to have been impacted less.

## 7 OVERALL ANALYSES OF THE DATASET

In this chapter we present the results of different analyses conducted on the whole dataset. More specifically, we address the following topics: First, we examine the effectiveness of teaching in general (chapter 7.1). Second, we analyse differences between innovative and classical teaching in terms of their effectiveness (chapter 7.2). And third, we investigate the influence of several impact variables (chapter 7.3).

### 7.1 Teaching effectiveness in general

In order to test the effectiveness of teaching in general a one-way repeated measures MANOVA was conducted. Statistically significant differences between the combined dependent variables were observed,  $F(12, 800) = 92,755$ ,  $p < 0,001$ , partial Eta Squared = 0,582, Wilks’ Lambda = 0,418. The results of the post-hoc univariate ANOVAs with repeated measures for every dependent variable are summarised in the following table. Here we can observe that the differences of pre- and post-course testings are significant for all constructs. This means that teaching in general is effective. We can also observe that the strongest effect is present for the knowledge constructs (problem and concept knowledge).



<b>Teaching effectiveness</b>			
Pre-Post			
	F (Parameter F(1. 811))	Sig.	Partial Eta Squared
Intention	48.9	<b>0.0</b>	0.057
Positive affective reaction (action)	42.0	<b>0.0</b>	0.049
Negative affective reaction (inaction)	23.1	<b>0.0</b>	0.028
Attitude	25.9	<b>0.0</b>	0.031
Subjective norm	21.7	<b>0.0</b>	0.026
Moral obligation	19.1	<b>0.0</b>	0.023
Biospheric values	38.0	<b>0.0</b>	0.045
Altruistic values	25.4	<b>0.0</b>	0.030
Ascription of responsibility	8.7	<b>0.0</b>	0.011
Awareness of consequences	9.3	<b>0.0</b>	0.011
Concept knowledge	1017.6	<b>0.0</b>	0.556
Problem knowledge	218.8	<b>0.0</b>	0.212

**Table 7.1: Effectiveness of teaching in general**  
Source: own analysis

## 7.2 Comparison of innovative and classical teaching

Respective the comparison of innovative teaching formats (i.e. treatment group) and classical teaching formats (i.e. control group) a repeated measures MANOVA was conducted. In the following, only the results of the post-hoc factorial ANOVAs with repeated measures (included in this analysis) will be reported as they show those results that are of the highest relevance for the question we aim to answer here: in which constructs the groups with innovative teaching formats and classical teaching formats differ in their effectiveness. The main criterion for the classification into either the treatment or control group was the proportion of the teaching method “lecture” used in the courses. Courses with a lecture share of 50% or more are classified as classical teaching, courses with a lecture share of less than 50% are classified as innovative.

Here we found that innovative and classical teaching formats differ significantly in the following constructs: intention, affective reactions (positive in case of action), subjective norm, ascription of responsibility and knowledge (concept knowledge) (see table 7.2). This means, that regarding these determinants of behaviour innovative teaching and classical teaching seem to differ in their impact.

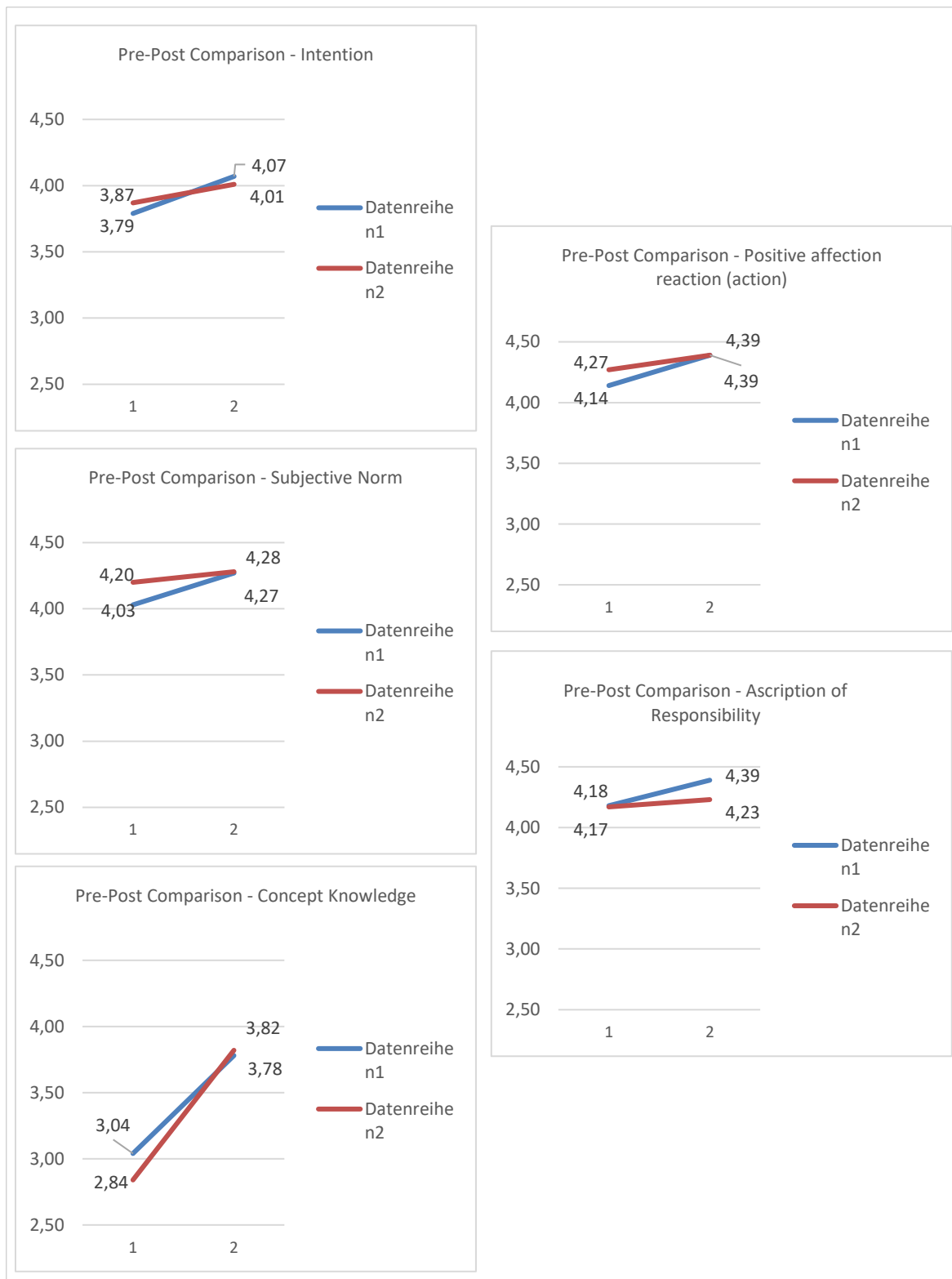
While for all the named constructs except concept knowledge, innovative teaching seems to be more successful than classical teaching, the opposite is true for concept knowledge. Here, the classical teaching seems to be more effective than the treatment (i.e. innovative teaching) (see figure 7.1).

However, further analyses conducted (see chapter 7.3. for detailed descriptions and results) have shown that the differences between innovative and classical teaching formats in terms of effectiveness may be influenced in part by characteristics of the students who participated in the teaching formats. Those include especially students' age as well as their motivation for the course participation.

<b>Differences between innovative teaching and classical teaching in terms of effectiveness</b>			
Pre-Post * Treatment			
	F (Parameter F(1. 810))	Sig.	Partial Eta Squared
Intention	4.387	<b>0.037**</b>	0.005
Positive affective reaction (action)	3.577	<b>0.059*</b>	0.004
Negative affective reaction (inaction)	1.073	0.301	0.001
Attitude	0.001	0.977	0.000
Subjective norm	6.439	<b>0.011*</b>	0.008
Moral obligation	1.196	0.274	0.001
Biospheric values	0.311	0.577	0.000
Altruistic values	1.080	0.299	0.001
Ascription of responsibility	3.803	<b>0.052*</b>	0.005
Awareness of consequences	0.655	0.418	0.001
Concept knowledge	7.234	<b>0.007**</b>	0.009
Problem knowledge	0.529	0.467	0.001
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.2: Differences between innovative and classical teaching in terms of effectiveness**

Source: own analysis



**Figure 7.1: Differences in teaching effectiveness between innovative and classical teaching (visualized for significant constructs)**

Source: own analysis

## 7.3 Impact Variables

### 7.3.1 General remarks

In chapter 7.3 we put a focus on the teaching effectiveness influencing factors, the so called impact variables introduced in chapter 3. We examine whether they have an impact on teaching effectiveness and how this impact looks like. Of the impact variables presented in chapter 3, only the "student characteristics" (that were measured via the Controlling Tool) are considered in the following<sup>18</sup>. This is due to the fact that the data from the lecturer survey, providing information on the other impact variables, had too little variance to be statistically analysed. The analyses presented here are guided by the following hypotheses:

- The effect of sustainability- and responsibility-related teaching on the intention of students to act as responsible leaders is moderated by a set of impact variables.
- The effect of sustainability- and responsibility-related teaching on variables predicting the intention of students to act as responsible leaders is moderated by a set of impact variables.

The following chapters 7.3.2 - 7.3.9 are all structured in the same way. First, we look at the influence of the specific impact variable focused in the according chapter on teaching effectiveness in general. Here we show results of factorial ANOVAs with repeated measures (in the case of gender, nationality, lead experience, voluntary work, and prior knowledge and consciousness on sustainability) and ANCOVAs with repeated measures (in the case of age, work experience, and motivation for the course) conducted. Then we include the factor "innovative vs. classical teaching" into the analysis. Here we present results of mixed factorial ANOVAs with repeated measures (in the case of gender, nationality, lead experience, voluntary work, and prior knowledge and consciousness on sustainability) and mixed factorial ANCOVAs with repeated measures (in the case of age, work experience, and motivation for the course).

### 7.3.2 Gender

#### 7.3.2.1 *The influence of gender on teaching effectiveness in general*

A factorial ANOVA with repeated measures was conducted to determine the influence of the impact variable gender on teaching effectiveness in general. In the questionnaire, there was an option not only to indicate whether one was female or male, but also to indicate "diverse". Only a few people

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<sup>18</sup> The impact variables "level of study" and "disciplinary affiliation" have not been taken into account in the analyses presented here as a large proportion of cases was Bachelor students and students studying in the field of business, administration and law.

assigned themselves to this category. Therefore, for the following calculations, the two “diverse” cases were set as missing values.

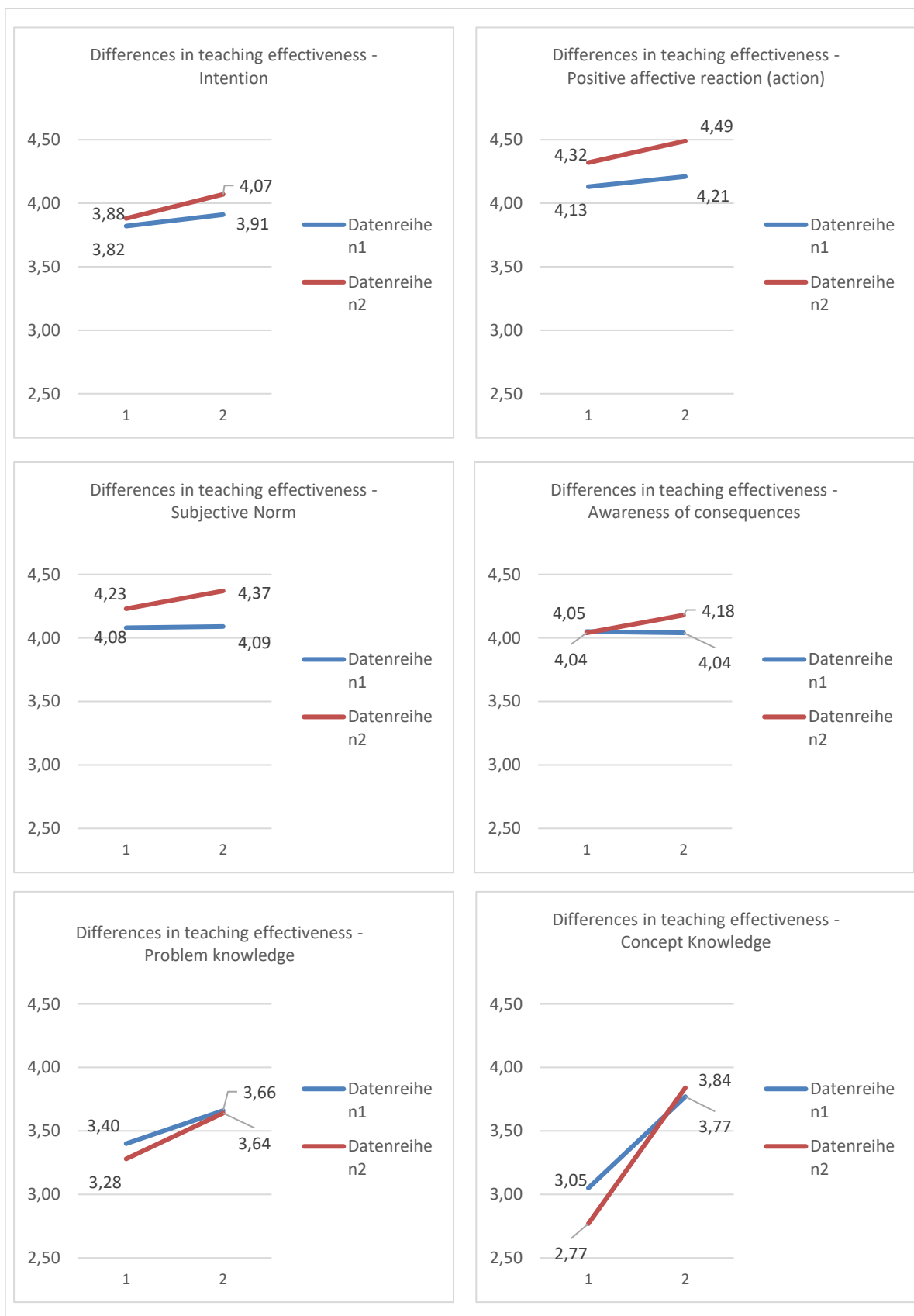
As the table below shows, there are significant interactions within subject in the constructs intention, positive affective reactions (in case of action), subjective norm, moral obligation, awareness of consequences and the two knowledge constructs (concept knowledge and problem knowledge). This means that for those constructs there is a difference in teaching effectiveness for the different gender groups.

<b>Teaching effectiveness in general in regard to gender groups</b>			
Pre-Post * Gender			
	F (Parameter F(1. 808))	Sig.	Partial Eta Squared
Intention	5.878	<b>0.016**</b>	0.007
Positive affective reaction (action)	3.961	<b>0.047**</b>	0.005
Negative affective reaction (inaction)	0.748	0.387	0.001
Attitude	0.486	0.486	0.001
Subjective norm	7.566	<b>0.006**</b>	0.009
Moral obligation	2.914	<b>0.088*</b>	0.004
Biospheric values	0.006	0.938	0.000
Altruistic values	0.266	0.606	0.000
Ascription of responsibility	0.597	0.440	0.001
Awareness of consequences	6.050	<b>0.014**</b>	0.007
Concept knowledge	33.493	<b>0.000**</b>	0.040
Problem knowledge	4.714	<b>0.030**</b>	0.006
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.3: Teaching effectiveness in general in regard to gender groups**

Source: own analysis

The figure below illustrates the differences between male and female students for the significant constructs (for those significant at level 0.05). Teaching effectiveness in general is higher for females.



**Figure 7.2: Differences in teaching effectiveness between gender groups**  
Source: Own analysis



There are also significant main effects between subject groups, which means that there are in general differences between female and male students. The table below shows that this is the case in almost all constructs, with 2 exceptions in biospheric values and awareness of consequences.

<b>Differences between gender groups</b>			
Between-Subject-Effects			
	F (Parameter F(1. 808))	Sig.	Partial Eta Squared
Intention	6.914	<b>0.009**</b>	0.008
Positive affective reaction (action)	34.619	<b>0.000**</b>	0.041
Negative affective reaction (inaction)	40.135	<b>0.000**</b>	0.047
Attitude	24.817	<b>0.000**</b>	0.030
Subjective norm	32.148	<b>0.000**</b>	0.038
Moral obligation	13.563	<b>0.000**</b>	0.017
Biospheric values	0.615	0.433	0.001
Altruistic values	37.443	<b>0.000**</b>	0.044
Ascription of responsibility	31.166	<b>0.000**</b>	0.037
Awareness of consequences	1.989	0.159	0.002
Concept knowledge	5.761	<b>0.017**</b>	0.007
Problem knowledge	3.443	<b>0.064*</b>	0.004
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.4: Differences between gender groups**  
Source: own analysis

### 7.3.2.2 Differences between innovative and classical teaching and gender

In section 7.2 we compared innovative and classical teaching formats and highlighted differences between them in terms of teaching effectiveness. When gender is introduced as a controlled variable here, using a mixed factorial ANOVA with repeated measures, the effects remain the same (see table 7.5). This means that the differences previously found are independent of gender.

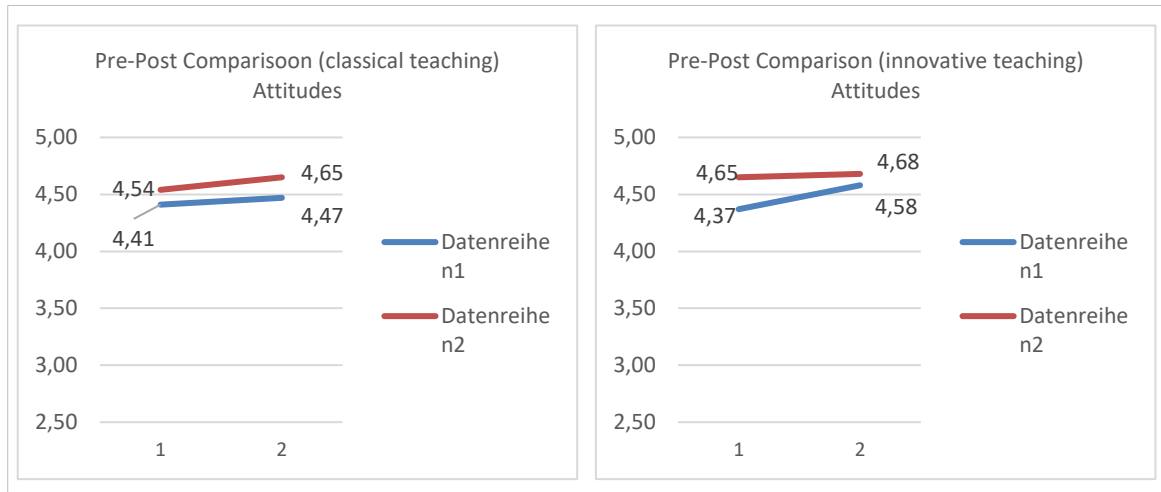
Besides, when examining the extent to which the innovative and classical formats differ in terms of their effectiveness among the different gender groups, a significant interaction effect can be seen for the construct attitude (table 7.6). Here we can observe that the innovative teaching is more successful in teaching males attitudes (see figure 7.3).

<b>Differences between innovative and classical teaching controlled by gender</b>			
PrePost1 * Treatment (controlled by gender)			
	F (Parameter F(1. 806))	Sig.	Partial Eta Squared
Intention	5.858	<b>0.016**</b>	0.007
Positive affective reaction (action)	2.799	<b>0.095*</b>	0.003
Negative affective reaction (inaction)	0.834	0.361	0.001
Attitude	0.359	0.549	0.000
Subjective norm	4.460	<b>0.035*</b>	0.006
Moral obligation	0.664	0.415	0.001
Biospheric values	0.162	0.687	0.000
Altruistic values	1.590	0.208	0.002
Ascription of responsibility	5.284	<b>0.022**</b>	0.007
Awareness of consequences	0.546	0.460	0.001
Concept knowledge	6.069	<b>0.014**</b>	0.007
Problem knowledge	0.159	0.690	0.000
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.5: Differences between innovative and classical teaching controlled by gender**  
Source: own analysis

<b>Teaching effectiveness of innovative and classical teaching in regard to gender groups</b>			
PrePost1 * Treatment * Gender			
	F (Parameter F(1. 806))	Sig.	Partial Eta Squared
Intention	1.637	0.201	0.002
Positive affective reaction (action)	0.464	0.496	0.001
Negative affective reaction (inaction)	0.110	0.741	0.000
Attitude	3.783	<b>0.052*</b>	0.005
Subjective norm	1.719	0.190	0.002
Moral obligation	0.965	0.326	0.001
Biospheric values	0.301	0.583	0.000
Altruistic values	0.697	0.404	0.001
Ascription of responsibility	2.038	0.154	0.003
Awareness of consequences	0.153	0.696	0.000
Concept knowledge	0.030	0.861	0.000
Problem knowledge	1.373	0.242	0.002
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.6: Teaching effectiveness of innovative and classical teaching in regard to gender groups**  
Source: own analysis



**Figure 7.3: Differences in teaching effectiveness (in terms of attitude) of innovative and classical teaching for different genders**

Source: own analysis

### 7.3.3 Age

#### 7.3.3.1 The influence of age on teaching effectiveness in general

An ANCOVA with repeated measures was conducted to determine the effects of age on teaching effectiveness in general. In regard to the interaction, 4 constructs are statistically significant: subjective norm, biospheric values, problem knowledge and concept knowledge (see table 7.7). This means that there seem to be differences in the effectiveness of teaching depending on the age of students.

Teaching effectiveness in regard to age			
Pre-Post * Age			
	F (Parameter F(1. 802))	Sig.	Partial Eta Squared
Intention	0.672	0.413	0.001
Positive affective reaction (action)	0.050	0.823	0.000
Negative affective reaction (inaction)	0.094	0.760	0.000
Attitude	0.000	0.999	0.000
Subjective norm	2.734	<b>0.099*</b>	0.003
Moral obligation	0.347	0.556	0.000
Biospheric values	6.197	<b>0.013**</b>	0.008
Altruistic values	0.491	0.484	0.001
Ascription of responsibility	0.312	0.577	0.000
Awareness of consequences	2.507	0.114	0.003
Concept knowledge	12.473	<b>0.000**</b>	0.015
Problem knowledge	3.868	<b>0.050*</b>	0.005

\* sign. at level 0.10; \*\* sign. at level 0.05

**Table 7.7: Teaching effectiveness in regard to age**

Source: own analysis

To find out how the differences look like, the Pearson correlation coefficients between age and the differences between post-course survey and pre-course survey values for the four different constructs were calculated. They show a tendency that teaching is less effective in terms of fostering knowledge and biospheric values the higher the age (see table 7.8).

<b>Correlation of the differences between post-course survey and pre-course survey values and age</b>			
	Pearson Correlation	Sig.	N
Subjective norm	-0.038	0.270	863
Biospheric values	<b>-.079*</b>	0.022	863
Concept knowledge	<b>-.114**</b>	0.001	863
Problem knowledge	<b>-.072*</b>	0.035	863

**Table 7.8: Correlation of the differences between post-course survey and pre-course survey values and age**  
Source: own analysis

It was also found that students differ in many respects according to their age in general (main effects of ANCOVA with repeated measures). Age makes a difference in the values of the following constructs: intention, subjective norm, biospheric values, ascription of responsibility, awareness of consequences and both knowledge constructs (concept knowledge and problem knowledge) (see table 7.9).

<b>Differences in age</b> Between-Subject-Effects			
	F (Parameter F(1. 802))	Sig.	Partial Eta Squared
Intention	14.826	<b>0.000**</b>	0.018
Positive affective reaction (action)	0.213	0.645	0.000
Negative affective reaction (inaction)	0.245	0.621	0.000
Attitude	2.177	0.140	0.003
Subjective norm	7.218	<b>0.007**</b>	0.009
Moral obligation	0.144	0.705	0.000
Biospheric values	21.496	<b>0.000**</b>	0.026
Altruistic values	0.021	0.886	0.000
Ascription of responsibility	3.311	<b>0.069*</b>	0.004
Awareness of consequences	21.601	<b>0.000**</b>	0.026
Concept knowledge	4.269	<b>0.039**</b>	0.005
Problem knowledge	9.574	<b>0.002**</b>	0.012
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.9: Differences in age**  
Source: own analysis



Calculated Pearson correlation coefficients (correlations of pre-course survey values of the different constructs and age) indicate the tendency that at the course beginnings the intention, the subjective norm, and the commitment to biospheric values are higher the older the respondents are. The same is seen in the awareness of consequences, ascription of responsibility and the 2 knowledge constructs: there is a tendency that the older the respondents are, the more they are aware of consequences, ascribe the responsibility for those to themselves and the more they already know about sustainability-related problems as well as concepts for solving them.

Correlation of the values in the pre-course survey and age			
	Pearson Correlation	Sig.	N
Intention	<b>.117**</b>	0.000	1276
Subjective norm	<b>.079**</b>	0.004	1295
Biospheric values	<b>.186**</b>	0.000	1277
Ascription of responsibility	<b>.072**</b>	0.010	1295
Awareness of consequences	<b>.126**</b>	0.000	1295
Concept knowledge	<b>.104**</b>	0.000	1295
Problem knowledge	<b>.103**</b>	0.000	1295
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.10: Correlation of the values in the pre-course survey and age**

Source: own analysis

### 7.3.3.2 Differences between innovative and classical teaching and age

We have seen in the previous subchapter that respondents were already different in terms of some constructs when they entered the courses and also that teaching itself is more effective for some constructs when students are of a certain age. For this reason, we first wanted to know whether innovative and classical teaching differ in their effectiveness when we control for age. Then we were interested in whether there are differences in the effectiveness of innovative and classical teaching for students of different ages. To answer these questions, a mixed factorial ANCOVA with repeated measures was conducted.

When age is introduced as a controlled variable, the previously observed differences between innovative and classical teaching formats in terms of their effectiveness (see chapter 7.2) are not significant anymore. This means that the differences between innovative and classical teaching found before seem to be influenced by age. In addition, a significant effect can now be observed for the construct of altruistic values.

<b>Differences between innovative and classical teaching controlled by age</b>			
PrePost1 * Treatment (controlled by age)			
	F (Parameter F(1. 806))	Sig.	Partial Eta Squared
Intention	0.339	0.561	0.000
Positive affective reaction (action)	1.650	0.199	0.002
Negative affective reaction (inaction)	0.113	0.737	0.000
Attitude	0.075	0.784	0.000
Subjective norm	2.566	0.110	0.003
Moral obligation	1.277	0.259	0.002
Biospheric values	0.335	0.563	0.000
Altruistic values	3.210	<b>0.074*</b>	0.004
Ascription of responsibility	0.071	0.790	0.000
Awareness of consequences	0.221	0.638	0.000
Concept knowledge	1.457	0.228	0.002
Problem knowledge	0.551	0.458	0.001
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.11: Differences between innovative and classical teaching controlled by age**

Source: own analysis

Furthermore, for the 2 constructs of altruistic values and problem knowledge, we can observe significant interaction effects between teaching effectiveness, treatment (innovative vs. classical) and age (see table 7.12). This means that differences between the effectiveness of innovative and classical teaching exist for students of different ages. A separate analysis of the correlations for each group (innovative vs. classical teaching) shows how differences look like:

- Altruistic values: The correlation of the post-pre-differences with age in the innovative teaching group gives indications that the older the respondents are, the more effective the teaching is (Pearsons Correlation=0.191\*, Sig.:0.057, N=100). There is no such effect in the classical teaching group (Pearsons Correlation=- 0.014, Sig.:0.708, N=723).
- Problem knowledge: For the correlation of the post-pre-differences with age in the innovative teaching group the coefficient is not high and not significant (Pearsons Correlation=0.013, Sig.: 0.896, N=103). In contrast, there is a negative correlation in the classical teaching group, which gives indications that teaching problem knowledge with classical formats is slightly more effective with younger students (Pearsons Correlation=-.100\*\*, Sig.:0.006, N=760).



<b>Teaching effectiveness of innovative and classical teaching in regard to age</b>			
PrePost1 * Treatment * Age			
	F (Parameter F(1.800))	Sig.	Partial Eta Squared
Intention	0.097	0.755	0.000
Positive affective reaction (action)	0.845	0.358	0.001
Negative affective reaction (inaction)	1.669	0.197	0.002
Attitude	0.072	0.788	0.000
Subjective norm	0.865	0.353	0.001
Moral obligation	0.041	0.839	0.000
Biospheric values	0.000	0.987	0.000
Altruistic values	4.850	<b>0.028**</b>	0.006
Ascription of responsibility	0.529	0.467	0.001
Awareness of consequences	0.172	0.678	0.000
Concept knowledge	0.385	0.535	0.000
Problem knowledge	9.049	<b>0.003**</b>	0.011
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.12: Teaching effectiveness of innovative and classical teaching in regard to age**  
Source: own analysis

### 7.3.4 Nationality

#### 7.3.4.1 *The influence of nationality on teaching effectiveness in general*

A factorial ANOVA with repeated measures was conducted in order to investigate the influence of the impact variable nationality on teaching effectiveness in general. Due to the small number of cases in the different individual groups, only 3 groups were compared for the analysis: Germans, Hungarians and other nationalities summarised under "Other".

The analysis results show that there are no significant interaction effects. This means that teaching effectiveness in general seems not to be influenced by students' nationality.

However, there are significant between-subject-effects for many constructs, namely: intention, affective reactions (positive and negative), subjective norm, values (biospheric and altruistic), awareness of consequences and knowledge (problem and concept) (see table 7.13), which means that the groups differ in general in those constructs. Thereby, Hungarians have higher values than Germans in all of them with one exception for the construct of conceptual knowledge.



<b>Differences between nationalities</b>			
Between-Subject-Effects			
	F (Parameter F(1.808))	Sig.	Partial Eta Squared
Intention	4.970	<b>0.007**</b>	0.012
Positive affective reaction (action)	5.909	<b>0.003**</b>	0.015
Negative affective reaction (inaction)	3.262	<b>0.039**</b>	0.008
Attitude	0.485	0.616	0.001
Subjective norm	5.551	<b>0.004**</b>	0.014
Moral obligation	2.171	0.115	0.005
Biospheric values	12.376	<b>0.000**</b>	0.030
Altruistic values	3.559	<b>0.029**</b>	0.009
Ascription of responsibility	0.040	0.961	0.000
Awareness of consequences	2.907	<b>0.055*</b>	0.007
Concept knowledge	3.363	<b>0.035**</b>	0.008
Problem knowledge	6.685	<b>0.001**</b>	0.017
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.13: Differences between nationalities**

Source: own analysis

#### 7.3.4.2 Differences between innovative and classical teaching and nationality

In a next step, we investigated whether the differences between nationalities were related to the differences between innovative and classical teaching formats examined in chapter 7.2. For this a mixed factorial ANOVA with repeated measures was conducted.

When nationality is introduced as a controlled variable, the previously observed differences between innovative and classical teaching formats in terms of their effectiveness (see chapter 7.2) are not significant anymore, with one exception for the construct of subjective norm (see table 7.14). This indicates that the differences between innovative and classical teaching found before seem to be partly influenced by nationality.

Besides, when analysing the extent to which the innovative and classical formats differ in terms of their effectiveness among the nationality groups, a significant interaction effect can be observed for the construct problem knowledge. However, the results cannot be interpreted as this effect is caused by



the group of “Other” nationalities. Those include all remaining nationalities (except Germans and Hungarians) which are, however, too small in number to be able to specify necessary calculations.

<b>Differences between innovative and classical teaching controlled by nationality</b> PrePost1 * Treatment (controlled by nationality)			
	F (Parameter F(1. 806))	Sig.	Partial Eta Squared
Intention	0.143	0.705	0.000
Positive affective reaction (action)	1.138	0.286	0.001
Negative affective reaction (inaction)	0.003	0.959	0.000
Attitude	0.259	0.611	0.000
Subjective norm	3.710	<b>0.054*</b>	0.005
Moral obligation	0.504	0.478	0.001
Biospheric values	0.031	0.860	0.000
Altruistic values	1.852	0.174	0.002
Ascription of responsibility	1.229	0.268	0.002
Awareness of consequences	0.635	0.426	0.001
Concept knowledge	0.017	0.897	0.000
Problem knowledge	1.610	0.205	0.002
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.14: Differences between innovative and classical teaching controlled by nationality**  
Source: own analysis

### 7.3.5 Work Experience

#### 7.3.5.1 *The influence of work experience on teaching effectiveness in general*

In order to examine the influence of the impact variable work experience on teaching effectiveness in general, an ANCOVA with repeated measures was conducted. The variable work experience was taken thereby as a cardinally scaled variable<sup>19</sup>. Table 7.15 provides an overview of its distribution.

We found 2 significant interaction effects for the constructs of concept knowledge and biospheric values (see table 7. 16). This means that the differences between the pre- and post-course survey for those who participated in both are moderated by work experience. Calculated Pearson correlation coefficients (for correlations between the post-pre-differences and work experience) indicate a light tendency that the less work experience students have, the more effective teaching is in terms of biospheric values (Pearsons Correlation=-0.061\*, Sig.= 0.075, N=843) and conceptual knowledge (Pearsons Correlation=-.120\*\*, Sig.: <0.001, N=872).

<sup>19</sup> However, it should be taken into account that the high number of cases in the last answer category "more than 10 years" is somewhat problematic for the interpretation of this variable as a cardinally scaled one.



<b>Work Experience</b> (Variable name: WorkExperience_cleaned)		Frequency
	None	441
	less or equal 1 year	330
	more than 1 year and less than or equal 2 years	238
	more than 2 years and less than or equal 3 years	104
	more than 3 years and less than or equal 4 years	54
	more than 4 years and less than or equal 5 years	36
	more than 5 years and less than or equal 6 years	31
	more than 6 years and less than or equal 7 years	11
	more than 7 years and less than or equal 8 years	14
	more than 8 years and less than or equal 9 years	3
	more than 9 years and less than or equal 10 years	8
	more than 10 years	55
	<b>Total</b>	<b>1325</b>
	Missing values	323
<b>Total</b>		<b>1648</b>

**Table 7.15: Distribution of work experience**

Source: own analysis

<b>Teaching effectiveness in general in regard to work experience</b>			
PrePost * WorkExperience_cleaned			
	F (Parameter F(1.810))	Sig.	Partial Eta Squared
Intention	0.283	0.595	0.000
Positive affective reaction (action)	0.295	0.587	0.000
Negative affective reaction (inaction)	0.273	0.602	0.000
Attitude	0.035	0.851	0.000
Subjective norm	1.374	0.242	0.002
Moral obligation	0.031	0.859	0.000
Biospheric values	4.023	<b>0.045**</b>	0.005
Altruistic values	0.545	0.461	0.001
Ascription of responsibility	0.061	0.805	0.000
Awareness of consequences	0.686	0.408	0.001
Concept knowledge	14.916	<b>0.000**</b>	0.018
Problem knowledge	2.031	0.154	0.003
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.16: Teaching effectiveness in general in regard to work experience**

Source: own analysis

In addition, between-subject-effects reported in table 7.17 show that students with different work experience differ in general in the following constructs: intention, attitude, subjective norm, and biospheric values, awareness of consequences, as well as problem and concept knowledge.

<b>Differences according to work experience</b> Between-Subject-Effects			
	F (Parameter F(1. 810))	Sig.	Partial Eta Squared
Intention	6.926	<b>0.009**</b>	0.008
Positive affective reaction (action)	0.662	0.416	0.001
Negative affective reaction (inaction)	0.101	0.750	0.000
Attitude	5.796	<b>0.016**</b>	0.007
Subjective norm	3.985	<b>0.046**</b>	0.005
Moral obligation	0.273	0.601	0.000
Biospheric values	12.817	<b>0.000**</b>	0.016
Altruistic values	0.050	0.824	0.000
Ascription of responsibility	1.386	0.239	0.002
Awareness of consequences	13.775	<b>0.000**</b>	0.017
Concept knowledge	6.129	<b>0.014**</b>	0.008
Problem knowledge	5.391	<b>0.020**</b>	0.007
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.17: Differences according to work experience**

Source: own analysis

Calculated Pearson Correlation Coefficients thereby indicate (see table 7.18) the light tendency that the more work experience students have, the higher is their intention to act as a responsible leader, the more they have biospheric values, are aware of the negative consequences when not acting responsible and know about sustainability-related problems and solution concepts at course beginnings.

<b>Correlation of the pre-course survey values and work experience</b>			
	Pearson Correlation	Sig.	N
Intention	<b>.087**</b>	0.002	1290
Attitude	.052	0.058	1310
Subjective norm	.028	0.303	1310
Biospheric values	<b>.129**</b>	0.000	1292
Awareness of consequences	<b>.080**</b>	0.004	1310
Concept knowledge	<b>.126**</b>	0.000	1310
Problem knowledge	<b>.076**</b>	0.006	1309

**Table 7.18: Correlation of the pre-course survey values and work experience**

Source: own analysis

### 7.3.5.2 Differences between innovative and classical teaching and work experience

In chapter 7.2 we have compared innovative and classical teaching and highlighted differences between them in terms of effectiveness. When work experience is introduced as a controlled variable, using a mixed factorial ANCOVA with repeated measures, it can be seen that the differences found previously partly remain the same (for constructs positive affective reactions, subjective norm, and concept knowledge) and partly are not significant anymore (for constructs intention and ascription of responsibility). This means that the differences between innovative and classical teaching found before seem to be partly influenced by work experience. In addition, a significant effect was now also observed for the construct of moral obligation.

<b>Differences between innovative and classical teaching controlled by work experience</b>			
PrePost1 * Treatment (controlled by work experience)			
	F (Parameter F(1. 808))	Sig.	Partial Eta Squared
Intention	0.833	0.362	0.001
Positive affective reaction (action)	2.713	<b>0.100*</b>	0.003
Negative affective reaction (inaction)	0.699	0.404	0.001
Attitude	0.003	0.956	0.000
Subjective norm	5.685	<b>0.017**</b>	0.007
Moral obligation	4.395	<b>0.036**</b>	0.005
Biospheric values	1.645	0.200	0.002
Altruistic values	0.449	0.503	0.001
Ascription of responsibility	1.235	0.267	0.002
Awareness of consequences	0.020	0.888	0.000
Concept knowledge	4.531	<b>0.034**</b>	0.006
Problem knowledge	0.001	0.980	0.000
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.19: Differences between innovative and classical teaching controlled by work experience**

Source: own analysis

When furthermore investigating the extent to which innovative and classical formats differ in terms of their effectiveness among students with different work experiences, a significant interaction effect can be observed for the construct moral obligation (see table 7.19). Correlating pre-post-differences with work experience shows the following: For the innovative teaching group and for the classical teaching group, there is not a statistically significant correlation (for innovative teaching: Pearson Correlation=-0.153, Sig.:0.120, N=104; for classical teaching: Pearson correlation=0.012, Sig.:0.733, N=768). However, the negative correlation coefficient for innovative teaching could point to the tendency that innovative teaching may be less effective in teaching moral obligation to students with higher work experience. However, this remains only a presumption.



<b>Teaching effectiveness of innovative and classical teaching in regard to work experience</b>			
PrePost1 * Treatment * WorkExperience_cleaned			
	F (Parameter F(1.808))	Sig.	Partial Eta Squared
Intention	0.313	0.576	0.000
Positive affective reaction (action)	0.260	0.610	0.000
Negative affective reaction (inaction)	0.117	0.732	0.000
Attitude	0.000	0.989	0.000
Subjective norm	0.672	0.413	0.001
Moral obligation	3.267	<b>0.071*</b>	0.004
Biospheric values	2.330	0.127	0.003
Altruistic values	2.255	0.134	0.003
Ascription of responsibility	0.004	0.951	0.000
Awareness of consequences	0.349	0.555	0.000
Concept knowledge	1.601	0.206	0.002
Problem knowledge	0.707	0.401	0.001
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.19: Teaching effectiveness of innovative teaching and classical teaching in regard to Work experience**  
Source: Own analysis

### 7.3.6 Lead Experience

#### 7.3.6.1 *The influence of lead experience on teaching effectiveness in general*

The question of lead experience, i.e. whether respondents already had experience as a supervisor (“In your job, did you already supervise or were directly responsible for the work of other people?” – Yes/No), was only asked to those respondents who indicated that they already had professional/work experience. For the following analyses, we constructed a new variable titled "supervisor" to include people without professional/work experience. It differentiates between 3 groups: No work experience; No experience as a supervisor (but work experience); Experience as a supervisor (plus work experience). We used this variable as a factor variable for the following analysis.

We conducted a factorial ANOVA with repeated measures to examine the effects on teaching in general and found interaction effects in 2 behavioural constructs: problem knowledge and concept knowledge (see table 7.20). Figure 7.4 shows that the effectiveness of the teaching in terms of sustainability-related problem and concept knowledge is higher for those who have no work experience and no leadership experience. However, these groups also start with lower values at the beginning of the course. The test for between-subject-effects additionally shows that students of the

three groups differ in general on the 2 knowledge constructs. Figure 7.4 thereby shows that students with lead experience have more knowledge than students without.

<b>Teaching effectiveness in general in regard to lead experience</b>			
PrePost1 * Supervisor			
	F (Parameter F(1. 800))	Sig.	Partial Eta Squared
Intention	0.404	0.668	0.001
Positive affective reaction (action)	1.056	0.348	0.003
Negative affective reaction (inaction)	0.952	0.386	0.002
Attitude	0.153	0.858	0.000
Subjective norm	1.082	0.340	0.003
Moral obligation	2.215	0.110	0.006
Biospheric values	0.529	0.589	0.001
Altruistic values	0.113	0.893	0.000
Ascription of responsibility	0.421	0.657	0.001
Awareness of consequences	0.909	0.403	0.002
Concept knowledge	13.933	<b>0.000**</b>	0.034
Problem knowledge	2.364	<b>0.095*</b>	0.006
* sign. at level 0.10; ** sign. at level 0.05			

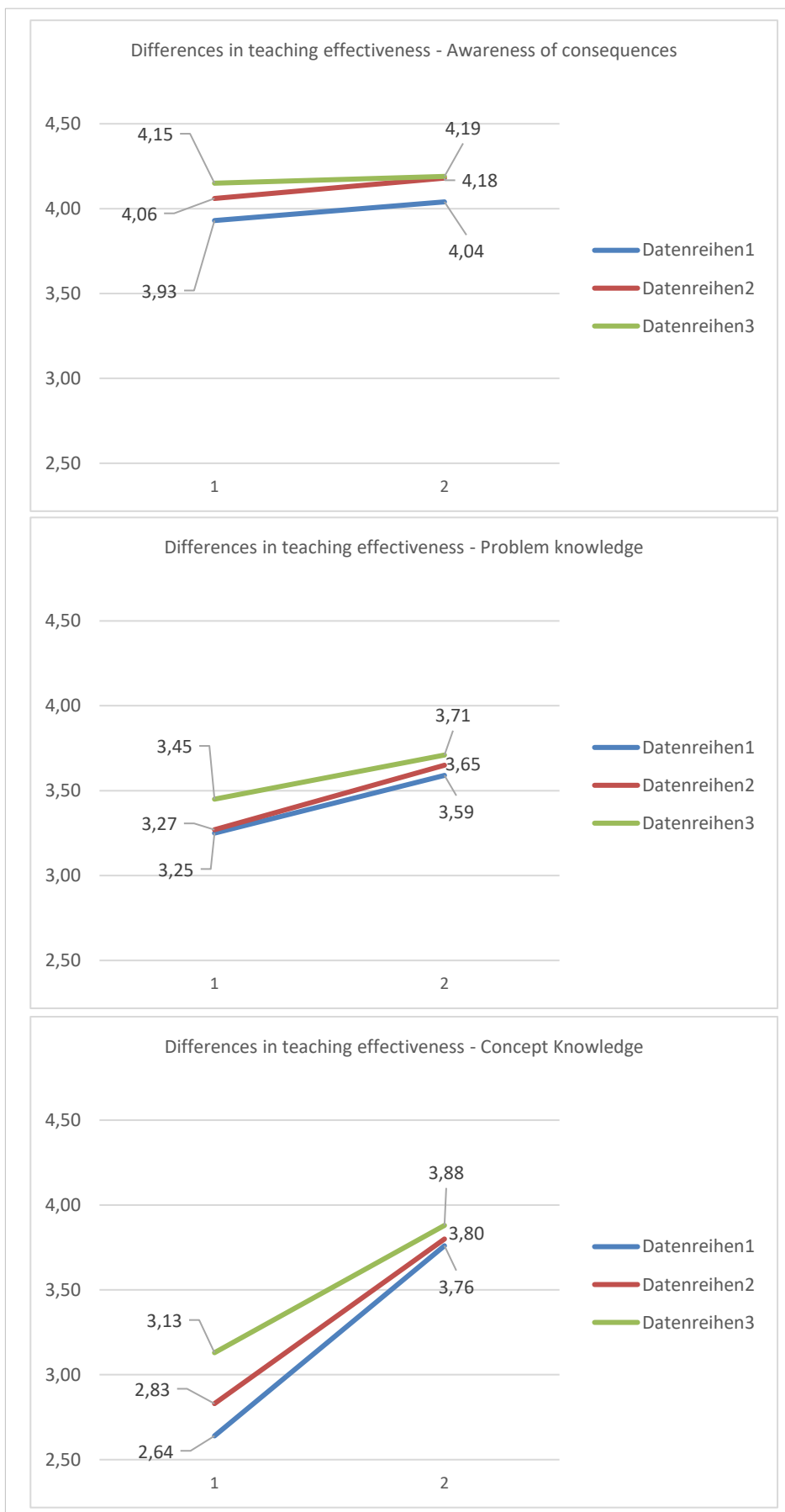
**Table 7.20: Teaching effectiveness in general in regard to lead experience**

Source: own analysis

<b>Differences between groups without work experience, without lead experience/with work experience, with lead experience</b>			
Between-Subject-Effects			
	F (Parameter F(1. 525))	Sig.	Partial Eta Squared
Intention	0.642	0.527	0.002
Positive affective reaction (action)	1.570	0.209	0.004
Negative affective reaction (inaction)	1.332	0.265	0.003
Attitude	1.318	0.268	0.003
Subjective norm	0.605	0.546	0.002
Moral obligation	0.454	0.635	0.001
Biospheric values	2.117	0.121	0.005
Altruistic values	0.580	0.560	0.001
Ascription of responsibility	0.523	0.593	0.001
Awareness of consequences	7.730	<b>0.000**</b>	0.019
Concept knowledge	19.454	<b>0.000**</b>	0.046
Problem knowledge	7.858	<b>0.000**</b>	0.019
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.21: Differences between groups without work experience, without lead experience, with lead experience**

Source: own analysis



**Figure 7.4: Differences in teaching effectiveness by work experience**  
Source: own analysis

### 7.3.6.2 Differences between innovative and classical teaching and lead experience

We conducted a mixed factorial ANOVA with repeated measures to determine whether leadership experience has an impact on the differences between innovative and classical teaching found previously in chapter 7.2. As the following table shows, experience as a supervisor has an influence on the differences between the 2 teaching approaches. When supervisor experience is introduced as a controlled variable, the prior observed differences in intention and subjective norm are not significant anymore. This means that the differences between innovative and classical teaching found may be partly influenced by this student characteristic.

<b>Differences between innovative and classical teaching controlled by work and lead experience</b>			
PrePost1 * Treatment			
	F (Parameter F(1. 797))	Sig.	Partial Eta Squared
Intention	0.480	0.488	0.001
Positive affective reaction (action)	3.988	<b>0.046**</b>	0.005
Negative affective reaction (inaction)	1.552	0.213	0.002
Attitude	0.133	0.715	0.000
Subjective norm	1.867	0.172	0.002
Moral obligation	0.191	0.662	0.000
Biospheric values	0.005	0.945	0.000
Altruistic values	0.879	0.349	0.001
Ascription of responsibility	3.484	<b>0.062*</b>	0.004
Awareness of consequences	0.277	0.599	0.000
Concept knowledge	10.885	<b>0.001**</b>	0.013
Problem knowledge	1.269	0.260	0.002
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.22: Differences between innovative and classical teaching controlled by work and lead experience**

Source: Own analysis

The next question is whether the types of teaching formats, the innovative versus the classical, differ in terms of whether one or the other teaching format is more effective for certain students without work experience, with work experience and with leadership experience. This question can be addressed by looking at the interaction effects presented in Table 7.23. We found one significant interaction effect in problem knowledge. Figure 7.5 shows respectively this that innovative teaching is less effective in teaching problem knowledge to students without work experience.

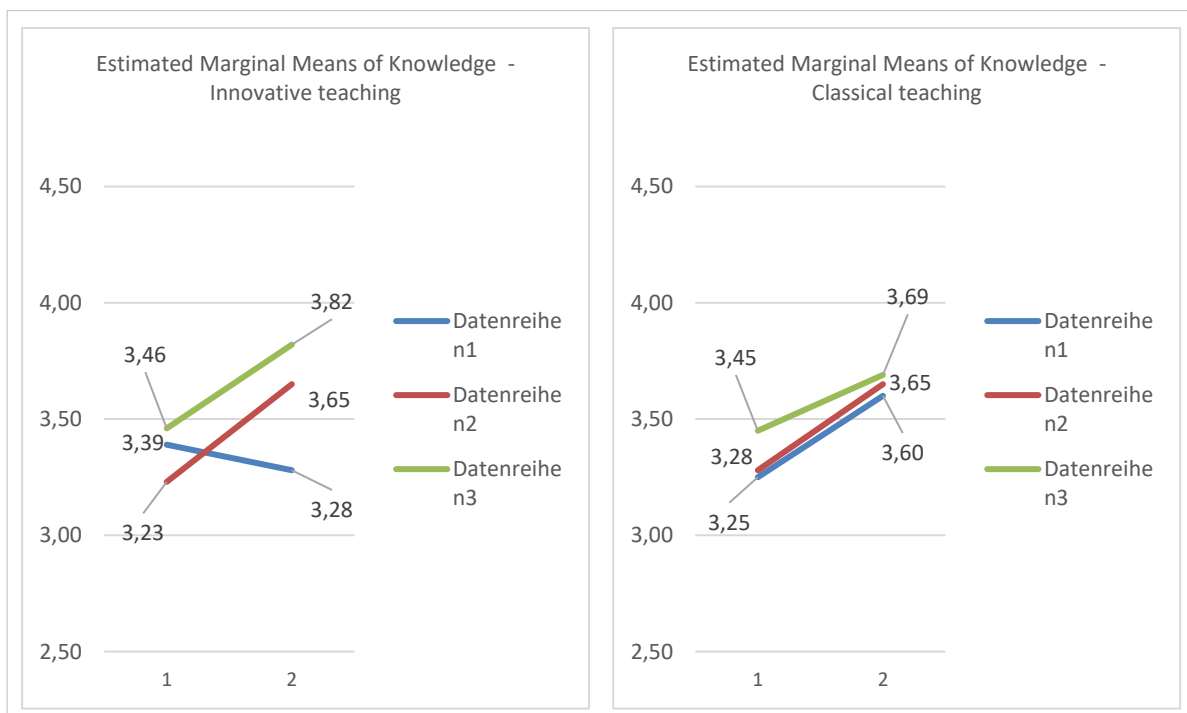




<b>Teaching effectiveness of innovative and classical teaching in regard to groups with and without work experience, with lead experience</b>			
PrePost1 * Treatment * Supervisor			
	F (Parameter F(2. 797))	Sig.	Partial Eta Squared
Intention	0.995	0.370	0.002
Positive affective reaction (action)	1.057	0.348	0.003
Negative affective reaction (inaction)	0.466	0.628	0.001
Attitude	0.303	0.739	0.001
Subjective norm	0.135	0.874	0.000
Moral obligation	0.947	0.388	0.002
Biospheric values	0.172	0.842	0.000
Altruistic values	0.191	0.826	0.000
Ascription of responsibility	0.925	0.397	0.002
Awareness of consequences	0.135	0.874	0.000
Concept knowledge	2.102	0.123	0.005
Problem knowledge	2.755	<b>0.064*</b>	0.007
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.23: Teaching effectiveness of innovative and classical teaching in regard to groups with and without work experience, with lead experience**

Source: Own analysis



**Figure 7.5: Differences in teaching effectiveness (in terms of problem knowledge) of innovative and classical teaching for different work and lead experiences**

Source: own analysis

### 7.3.7 Voluntary work

#### 7.3.7.1 *The influence of voluntary work on teaching effectiveness in general*

A factorial ANOVA with repeated measures was conducted to determine whether teaching effectiveness in general is influenced by the fact that students had already volunteered or not. As no significant interaction effect was found, it could be stated that the effectiveness of teaching does not seem to be influenced by the experience of having already volunteered.

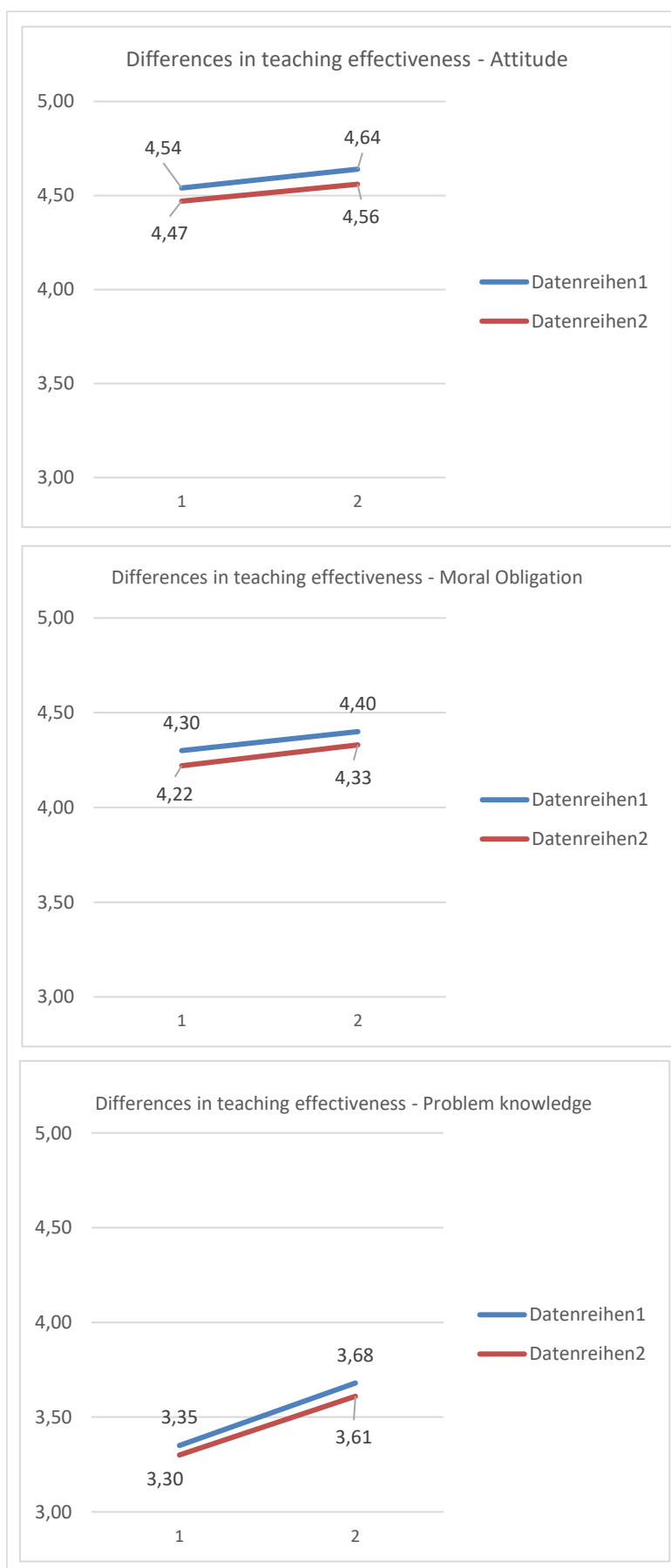
However, some general differences in constructs between the 2 groups were found: those with volunteering experience and those without differ in terms of attitudes, feelings of moral obligation and problem knowledge (see between-subject-effects in table 7.24).

<b>Differences between volunteering groups</b>			
Between-Subject-Effects			
	F (Parameter F(1. 810))	Sig.	Partial Eta Squared
Intention	2.016	0.156	0.002
Positive affective reaction (action)	0.523	0.470	0.001
Negative affective reaction (inaction)	0.005	0.941	0.000
Attitude	5.922	<b>0.015**</b>	0.007
Subjective norm	0.865	0.353	0.001
Moral obligation	3.072	<b>0.080*</b>	0.004
Biospheric values	0.670	0.413	0.001
Altruistic values	1.222	0.269	0.002
Ascription of responsibility	0.889	0.346	0.001
Awareness of consequences	0.524	0.469	0.001
Concept knowledge	1.612	0.205	0.002
Problem knowledge	2.842	<b>0.092*</b>	0.003
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.24: Differences between volunteering groups**

Source: own analysis

More specifically, as shown by figure 7.6, students who already volunteered have slightly stronger attitudes towards acting as a responsible leader than students without such experiences. Likewise, they feel a slightly higher moral obligation to act in a responsible way and know a little bit more about problems associated with sustainability.



**Figure 7.6: Differences in teaching effectiveness by volunteering experience**  
Source: own analysis

### 7.3.7.2 Differences between innovative and classical teaching and voluntary work

In the following, we present the results of a conducted mixed factorial ANOVA with repeated measures. First, we investigated whether volunteering has an impact on the differences between innovative and classical teaching that we found in chapter 7.2. When volunteering is introduced as a controlled variable, it can be observed that the differences found previously mostly remain the same (for all constructs except positive affective reactions in case of action). This means that the differences between innovative and classical teaching found before seem to be only minorly influenced by students' volunteering experiences.

<b>Differences between innovative and classical teaching controlled by volunteering</b> PrePost1 * Treatment (controlled by volunteering)			
	F (Parameter F(1. 797))	Sig.	Partial Eta Squared
Intention	4.535	<b>0.034**</b>	0.006
Positive affective reaction (action)	2.540	0.111	0.003
Negative affective reaction (inaction)	0.645	0.422	0.001
Attitude	0.024	0.876	0.000
Subjective norm	4.869	<b>0.028**</b>	0.006
Moral obligation	1.367	0.243	0.002
Biospheric values	0.327	0.568	0.000
Altruistic values	1.361	0.244	0.002
Ascription of responsibility	3.593	<b>0.058*</b>	0.004
Awareness of consequences	0.493	0.483	0.001
Concept knowledge	7.743	<b>0.006**</b>	0.009
Problem knowledge	0.435	0.510	0.001
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.25: Differences between innovative and classical teaching controlled by volunteering**

Source: own analysis

Second, when analysing whether innovative and classical teaching approaches differ in their effectiveness with regard to the 2 different groups of students (with or without volunteering experience), also no differences can be observed (see not present significance of interaction effects in table 7.26). This indicated that both teaching approaches, innovative and classical, are equally effective regardless of whether students have already volunteered or not.

<b>Teaching effectiveness of innovative and classical teaching in regard to groups with and without volunteering experience</b>			
PrePost1 * Treatment * Supervisor			
	F (Parameter F(2. 797))	Sig.	Partial Eta Squared
Intention	0.389	0.533	0.000
Positive affective reaction (action)	2.201	0.138	0.003
Negative affective reaction (inaction)	1.015	0.314	0.001
Attitude	0.324	0.570	0.000
Subjective norm	2.275	0.132	0.003
Moral obligation	0.360	0.549	0.000
Biospheric values	0.068	0.794	0.000
Altruistic values	1.243	0.265	0.002
Ascription of responsibility	0.000	0.999	0.000
Awareness of consequences	0.310	0.578	0.000
Concept knowledge	0.619	0.432	0.001
Problem knowledge	0.324	0.570	0.000
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.26: Teaching effectiveness of innovative and classical teaching in regard to groups with and without volunteering experience**

Source: Own analysis

### 7.3.8 Prior knowledge and consciousness on sustainability

#### 7.3.8.1 *The influence of prior knowledge and consciousness on sustainability on teaching effectiveness in general*

In the questionnaire of the pre-course survey, a question was asked whether students had, prior to their current course, already attended one or more sustainability- and responsibility-related courses (“Have you already completed one or more courses with content related to ethics, sustainability or corporate social responsibility (CSR)?” – Yes/No, variable name: PrevClass). Within the report this variable was used as an indicator for the impact variable “prior knowledge and consciousness on sustainability”, which refers to the extent to which the students enrolled in a course have preliminary sustainability and social responsibility knowledge and consciousness adequate for the sustainable development aim and scope of the course (see chapter 3). Although the measured variable does not reflect the impact variable completely, it represents a useful indicator for first analyses on the influence of this impact factor and is therefore used here in this sense.

A factorial ANOVA with repeated measures was conducted to determine the effects the variable has on teaching effectiveness in general. We found significant interaction effects for three constructs:

ascription of responsibility, problem knowledge and concept knowledge (see table 7.27). This means that the fact whether students have already taken one or more sustainability-/responsibility-related courses influences the effectiveness of teaching.

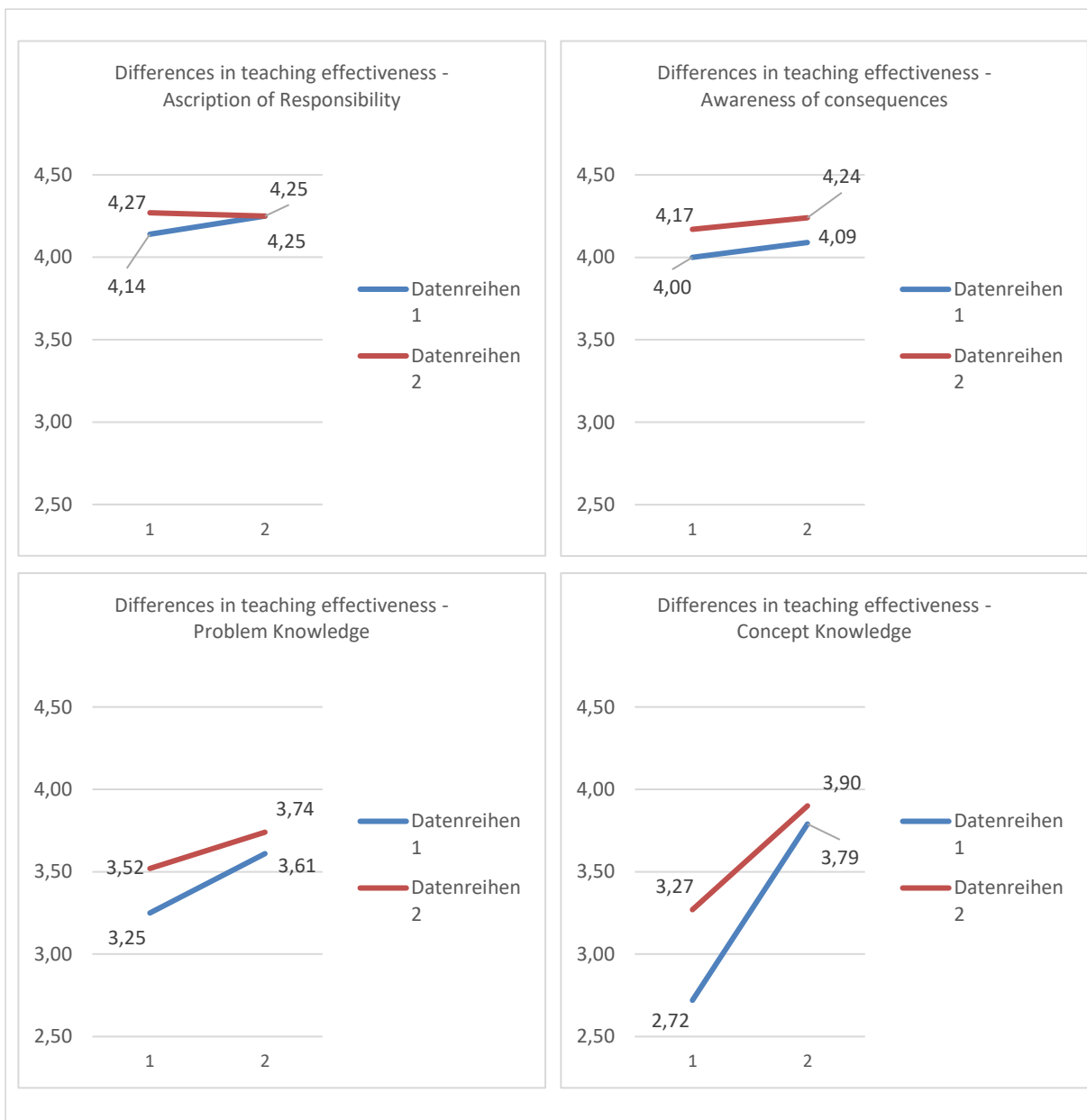
<b>Teaching effectiveness in general in regard to participation in previous sustainability-/responsibility-related classes</b>			
PrePost1 * PrevClass			
	F (Parameter F(1. 810))	Sig.	Partial Eta Squared
Intention	1.138	0.286	0.001
Positive affective reaction (action)	0.035	0.852	0.000
Negative affective reaction (inaction)	1.352	0.245	0.002
Attitude	0.124	0.725	0.000
Subjective norm	0.429	0.512	0.001
Moral obligation	2.135	0.144	0.003
Biospheric values	0.997	0.318	0.001
Altruistic values	2.274	0.132	0.003
Ascription of responsibility	4.487	<b>0.034**</b>	0.006
Awareness of consequences	0.202	0.653	0.000
Concept knowledge	44.791	<b>0.000**</b>	0.052
Problem knowledge	8.133	<b>0.004**</b>	0.010
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.27: Teaching effectiveness in general in regard to participation in previous sustainability-/responsibility-related classes**

Source: own analysis

Figure 7.7 visualizes how this influence looks like: Teaching seems to be more effective (in terms of the constructs ascription of responsibility, problem knowledge and concept knowledge) for students who have not yet taken a sustainability-/responsibility-related course.

Furthermore, it was found that the groups (with and without having already completed one or more sustainability-/responsibility-related courses) also differ in general in regard to some behavioural constructs. More precisely, this is the case for the constructs of the awareness of consequences, problem knowledge and concept knowledge (see between-subject-effects in table 7.28). Figure 7.7 indicates that students who have already attended one or more sustainability-/responsibility-related courses have more knowledge about problems of sustainability as well as solution concepts and are also more aware of the negative consequences resulting from not acting responsibly.



**Figure 7.7: Differences in teaching effectiveness by participation in previous sustainability-/responsibility-related classes**  
Source: own analysis



<b>Differences in regard to participation in previous sustainability-/responsibility-related classes</b>			
Between-Subject-Effects			
	F (Parameter F(1. 810))	Sig.	Partial Eta Squared
Intention	0.400	0.528	0.000
Positive affective reaction (action)	1.294	0.256	0.002
Negative affective reaction (inaction)	0.809	0.369	0.001
Attitude	0.310	0.578	0.000
Subjective norm	0.159	0.690	0.000
Moral obligation	1.367	0.243	0.002
Biospheric values	0.084	0.772	0.000
Altruistic values	0.564	0.453	0.001
Ascription of responsibility	1.784	0.182	0.002
Awareness of consequences	11.301	<b>0.001**</b>	0.014
Concept knowledge	50.988	<b>0.000**</b>	0.059
Problem knowledge	24.795	<b>0.000**</b>	0.030
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.28: Differences in regard to participation in previous sustainability-/responsibility-related classes**

Source: Own analysis

### *7.3.8.2 Differences between innovative and classical teaching and prior knowledge and consciousness on sustainability*

Next, we investigated whether the fact that students had already completed one or more sustainability-/responsibility-related courses has an influence on the differences between innovative and classical teaching found in chapter 7.2.

The results of a conducted mixed factorial ANOVA with repeated measures show that the differences presented in the chapter 7.2 remain when the variable “PrevClass” is introduced as a controlled variable. This means that the differences are not due to the fact that the students have previously taken a course on sustainability. This means that the differences previously found are independent of the fact whether students had already completed one or more sustainability-/responsibility-related courses.



<b>Differences between innovative and classical teaching controlled by participation in previous sustainability-/responsibility-related classes</b>			
PrePost1 * Treatment (controlled by PrevClass)			
	F (Parameter F(1. 806))	Sig.	Partial Eta Squared
Intention	4.083	<b>0.044**</b>	0.005
Positive affective reaction (action)	3.398	<b>0.066*</b>	0.004
Negative affective reaction (inaction)	0.667	0.414	0.001
Attitude	0.159	0.690	0.000
Subjective norm	6.216	<b>0.013**</b>	0.008
Moral obligation	0.720	0.396	0.001
Biospheric values	0.387	0.534	0.000
Altruistic values	0.477	0.490	0.001
Ascription of responsibility	3.376	<b>0.067*</b>	0.004
Awareness of consequences	0.191	0.662	0.000
Concept knowledge	4.045	<b>0.045**</b>	0.005
Problem knowledge	0.687	0.407	0.001
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.29: Differences between innovative and classical teaching controlled by participation in previous sustainability-/responsibility-related classes**

Source: Own analysis

### 7.3.9 Motivation for the course

#### 7.3.9.1 *The influence of the motivation for the course on teaching effectiveness in general*

In this and the following subchapter the impact variable “motivation for the course” is focused. As introduced in chapter 3, this impact variable refers to the degree to which students find the course topic interesting, important for society and important for their own future profession. In order to measure this variable, students were asked within the pre-course questionnaires to indicate their agreement (using a 5-point scale ranging from 1 "strongly disagree" to 5 "strongly agree") on the following 3 statements: “For me personally, the topic is interesting.”; “I believe the topic is generally important for the society.”; “I think that I will need the knowledge and competencies in my future profession.”. Based on these three items we created a new variable representing the motivation for the course by calculating the arithmetic mean. Prior to this, we conducted a reliability test using Cronbach's alpha (Cronbach's alpha = 0.778). With the new variable, we ran an ANCOVA with repeated measures and found no significant interaction effects. This means that effectiveness of teaching does not seem to be influenced by students’ motivation for the course. However, there are significant between-subject-effects for all constructs (see table 7.30). This means that there are differences in the

values of the constructs in relation to the motivation for the course. Calculated Pearson correlation coefficients (correlations between constructs' pre-course survey values and motivation for the course) go all into the same direction and indicate that the higher the motivation for the course, the higher the values of all constructs at the beginning of the course (see table 7.31).

<b>Differences in the motivation for the course</b>			
Between-Subject-Effects			
	F (Parameter F(1. 810))	Sig.	Partial Eta Squared
Intention	63.888	<b>0.000**</b>	0.073
Positive affective reaction (action)	153.605	<b>0.000**</b>	0.159
Negative affective reaction (inaction)	100.076	<b>0.000**</b>	0.110
Attitude	117.571	<b>0.000**</b>	0.127
Subjective norm	158.699	<b>0.000**</b>	0.164
Moral obligation	109.174	<b>0.000**</b>	0.119
Biospheric values	95.417	<b>0.000**</b>	0.105
Altruistic values	83.160	<b>0.000**</b>	0.093
Ascription of responsibility	105.095	<b>0.000**</b>	0.115
Awareness of consequences	82.797	<b>0.000**</b>	0.093
Concept knowledge	63.228	<b>0.000**</b>	0.072
Problem knowledge	61.650	<b>0.000**</b>	0.071
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.30: Differences in the motivation for the course**  
Source: own analysis

<b>Correlation of motivation for the course and constructs' pre-course values</b>			
	Pearson Correlation	Sig.	N
Intention	<b>.247**</b>	0.000	1290
Positive affective reaction (action)	<b>.353**</b>	0.000	1290
Negative affective reaction (inaction)	<b>.315**</b>	0.000	1310
Attitude	<b>.326**</b>	0.000	1310
Subjective norm	<b>.356**</b>	0.000	1310
Moral obligation	<b>.339**</b>	0.000	1310
Biospheric values	<b>.276**</b>	0.000	1292
Altruistic values	<b>.315**</b>	0.000	1274
Ascription of responsibility	<b>.358**</b>	0.000	1310
Awareness of consequences	<b>.263**</b>	0.000	1310
Concept knowledge	<b>.208**</b>	0.000	1310
Problem knowledge	<b>.214**</b>	0.000	1310
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.31: Correlation of motivation for the course and constructs' pre-course values**  
Source: own analysis

### 7.3.9.2 Differences between innovative and classical teaching and the motivation for the course

The question we address in this section is whether the motivation for the course has an influence on the differences in teaching effectiveness of the 2 teaching approaches (innovative versus classical) we found in section 7.2. Results of a conducted mixed factorial ANCOVA with repeated measures show that, when the motivation for the course is introduced as a controlled variable, the previously observed differences between innovative and classical teaching formats in terms of their effectiveness are not significant anymore (see table 7.32). This means that the differences between innovative and classical teaching found beforehand seem to be influenced by the motivation for the course. Additionally, now a significant effect for problem knowledge can be observed (see table 7.32).

<b>Differences between innovative and classical teaching (controlled by the motivation for the course)</b>			
PrePost1 * Treatment (controlled by motivation)			
	F (Parameter F(1. 806))	Sig.	Partial Eta Squared
Intention	1.664	0.197	0.002
Positive affective reaction (action)	2.380	0.123	0.003
Negative affective reaction (inaction)	0.530	0.467	0.001
Attitude	1.839	0.175	0.002
Subjective norm	0.019	0.890	0.000
Moral obligation	0.126	0.722	0.000
Biospheric values	0.003	0.959	0.000
Altruistic values	0.059	0.808	0.000
Ascription of responsibility	0.315	0.575	0.000
Awareness of consequences	0.216	0.642	0.000
Concept knowledge	0.917	0.339	0.001
Problem knowledge	3.256	<b>0.072*</b>	0.004
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.32: Differences between innovative and classical teaching (controlled by the motivation for the course)**

Source: own analysis

When furthermore analysing the extent to which innovative and classical formats differ in terms of their effectiveness among students with different motivations, a significant interaction effect can be observed for the construct problem knowledge (see table 7.33). Correlating pre-post-differences for the construct problem knowledge with the motivation for the course shows the following: We found a positive correlation in the group of innovative teaching formats (Pearson correlation=0.165\*, Sig.: 0.094, N=104), which indicates the tendency that those formats are particularly effective with students

who have a higher motivation for the course. In addition, we did not find such a correlation for classical teaching methods (Pearson correlation=- 0.025, Sig.: 0.494, N=768).

<b>Teaching effectiveness of innovative and classical teaching in regard to motivation for the course</b>			
PrePost1 * Treatment * Motivation			
	F (Parameter F(1. 800))	Sig.	Partial Eta Squared
Intention	0.855	0.356	0.001
Positive affective reaction (action)	1.505	0.220	0.002
Negative affective reaction (inaction)	0.863	0.353	0.001
Attitude	1.905	0.168	0.002
Subjective norm	0.376	0.540	0.000
Moral obligation	0.321	0.571	0.000
Biospheric values	0.003	0.960	0.000
Altruistic values	0.003	0.955	0.000
Ascription of responsibility	0.045	0.832	0.000
Awareness of consequences	0.098	0.754	0.000
Concept knowledge	0.224	0.636	0.000
Problem knowledge	3.898	<b>0.049**</b>	0.005
* sign. at level 0.10; ** sign. at level 0.05			

**Table 7.33: Teaching effectiveness of innovative and classical teaching in regard to motivation for the course**  
Source: own analysis

## 8 CONCLUSION AND FINAL REMARKS

The aim of this report was to summarize the results of the effectiveness measurement of sustainability- and responsibility-related higher education courses as part of the EFFORT project and to describe its conceptual and methodological foundations. Effectiveness was measured by means of a Controlling Tool, which is based on a theory-guided behavioural model with several constructs and applies a pre-post-course measurement design. The tool consists of 2 standardised questionnaires that need to be used prior to and after a sustainability- or responsibility-related course. Though the primary objective was to measure effectiveness of teaching in the context of HEIs, the tool can as well be used for measuring effectiveness of trainings held at companies or VETs. The tool is available in different languages and can therefore be used in a variety of national contexts.

The main results that can be derived with this report are summarized below:

- Teaching on sustainability has in the majority of cases positive impacts on the intention to act sustainably and/or other variables that influence this intention.

- The strongest effect of teaching is on knowledge constructs (problem and concept knowledge). The effect on other model constructs seems to depend on the methods applied and/or other contextual factors.
- All innovative teaching formats – 6 of them developed in the the framework of Erasmus+ projects – are effective in terms of increasing the behavioural intention to act as a responsible leader and/or several of its predicting variables.<sup>20</sup>
- The innovative teaching formats tested in this report have been shown to be more effective than classical one, especially in terms of non-cognitive constructs. However, socio-demographic factors partly influenced these results.
- Teaching effectiveness is higher for female students. Moreover, female and male students in general differ on a variety of constructs.
- Teaching effectiveness is also higher for younger students in terms of selected model constructs (especially biospheric values and knowledge). The influence of age might be explained by partly higher base scores in these constructs.
- A light tendency could be observed that the less work experience students have, the more effective teaching is in terms of biospheric values and conceptual knowledge.
- Finally, there is a slight indication that the effectiveness of teaching is influenced by work and lead experience (the lower the experience, the higher the effectiveness). However, work and lead experience correlate with age, such that deeper investigation is necessary to confirm this result.

With the given data we were not able to investigate the impact of institutional factors that have been surveyed by the EffSET tool, as not enough data was available for this. Further research is planned to increase the dataset, integrating more national and international parts to test courses throughout the world, taking into account comparable control groups.

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<sup>20</sup> Limited data is available for the course “Future Scenarios for Sustainable Business Solutions”, however, results indicate a positive effect also for this course.

## 9 REFERENCES

- Aertsens, J., Mondelaers, K., Verbeke, W., Buysse, J., & van Huylenbroeck, G. (2011). The Influence of Subjective and Objective Knowledge on Attitude, Motivations and Consumption of Organic Food. *British Food Journal*, 113(11), 1353-1378. DOI 10.1108/00070701111179988
- Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Bauer, D., Arnold, J., & Kremer, K. (2018). Consumption-Intention Formation in Education for Sustainable Development: An Adapted Model Based on the Theory of Planned Behavior. *Sustainability*, 10(10), 3455. <https://doi.org/10.3390/su10103455>
- Bouman, T., Steg, L., & Kiers, H. A. L. (2018). Measuring Values in Environmental Research: A Test of an Environmental Portrait Value Questionnaire. *Frontiers in Psychology*, 9, Article 564. <https://doi.org/10.3389/fpsyg.2018.00564>
- Braßler, M., & Sprenger, S. (2021). Fostering Sustainability Knowledge, Attitudes, and Behaviours through a Tutor-Supported Interdisciplinary Course in Education for Sustainable Development. *Sustainability*, 13(6), 3494. <https://doi.org/10.3390/su13063494>
- Bustamante, S., Martinovic, M. & Shaman, K. (2022). Fundamental Insights about Teaching Formats in the Area of Sustainability and Responsibility. In S. Bustamante, E. Saltevo, M. Schmitz, & M. Martinovic, Shaping a Sustainable Future. *Innovative Teaching Practices for Educating Responsible Leader* (pp. 31-49). Nomos.
- Conner, M. (2020). Theory of Planned Behavior. In G. Tenenbaum, & R. C. Eklund, *Handbook of Sport Psychology*. Fourth Edition (pp. 3-18). John Wiley & Sons.
- Conner, M., Godin, G., Sheeran, P., & Germain, M. (2013). Some Feelings are More Important: Cognitive Attitudes, Affective Attitudes, Anticipated Affect, and Blood Donation. *Health Psychology*, 32(3), 264–272. <https://doi.org/10.1037/a0028500>
- Conner, M., McEachan, R., Taylor, N., O’Hara, J., & Lawton, R. (2015). Role of Affective Attitudes and Anticipated Affective Reactions in Predicting Health Behaviors. *Health Psychology*, 34(6), 642–652. <https://doi.org/10.1037/hea0000143>
- Corres, A., Rieckmann, M., Espasa, A., & Ruiz-Mallén, I. (2020). Educator Competences in Sustainability Education: A Systematic Review of Frameworks. *Sustainability*, 12(23), 9858. <https://doi.org/10.3390/su12239858>
- De Groot, J. I. M., & Steg, L. (2009). Morality and Prosocial Behavior: The Role of Awareness, Responsibility, and Norms in the Norm Activation Model. *The Journal of Social Psychology*, 149(4), 425-449. <https://doi.org/10.3200/SOCP.149.4.425-449>
- Feder, M., & Weißenberger, B. (2019). Understanding the Behavioral Gap: Why Would Managers (not) Engage in CSR-related activities? *Journal of Management Control*, 30, 95–126. <https://doi.org/10.1007/s00187-019-00275-y>

- Felgendreher, S., & Löfgren, Å. (2017). Higher Education for Sustainability: Can Education Affect Moral Perceptions? *Environmental Education Research*. <http://dx.doi.org/10.1080/13504622.2017.1307945>
- Gerstung, V., & Deuer, E. (2021). Theorie-Praxis Verzahnung im Dualen Studium: Ein Konzeptioneller Forschungsbeitrag. *Zeitschrift für Hochschulentwicklung*. 16(2), 195-213. DOI: 10.3217/zfhe-16-02/14
- Gorsuch, R. L., & Ortberg, J. (1983). Moral Obligation and Attitudes: Their Relation to Behavioral Intentions. *Journal of Personality and Social Psychology*, 44(5), 1025-1028. <https://doi.org/10.1037/0022-3514.44.5.1025>
- Heiskanen, E., Thidell, Å., & Rodhe, H. (2016). Educating Sustainability Change Agents: the Importance of Practical Skills and Experience. *Journal of Cleaner Production*, 123, 218–226. <https://doi.org/10.1016/j.jclepro.2015.11.063>
- Hiller Connell, K. Y., Remington, S. M., & Armstrong, C. M. (2012). Assessing Systems Thinking Skills in Two Undergraduate Sustainability Courses: a Comparison of Teaching Strategies. *Journal of Sustainability Education*, 3.
- Hsiao, P.-W., & Su, C.-H. (2021). A Study on the Impact of STEAM Education for Sustainable Development Courses and Its Effects on Student Motivation and Learning. *Sustainability*, 13(7), 3772. <https://doi.org/10.3390/su13073772>
- Immordino-Yang, M. H., & Faeth, M. (2010). The Role of Emotion and Skilled Intuition in Learning. In D. A. Sousa, *Mind Brain and Education* (pp. 69-84). Solution Tree Press.
- Janmaimool, P., & Khajohnmanee, S. (2019). Roles of Environmental System Knowledge in Promoting University Students' Environmental Attitudes and Pro-Environmental Behaviors. *Sustainability*, 11(16), 4270. <https://doi.org/10.3390/su11164270>
- Klößner, C. A. (2013). A Comprehensive Model of the Psychology of Environmental Behaviour – a Meta-Analysis. *Global Environmental Change*, 23(5), 1028-1038. <https://doi.org/10.1016/j.gloenvcha.2013.05.014>
- Liobikienė, G., & Poškus, M. S. (2019). The Importance of Environmental Knowledge for Private and Public Sphere Pro-Environmental Behavior: Modifying the Value-Belief-Norm Theory. *Sustainability*, 11(12), 3324. <https://doi.org/10.3390/su11123324>
- Lülfes, R., & Hahn, R. (2014). Sustainable Behavior in the Business Sphere: A Comprehensive Overview of the Explanatory Power of Psychological Models. *Organization & Environment*, 27(1), 43-64. DOI: 10.1177/1086026614522631
- Marshall, J. A., Banner, J. L., & You, H. S. (2018). Assessing the Effectiveness of Sustainability Learning. *Journal of College Science Teaching*, 47(3), 57–67.
- McDonald, F. V. (2014). Developing an Integrated Conceptual Framework of Pro-Environmental Behavior in the Workplace through Synthesis of the Current Literature. *Administrative Sciences*, 4(3), 276-303. <https://doi.org/10.3390/admsci4030276>

- Nousheen, A., Yousuf Zai, S. A., Waseem, M., & Khan, S. A. (2020). Education for Sustainable Development (ESD): Effects of Sustainability Education on Pre-Service Teachers' Attitude towards Sustainable Development (SD). *Journal of Cleaner Production*, 250, 119537. <https://doi.org/10.1016/j.jclepro.2019.119537>
- Núñez-Andrés, M. A., Martínez-Molina, A., Casquero-Modrego, N., & Suk, J. Y. (2022). The Impact of Peer Learning on Student Performance in an Architectural Sustainability Course. *International Journal of Sustainability in Higher Education*, 23(1), 159–176. <https://doi.org/10.1108/IJSHE-11-2020-0447>
- Pham, H. L. (2011). Differentiated Instruction and the Need to Integrate Teaching and Practice. *Journal of College Teaching & Learning (TLC)*, 9(1), 13–20.
- Pomazal, R. J., & Jaccard, J. J. (1976). An Informational Approach to Altruistic Behavior. *Journal of Personality and Social Psychology*, 33(3), 317–326. <https://doi.org/10.1037/0022-3514.33.3.317>
- Randall, D. M., & Gibson, A. M. (1991). Ethical Decision Making in the Medical Profession: An Application of the Theory of Planned Behavior. *Journal of Business Ethics*, 10, 111–122, 1991. <https://doi.org/10.1007/BF00383614>
- Remington-Doucette, S. M., Hiller Connell, K. Y., Armstrong, C. M., & Musgrove, S. L. (2013). Assessing Sustainability Education in a Transdisciplinary Undergraduate Course focused on Real-world Problem Solving. *International Journal of Sustainability in Higher Education*, 14(4), 404–433. <https://doi.org/10.1108/IJSHE-01-2012-0001>
- Ryu, H.-C., & Brody, S. D. (2006). Examining the Impacts of a Graduate Course on Sustainable Development using Ecological Footprint Analysis. *International Journal of Sustainability in Higher Education*, 7(2), 158–175. <https://doi.org/10.1108/14676370610655931>
- Schwartz, S. H. (1994). Are There Universal Aspects in the Structure and Contents of Human Values? *Journal of Social Issues*, 50(4), 19–45. <https://doi.org/10.1111/j.1540-4560.1994.tb01196.x>
- Schwartz, S. H., & Tessler, R. C. (1972). A Test of a Model for Reducing Measured Attitude-Behavior Discrepancies. *Journal of Personality and Social Psychology*, 24(2), 225–236. <https://doi.org/10.1037/h0033365>
- Segalàs, J., Ferrer-Balas, D., & Mulder, K. F. (2008). Conceptual Maps: Measuring Learning Processes of Engineering Students Concerning Sustainable Development. *European Journal of Engineering Education*, 33(3), 297–306. <https://doi.org/10.1080/03043790802088616>
- Spörrle, M., & Bekk, M. (2015). Nachhaltiges Konsumentenverhalten. In K. Moser, *Wirtschaftspsychologie*. 2nd, completely revised and updated edition (pp. 285-302). Springer.
- Stahl, G. K., & de Luque, M. S. (2014). Antecedents of Responsible Leader Behavior: A Research Synthesis, Conceptual Framework, and Agenda for Future Research. *The Academy of Management Perspectives*, 28(3), 235-254. <http://dx.doi.org/10.5465/amp.2013.0126>
- Stern, P. C. (2000). New Environmental Theories: Toward a Coherent Theory of Environmentally Significant Behavior. *Journal of Social Issues*, 56(3), 407–424. <https://doi.org/10.1111/0022-4537.00175>



Stern P. C., Dietz, T., Abel, T., Guagnano, G. A., & Kalof, L. (1999). A Value-Belief-Norm Theory of Support for Social Movements: The Case of Environmentalism. *Human Ecology Review*, 6(2), 81–97. <https://www.jstor.org/stable/24707060>

Stevens, C. J., Gillman, A. S., Gardiner, C. K., Montanaro, E. A., Bryan, A. D., & Conner, M. (2019). Feel Good Now or Regret It Later? The Respective Roles of Affective Attitudes and Anticipated Affective Reactions for Explaining Health-Promoting and Health Risk Behavioral Intentions. *Journal of Applied Social Psychology*, 49(6), 331-348. DOI: 10.1111/jasp.12584

Tang, K. H. D. (2018). Correlation between Sustainability Education and Engineering Students' Attitudes towards Sustainability. *International Journal of Sustainability in Higher Education*, 19(3), 459–472. <https://doi.org/10.1108/IJSHE-08-2017-0139>

UNESCO (2017). *Education for Sustainable Development Goals: Learning Objectives*. UNESCO Publishing. ISBN 978-92-3-100209-0.

Watson, M. K., Pelkey, J., Noyes, C., & Rodgers, M. O. (2019). Using Kolb's Learning Cycle to Improve Student Sustainability Knowledge. *Sustainability*, 11(17), 4602. <https://doi.org/10.3390/su11174602>

Woo, Y. L., Mokhtar, M., Komoo, I., & Azman, N. (2012). Education for Sustainable Development: A Review of Characteristics of Sustainability Curriculum. *OIDA International Journal of Sustainable Development*, 3(8), 33-44.

Zsóka, Á., Szerényi, Z. M., Széchy, A., & Kocsis, T. (2013). Greening due to Environmental Education? Environmental Knowledge, Attitudes, Consumer Behavior and Everyday Pro-Environmental Activities of Hungarian High School and University Students. *Journal of Cleaner Production*, 48, 126-138. <http://dx.doi.org/10.1016/j.jclepro.2012.11.030>



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