The Impact of Entrepreneurship Education on Entrepreneurial Intention

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The University of St.Gallen, School of Management, Economics, Law, Social Sciences and International Affairs hereby consents to the printing of the present dissertation, without hereby expressing any opinion on the views herein expressed.

St. Gallen, October 26, 2011

The President:

Prof. Dr. Thomas Bieger

In loving memory of
Bernhard Lorz

Preface

The writing of this dissertation has been a fascinating process and personal experience throughout the past three years. Many people contributed to this process; without their support it would have been impossible to complete this dissertation. Therefore, I want to take the opportunity to express my gratitude in this section.

I am particularly grateful to all respondents of the surveys: in total more than 900 surveys were completed during two years of data collection. Participants in the entrepreneurship programmes additionally invested their time to write reflection essays on their experiences within the entrepreneurship programmes. In this context, I would also like to thank Dr. Jochen Gutbrod and Dr. Volker Bernhardt, who generously sponsored gifts for those who completed the surveys.

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I also want to thank my family, who always supported me and understood the time constraints that come with working on a dissertation. Most importantly, I want to thank my fiancé, Linda Blomster, who always stood by me in good and difficult times and created an atmosphere of love and care which facilitated the working process.

St.Gallen, July 2011 Michael Lorz

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List of Abbreviations

ATB	Attitude toward Behaviour
CEE	Center for Entrepreneurial Excellence
EEM	Entrepreneurial Event Model
EEP	Entrepreneurship Education Programme
e.g.	Exempli gratia (for example)
EI	Entrepreneurial Intention
etc.	Et cetera (and so forth)
GLM	General Linear Model
i.e.	Id est (that is)
PBC	Perceived Behavioural Control
SN	Subjective Norm
T_{start}	or T_1 represent the first data collection point
T_{final}	or T_6 represent the last data collection point
TBD	To be determined
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action

Abstract

While the number of entrepreneurship education programmes is growing, their impact is under-researched and studies paint an ambiguous picture of the impact of entrepreneurship education. This dissertation study therefore aims to contribute to the understanding of the impact of entrepreneurship education on entrepreneurial intention.

This study consists of a quantitative and a qualitative section. For the quantitative section, a quasi-experimental, ex-ante/ex-post, control group, longitudinal (up to 18 months), repeated measures research design was implemented, with a total of 272 matched pairs (T_{start}/T_{final}). The theory of planned behaviour was utilised as the underlying theoretical model. In the qualitative part of the study, a content analysis of 55 reflection papers was conducted.

The results attest to an insignificant impact of entrepreneurship education on entrepreneurial intention. This insignificant impact was not moderated by the length of an entrepreneurship education. However, those who were self-employed at the end of the entrepreneurship programme had had significantly higher entrepreneurial intention at the beginning of the programme compared to those who had not become self-employed. An analysis of the development of entrepreneurial intention after the end of an entrepreneurship programme showed that after six months entrepreneurial intentions had decreased significantly. Entrepreneurship education is confirmed to be a major source of inspirational triggers that positively impact on entrepreneurial intention.

From a theoretical perspective this study contributes to the further development and application of the theory of planned behaviour to entrepreneurship education, thereby supporting the link between entrepreneurial intention and self-employment and adding a further moderating variable of retention after the end of an entrepreneurship programme. From a practical point of view, it provides recommendations on how to setup entrepreneurship education programmes and how to facilitate an environment, in which inspirations are triggered.

1. Introduction

1.1 Importance of Entrepreneurship Education as Subject of Study

The past two decades have witnessed significant growth in entrepreneurship education in most industrialized countries (Matlay & Carey, 2006). The number of entrepreneurship courses increased in the US tenfold in the period from 1979 to 2001 (Katz, 2008) and investment in entrepreneurship programmes is still on the increase (Gwynne, 2008). The growth "can be seen as indicative of widespread governmental belief in the positive impact that entrepreneurship can have on the socio-economic and political infrastructure of a nation" (Matlay, 2008: 382). Public policy makers recognise the importance of entrepreneurship as promoter of economic development and hence support instruments like entrepreneurship education to increase entrepreneurial activity (Fayolle, Gailly, & Lassas-Clerc, 2006). The European Commission, for example, endorses such support, noting that the "primary purpose of entrepreneurship education [at higher education level] is to develop entrepreneurial capacities and mindsets" (European Commission, 2008: 11) and recommends integrating entrepreneurship more fully into university curricula. The final report of the European Commission Expert Group for Entrepreneurship Education underlines that the "important role of education in promoting more entrepreneurial attitudes and behaviours,..., is *widely recognised*" (European Commission, 2008: 10).

These examples provide evidence of the widespread belief in a positive impact of entrepreneurship education. By offering new entrepreneurship education programmes, the initiators follow "conventional wisdom" (Souitaris, Zerbinati, & Al-Laham, 2007: 566): If you want to become an entrepreneur, you need to learn "how" first. Research has, to date, contributed to this belief and underlined the positive impact of entrepreneurship education (Chrisman, 1997; Peterman & Kennedy, 2003; Zhao, Seibert, & Hills, 2005). Out of 41 studies analysing the impact of entrepreneurship education, 39 indicated a positive or mixed result (Lorz, Müller, & Volery, 2011). Only recently did two studies find a negative impact of entrepreneurship education (Oosterbeek, van Praag, & Ijsselstein, 2010; von Graevenitz, Harhoff, & Weber, 2010). At second glance, it appeared that most studies that had reported a positive impact of entrepreneurship education had significant methodological deficiencies, which strongly limited the validity of the results. Most of the studies are ex-post examinations that do not measure the direct impact of an entrepreneurship education

programme (Kolvereid & Moen, 1997; Menzies & Paradi, 2002; Menzies & Paradi, 2003; Noel, 2001) or do not utilize control groups (Kruzic & Pavic, 2010; Lee, Chang, & Lim, 2005) or have small samples (Clouse, 1990; Fayolle et al., 2006; Jones, Jones, Packham, & Miller, 2008). If one filters the impact studies by counting only studies utilizing an ex-ante, ex-post design with control groups and a sample size of n>100, then only four studies are left (Lorz et al., 2011): One study reporting positive results (Peterman et al., 2003), two reporting mixed or insignificant results (Olomi & Sinyamule, 2009; Souitaris et al., 2007) and one reporting significantly negative results (Oosterbeek et al., 2010). The overly positive picture is hence turned upside down and there is evidence of only a few studies with robust research designs. It thus comes as no surprise that many authors have called for more research into the impact of entrepreneurship education, especially with more robust research designs: Peterman et al. (2003: 130) state that although authors have acknowledged the positive effect from entrepreneurship education, "there has been little rigorous research on its effects". In their review of entrepreneurship education, Pittaway & Cope (2007) found that the link between entrepreneurship education and outcomes is under-researched (Pittaway & Cope, 2007). Fayolle (2006: 766) notes that "there is a lack of research regarding the outcomes of entrepreneurship education". Oosterbeek et al. (2010) call for more research into different variants of entrepreneurship education programmes, and von Graevenitz et al. (2010) state that "little is known at this point about the effect of these [entrepreneurship] courses" (von Graevenitz et al., 2010: 103)

If we consider the situation of research on the outcomes of entrepreneurship education at this point, we note that, on the one hand, there is a continuous effort to expand entrepreneurship education programme offerings. On the other hand, there is a lack of rigor in past research studies and ambiguous results regarding the impact of entrepreneurship education. Given this situation, it is of theoretical and practical relevance to research the impact of entrepreneurship education. Therefore, this dissertation study will deal with the impact of entrepreneurship education, and research questions are formulated accordingly.

1.2 Research Objective and Questions

The objective of this dissertation is to fill the gap in the existing literature with regard to the impact of entrepreneurship education. The research questions have been selected in order to advance the theoretical development of the subject and generate practical implications. In the following, an overview of the research questions is provided.

1.2.1 RQ1 - Impact of Entrepreneurship Education on Entrepreneurial Intention

As indicated in the introduction, there are ambiguous results regarding the impact of entrepreneurship education as well as a lack of rigorous studies. Therefore, the first research question in this dissertation concerns the impact of an entrepreneurship education programme on entrepreneurial intention:

1) Research Question (1): *What impact does an entrepreneurship education programme have on entrepreneurial intention?*

1.2.2 RQ2 - Effect of Duration on Entrepreneurial Intention

The entrepreneurship programmes examined in the literature review range from a one-day programme (Fayolle et al., 2006) to 12 months (Oosterbeek et al., 2010). This range from 1 day to 365 days indicates a variation in duration of entrepreneurship education programmes.

2) Research Question (2): *What is the impact of the duration of an entrepreneurship programme on entrepreneurial intention and its antecedents?*

This research question offers - from a process perspective – insight into how entrepreneurial intention develops throughout an entrepreneurship education programme. From a resource perspective and time investment perspective, it is important to understand whether there is a relationship between the length of an entrepreneurship education programme and potentially increasing impact with length. A programme that is too short might motivate participants, but the effect could potentially be a "straw fire", while a programme that is too long could potentially de-motivate.

1.2.3 RQ3 - Stability of Entrepreneurial Intention

Fayolle (2006) highlights an avenue for research by questioning whether entrepreneurial intentions "tend to be accentuated or at the opposite eroded over time?" (Fayolle et al., 2006: 716). Müller (2008) identifies the stability of entrepreneurial intentions as a research gap and questions whether "we need repetition to achieve lasting changes?" (Müller, 2008: 169).

3) Research Question (3): *What is the stability of entrepreneurial intention and its antecedents after the end of an entrepreneurship education programme?*

Assuming that entrepreneurship education has a positive impact on entrepreneurial intentions, how long does this impact on intentions last? If the strength of entrepreneurial intentions quickly decreases after the end of an entrepreneurship programme, then there would be a significant impact on the design of entrepreneurship education programmes. The objective of research question three is therefore to measure the strength of entrepreneurial intention after the end of an entrepreneurship education programme.

1.2.4 RQ4 - Entrepreneurial Intention and Self-Employment

While the concept of intention implies planned behaviour (Hmieleski & Corbett, 2006), entrepreneurial intention has not yet been empirically linked to subsequent venture creation (Shook, Priem, & McGee, 2003). Therefore, authors have called for longitudinal testing of the impact of entrepreneurship education (Gelderen et al., 2008; Kolvereid, 1996b; Peterman et al., 2003), especially the influence of entrepreneurship education on intentions and actual behaviour (Kolvereid et al., 1997; Müller, 2008; Souitaris et al., 2007):

4) Research Question (4): *Does entrepreneurial intention predict self-employment?*

1.2.5 RQ5 - Trigger-Events of Entrepreneurship Education

Souitiaris et al. (2007) conclude in their study that one major benefit of entrepreneurship education programmes could be so-called trigger-events, which are moments, experiences or events during (or because of) an entrepreneurship programme that trigger an increase or decrease in entrepreneurial intentions. This argumentation links well to Shapero and Sokol`s Entrepreneurial Event Model (1982), which is based on the assumption that a so-called "displacement event" changes perceptions about the feasibility and desirability of a target behaviour (Fayolle et al., 2006). In the context of entrepreneurship education, it raises the question of whether an entrepreneurship programme can be seen as a source of trigger-events, and if so, what kind of trigger-events within an entrepreneurship education programme have an impact?

5) Research Question (5): *What trigger-events during the entrepreneurship education programme impact the intention to become an entrepreneur?*

The objective of research question five is to generate rich data about possible positive and negative trigger-events that impact on entrepreneurial intention.

1.3 Research Relevance

This study is relevant, given the importance that entrepreneurship education has in today's university environment. The number of entrepreneurship programmes offered is growing in spite of a lack of clear scientific answers regarding the impact of entrepreneurship education on its participating students. This study will elaborate in depth on the impact of entrepreneurship education on entrepreneurial intention and its antecedents. Furthermore, it will, based on identified research gaps in literature, deal with five important research gaps.

First, new variants of entrepreneurship education programmes will be tested with respect to their impact and add to the current discussion of the impact of entrepreneurship education.

Second, the impact of duration of entrepreneurship education will be analysed. This is of crucial importance for educators as the length of duration relates to time investment and resource utilization. Duration of entrepreneurship education also has the potential to function as a moderator of impact and further develop the theory of planned behaviour in the context of entrepreneurship education.

Third, the stability of entrepreneurial intentions after the end of a programme will be examined. This is of importance from a theoretical as well as from a practical perspective. If an entrepreneurship education programme increases entrepreneurial intention, then how long does this impact last? This question is paramount for entrepreneurship educators as "intentions are the single best predictor of planned behaviour" (Krueger & Carsrud, 1993: 5).

Fourth, the link between entrepreneurial intention and venture creation will be analysed. Empirically, validation of the link between intention and actual entrepreneurial is lacking. This research gap also has the potential to further develop the theory of planned behaviour.

Finally, this study has the potential to fill a research gap concerning trigger-events within an entrepreneurship education programme. Knowing what trigger-events impact entrepreneurial intentions and under which circumstances they develop would benefit entrepreneurship education research and offer highly practical implications for the design of entrepreneurship education programmes. The entrepreneurial event model by Shapero & Sokol (1982) could potentially be applied to entrepreneurship education and different categories of trigger-events of entrepreneurship education could be added to the model.

1.4 Research Scope

Although the topic of this dissertation offers great research opportunities, it is necessary to define its scope in order for the dissertation to remain manageable.

First, the geographic location is limited to Switzerland and Southern Germany. This may have an impact on the overall attitude that participants bring to an entrepreneurship programme. The GEM report 2009 indicates that, in the 18-64 age group, Switzerland has slightly above average and Germany average entrepreneurial intention (Bosma & Levie, 2010).

Second, this dissertation is focused on university-level students. The question of what time is the best for learning entrepreneurship is not scope of this dissertation, although it is an interesting and relevant question.

Third, the main dependent variable is entrepreneurial intention as an impact measure of an entrepreneurship programme. This is considered the most appropriate indicator for measuring the direct impact of an entrepreneurship education programme and as a predictor for future behaviour.

Fourth, while one strength of this study is that longitudinal aspects are accounted for by following the development of students throughout a four-semester programme, the scope of the dissertation does not involve tracking these students for years after their participation in order to measure the conversion of intention into actual behaviour. This is however fertile ground for a follow-up study after the submission of the dissertation.

Fifth, the content of an entrepreneurship education programme as such is not part of this study; however, the entrepreneurship education programmes analysed in the study are found to be comparable to others and can be categorized as good-practice programmes using standard criteria (Souitaris et al., 2007).

Finally, exogenous factors that impact entrepreneurial intentions during the time of an entrepreneurship programme, for example, family or friends, are not taken into account separately. They will be indirectly captured through attitudinal variables which are antecedents of intention but are not specifically identified and isolated.

1.5 Dissertation Structure

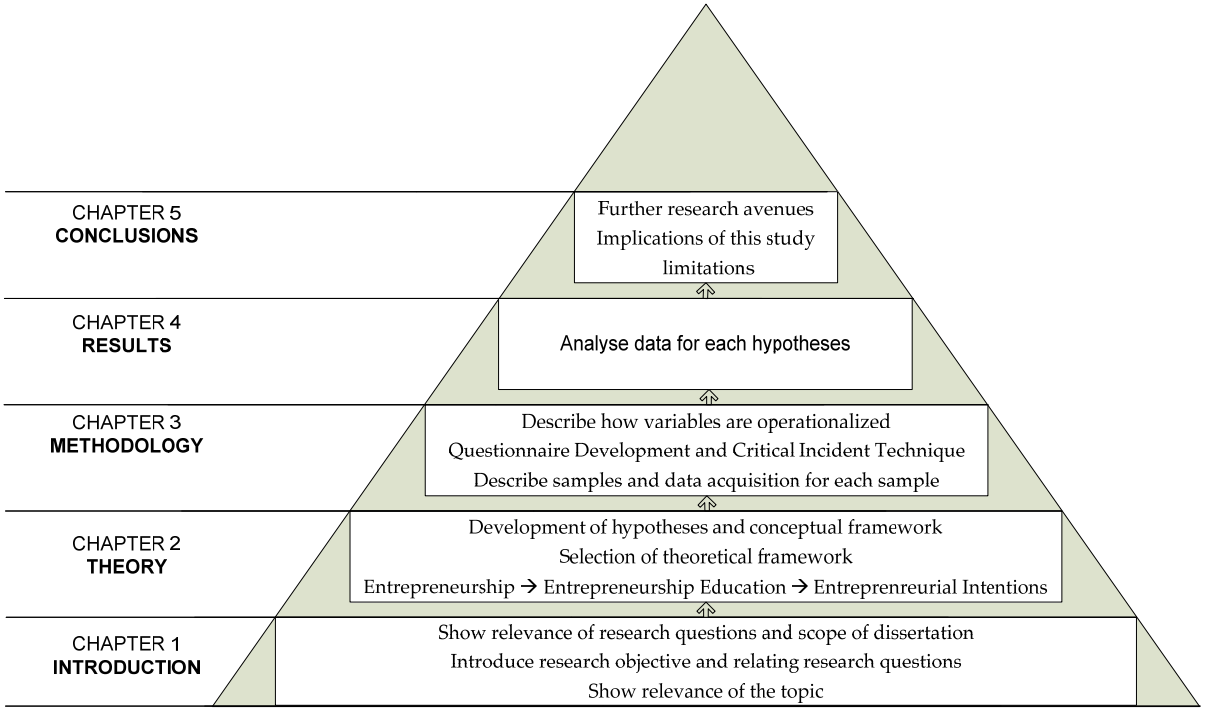


Figure 1 - Dissertation Structure

Chapter 1 introduces the research topic, elaborates on its relevance, and outlines the five research questions. It further explains the scope of the dissertation and concludes with the dissertation's structure. *Chapter 2* provides an introduction to entrepreneurship and entrepreneurship education and analyses the current strands of literature in the domain of impact of entrepreneurship education studies. Intention theories are reviewed and a theoretical framework is selected that underlies this dissertation study. Finally, hypotheses are developed and the conceptual framework is presented to the reader. *Chapter 3* describes in detail the methods used, samples are described, and objectives for each sample, data acquisition methods as well as measurement intervals are explained. The operationalization of the key variables is presented and the methods for data analysis are explained. *Chapter 4* provides the results of the analysis for each research question and an in-depth discussion of the results. The dissertation concludes with *Chapter 5*, which discusses the implications for theory and practice, elaborates on its limitations and provides further ideas for promising avenues of research. The appendices contain additional information and reference material as outlined in the table of contents and referenced in the text.

2. Theory

2.1 Objective

The aim of this theory chapter is to review the literature necessary to building a strong theoretical foundation for answering the research questions. The focus will be placed on reviewing journal articles in the topical area of impact of entrepreneurship education and reviewing theories that provide a theoretical framework for measuring entrepreneurial intention. The following sub-chapter begins with an introduction to two important concepts: entrepreneurship and entrepreneurship education. A review of the literature defines the state of research in entrepreneurship education impact studies and identifies research gaps. Subsequently, the link between entrepreneurship education and entrepreneurial intention is established and intention theories are reviewed. A theoretical framework is chosen and hypotheses are developed. The chapter concludes with the conceptual framework and a summary of the hypotheses.

2.1.1 Concept and classification of entrepreneurship

"Good science has to begin with good definitions"

Source: Bygrave & Hofer (1991, p.13)

The term entrepreneurship has a history that dates back to 1732, when the Irish economist Richard Cantillon used the word in reference to individuals with "a willingness to carry out forms of arbitrage involving the financial risk of a new venture" (Minniti & Lévesque, 2008: 603). The active form of entrepreneur, "entreprendre", can be translated as "to undertake or start something". Researchers and "economists such as Mill (1870), Say (1857), Knight (1921), Schumpeter (1934), Kirzner (1973, 1997), Baumol (1990,2002) are among the most influential contributors to our understanding of entrepreneurial behaviour..." (Minniti et al., 2008: 603).

In general terms an entrepreneur is described as "one who organises, manages, and assumes the risks of a business or enterprise" (Woolf, 1980: 378). While this definition may seem plausible, many researchers argue that entrepreneurship as such is still a field with no clear boundaries and that it lacks a clear conceptual framework (Bruyat & Julien, 2001; Busenitz et al., 2003; Ireland & Webb, 2007; Shane & Venkataraman, 2000).

Shane et al. (2000) therefore propose three major sets of research questions: "(1) why, when, and how opportunities for the creation of goods and services come into

existence; (2) why, when and how some people and not others discover and exploit these opportunities; and (3) why, when and how different modes of action are used to exploit entrepreneurial opportunities" (Shane et al., 2000: 218). Talking about entrepreneurship can thus be summarised as a two-level approach regarding the processes leading to becoming self-employed and the individual.

The context of this dissertation can be positioned in the second subset of research questions concerning why people become entrepreneurs. The dissertation examines individuals who intend to become entrepreneurs and are potentially spurred and accelerated through entrepreneurship education.

2.1.2 Concept and classification of Entrepreneurship Education

When the first entrepreneurship course was offered in February 1947, 188 Harvard MBA students were enrolled. Approximately 50 years later, as many as 120,000 North American students are participating in entrepreneurship courses (Katz, 2003). Not only in the USA but also in German-speaking countries, strong growth in entrepreneurship courses and professorships can be observed (Klandt, 2004).

In the context of this dissertation entrepreneurship education programme (EEP) is defined: "... *as any pedagogical programme or process of education for entrepreneurial attitudes and skills, which involves developing certain personal qualities. It is therefore not exclusively focused on the immediate creation of new businesses*." (Fayolle et al., 2006: 702).

Linan (2004) found that there are four different kinds of entrepreneurship education programmes. The first, "Entrepreneurial Awareness Education", aims to increase knowledge about entrepreneurship and to influence attitudes that may impact intentions. The second category is described as "Education for Start-Up". These programmes are geared toward people who generally already have an entrepreneurial idea and need to solve practical questions about becoming self-employed. The third category, "Education for Entrepreneurial Dynamism", focuses on people who are already entrepreneurs and want to promote dynamic behaviours after the start-up phase. The last category "Continuing Education for Entrepreneurs" describes life-long learning programmes and focuses on experienced entrepreneurs. (Linan, 2004).

Along with the different types of entrepreneurship education, there are four research streams of entrepreneurship education research (Bechard & Gregoire, 2005). The first

stream focuses on the role of entrepreneurship programmes on the individual and society. The second research stream is concerned with the systemisation of entrepreneurship programmes, for example, the use of multimedia environments or curriculum development. The third stream researches the content and its delivery in entrepreneurship programmes, and the fourth stream concentrates on the needs of individual participants in entrepreneurship programmes (Bechard et al., 2005). According to this categorisation, the context of this dissertation can be positioned in the first research stream, the analysis of the impact of an entrepreneurship programme.

2.2 Impact of Entrepreneurship Education

2.2.1 Overview of impact studies

If you ask a self-made entrepreneur whether entrepreneurship can be taught, he will most probably answer "No". If you ask the 5000+ entrepreneurship professors worldwide and the millions of students who join their entrepreneurship classes, you will most probably receive a different answer (Katz, 2007).

Education in general is confirmed to have a positive impact on entrepreneurship (Robinson & Sexton, 1994). Robinson et al. (1994) found in their study that there is a strong relationship between education and the probability of becoming an entrepreneur and the probability of having success as an entrepreneur. However, they did not differentiate between the various kinds of education and disregarded the possibility of specifically designed entrepreneurship education programmes. The literature review of studies that deal with the impact of entrepreneurship education yielded 41 papers[1]. Table 1 provides an overview of the studies categorised by the findings concerning the impact of entrepreneurship education:

Studies reporting negative impact		
(von Graevenitz et al., 2010)	(Oosterbeek et al., 2010)	
Studies reporting positive impact		
(Bakotic & Kruzic, 2010)	(Kruzic et al., 2010)	(Singh & Verma, 2010)
(Cruz, Escudero, Barahona, & Leitao, 2009)	(Athayde, 2009)	(Cheung, 2008)
(Jones et al., 2008)	(Liao & Gart, 2007)	(Matlay, 2008)
(Petridou & Glaveli, 2008)	(Alarape, 2007)	(Garalis & Strazdienė, 2007)
(Harris, Gibson, & Taylor, 2008)	(Wilson, Kickul, & Marlino, 2007)	(Fayolle et al., 2006)
(Friedrich, Glaub, Gramberg, & Frese, 2006)	(Lee et al., 2005)	(Zhao et al., 2005)
(Chrisman, McMullanb, & Hall, 2005)	(Ohland, Frillman, Zhang, Brawner, & Miller Iii, 2004)	(DeTienne & Chandler, 2004)
(Wee, 2004)	(Peterman et al., 2003)	(Thornberry, 2003)
(Menzies et al., 2002)	(Fayolle, 2000)	(Hansemark, 1998)

[1] The dataset of 41 studies was used from the article: Lorz, M., Müller, S., & Volery, T. 2011. Entrepreneurship Education: A Meta-Analysis of Impact Studies and Applied Methodologies, ***Conference Paper, FGF G-Forum 2011***. Zurich.

(Chrisman, 1997)	(Kolvereid et al., 1997)	(Kourilsky & Esfandiari, 1997)
(Clouse, 1990)	(Garnier & Gasse, 1990)	(Clark, Davis, & Harnish, 1984)
Studies reporting insignificant impact or mixed results		
(Olomi et al., 2009)	(Radu & Loué, 2008)	(Lee, Lim, Pathak, Chang, & Li, 2006)
(Souitaris et al., 2007)	(Galloway, Anderson, Brown, & Wilson, 2005)	(Galloway & Brown, 2002)

Table 1 - Overview of Impact Studies

2.2.2 Review of impact studies

The overview of impact studies in entrepreneurship education strongly indicates a positive impact of entrepreneurship education, with 33 studies reporting a positive impact, six with mixed results, and only two reporting a negative impact of entrepreneurship education. The positive impact of entrepreneurship education is further complemented by meta-studies of entrepreneurship education (Bechard et al., 2005; Dickson, Solomon, & Weaver, 2008; Mwasalwiba, 2010; Pittaway et al., 2007). "…in general, there was a significant and positive correlation between participation in educational programs and selection into entrepreneurship" (Dickson et al., 2008: 245) or "Although most studies vary in terms of approach and theoretical orientations…, their results seem to conclude that entrepreneurship education has some positive impact on students" (Mwasalwiba, 2010: 35).

With these initial observations in mind, the literature review will be guided by the following questions:

A) What are potential reasons for differing results in entrepreneurship education impact studies?

B) What are the research gaps identified in the current strands of literature?

A separate conclusion for the literature review will pinpoint the most relevant findings of the literature review for the dissertation study at hand.

A) What are potential reasons for differing results?

Three categories of reasons emerged during the review. First, the methods that were utilised to measure the impact of entrepreneurship education, second, the independent variable in form of entrepreneurship education programmes and third, the participants on entrepreneurship education who are targeted for influence by the entrepreneurship education programme.

Methods

Three major methodological limitations of previous studies may explain the overly positive studies: First and foremost, the focus on only ex-post studies, second, the lack of control groups and finally, the utilization of small sample sizes.

With regard to the time of measurement, there are two types of studies: ex-post and ex-ante/ex-post studies that are utilised in analysing the impact of entrepreneurship education studies. From 41 impact studies, 28 utilise ex-post measurement:

Ex-post studies measure the impact of entrepreneurship education only after the education has taken place (e.g. Kolvereid et al., 1997; Menzies et al., 2002; Menzies et al., 2003; Noel, 2001). Kolvereid et al. (1997) found that graduates who majored in entrepreneurship had a higher likelihood of becoming entrepreneurs after graduation. Similar results were found by Noel (2001), Chen et al. (1998) and Menzies (2002, 2003). Noel identified a significant difference between entrepreneurship and non-business majors but no difference between entrepreneurship vs. management majors. Chen et al. (1998) found a correlation between the number of management courses taken by students in non-management majors and entrepreneurial intention. Menzies et al. (2002, 2003) found that those who took electives in entrepreneurship were more likely to found a business and reach a higher management status than those who did not study entrepreneurship subjects.

While ex-post studies may indicate that education in general had an impact on the likelihood of becoming an entrepreneur, they have two substantial limitations that reduce their explanatory power. The first concerns selection bias: Students who chose entrepreneurship courses had an interest in the topic before they entered entrepreneurship education. Hence, if a study examines two groups of graduates, one of them comprising entrepreneurship majors, and compares them with graduates from non-entrepreneurship majors, it is not surprising that the study finds that entrepreneurship major graduates have a higher likelihood of founding businesses than

non-entrepreneurship majors. The second limitation concerns the measurement time lag. Kolvereid et al. (1997) examined graduates for up to 8 years after graduation. The cohort of students examined by Menzies et al. (2002) spans a period of 15 years. Can the decision to start a business be explained solely by education or were there other factors motivating the person to become an entrepreneur within the period of 8 to 15 years after graduation? What specifically was the impact of entrepreneurship education in this process? Did it raise awareness of the potential of a career as an entrepreneur or did it reinforce the career intentions of students who were already interested in entrepreneurship? Ex-post studies therefore are not appropriate to answer the question regarding the impact of entrepreneurship education on intentions. (Alberti, 1999; Gorman & Hanlon, 1997).

Ex-post studies have significant methodological limitations which are worsened if no control groups are utilised. In our sample of eight mixed and negative studies, five utilise ex-post studies, of which only two utilise a control group. The question can be raised: What is the experimental group compared with to validate the results?

The second type of time of measurement is the ex-ante, ex-post research design. These studies utilise quasi-experimental ex-ante/ex-post research designs which acquire data before an education programme has taken place or at the start of an entrepreneurship education and afterward. By utilising this method, the researcher can identify and quantify the direct impact of the education programme on the participant regardless of selection bias and previous background. According to Athayde (2009), an ex-ante/ex-post test design will balance out any differences between the groups and focus only on the increase or decrease of the constructs (Athayde, 2009). If publication in a well-ranked journal is taken as a sign of quality, then it can be concluded that only ex-ante, ex-post studies in the sample of mixed and negative studies were published in A or B journals according to the VHB ranking (VHB, 2011).

In addition to the methodological limitations with ex-post only studies, the majority of studies (27/41) do not utilise control groups, e.g., Fayolle (2006) examines only the experimental group and therefore has no opportunity to analyse differences between an experimental and control group to validate results. Referring to group size, a sample size of N=20 (Fayolle, 2006) may not be sufficient size to justify a valid and reliable result.

If a minimum methodological standard of impact studies was defined with the following parameters: n > 100, ex-ante, ex-post measurement and the utilisation of

control groups, then the sample of 41 studies would shrink to four (Olomi et al., 2009; Oosterbeek et al., 2010; Peterman et al., 2003; Souitaris et al., 2007). One reports negative results (Oosterbeek et al., 2010), two mixed results (Olomi et al., 2009; Souitaris et al., 2007) and only one indicates positive results (Peterman et al., 2003). The ratio between positive vs. negative/mixed studies would only be 1:3. This simple example shows that there are many studies that have not utilised robust methodologies and also indicates the potential for further research in the impact of entrepreneurship education with strong underlying methods.

Independent Variable

The independent variable in the examined impact studies is always an entrepreneurship education program that impacts on a certain set of dependent variables. When reviewing the negative and mixed result studies (table 2), it becomes apparent that every study examines an individual and specific programme of the institution providing the entrepreneurship education programme. Von Graevenitz et al. (2010) examine an entrepreneurship course of the Munich School of Management at Ludwig Maximilian University in Munich, Germany; Olomi (2009) investigates a training programme that is offered in Vocational Training Centres in Tanzania; Galloway et al. (2005) examines entrepreneurship courses that are offered at Scottish universities. This makes it potentially difficult to compare entrepreneurship programmes and therefore represents a need for authors to provide an in-depth explanation of the analysed programmes. In the majority of studies there is virtually no description of the entrepreneurship education programme that is examined (e.g. Galloway, (2002,2005), Lee et al.(2006), Radu and Louê, 2008). Further complicating the issue is that some programmes are offered at the school level (e.g. Oosterbeek et al., 2010), the majority at the university level and some at adult - professional level (e.g. Olomi, 2009). Therefore, it depends on the abstraction level on which the entrepreneurship education programmes are compared. Souitaris et al. (2007) recognised this challenge and provided a solution for it: Based on the literature, they define what constitutes a "good-practice" entrepreneurship education programme and then employ this basis to compare entrepreneurship education programmes. The research by Oosterbeek et al. (2010) and von Graevenitz et al. (2010) is particularly interesting as the outcomes contradict all other previously conducted research studies. Oosterbeek et al. (2010) surveyed college students in a Dutch state

Authors	Year	Journal	Independent Variable	Cultural Setting	Dependent Variable	Level	Sample Size	Control Group	Time of Measurement	Result
Oosterbeek, van Praag, Ijsselstein	2010	European Economic Review (VHB Ranking: B, 7.9)	Dutch entrepreneurship education program (SMC)	The Netherlands	students' entrepreneurship skills and motivation	school	104	146	Ex Ante/Ex Post Study	effect on students' self-assessed entrepreneurial skills is insignificant and the effect on the intention to become an entrepreneur is negative.
von Graevenitz, Harhoff, Weber	2010	Journal of Economic Behavior & Organization (VHB: A, 8,22)	Munich School of Management Entrepreneurship Course Business Planning	Germany	students' entrepreneurship skills, intention	university	196	no control group	Ex Ante/Ex Post Study	Intentions decline, positive effect on self-assessed entrepreneurial skills
Olomi	2009	Journal of Enterprising Culture (VHB: C, 6,61)	Vocational Training Centers in Tanzania	Tanzania	students' entrepreneurial inclination	professionals	119	118	ex-post	participation in the entrepreneurship course has no significant effect start-up inclinations
Radu, Loue	2008	Journal of Enterprising Culture (VHB: C, 6,61)	University Entrepreneurship Course	France	entrepreneurial self-efficacy, behavioural intention	university	44	no control group	ex-post	Mixed results, only positive in very specific situation (situation of high emotional involvement with self-ideal role models
Soultaris, Zerbinati, Al-Laham	2007	Journal of Business Venturing (VHB: A, 8,38)	University entrepreneurship programme	UK, France	entrepreneurial attitudes, intentions	university	124	126	Ex Ante/Ex Post Study	EI, Subjective Norms increased, ATB, Perceived Behavioural Control did not change; Nascency did not increase; not learning but inspiration is the programme's biggest benefit
Lee, Lim, Pathak, Chang, Li	2006	Entrepreneurship Management (VHB: not ranked)	University Entrepreneurship Courses	US, Korea, China, Fiji	cultural differences on effect of entrepreneurship education	university	307	no control group	ex-post	there are cultural differences, especially in intention of venture creation, confidence in venture creation and intention of overseas venture creation
Galloway, Anderson, Brown, Wilson	2005	Education + Training (VHB: not ranked)	University Entrepreneurship Module	Scotland	entrepreneurial skills	university	519	no control group	ex-post	only half of the students perceive their skills to be improved
Galloway, Brown	2002	Education + Training (VHB: not ranked)	University Entrepreneurship Course	Scotland	quality of business start-ups	university	210	2143	ex-post	unclear, effect of entrepreneurship education will be long-term

Table 2 - Overview of Negative and Insignificant Studies

entrepreneurship programme and found that the entrepreneurship education programme had a significant negative impact on entrepreneurial intentions. Oosterbeek et al. (2010) speculate that the negative impact may be related to the programme design and provide two reasons for the negative result that merit further attention: First, the programme may have been ineffective, and second, it may have been negative because participation in the entrepreneurship education programme was compulsory. While the first is fairly obvious and should be controlled for when reviewing an entrepreneurship education programme, the second adds a new dimension to the discussion as it implies a different setup of entrepreneurship education. Compulsory programmes are offered for every student enrolled in a certain degree programme; therefore, there is a mix of entrepreneurial-minded students and non- entrepreneurial-minded students in the group of participants. Voluntary programmes only attract those students who have an interest in entrepreneurship education. Of the two studies that reported a negative result (Oosterbeek et al. 2010 & von Graevenitz et al., 2010), both analysed compulsory programmes. Von Graevenitz et al. (2010) therefore argue that an entrepreneurship education programme is foremost a way for students to test their aptitude for an entrepreneurial career choice. According to the authors, the decline in entrepreneurial intention is not necessarily negative or a failure of the programme but potentially a socially desirable effect as students may discover that they have no aptitude for an entrepreneurial career and change course. Previous studies have not differentiated between voluntary and compulsory programmes; therefore, Oosterbeek et al. (2010) call for the testing of different variants of programmes.

Participants

The review of potential reasons in the category of participants points to the following discussion areas: level of participants, cultural differences, potential long-term effects, increase in realistic perspective and selection bias.

Along the lines of the review in the last section, there are wide-ranging levels of participants in the categories of school students, university students and adults. The question of when (age) to provide entrepreneurship education is not in the scope of this dissertation, but a short review of literature provides the following point: In order to increase interest in entrepreneurship, to plant or seed entrepreneurship as a career option, authors advocate the time during the teenage years where early career

aspirations are formed (Low, Yoon, Roberts, & Rounds, 2005). Wilson et al. (2007) highlight that "studies indicate that entrepreneurship education at precollege levels may be particularly effective in increasing interest in entrepreneurship" (Wilson et al., 2007: 392). When it comes to actual entrepreneurial activity, women and men have their highest entrepreneurial activity during the ages 25-34 (Reynolds, Gartner, Greene, Cox, & Carter, 2002). Post-university, professionals and entrepreneurs enrol in specific assistance programmes in order to master their business challenges (Chrisman, 1997). The objectives per age or lifecycle suit the classification of entrepreneurship education programmes by Linan (2004) (see chapter 2.1.2).

Consequently, the offering of entrepreneurship education must be adjusted to the level of participant and objectives must be suited to these groups of participants. Moreover, this differentiation between level of participants increases the challenges in comparing the impact of entrepreneurship education programmes. Similarly to the recommendation in the section independent variable, authors of impact studies should therefore provide information about the objectives of the entrepreneurship education programme and should try to classify it under Linan's (2004) categorisation scheme.

In the eight studies in table 2, entrepreneurship education programmes from ten different countries were analysed. The countries include the Netherlands, Tanzania, France, USA, Korea, China, Fiji, Germany, UK and Scotland. Lee et al. (2006) examined the cultural differences and impact of entrepreneurship education and confirmed that there is a strong cultural bias between US, Korea, China and Fiji. Furthermore, Olomi (2009) examined vocational training programmes in remote areas in Tanzania which can scarcely be compared with the programmes catering to potentially privileged students of Western European universities. The Global Entrepreneurship Monitor examines entrepreneurial attitudes, activities and aspirations globally and differentiates between three different types of economies, factor-, efficiency- and innovation-driven countries (GEM, 2011). Tanzania, although not part of the GEM analysis of 2010, would fall into the category of factor-driven economies, while the Western countries in this sample belong to the category of innovation-driven.

The cultural setting should be a sensible point to consider when undertaking research on the impact of entrepreneurship education. Either the researcher chooses culturally similar countries or specific controls for culture should be implemented in the research design.

Another reason for the absence of immediate impact is provided by Galloway et al. (2002,2005), who examined entrepreneurship education in Scottish universities. In 2002, they examined a group of students and a group of alumni and found that it is unclear whether entrepreneurship education increases the number of start-ups immediately after graduation. In comparison, 19% of the students wanted to found a business within five years after graduation versus 33% of alumni who actually founded a business within five years of graduation. They explained the result with a potential long-term impact of entrepreneurship education, the gain in knowledge about the challenges of entrepreneurship and therefore worse prospects of becoming entrepreneurs within five years after graduation. In 2005, they undertook a similar study and reconfirmed their results from 2002.

Oosterbeek et al. (2010) argue that the reason may have been that participants had lost their over-optimism about entrepreneurship and rejected the idea of becoming an entrepreneur after the programme had finished. A similar explanation was provided by Olomi et al. (2009), who posited that participants may have gained a more realistic overview of entrepreneurship and therefore did not want to become entrepreneurs after the end of the programme.

Souitaris et al. (2007) analysed two entrepreneurship education programmes and while they found that entrepreneurial intention was raised, they also found, in contrast with Peterman (2003), that entrepreneurship education did not have an impact on perceived behavioural control and attitudes toward behaviour. According to the authors, the insignificant impact was difficult to explain; however, the authors speculate that perceived behavioural control of the students was already high at the beginning and had little room to change.

B) Research Gaps

Not only have researchers in this specific field of study called for more studies to determine the impact of entrepreneurship education but also authors of comprehensive literature reviews in the area of entrepreneurship education have done so. Gorman (1997) notes that there is little rigorous research and that the research in this area is still in its infancy. Ten years after Gorman, Pittaway et al. (2007: 499) conclude that the link between entrepreneurship education and outcomes is (still) "under-researched". The same is postulated by Oosterbeek et al. (2010) as they call for more research in the impact of variant entrepreneurship programmes. Von Graevenitz et al.

(2010) state that "...,little is known at this point about the impact of these courses. In particular, it is largely unknown how the courses impact on students' willingness to engage in entrepreneurial activity..." von Graevenitz et al. (2010: 103).

With regard to the participant levels, research has indicated that school students are most receptive to the planting of a far-off idea of entrepreneurship as a future career path. However, from an economic and venture creation perspective, the potentially more interesting target group is university students who are at the brink of the decision on whether to start a career in a salaried employee relationship or to become self-employed. On this level, research on the important role of compulsory versus voluntary participation in entrepreneurship education has been neglected. While Oosterbeek et al. and von Graevenitz et al. (2010) examined compulsory entrepreneurship programmes on the school and university levels, the role of voluntary, university level education, especially in combination with methodologically sound research designs, is under-researched.

Along with the testing of the impact of variant entrepreneurship education programmes, these four promising avenues of research were identified during the literature review: a) the impact of length of entrepreneurship education on entrepreneurial intention; b) the stability of entrepreneurial intention after the end of an entrepreneurship education programme; c) the link between entrepreneurial intention and venture creation; and d) potential trigger-events of entrepreneurship education.

While some entrepreneurship education programmes consist of individual entrepreneurship courses lasting one day (e.g. Fayolle, 2006), some last for up to 12 months (Oosterbeek et al., 2010). Is a longer programme better or more effective than a shorter? Oosterbeek et al. (2010) underline duration of an programme as a promising avenue of research.

Arguably, a programme of one day may not make a lasting difference and the result of a significant increase in a one-day pre/post test design is therefore questionable. Fayolle (2006) thus identifies the question of the stability of entrepreneurial intentions as a central and promising area of research and recommends initiating longitudinal studies to observe the impact of entrepreneurship education on entrepreneurial intentions. Furthermore, he identified the stability of the impact of an educational intervention as a research gap. One avenue of research "concerns … perceptions and intentions after the EEP. Do these variables tend to be accentuated or at the opposite eroded over time?" (Fayolle et al., 2006: 716). This seems to be an important avenue

of research as it has to date been neglected in studies. Although Galloway (2002) indicated that the impact of entrepreneurship education may be long-term, the results of his study are significantly limited by its ex-post measurement. Similarly to Fayolle (2006), Souitaris et al. (2007) underline that entrepreneurship education may generate enthusiasm that may rapidly dissipate after the course.

In this context the link between entrepreneurial intention and venture creation is not established empirically (Shook et al., 2003) and many authors have called for longitudinal studies analysing the link between entrepreneurial intention and self-employment (Kolvereid et al., 1997; Müller, 2008; Peterman et al., 2003). While entrepreneurial intention is a convenient measure of the development and impact of entrepreneurship education, potential actions resulting from this intention have an economic and social impact and merit the attention of researchers.

While most authors focus on learning and improvement of entrepreneurial skills, Souitaris et al. (2007) provide a new perspective on a potential major benefit of an entrepreneurship education programme. Their research found that entrepreneurship education programmes could be a source of entrepreneurial trigger-events that impact on entrepreneurial intention. Souitaris et al. (2007) suggested research on triggers of entrepreneurship education programmes as promising field of research. Finally, there are few studies in the German language area (Lüthje & Franke, 2002)

2.2.3 Conclusion

While at first glance, the majority of research studies indicate a positive impact, this positive impact must be interpreted with caution. Three major reasons for the ambiguous results of impact of impact of entrepreneurship education studies have been found: First in the utilisation of methods, especially a lack of ex-ante/ex-post, control group, low sample and cross-sectional designs; second, in the independent variable and the wide range of different variants of entrepreneurship programmes; and finally, in the variance in the levels of participants (e.g. kid, student, adult).

Considering these new insights, research on the impact of entrepreneurship education provides myriad opportunities for methodologically robust studies. Along with testing different variants of entrepreneurship education, the potential moderating effect of duration of entrepreneurship education, stability of intentions after the end of education, the link between intention and self-employment, and the existence of entrepreneurial trigger-events will be focal research aspects of this dissertation study.

2.3 Entrepreneurship Intention Theories

2.3.1 The Case for Entrepreneurial Intention

"Entrepreneurial intent is substantially more than merely a proxy for entrepreneurship - it is a legitimate and useful construct in its own right that can be used as not just a dependent, but as an independent and a control variable."

Source: Thompson (2009: 670)

Intention models belong to the umbrella of social cognitive theory, proposed and developed by Bandura (1986). The central tenet of "social cognitive theory is that individuals can influence their own actions" (Ratten & Ratten, 2007: 92). Social cognitive theory proposes a framework for understanding, predicting and changing human behaviour (Davis, 2006). Within this umbrella, intention models contribute to the area of predicting behaviour.

Intentions represent "a person`s motivation to make an effort to act upon a conscious plan or decisions" (Conner & Armitage, 1998: 1430). Entrepreneurial intention is hence a person`s motivation to make a conscious plan to perform the behaviour of setting up a business. Thompson (2009) defines entrepreneurial intention as "self-acknowledged conviction by a person that they intend to set up a new business venture and consciously plan to do so at some point in the future" (Thompson, 2009: 676). Thus, entrepreneurial intention is not merely a yes or no question but can range from very low, zero, to a very high level of intention to set up a business (Thompson, 2009). That links very well to the general rule defined by Icek Ajzen: The stronger the intention is, the more probable the behaviour is (Ajzen, 1991); hence, entrepreneurial intentions function as a mediator or catalyst for actions (Fayolle et al., 2006).

Research confirms that intentions are strong predictors of actual behaviour in other applied settings (Armitage & Conner, 2001; Gelderen et al., 2008; Sutton, 1998). Many authors argue that the decision to become an entrepreneur and set up a business involves careful planning and a thinking process which is highly intentional (Autio, Keeley, Klofsten, Parker, & Hay, 2001; Bird, 1988; Krueger, 1993; Tkachev & Kolvereid, 1999). Entrepreneurship is seen as a good example of planned intentional behaviour and therefore applicable for intention models (Autio et al., 2001; Bird,

1988; Davidsson, 1995; Fayolle, 2006; Krueger, 1993; Shapero. A & Sokol, 1982; Tkachev et al., 1999).

Specifically for entrepreneurship education programmes, intentions are applicable as "intentions proved to be best predictor of planned behaviour" (Krueger et al., 1993: 5), "particularly when that behaviour is rare, *hard to observe*, or *involves unpredictable time lags*" (Souitaris et al., 2007: 568).

Due to the applicability of the entrepreneurial intention concept, it is often used as a measure of the impact of entrepreneurship programmes. Also, from a researcher point of view, it is not always practicable to wait a number of years to examine how many students eventually founded a real business. Taking entrepreneurial intention as a measure of the impact of entrepreneurship education has the benefit of measuring the immediate impact of a programme. The longer the post-measurement of an entrepreneurship programme is delayed, the greater the measurement bias from contextual and time effects will be. It will be more difficult to isolate the role of a single factor like an entrepreneurship programme in the business creation process (Hytti & Kuopusjarvi, 2004).

In this dissertation, the concept of entrepreneurial intention is used as it is a highly validated concept and capable of showing the impact of an entrepreneurship education programme. The aim of the following sections therefore is to identify and review relevant theories and then to select the most suitable theory to provide a theoretical framework to underlie the research questions. This framework needs to be empirically validated and robust, offering insights into the variety of research questions posed in this dissertation.

Overview of Theories

Based on a literature review examining the theories used in the context of entrepreneurial intention and entrepreneurship education, it can be stated that the most often used theory is Icek Ajzen's theory of planned behaviour (Fayolle et al., 2006; Gelderen et al., 2008; Gird & Bagraim, 2008; Kolvereid, 1996b; Krueger Jr & Reilly, 2000; Krueger et al., 1993; Lüthje & Franke, 2003; Müller, 2008; Souitaris et al., 2007; Tkachev et al., 1999).

Following the theory of planned behaviour, the entrepreneurial event model by Shaper & Sokol is used in a number of studies: (Krueger Jr et al., 2000; Krueger, 1993; Linan

& Javier Santos, 2007; Peterman et al., 2003). The focus of this review will therefore be on these two theories.

With respect to these theories two further contributions should be noted for their importance in intention research and specifically for the theory of planned behaviour: First, the concept of self-efficacy developed by Albert Bandura (1986). This concept is defined as "people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (Bandura, 1994: 71). Especially in entrepreneurship intention research, this concept has found widespread use and is often equated with perceived behavioural control in the theory of planned behaviour and perceived feasibility in the entrepreneurial event model.

The second contribution is Bird's model of intention, developed by Barbara Bird (1988). This model highlights the importance of intentions for organizational development and for the implementation of entrepreneurial ideas (Bird, 1988). It assumes that intentions are a blend of rational, analytic, cause-effect thinking and intuitive, holistic, contextual thinking. The model was further developed by (Bird & Jelinek, 1988; Boyd & Vozikis, 1994); however, it lacks empirical validation (Fayolle et al., 2006).

2.3.2 Theory of Planned Behaviour

The theory of planned behaviour has its roots in the theory of reasoned action (TRA), which was proposed by Fishbein and Ajzen in 1975/80 (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). The theory consists of three major constructs, 1) the behavioural intention that depends on 2) subjective norms and 3) attitudes. The stronger the positive attitudes toward a behaviour are and the stronger the social norms toward a behaviour are, the stronger the behavioural intention is. If the intention is high, the individual is likely to perform the specified behaviour.

Behavioural intention (BI) measures the strength of the intention to execute a specified behaviour. Subjective norms (SN) describes the pressure from peers or friends to comply with specific norms. If, for example, entrepreneurship is seen as too risky by parents and friends, then the individual is less likely to perform entrepreneurial behaviour. Attitudes (A) consist of expectations about the consequences of performing a specified behaviour. The TRA can be simplified in a mathematical formula:

$$\mathbf{BI = SN + A}$$

The TRA was developed further and in 1991 Ajzen proposed the theory of planned behaviour (Ajzen, 1991). One major development was the addition of a third attitudinal determinant of behavioural intention, perceived behavioural control (Ajzen, 2005). The theory assumes that specific actions are preceded by a conscious intention to act in a specific way. Furthermore, intentions are dependent on attitudes that are affected by previous life experiences, personal characteristics and perceptions drawn from those experiences (Ajzen, 1991). The theory of planned behaviour consists of three attitudinal antecedents of intentions:

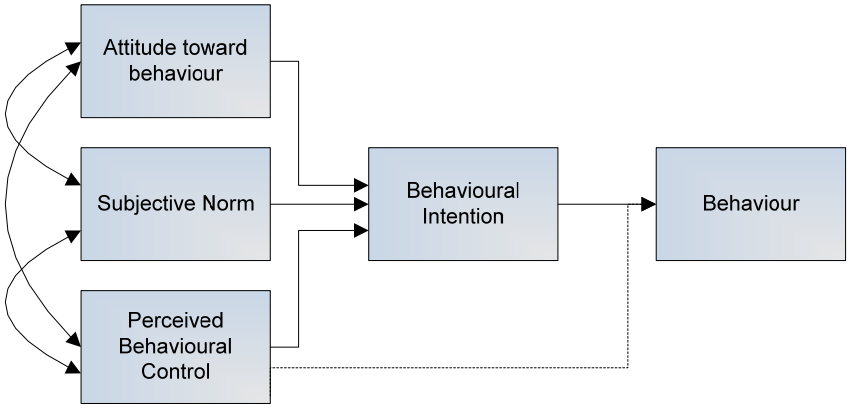


Figure 2 - Ajzen's Theory of Planned Behaviour

Source: Ajzen (1991: 182)

Attitude toward behaviour is equivalent to the attitude concept in the TRA and refers to the degree to which a person thinks positively about performing a certain behaviour. It represents the degree of desirability and includes expectation of outcomes resulting from this behaviour (Krueger Jr et al., 2000). *Subjective norms* refer to the social and cultural pressure to perform a specific behaviour. Important in this respect are friends', the family's peers', networks' or mentors' expectations about the desirability of, for example, becoming an entrepreneur. *Perceived behavioural control* overlaps with Bandura`s concept of self-efficacy (Bandura, 1986) and is a measure of the individual's perceived ability to perform a specified behaviour (Krueger Jr et al., 2000).

The three concepts can be summarised with these three questions: How desirable is it to perform this behaviour? How desirable do people close to the individual in question think it is to perform this behaviour? Do I believe in my own ability to perform this behaviour? Intention measured by the theory of planned behaviour have predicted

actual behaviour in other settings in the range of 60% to 82% (Kermit, 2008). The TPB can be simplified in a mathematical formula:

$$\mathbf{BI = SN + ATB + PBC}$$

2.3.3 Shapero and Sokol`s Entrepreneurial Event Model

When Shapero and Sokol introduced their entrepreneurial event model (EEM) in 1982, they did not propose it as an intention model, but it was quickly seen and used as such in the literature (Kermit, 2008). The aim of the model is to provide an explanation for the processes that lead to an entrepreneurial event, that is, the moment of launching a new business (Kollmann & Kuckertz, 2006).

The model assumes that inertia guides human behaviour until some event "displaces" that inertia and unblocks previously undesired behaviours. For example, a displacement, such as job loss, might alter the perception of the desirability to become self-employed. Shapero and Sokol (1982) classify these life path changes into three categories:

First, negative displacements such as being fired, insulted, angered, bored, reaching middle age, getting divorced or becoming widowed. The second is being between things such as graduating from high school, university, finishing military duty or being released from jail. Especially this second category of between-things is potentially interesting for entrepreneurship education programmes since students often have no clear idea of what they want to do after graduation. The third category is of a positive nature, the so-called positive pulls from the partner, mentor, investor or customers.

Which behaviour is ultimately performed depends on the credibility of the alternatives and the propensity to act. Credibility in this context is given when there is perceived desirability and feasibility of the specified behaviour. However, this alone is not enough to execute a specified behaviour; what is needed is a precipitating event, a displacement event that changes these perceptions and propensity to act in such a way as to eventually perform the behaviour.

Thus, if a displacement event triggers cognitive processes and changes perceptions of feasibility and desirability, the individual may act if the credibility of the specified behaviour is higher than that of the alternatives and if the individual has a general propensity to act on that action.

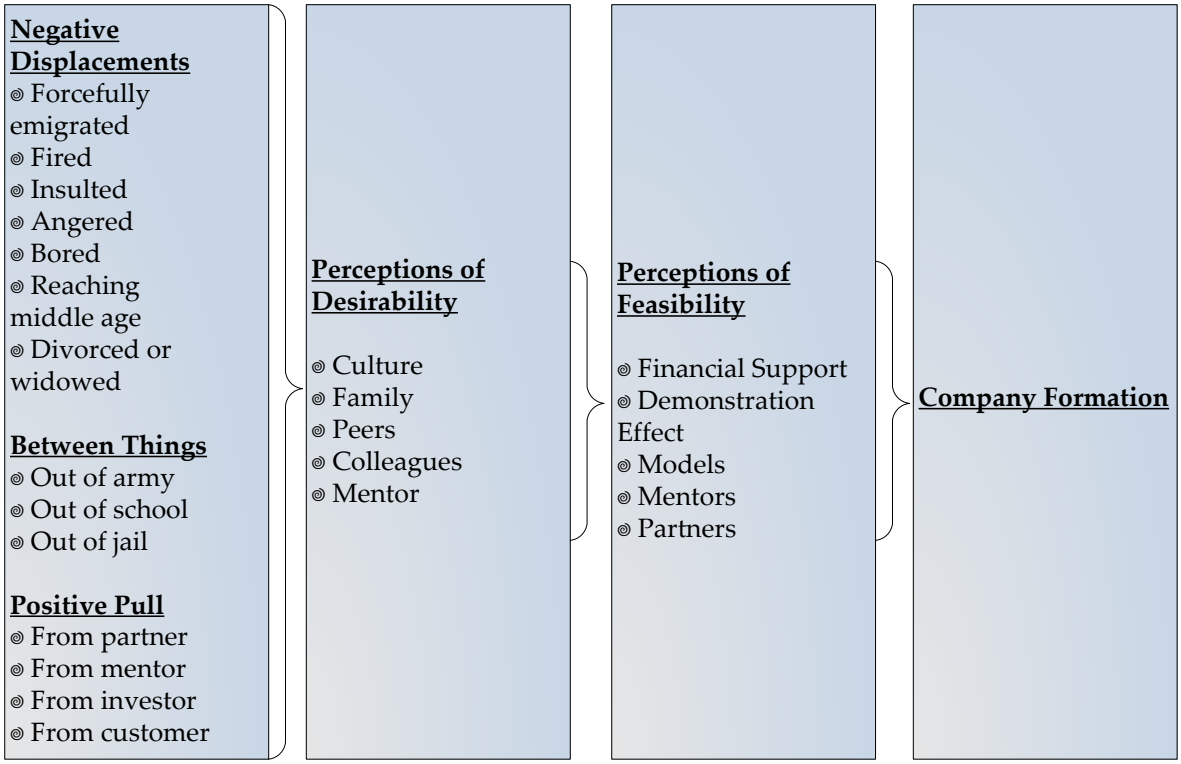


Figure 3 - Shapero and Sokol's Entrepreneurial Event Model

Source: Shapero and Sokol (1982: 83)

Perceived desirability refers strongly to values and how they will ultimately impact the individual's perception of what is attractive or desirable and what is not. In this context Shapero and Sokol (1982) identify culture, family, peers, colleagues, mentors and previous work experience as factors that strongly influence personal values and the perception of desirability. Perceived desirability is closely related to "subjective norms" in the theory of planned behaviour (Krueger Jr et al., 2000). The history of experiences strongly influences what is desirable and what is not.

Perceived feasibility indicates to which degree someone feels personally capable of, e.g., starting a business. The concept of perceived feasibility is similar to Bandura`s self-efficacy, which is often used as a measure of perceived feasibility (Krueger Jr et al., 2000).

Propensity to act is the personal disposition to act on one's decision (Krueger, 1993). Conceptually, Shapero and Sokol (1982) suggested an internal locus of control as a measure of the propensity to act. There is no agreement as to how to best measure propensity to act. Other authors suggest equating the propensity to act with "learned optimism" (Krueger Jr et al., 2000) or risk-taking propensity or tolerance of ambiguity (Kermit, 2008).

The three questions summarising the three concepts of the entrepreneurial event model can be expressed as: How desirable is it to perform this behaviour? Are you actually doing what you think you want to do? Do I believe in my own capability to perform this behaviour?

Similarly to the theory of planned behaviour, exogenous factors do not directly impact intentions or behaviour but are reflected through person-situation perceptions of desirability and feasibility of a behaviour (Krueger Jr et al., 2000).

2.3.4 Discussion and Selection of Theoretical Framework

The aim of this chapter is to discuss the advantages and disadvantages of the models in relation to the research questions dealt with in this dissertation and to select the most appropriate theoretical framework.

Both models, the entrepreneurial event model and the theory of planned behaviour, offer two strengths: They have been subjected to testing and the results offer strong statistical support for both models (Krueger Jr et al., 2000). They have the benefit that exogenous factors are captured in the attitudinal concepts, which in turn affect intention (Souitaris et al., 2007; Tkachev et al., 1999)

A distinctive benefit of the general understanding of entrepreneurial behaviour is the variable of propensity to act in the entrepreneurial event model (EEM). This variable explains why someone who is capable of and desires to become an entrepreneur never becomes one, as the individual lacks the propensity to act on the behaviour. Shapero and Sokol did not mention this variable explicitly in their original model; however, it was solved and included in further developments of the entrepreneurial event model (Krueger Jr et al., 2000; Krueger, 1993). Although of great interest for the explanation and understanding of processes that lead to an entrepreneurial event, the entrepreneurial event model is focused "on the issue of new business creation and not on the evolution towards the adoption of an entrepreneurial behaviour in general" (Fayolle et al., 2006: 707). This disqualifies the entrepreneurial event model as a theoretical framework for research questions 1-4 (impact, duration, stability) as their purpose is to examine the development of entrepreneurial intention over a period of time. The findings of the entrepreneurial event model could, however, on the one hand be beneficial for the understanding of research question 5 (trigger-events), and on the other hand, there is potential to further develop this model and apply it to

entrepreneurship education. In this dissertation trigger-events within an entrepreneurship education programme will be identified. These findings could add to the different categories of triggers within the entrepreneurial event model: "displacement events", "between things" and "positive pulls". The trigger-events of entrepreneurship education programmes may therefore be a rich addition to the entrepreneurial event model in the context of entrepreneurship education.

The theory of planned behaviour has been tested and empirically validated in depth (Gelderen et al., 2008). A distinctive advantage of this theory over the entrepreneurial event model is the opportunity to measure the development of intentions through entrepreneurship education programmes (Fayolle et al., 2006). Another of its distinct advantages is the additional variable of subjective norms. Specifically for research questions 1-4 and the context of entrepreneurship education, subjective norms, e.g., in form of peer-pressure, may play an important role in determining entrepreneurial intentions. Therefore, the theory of planned behaviour will be selected as the theoretical framework for research questions 1-4.

In conclusion, it can be stated that this dissertation will benefit from the strengths of both models. Considering the research questions, the theory of planned behaviour is well-suited to providing a theoretical framework for research questions 1-4. As it is the purpose of this dissertation to generate rich data for research question 5 (trigger-events), it seems appropriate to utilise the central tenets of the entrepreneurial event model as background understanding for answering research question 5.

2.4 Hypotheses

As discussed in the literature review of impact studies, the number of methodologically sound studies is limited and research opportunities are promising. The reviewed studies provide a mixed picture of the majority of studies reporting a positive impact, while a few but also methodologically sound studies report mixed or negative results of entrepreneurship education. Oosterbeek et al. 2010 therefore call for more research on different variants of entrepreneurship education. Of particular research interest is the impact of voluntary entrepreneurship education programmes on university-level participants as students are on the brink of deciding whether they want to pursue a career in a salaried employee relationship or becoming self-employed after graduation. Furthermore, the identified new avenues of research, a) the impact of duration - intensity of a programme on entrepreneurial intentions, b) the stability of entrepreneurial intentions, c) the link between entrepreneurial intention and self-employment, and d) the identification of potential entrepreneurial trigger events within entrepreneurship education programmes, will be further developed and examined in this dissertation study.

In order not to repeat parts of the literature review, the hypotheses will be briefly introduced and figures will provide a visualisation of the conceptual relationships that will be tested in the dissertation study:

2.4.1 Hypothesis 1-2: Impact of Entrepreneurship Education on Entrepreneurial Intention

Research Question 1: *What impact does an entrepreneurship education programme have on entrepreneurial intention and its antecedents?*

The impact of an entrepreneurship education programme in this dissertation is measured by the theory of planned behaviour and its variables: entrepreneurial intentions, attitudes toward behaviour, subjective norms and perceived behavioural control. The sample consists of university students who voluntarily chose to follow an entrepreneurship education programme consisting of different coherent entrepreneurship courses. Since attitudes are open to change, there are "ramifications for entrepreneurial education and change programmes. Entrepreneurial attitudes may

be influenced by educators and practitioners" (Robinson, Stimpson, Huefner, & Hunt, 1991: 24). Current research confirms that entrepreneurship education impacts, for example, entrepreneurial self-efficacy (Wilson et al., 2007).

Entrepreneurship education should hence positively impact the constructs of the theory of planned behaviour. All three constructs, attitude toward behaviour, perceived behavioural control, subjective norms are expected to be positively influenced, albeit on a high level, by the entrepreneurship education programmes. As entrepreneurial intention is dependent on and directly influenced by these three variables in the theory of planned behaviour, it can be expected that entrepreneurial intention will be positively influenced by the entrepreneurship education programme and that the experimental group will have higher scores on the constructs than the control group at T_{final} (see figure 4).

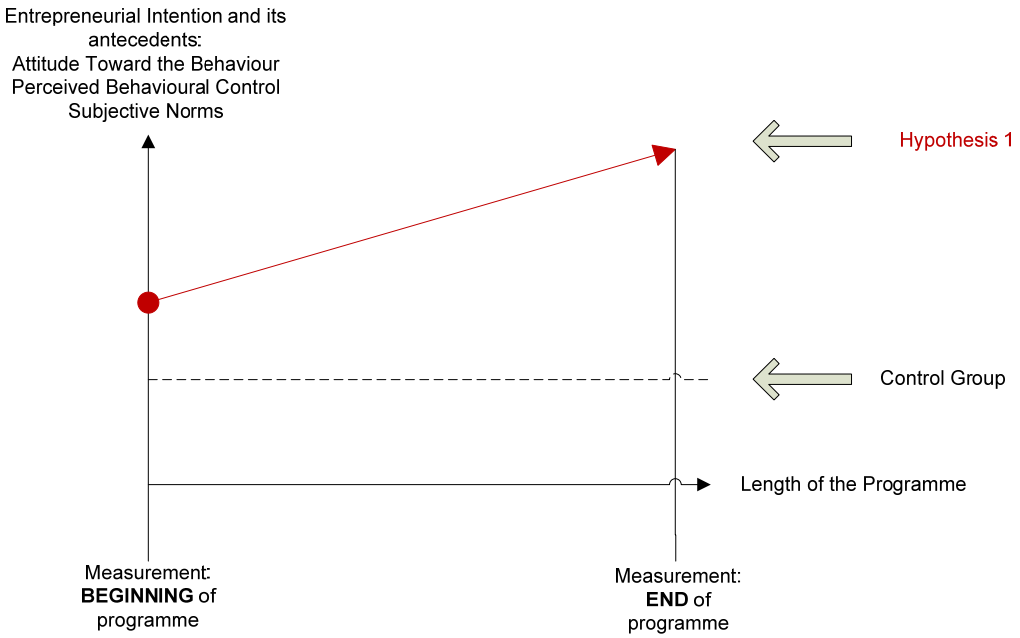


Figure 4 - Visualisation of Hypothesis 1

Hypothesis 1:

An entrepreneurship education programme positively influences attitude toward behaviour (1a), subjective norms (1b), perceived behavioural control (1c) and entrepreneurial intention (1d)

Hypothesis one must be tested against the control group, which is expected to remain in all constructs at a similar level throughout the measurement periods. Figure 4 shows

that entrepreneurial intentions, attitude toward behaviour, perceived behavioural control and subjective norms are expected to increase when comparing the end of an entrepreneurship education programme with the beginning (Hypothesis 1). The control group is expected to have lower values in entrepreneurial intention, attitude toward behaviour, perceived behavioural control and subjective norms at the final measurement point compared to the participants of an entrepreneurship education programme.

The theory of planned behaviour represents the theoretical foundation for this dissertation study. Therefore, the applicability of the theory to this dataset is tested. Its main assertion is that the more favourable attitudes toward behaviour, subjective norm and perceived behavioural control toward the behaviour are, the stronger the intention to perform the behaviour will be (Ajzen, 1991). This relationship is assumed to be applicable for this dissertation study as well, although Ajzen (1991) notes that in some situations only the attitudinal parts of the theory, e.g. ATB and PBC, may be applicable but do sufficiently explain intention. This is for example the case in Kruger et al. (2000) who could not establish a relationship between subjective norms and entrepreneurial intention. Similarly to Souitaris et al. (2007), the relationships of the theory of planned behaviour are tested and applied to this dataset:

Hypothesis 2:

The greater the attitude toward behaviour (2a), subjective norms (2b) and perceived behavioural control (2c) with regard to self-employment, the greater the entrepreneurial intention.

2.4.2 Hypothesis 3: Effect of Duration on Entrepreneurial Intention

Research Question (2): *What is the impact of the duration of an entrepreneurship programme on entrepreneurial intention and its antecedents?*

From education and entrepreneurship research we learn that the effect of length of education in general may be categorised into monetary and non-monetary effects. Monetary-related studies conclude that the longer the span of an individual's education is, the higher his salary will be (Robinson et al., 1994; Vila & Mora, 1998). This effect is higher for employees than for entrepreneurs in Europe (Van der Sluis, van Praag, & Vijverberg, 2008). This finding would mean that the more educated an individual is, the more risk-less it is to earn a good salary as an employee compared to an entrepreneur. If a link between risk-less and public jobs can be made, then this link is supported by Fabra and Vila (2007), who found that the higher an individual's education is, the higher the probability of his choosing a public sector job is (Fabra Florit & Vila Lladosa, 2007). Non-monetary effects may be sub-divided into positive effects on social capital (e.g. friends & network), human capital (qualification & knowledge) and identity capital (self-concept & plans, goals) (Schuller, Preston, Hammond, Brassett-Grundy, & Bynner, 2004). The category of identity capital may provide input: Arrow (1997) found that higher levels of education relate to a more efficient job search and a better matching of the job choice to expectation of the job seeker. Thus, students become more self-aware of what they want and hence, with a higher level of education, may have a more realistic view of what entrepreneurship means and, consequently, may or may not choose to follow an entrepreneurship career path.

In contrast, Davidsson (1992) and Katz (1992; in Kristiansen & Indarti, 2004) argue that the final decision to become an entrepreneur is a long "process in which attitudes and intention evolve based on the development of individual competence, experiences and relations to the business context" (Kristiansen & Indarti, 2004: 56). This would imply that the longer a programme is, the more time a participant has to reflect and develop his/her attitudes and intentions toward a target behaviour. This development of attitudes and intention may, of course, go in both directions. For example, the more a student becomes involved with entrepreneurial tasks, the more he/she might realise that this is not his/her destined career path.

The question is as well how entrepreneurial intention evolves. Does it evolve linearly or in a fluctuating manner? Is there a limit or does it de-/increase indefinitely? Some of the arguments above would indicate that the longer the educational intervention is, the more reasons there are for the impact of education on entrepreneurial intention to be weakened. This would support the idea that the duration of the intervention impacts intention in an inverted U- shape (curvilinear). Up to a specific point, the saturation point, education impacts positively; then entrepreneurial intention decreases with the length of the education programme. A similar relationship was found by Chrisman et al. (2005), who examined assistance advice offers to established entrepreneurs. It positively impacted the businesses up to a certain point but turned negative after the saturation point. Therefore, the more time is invested in entrepreneurship education, the more the constructs of the theory of planned behaviour, primarily perceived behavioural control should increase. However, this effect is only valid until the saturation point, from which point on it potentially becomes negative.

Hypothesis 3:

The longer an entrepreneurship education programme, the stronger the increase in attitude toward behaviour (3a), subjective norms (3b), perceived behavioural control (3c) and entrepreneurial intention. However, it does so only until the saturation point, from which point on, entrepreneurial intention and its antecedents again decrease (curvilinear relationship).

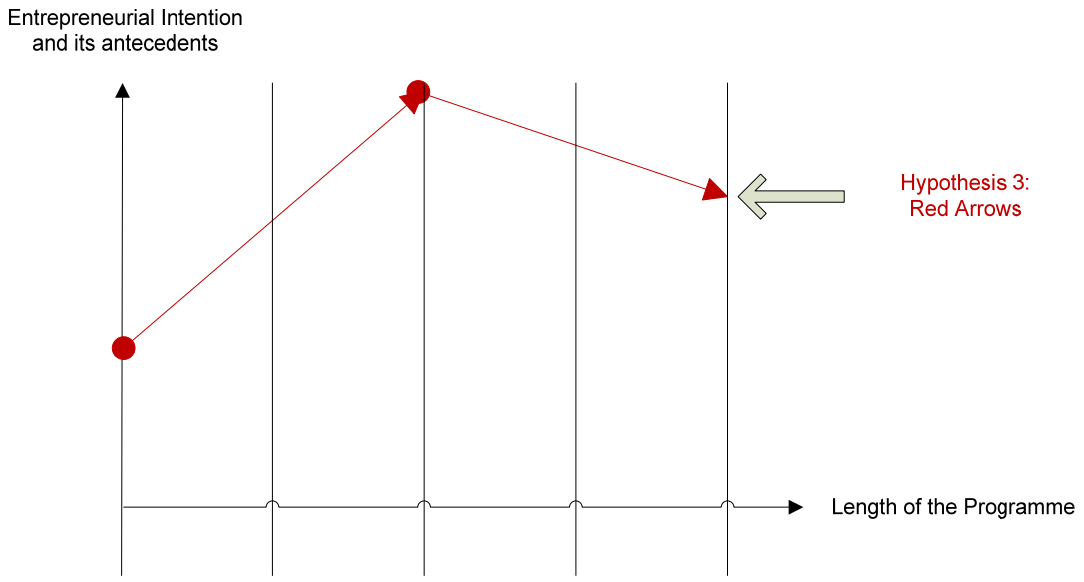


Figure 5 - Visualisation of Hypothesis 3

Figure 5 presents the development of entrepreneurial intention over a period of time. Measurements are taken at different points in time in order to track the development of entrepreneurial intention throughout an entrepreneurship education programme.

2.4.3 Hypothesis 4: Stability of Entrepreneurial Intention

Research Question 3: *What is the stability of entrepreneurial intention and its antecedents after the end of an entrepreneurship education programme?*

Assuming that entrepreneurship education has a positive impact on entrepreneurial intention, how long does this impact last? If the strength of entrepreneurial intention is decreasing quickly, then this would have a significant impact on the design of entrepreneurship education programmes. EEPs would need to provide strong support for the immediate setup of businesses after the end of the programme. A second implication would be that entrepreneurship education should only focus on students who want to set up a business within a short time after the end of a programme.

Ex-post career choice studies provide some insight into the stability of entrepreneurial intention. Norwegian students who graduated with a major in entrepreneurship had stronger entrepreneurial intention and a higher likelihood of becoming self-employed than other graduates (Kolvereid et al., 1997). This may indicate that there is a basic level of intention sustained by people once they have joined entrepreneurship classes and that this may last a long time. Furthermore, since such students studied entrepreneurship, they may be more alert and receptive to events (entrepreneurial event model) that trigger a change in perception and eventually the decision to become entrepreneurs. This line of thought is supported by a study that found that most of the people who became entrepreneurs had not harboured the intention to become an entrepreneur for a long time before they began the programme (Bergmann, 2000). Perhaps stability is comparable to learning how to ski: years after a person's last time on skis, he may feel uncomfortable skiing but quickly regains his skills.

As previously indicated, Kolvereid et al. 1997 studied graduates who had graduated up to eight years previously. This triggers the question of whether the entrepreneurship major may be held solely accountable for the enduring intentions or whether there were other occurrences that affected the intention of students whose interest was clear

in their voluntary choice of an entrepreneurship major. The study did not address this limitation, but decreasing predictability of intentions is confirmed by research in the area of psychology. As "time elapses intentions are less likely to predict behaviour because intention is more likely to change" (Chatzisarantis & Biddle, 1998: 305).
Taking this into consideration, it is valuable to examine the stability of entrepreneurial intentions shortly after rather than a long period after an entrepreneurship education programme.

Hypothesis 4:

The more time that elapses after the end of an entrepreneurship education programme, the weaker the attitude toward behaviour (4a), subjective norms (4b), perceived behavioural control (4c) and entrepreneurial intention (4d)

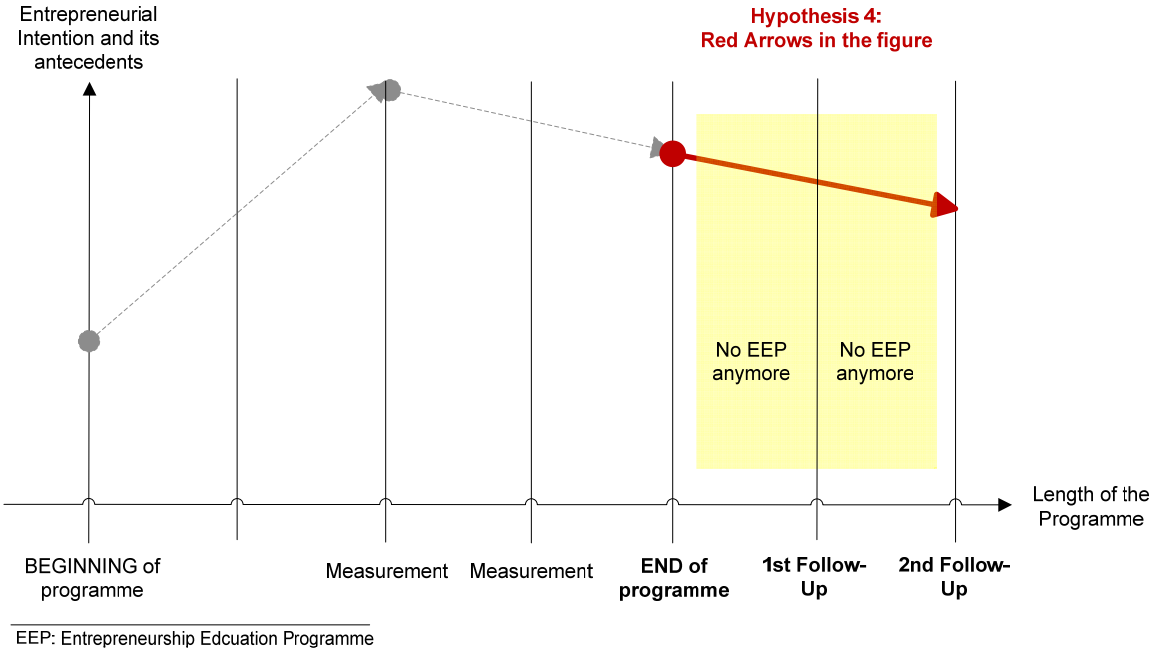


Figure 6 - Visualisation Hypothesis 4

Figure 6 indicates the effect hypothesised in hypothesis 3 (grey dotted line); the bold, red line represents hypothesis 4. The more time that elapses, the weaker the constructs become.

2.4.4 Hypothesis 5-6: Entrepreneurial Intention and Self-Employment

Research Question (4): *Does entrepreneurial intention predict self-employment?*

According to the literature review in chapter 2.3.1 "intention is the best predictor of planned behaviour" (Krueger, 1993: 5). From a theoretical point of view, hence, entrepreneurial intention should predict self-employment. Empirically, the link between entrepreneurial intention and self-employment has not yet been validated (Shook et al., 2003). Most of the studies analysed in the literature review were cross-sectional and ex-post studies. One of the closest to answering the link between entrepreneurial intention and self-employment is the study by Kolvereid et al. (1997), who surveyed graduates of a Norwegian university and differentiated between those who graduated with an entrepreneurship major with those who graduated with other majors. They found that those who graduated with the entrepreneurship major had higher entrepreneurial intention and were creating more ventures compared to those with other majors. However, these results need to be interpreted with caution as they are an ex-post observation and therefore prone to self-selection bias. It can safely be assumed that only those students who were keen on entrepreneurship chose an entrepreneurship major. Another way to find the answer is by researching nascent entrepreneurs; Liao et al. (2007) analysed panel data of nascent entrepreneurs and found that those who wrote a business plan were six times more likely to eventually become entrepreneurs. Souitaris et al. (2007) used a proxy and measured pre-nascent activity during an entrepreneurship education programme as a sign of students becoming self-employed but failed to establish a link. However, they measured activity only during one academic semester programme, which may have been too short for participants to engage in extra-curricular pre-nascent activity.

With no empirical study testing the impact of entrepreneurship intention on entrepreneurial behaviour, a meta-study in the domain of psychology was considered. There, the authors analysed empirical studies that utilised the theory of planned behaviour in other applied settings and found that on average 25% of variance of behaviour was explained by the behavioural intention (Armitage & Conner, 2001). Therefore, these findings are applied to the setting of entrepreneurship education and the behaviour of becoming self-employed and argue that entrepreneurial intention is a significant predictor of future self-employment.

Hypothesis 5:

The higher the entrepreneurial intention, the higher the probability of becoming self-employed

Analogously to hypothesis one, which assumes a positive impact of entrepreneurship education on the constructs of the theory of planned behaviour, hypothesis six tests whether those who participated in an entrepreneurship education programme increased their chances of becoming self-employed:

Hypothesis 6:

Participation in an entrepreneurship education programme increases the probability of becoming self-employed

2.4.5 Trigger-Events of Entrepreneurship Education

Research Question (5): *What trigger-events during the entrepreneurship education programme impact the intention to become an entrepreneur?*

The basic tenet of the entrepreneurial event model (Shapero & Sokol, 1992) is that human beings are guided by inertia and therefore a so-called displacement event is needed that unblocks previously undesired behaviours. The model therefore includes a displacement event as a pre-requisite of performing a behaviour. While Shapero & Sokol (1992) provide rather drastic examples of negative displacement events, such as forceful emigration and divorce, the question is valid regarding whether an entrepreneurship education programme or specific situations during an entrepreneurship education programme could be a source of positive or negative displacement-events. Souitaris et al. (2007) analysed potential benefits of entrepreneurship education and found a significant link between inspiration and entrepreneurial intention. They speculate that inspiration triggered by an entrepreneurship education programme is one of the major benefits of entrepreneurship education and underline this as a promising new avenue of research.

When one looks beyond the borders of entrepreneurship research, a similar phenomenon has been identified in leadership research. Bennis & Thomas (2002) suggest the concept of "Crucibles of Leadership" (Bennis & Thomas, 2002: 39); in their research study, every leader had experienced some kind of turning point in their life - which they call a crucible. Crucibles in the interpretation of Bennis & Thomas (2002) can entail everything from a mentoring relationship to a dangerous war-experience.

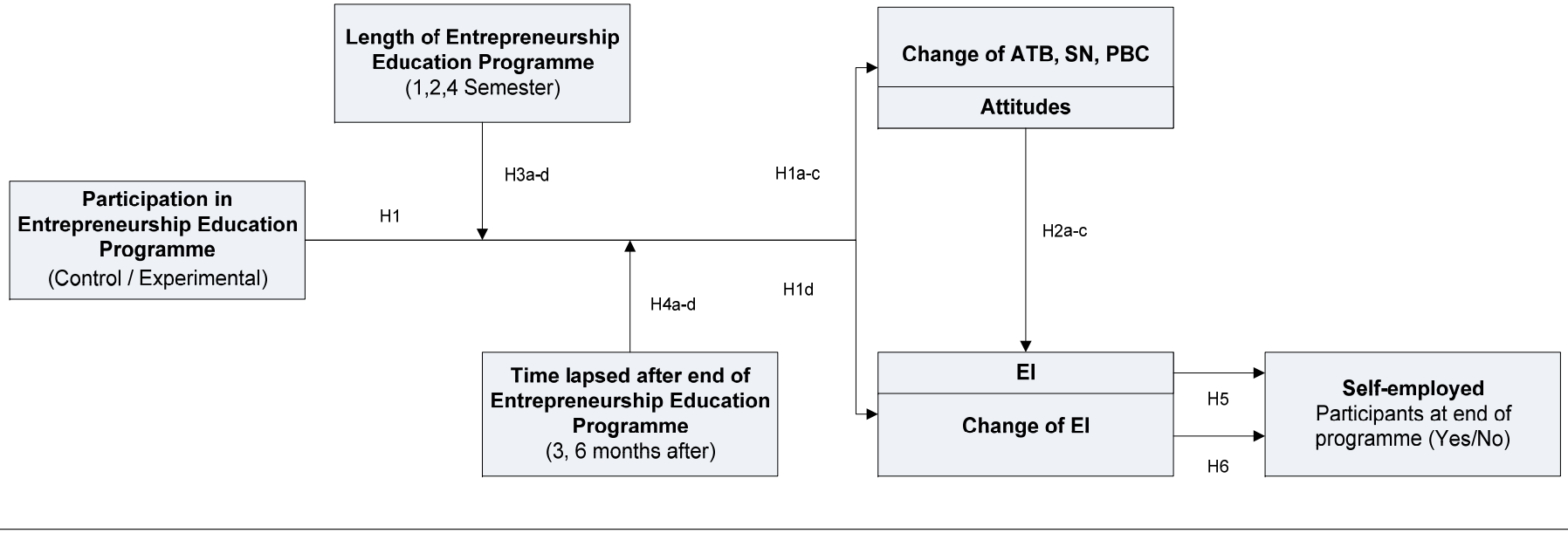
What connects these three thought concepts is that whether they are called displacement events, perceived triggers or crucibles, they have their basis in a negative or positive inspiration. Thrash and Elliot (2003) highlight that inspiration consists of three elements: a) transcendence - the orientation toward something better b) evocation - inspiration is evoked and unintended c) motivation to act. Therefore, they suggest that "inspiration represents a juxtaposition of two component processes: (a) being inspired by, which involves transcendence and denial of responsibility on encountering an inspiring influence (e.g., a role model), and (b) being inspired to, which involves motivation to transmit or extend the inspiring qualities toward a motivational object (e.g., a future self)" (Thrash & Elliot, 2004: 969). Therefore, there is a situation that facilitates or triggers the existence of an inspirational experience. The question that follows is: What trigger-events are induced by entrepreneurship education and which are positive, which negative?

Compared to the other research questions, research question 5 is designed to be explored qualitatively with the utilisation of reflection papers. The objective is to generate deep insights into the phenomenon and isolate entrepreneurship education specific trigger-events. Therefore, no hypothesis is formulated.

2.5 Conceptual Framework

The conceptual framework (figure 7) provides a visual overview of the relationships that are tested in this dissertation.

In hypothesis 1 the impact of entrepreneurship education (participation yes/no) is tested on the constructs of attitude toward behaviour (ATB), subjective norms (SN), perceived behavioural control (PBC) and entrepreneurial intention (EI). The relationship is assumed to be positive: Participation in entrepreneurship education results in an increase in all above-specified constructs. In hypothesis 2, the duration of entrepreneurship education is expected to moderate the strength of this impact. The longer an entrepreneurship programme, the stronger the increase in the constructs. Hypothesis 3 is also devoted to a time aspect and tests the moderating effect of time elapsed after the end of an entrepreneurship education programme on the constructs. The more the time that elapses after an entrepreneurship education programme, the stronger the decrease in the values of the constructs. The underlying theory is the theory of planned behaviour; therefore, the applicability of the theory is tested as well on this dataset. Hypothesis 5 tests the relationship between entrepreneurial intention and self-employment. It is assumed that high entrepreneurial intention increases the probability of becoming self-employed. Finally, hypothesis 6 reviews whether the impact of entrepreneurship education, hence if the increase in entrepreneurial intention, had a significant impact on the status of becoming self-employed.



H1: An entrepreneurship education programme positively influences attitude toward behaviour (1a), subjective norms (1b), perceived behavioural control (1c) and entrepreneurial intention (1d)

H2: The greater attitude toward behaviour (2a), subjective norms (2b) and perceived behavioural control (2c) with regard to self-employment, the greater the entrepreneurial intention

H3 : The longer an entrepreneurship education programme, the stronger the increase in attitude toward behaviour (3a), subjective norms (3b), perceived behavioural control (3c) and entrepreneurial intention (3d). However, it does so only until a saturation point, from which point on, entrepreneurial intention and its antecedents again decrease (curvilinear relationship).

H4 : The more time that elapses after the end of an entrepreneurship education programme, the weaker attitude toward behaviour (4a), subjective norms (4b), perceived behavioural control (4c) and entrepreneurial intention (4d)

H5: The higher entrepreneurial intention, the higher the probability to become self-employed

H6: Participation in an entrepreneurship education programme increases the probability to become self-employed

Attitudes (a,b,c) = a) attitude toward behaviour (ATB), b) subjective norm (SN), c) perceived behavioural control (PBC)
d) entrepreneurial intention (EI)

Figure 7 - Conceptual Framework

3. Methodology

3.1 Objective

This chapter discusses in detail the methods utilised in order to answer the research questions. The analysis of relevant scientific studies dealing with the question of the impact of entrepreneurship education in chapter 2 has shown that many studies suffered from methodological constraints.

From a methodological point of view, constraints usually result from not using control groups, from small group sizes, short (duration) entrepreneurship programmes and from ex-post analyses instead of pre-post, and quasi-experimental test designs. This dissertation hence aims to overcome these constrains and demonstrate improved methodology in comparison to previous studies.

3.2 Research Method Overview

A multi-method approach consisting of quantitative and qualitative methods was employed. This approach was chosen to allow for a mix of research questions aiming either at testing hypotheses or exploring new insights into a relatively new field of research.

For the research questions 1-4, corresponding hypotheses 1-6, a deductive research approach with a quasi-experimental research design was selected. Data acquisition was conducted via structured questionnaires with repeated measures over time and matched pairs. The reasons for choosing this approach lie in the advantage of setting up a pre-post test design (Cohen & Manion, 1989) to measure the development of entrepreneurial intentions of individual participants in the entrepreneurship programme from the beginning to the end of the programme. The logic of a deductive study approach offered the advantage of first researching the literature and proposing relationships between variables that could then be tested. The utilisation of questionnaires for data acquisition had the benefit of a highly structured approach and the controllability of large data samples.

For the research question concerning trigger-events within an entrepreneurship programme (research question 4), an inductive research approach was chosen. To date, there has been very little research; hence, the aim was to generate a deeper understanding of what trigger-events within an entrepreneurship programme exist. As

this question can only be answered after participating in the programme (or most of it), participants were asked to write a reflection paper at the end of their entrepreneurship education programme.

3.3 Methods Quantitative Study - RQ1-4

3.3.1 Sample description

The overall dataset consists of four groups that represent one control group and three experimental groups. The eligibility criterion for the sample in the experimental groups comprises university students who were taking part in an entrepreneurship education programme.

	Samples			
Group Number	**1**	**2**	**3**	**4**
Classification	Experimental Group	Experimental Group	Experimental Group	Control Group
Programme Name	Zusatzqualifikation Entrepreneurship 2009	Zusatzqualifikation Entrepreneurship 2010	Zertifikatskurs Stuttgart 2010	not participating in any
Provider of Programme	Center for Entrepreneurial Excellence (CEE)	Center for Entrepreneurial Excellence (CEE)	Center for Entrepreneurial Excellence (CEE)	not applicable
Director	Prof. Dr. Christoph Müller	Prof. Dr. Christoph Müller	Prof. Dr. Christoph Müller	not applicable
Participant Origin	University of St.Gallen	98.4% University of St.Gallen	Mixed	University of St.Gallen
Data acquisition for research question	RQ1,2,3,4	RQ1,4	RQ1,3	RQ1
Measurement Frequency	6	2	4	2
Ex-Ante, T_{start} N	58	56	45	370
Ex-Post, T_{final} N	53	42	24	153
Mean Age	21.92	21.7	22.97	21.83
Criteria for good practice (Souitaris, 2007)				
Taught Element	yes	yes	yes	not applicable
Business Planning	yes	yes	yes	not applicable
Interaction with practice	yes	yes	yes	not applicable
University Support	yes	yes	yes	not applicable

Note: Tstart = first measurement at the beginning of a programme, Tfinal = last measurement at the end of a programme

Table 3 - Overview of Samples

Table 4 provides an overview of the samples. The sample in the control group (4) comprises university students who were randomly selected and were not taking part in an entrepreneurship education programme. The reasons for choosing more than one experimental group are fourfold: *First,* since the research question required different

activities from participants (pre-post, follow-up questionnaires, reflection papers) and many surveys (up to six for the core experimental group), the decision was taken to distribute the activities over more than one sample in order not to overburden participants. *Second,* the selection of two sites for the entrepreneurship education programmes and the higher number of participants surveyed increases the generalisability of the results. *Third*, all of the entrepreneurship education programmes are developed and deployed by the same entrepreneurship professor and the majority of the courses are taught by the same lecturers, which ensures comparability.

Fourth, the entrepreneurship education programmes are further compared through the use of the criterion of a "good practice" programme (Souitaris et al., 2007) and found to fulfil the criteria. On the basis of a literature review and comparison of entrepreneurship programmes of major universities, Souitaris et al. (2007) suggest that a "good practice" programme include the following elements: 1) a taught element with one or more entrepreneurship modules 2) a "business planning" element, which involves a module for writing a business plan or participation in a business plan competition 3) "an interaction with practice" element which may include talks with practitioners of networking events, and 4) a "university support" element that supports students who want to start up a business, for example, an advisory body, access to networks, seed funding, or something similar.

Similarly to Souitaris et al. (2007), who chose two similar "good practice" programmes in two different countries, the focus of this dissertation is on capturing the effect of a "good practice" entrepreneurship education programme on individual benefits such as entrepreneurial intention and not the impact of specific modules of a programme. As a last indicator of comparability, all of the programmes can be classified as "Entrepreneurial Awareness Programmes" according to the classification by Linan (2004) (see chapter 2.1.2).

The next sections provide a description of the different entrepreneurship education programmes. Please see Appendix 1 for a detailed overview of the curricula of all entrepreneurship education programmes.

Zusatzqualifikation Entrepreneurship 2009 (CEE 2009)

The Centre for Entrepreneurial Excellence (CEE) offers three main services, an entrepreneurship education programme, a speaker series that invites entrepreneurs to the university and an advisory centre that orients and supports current and entrepreneurs-to-be.

The core of the CEE is the entrepreneurship programme: It allows 60 students, on a voluntary basis, to participate in an extra-curricular, four-academic-semester entrepreneurship education programme with the aim to help individuals to develop entrepreneurial thinking and acting. This thinking and acting builds the basis for careers as start-up, family or corporate entrepreneurs. The programme is structured around three pillars: Tools - Inspiration - Realisation. The tools part aims to equip students with the knowledge necessary to start a business, hence, start-up basics, business-planning, finance and a number of electives. The inspiration pillar aims to spark entrepreneurial thinking in the students. The third pillar is realisation, which aims at motivating the student to combine and apply the inspiration - entrepreneurial thinking and tools in practice. Hence, in this pillar a transfer with the practice is part of the programme: Students work in young start-ups in group sizes of maximum five students, build their own business plans and have close contact with real entrepreneurs (CEE, 2009).

In the context of admission policy it is also important to note that the programme is free of charge, but if the number of applicants exceeds 60, a selection process is initiated. The main aim of this selection is to assess the motivation and ability of the students to follow the entrepreneurship programme through the course of four academic semesters. Selection criteria are: motivation, creativity and flexibility, willingness to design and implement ideas, social competence and sense of responsibility. When the programme was first opened for admission (2009), the administration received 260 applications.

Finally, the programme is reviewed to determine whether it adheres to the standard of a "good practice" entrepreneurship programmes. Based on the work of Souitatis et al. (2007), a good practice entrepreneurship programme should include "a taught component, ... a business planning component, ... an interaction with practice component ... and a university support component". Over the duration of four semesters the CEE programme includes a business planning module as well as the opportunity for students to write their own business plan, work on their own business

ideas and participate in business plan competitions. Interaction with business practitioners is organised in so-called integration seminars "Integrationsseminare", where students can work with external start-ups for one semester. Furthermore, practitioners are regularly invited to speak to the students about their own entrepreneurship experiences (CEE, 2009). The university offers support through a start-up support association "Startfeld", which offers a) advice, b) networking, c) early stage seed finance, and d) rooms for start-ups and meetings (Startfeld, 2010). In summary, using the criteria above, the CEE programme can be considered a "good practice" entrepreneurship education programme. According to the entrepreneurship education programme categorisation from Linan (2004), this entrepreneurship education programme suits to the category of an entrepreneurial awareness training.

Zusatzqualifikation Entrepreneurship 2010 (CEE 2010)

The 2010 CEE programme has seen some changes to its programme, from the participant`s as well as from a programme perspective. It is worthwhile to note that the Zusatzqualifikation Entrepreneurship 2009 and 2010 were set-up on an extra-curricular basis with external funding as the main source of funding. Therefore, there have been some changes in the 2010 programme compared to the 2009 setup (CEE, 2010):

For the 2010 programme, participants must pay CHF 500 in tuition fees for the entire education programme or apply to a stipend pool that covers the tuition fees but must be repaid after graduation. None of the students applied to the stipend pool. While the 2009 programme was for University of St. Gallen students only, the 2010 programme also accepted students from other universities: In total, one student from another university participated in the 2010 programme. The selection process remained the same. The programme received 100 applications, and 60 participants were selected on the basis of the selection criteria described in chapter 3.3.1.

The focus of the first two semesters is on providing the necessary tools and knowledge an entrepreneur needs to possess. In the remaining two semesters the focus is on coaching to develop the participants' business plans and to start real businesses towards the end of the programme. This means that the actual course work is limited to two semesters compared to the coursework of the 2009 programme, which spanned the four semesters. Similarly to the CEE entrepreneurship education programme 2009, the

2010 programme can be classified as a "good practice" and entrepreneurial awareness entrepreneurship education programme.

Zertifikatskurs Entrepreneurship 2010

The "Zertifikatskurs Entrepreneurship Basics" was also developed and organised by the Executive Director of the Centre of Entrepreneurial Excellence of the University of St. Gallen. The target audience consists of students from universities in Southern Germany and tuition fees are covered by an external sponsor. There is no selection and the programme has a rolling admissions policy. The programme involves ten block-seminar days within a four-month period, from April - July 2010.

The entrepreneurship education programme itself may be classified under Linan's (2004) definitions as an "Entrepreneurial Awareness Education Programme". According to the brochure (CEE-UEC, 2010), the main aims are to raise awareness of the entrepreneurial context, to prepare students for their own entrepreneurial projects and provide them with methods and didactic approaches to entrepreneurship. Furthermore, coaching tailored to student needs and contact with entrepreneurs and companies are integral parts of the programme.

Considering the criteria used above, the Zertifikatskurs Entrepreneurship Basics 2010 education programme can be classified as a "good practice" programme. It includes a "taught component", a "business planning" element with a module on "how to write a business plan" and the opportunity to participate in a business plan competition, an "interaction with practice" component and a strong "university support" element. The "university support" consists of co-operation with the University of Hohenheim Centre of Entrepreneurship, which offers the coordination of entrepreneurial start-up activities and additionally the PUSH network, which offers the entire spectrum of services, from pre-seed funding advice to market entrance (CEE-UEC, 2010).

3.3.2 Questionnaire Development

The development of the questionnaire occurred in several steps following guidelines in the literature (Johnson & Christensen, 2007; Krathwohl, 1993; Venkatraman & Grant, 1986). As a starting point the literature was reviewed to identify scales that have been used in previous studies with a similar focus. The main constructs of the theory of planned behaviour and entrepreneurial intentions have been the subject of previous studies (Autio et al., 2001; Gird et al., 2008; Kolvereid, 1996b; Linan & Chen, 2009; Lüthje et al., 2003). In the article by Linan & Chen (2009), published in the highly respected journal Entrepreneurship Theory and Practice, the authors developed a scale for testing entrepreneurial intentions by utilising the theory of planned behaviour. Thus, the questionnaire was deemed to be relevant for the research questions and adapted to the specific context of this dissertation.

After designing the first draft and a feedback-loop with an expert in this field, a pilot study was conducted in order to increase face validity, with 12 feedback forms received from students and researchers alike. After incorporating the feedback into the questionnaire, a further review was conducted with another expert in this field to increase criterion validity. The questionnaire (see Appendix 2) was then used as the master questionnaire for the measurement of the experimental groups. All follow-up questionnaires (T2,T3...) and questionnaires for the control group were based on this master questionnaire (see Appendix 3 for follow-up questionnaire, Appendix 4 for the T_{final} questionnaire).

In order to increase acceptance of the questionnaire, a cover letter was attached to each questionnaire highlighting the importance of this dissertation, providing a short background to the study, contact details and the names of the supervising professors. In order to reduce response bias, the questionnaires of the experimental group were coded in order to render them anonymous (Fink, 1995).

Reliability of scales was reviewed and confirmed by conducting a three-day test-retest with N=10 and a Pearson Correlation of 0.98 (see Appendix 5). Internal consistency was examined with a Cronbach internal consistency test scoring $\alpha > 0.8$ for all key scales (see chapter 3.4.3.).

The questionnaire is structured into nine sections and features 83 items on four DIN A4 pages: *Section A* examines the respondents' background with regard to demographics, level of study, study programme and respondents' expectation have of the entrepreneurship programme.

Section B focuses on the respondents' work experience and identifies whether respondents have worked in small enterprises or even start-ups in combination with their assessment of positive or negative experiences associated with their work.
Sections C-D evaluates the respondents' level of knowledge, whether they have previously participated in entrepreneurship courses and their level of knowledge in specific areas of entrepreneurship that are part of the entrepreneurship education programme.
Sections E-H resemble the questions that refer to the concepts of the theory of planned behaviour: Section E checks "attitudes toward behaviour", section F "social norms", section G "perceived behavioural control", section H refers to the key dependent variable "entrepreneurial intentions".
Section I is the only semi-structured question in this questionnaire and aims at exploring trigger-events of entrepreneurial intention and gathering background data for the reflection papers at the end of the entrepreneurship programme.

3.3.3 Variable Operationalization

The variables consist of the constructs of the theory of planned behaviour: "attitude toward behaviour", "social norms", "perceived behavioural control" and the key dependent variable "entrepreneurial intention". The question for the status of self-employment is part of the variable set of "entrepreneurial intention".
While developing and following the steps to design the questionnaire, much effort was invested in reviewing the literature to identify existing and tested scales in studies with a similar focus (Autio et al., 2001; Chen, Greene, & Crick, 1998; Kolvereid, 1996a, b; Kolvereid et al., 1997; Krueger Jr & Brazeal, 1994; Krueger Jr et al., 2000; Krueger et al., 1993; Linan et al., 2009; Tkachev et al., 1999).
The study by Linan et al. (2009) develops and tests a new questionnaire aiming at measuring entrepreneurial intention through the theory of planned behaviour. Scales for the key constructs were adopted from this questionnaire and applied to measure the development of entrepreneurial intention during the entrepreneurship education programmes sampled.

Attitudes Toward Behaviour

The first construct in the theory of planned behaviour, "attitudes toward behaviour" measures the degree to which a person thinks positively about performing the behaviour of becoming an entrepreneur. Personal attitudes have been measured in a number of ways in previous studies. Krueger et al. (2000) use a single-item scale asking respondents to rate the attractiveness of becoming an entrepreneur: "Is starting your own business an attractive idea to you (scale 0 to 100)?"(Krueger Jr et al., 2000: 422). Autio et al. (2000) examine the desirability of different career paths (civil service, corporate, entrepreneurial, academic). Ajzen (2001) suggests using an aggregate measure to capture attitudes, which has been used by other research studies as well (Grundy & Welsch, 2001; Kolvereid & Isaksen, 2006; Linan et al., 2009). Therefore, the dissertation utilises the 5-item, 7-point Likert-type scale from Linan (2009: 612):

Section E:

1. Indicate your level of agreement with the following sentences from

1 (total disagreement) to 7 (total agreement)

	1	2	3	4	5	6	7
a. Being an entrepreneur implies more advantages than disadvantages to me	☐	☐	☐	☐	☐	☐	☐
b. A career as entrepreneur is attractive for me	☐	☐	☐	☐	☐	☐	☐
c. If I had the opportunity and resources, I would like to start a business	☐	☐	☐	☐	☐	☐	☐
d. Being an entrepreneur would entail great satisfactions for me	☐	☐	☐	☐	☐	☐	☐
e. Among various options, I would rather be an entrepreneur	☐	☐	☐	☐	☐	☐	☐

Figure 8 - Scale Attitude Toward Behaviour

Subjective Norms

Subjective norms measure the respondent's perception of what people in his/her network would think if the respondent became an entrepreneur. Thus, subjective norms refer to the social and cultural pressure to perform a specific behaviour. In this respect, the expectations of friends, family, peers, networks or mentors regarding the desirability of becoming an entrepreneur are of specific importance.

Scales usually range from single-item, general scales asking "Would family and friends want you to start your own business?" (scale: 0 to 100) (Krueger Jr et al., 2000:

422) to specifying social groups such as colleagues, friends, family, important people (Autio et al., 2001).

According to Ajzen (1991), subjective norms should be approached through the kind of measure "what do reference people think?" (Linan et al., 2009: 601). Armitage (2001) found that a multiple-item measure of subjective norms delivers the strongest correlation with entrepreneurial intentions. Linan (2009) uses a three-item scale specifying family, friends and colleagues. For the purpose of this dissertation, the introductory question for subjective norms was adapted from Linan (2009). Similarly to Autio et al. (2000), the social groups were complemented by a social group of friends from the university to cater to the specific sample and by a more general group of other people who are important to the respondent:

Section F:

1. If you decided to create a firm, would people in your close environment approve of that decision?

	Indicate from 1 (total disapprovement) to 7 (total approvement)						
	1	**2**	**3**	**4**	**5**	**6**	**7**
a. Your close family	☐	☐	☐	☐	☐	☐	☐
b. Your close friends	☐	☐	☐	☐	☐	☐	☐
c. Your close friends from university	☐	☐	☐	☐	☐	☐	☐
d. Other people who are important to you	☐	☐	☐	☐	☐	☐	☐

Figure 9 - Scale Subjective Norms

Perceived Behavioural Control

Perceived behavioural control measures the respondent's belief in his capacity to perform the behaviour of becoming an entrepreneur. Similar to subjective norms and attitudes toward behaviour, researchers have measured perceived behavioural control with single-item scales (Krueger Jr et al., 2000) to an 18-item scale measuring self-efficacy (Kolvereid et al., 2006). Self-efficacy is defined as "people's belief about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (Bandura, 1994: 71).

This dissertation utilises the scale from Linan (2009: 612), who uses a 6-item scale, with five items measuring general self-efficacy and one question referring to controllability (c).

1. To what extent do you agree with the following statements regarding your entrepreneurial capacity?

Value them from 1 (total disagreement) to 7 (total agreement)

	1	2	3	4	5	6	7
a. To start a firm and keep it working would be easy for me	☐	☐	☐	☐	☐	☐	☐
b. I am prepared to start a viable firm	☐	☐	☐	☐	☐	☐	☐
c. I can control the creation process of a new firm	☐	☐	☐	☐	☐	☐	☐
d. I know the necessary practical details to start a firm	☐	☐	☐	☐	☐	☐	☐
e. I know how to develop an entrepreneurial project	☐	☐	☐	☐	☐	☐	☐
f. If I tried to start a firm, I would have a high probability of succeeding	☐	☐	☐	☐	☐	☐	☐

Figure 10 - Scale Perceived Behavioural Control

Entrepreneurial Intention

Entrepreneurial intentions can be measured in different ways (Warshaw & Davis, 1985): From a behavioural intention perspective ("I intend to perform behaviour x"…) and from a self-prediction perspective ("How likely is it that you will perform behaviour x"). Arimtage et al. (2001) add a third dimension, from a desirability perspective (I want to perform behaviour x). Statistical analysis shows that behavioural intention-related questions have a high predictive power for behaviour (Armitage et al., 2001) as well as self-prediction-related questions (Shepperd, Hartwick, & Warshaw, 1988).

Section H:

1. Are you self-employed? ☐ YES

☐ NO

If you answered NO, please continue with the questions below. If you answered yes, please continue with Section I.

2. Indicate your level of agreement with the following statements from

1 (total disagreement) to 7 (total agreement)

	1	2	3	4	5	6	7
a. I am ready to do anything to be an entrepreneur	☐	☐	☐	☐	☐	☐	☐
b. My professional goal is becoming an entrepreneur	☐	☐	☐	☐	☐	☐	☐
c. I will make every effort to start and run my own firm	☐	☐	☐	☐	☐	☐	☐
d. I am determined to create a firm in the future	☐	☐	☐	☐	☐	☐	☐
e. I have very seriously thought of starting a firm	☐	☐	☐	☐	☐	☐	☐
f. I have got the intention to start a firm in the next 2 years	☐	☐	☐	☐	☐	☐	☐
g. I have got the intention to start a firm in the next 2 to 5 years	☐	☐	☐	☐	☐	☐	☐
h. I have got the intention to start a firm some day	☐	☐	☐	☐	☐	☐	☐

Figure 11 - Scale Entrepreneurial Intention

The scale, an 8-item, behavioural-intention-oriented, 7-point Likert-type scale was adapted from the Linan (2009) 6-item scale. The last question from Linan`s (2009) 6-

item scale "I have got the intention to start a firm some day" was complemented with "I have got the intention to start in the next 2 years" and with "I have got the intention to start in the next 2-5 years". This is due to the fact that most members of the CEE 2009 experimental group sample are at the Bachelor level and will also be graduating after the 4-semester programme in their Bachelor programme. Therefore, two more questions were added to provide a more accurate answer for those intending to become an entrepreneur immediately after completing their studies and those intending to become entrepreneurs after a few years of working.

The variable self-employed was captured in section H, directly before asking for entrepreneurial intention. While there are differentiations in forms of entrepreneurship (Jakobsen, 2011), the term self-employed was used as a differentiator between those who are unemployed or employed (salaried work) (Kolvereid, 1996b; Thurik, Carree, van Stel, & Audretsch, 2008; Vinogradov & Kolvereid, 2007).

Control Variables

Control variables describe exogenous influences on the dependent variable. Demographics, such as gender, family background, etc., are often used to "control" for a possible effect on the dependent variable. In this dissertation control variables such as demographics were not further utilised as they were tested in hypothesis 2 and found to be not significant. The influence of, e.g., demographics would have had a long-term effect on attitudes and entrepreneurial intention before the start of an entrepreneurship education programme and will be measured in the first measurement T_{start} and then eliminated by taking the differences between T_{final} and T_{start} (Souitaris et al., 2007); and b) Tkachev and Kolvereid (1999) found that adding family status and demographic control variables did not increase the predictability of entrepreneurial intentions in the theory of planned behaviour.

Therefore, only dummy control variables were added for the different sample groups (CEE 2009, CEE 2010, Zertifikatskurs, Control Group), for differentiating the groups who have a T_{start} and T_{final} measurement vs. those who only responded in T_{start} similarly to Souitaris et al. (2007).

3.3.4 Data Collection Procedure

Figure 12 provides an overview of the overall measurements and objectives throughout the period of September 2009 until May 2011. In the following sections the measurements per sample are described.

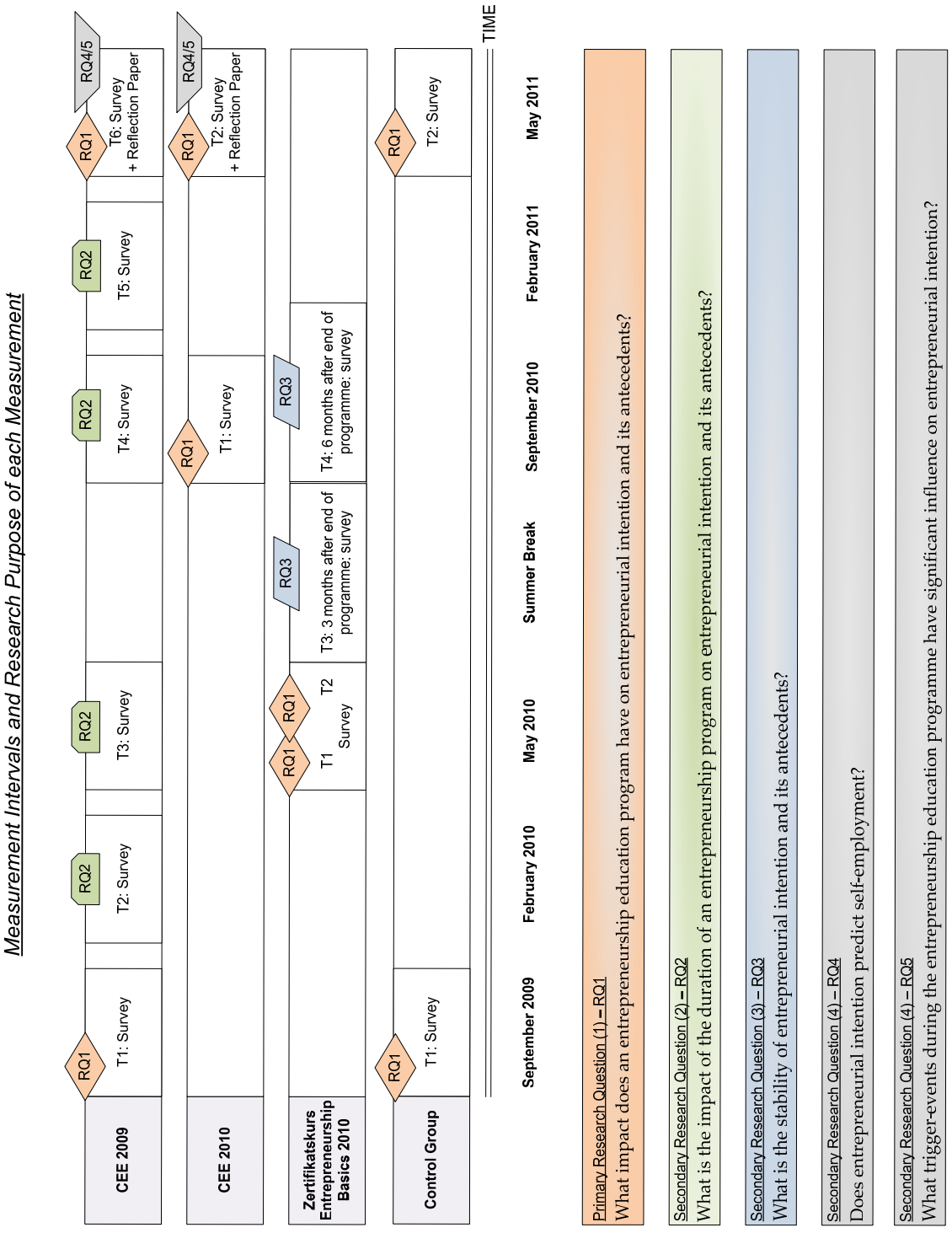


Figure 12- Measurement Intervals per Sample

Zusatzqualifikation Entrepreneurship - CEE 2009 Measurement Intervals

Participants in the education programme (N=58) were introduced to the dissertation project in July 2009 and the dissertation project is included as part of the agenda of the entrepreneurship education programme.

The pre-test questionnaire was issued to the experimental group after a short introduction at the beginning of the first entrepreneurship course in September 2009. For the analysis of the development of entrepreneurial intentions throughout the programme, this experimental group was tested the most frequently. The reason is that it is the programme with the longest duration: four semesters. The T2-6 measurements were conducted similarly to the first measurement: the administration and collection of the questionnaire in class and follow-up e-mails for those who did not attend.

The questionnaire is anonymous but is coded in order to match the post-questionnaires to the pre-questionnaires. The code that is used is a four letter personal code: 1) First letter of your month of birth 2) First letter of your place of birth 3) First letter of your family name 4) First letter of your mother`s first name.

Figure 13 shows the data acquisition intervals and the reasoning for each measurement. Measurements T1 and T6 are used for hypothesis 1 (Impact); measurements T1, T2, T3, T4, T5, T6 are used for the hypotheses related to duration of the programme.

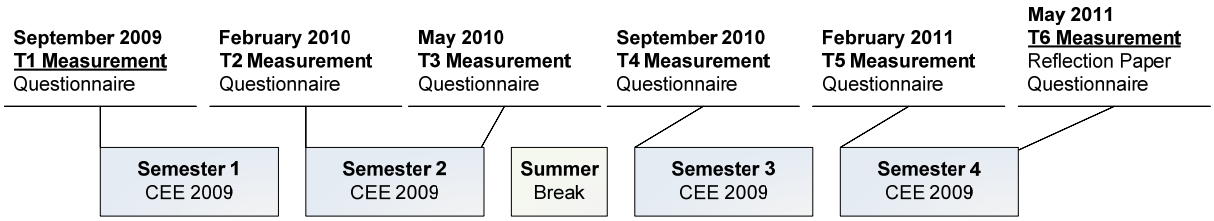


Figure 13 - Zusatzqualifikation CEE 2009 Sample Measurements

Zusatzqualifikation Entrepreneurship - CEE 2010 Measurement Intervals

The procedure for data acquisition of the CEE 2010 intake (N=56) is similar to the CEE 2009 intake. The dissertation project was introduced to the students at the very first gathering of all participants in July 2010. The 2010 programme brochure highlights that a scientific study is part of the entrepreneurship programme so that students were already aware of it when applying to the programme. The questionnaire

is anonymous but is coded in order to match the post-questionnaires to the right students. The code that is used has the same format as the CEE 2009 code.

The programme was changed compared to the 2009, and the course phase is now completed in two semesters instead of four. This provides the opportunity to finish the measurements at the same time as the CEE 2009 programme. Figure 14 provides an overview of the two measurement intervals, the pre-test and post-test measurement points T1 and T2; T2 also includes the reflection paper on entrepreneurial trigger-events. T1 and T2 are used for hypotheses 1:

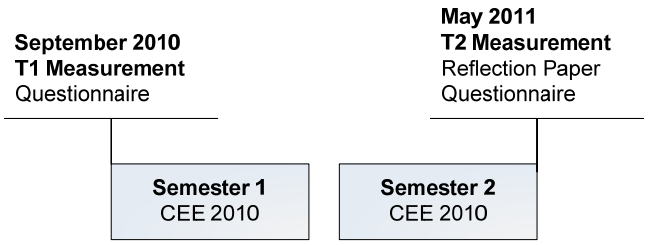


Figure 14 - Zusatzqualifikation CEE 2010 Sample Measurements

Zertifikatskurs Entrepreneurship Basics 2010 Measurement Intervals

As this programme takes place in Germany and not in St. Gallen, the introduction of the dissertation project and data acquisition (N=45) was done by the Academic Director of the programme himself. On the first day of the programme, before the start of the lecture, the Academic Director introduced the dissertation project to the students and issued the pre-test questionnaire. The last questionnaire was issued on the last day of course at the end of the programme.

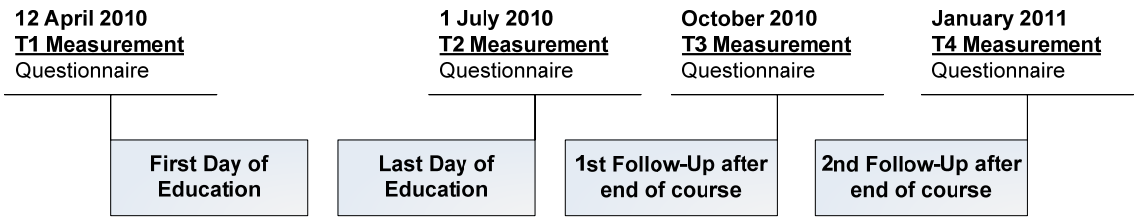


Figure 15 - Zertifikatskurs Entrepreneurship Measurements

Figure 15 indicates the measurement intervals, T1 represents the pre-test starting point and T2 is the post-test on the last day of the entrepreneurship education programme. In order to collect data for the research question on stability of entrepreneurial intention,

there were two follow-up measurement T3, three months after the end and T4, six months after the end of the programme.

Control Group

The data for T1 was acquired during the period from September to November 2009. Questionnaires were not anonymous; students were asked to provide their name and e-mail address in order to be contacted again in May 2011.

The control group (N=370) was selected randomly using four approaches: First, through in-class introductions of the dissertation project and then follow-up e-mails; second, by approaching students at the university and asking them to complete the questionnaire; third, through personal e-mails; and fourth, through personal introductions of the dissertation project and face-to-face handing-out and collection of the questionnaires in lectures.

Of all of the respondents, 87.7% provided their e-mail address for contact purposes.

The control group was measured twice, at the beginning of the first measurement for the experimental group (CEE 2009) course and at its conclusion in May 2011.

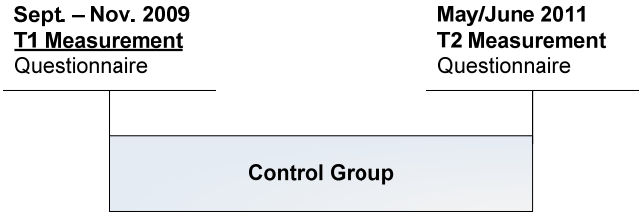


Figure 16 - Control Group Measurement Intervals

3.3.5 Data Analysis Procedures

Data analysis procedures comprise statistical analyses of the questionnaire data with the computer software Statistical Package for the Social Sciences (SPSS). Figure 17 provides an overview of the sequence of procedures undertaken for the data analysis. First, data was tested for selection and non-response bias. Second, variables were analysed for their applicability for parametric analysis methods. Third, scales were tested for reliability and fourth for validity. Finally, the statistical analyses to test the hypotheses were conducted. The statistical tests selection is based on expert literature (Acton, Miller, Fullerton, & Matlby, 2009; Bühl, 2010; Miles & Shelvin, 2001) and statistical tests in scientific articles that were undertaken in comparable situations and

published in reputable journals (e.g. Oosterbeek et al., 2010; Souitaris et al., 2007; von Graevenitz et al., 2010).

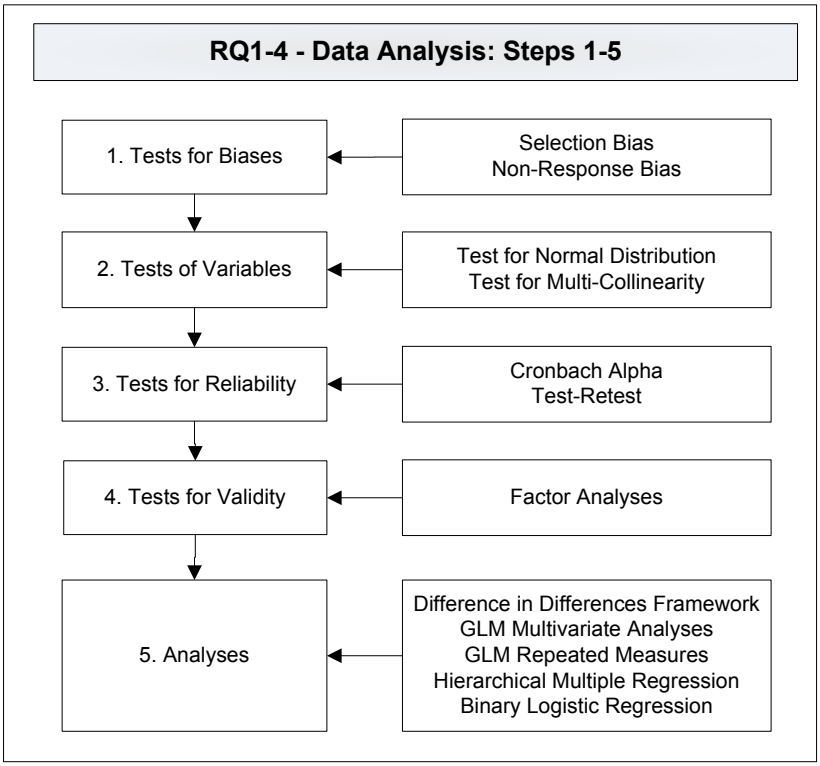


Figure 17 - Overview Quantitative Data Analysis Steps

Source: Adapted from Atanasova (2007: 115)

For hypothesis 1, a difference-in-difference framework was utilised (Oosterbeek et al., 2010), which means that, in a first step, the difference scores between T_{final} and T_{start} for each group were calculated. In a second step, the differences scores of the experimental group were subtracted by the differences scores of the control group. Finally, one-sample t-tests were conducted on the difference scores. A second test to check the results of the first test was conducted with a GLM repeated measures test and confirmed the results of the difference-in-differences framework.

Hypothesis 2 involved the testing of the relationships of the attitudinal constructs on intention. For this model further control dummy variables were included, along with the two dummy control variables (0/1, control/experimental group) and gender (0/1, female/male), a third one was included: age. This was done, in reference to chapter 3.3.3 (control variables), to evaluate the influence of demographics on the model. Two hierarchical multiple regression models were calculated, the first regressing the control variables and T_{start} independent attitudinal variables (ATB, SN, PBC) on

entrepreneurial intention in T_{start}) and the second regressing the control variables, T_{start} and T_{final} independent attitudinal variables on entrepreneurial intention in T_{final}.

In hypothesis 3, a GLM multivariate analyses of the fixed factor length (1,2,4 semesters) was conducted on the dependent variables of the difference scores of ATB, SN, PBC and EI. As the overall model was insignificant, a post-hoc Scheffe test was chosen in order to identify potential significant differences between the fixed factors. A Scheffe posthoc test has the advantage that it is a robust test applicable for unequal sample sizes (Eckstein, 2004), which is the case in this dataset.

For hypothesis 4, a GLM repeated measure model was chosen, similar to Souitaris et al. (2007). Additionally, the model was complemented with simple contrasts which provide the benefit of defining a reference level with which all T measurement points are compared. In the first part of the model, $T_{final+3months}$ and $T_{final+6\ months}$ are referenced to T_{final}, in order to test whether participants decreased significantly their values in the main constructs. In the second part, the reference value was T_{start}, in order to check whether participants decreased their values of the main constructs even below the starting level.

Hypotheses 5 and 6 involve a dichotomous, dependent variable. The status of being self-employed has only two options: "yes" or "no". For this design a binary logistic regression is appropriate (Bühl, 2010). The binary logistic regression has two further benefits: First the independent variable can take on any level of measurement, and second, it calculates the probability of the event being "yes" or "no". For each hypothesis two models were calculated: One model includes all T_{final} values of self-employed (yes/no) and the second model controls additionally for those who were self-employed already at the beginning of the programme and therefore only includes those that had become self-employed during the programme.

3.4 Preparatory Tests

As indicated in chapter 3.3.5 and figure 17, preparatory tests were undertaken to ensure that the data is appropriate for analysis. These tests entail checking for non-response bias, common-method bias, normal distribution of data, multi-collinearity, reliability and validity of the data. For all preparatory tests and tests in the analysis section, the standard "cut-off points for accepting hypothesis have been used: *$p \leq 0.05$, **$p \leq 0.01$, ***$p \leq 0.001$" (Acton et al., 2009: 126).

3.4.1 Tests for Biases

Selection Bias

All three samples of entrepreneurship education programmes operate on a voluntary admission basis. For the CEE 2009 and CEE 2010 programmes an additional selection has taken place. This should result in a selection bias of participants in the experimental groups with higher average values in the attitudinal constructs compared to the control group. In order to test for significant differences in the means of both groups an independent samples t-test was calculated (table 4):

Tests for Selection Bias

	ATB_{Tstart}	SN_{Tstart}	PBC_{Tstart}	EI_{Tstart}
N				
Experimental Group	159	159	159	154
Control Group	370	369	369	370
Mean				
Experimental Group	5.702	5.783	3.704	4.977
Control Group	4.905	5.627	3.149	3.636
Levene's Test	ATB_{Tstart}	SN_{Tstart}	PBC_{Tstart}	EI_{Tstart}
F	27.629***	0.53	4.544*	7.757**
Equality of Means				
t	7.804***	1.720	5.146***	9.692***
df	426.2	526.0	346.2	327.4

*p≤0.05, **p≤0.01, ***p≤0.001

Note: Total group, T_{start}

Table 4 - Tests for Selection Bias

The interpretation of the test follows two steps (Acton et al., 2009), first Levene's test for equality of variances and second, depending on the result of Levene's test, the t-test is interpreted. For example, ATB indicates significant differences in variance between the groups; hence, the independent t-samples test needs to be adjusted for interpretation of equal variances not assumed. Table 4 indicates that there is a significant selection bias for attitude toward behaviour (ATB), perceived behavioural control (PBC) and entrepreneurial intention (EI) between the control group and the experimental groups.

The selection bias was expected and does not hinder the adequate analysis of the data since for the impact measurements the difference scores are taken. This will balance

out any differences between the groups and focus only on the increase or decrease of the constructs (Athayde, 2009). Furthermore, the evidence of selection bias is a further argument that ex-post only studies are not sufficient to evaluate the impact of entrepreneurship education.

Non-Response Bias

A test for non-response bias was conducted by comparing the T_{start} values of the key construct attitude toward behaviour, perceived behavioural control, subjective norms and entrepreneurial intention from respondents who completed T1 only vs. respondents who completed T_{start} and T_{final}. The literature suggests that the best way to circumvent non-response bias is to reduce the number of non-responses (Armstrong & Overton, 1977).

Tests for Non-Response Bias

	ATB_{Tstart}	SN_{Tstart}	PBC_{Tstart}	EI_{Tstart}
N	370	369	369	370
T_{start} and T_{final} matched	154	154	154	154
T_{start} only	216	215	215	216
Mean				
T_{start} and T_{final} matched	4.9234	5.6190	3.2300	3.6615
T_{start} only	4.8912	5.6322	3.0904	3.6173
Levene's Test				
F	2.049	.345	.002	.058
Equality of Means				
t	.224	-.128	1.051	.264
df	368	367	367	368

*p≤0.05, **p≤0.01, ***p≤0.001, Control Group Sample

Table 5 - Tests for Non-Response Bias

While the experimental group achieved 119 of 159 (75%) matched questionnaire couples in T_{start} and T_{final}, the control group achieved 154 of 370 (42%). Therefore, a test for non-response bias in the control group has been conducted (table 5). The test concludes with no significant differences in variances and means between those who answered in T_{start} and T_{final} versus those who only responded in T_{start}. Therefore, non-response bias is not evident.

3.4.2 Tests of Variables

In order to examine whether the variables are appropriate for analysis two tests were conducted: First, checking for missing values and whether variables are normally distributed, and second, testing for (multi-) collinearity of independent variables.

Test for Normal Distribution

In order to test for normal distribution, the data was reviewed in two ways. First, the variables were visualised in histograms to provide a first view of the distribution of the values. Second, the variables of the key constructs were tested for skewness. Skewness indicates the symmetry of the distribution; a value of 0 would represent a perfect normal distribution. However, "since virtually all distributions of real data are skewed, what really matters is how much" (Bernard, 2000:522). -2 to +2 is deemed acceptable for parametric tests and assumes a normal distribution. A negative value indicates the distribution to be on the left side on the histogram. Kurtosis measures the flatness (- values) or peakedness (+ values) of a distribution and is within the range of -2 to +2, acceptable for parametric tests. Table 6 indicates a normal distribution of the key constructs as the range of skewness is between -0.754 and +0.292.

Descriptives for reviewing Skewness & Kurtosis

	ATB_{Tstart}	ATB_{Tfinal}	SN_{Tstart}	SN_{Tfinal}	PBC_{Tstart}	PBC_{Tfinal}	EI_{Tstart}	EI_{Tfinal}
Mean	5.2286	5.1231	5.7384	5.6987	3.3966	4.1985	4.2342	4.3325
Skewness	-.754	-.638	-.605	-.363	.292	-.052	-.107	-.189
Kurtosis	-.055	-.273	.044	-.239	-.291	-.350	-1.132	-.911

Note: Valid N=273, Total Group, Tstart / Tfinal Matched

Table 6 - Tests for Normal Distribution

Test for (multi-) collinearity

Before regressing independent variables on the dependent variable, the collinearity of the independent variables should be examined. The collinearity diagnostics tool of SPSS provides two measures of collinearity. The first is tolerance, which measures the correlation between the independent variables and varies between 0 and 1, with 0 being an indication of a very strong relation between the examined independent variables. Collinearity is indicated if the tolerance value is "very low" (Brace, Kemp, & Snelgar, 2004: 217). Variance Inflation Factor (VIF) is an alternative indicator of collinearity, where large values indicate a strong relationship between independent

variables. As a rule of thumb, VIF values of higher than >2 indicate multicollinearity (Miles et al., 2001). The tolerance and VIF statistics were calculated and indicated high tolerance values of >0.595 and low VIF <1.6 and therefore (multi-) collinearity was not evident.

3.4.3 Tests of Reliability

Reliability refers broadly to the capacity of a measurement to produce consistent results (Sarantakos, 2005). In order to achieve high reliability and validity, scales are relied on standards in the field which were published in an A-rated journal and used for a similar purpose (e.g. Linan et al., 2009). Along with this approach two additional measures were taken to check the reliability of the scales:

At the development stage, after the pilot-test, a separate test-retest was conducted. Ten respondents completed the questionnaire and were asked three days later to complete the same questionnaire again. An analysis of all answers of the questionnaire indicated a very high Pearson correlation of 0.98 (see Appendix 4).

All constructs of the theory of planned behaviour are multiple-item scales. Therefore, there is the potential to check the internal consistency reliability, which is applied to groups of items that measure one construct and examines the homogeneity of the variables. Litwin (1995) recommends to measure internal consistency by the Cronbach's coefficient alpha. Table 7 provides an overview of the Cronbach α coefficients of all scales which are at minimum >0.81. As a general rule of thumb, scales are deemed to be internally consistent when the Cronbach α is above 0.6 (Eckstein, 2004). Therefore, we can assume internally consistent scales.

Constructs and items, (Source / Adapted from)	Inter Item Total Correlation T1	Cronbach α T1	Inter Item Total Correlation Tfinal	Cronbach α T final
Attitude Toward the Behaviour (Linan (2009))		0.917		0.93
a. Being an entrepreneur implies more advantages than disadvantages to me	.671		.671	
b. A career as entrepreneur is attractive for me	.838		.899	
c. If I had the opportunity and resources, I would like to start a business	.760		.836	
d. Being an entrepreneur would entail great satisfactions for me	.836		.832	
e. Among various options, I would rather be an entrepreneur	.844		.862	
Social Norms (Adapted from Linan (2009))		0.827		0.811
a. Your close family	.604		.564	
b. Your close friends	.735		.748	
c. Your close friends from university	.553		.483	
d. Other people who are important to you	.720		.707	
Perceived Behavioral Control (Linan (2009))		0.908		0.913
a. To start a firm and keep it working would be easy for me	.595		.676	
b. I am prepared to start a viable firm	.807		.817	
c. I can control the creation process of a new firm	.803		.807	
d. I know the necessary practical details to start a firm	.767		.774	
e. I know how to develop an entrepreneurial project	.774		.752	
f. If I tried to start a firm, I would have a high probability of succeeding	.732		.720	
Entrepreneurial Intention (Adapted from Linan (2009), Krueger et al. (2000))		0.947		0.943
a. I am ready to do anything to be an entrepreneur	.772		.793	
b. My professional goal is becoming an entrepreneur	.883		.871	
c. I will make every effort to start and run my own firm	.897		.869	
d. I am determined to create a firm in the future	.882		.888	
e. I have very seriously thought of starting a firm	.796		.768	
f. I have got the intention to start a firm some day	.797		.776	

Note: T1 = Total Group & T 6 = Matched Questionnaires

Table 7 - Overview of Cronbach Alpha Coefficients of Scales

3.4.4 Tests of Validity

After confirming the reliability of the measurement instrument, the next and final step before the testing of the hypotheses is to review validity of the survey. Validity refers to "how well it measures what it sets out to measure" (Litwin, 1995: 33). Besides assessing face and content validity through a pilot-test and feedback loops with other researchers during the development stage of the questionnaire, an exploratory factor analysis was conducted. Factor analysis is deemed an appropriate method for examining construct validity (Nunnally & Bernstein, 1994). Construct validity indicates whether "there is a close fit between the construct it supposedly measures and actual observations made with the instrument" (Bernard, 2000: 50). From the explorative factor analysis three eigenvalues >1 emerged, with the fourth being 0.903. After considering the scree plot, a four-factor solution was incorporated. At first, the exploratory factor analysis indicated that variables within the

Explorative Factor Analyses

	Component			
	1	2	3	4
T1: Being an entrepreneur implies more advantages than disadvanatges to me			.784	
T1: A career as entrepreneur is attractive to me			.801	
T1: If I had the opportunity i would start a firm			.628	
T1:Being an entrepreneur would entail great satisfaction to me			.719	
T1: Among various options, i would rather be an entrepreneur			.741	
T1: Family approval?				.752
T1: Friends approval?				.841
T1: Uni friends approval?				.769
T1: People who are important approval?				.833
T1: To start a firm and keep it working would be easy for me		.639		
T1: I am prepared to start a viable firm		.816		
T1: I can control the creation process of a new firm		.836		
T1: I know the necessary details to start a firm		.858		
T1: I know how to develop an entrepreneurial project		.857		
T1: If I tried to start a firm, I would have a high probability of succeeding		.764		
T1: I am ready to make anything to be an entrepreneur	.688			
T1: My professional goal is to become an entrepreneur	.789			
T1: I will make every effort to start and run my own firm	.826			
T1: I am determined to create a firm in the future	.828			
T1: I have seriously thought of starting a firm	.753			
T1: I have got the serious intention to start a firm some day	.761			
Eigenvalues after rotation	4.813	4.368	3.538	2.756
Variance explained by individual factor after varimax rotation (%)	22.92	20.80	16.85	13.13
Total Variance Explained: 73.68%	EI	PBC	ATB	SN

Info: Extraction Method: Principal Component Analysis, Rotation: Varimax with Kaiser Normalization

Attitude Toward the Behaviour (ATB), Subjective Norms (SN), Perceived Behavioral Control (PBC) Entrepreneurial Intentions (EI)

Table 8 - Explorative Factor Analyses

construct of entrepreneurial intention were loading on the attitude toward behaviour construct. Since the entrepreneurial intention scale had been complemented by two further questions, "I have got the serious intention to start a firm within 2 years" and "I have got the serious intention to start a firm within 5 years", these two additional questions were deleted to test whether the reduction of variables had an effect. After the reduction of these two variables, the exploratory factor analysis was conducted again and the variables were then loading on the factors appropriate to the variables (see table 8). For further analysis the reduced set of variables for entrepreneurial intention was used. All calculations up to this point were redone and updated. Table 8 provides an overview of the rotated component matrix, all items below 0.5 were cut off to better visualise which components the variables are loading on. The factor loadings, the correlation between the factor and the variables, are in all cases above 0.6, which indicates a high correlation. The total variance explained by these four factors is 73.7%. In summary, the analysis provided evidence to support the validity of the measurement instrument.

3.5 Methods Qualitative Study - RQ5

3.5.1 Sample description

The sample consists of participants in the University of St.Gallen Center for Entrepreneurial Excellence entrepreneurship programmes of 2009 and 2010. In total 52 students, 27 students from the Zusatzqualifikation Entrepreneurship - CEE 2010 and 25 students from the Zusatzqualifikation Entrepreneurship - CEE 2009 completed the reflections online, with a total of 124 entrepreneurial triggers.

3.5.2 Reflection Assignment

The reflection essay approach was inspired by the basic tenets of the critical incident technique - asking students about a critical incident that changed their hearts and minds to become or not become an entrepreneur. The CIT was originally developed by Flanagan and his colleagues in 1954 (Flanagan, 1954). A newer definition of critical incidents defines them as incidents that a person "perceives or remembers as unusually positive or negative when asked about them" (Edvardsson & Roos, 2001: 253).

Focusing on such incidents is therefore deemed an appropriate technique for answering the explorative research question about possible trigger-events within an entrepreneurship programme:

Research Question 5: *What trigger-events during the entrepreneurship education programme impact on the intention to become an entrepreneur?*

These trigger-events, i.e., specific critical incidents of positive or negative nature within an entrepreneurship programme, will be identified and categorised. Especially in training situations the critical incident technique is regarded as an appropriate and useful technique (Flanagan, 1954).

For this dissertation, the criteria for a critical incident are defined as follows: Incidents must a) have dramatically impacted the intention to become or not become an entrepreneur; b) have happened during the time from September 2009 - May 2011; c) have a connection to the entrepreneurship programme. The following assignment was given for reflecting on a positive/negative trigger:

Think of an event/situation that you have experienced during or because of the entrepreneurship education programme that drastically changed your "heart and mind" *to intend to* become an entrepreneur.

a) Please describe the event/situation in as much detail as you can remember.

b) What and why did (it) motivate you to become an entrepreneur?

c) Please take your strongest positive event for this exercise; if you have more than one, please describe these as well

d) You can write in English or German.

Think of an event/situation that you have experienced during or because of the entrepreneurship education programme that drastically changed your "heart and mind" *to not intend* to become an entrepreneur.

a) Please describe the event/situation in as much detail as you can remember.

b) What and why did (it) motivate you to become an entrepreneur?

c) Please take your strongest positive event for this exercise, if you have more than one, please describe these as well

d) You can write in English or German.

The structure of the reflection paper consists of two parts (see Appendix 5). First, the introductory section explains the purpose of the reflection paper, highlights the importance of this dissertation and that data will be coded anonymously.

The second part is comprised of the essay and follows design examples of previous studies utilising open-ended interviews (Campbell & Martinko, 1998; Tuuli & Rowlinson, 2010). Using a structure similar to Campbell & Martinko's (1998), the participants are given the task of thinking of a trigger-event that they have experienced during or because of the entrepreneurship education programme and that dramatically changed their "heart and mind" to (intend or not intend to) become an entrepreneur. Four guidelines were provided: They were asked to describe the trigger-event in as much detail as they could. Furthermore, they were asked to explain why it motivated / de-motivated them to become an entrepreneur. Finally, they were given the option to either write in German or English.

3.5.3 Collection Procedure

The assignment was first introduced in class and then issued via email shortly before the end of both CEE programmes at the end of April 2011. Since trigger-events may have occurred up to 18 months in the past, they may not be easily recalled. Through the means of reflection, participants are provided with the chance to think more deeply about critical incidents while writing. Furthermore, the online reflections gave participants the time to reflect without the time pressure of quickly filling a questionnaire at the end of a class. Finally, they had the chance to complete the online reflections within a period of ten days, which gave them a broad enough time frame to complete it at their convenience.

3.5.4 Data Analysis Procedure

The analysis of the reflections about entrepreneurial trigger-events follow the systematic analysis procedure of qualitative content analysis (Mayring, 2000; Mayring, 2003). The steps involve (see figure 18) :

1. Sample description (See chapter 3.5.1.)

2. The criterion of selection is to identify contexts, situations, elements of the entrepreneurship education programme - hence triggers - that had changed the respondent's intention toward entrepreneurship.

3. As a first step, all reflections were paraphrased. A second researcher subsequently reviewed all of the original texts and added feedback to the paraphrasing. After the second paraphrasing, intuitive categories were formulated. In order to formulate the categories, the answer to the question of "what triggered you or what inspired you?" was formulated.

4. After the first and second round of coding, a third coding process followed in which all codes were copied to a blank sheet of paper, reviewed and then categorised into higher-level, inductive categories. These categories were reviewed by two other researchers.

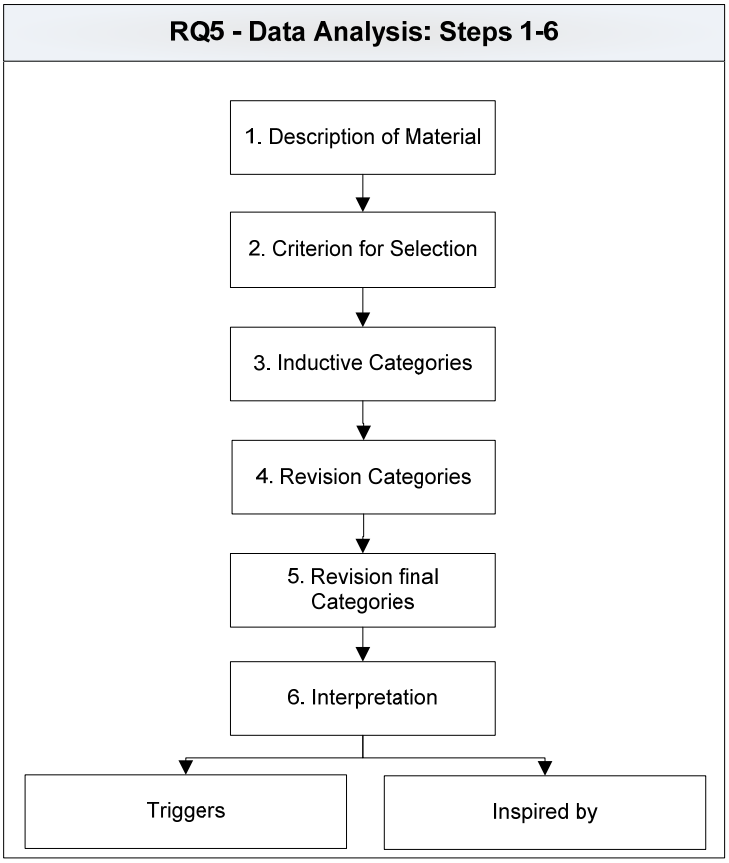


Figure 18 - Overview Qualitative Data Analysis Steps

Source: Adapted from Mayring (2003: 75)

During the discussion with the other reviewers it became apparent that different levels of analysis were mixed - for example, a student wrote that he was inspired by a guest speaker who had strong passion and enthusiasm. Initially, two codes were given - guest speaker - and passion/enthusiasm. After reviewing these codes we decided to split the component "inspired by" into two sub-components: 1) What context triggered the “inspired by” and 2) what actually inspired the student? The "inspired to" element is in this case clearer as the students were asked to describe trigger-events that motivated them to or not to intend to become entrepreneurs. In this system we can more specifically pinpoint which exact element of an entrepreneurship education programme was responsible for "inspired by". The new framework for analysis for the coding and categorisation of step 4 is shown in figure 19. The figure should be read as follows - The guest speaker XY (Trigger Event: Guest lecture) inspired the student through his enthusiasm (inspired by/inspiration) to intend to become an entrepreneur (inspired to):

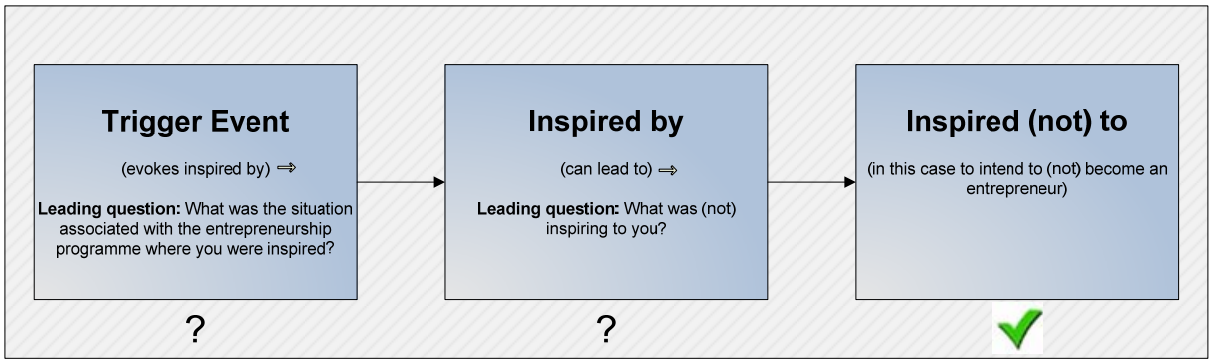


Figure 19 - Equation for Inspiration - Overview

In coding step four all original texts, paraphrasing one and two and initial codes were again reviewed and categorised into the two sub-sections: triggers + inspired by.

5. In coding step 5 all codes of triggers were again copied on to a blank sheet of paper, including the “inspired by” elements for each trigger and categorised into higher-level, inductive categories. Afterwards all trigger categories were reviewed by a group of researchers. In order to cater to the new analysis framework, the paraphrasing of the "inspired by" elements needed to be coded and categorised again. In this procedure, similarly to the coding process of the trigger, all "inspired by" elements were twice paraphrased. All paraphrasing was copied on to a blank sheet and assigned to higher level categories. The higher level categories were then re-defined and the set of criteria for inclusion was formulated. With the final criterion of inclusion, all "inspired by" categories were reviewed again and checked for whether the original text and paraphrasing still suited the final higher-level categories. A group of researchers finally reviewed all "inspired by" categories.

6. In the final step, the categories were re-coded into numbers and input in SPSS. The data was then analysed with SPSS.

4. Results

4.1 Hypotheses 1-2 - Impact of Entrepreneurship Education

Hypothesis 1: *An entrepreneurship education programme positively influences attitude toward behaviour (1a), subjective norms (1b), perceived behavioural control (1c) and entrepreneurial intention (1d)*

Table 9 - Difference in Differences Framework

Experimental Group vs. Control Group

Dependent Variables	Experimental Groups			Control Group			Diff. in Diff.
Means	(1) Tstart	(2) Tfinal	(3) Difference (2-1)	(4) Tstart	(5) Tfinal	(6) Difference (5-4)	(7) DD (3-6)
Attitude Toward Behaviour	5.62	5.59	-.03	4.91	4.77	-.14	0.111
Subjective Norms	5.89	5.79	-.11	5.61	5.63	.02	-0.127
Perceived Behavioural Control	3.61	4.81	1.20***	3.22	3.72	0.50***	0.694***
Entrepreneurial Intenion	4.98	5.09	.11	3.64	3.73	.08	0.027
N	119	119	119	153	153	153	272

*p≤0.05, **p≤0.01, ***p≤0.001

Between Experimental Groups

Dependent Variables	EEP CEE 2009			EEP CEE 2010			EEP Zertifikatskurs		
Means	(8) Tstart	(9) Tfinal	(10) Difference (9-8)	(11) Tstart	(12) Tfinal	(13) Difference (12-11)	(14) Tstart	(15) Tfinal	(16) Difference (15-14)
Attitude Toward Behaviour	5.78	5.80	.02	6.01	5.86	-.15	4.60	4.66	.06
Subjective Norms	5.99	5.92	-.08	6.06	5.90	-.15	5.39	5.30	-.08
Perceived Behavioural Control	3.77	5.18	1.42***	3.57	4.56	0.99***	3.34	4.42	1.08***
Entrepreneurial Intenion	5.32	5.47	.15	5.45	5.31	-.15	3.39	3.85	.47
N	53	53	53	42	42	42	24	24	24

*p≤0.05, **p≤0.01, ***p≤0.001

2-Level GLM Repeated Measures Multivariate Models with Repeated Contrasts
N=272

		ATB X			SN X			PBC X			EI X
F-value	ATB	Control Group	SN	Control Group	PBC	Control Group	EI	Control Group
Level 1 vs. Level 2	1.533	.642	.478	1.134	170.244***	28.485***	1.894	.036

*p≤0.05, **p≤0.01, ***p≤0.001
Note: Attitude toward Behaviour (ATB), Subjective Norms (SN), Perceived Behavioral Control (PBC), Entrepreneurial Intention (EI)

Table 9 represents the analysis of the impact of entrepreneurship education on the constructs of attitude toward behaviour, subjective norms, perceived behavioural control and entrepreneurial intention. Similarly to Osterbeek et al. (2010), the difference scores of Tfinal - Tstart were taken and compared first within the control and experimental groups (3,6). A difference-in-differences framework, (i.e. difference scores of experimental group minus difference scores of control group) was used to calculate the impact of entrepreneurship education between experimental and control group (7). There is no significant change for attitude toward behaviour, subjective norms and entrepreneurial intention. The only construct that changed significantly in all experimental groups and control group is perceived behavioural control (PBC, $p<0.001$). In direct comparison between experimental and control group, PBC changed significantly in the experimental group. In the analysis between the experimental groups (8-16), similar results are found; the only construct that changed significantly throughout all experimental groups is perceived behavioural control.

The impact of entrepreneurship education between control and experimental group was additionally calculated with a second test, a GLM repeated measures, similar to Souitaris et al. (2007). The GLM repeated measures model yields the same results as the difference-in-differences framework analysis. Taking these results into account, hypothesis 1c is supported, while hypotheses 1a,b,d are rejected.

4.1.1 Top 25 vs. Bottom 25

In order to understand more deeply the impact of entrepreneurship education on the different constructs, a further analysis was conducted. Only data from the experimental groups was taken with matched pairs in T_{start} and T_{final} (N=119). In a second step the bottom 25, in-betweens and top 25 participants were re-coded for T_{start} and T_{final} in order to evaluate how these specific groups developed.

Table 10 exhibits two aspects of the development; the top part (1 Counts) indicates how many participants changed from one category to another. The table should be read in the following way: From the bottom 25 in the construct ATB at T_{start}, 14 remained in the bottom 25 and 11 changed to the category of "in-betweens" at T_{final}. The relative figures for the changes in the categories are calculated as well. For the Bottom 25 in the construct ATB, 44%

Table 10 - Top 25 vs. Bottom 25

Crosstabulation Changes Top 25 Participants in each construct vs. Bottom 25 participants

		Tstart			Tstart			Tstart			Tstart		
(1) Counts		Bottom 25 ATB	Top 25 ATB	in-betweens	Bottom 25 SN	Top 25 SN	In-Betweens	Bottom 25 PBC	Top 25 PBC	In-Betweens	Bottom 25 EI	Top 25 EI	In-Betweens
T_FINAL	Bottom 25 ATB	14	1	10									
	Top 25 ATB	0	13	12									
	in-betweens	11	11	52									
T_FINAL	Bottom 25 SN				11	2	12						
	Top 25 SN				0	11	14						
	In-Betweens				14	12	48						
T_FINAL	Bottom 25 PBC							8	1	16			
	Top 25 PBC							2	10	12			
	In-Betweens							15	13	46			
T_FINAL	Bottom 25 EI										15	1	9
	Top 25 EI										0	13	9
	In-Betweens										10	11	52
From bottom to in between		44.00%			56.00%			60.00%			40.00%		
From bottom to top		0.00%			0.00%			8.00%			0.00%		
From top to in between			44.00%			48.00%			54.17%			44.00%	
From top to bottom			4.00%			8.00%			4.17%			4.00%	
From in between to bottom				13.51%			16.22%			21.62%			12.86%
From in between to top				16.22%			18.92%			16.22%			12.86%
Overall Changes of Top/Bottom		44.00%	44.00%	29.73%	**56.00%**	**56.00%**	35.14%	**68.00%**	58.33%	37.84%	40.00%	48.00%	25.71%

(2) MEANS	Bottom 25 ATB	Top 25 ATB	In-betweens	Bottom 25 SN	Top 25 SN	In-Betweens	Bottom 25 PBC	Top 25 PBC	In-Betweens	Bottom 25 EI	Top 25 EI	In-Betweens
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Tstart	4.13	6.78	5.78	4.59	6.96	5.94	2.24	5.28	3.61	2.81	6.69	5.15
Tfinal	4.46	6.28	5.77	5.13	6.10	5.87	4.45	5.57	4.72	3.73	6.27	5.13
Diff_Score (absolute)	.33	-.50	-.01	.54	-.86	-.07	2.21	.29	1.11	.91	-.42	-.02
Diff_Score (relative)	7.95%	-7.32%	-0.14%	11.76%	-12.36%	-1.19%	98.34%	5.52%	30.79%	32.46%	-6.28%	-0.39%

Only Experimental Group Tstart/Tfinal Matched, N=119

Note: Average development in Bottom 25: absolute: +0.99 / relative: +28.9%
Average development in Top 25: absolute -0.37 / relative: -5.8%

changed their category. The highest relative changes can be found in PBC, where 68% of the bottom 25 and 58.3% of the Top 25 changed. In SN 56% of the bottom 25 and top 25 changed their category.

The second important piece of information can be found at the bottom of the table 10 (2 Means). When looking at the bottom right side, the following information can be extracted: The mean value of the bottom 25 of entrepreneurial intention was at T_{start} 2.81 and at T_{final} 3.73. This represents an increase of 32.46%. The mean values of the top 25 of entrepreneurial intention was 6.69 at T_{start} and 6.27 at T_{final}, which represents a decrease of .42 or 6.28%. If comparing all values and increases/decreases of the constructs. then on average the bottom 25 increase their value from T_{start} to T_{final} by 28.9%, while the top 25 decrease their value by 5.8%

These results indicate that the impact is highest for those who start on a low level and second, that it is possible to change attitudes and entrepreneurial intention through entrepreneurship education.

4.1.2 Test of Theory of Planned Behaviour

Hypothesis 2: *The greater the attitude toward behaviour (2a), subjective norms (2b) and perceived behavioural control (2c) with regard to self-employment, the greater the entrepreneurial intention.*

Two hierarchical regression models were calculated in order to test hypotheses 2a-c. Model 1 utilises entrepreneurial intention in T_{start} as the dependent variable and model 2 entrepreneurial intention in T_{final}. In regression step 1 of the first model, the control variables, two dummy variables (group membership / gender) and age, are regressed on entrepreneurial intention (T_{start}) and in the second step attitude toward behaviour (T_{start}), subjective norms (T_{start}) and perceived behavioural control (T_{start}) on entrepreneurial intention (T_{start}). The model has an adjusted R^2 of .727 in step 2 and indicates that group membership (experimental group), attitude toward behaviour and perceived behavioural control significantly (all $p<0.001$) predict entrepreneurial intention.

Hierarchical Multiple Regression Models for testing the relationship of constructs on Entrepreneurial Intention (N=272)

Standardized Coefficients	Model 1 Entrepreneurial Intention (T_{start})		Model 2 Entrepreneurial Intention (T_{final})		
	Step 1	Step 2	Step 1	Step 2	Step 3
Step1:					
Group Membership	.356***	.178***	.362***	.236***	.095**
Age	.049	-.007	.010	-.053	-.030
Gender	.209***	.041	.250***	.127**	.052
Step 2:					
Attitude Toward Behaviour (Tstart)		.584***		.391***	0.141**
Subjective Norms (Tstart)		.037		-.019	-0.078*
Perceived Behavioral Control (Tstart)		.294***		0.309***	0.130**
Step 3:					
Attitude Toward Behaviour (Tfinal)					0.511***
Subjective Norms (Tfinal)					.047
Perceived Behavioral Control (Tfinal)					0.189***
Adjusted R^2	.191	.729	.213	.521	.731
Δ Adjusted R^2		.538		.308	.210

*p≤0.05, **p≤0.01, ***p≤0.001
Note: Dummy Variables:
Group Membership (0= Control, 1= Experimental Group)
Gender (0=female, 1=male)

Table 11 - Hierarchical Multiple Regression on TPB

In model 2, the dependent variable is entrepreneurial intention (T_{final}). Three hierarchical steps of multiple regression are undertaken, the first two are the same compared to model 1, in the third step the constructs of attitude toward behaviour (T_{final}), subjective norms (T_{final}) and perceived behavioural control (T_{final}) on entrepreneurial intention (T_{final}) are included. Besides the control variables in step 1, where group membership is still significant, the T_{start} values of attitudes were taken as additional controls in the hierarchical regression step 2. The model indicates that the values in T_{start} already had a significant (all $p<0.05$) predictive power in T_{start} on entrepreneurial intention in Tfinal. Step 3 paints a similar picture to model 1: Only attitude toward behaviour (T_{final}) (standardised coefficient .546; $p<0.001$) and perceived behavioural control (T_{final}) (standardised coefficient .182; $p<0.001$) significantly explain entrepreneurial intention (T_{final}).

The overall adjusted R^2 of the second model is slightly higher at .748. and is well placed in the range of predictive power of the theory of planned behaviour between R^2=0.43 - 0.94 (Ajzen, 1991: 189); the application to this dataset explains an adjusted R^2 of .727 in T_{start} and .748 in T_{final}.

The tests support hypotheses 2a and 2c and reject hypothesis 2b.

4.2 Hypothesis 3 - Effect of Duration

4.2.1 Impact of Duration on Constructs

Hypothesis 3: *The longer an entrepreneurship education programme, the stronger the increase in attitude toward behaviour (3a), subjective norms (3b), perceived behavioural control (3c) and entrepreneurial intention (3d). However, it does so only until the saturation point, from which point on, entrepreneurial intention and its antecedents again decrease (curvilinear relationship).*

Table 12 presents the results of the GLM multivariate analysis of the different durations of the entrepreneurship education programmes on the constructs of ATB, SN, PBC and EI. The overall model is not significant ($p<0.350$). The Posthoc analysis of the different durations indicates the same results; the duration of entrepreneurship education did not impact significantly on the tested constructs.
Hypotheses 3a-d are therefore not supported.

GLM Multivariate Analysis of Length (1,2,4 Semester) on ATB, SN, PBC, EI
N=119

Fixed Factor	Difference Score ATB	Difference Score SN	Difference Score PBC	Difference Score EI
F	.449	.092	1.996	2.497
Posthoc				
2 Sem X 1 Sem	-.206	-.071	-.091	-.611
4 Sem X 1 Sem	-.0357	.0079	.3379	-.3106
4 Sem X 2 Sem	.1703	.0793	.4292	.3000

Overall Model	Value	F	Hypo df	Sig.
Pillai's Trace	.076	1.121	8.000	.350

***p<0.05, **p<0.01, ***p<0.001. / Scheffe Posthoc Test (Mean Difference)**

Table 12 - GLM Multivariate on Length between Programmes

4.2.2 Development of Constructs over Time

The entrepreneurship education programme CEE 2009 was measured six times over a period of four academic semesters. These measurement intervals provide the opportunity to analyse the development of the key constructs of ATB, SN, PBC and EI over time. For this purpose a six-level (each level represents a measurement point)

GLM repeated measures multivariate model was calculated (Table 13). In order to identify which measurement pair was significant, a repeated contrast was chosen. This has the advantage that the model automatically compares consecutive pairs, for example, Level 1 with Level 2, Level 2 with Level 3. The overall model is only significant for PBC and indicates a strong significance ($p<0.001$) from Level 1 to Level 2 (time of measurement 1 to time of measurement 2).

6-Level GLM Repeated Measures Multivariate Models with Repeated Contrasts

	ATB	SN	PBC	EI
Pillai's Trace	.360	.147	16.597***	.520
Level 1 vs. Level 2	.580	.131	33.032***	.002
Level 2 vs. Level 3	.304	.316	1.468	2.169
Level 3 vs. Level 4	.059	.026	3.456	.664
Level 4 vs. Level 5	.285	.106	.010	.003
Level 5 vs. Level 6	.944	.008	.000	.084

F values, *p<0.05, **p<0.01, ***p<0.001.

Descriptive Statistics of each level and for each construct

Mean	ATB	SN	PBC	EI
Level 1	5.781	5.991	3.767	5.317
Level 2	5.646	5.810	4.561	5.359
Level 3	5.891	5.917	4.952	5.664
Level 4	5.783	5.786	5.124	5.600
Level 5	5.858	5.743	5.206	5.654
Level 6	5.804	5.915	5.183	5.472
Level 2 - Level 1	-0.135	-0.181	0.793	0.042
Level 3 - Level 2	0.245	0.107	0.392	0.305
Level 4 - Level 3	-0.109	-0.131	0.171	-0.064
Level 5 - Level 4	0.075	-0.042	0.082	0.054
Level 6 - Level 5	-0.054	0.172	-0.023	-0.182
N	22	22	22	20

Note 1: Levels equal Time of Measurement, e.g. Level 1 = T1 = T_{start}, Level 6 = T6 = T_{final}

Note 2: Only EEP CEE 2009 has been measured six times

Table 13 - GLM Repeated Measures on the development of constructs over time

The mean and difference scores per level of each construct are presented in the bottom part of table 13. These figures are used to build two descriptive graphs. First, the development of each construct over time (figure 20) and second, the difference score development per construct over the six measurements (figure 21). In figure 20, PBC represents half of a curvilinear development over time; all other constructs start on a high level and fluctuate on a high level. Figure 21 indicates a strong increase for PBC

in measurement 2 (T2), all other constructs increased strongest until T3 from where the intensity decreased.

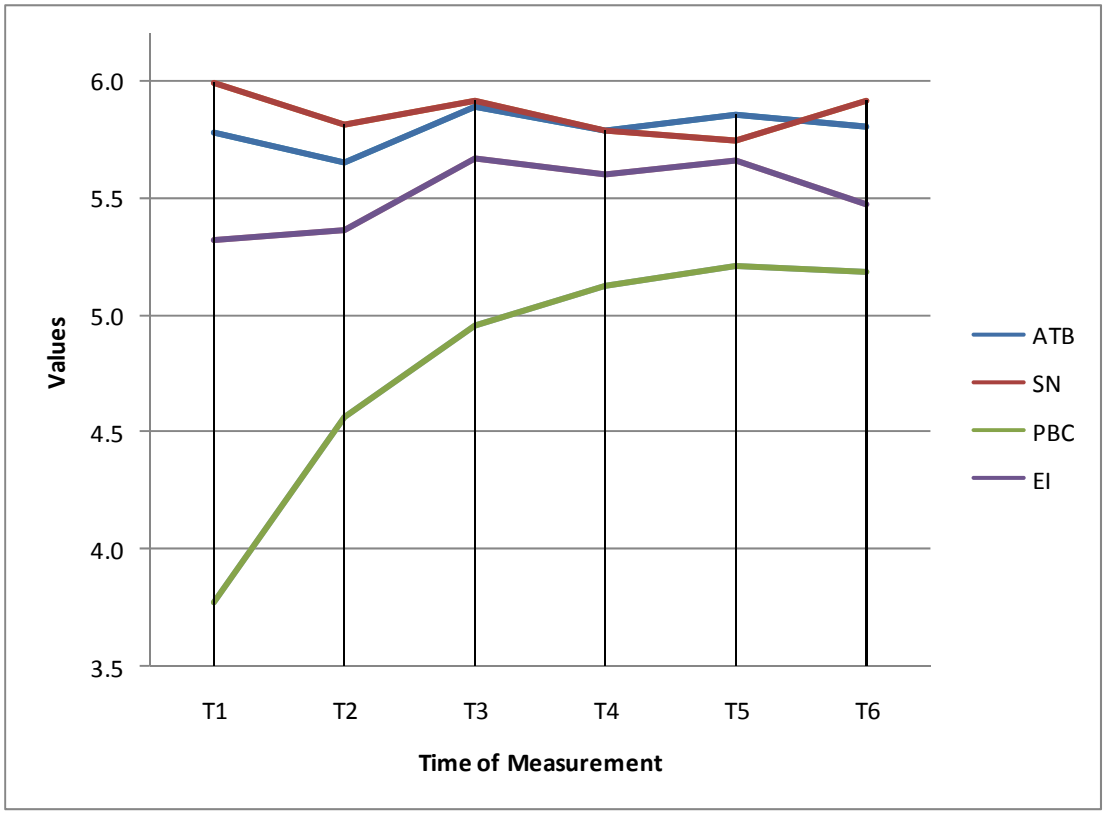


Figure 20 - Development of Means of Key Constructs over Time

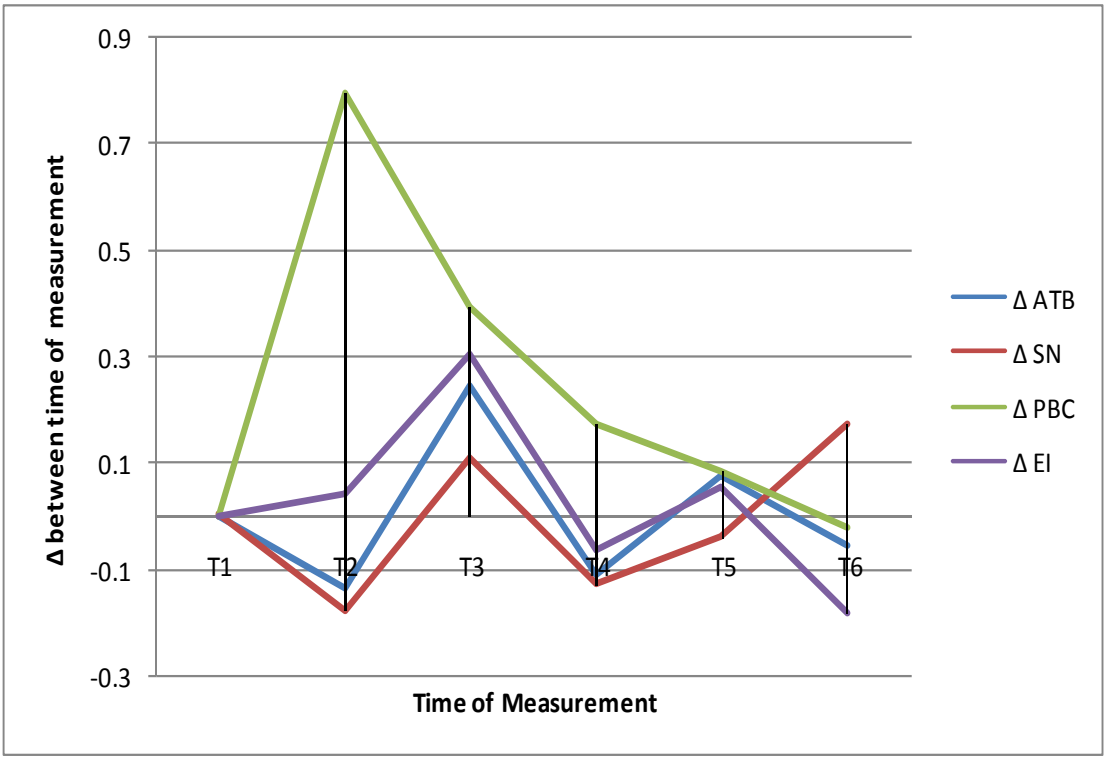


Figure 21 - Overview Delta (Tn+1 - Tn) per measurement (T) over time

4.3 Hypothesis 4 - Effect of time elapsed after end of EEP

Hypotheses 4: *The more time that elapses after the end of an entrepreneurship education programme, the weaker attitude toward behaviour (4a), subjective norms (4b), perceived behavioural control (4c) and entrepreneurial intention (4d) become.*

In order to test whether constructs lose their strength after the end of an entrepreneurship education programme, the participants were surveyed three and six months after the programme. Therefore, a 3-Level GLM repeated measure model with simple contrasts was calculated (Table 15). The simple contrasting provides the benefit of defining a reference category with which other measurement points are compared. In the first part of the model (1), T_{final} (end of the programme) is the reference and the repeated measures are tested against T_{final}. The model indicates no significant differences three months after the end of the programme. However, after six months SN, PBC, EI (all $p<0.05$) decreased their values significantly. ATB did not change significantly within the period of six months.

3-Level GLM Repeated Measures Multivariate Models with Simple Contrasts

F	ATB	SN	PBC	EI
(1) Reference T_{final}				
Pillai's Trace	.582	.184	3.678*	3.469*
3 Months after vs. Tfinal	.968	1.046	.734	1.964
6 Months after vs. Tfinal	.002	3.895*	7.575*	7.320*
(2) Reference T_{start}				
Pillai's Trace	.323	4.157*	33.063***	1.512
3 Months after vs. Tstart	.091	2.591	68.356***	.278
6 Months after vs. Tstart	.377	8.680**	10.640**	.645
Mean				
Tfinal (end of EEP)	4.88	5.30	4.64	4.29
3 months after end of EEP	4.88	5.05	4.47	3.99
6 months after end of EEP	4.73	4.94	4.25	3.98
Tstart (beginning of EEP)	4.87	5.40	3.57	3.39
3 months after - Tfinal	.00	-.25	-.17	-.31
6 months after - Tfinal	-.15	-.36	-.39	-.31
3 months after - Tstart	.01	-.34	.90	.60
6 months after - Tstart	-.14	-.46	.68	.59
N	19	20	20	24

***p≤0.05, **p≤0.01, ***p≤0.001**

Note: Only Zertifikatskurs EEP has been measured 3 and 6 months after the prorgamme

Table 14 - Stability of Constructs after the end of EEP

In the next step the same model (2) was calculated again with the reference set at as T_{start} (beginning of programme). This test shows whether values after an entrepreneurship education programme fall below the initial values. The test result indicates that SN fell significantly below the initial value. The mean values in the bottom part of the table indicate a difference score of T_{start} - $T_{final+6months}$ of -.46. PBC also fell significantly; however, it is - after six months - still well above the initial level (+.68).

The tests support hypotheses 4b-d and rejects 4a.

4.4 Hypothesis 5 - Impact of Entrepreneurial Intention on Self-Employment

Hypothesis 5: *The higher the entrepreneurial intention, the higher the probability of becoming self-employed.*

Hypothesis 5 tests whether entrepreneurial intentions at T_{start} already predict the status of being self-employed at T_{final}. For this purpose a binary logistic regression was conducted on the predictive power of entrepreneurial intention and the attitudinal constructs on the dichotomous variable self-employed (Yes/No). Two models were calculated (table 15): Model 1 includes all respondents who were self-employed in T_{final} and model 2 controls for respondents who were already employed in T_{start}.

Binary Logistic Regression Models of T_{start} predictors on Self-Employed (Yes/No) at T_{final} (N=272)

	Self-Employed T_{final} Model 1			Self-Employed$_{Control}$ Model 2		
	(B)	**Wald**	**Odd ratio**	**(B)**	**Wald**	**Odd ratio**
Entrepreneurial Intention (T_{start})	1.938	17.421***	6.947	1.108	8.292**	3.028
Cox and Snell R^2	.147			.052		
Nagelkerke R^2	.409			.208		
Overall Accuracy	94.1			96.7		
Omnibus Test Model Coefficients	43.493***			14.644***		
Events per Predictor	16			9		

*p≤0.05, **p≤0.01, ***p≤0.001

Table 15 - Entrepreneurial Intention on Status Self-Employed

Both models strongly support entrepreneurial intention as increasing probability of becoming an entrepreneur. An increase in 1 in the EI scale would reflect a 6.95x higher probability of becoming an entrepreneur in model 1 and 3.02x higher chance in model 2. Both models are significant ($p<0.001$) and represent a Nagelkerke of .409 in model 1 and .208 in model 2. In both models only one predictor was included in order to follow the sample size rule of thumb of 10 events per predictor (Peduzzi, Concato, Kemper, Holford, & Feinstein, 1996). In a separate test (Appendix 7). The sample size recommendations were neglected in order to test the impact of the attitudinal

constructs and entrepreneurial intention on self-employed in Tfinal in a hierarchical binary logistic regression model. This model exhibits the same results: Only entrepreneurial intention was significant. Hypothesis 5 is supported.

4.5 Hypothesis 6 - Impact of Participation in EEP on Self-Employment

Hypothesis 6: *Participation in an entrepreneurship education programme increases the probability of becoming self-employed*

Hypothesis 6 tests whether entrepreneurship education increased the probability of becoming self-employed. In order to test the impact of entrepreneurship education, the difference scores of entrepreneurial intention were utilised as the predictor variable. Similarly to hypothesis 5, two binary logistic regression models were calculated (Table 16):

Binary Logistic Regression Models of Difference Scores on Self-Employed (Yes/No) at T_{final} (N=119)

	Self-Employed T_{final} Model 1			Self-Employed$_{Control}$ Model 2		
	(B)	**Wald**	**Odd ratio**	**(B)**	**Wald**	**Odd ratio**
DS Entrepreneurial Intention	.435	2.804	1.545	.735	4.864*	2.085
Cox and Snell R^2	.024			.040		
Nagelkerke R^2	.045			.103		
Overall Accuracy	87.4			93.3		
Omnibus Test Model Coefficients	2.872			4.881*		
Events per Predictor	15			8		

***p≤0.05, **p≤0.01, ***p≤0.001; DS = Difference Scores**

Table 16 - Participation in EEP on Status Self-Employed

The first model regresses the difference scores of entrepreneurial intention on respondents in the experimental group who were self-employed in T_{final}, while the second model controls for those who were already entrepreneurs in T_{start}, hence, only including those who were self-employed in T_{final} and not in T_{start}. While the difference scores in entrepreneurial intention in model 1 are insignificant, they change in model 2 to significant. This confirms that the difference scores of entrepreneurial intention, hence the influence of participating in the entrepreneurship programme, impacted on the status of becoming self-employed.

When examining a 2x2 nominal table of experimental vs. control group and self-employed vs. not self-employed in T_{start} and T_{final}, the chi-square tests indicate a highly significant association between the experimental group and the status of self-employed only in T_{final} (chi-square 1df=17.39, $p<0.001$). This is an additional support for Hypothesis 6.

4.6 Discussion of Results: Hypotheses 1-6

First, an overall summary of the results from the previous chapters is provided, which is followed by a discussion of the results:

4.6.1 Summary of Overall Results

The testing of hypotheses 1-6 provided following results: Entrepreneurship education only impacted perceived behavioural control, which increased significantly and more strongly than in the control group. Attitude toward behaviour, subjective norms and entrepreneurial intention did not change significantly. From the analysis and comparison of the Top 25 vs. in-between and Bottom 25 participants in each construct (ATB, SN, PBC, EI), it becomes apparent that those participants who started with high values in the respective constructs saw the strength of their average values decrease, while those who initially had low values saw their construct values increase strongly. Hence, the impact of entrepreneurship education was strongest on those who had low values at T_{start}. 40% (EI) to 68% (PBC) of Top 25 and Bottom 25 participants changed their categories, which indicates that attitudes and entrepreneurial intention are open to change.

The length of entrepreneurship education proved not to have a positive or significant impact on attitudes and entrepreneurial intention. The two-semester programme did not have a more significant impact than the one-semester programme, and the four-semester programme did not have a greater impact than the one- or two-semester programmes. The analysis of the development of the attitudes and entrepreneurial intention over time within the four-semester programme indicated that the impact of entrepreneurship education was strongest at the beginning of the programme, especially with regard to perceived behavioural control, the intensity of impact decreased with the length of the programme and became at T_{final} even slightly negative (absolute changes): T2 +0.79, T3 +.39, T4 +.17, T5 +.08, T6 -.02

After the end of an entrepreneurship education programme, SN, PBC and EI decrease significantly but only after three months. SN even falls below its T_{start} values.

The theory of planned behaviour is applicable to this dataset. The attitudinal constructs explain 72.7-74.8% of entrepreneurial intentions (adjusted R2 .727 EI T_{start} to .748 EI T_{final}). The only exception is SN, which does not significantly predict entrepreneurial intention.

Entrepreneurial intention significantly increases the probability of becoming self-employed when comparing the status of being self-employed in T_{final} with the T_{start} values of entrepreneurial intention. The impact of entrepreneurship education measured as change in entrepreneurial intention significantly explains the status of being self-employed in the experimental group. A final, complementary chi-square test indicates a significant association between those respondents who were in the experimental group and those who were self-employed at T_{final}.

4.6.2 Discussion - Impact of Entrepreneurship Education

In the past, entrepreneurship education impact studies have univocally reported a positive impact of entrepreneurship education. Out of the 41 impact studies in the literature review only two recent studies reported a negative impact of entrepreneurship education (see chapter 2.2.). Methodological deficiencies were identified in the overly positive studies, and when filtering the 41 studies by only studies that used an ex-ante/ex-post, control group study design with n>100, there were only four studies left. One study reported negative results (Oosterbeek et al., 2010), two mixed (Olomi et al., 2009; Souitaris et al., 2007) and only one reported positive results (Peterman et al., 2003). The ratio between positive vs. negative/mixed studies was turned upside down to only 1:3. This dissertation study points in the same direction: The entrepreneurship education programmes tested had insignificant impact on entrepreneurial intention. Only perceived behavioural control was impacted significantly in all experimental groups and more strongly than in the control group.

Why did entrepreneurship education have an insignificant impact on entrepreneurial intention? The literature review in chapter 2.2 provided some potential reasons for negative or insignificant results. From a methods perspective, an ex-ante/ex-post, control group, with a comparatively large sample and longitudinal research design was utilized. Therefore, the limitations identified in previous impact studies in methods may be excluded. The entrepreneurship programmes themselves were described in detail and compared on the basis of the guidelines provided by Souitaris et al. (2007). Evaluations indicate a good grading of the programmes by their participants (see Appendix 1). Cultural considerations (Lee et al., 2005) may be ruled out as all programmes have been offered in culturally similar countries (GEM, 2011). It is possible that the effects are only long-term and the 18 months of data acquisition were

not long enough to capture these potential long-term effects (Galloway et al., 2002). The most likely reason, however, lies in the selection of the participants. While von Graevenitz et al. (2010) and Oosterbeek et al. (2010) both analysed compulsory programmes, the entrepreneurship education programmes in this dissertation study were voluntary and hence, only students who were already interested in entrepreneurship participated in the programmes. Souitiaris et al. (2007) found an insignificant impact on entrepreneurial intention and perceived behavioural. They speculate the reason as being that the sample consisted of elite students with already high perceived behavioural control at T_{start} (mean=4.18/7). This argumentation may be applicable for attitudes toward behaviour, subjective norms and entrepreneurial intentions in this dissertation study. As ATB started at a relatively high level of T_{start}=5.65, SN T_{start}=5.87 and EI T_{start}=4.98, there was not much room left for improvement from this high level. This argument is supported by the additional analysis of the T_{start} vs. T_{final} top 25 - bottom 25 participants. Across all of the constructs tested, those that started at a relatively low (bottom 25) level all increased on average 28.9%. Those that started at a high level (top 25) decreased on average in value by -5.8%. Moreover, the analysis of the theory of planned behaviour in this dataset showed that attitude toward behaviour (ATB) was the strongest predictor of entrepreneurial intention. As ATB was already high at T_{start} and had less room to positively change, there was also less room to change for entrepreneurial intention.

If we employ this perspective, the test results become more intuitively understandable. When offering a voluntary programme and selecting the most motivated participants, then the result should be a pool of people who already have, at selection, a strong desire and positive attitude toward behaviour and a high intention of becoming an entrepreneur, and, in this dataset, also high subjective norms. The only thing missing is perceived behavioural control, which they aim to acquire by participating in the entrepreneurship education programme. New methods, structures for finding business ideas, ways to implement these business ideas and, for example, gaining insights into administrative procedures for filing for a new business venture work, therefore increased the perceived behavioural capability of participants in the entrepreneurship education programmes.

The logical consequence would be that, if a programme already has very strong candidates in almost all constructs, the aim of such a highly selected programme should no longer be a sorting, but rather real entrepreneurial activity. Employing

Linan's (2004) terminology, the objective of the entrepreneurship education programme for this group would change from "Entrepreneurial Awareness Education" to "Education for Start-Up" (Linan, 2004: 10). Depending on the outcome variable, the programmes may be classified as significantly positive or insignificant. If looking from the perspective of entrepreneurial intention, then on average entrepreneurial intention did not change significantly. If judging real entrepreneurial activity, the programmes may be classified as a success. There was a significant relationship between those who attended entrepreneurship education courses and those who eventually became self-employed, and there was a significant increase in perceived behavioural control for those in the experimental groups. This should be evaluated as evidence of the benefits and therefore supporting the existence of entrepreneurship education.

4.6.3 Discussion - Length & Duration Aspects of Entrepreneurship Education

Oosterbeek et al. (2010) highlighted the duration of entrepreneurship education as being a new and promising avenue of research. The results of this dissertation study indicate that there is no significant relationship between length and increasing strength of impact between the measured entrepreneurship programmes. The only exception is perceived behavioural control, which increased significantly from T1 to T2, when compared within the sample of the Zertifikatskurs Entrepreneurship - CEE 2009 programme. Second, the development of constructs over time indicates that those whose values start at a high level experience minimal fluctuation in their values at that level, and those who start at a low level experience an strong increase in their values, especially at the beginning of the programme. PBC saw the strongest increase at the beginning; the intensity of impact, however, decreases with the length of the programme until the saturation point, at which time it begins to become negative. That means that the biggest impact of entrepreneurship education on its constructs can be achieved during a relatively short period. While this relationship was primarily true in this dataset for perceived behavioural control, the question remains whether it would have been true if the other constructs had also started at a low level. The tests in hypothesis 1 have shown that it is possible to positively change attitudes, subjective norms, and entrepreneurial intentions if they start at a relatively low level.

For the findings on impact of duration of entrepreneurship education on entrepreneurial intention and its antecedents, the same explanations may be valid as detailed in the previous section. There is only a limited potential to "upgrade" attitudinal constructs. Hence, if they start low, the impact is highest at the beginning of the programme and loses intensity because there is less room for further upgrading. Consequently, with regard to the duration of entrepreneurship education programmes, the following relationship should be appropriate: The lower the starting values, the longer an entrepreneurship programme can positively impact on those low values and upgrade them until a certain (higher) level.

The decrease in values in attitudinal constructs after the end of an entrepreneurship education programme was expected. The more the time that elapses, the more the social network of entrepreneurial-minded students breaks up, the more the learning of the programme will be forgotten and hence the weaker the attitudinal constructs become. A significant decrease, however, happens only after three months after the end of an entrepreneurship programme. This time indication provides practical guidance to educators regarding when to follow-up with further entrepreneurship education or support programmes. All of the constructs significantly decreased their values six months after the end of the entrepreneurship programme, with the exception of attitude toward behaviour. This indicates that attitude toward behaviour is a much more robust attitudinal construct that is more difficult to change than the others. The analysis of the Top 25 vs. Bottom 25 indicated a similar result: attitude toward behaviour was the category where the fewest changes occurred. While perceived behavioural control may be changed by learning new methods, knowledge and subjective norms by the social network, it seems that participants have a fairly stable desire to or not to become entrepreneurs.

This has implications for entrepreneurial intentions as attitude toward behaviour proved to be the strongest predictor of entrepreneurial intention. Applied to entrepreneurship education programmes, this could mean that, for voluntary programmes, only those with positive (high values) in ATB enrol into the programmes - and hence the room to change for either ATB and EI is very limited. Consequently, this would mean that voluntary admission entrepreneurship programmes are doomed to have insignificant impact on entrepreneurial intention. If that is the case, the dependent variable for voluntary entrepreneurship programmes should not be entrepreneurial intention but more application-related variables such as nascency-

indicators or direct measures of self-employment. For compulsory programmes with a mix of participants interested or disinterested in entrepreneurship, the argumentation of von Graevenitz et al. (2010) is supported: The aim of a compulsory programme is primarily a sorting effect and potential negative or insignificant impact on entrepreneurial intention may be socially desirable because those who are not interested in entrepreneurship may come to just that conclusion and those who are interested may be strengthened in their decision to become entrepreneurs.

4.7 Exploration of Triggers-Events

Research Question (4)

What trigger-events happen during an entrepreneurship programme that have an impact on the intention to become or not become an entrepreneur?

4.7.1 Background

Souitaris et al. (2007) found entrepreneurial trigger-events within an entrepreneurship education programme to have the strongest impact on entrepreneurial intentions. The literature review (see chapter 2.4.4.) provided a framework to analyse events that trigger inspirational moments that may lead to a specific action (see figure 22). The aim of this chapter is to analyse the reflections of the participants of the Zertifikatskurs Entrepreneurship - CEE 2009 and CEE 2010 entrepreneurship programmes with regard to two aspects: First, the elements are isolated "what were participants inspired by" ("Inspired by") and in the subsequent chapters the situations are analysed in which such inspiration were triggered. For the purpose of clarity, the "inspired by" box is termed with inspiration.

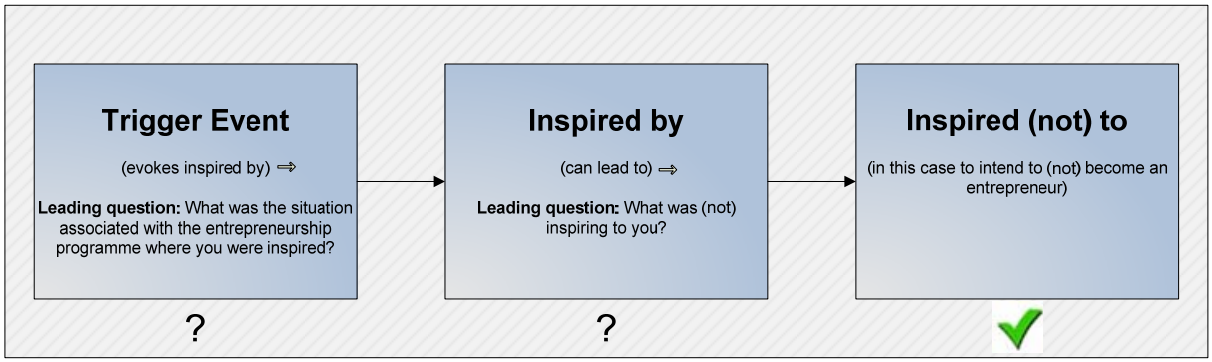


Figure 22 - Equation for Inspiration - Background

4.7.2 What inspired participants?

The "inspired by" should be read in the following way - within the context of the trigger - what really inspired you? For example, if the trigger is a guest speaker, the "inspired by" element might be a personality characteristic such as enthusiasm or passion. From this point on, "inspired by" will be termed with inspiration. Six categories of inspiration emerged during the coding and categorisation process. Table 17 provides an overview of them. The majority of types of inspiration can be attributed

to the categories of "Personal Discovery" and "Fact-Finding". In the following, all six categories are presented:

Overview of "Inspired by" Elements

	Frequency	Percent	Valid Percent	Cumulative Percent
Personal Discovery	34	27.4	27.4	27.4
Fact-Finding	33	26.6	26.6	54.0
Characteristics of Others	21	16.9	16.9	71.0
Social Encounter	19	15.3	15.3	86.3
Work Process	12	9.7	9.7	96.0
Not Mentioned	5	4.0	4.0	100.0
Total	124	100	100	

Table 17 - Overview of "Inspired By" Elements

Personal Discovery

Discovery is, by a small margin, one of the most frequently (27.4%) reflected-on types of inspiration. During the analysis process it emerged that "discovery" entails a mental process in which the person finds a subjective, very personal truth. It may be a new way of thinking, a broadening of horizons but is always related to the person - it is intrinsic to the individual. The "discovery" changes the individual's previous way of thinking about something. For example, the line of thought "this idea will not work out" changes to "I realized the potential of the idea" and may unleash a great deal of new energy:

19. "After the *idea jam* I went on holidays with a friend on a roadtrip in America. During this roadtrip and the hours on the road we *were thinking about ideas all the time, discussed and had a lot of good ideas*. *I realized that I have a lot of good ideas* and it is *really unique to have an idea together with your friend. Like having a "baby"*" (Respondent JZOK).

This reflection is a good example in many ways. It indicates the trigger, the business idea jam, and also contains three moments of inspiration that result from the trigger business idea jam. First, it indicates that after participation in the business idea jam, a "work process" was initiated: "During this roadtrip and hours on the road we were thinking about ideas all the time, discussed them and had a lot of good ideas". Second, it indicates a "social encounter" - "… it is really unique to have an idea together with

your friend. Like having a "baby"." Finally, the personal truth is discovered, a kind of "aha-moment". The respondent realises that he/she [actually] has a lot of good ideas. The following reflections provide further examples of the discovery of a personal truth (marked in *italic*):

55. "The integrative seminar with "Company 1" (descriptions of the coded companies, lecturers, etc. can be found in appendix 8) gave me the opportunity to experience ... the highly interesting range of activities in an entrepreneur's daily business. This incident motivated me to become an entrepreneur because *it made me realise that only as an entrepreneur will I be able to take advantage of all my talents and in that way reach a stage of satisfaction that couldn't be reached in any other job*." (Respondent JWGJ).

66. "Am eindrücklichsten war für mich das erste Tool im September 2009 Start Up Basics mit "Lecturer 1". Als wir das Start-Up "Company 2" besprochen haben, wurde ich ganz kribelig. Ich bekam beinahe Schmetterlinge im Bauch, weil mich der Gedanke, selbst einmal in dieser Situation zu sein, völlig faszinierte. Diese drei Jungs haben geschafft, wovon wir Jung-Entrepreneure träumen - eine eigene Firma zu gründen und erfolgreich zu etablieren. Ich war beeindruckt, wie sie die Idee umgesetzt haben und konsequent daran gearbeitet haben. Nach dieser Session dachte ich mir wirklich, es wäre total super in genau derselben Situation zu sein. Sein eigenes Ding zu drehen, mit den Leuten, die einem sympathisch sind, und das ganze noch äusserst erfolgreich - *so stellte ich mir mein zukünftiges Leben als Entrepreneur vor*." (Respondent MAKV)

95. "Dieser Vortrag hat mich abgeschreckt Unternehmer zu werden: Denn er hat mir vermittelt, dass *ich dieses Durchhaltevermögen und diesen Fokus ausschließlich auf das Startup nicht aufbringen kann*." (Respondent JSVH)

In reflection 55 the trigger was an integrative seminar with "Company 1" and the inspiration, the discovery of the personal truth that only by becoming an entrepreneur would the respondent be able to realise his full potential and feel truly satisfied. Reflection 66 shows how the respondent, inspired by a case study, realised how his/her life should be. Finally, reflection 95 represents an example of a negative trigger, a guest lecture, and the respondent's subsequent discovery that he/she was not able / or willing to invest the stamina and focus needed for starting-up a business.

Fact-Finding

"Fact-finding" is similar to "discovery" in that it entails finding out something potentially previously unknown, a new fact or insight. The key difference to "discovery" is that it is not personal; rather, it is a generally accepted truth, exogenous to the person and often related to things or a business insight:

4." it was *fascinating to see the simplicity of [this] business idea [and] how this business developed*." (Respondent JBEA)

37. "War *sehr interessant zu sehen, wie man Ideen entwickelt und auf ihre Machbarkeit testet*! Dieser Kurs hat mich dazu bewogen, das gleiche mal selbst durchzuführen mit meinen Kollegen!" (Respondent AWSS)

11."when I heard about projects such as "Company 3" oder Company 1" etc. where you mostly act with modules. *it doens't require much money to get it started and for us students it's a good way to start a business while not having loads of money.*" (Respondent JAEB)

83. "Die Vorträge *haben gezeigt, dass Unternehmertum sehr viel Unsicherheit hervorruft*. Das ganze Umfeld eines Unternehmers wird somit involviert." (Respondent JBSL)

All four reflections provide an example of how respondents found a new inspiring insight, fact and not a personal truth compared to the category of "discovery".

Social Encounter

A social encounter inspired participants on either the group or individual level. Group encounters include all those inspirational elements such as experiencing the atmosphere surrounding entrepreneurship-minded people, groups or some form of group-pressure. Most moments of inspiration in the category of group encounters are triggered by fellow classmates - for example, respondents were inspired by the progress of others:

7. "Ich glaube wir haben uns auch sehr stark selber motiviert. *Jeder hat von seinen super Ideen und seinen Plänen erzählt, dass war sehr anregend…*" (Respondent JBHW)

30. "the *progress of other participates* in the program was motivating.." (Respondent SZHA)

97. "Der *Moment indem ein Grossteil der anderen Kursteilnehmer den Kurs abbrach...*[der] intrinsische Anspruch des Kurses war kurzfristig nicht mehr spürbar. (Respondent JWPV)

Individual encounters are, for example, a bonding of two persons. While group encounters are more general, individual encounters can often be pinpointed to a specific person. Furthermore, while group encounters are exogenous and have the potential to impact passively, individual encounters always entail the active involvement of the person:

16. "An evening in Zurich shortly before Christmas time at the hotel Widder in Zurich. 'Guest Speaker 1' (Founder of "Company 4") held a speech about his motivation to become an entrepreneur and to stay in that kind of business. There were supposed to be about 60 people. *We ended up being only 4, which was very inspiring. He was really close to us* and was able to answer out questions. He was able to show us the challenges of being an entrepreneur. And other than that he was able to hint again to the fact of the "freedom" you are able to gain when you are self employed. *After the speech we sat a while at the wine bar and then I accompanied him to his hotel nearby*. It was really interesting, because he was walking through Zurich with in a total different way, than I usually am." (Respondent JIBH)

Characteristics of Others

The category of "characteristics of others" comprises elements where respondents were "inspired by" the characteristics of others, such as enthusiasm, passion, success of their business, etc. This category probably approaches what is known as a role model or ideal-self (Radu et al., 2008), being inspired by something one admires in another person:

1. "Skypeinterview mit einem Unternehmer, der hochpreisigen und gleichzeitig nachhaltig angebauten und fair gehandelten Kaffee vertreibt. *Seine persönliche Begeisterung und sein Optimismus hat mich angesteckt auch meine eigenen Ideen zu verwirklichen…*" (Respondent JAKI)

56. "The strongest positive event was the briefing meeting, when "Guest Speaker 2" *spread his passion about his product and his very own company*." (Respondent JWGJ)

58. "Insbesondere *die unternehmerische Leidenschaft* von "Lecturer 2" zeigte die Passion, die hinter dem Wort Unternehmertum stecken kann und spornte zusätzlich an." (Respondent JWPV)

Work-processes

This category concerns all reflections where respondents were inspired by work-related activities, for example, a work assignment. Work processes can be pinpointed to a specific task or working theme. The following two positive (2, 47) and one negative (81) reflections provide examples of "inspired by" elements:

2. "...What *started merely as one more additional business exercise* (like in any other business class at the university) has emerged into a real start-up. The *whole transformation from exercise to reality* has enhanced my chances to become an entrepreneur. Due to the "*sunk cost" principle (the fact that we already had worked very much for our project) helped to continue our idea and to implement it*, make it fit for the real market..." (Respondent JBAH)

47. "It was very interactive, [it] *gave us the opportunity to raise and intensively work on our ideas*." (Respondent JKBJ)

81. "It's feelings I had *during the time me and my colleague had already done very much work and success was not visible soon*. This so-called "entrepreneurial rollercoaster" is inevitable during the startup process. Again, the principle to avoid "sunk costs" made me help to continue. I don't regret it yet!" (Respondent JBAH)

Not Mentioned

This category was utilised when it was not possible to identify an "inspired by" element:

77. "The business Idea Jam" (Respondent SZOC) or

31. "the speakers, i.e., entrepreneurs were amazing ! ! !" (Respondent NSFA). While the trigger was mentioned, it was not possible to identify the "inspired by" element or what the trigger evoked.

4.7.3 How was this inspiration triggered?

After learning what inspired the participants, the next question is: In what context was a specific inspiration triggered? This section provides an overview of the triggers including their definitions. During the review and coding process three different kinds of trigger-events emerged. Table 18 shows the frequencies of the particular triggers. In the following sub-chapters the three different trigger contexts are elaborated on in detail through a comparison of positive versus negative examples of triggers.

Overview of what context triggered "inspired by"

	Frequency	Percent	Valid Percent	Cumulative Percent
Context of Programme / Course	49	39.5	39.5	39.5
Context of Person	48	38.7	38.7	78.2
Context of Work/Assignment	13	10.5	10.5	88.7
Not Related to EEP/Not Mentioned	14	11.3	11.3	100.0
Total	124	100	100	

Table 18 - Overview of Trigger Events

The majority of moments of inspiration, with a margin of one count, were triggered within the context of the overall programme or the courses of the programme, followed by persons and work assignments. In the following, the categories are defined:

A. Context of Programme / Course

This category encompasses all "inspired by" elements that happened in or were evoked by a specific course or the overall entrepreneurship education programme. Many students wrote about the entire time during the entrepreneurship education or a course, without mentioning the specific name of the course.

B. Context of Person

This category includes triggers that are induced by human beings / persons. Persons in this context include guest speakers, entrepreneurs, peers, lecturers.

C. Context of Work Process / Assignment

This category includes those triggers that are related to a work process, assignment, activity.

D. Not Related to EEP / Not Mentioned

This category captures those reflections that had an "inspired by" element but no indication of any trigger and triggers that had a connection to the programme (e.g. sleepiness night).

At this point of analysis, the types of inspiration and the triggers that caused such inspiration were identified. The inspiration equation (see figure 23) visualises the complete equation and all elements identified during the research process:

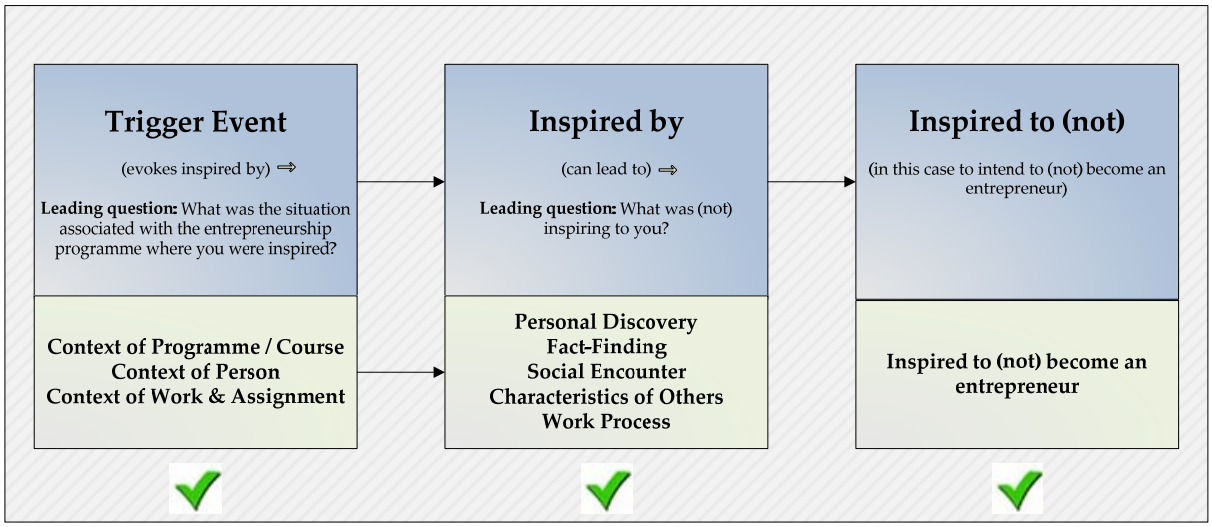


Figure 23 - Equation for Inspiration - Triggers and Inspirations Completed

While we know the trigger-events and moments of inspiration, the next step is to elaborate in detail on what triggers impacted positively versus negatively on the intent to become an entrepreneur. For this purpose a crosstabulation (table 19) is emulated with triggers vs. negative / positive inspiration. This table will be the basis for the analysis of the positive versus negative inspiration per trigger in the next chapter.

Overview of Positive and Negative Triggers

			Trigger				
			Context of Programme / Course	Context of Person	Context of Work/Assignment	Not Related to EEP/Not Mentioned	Total
Positive	Inspired By	Personal Discovery	12	4	5	1	22
		Fact-Finding	10	9	2	2	23
		Social Encounter	3	9	0	2	14
		Characteristics of Others	0	17	0	2	19
		Work Process	3	0	2	1	6
		Not Mentioned	3	2	0	0	5
	Total		31	41	9	8	89
		% of Total Positive	34.8%	46.1%	10.1%	9.0%	100.0%
		% of particular Trigger	63.3%	85.4%	69.2%	57.1%	71.8%
Negative	Inspired By	Personal Discovery	6	3	0	3	12
		Fact-Finding	7	1	1	1	10
		Social Encounter	3	1	0	1	5
		Characteristics of Others	0	2	0	0	2
		Work Process	2	0	3	1	6
	Total		18	7	4	6	35
		% of Total Negative	51.4%	20.0%	11.4%	17.1%	100.0%
		% of particular Trigger	36.7%	14.6%	30.8%	42.9%	28.2%

Table 19 - Crosstabulation of Positive vs. Negative Triggers

4.7.4 Positive vs. Negative Triggers

This section will analyse positive and negative triggers according to the aforementioned categories A) context of programme / course B) context of person C) context of work process / assignment.

A. Positive Triggers in the context of programme / courses

The analysis yielded 31 incidents of inspiration that were triggered by the context of programme / courses. The majority of positive triggers in this context are attributed to the course Business Idea Jam, which was the source of 10 triggers. The course "Business Idea Jam" seeks to model and provide a true-to-life experience of the entire process, from generating initial ideas to completing a concept of the idea and pitching the concept in front of a jury within two days (CEE, 2010). Since the number of triggers attributed to Business Idea Jam was relatively high, a recall bias, hence, recalling only the most recent experiences, had to be excluded. For this purpose the curriculum of the entrepreneurship education programme was reviewed with regard to when Business Idea Jam had taken place. In both cases, the CEE 2009 and CEE 2010, the course took place in the first semester of the programme. Therefore, recall bias may be ruled out.

Business Idea Jam triggered a mix of incidents of inspiration in the categories of personal discoveries (3x), fact finding (1x), social encounter (3x), work processes (2x)

and not mentioned (1x). The description of the triggers indicates three major impact areas for this particular trigger: *First*, it eliminated the fear participants initially had of finding an idea by learning particular methods and a structured process of emulating business ideas:

43. "Der eindrücklichste Event war für mich der Business Idea Jam. Dort wurde uns bewusst gemacht, dass *man Geschäftsidee mehr oder weniger strukturiert hervorrufen kann und diese nicht dem Zufall überlassen muss*" (FBHE)

Second, the mastery experience of the hands-on process of working with one's own ideas increased participants' self-confidence:

33. "… die zweite Idee kam mir beim Business Idea Jam (erstes CEE-Semester). Die Motivation, dies dann zu gründen, *kam aus der Überzeugung, dass die Idee gut ist, im finanziellen Sinne*." (ALBM)

19. "…I realized that I have a lot of good ideas…" (JZOK)

Third, it generated a group experience; the group was passionate about creating business ideas and group pressure was created by observing how far peers progressed with their ideas:

50. "Business Idea Jam: Never ever experienced *the passion of creating an enterprise* ever like that" (JRVV)

57. "Business Idea Jam *Zusammenkommen mit Gleichgesinnten* und sich über die unmöglichsten Geschäftsideen austauschen regte die unternehmerische Kreativität grundlegend an" (JWPV)

In summary, the Business Idea Jam was a source of entrepreneurial trigger-events. The characteristics of the course that made it such a fertile source were 1) relieving participants of a fear they had, 2) mastery experience and strengthening their self-confidence by providing methods / structure, and 3) creating social encounters.

Negative triggers in the context of programme / courses

While it is possible to pinpoint positive inspiration to a specific trigger, it is difficult with negative inspiration. From 18 incidents of negative inspiration in the context of programme / courses, 7 are related to fact finding, 6 to personal discoveries, 3 to social encounters and 2 to work processes. There are two major reasons that de-motivated participants from becoming entrepreneurs: *First*, the realisation that becoming an entrepreneur is a challenge too big at the given point of time in life. Therefore, a safe

option such as becoming a contracted employee is chosen. Participants hence realise and appreciate more fully the risks of entrepreneurship, e.g., legal and financial risks, potentially high amounts of money for starting up a business, (80). *Second*, de-motivating factors arose from the overall design of the course or dissatisfaction with the content (89/105):

80. "de-motivating was that for a lot of ideas you have high fix costs plus you need a big amount of money to get the 'machine' started while having a big risk at the same time it might not work out. so after all I'm on one hand i'm motivated to become an entrepreneur, with a modular idea most probably and on the other hand i'm a little deflated because of the high fix costs you need for a lot of ideas. nevertheless i want to became an entrepreneur sooner or later." (JAEB)

89. "Die *zu detaillierten Vorgaben im Rahmen des Programms* (wann was abzugeben ist etc.) haben mein Bestreben im Rahmen des Programms ein eigenes Unternehmen zu gründen, negativ beeinträchtigt. Ich finde, dass eine Unternehmensgründung etwas sehr individuelles ist, dass nicht nach einem Schema ablaufen kann." (SDSP)

105. "Vor allem hat mich demotiviert, dass *oft Cases besprochen wurden oder Unternehmen vorgestellt wurden die nicht besonders interessant* waren. Es müssten aufregendere Persönlichkeiten eingeladen werden, ich bin davon überzeugt, dass es um die Persönlichkeit geht die einen Studenten motiviert und weniger um das Tätigkeitsfeld" (MSSM)

In summary, triggers that caused negative inspiration are much more difficult to pinpoint to a specific trigger compared to positive inspiration. An overall result of acquiring new insights into entrepreneurship throughout the programme results in increasing appreciation of the risks of entrepreneurship, which in turn de-motivates some participants from becoming entrepreneurs. Dissatisfaction with design or the overall content was the second source of negative inspiration.

B. Positive vs. Negative Triggers in the Context of Persons

Positive Triggers in the context of persons

The majority of person-related triggers (41 / 85%) were positive. While most refer to a person without providing a name, there are 17 individual respondents who specified the respective person. The category of persons encompasses three types: a) lecturer, b)

peers, c) guest speakers. "Lecturer 2" was the source of 5 "inspired by", peers are responsible for 5 "inspired by". The field of guest speakers is varied, three examples are taken: "Guest Speaker 3" (2x), "Guest Speaker 4" (2x) and "Guest Speaker 5" (1x). Persons are anonymized in the analysis, the descriptions per code can be found in appendix 8.

Lecturer

Two characteristics stand out if one examines "Lecturer 2" from the subcategory of lecturer for triggering the positive "inspired by": First, passion and enthusiasm, which can be infectious for participants (reflections 58/71), and second, feedback and influencing skills (reflections 3/13/73):

58. "… Insbesondere die *unternehmerische Leidenschaft* von "Lecturer 2" zeigte die Passion, die hinter dem Wort Unternehmertum stecken kann und spornte zusätzlich an…" (JDBH)

71. "… "Lecturer 2's" *Begeisterung* wenn er von Arbeit in dem Bereich sprach…" (NMSA)

3. "… Especially the business idea jam principles and *the encouragement of* "Lecturer 2" to 'just test your ideas on the market as quick and as much as possible' helped me to really become an entrepreneur…" (JBAH)

13. "Am meisten "motiviert" hat mich das erste *Feedback-Gespräch zu unserer eigenen Projekt-Idee durch* "Lecturer 2". Bis dato hatten wir eher im stillen Kämmerlein ein wenig vor-uns-hin analysiert und uns Gedanken gemacht, sind dabei aber nicht wirklich voran gekommen. "Lecturer 2" sagte uns dann: "Alles gut und schön, aber geht doch einfach mal raus und redet mit den Kunden!" - klingt simpel, war aber eine gute Erfahrung und für mich ein klares "Aufrütteln" hin zu dem Motto "Just do it." (JDHB)

73. "Lecturer 2's" Vorlesung über Innovation hat mich sehr überzeugt. Er hat mich begeistert ein Unternehmer zu werden. Vor allem *seine Art die Leute zu überzeugen,* hat mir sehr gefallen. Er motivierte die Studenten sehr." (SGGE)

Peers

In this category, the peer group as a whole was responsible for 5/17 "inspired by" elements in the context of persons. Two features of the programme stand out: First,

there was enough "room" for participants to discuss and present their own ideas in front of the others. Second, the group felt "special" as they were students who were interested in one specific topic: entrepreneurship. As one respondent wrote, they felt different to the typical University of St.Gallen student:

6. "Ich kann kein spezielles Event nennen, es waren einfach die beiden Break Wochen die immer super spannend waren. Dazu beigetragen haben auch meine *Mitstudierenden im CEE Programm*. Es waren *alles super Persönlichkeiten - nicht so die typischen HSGler.* Ich glaube *wir haben uns auch sehr stark selber motiviert. Jeder hat von seinen super Ideen und seinen Plänen erzählt, dass war sehr anregend*." (JBHW)
15. "I've got the impression that the *team showed much entrepreneurial spirit and had fun* with what they are currently doing" (JGER)
30. "Also the *progress of other participates in the program was motivating*.." (SZHA)
40. "Das *Zusammentreffen mit Menschen die vom Unternehmertum begeistert* sind: Im Rahmen der Zusatzqualifikation habe ich zahlreiche "Gleichgesinnte" und bereits erfolgreich unternehmerisch Tätige kennengelernt. Der *Austausch mit diesen Menschen* auf verschiedenen Ebenen *hat sehr inspirierend und ermutigend gewirkt.*" (DSMV)

Guest Lecturers

Each guest speaker had a different impact on the participants, depending on the learning or key message of his/her speech. Most "inspired by" elements by "Guest Speaker 3", "Guest Speaker 4" and "Guest Speaker 5" fall into the categories of "fact finding" and "characteristics of others".

"Guest Speaker 3" inspired students with his life story and his rapid rise to success. Furthermore, his focus in his guest speech about the element of freedom in his role as entrepreneur was inspiring. "Guest Speaker 4" inspired the students through his enthusiasm and by communicating that it is not that difficult to become an entrepreneur. Although he does not own a multi-million euro business, students had the impression that he was happy with his choice of an entrepreneurial career. Furthermore, he impressed the students by providing them with a sense of the importance of not pushing too hard but waiting for the right opportunities to come

along. Finally, "Guest Speaker 5" inspired students by his taking the time and making the effort of travelling to St.Gallen to present in front of the students:

64. "Ein Moment, welcher mir in Erinnerung bleibt, war der Vortrag von "Guest Speaker 4". Ich bin mir nicht mehr ganz sicher, wann es war, aber ich denke, dass es im HS 2009 gewesen war. Ich würde sagen, dass es ein Modul bezgl. Geschäftsmodelle war und es kamen zwei bis drei Referenten in diesem Block, einer von ihnen wie gesagt "Guest Speaker 4". *Was mich daran motiviert hat, war die Art von "Guest Speaker 4" selbst und damit das Versprühen des Gefühls, dass es eben doch nicht so schwierig ist, ein Unternehmen zu gründen. Sein Unternehmen ist zwar auch nicht riesig und kein ICT oder Biotech Start Up, dass eine Millionenbewertung hat - und trotzdem hat man wirklich das Gefühl, dass er an seiner Arbeit Spass hat, und das ist für mich persönlich doch auch ein sehr wichtiger Punkt und ein Grund, Unternehmer zu werden.*" (JZWH)

36. "Der Vortrag von "Company 5" (="Guest Speaker 4") hat mich damals, zu Beginn des Entrepreneurship Kurses, extrem inspiriert. *Es hat mir gezeigt, dass man vielleicht auch einfach auf die richtige Chance warten muss, um sich unternehmerisch zu tätigen*". (ASJC)

25. "Der *Gastvortrag des Geschäftsführers und Gründers der* "Company 6" (="Guest Speaker 3") hat meine Bereitschaft eines Tages Unternehmer zu werden am meisten gestärkt. Mit *seiner Lebensgeschichte* hat er deutlich gezeigt, *was alles innerhalb einer kurzen Periode erreicht* werden kann. Ganz besonders gut fand ich, dass er über seine "Lessons learned" ganz allgemein gesprochen hat. (…) .Für mich persönlich sind solche Beispiele extrem inspiriend." (Respondent SDSP)

74. "Das beeindruckendste Erlebnis während meiner Entrepreneurausbildung war die Auftaktveranstaltung zu Beginn der gesamten Entrepreneurshipausbildung, **als** "Guest Speaker 5" *extra für uns kam um eine Rede zu halten*." (SUEB)

Negative Triggers in the context of persons

Similarly to the negative triggers of the category of courses/programme, most of negative triggers in this category are not specifically named. The reasons why a person triggers negative inspiration lies primarily in two areas: First, participants learn about a specific aspect of entrepreneurship that is in their view negative (83/95). Second, they are negatively impacted by personal characteristics of the entrepreneur, such as a lack

of entrepreneurial spirit or the entrepreneur is seen as being unhappy with his situation (109):

83. "Die Vorträge haben gezeigt, dass *Unternehmertum sehr viel Unsicherheit hervorruft*. Das ganze Umfeld eines Unternehmers wird somit involviert." (JBSL)
95. "Wie zuvor erwähnt, waren Unternehmergespräche für positive, wie auch negative Einflüsse bei mir verantwortlich. Ich kann nachfolgend geschilderte Situation leider nicht mehr dem entsprechenden Vortrag/Unternehmer zuordnen. Doch die Situation war wie folgt: Ich erinnere mich an einen Unternehmer, der von den "Aufs" und "Abs" seines Unternehmens berichtet hat. Wie er sein Geschäft(-smodell) immer wieder von neuem ausrichten muss, wie er seit Jahren hart arbeitet und kein Urlaub nimmt. Seine unternehmerische Begeisterung hat sich nicht auf mich übertragen und ich glaubte auch nicht so recht an sein Geschäftsmodell. Aus seinem Vortrag nahm ich mit, dass Entrepreneur sein heißen kann: *- Jahrelang ohne Pausen zu arbeiten mit der vollen Verantwortung über seinen eigenen Erfolg - dabei Freunde/Familie/Hobbys stark zur Seite zu schieben bis hin zur Vernachlässigung eines Lebens außerhalb der eigenen Firma - während das Angestellten-Dasein mit festem Gehalt + X Urlaubstagen etc. so entspannt sein könnte. Dieser Vortrag hat mich abgeschreckt Unternehmer zu werden: Denn er hat mir vermittelt, dass ich dieses Durchhaltevermögen und diesen Fokus ausschließlich auf das Startup nicht aufbringen kann.* Es wirkte so, als bedürfte es jahrelanges äußerst hartes arbeiten, das auch keine Fehler oder eine Auszeit verzeiht. Es wirkte seelenlos und weltfremd. (Ich möchte kurz erwähnen, dass ich den Aufbau eines eigenen Unternehmens sich nicht als "Zuckerschlecken" oder gar Selbstläufer betrachte, jedoch habe ich durch meine Erfahrungen bei "Company 7" auch eine andere [meines Erachtens gesunde] Art kennengelernt.)" (JSVH)
109. " Die Vorlesung von einem Softwareunternehmer hat auf mich einen sehr negativen Einfluss. *Es kam so herüber, ob er gar kein Spass an seiner Unternehmung hatte.* … Bei der Wahl von Unternehmervorlesungen sollte man daher aufpassen, dass man begeisterte Jungunternehmer einlädt. (SGGE)

C. Positive vs. Negative Triggers in the Context of Work / Assignments

Positive Triggers in the context of work/assignment

Of the nine positive triggers, three relate to pitching a business idea, three to discussing or working with case studies, and the last three to teamwork / assignments.

Pitching was motivational because students realised, especially when pitching in front of an audience, that they were being taken seriously by the audience and that the audience had an interest in further developing their ideas (60/75). Working with case studies was motivating because students were provided real-world examples of how founding a successful business actually works (4). Finally, team assignments and, in particular, experiencing the progress of work or interesting results created by a group can be very powerful (54):

60. "Am stärksten motivierte allerdings der *Austausch mit den Unternehmer-Alumni. Ihre ernsthafte Auseinandersetzung mit unseren zuvor noch als Witzideen betrachteten Geschäftsmodellen und vor allem der respektvolle direkte Kontakt liess die Motivation um selbstständig zu werden und die Motivation für das CEE in die Höhe schnellen*." (JWPV)

75. "Auch war das Event als wir *vor dem Alumni Rat unsere Ideen gepitched* haben sehr einprägsam, da man schnell gesehen hat, dass *unsere Ideen tatsächlich Potential* haben." (SUEB)

4. "Die stärksten positiven Effekte auf mich hatten *sicherlich die Fallbeispiele*, insbesondere der "Company 2" case. Es war faszinierend zu sehen, wie aus einer simplen Idee ein lebensfähiges Unternehmen wuchs" (Respondent: JBEA)

54. "…Weitere Situationen, die mich für das Unternehmertum begeistert haben waren die Kurse mit "Lecturer 2", *konkret eine Gruppenaufgaben*, in der wir verschiedene Restaurant-Ideen konzeptionierten, wo alle üblichen, notwendigen Elemente eines Restaurants ausgeschlossen waren (also ein Restaurant neu denken). *Am Ende dieser Aufgabe hatte ich das Gefühl: "Wow, da gibt es so viel Potenzial. Da gibt es so viele Ideen, da muss ich etwas umsetzen!*" (Respondent JSVH)

Negative Triggers in the context of work/assignment

The few (4) negative triggers relate mostly to teamwork situations where challenges in the work process needed to be mastered:

82. "Im Rahmen der Realisationsprojekte habe ich gemerkt, dass es von großer Bedeutung ist, dass alle Mitglieder des Unternehmerteams an einem Strang ziehen. Wenn das nicht der Fall ist, wird die Arbeit schnell frustrierend. Konkret haben wir bei unseren wöchentlichen Treffen jeweils Aufgaben für das nächste Treffen verteilt, die meistens nur kurz vorher und in einer entsprechenden Qualität gemacht wurden. Diese Abhängigkeit empfand ich als durchaus negativ." (JBEA)

4.7.5 Self-employment vs. Triggers

In the sample of 52 students who submitted the reflections are seven students who were self-employed at T_{final}. This additional analysis examines the trigger-events of this special sub-group. Four of the students wrote that triggers within the entrepreneurship education programme had a causal link to becoming self-employed. Reflection 44 indicates that the experience of one course, the integrative seminar, a seminar in which students work together with external entrepreneurs, was the trigger responsible for his/her becoming self-employed. Reflection 2 indicates that the course Business Idea Jam and the encouragement of "Lecturer 2" strongly supported his/her decision to become an entrepreneur. Reflection 62 notes that mainly courses from the inspiration modules of the CEE programme were responsible for his/her becoming an entrepreneur. Finally, reflection 69 states that the entrepreneurship education only indirectly impacted him/her. Due to the time investment (sunk cost principle) in the course, she/he noted that she/he was now willing to assume the risks involved in becoming an entrepreneur:

44. "Der *wirkliche Auslöser unternehmerisch tätig zu werden, war das Integrationsseminar* im ersten Semester. In dem Sinne bin ich eigentlich schon mit der klaren Vorentscheidung zu gründen in das Programm eingetreten. Das Integrationsseminar hat dann den Weg aufgezeigt, der zu gehen ist um das ganze wirklich auch durchzuziehen. Die wirkliche Motivation etwas zu machen und etwas zu bewegen fand dabei zentral im Integrationsseminar statt. *Wirkliche Motivation kommt dann auf, wenn ein Geschäftsmodell strukturiert wird und man dann langsam merkt, dass es funktionieren könnte"*. (FZDC)

2. "What started merely as one more additional business exercise (like in any other business class at the university) has emerged into a real start-up. The whole transformation from exercise to reality has enhanced my chances to become an entrepreneur. Due to the "sunk cost" principle (the fact that we already had worked very much for our project) helped to continue our idea and to implement it, make it fit for the real market. This enforced learning will stay in my mind, I now think that business incubation is not that hard. *Especially the business idea jam principles and the encouragements of "Lecturer 2" to "just test your ideas on the market as quick and as much as possible" helped me to really become an entrepreneur*. Furthermore, the many speakers were a good example for me". (JBAH)

62. "Generell erachte ich es als sehr wichtig, inspirierende als auch schulende Kurse zu haben. *Die Kurse, die mich dazu bewegten, Unternehmer zu werden, sind jedoch mehrheitlich in der Säule "Inspiration" anzusiedeln*". (JWSM)

69. "Zuerst muss allgemein festgehalten werden was mich am Cee Programm fasziniert. Mich fasziniert die Community an interessierten Studenten, die Ideen hinterfragen, gute Fragen stellen und wichtiges Feedback für die Umsetzung eines eigenes Projektes geben. Dies muss noch viel stärker ausgebaut werden! Ich habe selber gegründet. *Dabei beeinflusste mich die Zusatzausbildung lediglich indirekt*. Ich war von meiner eigenen Idee begeistert und habe grosses Potenzial erkannt. *Die Zusatzausbildung war lediglich ein Grund zu sagen, ich habe mich damit befasst, ich riskiere es jetzt."*

While this sample of reflections from entrepreneurs is not statistically relevant, it points to some interesting facets of entrepreneurial trigger-events. First, most of the students who were self-employed at T_{final} wrote that they had wanted to become self-employed when they entered the programme, indicating high entrepreneurial intention and confirming the results of hypothesis 5. During the entrepreneurship education programme they experienced a moment of inspiration, which confirmed that decision to become self-employed and motivated them to eventually become self-employed.

4.8 Discussion of Results: Entrepreneurial Trigger-Events

4.8.1 Summary of Overall Result

The study identified 89 incidents of positive inspirations and triggers versus 35 of negative inspiration associated with the entrepreneurship education programme. An entrepreneurship education programme is hence a major source of positive-related triggers and inspiration. Through the coding process six categories of inspiration emerged: Personal discovery, fact-finding, characteristics of others, social encounter, work processes and not mentioned. These incidents of inspiration were triggered by three categories of sources: the context of the programme/courses, the context of persons and the context of work processes. The analysis of triggers written by participants who had become entrepreneurs implies that entrepreneurial trigger-events may tip the scales for participants to actually become entrepreneurs. A detailed analysis of positive versus negative incidents of inspiration and their respective triggers reveals first, that most positive inspirations were triggered by the context of persons and second, a list of key ingredients for designing programs that facilitate the occurrence of trigger-events evoking inspiration, which in turn motivates participants to become entrepreneurs.

Facilitators of Positive Triggers

1) Identify the fears of participants or inhibitors of entrepreneurship within groups of students (finance, resources, business idea, etc.) and teach corresponding methods & structure and provide support to overcome these fears
2) Provide participants with the opportunity to gain mastery experience, hands-on experience and contact with entrepreneurs
3) Create room and opportunities for social experiences & bonding of entrepreneurship-minded students
4) Engage lecturers and guest speakers who are passionate about entrepreneurship and are able to spread this contagious passion & enthusiasm to participants
5) Engage lecturers who provide feedback, encourage and influence participants to test their ideas
6) Create a feeling of exclusivity in the entrepreneurship education programme; participants should be proud to be part of the programme
7) Provide opportunities for participants to communicate & work with each other

8) Provide opportunities for participants to present (pitch) their ideas to others and hence create some form of positive group pressure
9) Engage entrepreneurs as guest speakers who (a) are passionate about their business, (b) provide examples with which students can easily identify (Example "Guest Speaker 4": Although he did not have a multi-million business, he was happy with being an entrepreneur..., example "Guest Speaker 3": being successful already at a young age
10) Select case studies that relate to the students' current situation (e.g. "Company 2")

Facilitators of Negative Triggers

While positive triggers were easily identifiable, the negative triggers were of a more general nature. If students experience the risks of entrepreneurship as de-motivating, the solution to the problem should not be to omit topics associated with risk form the curriculum. One possible solution, as suggested in the above section, is to provide support to overcome such risks. Therefore, the negative inspiration associated with risk or the realisation that entrepreneurship may not be the lifestyle of choice is personal and cannot be greatly influenced by educators. Three recommendations can be made that are partially the opposite recommendations of the positive ones. First, do not select lecturers or guest speakers who are not enthusiastic about teaching entrepreneurship and second, not genuinely interested in helping the students to become entrepreneurs, and third, make sure that the organisation of the course is done well and not a source of frustration. On average the last point was not the case in the examined entrepreneurship education programmes (see Appendix 1 for detailed overview and grading of the programmes)

4.8.2 Discussion

This research confirms that there are trigger-events, identifies these and differentiates between triggers and the inspirations that were evoked by these triggers. Furthermore, it confirms that an entrepreneurship education programme is a major source of positive triggers when compared the number of positive triggers (89) with the number of negative (35). Hence, we know that there are triggers, we known which triggers were responsible for which inspirations; and finally, that it is desirable to have

entrepreneurial trigger-events. Interestingly, not the context of programme/course but the context of persons was the greatest source of positive triggers.

If taking these findings into consideration, then the next question at hand is: is it possible for an educator to manipulate or create entrepreneurial trigger-events that evoke positive inspiration and as a result motivate students to become entrepreneurs?

If examining the types of inspiration identified and the recommendations in the previous chapter, it appears to be rather challenging to actively steer the process of creating inspiration. Most moments of inspiration are very personal, related to mental processes (personal discovery & fact finding), other persons or work processes in which the educator has, at most, an indirect influence. For example, a course "Tax, Law, Insurances" should be included in the curriculum in order to realistically prepare the future entrepreneur. If a participant reflects on the course and indicates that it has a negative effect, it should not result in a decision to not offer this course. Rather, it should function in such a way that the positive triggers are increased and the negative are necessarily a part of it. The only way an educator is able to exert influence is by providing the right environment or framework of operation, as indicated in the subsection of facilitator of positive triggers. As the analysis of triggers shows, the context of persons is a very important source of positive triggers. Therefore, choosing passionate lecturers and guest speakers as well as an enthusiastic group of participants may be a promising way to foster the development of positive inspiration. Furthermore, following the recommendations provided in section 4.8.1. may provide further suggestions for educators.

This research adds as to the entrepreneurial event model, first, by identifying and exploring positive and negative "displacement events" of entrepreneurship education and further, by proposing that these trigger-events could be the tipping point for students considering self-employment. Given there are students with high entrepreneurial intention who become self-employed versus students with high entrepreneurial intention who do not become self-employed and given ceteris paribus an entrepreneurial trigger-event could function to be the kind of Shapero & Sokol's displacement event that is responsible for "pushing" students toward becoming self-employed.

5. Conclusions

5.1 Implications for Research

This dissertation study contributes to the theory of planned behaviour, entrepreneurship education research and benefits educators.

The theory of planned behaviour was applied to entrepreneurship education and tested with three entrepreneurship education programmes. The findings support the further development of the theory of planned behaviour applied to entrepreneurship education. First, through the addition of a new variable "Retention of Entrepreneurial Intention" after the end of an entrepreneurship education programme. The time that elapses after the end of the programme was a significant moderator of the strength of entrepreneurial intention, subjective norms and perceived behavioural control. Second, the results provide evidence of the link between entrepreneurial intention and becoming self-employed.

Moreover, initial results from the qualitative analysis of the entrepreneurial-trigger events propose a possible blend of the theory of planned behaviour and elements of the entrepreneurial event model. Entrepreneurial trigger-events may represent the tipping point for those students with an already high entrepreneurial intention to turn ideas into reality and become self-employed. This could explain why some students with high entrepreneurial intentions do become entrepreneurs while others do not. As a final point, the analysis supported the argumentation that attitudes are open to change. The analysis of the bottom 25 vs. in-between vs. top 25 students of each construct showed that 40-68% of these students change their respective categories.

This dissertation study also contributes to applied research on the impact of entrepreneurship education research. The extensive literature review of entrepreneurship education impact studies analysed the current strands of the literature, altered the positive picture of impact of entrepreneurship education that initially existed and provided explanations for the overly positive studies and the recent negative studies. The literature review pointed to many promising research gaps that were followed up in this study and tested. First, new variants of entrepreneurship education programmes were tested; second, research gaps in the areas of impact of duration, stability, link between entrepreneurial intention and self-employment were filled. While the entrepreneurship education programmes tested proved to have an insignificant impact on ATB, SN and EI, an explanation was provided and the

important features of mode of selection, selection bias and sorting effects were discussed, which will help to further improve future entrepreneurship education impact studies.

5.2 Implications for Practice

Educators and policy makers benefit from this study as it provides a differentiated picture of why entrepreneurship education may, at first glance, have an insignificant or negative effect. Having completed this study, the author believes that entrepreneurship education is still of crucial importance for facilitating entrepreneurship. What is needed is a better understanding of the mechanics of impact on entrepreneurial intention and a stronger refinement of the objectives of entrepreneurship education in relation to its participants:

With regard to the mechanics of impact, the analysis of the top 25 vs. bottom 25 students (chapter 4.1.1) indicated that entrepreneurship education was able to change attitudinal constructs and that the impact was strongest on those participants who started with low values in the attitudinal constructs of the theory of planned behaviour. A longer entrepreneurship programme was only able to add impact on perceived behavioural control as perceived behavioural control started on a relatively lower level compared to the other constructs. The analysis of the theory of planned behaviour (chapter 4.1.2) revealed that attitude toward behaviour was the strongest predictor of entrepreneurial intention. Furthermore, the analysis of selection bias (see chapter 3.4.1) between control vs. experimental group indicated a significant selection bias, with the experimental groups having a bias in attitude toward behaviour. This indicates that voluntary programmes attract participants with high values in attitude toward behaviour and is a further evidence for interpreting ex-post only impact studies with caution. Taking these findings into consideration, it becomes apparent that the scope of possible change in attitude toward behaviour, which is already at a high level, and hence entrepreneurial intention (as ATB is the strongest predictor of EI) is limited for voluntary admission programmes. The result of an insignificant impact on entrepreneurial intention is therefore explainable.

With this understanding in mind, educators should be cautious about disqualifying an entrepreneurship education programme on the basis of the dependent variable entrepreneurial intention as ineffective or not successful. Depending on the kind of

entrepreneurship programme and objectives, e.g., voluntary programmes (objective: education for start-up) and compulsory programmes (objective: entrepreneurial awareness training), the outcome variable needs to be adjusted. For education for start-up, nascency-related or applied indicators such as rate of self-employment should hence be utilised. In light of these findings, the "Zertifikatskurs Entrepreneurship - CEE 2009" is an example of a non-aligned programme setup with programme objectives. Although the brochure indicated the programme to be an entrepreneurial awareness training, the participants were highly selected and the programme's length was four semesters. Hence, judging on basis of the impact on entrepreneurial intention, the impact of the four semesters was insignificant and at least the three semesters were not able to add significantly more impact on entrepreneurial intention compared to what the first semester did. However, judging from the rate of self-employment, the programme was a success: Significantly more participants of the entrepreneurship programme became self-employed compared to the control group.

Taking these findings and the other findings of the tests and literature review into consideration, educators should offer short, compulsory entrepreneurship education programmes for sorting purposes, as suggested by von Graevenitz et al. (2010). For those who have a predisposition toward entrepreneurship (esp. ATB) and opt into an voluntary entrepreneurship education programme, the biggest impact can be achieved in three categories: First in perceived behavioural control, which increased significantly in the experimental groups. Second, in the facilitation of entrepreneurial trigger-events and third, in increasing the number of participants becoming self-employed. The analysis of the triggers and inspirations evoked during the entrepreneurship education provides educators with a hands-on set of recommendations on how to facilitate an environment conducive to the creation of inspirational moments (chapter 4.8.1). Trigger-events that evoke these inspirational moments may be tipping the scales for participants considering self-employment.

On a practical note, the results indicate that follow-up entrepreneurship education should be offered, in a best case scenario, within three months after the end of the first programme, as, after six months, some constructs have already begun decreasing significantly, even below the starting values.

5.3 Limitations of this study

Great care was taken to review the 41 existing impact studies and to learn how to set up a robust research design according to and exceeding the latest standards in the field of impact of entrepreneurship education research. However, taking practical reality and resources into account, the following limitations are part of this study: While a sample size of 272 matched pairs (T_{start}/T_{final}) in the experimental and control group is reasonable compared to recent studies published, it can be argued that this size comes at the price of external validity.

The design of the study was set up to overcome this potential limitation by utilising ex-ante, ex-post sampling, the using of control groups and sampling from three comparable programmes. All of the programmes provided the same results, which can be taken as evidence of strong validity. However, future studies would benefit from sampling larger numbers of participants nationwide or even on a cross-border level.

Second, a detailed examination and analysis of the content, delivery and design of the entrepreneurship education programmes was not within the scope of this research. Similarly to Souitaris et al. (2007), the objective of this research was to test the impact of a "good practice" programme on individual intention, rather than the variability of programme content on individual intention. In order to make comparability among the programmes possible, they were compared based on Souitaris et al.'s (2007) suggestions regarding "good practice" and were then described in detail. Third, the usage of self-reported measures represents an imminent risk to the reliability and validity of data. Therefore, a self-reported measure of knowledge in different areas of entrepreneurship in the T_{start} questionnaire was excluded from analysis and follow-up in T_{final}. Similarly, the testing of entrepreneurial nascency was not included in this dissertation study as it was not possible to exclude the possibility that students were active in nascent activities due to their participation in the programme compared to the control group.

5.4 Suggestions for future research

The field of entrepreneurship education research would benefit from further research in the following areas: The findings of the dissertation study indicate that the impact of entrepreneurship education varies depending on the profiles of the participants. Hence, a study conducted to review what specific profiles derive the most benefit from entrepreneurship education would potentially save on resources. The entire subject of

target-specific entrepreneurship education merits more attention from researchers. What kind of entrepreneurship education programme should be offered for what kind of group of participants and what would be realistic success measures? In this context, the whole field of entrepreneurship education research would benefit from a realistic assessment of what objectives of entrepreneurship education are appropriate for which life-cycle? Arguably, objectives should be different for school students vs. university students vs. mature adults. However, at this point in time, success measures, potentially indicative of objectives, are mixed for all groups as, for example, entrepreneurial intention is used as a measure of success for all groups.

When it is clear what kind of programme should be offered for which target group, the next question is: What content, design and delivery are optimal for this target group? Research should provide practitioners more and clearer information on how to set up successful entrepreneurship education programmes. In this context, further research into triggers of entrepreneurship education and their impact and strength in combination with aspects of entrepreneurial emotions provides promising avenues of research.

The effects of time and duration on entrepreneurial intention and its antecedents is of great interest for education research and practitioners because these areas relate to effectiveness and resource utilisation. Thus, they merit further in-depth research. With length or duration of entrepreneurship education, two additional questions seem to be appropriate for further examination. First, there is a difference between intensity and duration of entrepreneurship education. The length of a 4-ECTS course can span one week or six months. Is there a difference in impact depending on the intensity of entrepreneurship education? Secondly, what is the impact of over-analysis or over-education? Do they exist in entrepreneurship education on school or university-level? Chrisman et al. (2005) indicate that this phenomenon exists for entrepreneurs already active in the business world. The more they learned, the more the impact until a point from which the impact of learning on business performance decreased. This dissertation study found a similar relationship for PBC for university students. It would be worthwhile to examine more closely the phenomenon of over-analysis and its impact on university students, who are used to studying and analysing.

Finally, this dissertation study has suggested further developments for the theory of planned behaviour that should be further tested and evaluated. First, the addition of time aspects as moderators; second, the addition and confirmation of the link between

entrepreneurial intention and self-employment; and finally, the addition of trigger-events in entrepreneurship education. The qualitative analysis of the trigger-events has provided indication of a relationship that should empirically be validated: Given a group of students, each of whom is equipped with high entrepreneurial intention and given ceteris paribus, do trigger-events play a decisive role in their becoming self-employed as compared to students who do not?

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7. Appendices

7.1 Appendix 1: Curricula of the Entrepreneurship Education Programmes

A) Zusatzausbildung Entrepreneurship, CEE 2009

Overview of courses of the entrepreneurship programme. The descriptions are translations of the German texts in the CEE 2009 brochure (CEE, 2009):

Start-Up Basics

Discussing different aspects of the entire spectrum of entrepreneurship. Discussions of case studies and live interviews with founders. Furthermore, providing the participants with an overview of the entire entrepreneurship education programme.

Business Idea Jam

Providing guidance for and the opportunity for practical application the process of finding an idea and following it up through each steps, from idea generation to evaluation.

Entrepreneurial Finance

Providing students with an understanding of the different variants of start-up financing as well as the finance cycles, different financial resources, criteria for finding partners with a focus on the special circumstances of start-up finance. Discussions with business angels, simulations and training sessions on financial negotiations, best practice examples.

Business Plan

Overview of the building blocks of business plans. Writing a business plan and exercising the defence and communication of it. Analysis and improvement of real business plans and contact with professional business plan writers. Participation in a business plan competition.

Corporate Entrepreneurship

Advancement of entrepreneurship in corporations, working through examples of corporate entrepreneurship. Guidance through all kinds of internal and external corporate entrepreneurship and the whole process of corporate entrepreneurship, including assembling a team and the acquisition of capital. Contact with representatives of blue-chip companies.

Family Enterprises & Succession

Opening the spectrum of alternatives to founding a new company: characteristics of family enterprises, development of all core contents and processes of succession. Providing overview of succession exchanges and where to find potential contacts. Application of the St.Gallen Succession Model on the normative, strategic and operational level. Additional topics: Self-image of family enterprises, financial precautions and security, stability and health of family enterprises, legal aspects, transaction costs, valuations and project management.

Patents & Technology

Basics of legal aspects of patent, trademarks, copyright laws and their application. Case studies and patent strategies, license agreements, patent valuations and training in patent and licensing negotiations with practitioners.

Law, Taxes & Insurances

Application-oriented introduction to relevant Swiss and international legal forms of companies. Dealing with the most important questions about legal forms, taxation and insurance questions of entrepreneurs.

Social Entrepreneurship

Overview in specific forms and new concepts of entrepreneurship: social entrepreneurship, culture entrepreneurship and immigrant entrepreneurship.

Entrepreneurial Responsibility

Sharpening participant awareness of the duties and rights of entrepreneurs and their commitment in relation to their stakeholders.

Business Modeling

Presentation of different kinds of business models, their embeddedness in the context of society, their framework and examples of different branches. Identification of what characterises successful entrepreneurs.

Excursions

Excursions are made to companies, entrepreneurs or institutions to provide examples of entrepreneurship and learn directly from entrepreneurs.

Guest Speakers

A speaker series that invites interesting entrepreneurs to complement the programme so that participants have the opportunity to meet with and talk directly to entrepreneurs and learn from their enthusiasm as well as become acquainted with the negative and positive aspects of being an entrepreneur.

Integration Seminars

The seminars provide the opportunity to directly work together with young start-ups or small business and to work on current problems of these businesses. Work on one's own start-up projects is optional.

CEE Advisory

The Center for Entrepreneurial Excellence offers an advisory point for young start-ups at the University of St.Gallen. Additionally, cooperation with local partners in St.Gallen offers a further advisory and support processes for guiding young entrepreneurs.

Overall grade in Swiss Grading System: **5.0**
Would you recommend this course to a friend: **88%**
Source: T_{final} questionnaire (participants)

B) Zusatzausbildung Entrepreneurship, CEE 2010

Overview of the courses of the entrepreneurship programme. The descriptions are a direct English translation of the German texts in the CEE 2010 brochure (CEE, 2010). The courses are in their basic tenets similar to the courses in the 2009 programme:

Start-Up Basics

The kick-off day provides an overview of the entrepreneurship programme and seeks to motivate for the entire spectrum of entrepreneurship. The process of founding a business is illustrated with case studies. Topical themes are the spotting, evaluation and exploitation of opportunities, integration of different disciplines in entrepreneurship, key success measures of founding a business, the necessity of strategic thinking and the influence of the personality of the entrepreneur.

Business Models

The spectrum of business models from different branches will be shown and categorised into the macroeconomic context. Practical methods such as customer observation, need analysis, entrepreneurial marketing and the conduct of campaigns will be dealt with. Furthermore, the regulative environment will be shown and its impact on entrepreneurship and the business plan.

Entrepreneurial Finance

In a first step, the theoretical basics and variants of start-up finance and growth finance will be elaborated on. Topics include finance cycles, sources of capital, criteria for the selection of finance partners, special issues of start-up finance, legal aspects and the process through different financing rounds. In a second step, discussions and real cases are discussed at length with practitioners, and participants have the opportunity to exercise real-world cases.

Business Plan / Corporate Valuation

Overview of the building blocks of business plans. Writing , defending communicating a business plan. Analysis and improvement of real business plans and contact with professional business plan writers. Moreover, the topic of valuation will be discussed

and different methods of valuation introduced. Practitioners will exercise real-world cases with the participants.

Business Idea Jam

Providing guidance for and opportunities for the practical application of finding an idea and following it up through each step, from idea generation to evaluation. With respect to finding a business idea, an idea jam will be organised which represents initial preparation for an internal idea competition. After finding a business idea the participants become familiar with the application of ideas in different circumstances.

Family Entrepreneurship & Succession

The course is designed broaden the spectrum of alternatives to founding a new company: characteristics of family enterprises, development of all core contents and processes of succession. Providing an overview of succession exchanges and where to find potential contacts. Application of the St.Gallen Succession Model on normative, strategic and operational level. Additional topics: Self-image of family enterprises, financial precautions and security, stability and health of family enterprises, legal aspects, transaction costs, valuations and project management.

Guest Speakers

A speaker series that invites interesting entrepreneurs complements the programme so that participants have the opportunity to meet and talk directly to entrepreneurs and learn from their enthusiasm and become familiar with the positive and negative aspects of being an entrepreneur.

Corporate Entrepreneurship

Corporate entrepreneurship deals with the advancement of entrepreneurship within large corporations. Different forms of internal and external corporate entrepreneurship will be identified. Additional topics are the utilisation of corporate venture capital, assembling the entrepreneurial team, the meaning of innovation and stage-gate processes and the definition of different entrepreneurial roles in corporate entrepreneurship. Complementarily, there are discussions with practitioners from large corporations.

Patents & Licensing

The basics of legal aspects of patent, trademark, copyright laws and their application will be elaborated on in cooperation with practitioners (trademark, patent lawyers, the ITEM-HSG, confederate department for trademark and patents). Case studies and patent strategies, license agreements, training in patent and licensing negotiations with practitioners.

Social Entrepreneurship

Overview of specific forms and new concepts of entrepreneurship: social entrepreneurship, culture entrepreneurship and immigrant entrepreneurship.

Excursions

Excursions are made to companies, entrepreneurs or institutions to provide examples of entrepreneurship and directly learn from entrepreneurs.

Law & Tax and Insurance

Application-oriented introduction to relevant Swiss and international legal forms of companies. Dealing with most important questions about legal forms, taxation and insurance questions of entrepreneurs.

Integration Seminars

The seminars provide the opportunity to directly work together with young start-ups or small business and to work on current problems of these businesses. Work on one's own start-up projects is optional.

CEE Advisory

The Center for Entrepreneurial Excellence offers an advisory point for young start-ups at the University of St.Gallen. Additionally, cooperation with local partners in St.Gallen offers a further advisory and support processes for guiding young entrepreneurs.

Overall grade in Swiss Grading System: **4.7**
Would you recommend this course to a friend: **82%**
Source: T_{final} questionnaire (participants)

C) Zertifikatskurs Entrepreneurship 2010

Overview of the courses of the entrepreneurship programme. The descriptions are English translation of the German texts in the Zertifikatskurs brochure spring 2010 (CEE-UEC, 2010). The course names are guided by practical questions but resemble in essence similar courses compared to both of the aforementioned programmes. All three programmes, CEE 2009, CEE 2010 and the Zertifikatskurs Entrepreneurship 2010 are essentially taught by the same faculty.

How do I find a business idea?
Guidance through the process of idea generation to idea evaluation and structured idea feedback. Discussion of current examples, successful business ideas and the identification of current trends in technology, society and economy. Learning of the systematic idea finding process of COSTAR (Customer, Opportunity, Solution, Team, Advantage, Result).

How do I develop my ideas systematically?
Development of business models, discussion of successful and unsuccessful business models, including an overview of the literature on business models. Development of two business models and feedback on them.

How do I write a business plan?
The process of writing and evaluating a business plan. Content, structure and quality aspects of business plans. Business plans will be discussed and critically evaluated. Each student will draft his/her own business plan and possible business plan competitions will be introduced.

What are the signs of a clever marketing concept?
Discussion of elements of a clever marketing concept: systematic analysis of the market, customer satisfaction, customer and market segmentation, structure of marketing concepts, customer retention systems, partnership concepts and the methods of guerilla, online and viral marketing are discussed.

How do I find adequate financing?

In this course the topics of start-up finance, the overview of different sources and kinds of start-up finance, financial planning, dealing with finance partners are dealt with. Furthermore, the financial aspect of the business plan will be developed during the course.

Which entrepreneurship-personality do I represent?

A personality test will show different types of entrepreneurs and their characteristics. Required types per development stage of the business are discussed and case studies will be utilised.

How do I assemble my start-up team?

The topic of talent management for start-ups and quickly growing companies are discussed. Methods for inspiring employees and case studies of personnel marketing concepts will be introduced. Practitioners will share their experiences on the topic of building a winning team.

What are the practical aspects of founding a business?

The role of law, tax and insurance will be elaborated on and the participants will be provided with an overview of the different legal forms of businesses.

How do I further develop my start-up project?

Individual coaching will support and help participants to further advance their projects.

Excursions

There will be an excursion to a start-up incubator, which will provide participants with the opportunity to get in touch with start-up entrepreneurs and get a feeling for what it means to be an start-up entrepreneur.

Advisory

The PUSH initiative provides a first contact point for those who are interested in founding a business at the University of Hohenheim.

7.2 Appendix 2: T_{start} - Questionnaire

Entrepreneurial attitudes and intentions of university students

Dear student of the CEE-HSG Entrepreneurship Programme,

Thank you very much for participating in this important study. The study will highlight attitudes and entrepreneurial intentions and will be used to measure the impact of education on entrepreneurial intentions. The data will only be accessed by the researcher and all personal data will be kept strictly confidential and will be coded (below) to render it anonymous. In order to measure the impact of education, it will be necessary to survey you again during the programme. Therefore, I would be grateful if you would complete your personal code below.

Please complete your personal code:

First letter of your month of birth: ___
First letter of your place of birth: ___
First letter of your family name: ___
First letter of your mother's first name: ___

Once again, many thanks for taking the time to fill out the questionnaire!

Kind regards,
Michael Lorz
PhD student
Michael.lorz@unisg.ch

Advisors:
Prof. Dr. Thierry Volery, Director Institute for Entrepreneurship (KMU)
Prof. Dr. Christoph Müller, Executive Director, CEE

Questionnaire

Section A: Personal Data

1. Age: _____

2. Gender: ☐ Female ☐ Male

3. What (main) nationality are you: ☐ Swiss ☐ German ☐ Austrian ☐ Other: _____

4. What degree level are you studying: ☐ Assessment ☐ Bachelor ☐ Master ☐ Doctorate

5. What programme are you studying in: _____ (not applicable for Assessment)

6. What do you expect from the CEE-HSG Entrepreneurship Programme? Please tick **only one question**

a. I have no precise expectation. ☐
b. I have a general interest and want to learn more about entrepreneurship. This will help to decide whether becoming an entrepreneur is an option for me. ☐
c. I could imagine becoming an entrepreneur. Therefore, I want to learn the necessary skills and competencies. ☐
d. I am determined to start my own business. Therefore, I want to learn the necessary skills and competencies. ☐

7. When do you expect to graduate from your current degree:
☐ 1st half 2010 ☐ 2nd half 2010 ☐ 1st half 2011 ☐ 2nd half 2011 ☐ 1st half 2012 ☐ later

Section B:

1. Have you got work experience (including internships)? ☐ Yes ☐ No
If yes:
a. Have you been in charge of other people? ☐ Yes ☐ No
b. How much work experience (full-time) do you have? _____ (years) _____ (months)
c. How much work experience (part-time) do you have? _____ (years) _____ (months)
d. What was the smallest size of a company you ever worked for? _____ (employees)

2. Have you ever worked for a start-up (young, small company)? ☐ Yes ☐ No
If yes:
a. How did you experience your work at the start-up? ☐ Positive ☐ Negative

3. Have you ever been self-employed (independent worker or firm owner)? ☐ Yes ☐ No
If yes:
a. How many years/months have you been self-employed? _____ (years) _____ (months)
b. When did you leave your company? (if still self-employed write 0) _____ (years) _____ (months)
c. How did you experience being self-employed? ☐ Positive ☐ Negative

Section C:

1. Have you ever taken any entrepreneurship course(s)? ☐ Yes ☐ No
If yes: Please estimate how many ECTS you took in total?_____

2. To what extent do you value your depth of **knowledge** in the following areas of entrepreneurship?

	1 (to no extent) to 7 (to a great extent)						
	1	**2**	**3**	**4**	**5**	**6**	**7**
a. Start-up Basics	☐	☐	☐	☐	☐	☐	☐
b. Business Planning	☐	☐	☐	☐	☐	☐	☐

c. Entrepreneurial Finance	☐ ☐ ☐ ☐ ☐ ☐ ☐
d. Business Models	☐ ☐ ☐ ☐ ☐ ☐ ☐
e. Corporate Entrepreneurship	☐ ☐ ☐ ☐ ☐ ☐ ☐
f. Patents & Technology	☐ ☐ ☐ ☐ ☐ ☐ ☐
g. Social Entrepreneurship & New Themes	☐ ☐ ☐ ☐ ☐ ☐ ☐
h. Family Entrepreneurship	☐ ☐ ☐ ☐ ☐ ☐ ☐
i. Law & Insurances & tax for entrepreneurs	☐ ☐ ☐ ☐ ☐ ☐ ☐

1 (to no extent) to 7 (to great extent)

	1	2	3	4	5	6	7
j. Idea development	☐	☐	☐	☐	☐	☐	☐
k. Lifestyle of an entrepreneur	☐	☐	☐	☐	☐	☐	☐
l. Team recruitment & management	☐	☐	☐	☐	☐	☐	☐
m. Responsibilities of an entrepreneur	☐	☐	☐	☐	☐	☐	☐
n. Problem recognition & solution development	☐	☐	☐	☐	☐	☐	☐
o. Process from idea to realisation of a start-up	☐	☐	☐	☐	☐	☐	☐
p. Working for/in small companies	☐	☐	☐	☐	☐	☐	☐
q. Writing a business plan	☐	☐	☐	☐	☐	☐	☐

Section D:

1. How many entrepreneurs do you know personally? _____ (number)

If you know at least one entrepreneur personally, please answer:

a. How many of those are contacts from university or via the university network? _____

Please value **from the one entrepreneur you know best** the following questions:

1 (to no extent) to 7 (completely)

	1	2	3	4	5	6	7
b. To what extent do you know his/her activity as an entrepreneur?	☐	☐	☐	☐	☐	☐	☐
c. To what extent has this relationship provided you with an understanding what it means to be an entrepreneur?	☐	☐	☐	☐	☐	☐	☐
d. To what extent has this relationship influenced your intention to become an entrepreneur yourself?	☐	☐	☐	☐	☐	☐	☐

2. When you think about entrepreneurs, how do you valuate the images that come into your mind?

1 (very negative) to 7 (very positive)

	1	2	3	4	5	6	7
a. Please indicate from very negative to very positive	☐	☐	☐	☐	☐	☐	☐

Section E:

1. Indicate your level of agreement with the following sentences from

1 (total disagreement) to 7 (total agreement)

	1	2	3	4	5	6	7
a. Being an entrepreneur implies more advantages than disadvantages to me	☐	☐	☐	☐	☐	☐	☐
b. A career as entrepreneur is attractive for me	☐	☐	☐	☐	☐	☐	☐
c. If I had the opportunity and resources, I would like to start a business	☐	☐	☐	☐	☐	☐	☐
d. Being an entrepreneur would entail great satisfactions for me	☐	☐	☐	☐	☐	☐	☐
e. Among various options, I would rather be an entrepreneur	☐	☐	☐	☐	☐	☐	☐

Section F:

1. If you decided to create a firm, would people in your close environment approve that decision?

Indicate from 1 (total disapprovement) to 7 (total approvement)

	1	2	3	4	5	6	7
a. Your close family	☐	☐	☐	☐	☐	☐	☐
b. Your close friends	☐	☐	☐	☐	☐	☐	☐
c. Your close friends from university	☐	☐	☐	☐	☐	☐	☐
d. Other people who are important to you	☐	☐	☐	☐	☐	☐	☐

Section G:

1. To what extent do you agree with the following statements regarding your entrepreneurial capacity?

Value them from 1 (total disagreement) to 7 (total agreement)

	1	2	3	4	5	6	7
a. To start a firm and keep it working would be easy for me	☐	☐	☐	☐	☐	☐	☐
b. I am prepared to start a viable firm	☐	☐	☐	☐	☐	☐	☐
c. I can control the creation process of a new firm	☐	☐	☐	☐	☐	☐	☐
d. I know the necessary practical details to start a firm	☐	☐	☐	☐	☐	☐	☐
e. I know how to develop an entrepreneurial project	☐	☐	☐	☐	☐	☐	☐
f. If I tried to start a firm, I would have a high probability of succeeding	☐	☐	☐	☐	☐	☐	☐

2. Do you think you have a satisfactory level of the following capacities to be an entrepreneur?

Indicate from 1 (no capacity at all) to 7 (very high capacity)

	1	2	3	4	5	6	7
a. Opportunity recognition	☐	☐	☐	☐	☐	☐	☐
b. Creativity	☐	☐	☐	☐	☐	☐	☐
c. Problem solving	☐	☐	☐	☐	☐	☐	☐
d. Leadership and communication skills	☐	☐	☐	☐	☐	☐	☐
e. Development of new products and services	☐	☐	☐	☐	☐	☐	☐
f. Networking and making professional contacts	☐	☐	☐	☐	☐	☐	☐
g. Implementation of ideas	☐	☐	☐	☐	☐	☐	☐

3. How capable do you generally feel to start-up a business (not at all 0-100% totally): _____

Section H:

Are you self-employed? ☐ YES

☐ NO

If you answered NO, please continue with the questions below. If you answered yes, please continue with Section I.

1. Estimate your probability of becoming self-employed within the next five years (not at all 0-100% very probable): _____

2. Indicate your level of agreement with the following statements from

1 (total disagreement) to 7 (total agreement)

	1	2	3	4	5	6	7
a. I am ready to do anything to be an entrepreneur	☐	☐	☐	☐	☐	☐	☐

b. My professional goal is becoming an entrepreneur	☐	☐	☐	☐	☐	☐	☐
c. I will make every effort to start and run my own firm	☐	☐	☐	☐	☐	☐	☐
d. I am determined to create a firm in the future	☐	☐	☐	☐	☐	☐	☐
e. I have very seriously thought of starting a firm	☐	☐	☐	☐	☐	☐	☐
f. I have got the intention to start a firm in the next 2 years	☐	☐	☐	☐	☐	☐	☐
g. I have got the intention to start a firm in the next 2 to 5 years	☐	☐	☐	☐	☐	☐	☐
h. I have got the intention to start a firm some day	☐	☐	☐	☐	☐	☐	☐

Section I:

1. Has anything happened in your life that changed your heart & mind to (intend to or not intend to) become an entrepreneur? **If these trigger-events below do not apply, please do not answer.**

	1 (negative influence) to 7 (positive influence)						
	1	**2**	**3**	**4**	**5**	**6**	**7**
a. Entrepreneur(s) in the family	☐	☐	☐	☐	☐	☐	☐
b. Identification of a business idea	☐	☐	☐	☐	☐	☐	☐
c. Guest speaker at university	☐	☐	☐	☐	☐	☐	☐
d. Mentor	☐	☐	☐	☐	☐	☐	☐
e. Found partner to start a business	☐	☐	☐	☐	☐	☐	☐
f. University education	☐	☐	☐	☐	☐	☐	☐
g. Other, please specify:	☐	☐	☐	☐	☐	☐	☐

_____

If you have any comments, ideas or suggestions, please let me know:

THANK YOU!

7.3 Appendix 3: Example Follow-Up Questionnaire

Entrepreneurial attitudes and intentions of university students

Dear student of the CEE-HSG Entrepreneurship Programme,

Thank you very much for participating in this important study. This study will highlight attitudes and entrepreneurial intentions and will be used to measure the impact of education on entrepreneurial intentions. The data will only be accessed by the researcher and all personal data will be kept strictly confidential and will be coded (below) to render it anonymous. In order to measure the impact of education, it is necessary to survey you again during the programme. Therefore, I would be grateful if you would complete your personal code below.

Please complete your personal code:

First letter of your month of birth: ___
First letter of your place of birth: ___
First letter of your family name: ___
First letter of your mother`s first name: ___

Once again, many thanks for taking the time to fill out the questionnaire!

Kind regards,
Michael Lorz
PhD student
Michael.lorz@unisg.ch

Advisors:
Prof. Dr. Thierry Volery, Director Institute for Entrepreneurship (KMU)
Prof. Dr. Christoph Müller, Executive Director, CEE

Questionnaire

Section A:

1. Indicate your level of agreement with the following sentences from

1 (total disagreement) to 7 (total agreement)

	1	2	3	4	5	6	7
a. Being an entrepreneur implies more advantages than disadvantages to me	☐	☐	☐	☐	☐	☐	☐

b. A career as entrepreneur is attractive for me	☐	☐	☐	☐	☐	☐	☐
c. If I had the opportunity and resources, I would like to start a business	☐	☐	☐	☐	☐	☐	☐
d. Being an entrepreneur would entail great satisfactions for me	☐	☐	☐	☐	☐	☐	☐
e. Among various options, I would rather be an entrepreneur	☐	☐	☐	☐	☐	☐	☐

Section B:

1. If you decided to create a firm, would people in your close environment approve that decision?

Indicate from 1 (total disapprovement) to 7 (total approvement)

	1	2	3	4	5	6	7
a. Your close family	☐	☐	☐	☐	☐	☐	☐
b. Your close friends	☐	☐	☐	☐	☐	☐	☐
c. Your close friends from university	☐	☐	☐	☐	☐	☐	☐
d. Other people who are important to you	☐	☐	☐	☐	☐	☐	☐

Section C:

1. To what extent do you agree with the following statements regarding your entrepreneurial capacity?

Value them from 1 (total disagreement) to 7 (total agreement)

	1	2	3	4	5	6	7
a. To start a firm and keep it working would be easy for me	☐	☐	☐	☐	☐	☐	☐
b. I am prepared to start a viable firm	☐	☐	☐	☐	☐	☐	☐
c. I can control the creation process of a new firm	☐	☐	☐	☐	☐	☐	☐
d. I know the necessary practical details to start a firm	☐	☐	☐	☐	☐	☐	☐
e. I know how to develop an entrepreneurial project	☐	☐	☐	☐	☐	☐	☐
f. If I tried to start a firm, I would have a high probability of succeeding	☐	☐	☐	☐	☐	☐	☐

2. Do you think you have a satisfactory level of the following capacities to be an entrepreneur?

Indicate from 1 (no capacity at all) to 7 (very high capacity)

	1	2	3	4	5	6	7
a. Opportunity recognition	☐	☐	☐	☐	☐	☐	☐
b. Creativity	☐	☐	☐	☐	☐	☐	☐
c. Problem solving	☐	☐	☐	☐	☐	☐	☐
d. Leadership and communication skills	☐	☐	☐	☐	☐	☐	☐
e. Development of new products and services	☐	☐	☐	☐	☐	☐	☐
f. Networking and making professional contacts	☐	☐	☐	☐	☐	☐	☐
g. Implementation of ideas	☐	☐	☐	☐	☐	☐	☐

3. How capable do you generally feel to start-up a business (not at all 0-100% totally): _____

Section H:

Are you self-employed? ☐ YES

☐ NO

If you answered NO, please continue with the questions below. If you answered yes you do not need to continue. Thanks

1. Estimate your probability of becoming self-employed within the next five years (not at all 0-100% very probable): _____

2. Indicate your level of agreement with the following statements from

1 (total disagreement) to 7 (total agreement)

	1	2	3	4	5	6	7
a. I am ready to do anything to be an entrepreneur	☐	☐	☐	☐	☐	☐	☐
b. My professional goal is becoming an entrepreneur	☐	☐	☐	☐	☐	☐	☐
c. I will make every effort to start and run my own firm	☐	☐	☐	☐	☐	☐	☐
d. I am determined to create a firm in the future	☐	☐	☐	☐	☐	☐	☐
e. I have very seriously thought of starting a firm	☐	☐	☐	☐	☐	☐	☐
f. I have got the intention to start a firm in the next 2 years	☐	☐	☐	☐	☐	☐	☐
g. I have got the intention to start a firm in the next 2 to 5 years	☐	☐	☐	☐	☐	☐	☐
h. I have got the intention to start a firm some day	☐	☐	☐	☐	☐	☐	☐

If you have any comments, ideas or suggestions, please let me know:

THANK YOU!

7.4 Appendix 4: T_{final} Questionnaire

Universität St.Gallen

Entrepreneurial attitudes and intentions of university students

Dear student of the CEE-HSG Entrepreneurship Program,

Thank you very much for participating in this important study and in the final questionnaire survey. This study will highlight attitudes and entrepreneurial intentions and will be used to measure the impact of education on entrepreneurial intentions. The data will only be accessed by the researcher and all personal data will be kept strictly confidential and will be coded (below) to render it anonymously. The ones that complete this survey will take part in a lottery with the potential to win an IPAD 2 or an one-year Handelsblatt subscription.

Please complete your personal code:

First letter of your month of birth: ___
First letter of your place of birth: ___
First letter of your family name: ___
First letter of your mother`s first name: ___

Are you participant of... (please tick)
... the CEE 2009 cohort of students ☐
... the CEE 2010 cohort of students ☐

Once again, many thanks for taking your time to fill out the questionnaire!

Kind regards,
Michael Lorz
PhD student
Michael.lorz@unisg.ch

Advisors:
Prof. Dr. Thierry Volery, Director Institute for Entrepreneurship (KMU)
Prof. Dr. Christoph Müller, Executive Director, CEE

11.05.2011, Graduation Day CEE

Questionnaire

Section A:

1. Indicate your level of agreement with the following sentences from

1 (total disagreement) to 7 (total agreement)

1	2	3	4	5	6	7

a. Being an entrepreneur implies more advantages than disadvantages to me	☐	☐	☐	☐	☐	☐	☐
b. A career as entrepreneur is attractive for me	☐	☐	☐	☐	☐	☐	☐
c. If I had the opportunity and resources, I would like to start a business	☐	☐	☐	☐	☐	☐	☐
d. Being an entrepreneur would entail great satisfactions for me	☐	☐	☐	☐	☐	☐	☐
e. Among various options, I would rather be an entrepreneur	☐	☐	☐	☐	☐	☐	☐

Section B:

1. If you decided to create a firm, would people in your close environment approve that decision?

Indicate from 1 (total disapprovement) to 7 (total approvement)

	1	2	3	4	5	6	7
a. Your close family	☐	☐	☐	☐	☐	☐	☐
b. Your close friends	☐	☐	☐	☐	☐	☐	☐
c. Your close friends from university	☐	☐	☐	☐	☐	☐	☐
d. Other people who are important to you	☐	☐	☐	☐	☐	☐	☐

Section C:

1. To what extent do you agree with the following statements regarding your entrepreneurial capacity?

Value them from 1 (total disagreement) to 7 (total agreement)

	1	2	3	4	5	6	7
a. To start a firm and keep it working would be easy for me	☐	☐	☐	☐	☐	☐	☐
b. I am prepared to start a viable firm	☐	☐	☐	☐	☐	☐	☐
c. I can control the creation process of a new firm	☐	☐	☐	☐	☐	☐	☐
d. I know the necessary practical details to start a firm	☐	☐	☐	☐	☐	☐	☐
e. I know how to develop an entrepreneurial project	☐	☐	☐	☐	☐	☐	☐
f. If I tried to start a firm, I would have a high probability of succeeding	☐	☐	☐	☐	☐	☐	☐

2. Do you think you have a satisfactory level of the following capacities to be an entrepreneur?

Indicate from 1 (no capacity at all) to 7 (very high capacity)

	1	2	3	4	5	6	7
a. Opportunity recognition	☐	☐	☐	☐	☐	☐	☐
b. Creativity	☐	☐	☐	☐	☐	☐	☐
c. Problem solving	☐	☐	☐	☐	☐	☐	☐
d. Leadership and communication skills	☐	☐	☐	☐	☐	☐	☐
e. Development of new products and services	☐	☐	☐	☐	☐	☐	☐
f. Networking and making professional contacts	☐	☐	☐	☐	☐	☐	☐
g. Implementation of ideas	☐	☐	☐	☐	☐	☐	☐

3. How capable do you generally feel to start-up a business (not at all 0-100% totally): _____

Section D:

1. Have you - during or as a result of the entrepreneurship programme - taken any further action towards becoming an entrepreneur? I ...

	Not done	Initiated	Completed
a. Applied for a job (project/work) in a start-up	☐	☐	☐
b. Conducted market research for a business idea	☐	☐	☐

c. Prepared a business plan	☐	☐	☐
d. Organized a start-up team	☐	☐	☐
e. Looked for facilities / equipment	☐	☐	☐
f. Acquired facilities / equipment	☐	☐	☐
g. Developed product / service	☐	☐	☐
h. Organized finance for start-up	☐	☐	☐
i. Devoted full-time to the business	☐	☐	☐
j. Applied for license, patent	☐	☐	☐

Section E: Self-employment before, at the start, during and at the end of the entrepreneurship programme

1. Have you (once) been self-employed **before** the CEE entrepreneurship programme? ☐ YES
   NO ☐

2. Have you been self-employed **when beginning** the CEE entrepreneurship programme? ☐ YES
   NO ☐

3. Have you been self-employed **during** the CEE entrepreneurship programme? ☐ YES
   NO ☐

4. Are you **currently** self-employed? ☐ YES
   ☐ NO

5. Estimate your probability to become self-employed within the next five years (not at all 0-100% very probable):

_____ % (**If you are self-employed**, please continue with section F)

6. Indicate your level of agreement with the following statements from

1 (total disagreement) to 7 (total agreement)

	1	**2**	**3**	**4**	**5**	**6**	**7**
a. I am ready to do anything to be an entrepreneur	☐	☐	☐	☐	☐	☐	☐
b. My professional goal is becoming an entrepreneur	☐	☐	☐	☐	☐	☐	☐
c. I will make every effort to start and run my own firm	☐	☐	☐	☐	☐	☐	☐
d. I am determined to create a firm in the future	☐	☐	☐	☐	☐	☐	☐
e. I have very seriously thought of starting a firm	☐	☐	☐	☐	☐	☐	☐
f. I have got the intention to start a firm in the next 2 years	☐	☐	☐	☐	☐	☐	☐
g. I have got the intention to start a firm in the next 2 to 5 years	☐	☐	☐	☐	☐	☐	☐
h. I have got the intention to start a firm some day	☐	☐	☐	☐	☐	☐	☐

7. In retrospective, how did your entrepreneurial intention develop during the entrepreneurship education programme? Choose one:

☐ My entrepreneurial intention (EI) **remained stable** throughout the programme

☐ My EI **fluctuated a little** throughout the programme **but increased after all**
☐ My EI **fluctuated a little** throughout the programme **but decreased after all**
☐ My EI **fluctuated strongly** throughout the programme **but increased after all**
☐ My EI **fluctuated strongly** throughout the programme **but decreased after all**

Section F:

1. How many entrepreneurs do you know personally? _____ (number)

If you know at least one entrepreneur personally, please answer:

a. How many of those are contacts from university or via the university network? _____

Please value **from the one entrepreneur you know best** the following questions:

	1 (to no extent) to 7 (completely)						
	1	**2**	**3**	**4**	**5**	**6**	**7**
b. To what extent do you know his/her activity as an entrepreneur?	☐	☐	☐	☐	☐	☐	☐
c. To what extent has this relationship provided you with an understanding what it means to be an entrepreneur?	☐	☐	☐	☐	☐	☐	☐
d. To what extent has this relationship influenced your intention to become an entrepreneur yourself?	☐	☐	☐	☐	☐	☐	☐
e. To what extent has the CEE entrepreneurship programme provided you with an understanding what it means to be an entrepreneur?	☐	☐	☐	☐	☐	☐	☐

2. When you think about entrepreneurs, how do you value the images that come into your mind?

	1 (very negative) to 7 (very positive)						
	1	**2**	**3**	**4**	**5**	**6**	**7**
a. Please indicate from very negative to very positive	☐	☐	☐	☐	☐	☐	☐

3. Is there an entrepreneur in your close family (mother/father/brother/sister)? ☐ YES ☐ NO

4. Have you, during the education programme, build a network of entrepreneurship like-minded people?

☐ YES ☐ NO

Section G:

1. In retrospective, did the CEE entrepreneurship education programme match your expectations of it?

☐ YES ☐ NO

2. What overall grade would you give to the CEE entrepreneurship education programme (Swiss grading, 6 excellent)?

_____

3. Would you recommend this programme to a friend of yours? ☐ YES ☐ NO

4. Would a further semester of entrepreneurship education strengthen your decision to become an entrepreneur?
☐ YES ☐ NO

5. How long would be the optimal entrepreneurship education programme (months)? _____

6. In retrospective, how would you describe the programme?

e. For students with general interest in entrepreneurship and want to learn more about it in order to decide whether becoming an entrepreneur is an option for me. ☐
f. For students who can imagine becoming an entrepreneur. Therefore, they want to learn the necessary skills and competencies. ☐
g. For students who are determined to start their own business. Therefore, they want to learn the necessary skills and competencies. ☐
h. No description above fits to the programme ☐

7. What is the single biggest learning from the EEP?

_____

Out of all respondents I will need to interview a few, would you be available for a short interview? If yes, please leave your email address, so that I am able to contact you. The data will be treated confidential and only used for this single purpose of contacting you for a potential interview:

Email: _____

Cell: _____

If you have any comments, please let me know:

_____

_____

THANK YOU!

7.5 Appendix 5: Correlations test-retest

Overall Pearson correlation T2all: .988 at 0.01 level.

Correlations

		E1_T1	E1_T2	F1_T1	F1_T2	G1_T1	G1_T2	H2_T1	H2_T2
E1_T1	Pearson Correlation	1	.965**						
	Sig. (2-tailed)		.000						
	N	10	10						
E1_T2	Pearson Correlation	.965**	1						
	Sig. (2-tailed)	.000							
	N	10	10						
F1_T1	Pearson Correlation			1	.916**				
	Sig. (2-tailed)				.000				
	N			10	10				
F1_T2	Pearson Correlation			.916**	1				
	Sig. (2-tailed)			.000					
	N			10	10				
G1_T1	Pearson Correlation					1	.978**		
	Sig. (2-tailed)						.000		
	N					10	10		
G1_T2	Pearson Correlation					.978**	1		
	Sig. (2-tailed)					.000			
	N					10	10		
H2_T1	Pearson Correlation							1	.994**
	Sig. (2-tailed)								.000
	N							10	10
H2_T2	Pearson Correlation							.994**	1
	Sig. (2-tailed)							.000	
	N							10	10

**. Correlation is significant at the 0.01 level (2-tailed).

7.6 Appendix 6: Reflection Paper

REFLECTION PAPER

Programme: CEE 2009, CEE 2010
Administration: **April 2011 via online questionnaire**

Dear Student,

As previously mentioned this scientific study is part of your entrepreneurship education programme. The study will examine the impact of entrepreneurship education on entrepreneurial intentions. The last part consists of a short reflection essay. This will help us to identify situations, events within an entrepreneurship education programme that impacted your intention to become or not become an entrepreneur and understand why they had an impact.

The data will only be accessed by the researcher and all personal data will be kept strictly confidential and will be coded to render it anonymous.

In order to match the questionnaires from the first questionnaire please complete the personal code.

Many thanks,

Michael Lorz
PhD Student
michael.lorz@unisg.ch

Advisors:
Prof. Dr. Christoph Müller
Prof. Dr. Thierry Volery

Please complete your personal code:

First letter of your month of birth: ___
First letter of your place of birth: ___
First letter of your family name: ___
First letter of your mother's first name: ___

Introduction

1. Think of an event/situation that you have experienced during or because of the entrepreneurship education programme that changed drastically your "heart and mind" to intend to become an entrepreneur.

- Please describe the event/situation in as much detail as you can remember.
- What and why did (it) motivate you to become an entrepreneur?
- Please take your strongest positive event for this exercise, if you have more than one, please describe these as well
- You can write in English or German.

Trigger-Event 1:

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2. Think of an event/situation that you have experienced during or because of the entrepreneurship education programme that drastically changed your "heart and mind" to not intend to become an entrepreneur.

- Please describe the event/situation in as much detail as you can remember.
- What and why did (it) de-motivate you to become an entrepreneur?
- Please take your strongest negative event for this exercise, if you have more than one, please describe these as well
- You can write in English or German.

Trigger-Event 2:

7.7 Appendix 7: Entrepreneurial Intention on Self-Employed

Logistic Regression on Self-Employed

Hierarchical Binary Logistic Regression Models of T_{start} predictors on Self-Employed (Yes/No) at T_{final} (N=272)

	Self-Employed T_{final} Step 1				Self-Employed T_{final} Step 2			
	(B)	**Wald**	**Sign.**	**Odd ratio**	**(B)**	**Wald**	**Sign.**	**Odd ratio**
Step 1								
Entrepreneurial Intention (T_{start})	1.937	16.601	.001***	6.936	2.173	13.442	.001***	8.788
Step 2								
Attitude Toward Behaviour (T_{start})					-.227	.166	.684	.797
Subjective Norms (T_{start})					-.594	3.007	.083	.552
Perceived Behavioral Control (T_{start})					.240	.633	.426	1.271
	Step 1				Step 2			
Cox and Snell R^2	.140				.151			
Nagelkerke R^2	.404				.434			
Overall Accuracy	94.5				94.5			
Omnibus Test Model Coefficients	41.166***				44.442***			

***p≤0.05, **p≤0.01, ***p≤0.001**

Note: Values in step2 = Beta Coefficients

7.8 Appendix 8: Coding Companies, Lecturers, Guest Speakers

Code	No.	Description
Company	1	Luxury Food Retailer
Company	2	Online Cereal Retailer
Company	3	Tea Shop
Company	4	Provider of open source software
Company	5	Online Marketing Service Provider
Company	6	Finance & Insurance Company
Company	7	Online start-up investing service
Lecturer	1	Social Entrepreneurship Lecturer
Lecturer	2	Founder and Entrepreneurship Lecturer
Guest Speaker	1	Founder of Company 4
Guest Speaker	2	Founder of Company 1
Guest Speaker	3	Founder of Company 6
Guest Speaker	4	Founder of Company 5
Guest Speaker	5	retail chains, Family entrepreneur of multinational

7.9 Appendix 9: CV of Author

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EDUCATION

Doctor Oeconomiae (Dr.oec) 08/2008 - 02/2012
University of St.Gallen, Switzerland
Master of Business Studies (MBS) 08/2004 – 08/2005
UCD Michael Smurfit Graduate School of Business, Dublin, Ireland
CEMS Master in International Management (CEMS MIM) 08/2004 – 08/2005
UCD Michael Smurfit Graduate School of Business, Dublin, Ireland
RSM Erasmus University, Rotterdam, The Netherlands
Bachelor of Business Administration (BBA) 08/2000 – 07/2004
International Business School, Hanze University Groningen, The Netherlands
Bachelor of Business Administration (BBA) 08/2002 – 07/2003
University of Macau, Macau, China

WORK EXPERIENCE

University of St.Gallen (HSG) Since 06/2008
Director of Development, St.Gallen, Switzerland Since 01/2010
Assistant to the President of HSG, St.Gallen, Switzerland 06/2008- 12/2009
Scottish & Newcastle plc 08/2005 - 05/2008
Senior Operational Auditor, Edinburgh, UK 10/2007- 05/2008
International Graduate Programme (IGP) - Job Rotations: 08/2005-10/2007
Sales & Brand Manager Chicago, USA (IGP 4/4)
Inbound Team Manager at S&N CCC Firstpoint, Livingston, UK (IGP 3/4)
Product Manager Speciality Beer in Off-Trade, Antwerp, Belgium (IGP 2/4)
Project Manager in HR Training & Development UK, Edinburgh (IGP 1/4)