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EDUCATION AND SME POLICIES

Sean Patrick Sassmannshausen, Alex Maritz, Howard Frederick; Colin Jones, and Liora Katzenstein

1. Background of this special issue

This is the second of two volumes of the special issue of selected papers presented at the 8th Australian Graduate School of Entrepreneurship International Entrepreneurship Research Exchange in Melbourne 2011 (AGSE IERE 2011). As expressed in the editorial of the first volume, the editors want to express their gratefulness to the AGSE for providing the opportunity to use the 8th AGSE IERE as a resource for this special issue. In the meanwhile the AGSE IERE has come to an end; but the idea of an international Australian entrepreneurship research conference has sustained under a new label, "The Australian Center for Entrepreneurship Research Conference (ACERE)". Murray Gillin has passed on his great leadership in founding and hosting a world class research conference and in forming an unique entrepreneurship research community to Per Davidsson and many fellow Australian (and international) entrepreneurship scholars. Information on the succeeding ACERE conference is available on the internet at http://acereconference.com/.

We previously described our motivation and the merits of the AGSE IERE in the editorial of the first volume of this special issue. Still, we would like to remind of the motivation behind this special issue. Therefore, and in the interest of those readers who didn't come across the first volume, we want to borrow some paragraphs from the first editorial. These paragraphs describe our pluralistic view on entrepreneurship, the nature of the papers that were considered for review and publication, and the review and selection process. Last but not least, we also pay our tribute to those who organized the 8th AGSE IERE. In a second chapter we will summarize the papers collected in this volume.

In the editorial of the first volume of this special issue we stated that "[t]he academic dialogue on the nature of Entrepreneurship still continues, as well as the debate on the

boundaries of the academic field. […] Acknowledging the pluralistic nature of the field, the editors have invited research papers from various disciplinary backgrounds to the two special issues." Articles in the first issue addressed areas such as new venture creation, intentions, growth, life cycle, family business, small business research, venture capital and technopreneurship, entrepreneurial failure, and entrepreneurs' philanthropy. *In this second volume the focus is on entrepreneurship education and SME support*. "Together, both volumes […] cover the broad field of entrepreneurship. Hindle (2004, p. 583) argued that entrepreneurship may be "insolubly holistic in nature", and our selection of papers aims to give – in sum – an impression of this holistic nature" (Sassmannshausen et al. 2011, p. 5).

With regard to empirical contributions, this second volume features reports and reflections based on personal experiences, taxonomies, some small scale studies of descriptive or explorative nature, and some large scale studies with explanatory power. As stated in the first volume's editorial, "[w]e believe in Paul Feyerabend's (1993) idea of methodological pluralism. That is: Different methods can be applicable, according to the aim of different studies; and even new methods may emerge. Nonetheless, any method that is used should be applicable, meaningful, generate insights, and has to be used with rigor" (Sassmannshausen et al., 2011, p. 5).

Our major selection criteria for both volumes of this special issue were "originality and relevance of interesting topics. The special issue is not limited to research from Asian countries or on sustainable entrepreneurship. The *Asia Journal of Entrepreneurship and Sustainability* (launched in 2005) is listed with ProQuest and covered by Google Scholar. It is an open access online journal, […] offering broad opportunities to get cited. Gartner et al. (2006, p. 327) have stated that "Entrepreneurship scholarship is what entrepreneurship scholars pay attention to." This special issue gives mostly early stage career researchers room to gain the attention of the wider academic community. For the editors and reviewers it was a pleasure to witness the emergence of such new scientific talents. Nevertheless, all papers have undergone a double blind review process and many

have been revised for resubmission while some have been rejected" (see already Sassmannshausen et al. 2011, p. 5.).

"The editors are very pleased with the outcome of the review process. Our idea of conducting reviews was to help authors getting published, not to hinder them. Nevertheless, academic quality was our first concern. Hence, the reviewers have conducted fair but rigorous reviews, providing detailed and constructive feedback without compromising scholarship in the field of Entrepreneurship. We are grateful to the contribution of our review board (see page 3 of this volume for all reviewers and members of the special issue editorial board).

The conference had over 200 full paper submissions, and after the conference's double blind review process, 120 papers were accepted for presentation. Out of these 120 papers many have been invited for submission to this special issue (selected for their appropriateness by the special issue editorial board) and finally 12 papers have been accepted after the common review-and-resubmission-procedure (however, two out of the twelve accepted papers had such a high quality that after reviewing they were accepted right away without any resubmission process). These twelve papers are split over two volumes of this conference special issue [while one paper on family entrepreneurship among members of the Bantu in Congo will be featured by a regular issue later on].

The special issue editors are grateful and want to express their respect for the great work the conference committee has done in organizing the 8th AGSE International Entrepreneurship Research Exchange and in selecting papers of great interest for the conference. Our thanks go to (in alphabetical order) Dr Sanjay Bhowmick (Auckland University of Technology), Dr Alistair Campbell (University of South Australia), Professor Per Davidsson (Queensland University of Technology), Professor Evan Douglas (University of the Sunshine Coast), Professor Noel Lindsay (University of Adelaide), Professor Tim Mazzarol (University of Western Australia), Ms Carolyn Oates (Conference Secretariat, AGSE), Dr Allan O'Connor (University of Adelaide), Dr Martie-Louise Verreynne (University of Queensland), and Professor John Watson (University of Western Australia). Two members of the special issue editorial team,

namely Professor Howard Frederick (Deakin University) and Professor Alex Maritz (AGSE Swinburne University of Technology) have also been members of the conference committee; the latter even chaired the committee and has facilitated the interface between the conference committee and the editorial board." (Note: The previous paragraphs have been taken from the editorial of the first volume of this special issue, as they are valid for this second volume; Sassmannshausen et al. 2011, p. 5-6).

2. Articles published in this special issue: Entrepreneurship Education and SME Policies An introduction with comments

While the first volume of this conference special issue had a focus on entrepreneurship research along the entrepreneurial life cycle, the second volume is concentrated on *entrepreneurship education and on projects supporting start-ups and SMEs*.

Our take is that entrepreneurship education is important because it serves to motivate potential entrepreneurs and helps to ensure critical inflow of ideas and entrepreneurs into the community (Maritz & Brown, 2013). Where entrepreneurship sits in higher education is another point of discussion (Jones et al, 2012). The articles by the scholars below address prominent issues around entrepreneurship education pedagogy, assessment, objectives, context and outcomes.

Susan Rushworth's article on the team-based learning approach is the opening contribution. Her article starts with a literature review and Fink's taxonomy of significant learning (2003). Rushworth then introduces the concept of team-based learning and in a next step elaborates on how this approach can be applied to the field of Entrepreneurship Education. The author continues to report on her own experience with using team-based learning in Entrepreneurship Education, pointing at advantages in several dimensions of the learning/teaching-experience. Thus, Susan Rushworth provides meaningful insights from her teaching, reflected by multi-dimensional pedagogic considerations. Her article is far from any common statistical examination of means and ends in Entrepreneurship Education, but rather provides insights for those who might search for inspirations on how to incorporate team learning. Some may say this useful article seems to be less about

'researching' and more about 'sharing', but this idea of reflecting and sharing own experience is exactly an approach that we found in line with our consideration on Feyerabend's "methodological pluralism" (1993) and absolutely worth publishing in a special issue on Entrepreneurship Education. After all, Rushworth's article is a good starting point, contributing to a young and specific field of interest in research on Entrepreneurship Education.[1] Future research could take her approach one step further by either conducting multiple case-studies on team-based learning or by quantitatively evaluating the participant's learning outcomes and learning experience.

To contrast methodological approaches, the second article makes use of quantitative research in Entrepreneurship Education, looking into means-ends relationships: How do certain means in Entrepreneurship Education effect different groups of participants? Auchter and Kriz use three large samples (e.g. n=1,706; n=1,624; n=845, total N=4,145) and one smaller longitudinal sample (n=99) to reveal gender differences in the learning effectiveness of computer based start-up simulations (see a special issue edited by Katz et al. (1995) featured by the journal *Simulation & Gaming* for an early introduction of this subject area of research on Entrepreneurship Education). In this special issue, Feldman (1995, p. 355) asked whether computer based simulations could enhance entrepreneurial attitudes and behaviors, but left the question unanswered. In short, Auchter and Kriz find that female participants in such computer based start-up simulations are negatively affected in their entrepreneurial intent. This finding is in contrast to the effects reported for male students and the effects reported in general for such simulations in previous studies (e.g. Drost 2010) that often did not differentiate for sex.[2] Auchter and Kirz confirm earlier results presented by Lendner and Hübscher 2009 (p. 275), who conducted

[1] So far Google Scholar indicates only 28 publications that contain both phrases "team based learning" and "entrepreneurship education", most of which have been published after 2008. But most of these articles treat TBL merely as a side issue. Only one article that really focuses on TBL was identified by the editors (Drummond 2012). This article was published in 2012 and first presented 2010 at the Allied Academics International Conference (hosted by Carland and Carland). Rushworth also submitted her first draft of the featured paper in 2010 and the final version in 2011, so both papers have been developed in parallel sequence but independently and without knowing the other paper.

[2] In the given context we use the (statistical) term "sex" instead of "gender" because the questionnaire asked to report the respondents' biological sex; more differentiated gender aspects had not been incorporated.

an ANOVA on students' learning benefits from participating in computer based simulations. Lendner and Hübscher mentioned a significant difference for sex in their table of results from ANOVA, but did not provide any detail on this finding. Based on their research presented in this volume, Auchter and Kirz now go deep into the matter and thereby are closing a research gap. The results have implications for the practice of Entrepreneurship Education. How can start-up simulations be executed in a way that affects female participants in a more positive way? Do we need to employ totally different simulations and games for male and female students? Should we establish single sex groups in our courses in Entrepreneurship Education? Or can we find less provoking solutions guaranteeing the positive effects for both sexes that start-up simulations are usually associated with? The results also have implications for future research, as we do not exactly understand why the negative effect occurs with female participants especially in mixed sex groups. A reviewer called for the use of qualitative methods in future research. For instance, the use of focus group discussions with female participants or manual-supported interviews in the first and the final session of the seminar could support the generation of a deeper understanding of what exactly happens to the entrepreneurial motivation of female participants. Additionally maybe more detailed quantitative methods (such as regressions or even structural equitation models) could be used in connection with the given sample, to learn more about the statistical effects behind the finding of decreased motivation among female participants in mixed-sex groups.

The third paper is a reflection on the use of case studies in Entrepreneurship Education. Sassmannshausen and Gladbach are concerned with the scarce and deficient use of case studies in Entrepreneurship Education, particularly in Germany. In Germany's traditional higher education, case studies are still often seen as something with no or only little theoretical merit, a teaching method seen inferior to the traditional lecture. The authors first lay out several dimensions of Entrepreneurship Education and how cases fit into the learning goals and target groups of the various dimensions. The authors explain how cases in entrepreneurship can be connected with entrepreneurship theory and how they can be used to generate knowledge and learning outcomes far beyond the "hinc et nunc"

of the single case. They elaborate on the advantages of the case method in general and especially on the advantages in the field of Entrepreneurship Education. They extract certain desired outcomes of Entrepreneurship Education both in terms of making entrepreneurs more successful and making participants more likely to become entrepreneurs. Following an evidence-based approach, Sassmannshausen and Gladbach explain how the case study method can leverage factors that had influencing power in empirical studies, either on entrepreneurial success or entrepreneurial intentions.

Finally, they present a small scale explorative study that demonstrates that students prefer case studies over traditional courses of lectures, because it allows them both to better comprehend concepts of entrepreneurship theory and to better understand how such concepts can be applied for the benefits of a new venture. The study further indicates that the students' self-confidence in their ability to successfully start a new venture is leveraged by the use of case studies as a teaching method. Even though no direct effect on the intent to start a new venture was measured here, the importance of such indirect effects is well reported by several previous studies (see e.g. Busenitz & Barney 1997, for an introducting review on the cognitive psychology of entrepreneurs see Krueger 2005). Sassmannshausen and Gladbach conclude with recommendations and with an outlook on how future research could be crafted to better support their arguments for the use of case studies as a teaching method.

The focus in Entrepreneurship Education usually is on teaching methods, learning outcomes and educational effects on entrepreneurial intentions and success. Commonly differentiations are made by the institutional context of learning/teaching (e.g. intra- vs. extra-curricular, common or higher education) or for target groups (most commonly differentiated by certain academic departments, gender, necessity and opportunity entrepreneurs, high- and low-tech entrepreneurs, high- or low-growth ventures, or by considering the needs of various minorities). Franks & Frederick take a fresh perspective by identifying a yet under-researched group of particular interest: dyslexics. Franks & Frederick argue that there are theoretical sound reasons why dyslexics often become self-employed. Anecdotal evidence exists that the portion of dyslexics amongst entrepreneurs

is rather high, compared to the portion amongst employees. The aim of the article therefore is to prepare the ground for future research on dyslexic entrepreneurs. Franks and Frederick organize their argumentation along four theoretical dimensions: (1) psychological trait theory, (2) social marginalization and displacement, (3) neurobiology, and (4) other environmental influences. From the literature they extract a trait typology of dyslexics and in a second step they match the trait typology of dyslexics in general with typical characteristics of entrepreneurs.

Thereby, Franks and Frederick not only generate a trait typology of dyslexic entrepreneurs, but also identify a set of commonalities and differentiating factors among (or resp. between) dyslexics and entrepreneurs. Thus, the article provides a statement on possible pull-factors but also of barriers to entrepreneurship. Entrepreneurship Education could incorporate these findings, providing future support to dyslexics, both in overcoming such barriers and in leveraging the common strength of this particularly challenging target group. But since research on dyslexia and entrepreneurship still is a very sparse field, more research would be needed in a first attempt. The article by Franks and Frederick can help to organize such future research in a fruitful and systematic way.

Judy Matthews and Sam Bucolo have conducted first research on an Australian SMEs support program that aims at stimulating entrepreneurial behavior in SME. The program especially addresses SMEs that are active in the export business. The idea of the program is to foster entrepreneurs' or SMEs' design innovation. Improved design innovation is expected to result in better international market positioning and – consequently – better firm performance. Therefore the program is assisting companies in integrating design into all aspects of their operations, an approach also frequently used in Entrepreneurship Education, an area where several 'schools of design thinking' have emerged (for instance see Kortzfleisch et al. 2011). The authors conducted semi structured in-depth interviews with participants in the program. Based on these interviews, the authors crafted two cases that reflect the early outcomes of the program. The results show that the focus on design thinking did not only improve design and market positioning but also educated entrepreneurs on strategic entrepreneurship, enabling entrepreneurs to craft better

strategies around their product or service portfolios. Future research should generate larger samples of cases to confirm results and to guide the development of questionnaires for a second phase of evaluating the program with quantitative measures and methods. According to the results presented by Matthews and Buccolo, this quantitative research should not only focus on results caused on firm level, but should also care for learning effects induced on the individual level of the entrepreneur.

The contribution by Matthews and Buccolo is presented as the closing contribution of this volume, as with their article the focus finally shifted from educating nascent entrepreneurs to an attempt that instead addresses established entrepreneurial companies. Their examination of the design innovation program demonstrates that entrepreneurial learning does not end with starting a venture. The findings presented here should make us aware that entrepreneurial learning is an ongoing challenge and not limited to pre-start-up activities. Entrepreneurship Education, as well as research on Entrepreneurship Education, should be more aware of the continuing, often life-long challenge of entrepreneurial learning. With this special issue on Entrepreneurship Education we would like to contribute to a better understanding of the life-long journey in entrepreneurial learning.

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ENTREPRENEURSHIP EDUCATION: THE CASE FOR ADOPTING THE TEAM-BASED LEARNING APPROACH

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ABSTRACT

Entrepreneurship education makes extensive use of experiential learning, but the experiential activities are often not underpinned by established theory, or rely on a narrow base of theory informed by the research interests of the teaching staff (Fiet, 2000a). Students often resist theory classes, perceiving them as boring and irrelevant (Fiet, 2000b). Fiet argued for teaching through a combination of theory and activity, where the relevance of theory is clearly demonstrated through activities based on problems the theory purports to explain or solve. The Team-Based Learning approach (Michaelson, 2002) is a specific technique that facilitates this process, and yet has not been widely adopted by entrepreneurship educators apart from Michaelson himself. This discussion paper compares the TBL process with the pedagogical principles outlined by Fiet (and supported by other research in entrepreneurship education), reports a specific experience of using TBL in an integrative business unit, and calls for wider adoption of TBL in entrepreneurship teaching.

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INTRODUCTION

If entrepreneurship is about anything, it is about *doing* (Gibb, 2007). Entrepreneurship is a practical, not a conceptual pursuit. Entrepreneurship education, therefore, faces the challenge of teaching the theoretical concepts that inform entrepreneurship practice, while making them relevant to the day-to-day challenges that confront practising and aspiring entrepreneurs (Fiet, 2000a, 2000b).

Traditional solutions involve some degree of experiential learning, ranging from simulation games, case studies, consultancy projects, even to teams of students actually starting a business. While these may succeed in engaging students, they also frequently fail to embed any of the underlying theoretical principles, because students focus on the immediate experience rather than the theoretical concepts it illustrates. But shifting the balance to a greater focus on theoretical concepts risks students disengaging (Fiet, 2000a, 2000b).

In keeping with experiential learning, and the extensive literature demonstrating that successful entrepreneurship is a team rather than a solo pursuit, entrepreneurship education makes widespread use of team assignments. However, all educators will be aware of the shortcomings of these, where weak students may pass subjects as 'passengers' alongside their stronger team members who prefer to take on an unfair proportion of the workload rather than risk a poor grade.

The technique of Team-Based Learning (TBL), developed in the late 1970s by US academic, Larry Michaelson addresses both these challenges. Theoretical concepts are studied outside of classes, tested at the beginning of a class and then immediately applied to problems that mimic the challenges of real world application. Students work in teams throughout the semester and are held both individually and collectively accountable for their performance. Dr Michaelson actually teaches entrepreneurship, having created the "Integrated Business Core" unit at University of Oklahoma where students create and operate a business. And yet, his technique has not found much favour among entrepreneurship educators, being much more widely adopted by disciplines such as medicine and engineering[1].

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This paper provides an overview of the concepts of TBL and assesses the fit of this approach with established research on entrepreneurship education. Drawing on the experience of adopting TBL for a business capstone unit, it assesses some of the challenges involved in applying the approach in teaching entrepreneurship, concluding that overall the benefits justify the efforts and offers a way to move toward entrepreneurship education that is both theoretically and pedagogically sound.

EFFECTIVE EDUCATION FOR PRACTICE

If entrepreneurship is about *doing* (Gibb, 2007), then the desired outcome of an education program is not just that students should *know* things they did not know before they commenced the program, but that they should be able to *do* things they did not know how to do, or lacked confidence in their ability to do, before the program: in other words, to apply their knowledge.

One term for this ability "to do" in real life circumstances, is "capability" (Stephenson, 1992) and, in keeping with the richness and complexity of what it represents, does not lend itself to simple definition. Stephenson offers the following explanation:

"Capability depends much more on our confidence that we can effectively use and develop our skills in complex and changing circumstances than on our mere possession of those skills. The following definition of capability, however, has been useful in exploring the essence of capability with academics:

Capable people have confidence in their ability to

- *take effective and appropriate action,*
- *explain what they are about,*
- *live and work effectively with others and*
- *continue to learn from their experiences*

as individuals and in association with others, in a diverse and changing society."(Stephenson, 1992:1)

Thus a capable accountant, for example, should be able not only to manage the production of an accurate set of financial accounts for a company, but to identify issues that need attention and recommend actions, to explain to non-accountants what the figures

mean, to work productively with colleagues from their own and other areas of specialisation and to keep up to date both with the knowledge and skills base of their profession and its practical application in a wide variety of circumstances.

Capability is distinguished from competency by the degree of familiarity of problems and contexts. *Competent* practitioners can deal confidently only with familiar problems in familiar contexts, whereas *capable* practitioners also have confidence to deal with unfamiliar problems in unfamiliar contexts (Stephenson, 1992: 5).

The importance of capability is inherent in the approach of developing theory grounded in practice (Glaser & Strauss, 1967; Eisenhardt, 1989), which emphasises richness and complexity over reduction and predictive certainty. Rae (2004) has pioneered the field of practice-based entrepreneurship theory, developed through systematic exploration of actual practices used by entrepreneurs using a Weickian (1995) sense-making approach. This, in turn, lends itself to teaching, through students learning to understand the theory by drawing on their own direct and observed experience to "make sense" of theory as it affects their current context and future decisions (Rae, 2005).

Biggs (2003) emphasised the importance of what he calls *constructive alignment* across a teaching program. This argument is based on the premise that *good* learning is *deep* learning, where the objective is to make sense of the curriculum in order to mentally file it; to retrieve it; *and to apply it*, not just in the classroom, but also in real life.

Good teaching is therefore that which supports deep learning and is a partnership between teacher and student to construct an environment within which the student can develop a deep approach to learning. Conceptual pre-requisites of this are (Biggs, 2003: 13):

- a shared understanding of learning objectives ("where we are supposed to be going")
- motivation on the part of students to get there
- freedom to focus on the task (rather than the test)
- collaborative and dialogue-based learning, involving fellow students as well as teachers

Constructive alignment at the level of a unit of study (subject, module) involves designing a coordinated series of activities that support these conceptual elements. The approach advocated by Fiet (2000a, 2000b) exemplifies constructive alignment.

Teaching for capability requires that students take responsibility for their own learning, which in turn implies a student-centred approach to teaching (Stephenson, 1992: 8) and is compatible with andragogy (adult-leading versus the child-leading basis of pedagogy) as favoured by entrepreneurship education research (e.g. Neck & Greene, 2011).

Traditional learning objective frameworks, such as Bloom's taxonomy of educational objectives (Bloom, 1956), do not distinguish well between *knowing how to* and *being able to*. For example, a student may use "synthesis" and "evaluation" (the two highest order cognitive skills in the taxonomy) to combine information from a variety of sources and disciplines to evaluate a range of options and recommend a course of action *on paper*, but this does not necessarily mean that they have the confidence to do so in the real world, where poor judgement may lead to loss of status, credibility, employment, income or even life.

A more useful taxonomy for the teaching of capability – the confidence 'to do' – is Fink's taxonomy of significant learning (Fink, 2003), illustrated in Figure 1. Whereas Bloom's taxonomy focuses implicitly on degrees of mastery of *content*, Fink's taxonomy focuses on application, relationships (between ideas and between human actors) and on the process of learning, arguably a much better preparation for success in a complex and ever-changing world. Fink's expertise on small group learning informs and underpins the team formation and team activities that form the core of the TBL approach to education (Fink, 2002).

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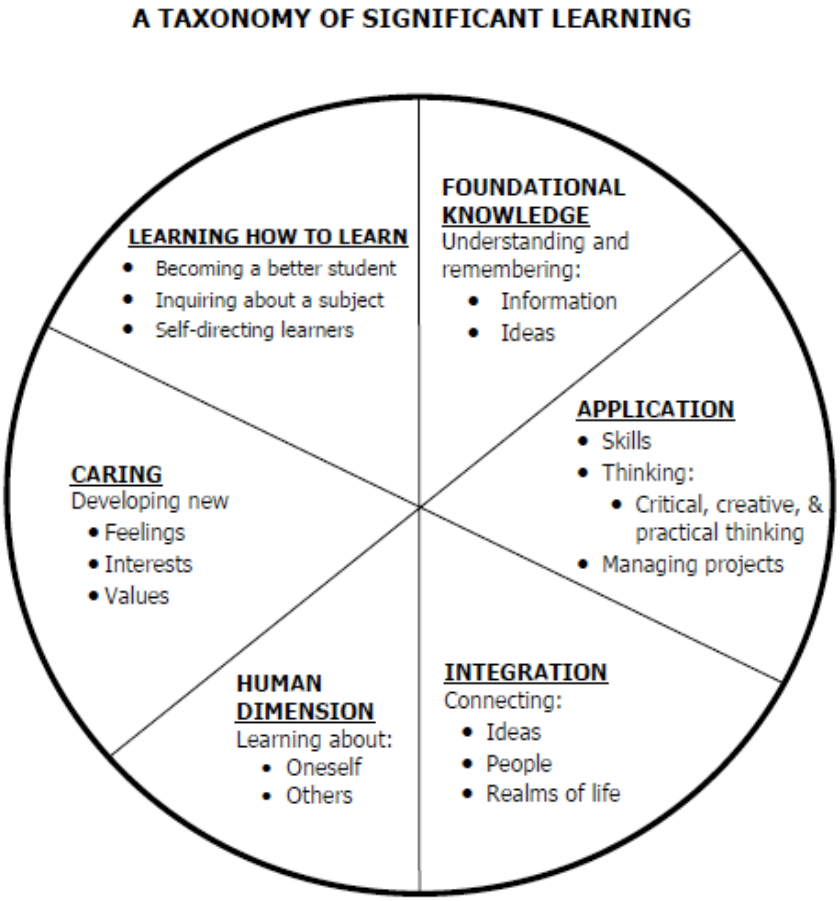

Figure 1: Fink's taxonomy of significant learning
[Source Fink, 2003: 30; image from Google images]

EFFECTIVE ENTREPRENEURSHIP EDUCATION

Experiential learning, where students learn from actual experiences rather than textbook knowledge, is strongly associated with teaching for capability (Stephenson & Weil, 1992). Unlike other disciplines where there is a clear body of knowledge to be mastered (such as accounting practices) or proven analysis techniques to be understood and applied (such as Porter's 5 forces), entrepreneurship capability depends more on using judgement, making assumptions, analysing risks, building relationships and a large amount of trial and error. While there are areas of knowledge that can be applied (it is useful, for example, to be able to read a balance sheet), entrepreneurs habitually tread new ground

and can only rely on conventions and standards to a limited extent. Indeed, their success often depends on actively challenging conventional wisdom. Experimentation and learning from experience are important skills in the entrepreneur's toolset.

Experiential learning, the principles of which were outlined by Kolb (1984), involves a heuristic approach to learning, where skills and knowledge accumulate through a cyclical process of *concrete experience*, *reflective observation* of that experience to form *abstract concepts* leading to *active experimentation*, which in turn leads to new concrete experiences. Learning styles characterise preferences for specific stages of this cycle.

The Kolb model has informed much research in entrepreneurship education, such as Corbett (2005) who proposed that that each of the learning style preferences was more suited to a different stage of the entrepreneurial process: entrepreneurs, therefore, should identify their preferred learning style and its applicability so as to recognise when it was critical to bring in others with different learning styles. Politis (2005) examined the influence of prior experience on learning, finding that past failures promoted an exploratory approach, while past successes promoted an exploitation approach.

Sarasvathy (2001) highlighted the influence of dominant logic on the learning cycle, identifying two perspectives: *Causation*, which favours established techniques of analysis and estimation to make the most of what already *is*; and *Effectuation*, which favours synthesis and imagination to imagine and bring into being what *could be*.

More recently, Neck and Greene (2011) proposed a new "world" of teaching entrepreneurship based on a *Method* approach, which presents entrepreneurship as value creation using a portfolio of techniques, which students learn to understand through experimentation and practice, in conjunction with reflection on their practice.

The above are just a selection from many excellent studies – the point is that experiential learning is well established as an essential component of entrepreneurship education.

Fiet's (2000a) contribution was to highlight a disconnect between the ideal of entrepreneurship education and the current practice. He investigated the practice of teaching entrepreneurship by comparing syllabi and teaching styles of a number of

leading practitioners in the field. He found a wide divergence in curriculum, which he attributed to the absence of a generally agreed theory of entrepreneurship. The result was curriculum driven either by 'academic autobiography' (the research background of teaching faculty) or 'case and anecdote' (an atheoretical combination of guest speakers, cases and 'war stories').

Fiet argued that this was unsatisfactory:

> *"Theory is an essential part of what we teach because we do not know any other way to help students anticipate the future, which is a key to entrepreneurial success, unless we counsel them to rely on luck or intuition." (Fiet, 2000a: 1)*

Thus entrepreneurship education as actually practiced, according to Fiet's analysis (2000a), failed to cover the full experiential learning cycle, either focusing on *concrete experience* while neglecting *abstract concepts* (the 'case and anecdote' approach) or focusing on a narrow set of *abstract concepts* that were not reinforced through relevant *concrete experiences* (the 'academic autobiography' approach).

Fiet's solution was to take a contingent approach to teaching theory that presents multiple perspectives on core questions of entrepreneurship, explaining the assumptions that underlie each perspective, and examining the evidence to support these assumptions. This approach, he argued, was consistent both with the scientific research method of theory development, and with the practise of entrepreneurship which, in common with entrepreneurship research, seeks "to construct a more accurate, general theory about the future" (Fiet, 2000a: 22).

Neck and Greene (2011) took a broader view of entrepreneurship education identifying three "worlds" that entrepreneurship educators have generally taught in: *Entrepreneur* (focus is on characteristics of the entrepreneur), *Process* (focus is on proven and predictable processes), and *Cognition* (focus is on how the entrepreneur perceives and thinks), and advocating a fourth: *Method* (focus is on a portfolio of techniques to practice entrepreneurship).

Viewed through this lens, Fiet's critique (2000a) can be seen as situated predominantly within the *Process* world, where theories are chosen for their predictive ability – in particular their ability to prevent failure – and somewhat dismissive of the *Entrepreneur* world as placing too much emphasis on individual role models. (*Cognition* was only beginning to emerge as a field at that time)

Neck and Greene (2011) argued that the three existing "worlds" failed to address the uncertain and rapidly changing context in which today's entrepreneurs have to operate and advocated adoption of the *Method* world, with its emphasis on creativity, experimentation, and assembling a toolkit of techniques - more in keeping with the effectuation (Sarasvathy, 2008) view of entrepreneurship.

Fiet's proposed solution to the shortcomings he identified in entrepreneurship education was that theory should be presented in the context of explaining observed outcomes and assisting in making decisions, and always accompanied by evidence of validity, thus maintaining relevance to students (2000b).

Fiet's solution can be extended to the other "worlds" identified by Neck and Greene (2011), by substituting the predictive theories of the *Process* world with whatever fundamental building blocks are favoured by the educator's preferred world(s) – in the *Method* world, for example, proven techniques. The key point is that the educator is clear about the content students should understand and the reason it may benefit them to understand it. Summarising the above, entrepreneurship education should:

- Be grounded in evidence-based theory and proven techniques (Fiet, Neck & Greene), …
- … aimed at embedding *capability* rather than *knowledge* (Stephenson, Rae), …
- … through experiential learning (Kolb, Rae, Sarasvathy), …
- … in the form of significant learning experiences (Fink), …
- … that apply theoretical concepts to problems students expect to encounter in practice (Fiet, Neck & Greene), …
- … and ideally involving students in the design of these activities (Fiet, Stephenson, Neck & Greene)

I would further argue that entrepreneurship education should involve working in teams because, despite popular conception of the entrepreneur as maverick, entrepreneurship is a team rather than a solo pursuit, involving as it must, negotiation for use of others'

resources (Stevenson, 2004).Team-based learning is a specific technique that facilitates many of these concepts.

OVERVIEW OF TEAM-BASED LEARNING

In order to understand how the TBL approach supports the ideal of entrepreneurship education outlined above, it is necessary to explain briefly what it involves. The overview that follows is a synopsis of Michaelson (2002).

Dr Larry Michaelson of the University of Oklahoma developed TBL more than 30 years ago in response to the pedagogical challenge of teaching classes of more than 100 students using group activities designed for classes of 40 or less. Rather than abandon the group-based activities and assessments, which he had found very effective at embedding learning, he adapted his teaching approach to allow the majority of the group-based activity to be done in class.

In TBL, theoretical content is studied outside of class by students working independently, allowing class time to be spent on *applying* those concepts through group activities carefully designed to embed the key concepts.

In order for this to work, the lecturer needs to be confident that students will have done the independent preparation and are ready to apply the skills and concepts they have studied. Therefore classes begin with a 'Readiness Assurance Process' (RAP) consisting of a multiple-choice test based on the set readings, which students do first individually and then as a team. As a team, this involves not only deciding on the right answer, but on working out the best process for arriving at that answer. Over multiple rounds of TBL, the latter skill improves significantly.

Following the RAP, the remainder of the class is spent applying the concepts to a real problem (when classes are of short duration, this may be done in a subsequent class). Based on years of experience, activities are designed to follow four key principles: **S**ame problem; **S**ignificant problem; **S**pecific decision; **S**imultaneous reporting. *Significant*

drives student-engagement, while *Same* problem and *Simultaneous* reporting introduce the stimulus of competition. *Specific* decision encourages the teams to work together, in contrast to general decisions that allow students to divide up the work and work independently.

The objective of the team-based activities is to generate significant learning experiences (Fink, 2003) that embed deep learning (Biggs, 2003)

A unit of study would start with simple problems, working toward a complex problem that the team would tackle after mastering core concepts and developing effective team-working skills. The number of sessions involving a Readiness Assurance Process is discretionary.

A core principle of TBL is immediate and frequent feedback. In the group test, a special form is used with a thin opaque layer (like a lottery scratch ticket) covering squares representing the four possible answers. Teams agree an answer and scratch off the corresponding square. If they are correct, it will reveal a star. If not, they need to try again. If many teams make the same mistake, the lecturer can intervene to clarify misunderstandings, ensuring that core concepts are understood before continuing.

For the team tasks, after decisions are simultaneously reported, a discussion takes place where teams have to explain and defend their choices. Thus they get feedback from each other and from the discussion process on the quality of both their decision and their supporting argument.

Accompanying the tests, team activities and assessments is a process of peer review, usually carried out two or three times during the semester. This involves both providing and receiving qualitative feedback that allows students to reflect on their contribution and make improvements, as well as a quantitative rating of team members' performance against a number of agreed criteria (ideally negotiated by the students themselves).

In summary, the TBL approach offers these main benefits:

- Accountability for individual *and* team performance
- Efficient use of class time through emphasis on activities that can *only* be done as a team, leaving individual work to be done outside of class

- Embedding core discipline concepts through experiential learning
- Embedding the benefits of effective teamwork through positive experience

TBL AND ENTREPRENEURSHIP EDUCATION

The TBL approach facilitates achieving the objectives of effective entrepreneurship education. Each of the objectives outlined in the previous section are discussed in turn.

Grounded in evidence-based theory and techniques and applicable to problems students expect to encounter in practice:

TBL cannot ensure the quality of theory, models or techniques presented to students, but it does force lecturers to be selective and critical about what they ask students to read and prepare for class. Not only do we have to ask whether it is necessary for our students to know and understand the concepts, but we also have to ask what problems it will help the students to solve, since we must design an activity for the students allows them to apply those concepts. The test of relevance cannot be ignored. TBL provides a mechanism for evaluating curriculum content and progressively refining it to be aligned to the learning objectives of the unit of study.

Conversely, it also allows learning objectives to be refined and sharpened so that they become outcomes that *students* find valuable rather than boxes to be checked by accreditation committees, while the link to theory ensures that these refined outcomes remain academically sound.

Aimed at embedding capability rather than knowledge

TBL reinforces the foundational knowledge that is a pre-requisite for capability, but relies on the student to acquire this knowledge through independent study, thus building a capability in self-directed learning. The focus of class activities is to embed the knowledge by applying it to real problems that are relevant to the challenges students expect to face in their entrepreneurial endeavours. By attempting to apply knowledge, incomplete or incorrect understanding is quickly revealed and addressed at the time.

Through solving problems, making decisions, diagnosing situations etc, students acquire a confidence in their ability to *do* (self-efficacy).

Through experiential learning involving significant learning experiences

Students who are drawn to study entrepreneurship usually have a bias for action (and often a short attention span). They are drawn to active experimentation and enjoy concrete experiences, but quickly grow impatient with abstract concepts. And yet, as Fiet (2000a) argued, it is those abstract concepts (theory) that help them to decide what to do when faced with the many challenges that entrepreneurship involves. Much as they may be entertained and motivated by stories from successful entrepreneurs, they are unlikely to find those anecdotes of much practical help in their own ventures, because it is very unlikely their circumstances will be sufficiently similar.

TBL is a technique that follows the full experiential learning cycle. In an individual class, *abstract concepts* are studied (and understanding of them tested) and then applied through *active experimentation* on a specific task, providing a *concrete experience*. The discussion that follows the reporting of the teams' decisions, provides a form of *reflective observation* of what they have learned. The reflective practice component is strongly supported in Neck and Greene's (2011) *Method* world of teaching entrepreneurship.

Over a series of classes, the reflective observation accumulates and the understanding of abstract concepts is refined and personalised. Students begin to see how the theory explains what they experienced and observed, and how it can help them to plan or make decisions for their own venture. Students are led toward an understanding of "what each concept means for *me*".

The quality and significance of the learning experiences afforded by team activities obviously depend on the design of the team activities. Fink (2003) provided both the theoretical basis and practical guidelines for designing activities likely to generate significant learning. Fink argued that "In order for learning to occur, there has to be some change in the learner" (2002: 30) and unpacks this concept to identify the six types of

significant learning that form his taxonomy (see Figure 1 above), all of which are centred on a form of change in the learner's perspective.

Student-directed learning

Within the philosophy and structure of TBL, there is ample scope for students to design and negotiate their learning activities and objectives. Michaelson (2002) advocated involving students in the discussion of allocation of assessment weightings, for example, and in agreeing criteria for the team peer reviews.

Going beyond this to student-designed activities is no trivial matter. Numerous objectives arise:

- Student perception that they're being asked to do the lecturer's job for them
- Irrelevant activities (don't apply the theoretical concepts)
- Ineffective activities (poorly designed, unexpected outcomes, not accepted by other students)
- Contribution to assessment (rewarding students who design activities or not?)

However, these apply equally to any teaching approach. Experimentation is required and a proportion of those experiments will be unsuccessful. However, learning can usually be extracted even from unsuccessful experiments. TBL provides a context where students are more empowered than in traditional classes and is therefore likely to be more, rather than less conducive to experimentation.

The one constraint that TBL enforces is that all students work on the same problem at the same time. Whether that problem is designed by the lecturer or students is unimportant. For example, the student-designed negotiation exercise that provided by Fiet (2000b) as an example could be used in a TBL class with only minor adaptation to allow for participation as a team rather than a pair.

Supports the value of working in teams

Why do we ask our students to work in teams? Many students hate it. Strong students dislike it because feel they have to 'carry' the weak or lazy students. Shy students or those with weaker language skills fear rejection by their more confident, more outspoken team members. Everyone dreads trying to organise team meetings outside of class. The overall experience is negative.

So why do we persist with team assignments? Because most work (paid or otherwise) gets done by groups of people working together rather than individuals working alone. Getting a group of people to work together effectively as a team is an extremely valuable skill, especially for entrepreneurs who are so often dependent upon the resources of others (Stevenson et al., 1994). However, if most students have negative experience of team assignments, then we are not succeeding in developing capability for teamwork.

The main reasons students dislike team assignments are:

1. The requirement for teams to meet outside of class time
2. Lack of equity: workload is not equal, yet all team members get the same mark

Both of these issues are significant. Meeting outside of class time is problematic. Full-time students may be studying four subjects per semester, each with a team assignment, and with different team members in each subject. On top of that, they are probably working part time. Trying to find a timeslot when everyone can meet is a nightmare.

With TBL, the majority of team work is done *during* class time, because the majority of the independent work is done *outside the class*. Content and theory is covered by students doing their own independent preparation at their own convenience. Class time is spent on activities that apply this independent learning, including team assignments. 'Class' time does not have to be spent in the classroom, but could be anywhere that contributes to the applied learning activity that the teams are working on – in the library, on a field trip, in the high street researching a new business idea.

The lack of equity issue is something TBL was developed specifically to address. Michaelson (2002) refers to the issue of non-contributing students as 'social loafing' and identifies several contributing factors, which TBL is designed to neutralise.

First of all, it looks beyond the symptom (unequal contribution) to the underlying causes. Students usually assume that lack of contribution is due to laziness or incompetence, and this may indeed be the case in some instances. However, there are other factors such as lack of confidence, language skills, intimidation by outspoken, highly confident team members and so forth.

TBL seeks to overcome these issues in several ways:

1. Distribute the 'assets' and 'liabilities' equally within teams

TBL teams are not self-selecting. Lecturers allocate students to teams according to criteria defined by the set of skills (or liabilities) that are most likely to be relevant to the particular subject and the cohort of students. Rare assets (for example several years of work experience) are separated between different teams, similarly with liabilities. The aim is to have a diversity of knowledge, skills, cultural and work backgrounds.

2. Hold students individually and collectively accountable for performance

The individual component of testing in the Readiness Assurance Process (RAP) ensures that weak students cannot 'hide' in a strong team. Their lack of preparation or weak grasp of the concepts will be revealed by the individual test. Furthermore, when the team does the test together, it will be obvious that they have little to contribute.

However, the team negotiation of the test also shows up the over-confident contributors who are sure they know the answer, but turn out to be wrong. It exposes the quieter team member who didn't have the confidence to speak up but turned out to have most of the right answers. It encourages the loudmouths to pipe down and the quiet mice to speak up and everyone in the team to check everybody else's opinion. The team score is almost invariably above the highest score of any individual member.

3. Design activities that encourage students to collaborate

The key here is to avoid tasks that can be divided up and worked on individually, and the way this is achieved is to design tasks that result in specific decisions. Thus the *output* of the task is minor – Yes/No, one of four options, an entry price for a new product – so the focus is on the process of making the decision. In particular, tasks involving significant writing are to be avoided because writing has to be delegated to one or two individuals. Simulation games could be well-suited to TBL because they usually involve a limited number of decision points, but a complex set of factors to be taken into account in arriving at the actual decisions.

After a few weeks of working together in this way, teams develop a good sense of their individual strengths and weaknesses and how each member can contribute most effectively. Peer review about half way through the semester is a good way to get them to reflect on this. By the end of the semester, they can approach a more complex task that *does* require them to divide up the work in a productive way that makes the most of each team member's abilities. Teams develop a sense of accountability to their team, rather than to the lecturer (Sweet & Pelton-Sweet, 2008), which shifts the focus from the *test* to the *task* (Biggs, 2003)

PERSONAL EXPERIENCE

For the past three semesters, I have been using the TBL approach to teach an undergraduate capstone unit. Although it is not an entrepreneurship program, it contains many of the same challenges. The unit's purpose is to prepare students to conduct a consulting project for a real client, where they will face unfamiliar problems in unfamiliar contexts. Thus a requirement to develop *capability* (Stephenson 1992) is indicated.

The subject is an integrative unit of study, mandatory for all Bachelor of Commerce students and therefore classes have a range of majors (Accounting, Marketing, HRM, Entrepreneurship). Students are allocated to teams on the basis of major, gender and country of origin.

In a 12-week semester, four classes include a Readiness Assurance Process and relevant team activity (one of these is an ungraded practice run). In the second half of the semester, students work on an extended case study, which requires them to do independent research and analysis and develop a business case for their recommended solution. This represents a mini version of what they will be expected to do for the real business client in the following semester.

Relating theory to practical problems

As an integrative unit, we do not teach new content, but seek to reinforce existing knowledge, therefore it is not an objective to cover new theoretical concepts. Students are given preparation readings relevant to the team activity they will be asked to do that do not rely on specialist content, but highlight themes students should already have some knowledge of. Depending on their major, the content may be more or less familiar.

Students typically begin by treating this as a memorisation exercise (and some do not advance beyond this). Group discussion of the solution helps them to embrace the concepts. Strong teams talk about the issues when trying to choose the right answer. Weaker teams talk about which option (a, b, c or d) they chose.

Intervention from the lecturer is required at the beginning to remind students how the preparatory readings relate to the task or activity they have been given, and to relate the outcomes back to the readings at the end of the class. This is consistent with Fiet's (2000a) approach to integrating theory with application, where the theory is discussed first, then the activity takes place, and then a debrief recaps the theory and how it helped to predict, or at least make sense of, what happened.

The most promising indicator that theory was sinking in was some of the strongest students reporting that they used the readings we gave them in *other* subjects they were studying in the same semester.

Embedding capability rather than knowledge

Students typically enter the unit having achieved a degree of competence in their chosen major. That is, they are able to solve familiar problems in familiar contexts. They are not comfortable with unfamiliar problems or unfamiliar contexts, let alone both of these in combination. Nor are many of them comfortable with an answer that depends on judgement and educated assumptions rather than the lecturer revealing the 'correct' answer at the end of the class. Therefore some coaching and support is needed.

In particular, we have had to provide some coaching in the role of assumptions. Activities are based on cases or scenarios with limited information and teams interpret them differently. This has proved to be very useful in bringing out a key business (and life) skill, which is to recognise assumptions, make them explicit, understand how they influence your recommended solution, and assess the risk of them being incorrect.

The multi-discipline, multi-cultural teams are a real asset here, because it means that each team member has some knowledge or skill that none of the others possess, whether from their chosen major, from their country of origin or cultural background, or from work experience. Therefore no student feels under pressure to be the expert, but everybody has a perspective that adds unique value. With relatively little coaching support from the lecturer, they start to debate the problem and ask for each others' opinions.

In line with TBL philosophy, team tasks are designed to force a decision so solutions are presented in the form of a limited number of options, each of which has advantages and disadvantages, so there is no clear 'right' answer.

These team-based activities have been very effective in building students confidence in their ability to *explain* and *justify* their selected option. Their ability to present a concise business case for a proposed solution is vastly improved by the end of the semester.

Experiential learning

The TBL process inherently provides concrete experiences and abstract concepts. To reinforce the reflective observation component of experiential learning, we require students to write public (within their class) blog entries. They are asked to write about

what they are learning and how they are learning it, and how this changes the way they think about their studies, their careers and society in general. A couple of team exercises with a focus on sustainability proved especially fruitful for reflection.

What one student writes in their blog can provoke another student to reflect on their own learning experience and write about it. In this way learning becomes collective as well as individual.

To encourage the active experimentation component, and to build competency in different 'literacies', we ask students to include images and video clips in their blogs. Some have gone as far as to create their own video clips using 'avatar' sites such as Xtranormal.

Significant learning experiences

Through the blogs, we routinely read students' accounts of experiences that have changed the way they think. Many, many students report changes in their attitude to teamwork and to their team members. They realise their initial impressions were misleading and they learn new respect for each other. They develop skills in giving constructive feedback. They learn how to manage group dynamics more effectively.

Students begin to think of how their skills and knowledge relate to work and society. They notice news items and find YouTube clips that illustrate the ideas we have discussed in class. ("Hey, I just read this article about child care regulations – maybe we should have chosen Option 2 instead").

Involving students in the design of learning activities

We have experimented with this only to a limited extent, and only in the most recent teaching period. The major team assignment was presented as a fairly open-ended requirement, allowing teams a good deal of flexibility about how they chose to respond. This simulated the experience they would have in the Industry Project unit that followed, where they would have to respond to a client brief that might be quite broad and imprecise.

The results were encouraging, with substantial variety in approaches to the problem, especially among the stronger teams. A significant benefit was that the final session, in which the teams presented their findings, was much more engaging both for students and to teaching staff, because presentations were much more varied and novel.

Promoting effective teamwork

This is what TBL is for and we have found that it genuinely does deliver a positive team experience. Although there is initial resistance to not being able to choose their own team members, students quickly overcome this, supported by activities and exercises that help them get to know each other. They find common bonds and interesting differences and become interested in each other as individuals.

Every team contains surprises. Many of the Asian students have difficulty with spoken English but their reading is good and they surprise their English-speaking team members by scoring well in the individual test. The confident, impulsive student who is sure they have the right answer turns out to be wrong. They just confident they are right next time, but the rest of the team has learnt not to be so quick to go along with them. Somebody in the team has worked in the industry the team activity is about, or in the country it is based in, or has some particular knowledge. One person is good at organising the team and bringing them back into focus. Another may be creative and a lateral thinker, but inclined to wander off. Another is a good peacemaker and can calm things down when discussion gets overheated.

The immediate feedback from the 'scratchy' forms used for the group test is enormously energising and bonding. This part of the class is often noisy and playful. High Fives all round when the right answer is chosen. Groans and sighs when they get it wrong, followed by relief when the second choice turns out to be right.

Students develop loyalty to their team members. Absenteeism is low and when they can't be there, they take care to let someone else in their team know rather than not showing up.

Routinely, strong students report that this has been their first truly positive experience of teamwork and that they are very grateful for the experience.

This process is not automatic and needs to be supported. We have found that we need to allow a couple of weeks of 'getting to know each other' classes before we can commence the TBL process. TBL takes students outside their comfort zone, so they need some reassurance that they are 'safe' in order to be able to embrace the experiment to any degree. Within a program where several units were taught in this manner, however, the process might be accelerated.

Engaging teaching staff

The capstone integrative business unit is delivered by a team of teaching staff drawn from different business disciplines, who collaborate to design the curriculum and delivery method. For this to work, regular planning and debriefing meetings are essential. This process, while labour intensive, has proved extraordinarily engaging and creative. Just like the students in their multi-disciplinary, multi-cultural teams, we learn from each other and we learn about each other. We work to each others' skills and share the workload according to inclination and ability. Technically-oriented people manage the wikis and blogs; one person with an eye to aesthetics and professional presentation formats all teaching materials for consistent look and feel; another person coordinates printing and distribution of teaching materials.

The collaboration also facilitates exchange of knowledge on our discipline areas and teaching styles. It generates ideas for other subjects we teach and for collaboration on research, and it builds a network that extends our institutional social capital.

RESULTS AND IMPLICATIONS

The fit between Fiet's recommended pedagogy for teaching entrepreneurship (Fiet 2000a & 2000b) and Michaelson's (2002) team-based learning approach is strong. The technique also supports the broader view of entrepreneurship education approaches outlined in Neck and Greene (2011). Overall, the case for wider adoption of this technique in teaching entrepreneurship is strong.

The efficacy of the technique in embedding theoretical concepts is strongly supported by its use in other disciplines such as medicine and engineering and a multitude of cases confirm its ability to overcome the weaknesses of traditional 'divide and conquer' team assignments. It is underpinned by sound theory of small group learning (Fink, 2002). My direct experience of the technique in a capstone unit confirms its efficacy in creating strong and productive bonds in student teams.

Having taught entrepreneurship units to undergraduate students before, I have encountered the frustration of trying to embed core concepts in a lecture plus tutorial setting. Take Porters 5 Forces as an example, which we routinely use in opportunity evaluation and business planning. Porter has written a journal article that explains the concepts, but most of the students won't read it. So you cover it in a lecture, which is boring and then try to get them to apply it to a case or their own business idea, but they didn't really get the concepts in the first place because they didn't read it and tuned out during the lecture.

How much better if they prepared the reading before the class, did a test on the main concepts, repeated that test as a group and then went on to conduct a Porter 5 Forces analysis on a selected industry. A specific decision is involved – what is the 'strength' of each force. Teams can report simultaneously and then debate the answers. Team A said the barriers to entry were high; Team B thinks they are low. Team A explains their reasoning; Team B gives their counter-argument. Robust debate ensues and students get a better understanding not only of how a Porter 5 Forces analysis works, but what it is useful for, and how different assumptions and interpretations lead to different conclusions. And best of all, everybody has fun, including the lecturer. I know this is possible. I have experienced it.

The greatest challenge of adopting the team-based learning approach to teaching entrepreneurship is also probably the strongest argument for doing so. Team-based learning requires explicit identification of the theory, models and techniques being taught. This forces academics to go beyond cases, anecdotes and fragmented toolkits to identify the underlying theory and philosophy that informs their teaching (and to highlight if such

theory is lacking). In short, it enforces academic rigour, which can only be a good thing for entrepreneurship scholarship and teaching.

The investment in adapting content and delivery is significant, but the evident benefits of greater student engagement and more self-directed learning, make a compelling case for exploring this technique further.

NOTES

See the list of courses on the Team Based Learning web site at ww.teambasedlearning.org

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GENDER ASPECTS BY USING START-UP SIMULATIONS FOR ENTREPRENEURSHIP EDUCATION
RESULTS OF THEORY-BASED EVALUATION STUDIES

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ABSTRACT

Since 2005, we have been carrying out several studies in the area of entrepreneurship education with business games that simulate start-up business processes. One part of the studies is to research the learning effects of university students in Germany, enrolled in regular courses involving start-up simulations. In these simulation courses the entire process of starting a new venture is simulated.

Another important part of our studies is the evaluation of entrepreneurship education in the nationwide German competition "exist-priMEcup". Both activities (regular courses and voluntary competition cup) share the common goals of fostering entrepreneurial competencies and influencing the intention of participants to start-up their own company. The same start-up business simulations are used and the same research methodology is applied in both programs. We put into practice the theory based evaluation approach. The evaluation of the business simulations should have a logic model as its starting point. This

logic model provides a framework for the interpretation of what takes place during the entrepreneurship business simulations.

Apart from other results, significant differences due to gender aspects have been identified. These aspects and two new studies (one of them currently still being carried out) to examine these gender differences are the issue of this paper.

1. INTRODUCTION

Gender aspects in respect of entrepreneurial activities, start-up motivation and success etc. are more and more discussed in the field of entrepreneurship research and entrepreneurship education (de Bruin, Brush & Welter, 2007; Maxfield, 2007; Fischer, Reuber & Dyke, 2003; Hisrich & O`Brien, 1981). There is still a great demand in the German speaking area for teaching and training entrepreneurship in universities and in the field of start-up consultancy. To start a new company is a complex task and requires from its founders a wide range of competencies and knowledge (Kriz & Auchter, 2006, 2007). The computer supported business simulation game "TOPSIM-Startup" represents the complexity and the relevant variables in different start-up situations, and covers all stages of a start-up business from collecting information, checking the business idea to transforming the business idea to a successful company in a competitive situation (Auchter, 2003; Auchter & Keding, 2004). Since 2005, we have carried out several studies in the area of entrepreneurship education with business simulations that simulate start-up business processes, further called "start-up business simulations" (e.g. Kriz, Auchter & Wittenzellner, 2008). One part of the studies is to research the learning effects of university students enrolled in regular courses involving start-up business simulations. Currently we have done research on more than 1000 students enrolled in more than 50 courses. Another important part of our studies is the evaluation of entrepreneurship education in the nationwide German competition "existpriMEcup". More than 4000 students have been attending about 200 of these cup-seminars. Both activities (regular courses and voluntary competition cup) share the common goals of fostering

entrepreneurial competencies and influencing the intention of participants to start up their own company.

The central research question in this paper is: Do the start-up simulation seminar outcomes show differences due to gender aspects in regard to a change of entrepreneurial competencies and motivation?

2. ENTREPRENEURIAL COMPETENCIES AND ENTREPRENEURSHIP EDUCATION

Explicit knowledge only about start up management does not suffice to produce an actionable response to the day to day challenges of entrepreneurs (Hisrich, Peters & Shepher, 2010; Koch, 2003; Braukmann, 2001). The model of Brinckmann, Salomo & Gemünden (2006) describe technical, methodological and social competencies as well as entrepreneurial competencies as key factors leading to profit and market success. Entrepreneurial behavior as a success factor has been intensely discussed (Frank, Korunka & Lueger, 2002). There is widespread opinion that entrepreneurial activities are traceable to specific bundles of competencies and motivation, which in turn are influenced by personality factors (Gemünden, 2003). Based on these insights it is suggested that the following competencies and inclinations should be investigated in connection with start-up business simulations (Auchter, 2001; Klandt, 1998).

Technical and methodological competence: Technical competence in this context is the specialist knowledge needed to found and lead a new enterprise. Methodological competence covers the mastery of fundamental techniques for learning and work as well as the use of problem solving skills in a methodical way (Braukmann, 2001). This comprises topics such as business plan writing (aim, concept, content, uses), internal and external accounting (basic knowledge of balance sheets, cost benefit accounting, contribution costing as well as their employment) and financing (types of financing, financial and liquidity accounting).

Social competence: Social competence describes the ability of a person to work effectively together with other people. This means not only the ability to co-operate and communicate with other people, but also the ability to understand the actions of others (Gemünden, 2003), teamwork (communication, solidarity, dispute resolution), sensitivity towards others and ability to be introspective.

Entrepreneurial competence: Especially this aspect relates to competencies which make the difference between an entrepreneur and a manager. There is a one to one correspondence between competence in this sense and the idea of "entrepreneurial posture" in the conceptual model of Covin & Slevin (1991). In this respect entrepreneurial posture is made operational by three sub-factors: risk taking (preference for very risky projects with the chance of making a very big profit), proactive orientation (the willingness to initiate actions and projects that force competitors to react to) and innovation (the willingness to innovate, even when this involves taking on risks).

Entrepreneurial predisposition: Here the focus is on personality traits which are a prerequisite for entrepreneurial success and which have been to some degree empirically proven. Insight in this respect can be abstracted from contemporary psychological research literature on the subject of founders of companies (Koch, Kaschube & Fisch, 2003; Müller, 2002). The following are regularly mentioned as being particularly relevant personality factors: achievement motivation (Mc Clelland, 1987), belief in internal (self) control and self-efficacy, willingness to prevail, desire to be independent, emotional stability and propensity to lead.

Intention and motivation to start-up a business: As well as the bundles of competencies just mentioned, we should in addition explicitly record the motivation for a start-up (Krueger, Reilly & Carsrud, 2000): desire or interest in being self-employed, ideas about an own specific start-up project and estimation of own competencies for a real start-up.

3. THE BASIC CONCEPT OF THE START-UP SIMULATIONT

"TOPSIM-Startup" is a strategic entrepreneurship simulation which was jointly developed by the University of Applied Sciences Regensburg, TATA Interactive Systems and the Hans Lindner Institute, a foundation established by a successful entrepreneur to support the start-up idea.

The modular set-up of the simulation scenarios offers a wide variety of uses in different businesses (www.TOPSIM.com): Trade (e-Commerce), Service (Fitness studio), Production (High-tech sport goods). A strong emphasis is put on a realistic simulation of the start-up phases within the first 2 years of a new venture.

Initial Phase: The entire process of starting a new venture is simulated, starting from the business idea, covering the writing of the business plan and leading to the actual incorporation of the company. *Competition Phase:* After the incorporation, the business concept has to be put to work in a very competitive environment. Up to five teams are competing against each other for up to a period of eight quarters (i.e. 2 years).

Some simulations used in nationwide German competition "existpriMEcup, are not identical with the scenarios described above, but the same business simulation methodology is used with a very similar structure and decision settings and is therefore absolute comparable with "TOPSIM-Startup".

4. THE EVALUATION APPROACH

The purpose of evaluation is in general terms to provide assistance with planning and decision making, with the controlling and improvement of practical measures and with the assessment of the efficacy of an intervention. The starting points of most simulation evaluations are traditionally of the summary kind, and thus output oriented in the first instance. They focus on the effectiveness of the participation in the simulation, mainly in order to measure the degree of learning that has taken place (Faria, 2001; Wolfe, 1997). This approach and the efficacy analyses of simulations that stem from it are undoubtedly justifiable methods and in present research they are still an important part of the evaluation. Thus as a result they are relevant in the research project that is being

presented here. Nevertheless, this traditional approach can be regarded as being somewhat too narrow, in view of the fact that purely output oriented evaluations are not adequate to explain why and how the results of learning that arise from a particular measure are achieved (Hense & Kriz, 2008).

Therefore to be true to this purpose, the approach of the so-called theory based evaluation was used (Chen, 1990; Chen & Rossi, 1983). The strength of the theory based approach lies in its premise that the evaluation of interventions or learning environments such as the simulation game should have as its starting point a "logic model". Such a logic model consists of various variables, which can be classified under the three components prerequisites (input), processes (actions) and effects (output or outcome), and their reciprocal dependencies and mutual relations (Hense & Kriz, 2007). A logic model thus provides a framework for the interpretation of what takes place in the simulation. Furthermore, it can be expected that not only will key learning be shown, but also those elements will be identified that are responsible for such learning or for the fact that such learning does not take place. In this way important starting points can be identified that can lead to improvements in further design and use of the simulation game (Kriz, 2004; Kriz & Hense, 2004; Kriz & Hense, 2006).

The logic model for the evaluation of the start-up simulation stems from several sources, including 1) contemporary research on simulations (Faria, 2001; Hindle, 2002; Kriz & Brandstetter, 2003), 2) approaches of situated learning (Brown, Collins & Duguid, 1989; Gruber, Law, Mandl & Renkl, 1995) – in this respect especially the so-called "problem oriented learning" – as well as 3) more general models concerning the quality of teaching and the learning environment (Ditton, 2002) and 4) contemporary entrepreneurship research (see above).

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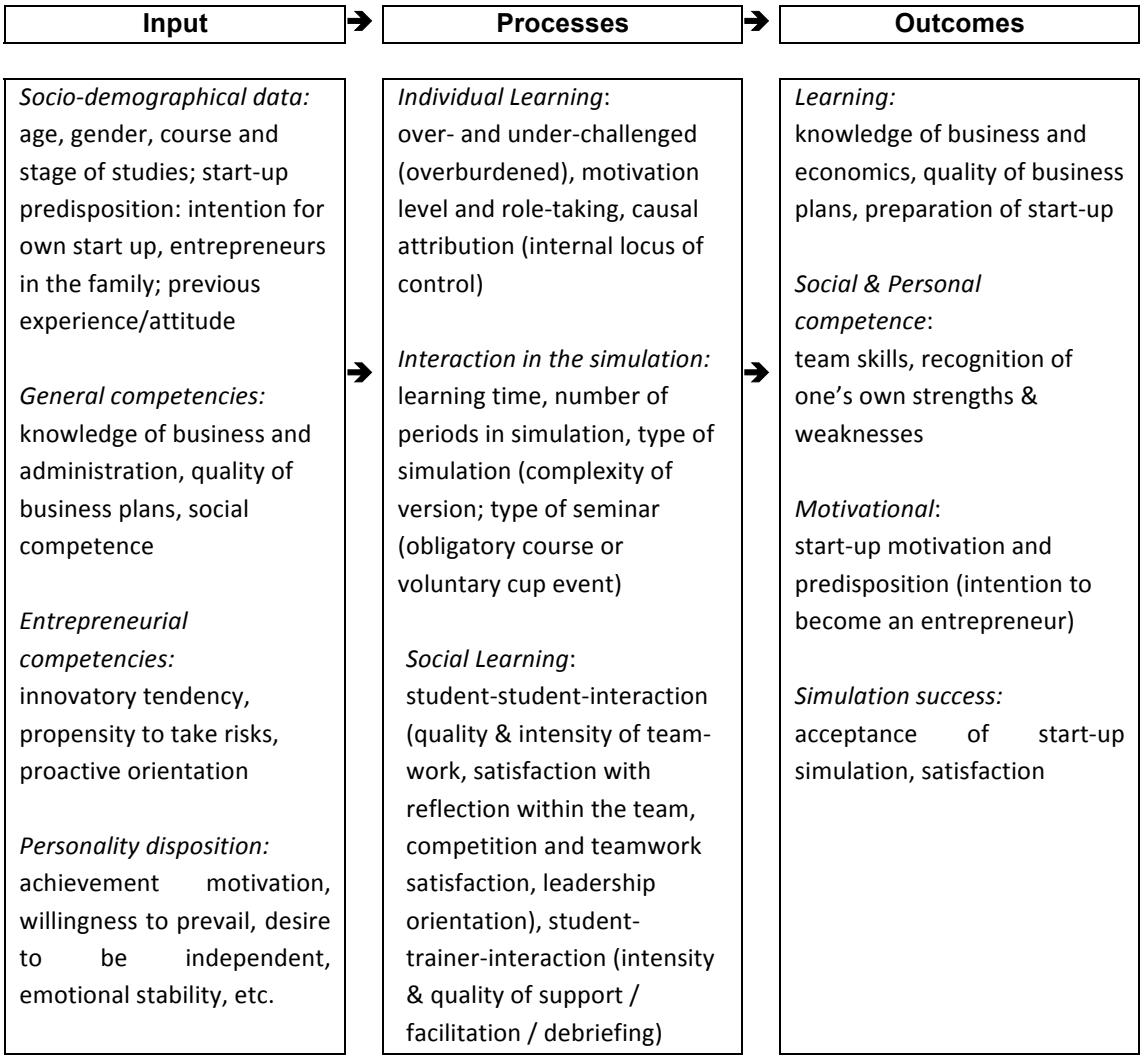

Figure 1: Logic Model of Entrepreneurship Education with start-up Simulations

5. METHODOLOGY AND DATA

All variables of the logic model were derived from research results and relating theoretical concepts. In addition, all factors shown in the logic model were operationalized and measured. In general this paper comprises four subsequent explorative studies which, however, are confined to male and/or female students at German universities.

For the operationalization and measurement in Study 1 three questionnaires were developed with items on a 5-point Likert scale. Questionnaire No. 1 served to measure the input variables, No. 2 was for measuring the process variables and No. 3 was designed mainly to measure output variables and partly also to collect more data about the process variables. The data for Study 1 was collected in 2005 and 2006. A total of 606 participants from five technical universities took part in the investigation. For this a total of 31 start-up simulations were carried out. All the simulations were conducted by trainers who had experience with this particular simulation game. Questionnaire No. 1 was handed out before the start of the simulation, questionnaire No. 2 was answered in the temporal middle of the simulation (i.e. usually after simulation round 3 or 4) and questionnaire No. 3 was answered after the simulation was finished and the participants had had time to reflect on it. In addition to the questionnaires, the business knowledge and the quality of making business plans were assessed by the university lecturers of entrepreneurship and business studies before and after the game.

Study 2 was carried out as a close replication of Study 1 with the same questionnaires. A total of N=202 students participated in 2006 in 11 further trainings with the start-up simulation (taking place at the same universities as in study 1). There was however one important difference to Study 1. Instead of using ratings of business knowledge by university lecturers, a multiple choice test was developed together with experts. The test was conducted before and after start-up simulation in identical form. The test contains 12 questions about different aspects of the curriculum for entrepreneurship and management education. There were three alternative answers to every item on the list, with at least one or more than one alternative being correct. Altogether there were 16 correct answers. An initial test analysis showed that the items complied with the main quality criteria of test-theory.

Study 3 is different from Studies 1 and 2. Start-up simulations are carried out within a nationwide entrepreneurship competition on four levels. On “Campus Cup” level teams of students compete within the same university (teams from about 150 German universities took part). The best two teams of each university are allowed to enter the next level of the

"Master Cup", in which teams from different universities compete. Again, the two winning teams of each Master Cup enter the next level of "Professional Cup", and the last level is the final "Champions Cup". In each cup level the same simulation methodology is used, but with increasing complexity of scenarios and simulated variables. For the assessment an evaluation questionnaire is used that is handed out to the participants after each cup activity and answered by the students. This questionnaire contains 35 assessment-items on a 6-point ordinal scale (1=very good assessment or total agreement with a statement; 6=very bad assessment or total disagreement with a statement). It also contains items to gain socio-demographic data and items to ask for personality aspects (related to entrepreneurship research) and pre-knowledge and experiences and attitudes (about business knowledge, teamwork, simulation games etc.). Participants of Study 3 can be seen as another treatment group, because attending the cup is voluntary for interested students, whereas attending the simulation games in study 1 and 2 was a regular obligatory part of the students' course program. Due to time constraints of the cup system, only one questionnaire was used after each cup. However, partly different items were used in the various cup levels. We used a special codification system for the participants. This allows for the linking of individual participant's data at different cup levels (for those participants qualifying for the next levels) and makes it possible to calculate paired sample results.

The average rate of return of the questionnaires was 97%. In 2007 N=815 students participated in 43 cups in the evaluation, in 2008 N=1706 students participated in 76 cups and in 2009 N=1624 students participated in 80 cups (total N=4145 students in 199 cups).

Study 4 took place in 2009. Seven term-long simulation seminars based on the same start-up simulation and the same methodology as study 1 and 2 have been carried out. The participants have been business students (N=99). In order to trace gender effects (that we found in studies 1 to 3; see results), we designed this additional study by constituting teams with either male or female participants. This idea is based on the experience on the significantly better learning behaviour of female pupils in technical subjects due to attending classes with only female participants (i.e. Kessels, 2002).

6. RESULTS

All results presented in tables are significant on alpha probability value p<.001. We focus in this paper only on the significant results related to gender differences. Therefore we discuss for the interpretation of the results only selected variables of the evaluation model.

Results of Studies 1 and 2

In contradiction to the intensions of the program to force the entrepreneurial motivation, a decrease of the motivation was detected. Figure 2 shows, there was a significantly steeper drop in the interest of women in starting-up a business after the simulation seminar (men stayed constant, while woman fall in interest; the drop of interest in the whole sample is thus due to women).

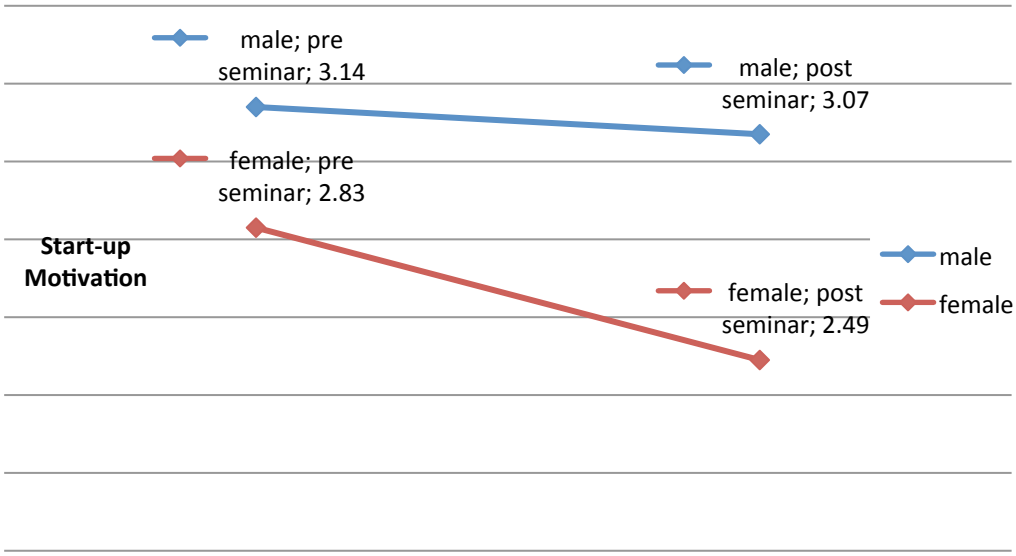

Figure 2: Developement of Start-up Motivation in Start-up Simulation Seminars

In comparison to men women had a better knowledge in business administration before and after the simulation as well better business plans both before and after the simulation. Although both groups improved significantly, the men benefited more, i.e. the improvement in the men's knowledge of business administration is significantly better. In the case of women the predisposition to found a business is significantly less before and

after the simulation. In comparison to men women demonstrate less inclination to take risks and their leadership orientations are less pronounced. They were also more overburdened in the simulation than men, a leading role was taken more seldom and the motivation and role adoption was less. The women's comparatively superior technical and methodological competencies were thus not sufficiently effective, since in the simulation process they apparently left the leading role for the men and as a result experienced less motivation. Perhaps certain gender stereotypes play as usual a role in this respect. However, even before the simulation the disposition of the women to start-up a business is less pronounced and this must have made them less able to put themselves in the situation of an entrepreneur and as a consequence they participated with less motivation (see Table 1).

	Gender	N	Mean	Standard Deviation
Businessplan quality before simulation	female	107	3,457	,911
	male	171	3,894	,915
Businessplan quality after simulation	female	107	2,215	,651
	male	171	2,672	,721
Knowledge of business administration before simulation	female	105	2,728	,819
	male	167	3,305	,859
Knowledge of business administration after simulation	female	107	1,981	,628
	male	171	2,381	,699
Predisposition to found a business before simulation	female	198	2,496	,897
	male	357	2,721	,822
Predisposition to found a business after simulation	female	168	2,581	,805
	male	277	2,890	,805
Leadership orientation	female	191	3,691	,540
	male	350	3,885	,566
Propensity to take risks	female	198	2,844	,699
	male	356	3,129	,732
Overburdend by simulation	female	160	2,232	,709
	male	296	2,099	,620
Internal locus of control	female	158	2,557	,794
	male	289	3,008	,724
Motivation and role taking in the simulation	female	160	3,818	,723
	male	296	4,127	,643

Table 1: Gender differences in business simulations; significant results from t-test

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Results of Study 3

In general the analysis (based on t-tests and analysis of variances methods) shows that participants with higher entrepreneurial competence, attitudes and predisposition assessed the cups significantly better (e.g. higher satisfaction, rating of own learning effects etc.). Participants with higher propensity to take risks, propensity to lead, belief in internal control/internal causal attribution, achievement motivation (this data was retrieved from additional items in the questionnaires) benefit more and more easily adopt the role of an entrepreneur in the game. There are no significant differences in the assessments of different age-groups or students from different courses of study. We found again gender effects: female students benefit less from the cup activities than male students. But these results are quite similar to those of Study 1and 2. Some other specific effects are worth to be reported:

Female German career patterns show a strong relative decline of women in management positions in regard to the increase of the hierarchic level (Holst &Wiemer, 2010). The same effect we identified in the hierarchy of the“existpriMEcup” entrepreneurship competition system.

	% of male participants	% of female participants	N
Campus Cup	72,3	27,7	1202
Master Cup	73,3	26,7	2261
Professional Cup	76,4	23,4	818
Champions Cup	81,3	18,7	157

Table 2: Percentage of female participants in different cup levels

In the first level “Campus Cup” more than a quarter of all participants has been female. As shown in Table 2 the ratio of female participants dropped continuously over the four levels to just 19% in the final Champions Cup. An explanation of this development can be found regarding following results shown in Table 3.

	Gender	N	Mean	Standard Deviation
Satisfaction with reflection within the team	female	82	2,024	1,175
	male	267	1,737	,908
Propensity to risk	female	81	3,333	1,224
	male	268	2,977	1,242
Leadership orientation	female	82	2,439	,944
	male	268	2,141	,901

Table 3: Gender differences on the level "Professional Cup"

We found that women in comparison to men show a lower satisfaction with the decision making process, reflection and feed-back in the team, a lower propensity to take risks and less willingness to take leadership in the group. Comparing the satisfaction of the participants with the simulation in regard to competitive situation and the teamwork in the game, the study shows a lower situational motivation for women in comparison to men (Note for Study 3: different from Study 1 and Study 2 lower means in the tables of Study 3 correspond here with better assessments or stronger agreements of the students on the 6 point Likert-scale). In addition we found that the women overall satisfaction with the teamwork within the own team and satisfaction with the situation of competition with other teams declines with the rise of the cup levels (at the same time satisfaction of men rises).

	Gender	N	Mean	Standard deviation
Competition and teamwork satisfaction	female	564	1,531	,655
	male	1546	1,449	,582

Table 4: Competition and teamwork satisfaction - Master Cup

	Gender	N	Mean	Standard deviation
Competition and teamwork satisfaction	female	82	1,622	,739
	male	267	1,385	,549

Table 5: Competition and teamwork satisfaction - Professional Cup

Results of Study 4

By dividing seminars in 4-5 teams with same gender within the teams, we intended to identify if women benefit through participating in female only teams in terms of start-up motivation. In other words: Does this setting reduce or equalize the decrease of interest in founding an own company (as shown in study 1-3).

Our results however show no significant effect of creating teams consisting in only male and only female participants. We found the same results as already discussed in study 1-3. This means that there is again the same significant motivation decrease for founding a new company in the sample of women compared with men (t-test for paired samples). Also other results are in line with the outcomes of study 1-3 (i.e. women show less willingness to lead, less internal locus of control regarding the simulation game results, less alignment to the competitive situation of the game, etc.).

7. SUMMARY AND CONCLUSION

All studies discussed in this paper show gender differences in using start-up simulations for entrepreneurship education: Independently of the personal and family background of the participants, not depending on the matter, if the seminars have been voluntarily or compulsory. We identified gender specific differences in form of lower interest of women in starting-up an own business after the simulation seminar. As well other research results report that females are significantly less interested to start their own business than men (Ljunggren & Kolvereid, 1996; Cooper & Lucas, 2006; Sternberg & Lückgen, 2005). In comparison to men women demonstrate less inclination to take risks and their leadership orientation is less pronounced and the role adoption of an entrepreneur in the simulation game was lower (for research results addressing similar gender differences e.g. Langowitz & Minniti, 2007; Wilson, Kickul & Marlino 2007; Scheiner, 2009).

To work within a team and the confrontation with the competitive situation was not that satisfying in comparison to male simulation participants. Our research design by building same gender teams in the simulation seminars in order to limit “male restricting” factors in teamwork (leadership ambitions, etc.) did not show significant effects on the start-up

motivation of women and the related factors influencing this. Of course there are limitations in the present evaluation results. For example, participants in a start-up simulation game might act differently if they were in an actual business start-up process. The evaluation model does not include all skills and competences which are required for a business start-up (for example entrepreneurial creativity, entrepreneurial opportunity recognition and exploitation). But these competencies are not required in the start-up simulation, because the business idea is already predefined in the start-up simulation.

Further studies are already in process to identify gender aspects by using start-up simulations for entrepreneurship education:

- Same gender seminars, that means that all participants are either women or men.
- Different simulation game scenarios that are more attractive for women, i.e. scenarios in business services, finance, consulting, etc.
- Better debriefing structures, that take into account the enhanced interest of women in reflecting the group dynamics and leadership behavior in the teams. The debriefing should support to satisfy the "content orientation" of women - in contradiction to the "competition orientation" of men in an entrepreneurial simulation game situation.

Additional qualitative research methods will be applied, such as interviews in different phases of the seminars in order to gain deeper insights into gender differences. Furthermore we aim to apply some additional statistical procedures such as regression analyses in order to evaluate the data for a proof of our logic model.

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STRENGTHENING CASE STUDY BASED TEACHING IN ENTREPRENEURSHIP EDUCATION IN GERMANY: THEORETICAL REFLECTIONS AND EXPLORATIVE RESEARCH

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ABSTRACT

This article suggests an extended use of the case study methodology in teaching entrepreneurship in Germany. In Germany, the traditional form of formal lectures seems still to be predominant in Entrepreneurship Education. Case studies as a teaching methodology can serve the many dualities of Entrepreneurship Education: heterogeneous vs. homogeneous prior knowledge of participants, participants' divergent interests in entrepreneurship courses, from simply collecting credits to theoretical interest to practical and urgent interest in practical skills for starting a venture. The advantages of case study based teaching methodology in transmitting theoretical knowledge as well as practical skills in entrepreneurship is described, based on the evidence in state of the art entrepreneurship research literature. A small explorative survey on case studies in Entrepreneurship Education is presented. Descriptive results generate insights in students perspective on the usefulness of the case study based teaching methodology in comparison with traditional lectures and provide hints for a more elaborated future empirical study that could employ a proper model on the effectiveness and advantages of case study based learning. The authors conclude in encouraging an increase in the usage of case study based teaching in Entrepreneurship Education especially in Germany.

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INTRODUCTION: CASE STUDY BASED TEACHING IN ENTREPRENEURSHIP EDUCATION?

Entrepreneurship teachers face a dilemma: On the one hand, they should teach students what entrepreneurship is about, reflecting on entrepreneurship from an academic perspective by lecturing on helpful and applicable or basic but generalizable theories (transmitting knowledge). On the other hand, they have to focus on practical tools and abilities, which help the particular future entrepreneur to found his business in his specific area (transmitting skills, instruments, heuristics and practicing their useful application). But how should entrepreneurship teachers meet these two-sided challenge?

As we will show in this essay, the usage of case studies in entrepreneurship classes is a very good method to teach entrepreneurship in a dynamic way so that students could get both, a theoretical and a practical mindset of entrepreneurship and of how to found a business – through one method. Cases are mostly used to transmit practical knowledge and skills. In Germany and some other countries or regions of a similar academic style (like central and east Europe, cf. Galtung 1985), it is often neglected that general and generalizable knowledge as well as useful theories can be taught through cases. Especially the usefulness of case studies in reflecting on theories is widely neglected. This article addresses readers who are still critical about the case study method and its benefits for entrepreneurship education. To show why case study-based teaching is one of the best ways to teach entrepreneurship, we proceed as followed:

In the next paragraph we explain why Entrepreneurship Education to some extent is distinct from common courses in business administration. The focus is on the *educational* claim of Entrepreneurship Education and the broad implications that result from this claim. Then the challenge of heterogeneity and homogeneity within and among target groups of Entrepreneurship Education is addressed. The following paragraph discusses the methodologies and didactics of Entrepreneurship Education in general that derive from the aforementioned educational claims as well as from the characteristics of the different target groups. The article then focuses on the case study based teaching methodology in general and its special advantages in Entrepreneurship Education. After

thus discussing the claims as well as challenges of Entrepreneurship Education and how case study based teaching does meet these claims and challenges, the article turns to explorative research. Students in an entrepreneurship course have been asked about their perspectives on case studies compared to traditional lectures and their learning outcomes are assessed, both in terms of comprehending theoretical knowledge and gaining entrepreneurial intention. The theoretical discussion and explorative survey leads to two main claims: *The usage of case study based teaching especially in the German Entrepreneurship Education should increase* and *more case studies should be written especially for German Entrepreneurship Education.*

ENTREPRENEURSHIP EDUCATION – AND WHY IT IS DESTINCT

In 1985 Peter Drucker mentioned that there is nothing special about teaching entrepreneurship: "The Entrepreneurial mystique? It's not magic, it's not mysterious, and it has nothing to do with the genes. It's a discipline. And, like any discipline, it can be learned" (Drucker 1985). But is there really nothing special about teaching and learning entrepreneurship? Why is there an extra term for imparting knowledge for founding a business called "Entrepreneurship *Education*" while there is nothing like "Organizational Behavior Education", "Marketing Education" or "Accounting Education"?

Teaching entrepreneurship differs from teaching other classes in functional Business Administration and Economics (Filion 1996) because the distinguishing tasks of entrepreneurs and managers are fundamentally different (Gartner et al. 1992). Entrepreneurship Education does not only transmit knowledge and skills, it addresses the personality of students, aiming at their entrepreneurial intentions and motivations, changing mindsets and giving vitas entirely new directions.

In the academic tradition especially of German universities the term "Bildung" (education) reflects an end in itself. Hence, for many years the most common way of teaching especially in Germany was to conduct lectures in the classical way: The professor is presenting PowerPoint Presentations and giving speeches, based on text books. There is no or few interaction, often with no or only very limited practical

examples, and teaching is very theory based – in particular at traditional universities rather than at universities of applied science with a focus on practice. It is doubted that with such a teaching methodology – that primarily does focus on theoretical knowledge and neither on skills nor at individual development – the aforementioned holistic goals of Entrepreneurship Education could be achieved.

The target – beyond the ideal typical end in itself – of academic education is to prepare students with knowledge for working in the corporate world (Scott et al. 1998) or for academic careers. However, Entrepreneurship Education should be different from such courses designed for preparing for the corporate world. Teaching entrepreneurship is about founding a business – not about working in an existing company. It's about passion, about creating something new with only with very limited resources, about discovering or creating opportunities, innovative venturing, taking Knight'ian uncertainties and managing risks while handling ambiguity. Entrepreneurship Education needs to showcase what it's like to be an entrepreneur and to address the whole personality of each student – not just his or her knowledge. But why is Entrepreneurship Education different from teaching other subjects in the field of Business Administration, even though Entrepreneurship Education often includes many different subareas of the traditional, functional Business Administration curricular? As Kuratko states, Entrepreneurship Education takes a special position: "A core objective of entrepreneurship education is that it differentiates from typical business education. Business entry is fundamentally a different activity than managing a business [...]; entrepreneurial education must address the equivocal nature of business entry [...]. To this end, entrepreneurial education must include skill-building courses in negotiation, leadership, new product development, creative thinking, and exposure to technological innovation [...]" (Kuratko 2005). As per Kuratko, the special position of entrepreneurship results from the necessity of a very broad education of future entrepreneurs, both, theoretical and practical. Entrepreneurship Education integrates areas that are normally left to various 'silos' of separate academic departments and disintegrated functions of corporate giants and combines those elements with the special requirements needed in starting and growing a new venture. Filion verifies Kuratko and the special position of Entrepreneurship: "In education generally,

emphasis is placed in knowledge acquisition, whereas in management education it is placed on acquisition of know-how, and in entrepreneurship education, on self-awareness [...]“ (Filion 1996).

Entrepreneurship Education therefor builds on three general assumptions:

1. The first axiom describes the assumption that *it is possible to learn entrepreneurship*, i.e. knowledge critical to entrepreneurs can be acquired and entrepreneurial activities can be trained and learned.
2. Axiom number two states that *entrepreneurial behavior* is not only achievable through personal experience, but also through education.
3. The last axiom combines these first two axioms with the declaration that *entrepreneurship can be taught and learned* especially *through academic Entrepreneurship Education* at universities (Klandt et al. 2006).

These three basic principles look trivial but are important for the following: Entrepreneurship Education *for* entrepreneurship would be meaningless if one of these axioms would proof wrong.

After witnessing hundreds of classes and courses for future business administrators in Germany (so called “Betriebswirtschaftslehre”, in short BWL) and more than a dozen of entrepreneurship classes, we have identified key differences between the still very traditional educational arrangement of the German BWL and the more progressive Entrepreneurship Education. Table 1 summarizes differences between the functional German BWL and the content of Entrepreneurship Education. As a result of our observations, we found Filion’s findings from 1996 still applicable to the current situation in Germany (see table 1).

Traditional German BWL	Entrepreneurship Education
Endorsement for membership-culture	Endorsement for personal leadership-culture
Concentration on group dynamics and group communication	Concentration on individual enhancements
Developing abstract theories based on (sometimes unrealistic) academic axioms (homo oeconomicus)	Developing applicable theories based on interdisciplinary axioms (homo sapiens)
Strictly following conceptional and other rules (e.g. reporting)	discovering (unwritten) rules of conduct that someone could break for creating opportunities and gaining competitive advantage
Using models, analytical tools, and heuristics in standardized ways and believing in analytical results to justify decisions within the company hierarchy	Critical and dynamic use of models, analytical tools, and heuristics to derive new business ideas, business models, and market niches
Based on the development of self-awareness by focusing on adaptability	Based on the development of self-awareness by focusing on persistency
Achievement of know how focusing on how to manage given resources for a given purpose	Achievement of know how focusing on how to gain resources for a new purpose that needs to be created and enacted, and how to assign markets

Table 1: Differences between traditional German BWL Teaching and Entrepreneurship Education (modified from Filion 1996)

The authors found no generally accepted definition on Entrepreneurship Education. In German literature, you can find a definition, which describes very precisely the content of this special topic:

> *"Entrepreneurship Education consists of all didactical efforts – principally with ideational content – which sensitize the addressed target group to eventually found a business (rather than working in the corporate world). Entrepreneurship Education aims at providing special knowledge and skills for decision making processes into the field of entrepreneurial acting"* (Uebelacker 2005, translated by the authors).

Given this definition, we differentiate between two targets of facilitation: Content-related *learning-targets* and broader *educational objectives*. In the following, we want to discuss which learning-targets Entrepreneurship Education pursues in the context of two educational objectives.

Learning targets:	Effects:
Theoretical basis of values	The economical function of Entrepreneurs is appreciated
Economical creativity	Ability to invent, create and develop innovative and economical promising products, services, and business models
Decision-making ability	Ability to make decision – especially in uncertain situations
Scientific and economical / managerial method skills	Analytical skills through tools for economic, strategic, and managerial analysis, e.g. "Porter's Five Forces", "BCG-Matrix", "SWOT-Analysis", "Give and Get-Risk and Reward-Matrix" etc. and knowing their limits
Management qualification	Motivation-, communication- and leadership skills for delegating tasks, especially to inform and manage teams

Table 2: Entrepreneurship Education Learning-targets (modified from Ripsas 1998)

The main intention of Entrepreneurship Education in the area of learning targets is to provide potential and future entrepreneurs with knowledge and skills regarding the processes of discovering, creating, evaluating and exploiting opportunities to create future goods and services (Shane & Venkataraman 2000). This intention can be pursued by a set of content-oriented learning targets that are organized by the practical challenges future entrepreneurs may face (following and complementing Ripsas 1998), especially during the dynamic processes of new venture creation (Gartner 1988, Kuratko & Hodgetts 2004) or new business activity (Levie 2007). Table 2 summarizes common learning targets and their desired effects in Entrepreneurship Education.

HETEROGENEITY AND HOMOGENEITY WITHIN AND AMONG TARGET GROUPS OF ENTREPRENEURSHIP EDUCATION

These learning targets can be achieved in different cohesions including differing target groups. Entrepreneurship can be taught in both, an intra-curricular as well as in an extra-curricular framework. Intra-curricular means Entrepreneurship Education happens *in the general curriculum,* for example at Business Schools for *all* MBA students, or at least as a compulsory optional subject. Students earn credits by taking (and passing) entrepreneurship courses. In contrast, extra-curricular Entrepreneurship Education means

studying entrepreneurship outside of the general curriculum, for example in a multidisciplinary framework. For instance students, who study e.g. engineering, are able to choose – outside their general curriculum – some courses on entrepreneurship, but without any rewards for achieving a degree. Within this context, Entrepreneurship Education is open to students from all departments. This extra-curricular approach aims at those students who are motivated to obtain entrepreneurial skills; i.e. students who choose entrepreneurship courses outside their general curriculum have usually a higher, more homogenous motivation due to their willingness or at least open-mindedness towards launching a business. However, extracurricular target groups are often very heterogeneous, as students from various departments with quite distinct background knowledge and divergent (or even conflicting) approaches to learning gather in one program.

Corresponding with the distinction of two target groups (see figure 1) – i.e. target group A (students, who study Entrepreneurship *in* their general curriculum with a heterogeneous interest (see Jones & Matlay (2011) on the challenge of heterogeneity in entrepreneurship education) ranging from plans to start a business to pure academic interest in the theoretical subject but homogeneous knowledge basis, e.g. all students studying business in a bachelor program) and target group B (students, who study Entrepreneurship *outside* their general curriculum due to their – homogeneous – practical interest in launching a venture with a heterogeneous composition of knowledge backgrounds and approaches to learning) – there are two distinguished educational targets respective frameworks. On the one hand, learning goals in Entrepreneurship Education could be explicitly focusing on the practical doing, in terms of an education *for* founding a new business. Here, teaching focuses on the practical sides of Entrepreneurship, either in an intra-curricular, or an extra-curricular context. On the other hand, Entrepreneurship Education could be *about* entrepreneurship, for instance focusing on entrepreneurship theory and research. This teaching is basically located at universities, for instance within schools of economics, whereas the aforementioned perspective of Entrepreneurship Education could be located either at universities, universities of applied sciences, incubators or at initiatives fostering entrepreneurial culture and development via Entrepreneurship Education. Hence two

educational objectives, education *for* or *about* entrepreneurship are identified (Schleinkofer et al. 2009 and Vyakarnam 2005).

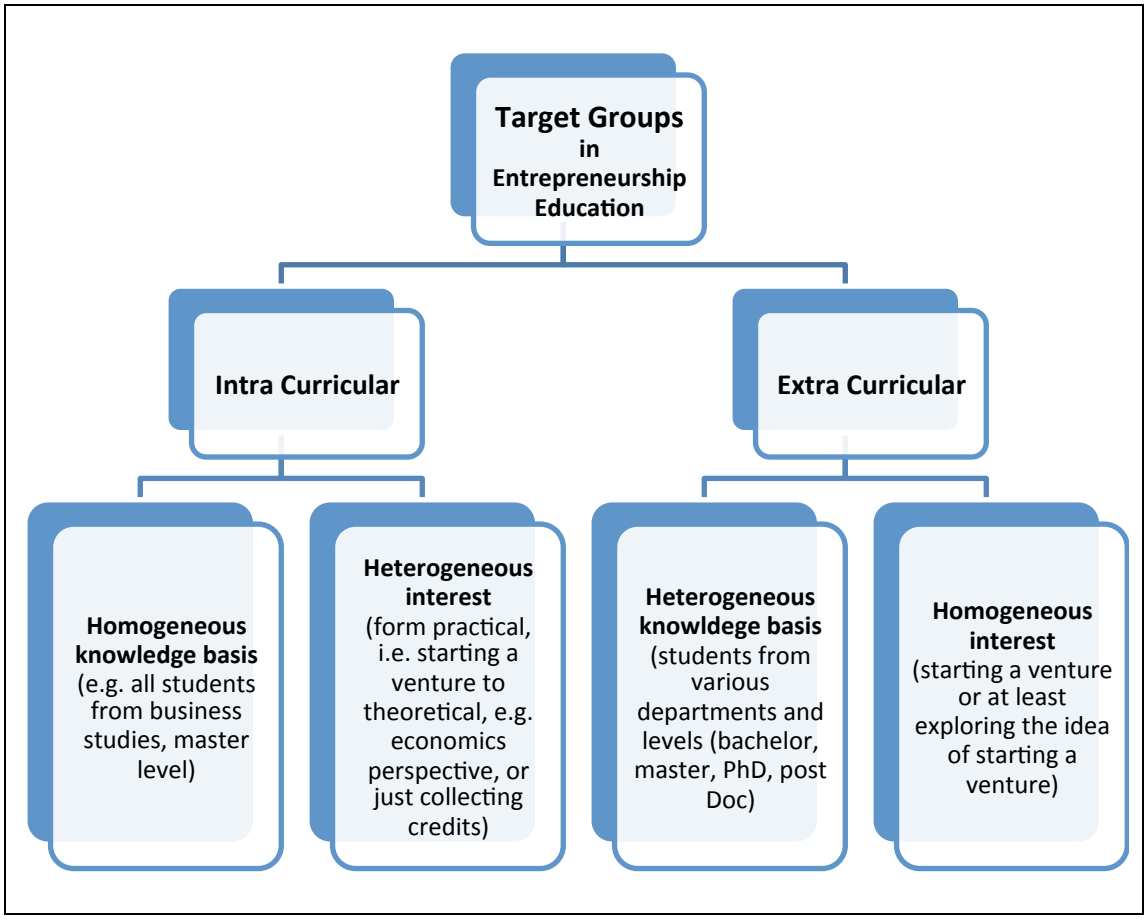

Figure 1: Systematic framework of the homogeneous and heterogeneous composition of target groups of Entrepreneurship Education

Finally, Entrepreneurship Education could combine both learning targets, providing practical knowledge and skills as well as theoretical frameworks. In this case, entrepreneurship courses would educate *for and about* entrepreneurship by combining both educational goals. This would be the most thorough educational goal. Such an education would result in both: theoretical knowledge and reflection as well as practical skills and individual enhancement. This combined educational objective might also be the most appropriate for Entrepreneurship Education at universities. This is because on the one hand solely focusing on Entrepreneurship Education *for* entrepreneurship might not be regarded sufficient and deliberated enough to fit in the academic context and might

harm the standing of entrepreneurship as a field of science. – While on the other hand exclusively focusing on Entrepreneurship Education *about* entrepreneurship might fail to help students in their future entrepreneurial careers and might harm the entrepreneurial motivation of students as wells as the entrepreneurial potential of an university. In the following sections of this article we will develop arguments on the use of case study based teaching methodology as a method that simultaneously facilitates learning content for both of these combined educational objectives *for and about* entrepreneurship in the theoretical and practical hemisphere.

Typical Organizational Context	primary practical oriented	combining practical and theoretical aspects	primary theoretical oriented
Intra-curricular	**Teaching FOR Entrepreneurship:** Educating and assisting potential Entrepreneurs. Providing knowledge for the practical needs of founding and growing a business in a particular industry / field of science.	**Teaching FOR AND ABOUT Entrepreneurship:** Sensitizing and educating students for founding businesses and reflecting on entrepreneurship theory at the same time. Focusing on entrepreneurship in particular industries or fields of science.	**Teaching ABOUT Entrepreneurship:** Reflecting on entrepreneurship from an academic perspective, e.g. focusing on the economic analyses of entrepreneurship. The educational goal is researching entrepreneurship rather than starting a business.
Extra-curricular	**Teaching FOR Entrepreneurship:** Educating and assisting potential Entrepreneurs. Giving general knowledge for the practical parts of founding a business.	**Teaching FOR AND ABOUT Entrepreneurship:** Sensitizing and educating students for founding businesses and reflecting on entrepreneurship theory at the same time. Open for students from all programs.	**Teaching ABOUT Entrepreneurship:** Rather rare. Occurs for instance at special events like "Antrittsvorlesung" or "Studium generale" (liberal arts program) at a school of economics

Theory / Practice Orientation

Figure 2: Different perspectives of Entrepreneurship Education

These three educational objectives (*for, about, for and about*) in Entrepreneurship Education are organized by the learning-targets and target groups of entrepreneurship (intra- or extra-curricular) in the following matrix, containing six fields (see figure 2).

In summary, Entrepreneurship Education in its best sense should facilitate both, a practical oriented view on entrepreneurship for future entrepreneurs as well as a theoretical oriented view fulfilling academic demands. Theoretical knowledge is especially important for students who either want to attend to entrepreneurship through a theoretical approach, or for those, who want to become a young academic in the exciting field of Entrepreneurship Research. Additionally, future entrepreneurs can be educated either in an intra-curricular or in an extra-curricular context. For example, if students who study engineering want to start their own business, they usually choose an extra-curricular context to study *for* entrepreneurship, while students at the economics department might opt for an intra-curricular theoretical course *about* entrepreneurship. Different from this classical tow-sided approach we want to draw special attention on combing practical and theoretical education *for and about* entrepreneurship. Such a combination would help practical entrepreneurs to better understand their role and develop their abilities to cope with unforeseen challenges. It would also help future academics in the field of entrepreneurship research to better understand practical entrepreneurship and to close the research / practice gap (see Ritchie and Lam 2006, Freese et al. 2012).

TEACHING METHODOLOGIES IN ENTREPRENEURSHIP EDUCATION

The need for teaching methodologies in Entrepreneurship Education which differ from traditional learning arrangements is rooted in the history of entrepreneurship as a field of science (see e.g. Low 2001, Sassmannshausen 2012, chapter 2). Entrepreneurship Education was aimed at the 'doing', i.e. it was supposed to encourage entrepreneurship. One of the initial thoughts, why entrepreneurship should be taught was the opinion that entrepreneurs and business foundations are very important for the development of modern economies (Rosa et al. 1996). One of the first international well known universities who implemented entrepreneurship courses in their curriculum was Harvard Business School in 1947 as an answer of structural problems within the US economy after WW II (Koch 2002). Entrepreneurship was – like today – a socio-political topic: "From a national economics point of view [...] the possibility of a positive welfare effect is significant. In

addition to competitive employment effects, innovation and structural change effects play a decisive role here [...]. As there is an acceleration of social and economic problems which develop in the process of globalization, a competitive context from which new solutions to problems and innovative organizational structures are motivated is today more than ever before a decisive mechanism for the 'evolutionary success' of socio-cultural systems" (Scott et al. 1998). In this tradition Entrepreneurship Education should not only transmit theoretical knowledge but should also be taught through practical oriented methodologies so that business foundations are promoted, which foster the evolution and success of socio-cultural systems. Common and newly developed methods in an action oriented Entrepreneurship Education include: case studies, live cases, excursions, role plays, action learning, IT based start-up simulations (see Auchter & Kriz 2012 in this volume) and group work-based start-up simulations (Hrabovsky Bevill & Glasgow 2009), as well as haptic start-up games, courses on design thinking, experimental entrepreneurship projects in classrooms (Sherman et al. 2008) such like learning firms (Braukmann 2001) and other small scale entrepreneurial projects for students, including student initiatives like SIFE, micro student consulting projects (Herriot et al. 2008), and other innovative approaches.

But the German Entrepreneurship Education is embedded within the traditional higher education and is therefore at least partly not very creative, especially regarding didactics and methods (Braukmann 2001). Even though that progress has been made during recent years, the German Entrepreneurship Education is often still characterized by classical lectures and teaching of factual, theoretical knowledge. An essential lack of this traditional, university based teaching is the disregard of methodological expertise and social competence, two components of the so called "method triad" consisting of specialized knowledge methodological expertise and social competence. These fields of competence are necessary for successfully acting entrepreneurial so that Entrepreneurship Education has to train all three elements together (Braukmann 2001, Schleinkofer et al. 2009) to achieve action oriented decision making and responsibility competence (German concept of "Handlungskompetenz", see Braukmann 2001).

Classical didactic used in traditional German BWL (Functional Business Administration)	Didactic useful for educating future Entrepreneurs
Teacher-centered learning	Participant centered learning: Dynamic learning facilitated by teachers, students, guest lecturers, practitioners etc.
Learning through written materials: Textbooks, journals, etc.	Learning through exchange of ideas and by communicating, doing, trial and error
Student as passive participant: Learning through listening	Student as active participant: Learning through interaction (e.g. action learning)
Learning through given contents	Learning by discovery in a flexible environment
Learning for solving problems that have appeared in the past (research) and may appear in the future again	Learning for achieving goals and working around problems
Imitation unrequested	Learning through active imitation and improved reproduction
Failure unrequested	Learning through failure; Failure as chance to learn

Table 3: Differences between classical didactic, used in traditional German BWL (functional business administrative) (left) and didactic for Entrepreneurship Education (right)

Entrepreneurship Education at German universities is often mostly about theories of entrepreneurship, taught by Professors which usually (there are exceptions, of course) have a very theoretical background and no personal entrepreneurial experience. Entrepreneurship is taught like every other subject in BWL. But there is a main difference between the entrepreneurial learning process and the learning process of other BWL courses as Klandt and Volkmann (2006) stated: "[...] the entrepreneurial learning process develops in a situation in which the learners see themselves confronted by practical problem situations and in this way receive their learning impulses" (Klandt & Volkmann 2006). Klandt and Volkmann (2006) also provide a comparison of differences between classical German BWL didactic and Entrepreneurship Education didactic as table 3 shows (deviated and adopted from Filion 1996, modified again for this article).

One of the main differences between classical BWL and Entrepreneurship Education is that in BWL students usually learn about solutions for given problems, whereas

entrepreneurship requires to go beyond given solutions. Hence, it is very important to facilitate synergies between theory and practice. A background in entrepreneurship theory can – in combination with the skills necessary for successful application – help future entrepreneurs to develop solutions for yet unknown and unforeseeable problems. Therefor practice oriented learning should still incorporate elements of theoretical reasoning. But which method is good for teaching entrepreneurship by facilitating practical skills, methodological and social competence in combination with a solid but applicable theoretical knowledge? In the following section we will discuss the case study based teaching methodology as a method that allows generating such valuable synergies.

ADVANTAGES OF CASE STUDY BASED TEACHING IN GENERAL

Case study based teaching has its modern origins in the casuistic used in law (though it was already used in military training by the ancient Romans 2,000 years ago). It is mentioned that Harvard Business School was the first university which applied case studies for teaching Entrepreneurship and Business Administration. (Kaiser 1983). One prominent definition for the case study method can be found in Harvard Business School press: "A business case imitates or simulates a real situation. Cases are verbal representations of reality that put the reader in the role of a participant in the situation" (Ellet 2007). Case studies are about persons, firms, industries or economies. They can provide almost full information and context or just some rudimental facts. The only thing all kinds of case studies have in common is the fact that they partly reproduce reality, even if sometimes the settings of the case and all names have been changed to secure the identities of characters or institutions involved.

Another, rather theoretical oriented definition of case studies is the following: "The essence of a case study, the central tendency among all types of case study, is that it tries to illuminate a decision or set of decisions: why they were taken, how they were implemented, and with what result." (Yin 2003). Case studies are a qualitative empirical research method aiming at reproducing and analyzing situations in a realistic context. Students can analyze case studies with different sources of help and different analytical

tools (Yin 1984). While research cases conclude in the analyses and hence go beyond description, cases for teaching purpose usually leave conducting analyses to students.

Case study analyses conducted by students are not only aiming at finding a solution for the particular case. It's about understanding why a certain action or decision is taken and how it should be carried out with what effect. Thereby case study analysis is more about abstracting and generalizing, how to solve similar problems – similar cases. This is why some cases, like R&R (Jarillo Mossi & Stevenson 1985, Roberts et al. 2007, chapter 1), became classics and offer value for learning even decades after their first publication. In case study analyses, there is usually no "one and only solution", it is more about gaining experience from applying analytical tools and methods and knowing the processes and consequences. Like in reality, students have to develop their own "solution", they have to decide on their own, which step they should take next (Euler et al. 2004). Hence case based learning is discussion based, with the lecturer not in the position of giving a speech (formal lecture) but in the position to facilitate and direct a fruitful discussion among students (Christensen 1992). Case based learning can incorporate elements of action learning; for instance case preparation can be carried out in small group works and practical tasks can be dedicated to groups of students in small assignments. Cases often offer the possibility to include discussions on certain styles of or challenges to the leadership and to reflect on or train for negotiations. Role plays in the class room can enhance the learning experiences from such elements.

As we discussed above, case studies have multiple aims and can provide a lot of realistic information for students. The climax of dealing with a given case study often is the decision-making processes: What would you do, if you were "in the shoes" of the entrepreneur? Decision making can occur either reflective (what was done in the case, why and to what consequences?) or active (what would be the solution proposed by students, why, and what consequences would likely occur?). Students have to balance different reasons and different consequences for different decisions, thus training their ability to make sound judgments. The means-end discussion can also touch ethical issues and differences in personal goals (e.g. distinguished from profit maximization). The

active debate or reflective discussion can build a bridge from the application in a particular case to more generalizable knowledge (theory). Besides, case studies aim to give both, a theoretical as well as a practical framework to understand how to – in the case of entrepreneurship – act entrepreneurial. In case-based teaching the lecturer can help students to abstract from the reality of a single case by concluding in general applicable solutions derived from the special solution to the single case. Or – the other way around – can encourage students to use generalized methods and theories on the particular case to find or understand individual solutions. Both ways will provide showcases in how to apply theoretical knowledge – or how to generate it.

From this discussion we can derive general advantages of case study based teaching methodology:

- Describing situations from an decision-maker perspective
- Developing own solutions for concrete problems
- Discussing students' different solution approaches
- Educating arguing and decision making skills
- Educating communication and leadership skills
- Motivating students to make a difference through own solutions
- Identifying several solution alternatives
- Learning through failure
- Educating on gathering information
- Education analytical capabilities
- Educating ability to make sound judgments (Christensen et al. (ed.) 1991).

In conclusion, case-studies are able to facilitate both, practical skills which are important for acting entrepreneurial in combination with a theoretical framework to educate analytical capabilities and the meaningful application of theories. Another important part of using case-studies as a method is that it reproduces reality and therefore cases in entrepreneurship provide students with a taste of the entrepreneurial process. In the following section we will focus on the particular benefits of using case study-based teaching in Entrepreneurship Education.

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ADVANTAGES OF CASE STUDIES IN ENTREPRENEURSHIP EDUCATION

In the previous discussion we pointed at the fact that Entrepreneurship Education differs from the traditional learning in BWL, especially in learning-targets and the heterogeneity of target groups. Additionally, didactics used in Entrepreneurship Education should vary from didactics used in traditional BWL. Future entrepreneurs should be trained in decision making capabilities, analytical- and communication skills. Educating potential entrepreneurs in these fields requires methods, which do involve students into discussions. The previous chapter showed that the case study method is able to achieve this. In this chapter we want to deepen the understanding of why using case studies is one of the best methods to teach entrepreneurship and help future entrepreneurs to gain the necessary skills to found their business and become successful.

Besides the transmission of knowledge and the training of skills and abilities (an advantage addressed later in this paragraph in more detail), case studies in entrepreneurship can change students' attitudes towards entrepreneurship. We therefore will attempt to cover changes in students' attitudes in our explorative research. As Howard Stevenson stated in a speech at Harvard Business School in 2007[3], Students experience that:

- Every situation can be improved (by them, the students, or the protagonist of the cases), not only those situations in which problems obviously occurred.
- The men and women in charge, the experts and the experienced in the case may had been wrong, while a student can be right with his or her thoughts and suggestions. Students learn to be confident in their knowledge, skills, insights, and methods, and to be critical with external or internal advice.
- In communication, leadership or group discussion, students learn to make their point, listen to other participants and build upon their contributions to push discussion forward.
- And students learn from many examples that one can do it, no matter what.

[3] This section of the article is based on the author's extension of the protocol that one of the authors took during Howard Stevenson's speech.

Teaching cases, according to the same speech by Howard Stevenson in 2007, furthermore offers the opportunity to choose many alternative cases in entrepreneurship, in order to cover the broad variance of the entrepreneurial phenomenon (see Rocha & Birkenshaw 2007 and Sassmannshausen 2012, ch. 2.3, on the phenomenology of entrepreneurship):

1. Entrepreneurship has many protagonists: Male and female, old, young or in their middle ages, ethnic and indigenous, all nationalities, successful and non-successful, ethical and unethical, opportunity or necessity entrepreneurs, social or commercial entrepreneurs etc. A selection of different cases used over one module can reflect these diverse protagonists in the entrepreneurial scene.
2. Entrepreneurship knows many stages (seed, early, growth, bridge, IPO, turn around, late, etc.), company sizes and forms (start-up, spin-off, MBO, MBI, franchising, SME or family business management, intrapreneurship or corporate entrepreneurship etc.). A selection of different cases can reflect these diverse settings along the various stages of an ideal typical phase model[4] and across different forms of the entrepreneurial act.
3. Entrepreneurship can happen in all industries and branches – even in yet unknown ones. Cases within one module can either provide insides into various industries, enriching students' sensitivity for industry specific codes of conduct, dedicated financial resources etc. or they can focus on a single industry, especially if students display a particular interest in becoming an entrepreneur in a certain industry. Such a setting will be found with homogeneous groups of participants, e.g. in extra-curricular Entrepreneurship Education *for* entrepreneurship within the department of biotechnology.
4. Entrepreneurship has to deal with many tasks, like financing, marketing, legal requirements, exit strategies, internationalisation etc. Each case can include a number of various tasks and a range of cases together can cover all of the important tasks an entrepreneur should be familiar with. Furthermore by using various cases over on

[4] Many universities organize their entrepreneurship courses by a number of cases that each reflect different phases of the entrepreneurial process, starting with entrepreneurial intentions and opportunity discovery, continuing with cases that focus on topics like business planning, resource acquisition, start-up and initial sales, organizational growth, internationalization and exit.

course, alternatives in carrying out tasks and finding solutions can be addressed, for instance guerrilla marketing vs. a more traditional approach, traditional financing vs. venture capital, organic vs. external growth etc.

There are cases for each of these various aforementioned settings. Even better: good cases will reflect on a broad variance of the mentioned issues. This will help students not to consider issues as isolated tasks that need to be addressed by functional silos, but to develop a holistic approach to solutions that reflect the interdependencies and continuities of entrepreneurial decisions on certain issues.

The content of case studies allows for addressing both knowledge ("know what") and skills ("know how") relevant in entrepreneurship (see e.g. Tocher et al. 2012, Brown 2007, Baum & Locke 2004, Lazear 2004, Baron & Markman 2000). The following collocation (see table 4) of knowledge elements and skills displays skills in accordance to knowledge elements. For instance, a person who knows a lot about marketing is not necessarily a good sales person. To cover the full range or at least the most important parts of knowledge elements and skills critical to entrepreneurship, it is usually necessary to discuss several cases over multiple sessions.

Knowledge, relevant in entrepreneurship:	*Skills,* relevant in Entrepreneurship:
– Risk assessment analytics	– Opportunity recognition
– Market analyses, marketing	– Selling
– Economics	– Reading economic context
– Strategic management	– Execution
– Business planning	– Integration
– Laws and legal aspects	– Discussing and discussion leadership
– Finance, capital market	– Resource mobilisation
– Venture capital process	– Negotiating
– Patents and other intellectual proper	– Creativity
– Bankruptcy law	– Leadership
– Internationalization	– Cultural sensitivity
– Human Resource Management	– People judgement
– Organizational Theory	– Communication and motivation
– ….	– …..

Table 4: Knowledge and skills relevant in entrepreneurship

The advantages of case study based teaching in Entrepreneurship Education are broad and include the training of many abilities that are important for the initial start-up decision as

well as for new venture performance (Wong, Lee & Leung 2006). The following bullet points name important advantages of case based teaching in Entrepreneurship Education and relate those advantages to empirical evidence as well as theoretical frameworks provided by state of the art literature in entrepreneurship research:

- *Discussion leadership*

  Successful entrepreneurs are often characterized as charismatic women or men, who know how to articulate and express themselves, who know how to lead their team and their firm and who are often very self-confident (e.g. Townsend et al. 2010, Tyszka et al. 2011). The case based classroom discussions and debates within smaller class preparation or assignment groups train the discussion leadership ability.

- *Endorsement for leadership-culture through case studies*

  As mentioned above, Entrepreneurship Education should endorse a leadership-culture, not a membership-culture like in the traditional BWL. Case-studies are able to facilitate such a leadership culture by narrating situations and processes from an entrepreneur's perspective that took considerable amount of leadership behavior to overcome a critical situation. This gives students the opportunity to follow such concrete decision-making processes, directly from a decision-maker's perspective. (Klandt & Volkmann 2006, Filion 2006)

- *Concentration on individual enhancements through case studies*

  In the center of Entrepreneurship Education stands the entrepreneur as the main actor and the nucleus of entrepreneurial activity and behavior (e.g. Anderson & Warren 2011, Meier Sørensen 2008, Whelan & O'Gorman 2007, already Carland et al. 1988). He or she is the individual who founds the business, who leads the firm and he or she is the person who manages the processes. Therefore, the enhancement of the entrepreneur and his or her self-efficacy is more important (Krueger, Reilly & Carsrud 2000, Zhao, Seibert & Hills 2005, Davidsson 2006, Wong, Lee & Leung 2006, Carsrud & Brännback 2011) than an enhancement of the manager in the traditional BWL, because managers are embedded in functional structures that compensate self-efficacy. Through the usage of case-studies in Entrepreneurship Education, students

are forced to develop own solution approaches for the case's special problems. They don't listen passively, they work actively on own ideas, enhancing their analytical skills and winning fellow students over in the class room discussion.

- *Development of self-confidence focusing on individual insistency and persistence through case studies*

  Working on case studies in Entrepreneurship Education is about interacting. First, students have to develop their own solutions; second, they have to discuss which approach is the best for the given situation in the case. Therefore, students have to defend their approaches against the professor and in particular against other students. Hence, not only students' arguing and discussing skills will be educated but also their assertiveness by insistency and persistence – very important skills to be a successful entrepreneur (e.g. Burke et al. 2008, Mullins 2006, Hunter 2005, Baum & Locke 2004).

- *Educating students' leadership, motivation and communication skills*

  Intimately connected with the development of one's self-confidence are the leading-, motivating- and communicating skills of potential Entrepreneurs. These skills are very important for successfully founding a business (see e.g. Tocher et al. 2012, Carsrud & Brännback 2011, Oosterbeek et al. 2010, Baron & Tang 2009, Frank 2007, Baum & Locke 2004, Lazear 2004, Baron & Markman 2000). Entrepreneurs face multiple challenges with leading and motivating a team, communicating with the team, communicating and negotiating with partners, banks or venture capitalists etc. By using case studies, students can learn in an early stage to communicate with other students, with the professor or for example talk in front of the class. Role plays or inviting venture capitalists to the class for a case based "Dragon Deans Contest" (i.e. the presentation of a venture idea or complete business plan in competition with other teams) can further enrich this learning experience. In our entrepreneurship curriculum at Wuppertal University for instance the founders of WaveScape Technologies GmbH performed a live case with students who had to craft and negotiate the start up's venture capital strategy including arguing for (or against) share price and share

premium. Similar classes are performed at many Universities around the globe. Through taking this last aspect of the method triad – social competence – into consideration, students will be educated in these so called "soft skills" sector, which are actually "hard skills" (directly relevant for the venture's resources and success) for an entrepreneur.

Additionally to the above mentioned personal skills like communication, discussion and leadership skills, there are some analytical skills, which are very important for being a successful entrepreneur, too. How these skills are able to be educated through the usage of case-studies in Entrepreneurship Education are mentioned in the following.

- *Ability to develop innovative and economical promising products or services*

  Case studies always contain stories; often these stories deal with successful entrepreneurs, who often weren't successful from the beginning but learned to make their way against all odds (Henricks 2007, Cha & Bae 2010, Gilbert & Eyring 2010). Through hard work and the right decisions they become successful at last. Hence, students should be educated with smartness to develop products or services and business models, which have to be economical promising. The ability of innovative opportunity identification and development might be one of the most important functions in being an entrepreneur (e.g. Kirzner 2008, Dimov 2007, Sanz-Velasco 2006, Ardichvili 2003, Koning 2003, Sarasvathy et al. 2003, Shane 2003, Gaglio & Katz 2001, Shane & Venkataraman 2000, Ardichvili & Cardozo 1999, Hills et al. 1997, Kirzner 1997, Schumpeter 1934). Potential entrepreneurs need the cognitive structures necessary to recognize opportunities when they emerge (Carsrud & Brännback 2011, p. 19, Kim & Mauborgne 2000, Gollwitzer & Brandstätter 1997). These ability and cognitive structure can be trained through the usage of case studies. Students learn how and why other entrepreneurs made the right decisions and developed the right products and related business models, which became economical successful. But this is not all. Through case studies and the story "behind the scenes", students are also able to comprehend which decisions were wrong and through what decisions entrepreneurs failed or at least came of the track for some time. Hence,

students learn through failure and are sensitized to be aware of the fact that mistakes could easily be made, but could also be avoided through reflections on the own 'case'.

- *Ability to make decisions even in risky or insecure situations*

  Entrepreneurs, as mentioned above, face multiple challenges. One of the biggest challenges is to make the right decisions, even with incomplete or uncertain information (e.g. McKelvie et al. 2011, Haynie et al. 2010, McMullan & Shepherd 2006, already Knight 1921). Through case studies without much information or with the same information-set the entrepreneur had in that concrete situation, students learn how to deal with insecure situations and incomplete information. They learn how to gain the information they need through detailed and structured information research and how to compensate incomplete information and minimize and manage risks that occur from uncertainty.

- *Ability to apply analytical tools for analyzing firms, markets and industries*

  Analyzing competitors, markets, industries economical and financial data or just the own strength and weaknesses is very important for young entrepreneurs (see Brown 2007, Frank 2007). A good teaching case will usually allow the use of multiple analytical processes (like Porter's Five Forces, PESTEL, SWOT, BCG Matrix, and alike). Cases in entrepreneurship often go beyond the wisdom of such common tools in strategic management. For instance in the case of IKEA or Ryan Air the advice based on Porter's Five Forces Analysis would have been not to start the companies, as both markets – furniture retail and the passenger segment of aviation – were seen unattractive with overcapacity and fierce competition among incumbents. By using such cases students can learn about the limits of strategic instruments and the meaning of entrepreneurial spirit. The case "R&R" (Jarillo Mossi & Stevenson 1985, Roberts et al. 2007, chapter 1) and Nantucket Nectars (Biotti et al. 2000) – both published by Harvard Business School – make a good point in that respect, too. Students can learn from such cases why and how entrepreneurs win against all odds (Henricks 2007, Gilbert & Eyring 2010), for instance by applying a new business model, by creating more or distinguished value for customers and by forming a value chain that is

distinct from competitors. Such innovative acts can also be linked to entrepreneurship theory, e.g. Schumpeter's (1934) five types of innovation and the entrepreneur's role in enacting the innovations. The advantage of using case studies for practicing these tools is that in some good cases the aforementioned limitations of such tools in the entrepreneurial context can be highlighted. Especially those limitations that derive from the entrepreneur's "rule braking behavior" (Knyphausen-Aufsess et al. 2006 focusing on industry specific rules of conduct rather than breaking the law) applied by entrepreneurs in cases like IKEA, Ryan Air, R&R or Nantucket Nectars.

With all these above mentioned aspects, case studies are able to prepare potential entrepreneurs for future challenges. Through different styles of case studies and various didactical arrangements that can be combined with case teaching in synergetic ways, cases are able to facilitate all competencies of the method triad: specialized knowledge, methodological expertise and social competence. Case studies are able to provide a theoretical framework as well as a practical framework and to combine both of these frameworks in case reflections. Thus, students get both, a theoretical based perspective and a practical perspective on what it takes to be an entrepreneur. Thereby, it is possible to create synergies between theory and practice through the usage of case studies in Entrepreneurship Education. For this reason, case studies are of particular value not only for teaching *for* entrepreneurship but also for teaching *about* entrepreneurship, a fact that still is partly neglected in German BWL. This is also important for research, because case studies allow future research assistants and PhD students in the field of entrepreneurship to build realistic mental representations of the entrepreneurial phenomenon and to reflect entrepreneurship theories in the light of entrepreneurial practice, thus bridging the theory-practice gap in entrepreneurship (see Ritchie & Lam 2006, Freese et al. 2012).

In the previous sections of the paper we discussed the benefits of the case study method for Entrepreneurship Education from a didactical and theoretical perspective in the light of empirical literature. It was also explained that in Germany and some other countries especially in mid- and central Europe, case study based teaching is still rarely used, as traditional lecturing remains predominant. But what is the students' perspective on case study based teaching, and what learning outcomes especially in the area of teaching *for* entrepreneurship are achieved? In January 2012 we conducted a first explorative study among students in one entrepreneurship course. The course was part of an entrepreneurship module for students from the business and economics department (i.e. teaching *for* and *about* entrepreneurship). Other courses in the same entrepreneurship module have been taught using a more classical lecture style. This allows directly comparing both settings in our small survey. The aim of the study was to gain first explorative insights that will later help in the creation of a large scale study that is supposed to follow up. The large scale study will include more questions and variables; however at this point we can only present the results from the small scale explorative research.

The sample size was n=24; 12 respondents were male and 10 were female students while 2 students rejected to report on their sex. All questions had been included in the standard evaluation form that is used on a regular basis at the end of each course.

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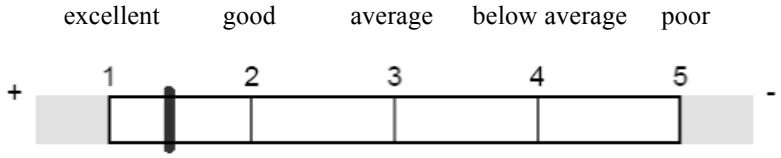
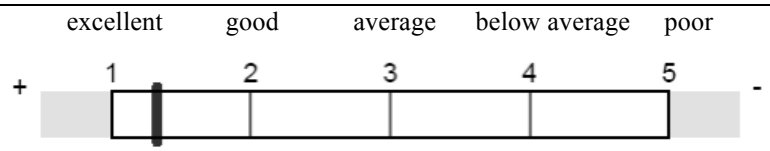
Part 1: Overall evaluation of the case study-based course and general comparisons

1.1 Overall, in comparison to my other courses, I evaluate the case study based entrepreneurship course…



1.2 The presentation of the learning content by case studies was…



1.3 In comparison with more traditional lectures I feel that a case study-based course is better suited for transmitting learning content of practical relevance:

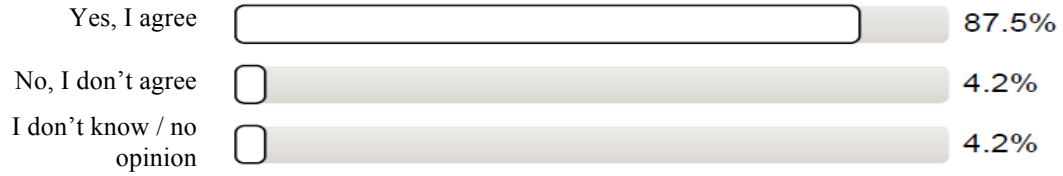


Table 5: Results from an explorative survey on case study based methodology in Entrepreneurship Education (part 1)

The results indicate that students enjoy case study-based courses very much, in absolute as well as in relative terms (see part 1 of the survey, table 5). The results furthermore show that the case study methodology might be better suited to achieve a better overall learning effect and to achieve a better understanding of entrepreneurship than traditional lectures (see part 2, table 6). Results also demonstrate that case studies can help to better comprehend entrepreneurship theories, so case study-based learning is not solely suited for praxis oriented learning and skill development but also suited to provide a better understanding of theoretical knowledge too (see question 2.2).

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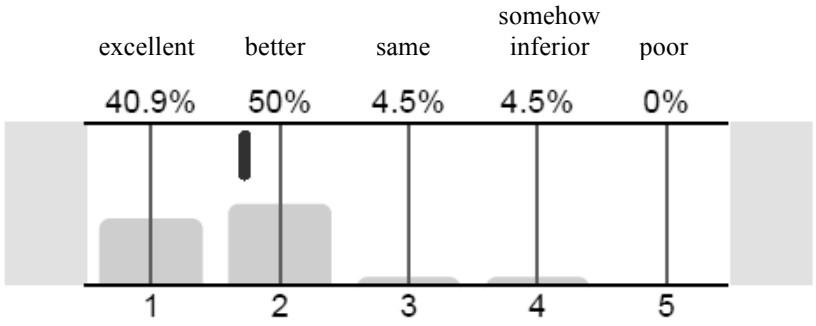
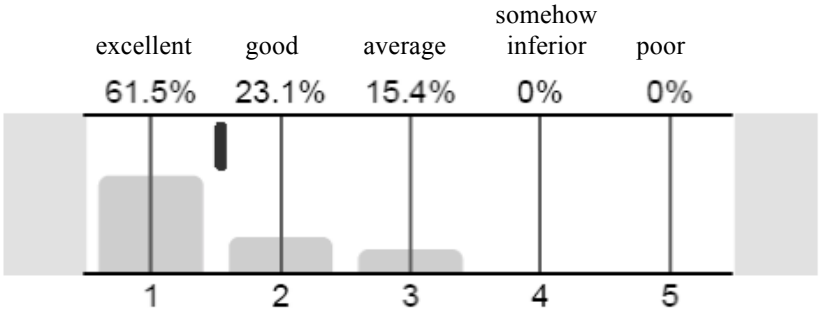
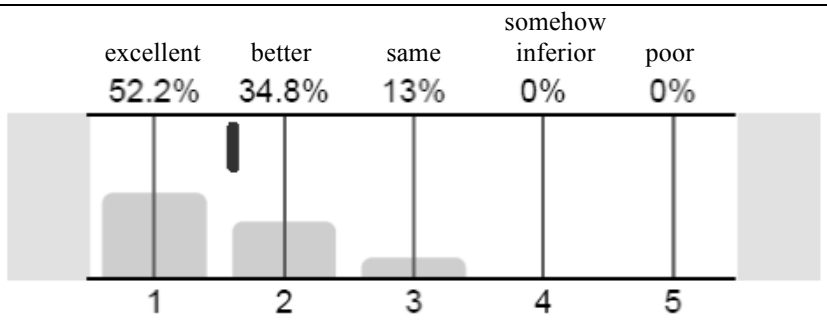
Part 2: Comparison of the case study-based course in entrepreneurship with entrepreneurship courses in the same module that utilize a more traditional lecture style	
2.1 Compared with the more traditional lecture-based courses in the same module the **overall learning effect** of the case study-based course to me was…	
2.2 The case study-based course has **helped me to comprehend theories** that had been a learning matter during the lectures on entrepreneurship in other courses of the same module in a …. way.	
2.3 Compared with the more traditional lecture based courses in the same module the case study-based course has helped me in a …. way **to gain a better understanding of entrepreneurship**	

Table 6: Results from an explorative survey on case study based methodology in Entrepreneurship Education (part 1)

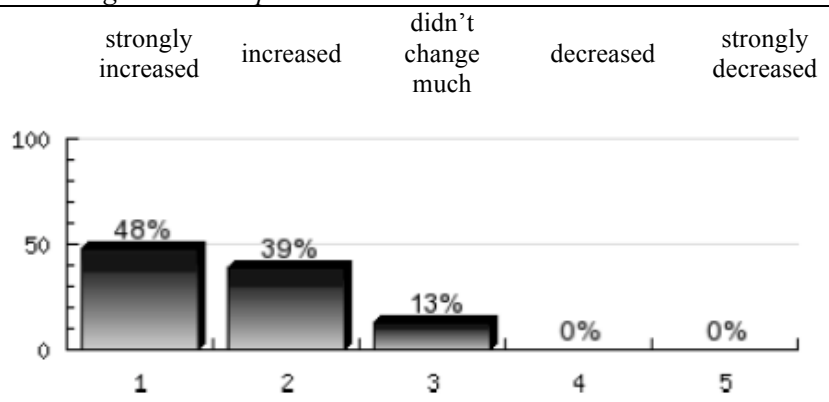
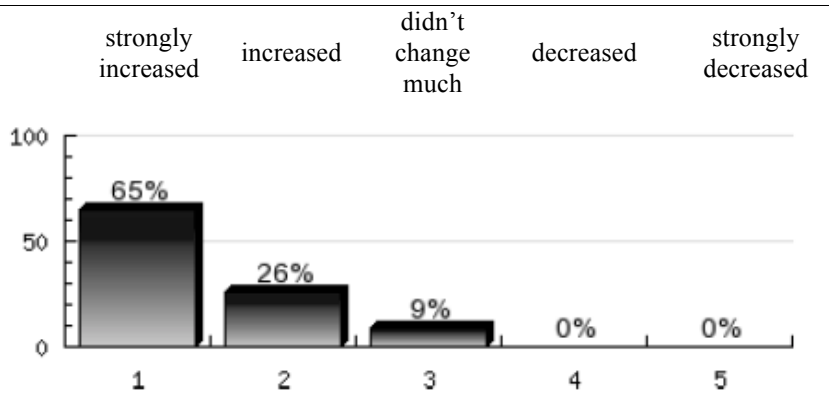
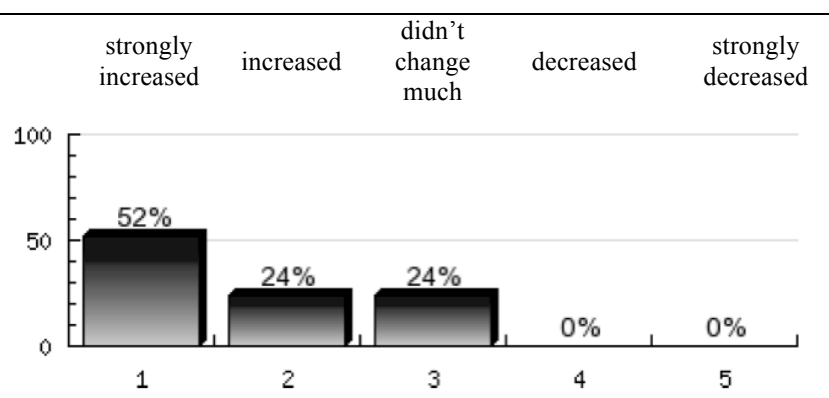
Part 3: Learning outcome in regard to entrepreneurial motivation and intention	
3.1 Independently from any given concrete interest in starting a new venture, **my self-confidence in my ability to successfully start a new venture has**…	
3.2 Independently from any given concrete interest in starting a new venture **my general interest in entrepreneurship has**…	
3.3 After visiting the case study based course, **my personal interest in starting a new venture has**…	

Table 7: Results from an explorative survey on case study based methodology in Entrepreneurship Education (part 3)

In the previous chapter we have extracted several personal characteristics (like self-confidence, self-efficacy and persistence), skills (like communication) and abilities (like decision making under uncertainty and the critical and meaningful use of analytical

heuristics). Part 3 of our survey aims at assessing the impact of case study based learning on facilitating these characteristics, skills and abilities. Despite the fact that our short explorative survey did not go into much detail the results still clearly show that students gained self-confidence in their ability to successfully start a new venture (part 3, table 7).

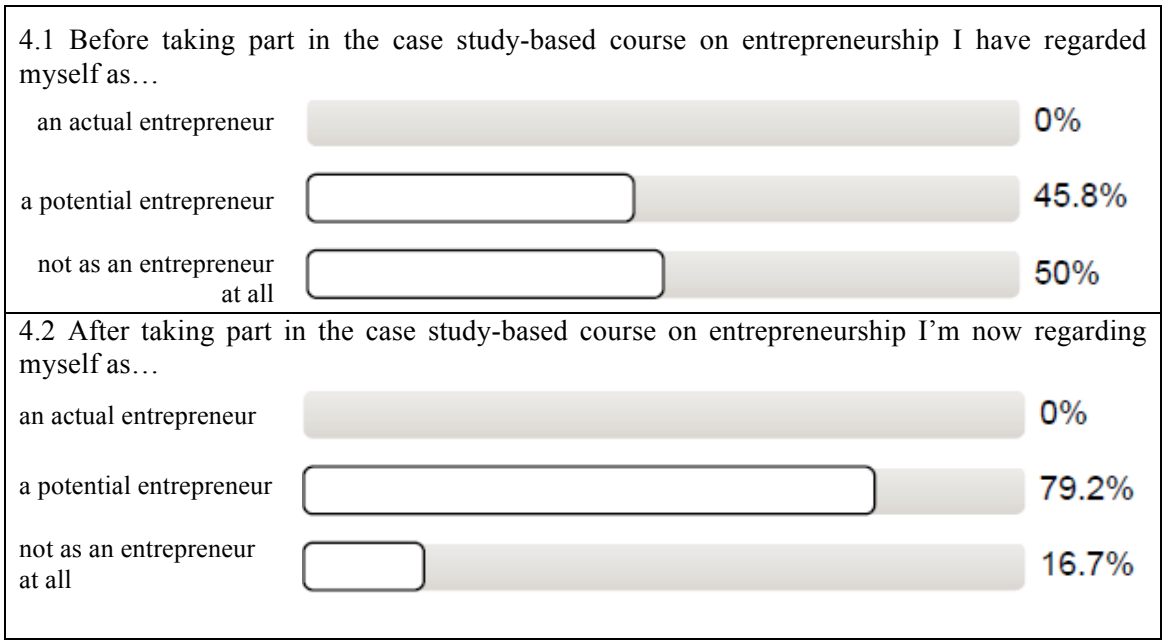


Table 8: Results from an explorative survey on case study based methodology in Entrepreneurship Education (part 4)

Table 8 (part 4 of survey) finally shows how strongly the students' interest in starting a venture increased, documented by an astonishing shift in self-perception from 'non-entrepreneur' to 'potential entrepreneur'.

Limitations of the explorative study: Besides the given limitations of explorative studies in general (e.g. small sample size, no representativeness beyond the sample, no legitimate generalizations etc.) five major drawbacks have to be addressed:

1. The study only examines a limited number of variables relevant to the learning context and learning outcomes of case study based entrepreneurship education. It makes statements mostly based on Likert scales, summarized from the individual judgments of participants. If any effect is indicated by the results from the

accumulated Likert scale judgments, it still remains difficult to assess the strength of any effect.

2. Even though respondents were asked to compare a case study-based course with courses that employ a more traditional lecture style, there is still a lack of control group; hence, there is no empirical evidence provided that would support any statement that case study based teaching methodology is "better" or "superior" in entrepreneurship education to the traditional forms of classical lectures. Still, the explorative study reveals that such empirical proof might be expected to exist in a proper study.
3. The survey was conducted right after the course, so no long term effects are monitored. However, starting a venture is a career choice that often is made only years after graduation. So even though in entrepreneurship education the long term effect might be very important, it is not monitored by the survey.
4. No questions except one have directly addressed the proposed learning synergies bridging entrepreneurship theory and practice. So the evidence for this argument is positive by the result of that one question but rather limited because no other questions were included to control and ensure this result. Especially it was not controlled whether the case study methodology helped to better comprehend entrepreneurship theories just by illustrating the theory – or by deepening the understanding of the theoretical construct and how (or why) the theory could be usefully applied in practice.
5. The different courses in the module have been taught by different lecturers, any differences in the above reported comparative evaluations of the distinguished didactical arrangements (traditional lecture vs. case study methodology) could therefore be caused by the individual teaching style of the lecturers and professors and the individual perceptions and preferences of students for one teacher or the other. The influence of the individual lecturers remains uncontrolled. Controlling for this influence is yet another challenge for the intended large scale study.

Given these results and limitations, our goal is to advance our empirical research in favor of eliminating these limitations. With this article we have contributed to the theoretical

basis for empirical examination of the case study methodology in Entrepreneurship Education. In the future we would like to elaborate on the thoughts presented in this article by constructing a model based on such a theoretical framework. We aim at separately as well as comparatively testing the model with empirical data for the two target groups (intra- and extra-curricular), as well as for the three learning goals (courses targeting on teaching *for,* teaching *about*, or teaching *for and about* entrepreneurship). Such tests should also report on the strength of correlations, identifying the most important elements of case study-based teaching. Therefore it would be important to isolate variables, but it might also be the fact that all variables 'work in symphony', so that single elements of case based teaching aren't as effective as the sum of several or all elements when taken together. Furthermore, with such an approach in research it would be interesting to see the influence of the heterogeneity / homogeneity of knowledge bases or interests of students (see figure 1) on the effectiveness of the case study methodology.

CONCLUSION AND IMPLICATIONS

The intention of the present article was to show why the method of case study-based teaching is well suited especially for Entrepreneurship Education. The usage of case-studies in Entrepreneurship Education can facilitate both, a theoretical as well as a practical oriented framework of how to found a business and of what it's like to be an entrepreneur. Through the medium of case studies all particular target groups of Entrepreneurship Education are able to achieve the knowledge they need to successfully start a venture or to continue an open or even more academic career path. As already mentioned above, the case study method is able to educate future entrepreneurs through creating an important synergy between theory and practice. Case study-based didactics are able to facilitate all three competences of the method triad and skills of great importance for entrepreneurs.

After introducing a classification of target groups in Entrepreneurship Education we have shown that case studies are valuable for all groups addressed, no matter how heterogeneous they are. We have stressed out that case studies do not only transmit

practical knowledge but can also be used for advancing theoretical reasoning. We have related the advantages and proposed outcomes of case study-based teaching methodology to the entrepreneurship research literature, providing evidence based arguments for the use of case studies especially in Entrepreneurship Education. Finally, we have shown descriptive results from a first small sample study. Students in our survey favored case study-based teaching over more traditional lecturing, an approach still common in Germany. Students felt encouraged for entrepreneurship after taking part in a case study-based course; they stated higher interest in entrepreneurship as well as higher level of self-confidence for entrepreneurship and a much better comprehension of entrepreneurship theory (see Carsrud & Brännback 2011 on entrepreneurial motivation). We have pointed at the limitations of our small empirical study. Despite the fact that more research is needed we would like to ask for an increasing usage of case study-based teaching in Entrepreneurship Education especially in Germany. We would also like to encourage the creation of more case studies specialized for the requirements of Entrepreneurship Education in Germany, as there is still a lack of *good*[5] entrepreneurship teaching cases based on German start-ups and other phenomena in entrepreneurship.[6].

ENDNOTES

The authors are grateful to comments made by participants of the AGSE conference 2011 in Melbourne, Australia and to two reviewers who have provided critical feedback. Thanks to the reviewers feedback this paper has been developed much further than our original contribution published in AGSE 2011 conference proceedings.

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[5] See Chrisman (1994) on how to achieve quality when writing entrepreneurship cases. Also see Thomas Cooney, Dublin Institute of Technology, Ireland, who provides a free webinar via the ICSB webpages.

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DYSLEXIC AND ENTREPRENEUR: TYPOLOGIES, COMMONALITIES AND DIFFERENCES

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ABSTRACT

There is anecdotal evidence as well as a small but growing research literature indicating there may be a higher incidence of dyslexia amongst entrepreneurs compared to business managers and to the general population. Studies indicate that while dyslexics may resist entry into mainstream businesses due to their generally low literacy levels, there appears to be no such barrier for dyslexics wanting to start new ventures. Given that dyslexics also dislike imposed structure, have strong oral and spatial skills, are intuitive/insightful/curious as well as resilient and determined, it is not surprising that they gravitate toward self-employment as opposed to highly organised corporate professions.

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INTRODUCTION

This paper is part of the primary author's PhD research that aims to define and explore the emerging field of Dyslexic Entrepreneurship. The present paper explores the literatures of dyslexia and entrepreneurship to ascertain commonalities and differences and constructs three tentative typologies that illustrate these. Some previous research has been carried out in the UK and the US, but we have located no similar research in Australia.

A small but growing body of evidence has found that there may be a higher incidence of dyslexia amongst entrepreneurs compared both to corporate business managers (managers of established businesses) and to the general population. Additional evidence indicates that, while many dyslexics may resist entry into or may be discriminated against in mainstream business (due primarily to literacy issues), there may be no such barrier for dyslexics in creating a new venture, that is, in becoming entrepreneurs.

The present exercise aims to identify fruitful theoretical orientations in this sparse field and further to map the possible communalities or congruities against the various difference or incongruities. Four theoretical orientations come to mind.

Psychological trait theory

Researchers and writers have been interested in identifying traits common to entrepreneurs (Shaver and Scott 1991; Bolton and Thompson 2000) and to dyslexic individuals (Logan 2008; Smith 2008). This approach is grounded in the study of people who tend to exhibit similar characteristics. For example, achievement, creativity, determination, family development, educational development, and technical knowledge are factors that usually are exhibited by successful entrepreneurs. This reasoning promotes the belief that certain traits established and supported early in life will lead eventually to entrepreneurial success. For dyslexics, there are also certain traits that arise; persistence, conceptual thinking, intuitiveness, visual spatial skills and resilience are all recognised as characteristics of those with this disorder.

Studies hint that visual thinking, innovation, delegation of authority and problem solving are common in both dyslexics and entrepreneurs. Given that dyslexics also dislike imposed structure, it is not surprising that they gravitate toward self-employment as opposed to organised, literacy-focussed professions such as business management.

Logan (2009) found in the UK and the US that there is a significantly higher incidence of dyslexia in entrepreneurs than in corporate business managers and in the population in general. Her research also found that dyslexic entrepreneurs are able to grow their businesses more quickly and that they usually own more businesses than non-dyslexic entrepreneurs. Logan indicates that these factors were mainly attributed to the various coping strategies employed by dyslexics, such as good levels of oral communication and their ability to delegate.

An initial review of the literature reveals that dyslexics and entrepreneurs do have a several common traits. Characteristics such as innovative problem solving, big picture thinking and a general dislike for 'rules' and structure are cited in both the entrepreneurial literature and the dyslexia literature (Becherer and Maurer 1999; Everatt, Steffert et al. 1999; Cross and Travaglione 2003; Ehardt 2009). This leads us to speculate that parallel character traits may form an initial explanation of the high incidence of being both dyslexic and entrepreneurial.

Nonetheless, trait theory of entrepreneurs has always been problematic. The idea that the characteristics of entrepreneurs cannot be taught or learned, that they are innate traits one must be born with, has long been prevalent. Like all disciplines, entrepreneurship has models, processes and case studies that allow the topic to be studied and knowledge to be acquired.

Social Margination and Displacement

This school of thought holds that society affects or eliminates certain factors that project the individual into an entrepreneurial venture. As Rondstadt (1984) has noted, individuals will not pursue a venture unless they are prevented or displaced from doing other activities. The point is that being disadvantaged may actually lead one to become more

entrepreneurial. For example, Scase and Goffee (1980) (Willsdon 2005) suggest that "entrepreneurs may be more likely to emerge from those groups in society which are deprived or marginal; that is, groups which are discriminated against, persecuted, looked down upon or exceptionally exploited" (pp. 107). Some research has even looked at entrepreneurs in the context of being deviant or marginalised characters. Shaperso (1975) addressed the issue of the entrepreneur as being a displaced person. This corresponds with what is called the social marginality theory put forward by Stanworth and Curran (1976), who suggest the perceived incongruity between an individual's prodigious personal attributes and the position they hold in society might propel them to be entrepreneurial. Hagen (1962) suggests that where the behaviour of a group is not accepted or where a group is discriminated against, then a psychological disequilibrium would occur. This might drive a person into enterprising behaviour to compensate for this imbalance. Dyslexics are also subject to displacement and social margination due to their learning disability. Usually isolated at school owing to the literacy inabilities, dyslexics face increasing childhood adversity as they progress through the school system (Smith 2008).

Neurobiology

Beyond this, there is even some tantalising evidence indicating that there may also be neurobiological determinants for entrepreneurship. For example, research has shown that higher testosterone levels can facilitate entrepreneurial behaviour and that higher-than-usual testosterone levels in utero were found to be underlying learning disorders such as dyslexia (Geschwind and Behan 1982; Geschwind 1983; White, Thornhill et al. 2006). Another biological determinant may even be gender: A higher male-to-female gender ratio in both entrepreneurs and dyslexics has been shown (Duane 2001; Acs, Arenium et al. 2004; Gupta, Turban et al. 2009; Hawke, Olson et al. 2009). The neurobiology of dyslexic entrepreneurs has yet to be explored.

Environmental factors

This school of thought deals with external factors and surrounding conditions and influences that affect a potential entrepreneur's lifestyle. These can be either positive or

negative forces in the moulding of entrepreneurial desires. The focus is on institutions, values and more, that when grouped together, form a socio–political environmental framework that strongly influences the development of entrepreneurs (Van de Ven 1993). For example, if a middle manager experiences the freedom and support to develop ideas, initiate contracts, or create and institute new methods, the work environment will serve to promote that person's desire to pursue an entrepreneurial career. Another environmental factor that often affects the potential development of entrepreneurs is their social group. The atmosphere created by the support of friends and relatives can influence the desire to become an entrepreneur.

DYSLEXIA

Background

Dyslexia was first recognised in the 1890s when it was known as 'congenital word blindness' and it is now considered to be one of the most common childhood learning disorders. It affects 5% - 17.5% of the general population (Shaywitz, Shaywitz et al. 2001; Fisher and DeFries 2002; Taylor and Walter 2003; van Kraayenoord 2008; Ehardt 2009). Dyslexia might be defined as an impairment of phonological processing which manifests in a lower level of literacy, particularly reading and spelling (Castles, Bates et al. 2006; Coltheart 2006; Hudson, High et al. 2007). Dyslexia also negatively affects an individual's executive functioning abilities particularly in the area of working memory (Helland and Asbjørnsen 2000; Reiter, Tucha et al. 2005). Dyslexia occurs in people with average or above-average intelligence that have had adequate exposure to educational opportunities, it is therefore not considered to be correlated with intelligence or associated with the childhood environment (Fisher and DeFries 2002; Zambo 2004).

As most dyslexics experience ongoing struggles within various academic environments, they usually experience low levels of self-efficacy and self-esteem and often do not feel like they fit within schools, universities, corporate or even social systems (Hall, Spruill et al. 2002; Taylor and Walter 2003; Lackaye, Margalit et al. 2006; Griffin and Pollak

2009). Studies conducted in the UK, Sweden and the USA found that up to 52% of the prison population in these countries are dyslexic, which highlights the social isolation that can be experienced by people with this disorder (Morgan and Klein 2000). Although some report dyslexia as a gift (West 2005; Davis and Braun 2010), it is primarily considered a disadvantageous disorder that is familial, inheritable and incurable (Geschwind 1983; Shaywitz, Shaywitz et al. 2001; Castles, Bates et al. 2006; Coltheart 2006; Olson 2006; Hudson, High et al. 2007; Ehardt 2009).

Strengths and talents of dyslexics

Although the disorder is considered unfavourable, it can be accompanied with certain talents. These strengths include: excellent mechanical skills, logical problem solving skills, global visual spatial skills, enhanced creativity and innovation, 3D visual abilities and conceptual thinking (Everatt, Steffert et al. 1999; Morgan and Klein 2000; von Károlyi, Winner et al. 2003; West 2005; Ehardt 2009; Tafti, Hameedy et al. 2009). Certain professions such as medicine, engineering, art and design, appear to have higher numbers of dyslexics within their cohorts when compared to other professional groups and there is certainly no shortage of dyslexics in the Nobel Laureate lists (West 2005). It is important to note that these are correlations and the causal direction of these hypotheses has yet to be confirmed.

Testosterone, gender and learning disorders

An interesting related notion has become known as "The Testosterone Hypothesis". Geschwind and his colleagues undertook research in relation to testosterone levels and the incidence of left handedness, learning disorders and immune diseases (Geschwind and Behan 1982; Geschwind and Behan 1982; Geschwind 1983; Galaburda 1990). According to the hypothesis, elevated levels of testosterone present in the developing brain in utero slow neural development resulting in delayed growth of the left hemisphere of the brain and creating abnormalities in the left temporal speech area of the brain, which may account for the higher incidence of learning disorders such as dyslexia (Geschwind and Behan 1982). This higher level of testosterone may also explain the gender ratio of

dyslexia which is generally believed to favour males, although there are differing opinions in relation to the extent of this incidence (Geschwind and Behan 1982; Miles, Haslum et al. 1998; Shaywitz, Shaywitz et al. 2001; Hawke, Olson et al. 2009).

Traits of Dyslexics

The table below summarises the characteristics of individuals with dyslexia as reported in the literature we have reviewed to date. In addition to the strengths and talents previously discussed, Davis (2010) asserts that dyslexics are also "highly intuitive and insightful" and "more curious than average" (pp. 5). Interestingly, the literature also reveals that dyslexics are very determined. Those who are able to persevere in their academic study or professional careers, especially ones that utilise their special abilities in areas that are of strong interest to them, appear to be able to transcend their literacy barriers to enjoy successful outcomes in their chosen fields (Hall, Spruill et al. 2002; Taylor and Walter 2003; West 2005). The key to these successful outcomes appears to be the need for an extremely high level of interest by the dyslexic person in their chosen field (Hall, Spruill et al. 2002). Highly successful dyslexic entrepreneurs include Richard Branson, Jamie Oliver, Bill Gates, Steve Jobs and Anita Roddick, to name a few.

Dyslexic	Low self-esteem/efficacy Low level literacy skills Dislike of structure Poor executive functioning skills Socially isolated, perceived by others and self as 'different' External locus of control Expert delegator Conceptual /3D thinker Excellent mechanical skills Strong global spatial skills Intuitive/insightful/curious Logical problem solver Resilient/determined Innovative Proficient verbal communicator

Table 1: Characteristics of dyslexics

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ENTREPRENEURS

Background

Entrepreneurs have long been regarded as playing a central role in job creation and economic development, and as such have been the subject of many years of academic research (Drucker 1985; Timmons and Spinelli 2003; Poh Kam, Yuen Ping et al. 2005; Rhee and White 2007; Loos, Koellinger et al. 2010). There are many differing views in the literature in relation to the validity of using specific theories such as cognitive, trait and motive in relation to the defining entrepreneurship. Timmons and Spinelli offer a succinct description of entrepreneurship as "a way of thinking, reasoning, and acting that is opportunity obsessed, holistic in approach, and leadership balanced" (2003, pp.47). Issues such as heredity, testosterone levels, adversity, familial business background, external environment and emotional intelligence have all been raised as possible contributors to entrepreneurship, but definitive causality still alludes us (Miner 2000; Cross and Travaglione 2003; Timmons and Spinelli 2003; Kirby 2004; Schaper and Volery 2004; White, Thornhill et al. 2006; White, Thornhill et al. 2007; Smith 2008; Tang, Tang et al. 2008).

Characteristics

It is generally agreed that entrepreneurs have the following key characteristics. They are innovative and proactive. They have a high need for achievement and an internal locus of control. Their tolerance for ambiguity is high and they are singled-minded in their determination. They have high levels of self-efficacy, are autonomous, and seek and exploit opportunities wherever possible (Boyd and Vozikis 1994; Cross and Travaglione 2003; Timmons and Spinelli 2003; Schaper and Volery 2004; White, Thornhill et al. 2006; Levander, Raccuia et al. 2008; McGee, Peterson et al. 2009).

Entrepreneurs are also considered to be committed and determined leaders who are self-reliant and highly motivated to succeed and therefore make the necessary sacrifices required in order to achieve their goals (Cross and Travaglione 2003; Timmons and

Spinelli 2003). Their ability to innovate is another key entrepreneurial characteristic. In fact, Drucker (1985) stated that "innovation is the specific instrument of entrepreneurship" (pp. 27). It is repeatedly reported in the literature that entrepreneurs take calculated risks as opposed to having a high risk propensity (Drucker 1985; Timmons and Spinelli 2003), however, research conducted by Levander (2008) found that uncalculated risk-taking was a permeating characteristic of the sampled entrepreneurs. Delegation can also pose a problem for entrepreneurs as they are autonomy seekers and generally very self-reliant. Whilst this lack of delegation allows them to get things done on their own terms, it also inhibits the growth of an organisation and can cause discord amongst those working for them as it can be construed as a lack of trust and belief in his or her team members (Carlopio, Andrewartha et al. 2001).

The table below summarises the characteristics of entrepreneurs as reported in the literature reviewed to date.

Entrepreneur	Determined/persistent
	Opportunity seeking
	Innovative
	Highly motivated
	Autonomous/self-reliant
	High EQ
	High tolerance of ambiguity
	Internal locus of control
	High propensity for risk
	High need for achievement
	Conceptual thinker
	High self-efficacy

Table 2: Characteristics of entrepreneurs

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Neurobiological determinants of new venture creation

Neurobiology is the scientific study of the brain and nervous systems which incorporates other research areas such as psychology, medicine and chemistry. Research in this interdisciplinary area has improved greatly since the advent of MRI's, as neurobiologists are now able to investigate live brain activity in a non-invasive fashion in patients. Variables such as gender and testosterone and their affect on new venture creation have also been investigated in this field, as have learning disorders such as dyslexia and ADHD.

Testosterone levels, which Meikle et al (1988), (White, Thornhill et al. 2006) assert are 80% heritable, have been linked with behaviours such as risk-taking, assertiveness and persistence, which are known entrepreneurial traits (White, Thornhill et al. 2006; White, Thornhill et al. 2007). White et al (2006) conducted an exploratory study utilising saliva samples to establish the effect of testosterone on new venture creation based primarily on risk-taking behaviour as a common characteristic in both the testosterone and entrepreneurial literature. The study concluded there was a positive correlation between higher testosterone levels and risk-taking. In fact, White et al (2006) went as far to state "A specific heritable characteristic of each individual, their testosterone level, explains something about the likelihood of that individual being significantly involved in a new venture" (pp. 30). Interestingly, in a further study conducted by White et al (2007) found there was a higher likelihood of new venture creation from individuals who have high levels of testosterone combined with a family history of business.

Gender presents another interesting variable in the neurobiological profile of entrepreneurs. Although a definitive reason is unknown at this stage, more men than women are involved in entrepreneurial activities (Acs, Arenium et al. 2004; Bosma and Levie 2009). Access to venture capital, male business networks, and appropriate education opportunities have been reported as potential issues for female entrepreneurs entering new venture territory, however these problems are dispelled as myths by Brush, Carter et al (2010). Bosma and Levie (2009) report that key factors such as differing cultures and customs can affect entrepreneurial participation opportunities and therefore

the incidence of women in these activities. Nonetheless, as reported by Acs, Arenium et al (2004) "there are almost twice as many men who are active entrepreneurs than women, and these differences are consistent across age groups and across most countries" (pp.27).

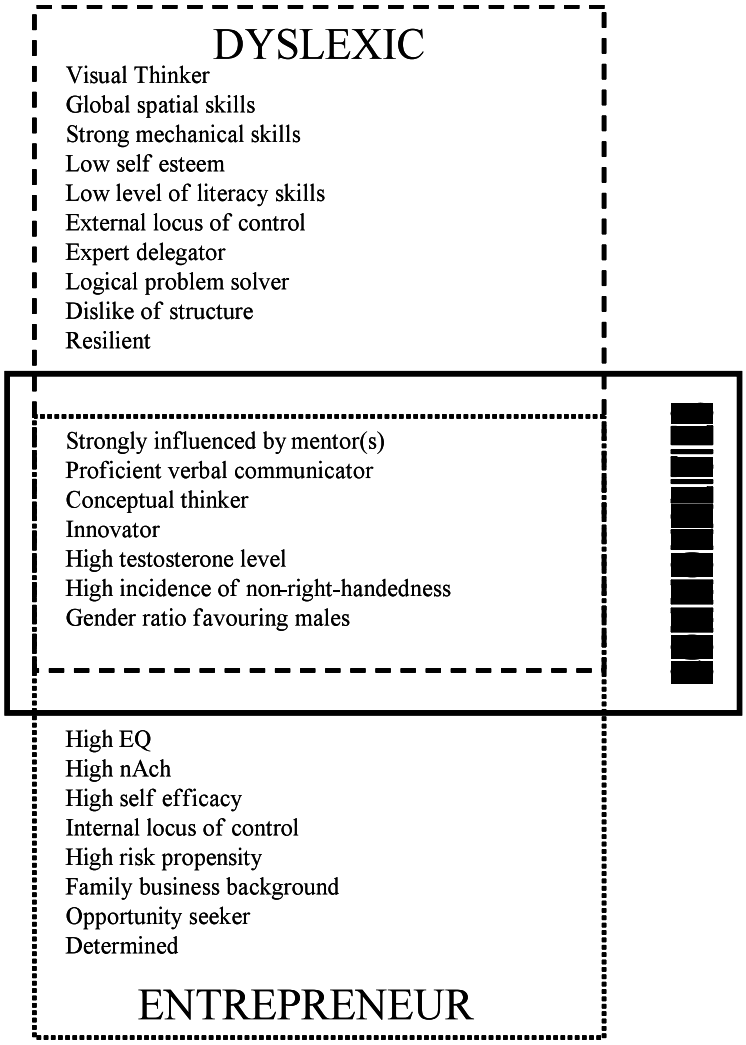
Other neurobiological determinants of entrepreneurial behaviour may include learning disorders such as dyslexia and ADHD (Levander, Raccuia et al. 2008; Smith 2008; Logan 2009). Although there is a limited body of research at this time, studies conducted by Logan have contributed greatly to the current knowledge in this field. Logan's research in the USA and the United Kingdom have given an insight into the incidence of dyslexic entrepreneurship with studies revealing that of the entrepreneurs sampled, 35% in USA and 19% in the UK were dyslexic. Both the UK and the USA studies also showed statistically significant differences between the dyslexic and non-dyslexic cohort of entrepreneurs in the sample. The dyslexic entrepreneurs owned more businesses, employed more people, delegated more, had a higher risk profile and owned their businesses for less time than non-dyslexic entrepreneurs. Both the dyslexic and the non-dyslexic entrepreneurs were strongly influenced by family role models or external mentors.

Smith (2008) has taken an innovative research approach trawling the internet for information pertaining to well-known dyslexic entrepreneurs. He draws parallels between the educational and familial backgrounds of dyslexics and entrepreneurs in an effort to understand the combined phenomenon. Smith correlates the resiliency required by dyslexics to overcome their formative school years with the perseverance and determination commonly attributed to the 'single mindedness' of successful entrepreneurs. Smith also surmises that the well-documented talents of dyslexics fit within the framework for successful entrepreneurial activities.

Figure 2 shows some clear commonalities between entrepreneurs and dyslexics. Conceptual thinking is a common trait ascribed to dyslexics and entrepreneurs. Dyslexics are predominantly visual thinkers and as such are able literally to see the 'big picture', a characteristic repeatedly credited to entrepreneurs. Both are also strongly influenced by mentors and both are recognised as engaging verbal communicators. Dyslexics and

entrepreneurs are also both cited in the literature as being very innovative, that is, they are people who can see things that others cannot (West 2005; Smith 2008; Davis and Braun 2010).

Figure 2: Trait typology of entrepreneurs and dyslexics showing commonalities



Congruities and incongruities

For all the commonality, however, there are also incongruities that open new research questions.

- The literature generally agrees that entrepreneurs have high self-efficacy, whereas dyslexics have particularly low self-esteem (Hall, Spruill et al. 2002; Lackaye,

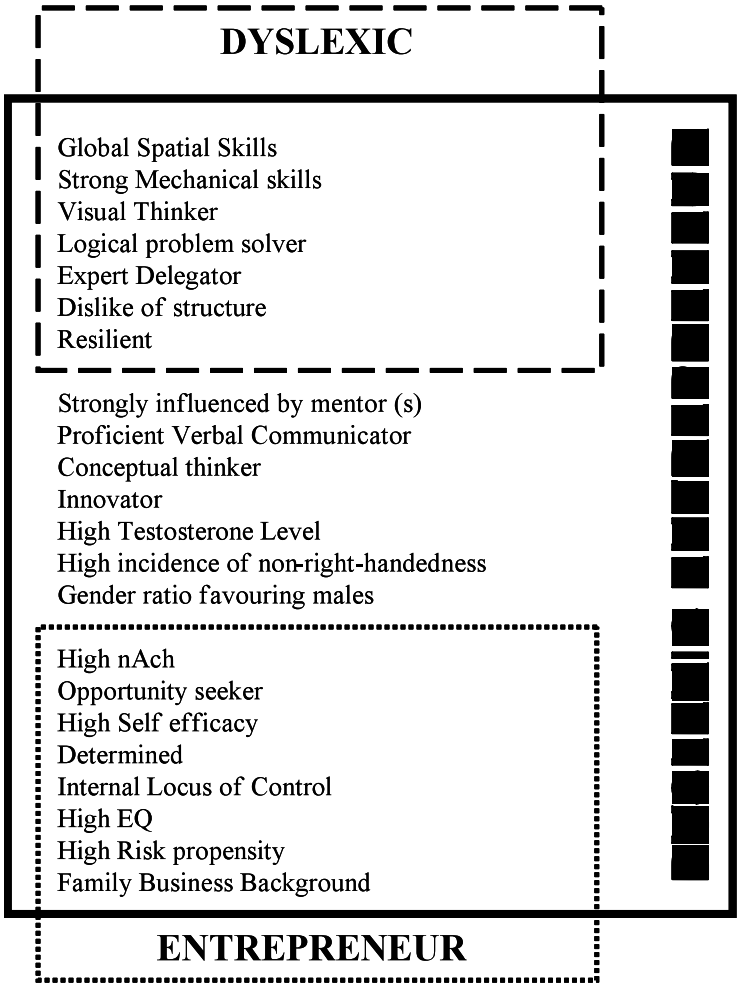
Margalit et al. 2006; Rhee and White 2007; Tang, Tang et al. 2008). Given that this is the case, how do so many dyslexics become entrepreneurs when belief in self is usually paramount to success?

- Studies show that dyslexics generally have an external locus of control whilst the literature confirms that entrepreneurs usually have an internal locus of control (Bosworth 1983; Carlopio, Andrewartha et al. 2001; Hall, Spruill et al. 2002; Tang, Tang et al. 2008). Internal locus of control is accepted in the literature has having a positive impact on success (Carlopio, Andrewartha et al. 2001). If this is the case, what then is the implication for an entrepreneur who is also a dyslexic and therefore inclined to have an external locus of control? Is their success potential diminished or have they found compensatory strategies to work around their perceived lack of control of their future and environment?
- Delegation is another key area of difference; entrepreneurs by nature seek autonomy (Sexton and Bowman 1985; McKenna 1996). Dyslexics on the other hand are forced at a young age to depend on, rely on and trust other people as a strategy to cope with their learning disorder (Davis and Braun 2010). That means that effective delegation is a very necessary part of their everyday life. How then does an entrepreneur who seeks autonomy cope with conflicting requirement for high levels of delegation?
- The need for achievement is also cited as a fundamental entrepreneurial trait; however the dyslexic literature does not generally report that this is present in those with this particular learning disorder. If the need for achievement is not high, how does a new venture get off the ground? These questions lead to yet another pertinent point. Are certain disadvantageous traits in dyslexic entrepreneurs (such as lack of self-efficacy, low need for achievement, external locus of control) compensated by strengths (such as expert delegation, creativity and conceptual thinking)? Or is there a sub-group of dyslexics who do not actually have the commonly accepted cognitive traits usually present in individuals with this disorder? If so, is it this group that gravitate toward entrepreneurial endeavours?[i]

Figure 3 proposes a trait typology of dyslexic entrepreneurs based on the literature reviewed to date. The hypothesis offered presumes that the dyslexic entrepreneur utilises

the known commonalities of dyslexia and entrepreneurship (see Figure 1) coupled with the complementary strengths existent in both dyslexics and entrepreneurs that would add value to a new venture project and therefore increase success potential.

Figure 3 Trait typology of dyslexic entrepreneurs



The typology presented suggests the hypothesis that the combined strengths present in the dyslexic and the entrepreneur would outweigh the limitations of low literacy skills of the dyslexic entrepreneur. For example, the need for high levels of literacy are offset by the compensatory strategy of delegation; if the dyslexic entrepreneur surrounds themselves with a strong team with sound literacy skills this deficit can be managed appropriately. On the other hand, an entrepreneur who effectively delegates to, communicates with, and

empowers his or her team is uncommon (Sexton and Bowman 1985; McKenna 1996). Such an entrepreneur would certainly be able to grow a business far more effectively than one who does not possess this crucial leadership skill. In addition the dyslexic ability of 3D visual thinking presents a new meaning to the term 'big picture thinking' that is so important in the creation, innovation and growth of new ventures. Yet another dyslexic trait of solving problems logically would surely add to the success potential of any new venture whilst the entrepreneurial skills of single mindedness and opportunity seeking would combine to create quite a formidable business person. To explore the dyslexic entrepreneur profile further, Figure 3 presents a hierarchy of biological, environmental and cognitive determinants of entrepreneurs, dyslexics, and dyslexic entrepreneurs. It is hypothesised that traits shared by dyslexics and entrepreneurs would inherently be present in dyslexic entrepreneurs, however assumptions are made to ascertain which would be the stronger trait when there is disparity (or incongruity). As dyslexia is a disadvantageous neurobiological disorder, it has been assumed that strengths and weaknesses associated with dyslexia may be found to be stronger than the generally accepted cognitive traits of entrepreneurship, for example, no matter how successful a dyslexic entrepreneur may become, he or she will still have low literacy levels and as such probably low self-esteem.

Figure 3: Hierarchy of determinants of the dyslexic entrepreneur

DETERMINANTS	Entrepreneur	Dyslexic entrepreneur	Dyslexic (non-entrepreneur)
COGNITIVE	Visual & Conceptual Thinker--*"can see things that others cannot"*		
	High self-esteem	Low self-esteem	
	Above-average EQ	Intuitive/curious	
	Voracious Reader	Uses technology/visual/audio/people to learn due to low level literacy skills	
	Strong verbal communicator		
	Weak executive functioning skills		
	Average/above-average IQ		
ENVIRONMENTAL	Highly influenced by mentor(s)		
	Self reliant	Proficient delegator/reliant on others	
	Seeks autonomy	Dislike of structured environments	
	Resilient		
	Father/Mother entrepreneur	Familial History of dyslexic & entrepreneurship	Father/Mother dyslexic
SOCIAL MARGINALITY	Perceived by self and others as being different		
	Underachievement at school	Negative school experience	
	Experienced childhood adversity		
BIOLOGICAL	Higher incidence of non-right handedness		
	Male gender ratio		
	Higher than average testosterone		

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CONCLUSION

Much research is yet to be done in the emerging field of "dyslexic entrepreneurship", however as established in this paper, the literature does demonstrate analogous neurobiological, social marginality, environmental and cognitive traits in both entrepreneurs and dyslexics. In addition, the talents found in the disadvantageous disorder of dyslexia appear to naturally complement the creativity and innovation required for entrepreneurship and hence may offer a preliminary explanation of incidence, but clearly the issue of causality still remains unanswered. Do dyslexics pull entrepreneurship toward them because it fits their creative, innovative and conceptual thinking strengths or is it their low level of literacy that pushes them into new venture creation as one of the few viable employment options available in a world still hooked on the written word?

This question and others will form the foundation of a PhD research project that will take an epidemiological approach to identifying factors and causations of the dyslexic entrepreneur phenomenon during 2011/2012.[7]

[7] Editor's Comment: The authors have informed the editorial board that the PhD research project is currently on hold, but will probably continue later. One reviewer pointed at Sally Ann Clarke at University of Brighton, UK, who is also researching dyslexic entrepreneurs during her research placement with The British Library's Business & IP Centre. In connection with this project a discussion had recently emerged at the Linked-In Group of the Institute of Small Business and Entrepreneurship (ISBE). An interesting publication not considered by the given list of references is Smith, R. (2008) "Entrepreneurs and Dyslexia: Learning Lessons from Dyslexic Entrepreneurs" in "Entrepreneurial Learning: Conceptual Frameworks and Applications", Harrison, R.T. & Leitch, C.M. (Eds) Routledge (it's printed in the same edited volume mentioned by the list of references under Smith 2008).

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NOTES

[i] An interesting study conducted by Hall et al (2002) researched "emotional resiliency, stress levels, locus of control and need for achievement" in 17 college students with learning disabilities (LD) and 17 without (NLD) and found that the usual traits present in people with LD were not evident in the group studied. The LD group (88.24% of which had reading disabilities) attained considerably higher scores for Need for Achievement than the NLD cohort; there was no significant difference in Locus of Control results for both groups of students; the LD group actually displayed higher resilience, initiative and goal orientation when compared to NLD students (Hall, Spruill et al. 2002). Although this was a small sample, it does raise the possibility that some dyslexics may not have the usual cognitive styles generally associated with this learning disorder and accepted in the literature.

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IMPROVING OPPORTUNITY RECOGNITION AND BUSINESS PERFORMANCE IN SMALL AND MEDIUM MANUFACTURING ENTERPRISES THROUGH DESIGN INNOVATION PROGRAMS

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~

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ABSTARCT

Increasing awareness of the benefits of stimulating entrepreneurial behaviour in small and medium enterprises has fostered strong interest in innovation programs. Recently many western countries have invested in design innovation for better firm performance. This research presents some early findings from a study of companies that participated in an holistic approach to design innovation, where the outcomes include better business performance and better market positioning in global markets. Preliminary findings from in-depth semi-structured interviews indicate the importance of firm openness to new ways of working and to developing new processes of strategic entrepreneurship. Implications for theory and practice are discussed.

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INTRODUCTION

Governments in many countries have encouraged, developed or financed business programs to improve the entrepreneurial and innovation capacities and business performance of small and medium enterprises (Storey, 2003). Encouraging small and medium enterprises to be alert to opportunities in their products or markets has often been the focus of numerous training programs. Some programs specify new entrepreneurial ways of working, while others develop benchmarking processes or specifically target design based processes to encourage better ways of identifying opportunities and targeting their markets for products and services.

Companies that use design in their business, perform better economically in the marketplace (Cox Review, 2005; Borja de Mozota, 2003; Dell'Era, Marchesi & Verganti, 2010: Moultrie & Livesey, 2009; Nussbaum, 2006). Research by the UK Design Council on the performance of firms and the impact of design on firms' performance found that over a ten-year period of analysis, the benefits of effective use of design include an improved share price performance and therefore greater shareholder returns (UK Design Council, 2004). Furthermore, the World Competitive Forum's Global Competitive Report shows that without exception, all of the 24 countries ranked top for design appear in the top 25 countries in terms of competitiveness (Designium, 2008).

The aim of this research is to examine outcomes from design innovation program initiatives established to improve entrepreneurship and innovation in small and medium enterprises and to identify to what extent these programs lead to increased opportunity recognition, innovation activities and successful business performance. The purpose is to identify and understand how different forms of entrepreneurship and innovation intervention (from participation in design innovation at strategic and operational levels) influence entrepreneurship and innovation and enterprise development. Past research has to a large extent not examined the organisational level changes that occur through such approaches nor its effect on opportunity recognition, innovation, organisational strategy and organisational culture.

The research question we are investigating is: How do intervention programs targeted to increase entrepreneurship and innovation in small and medium enterprises improve opportunity recognition? This research examines and compares firms that participated in a design innovation program focused on using design to develop entrepreneurship and innovation. By studying the outcomes of firms' engagement with design innovation program we hope to identify the strengths and weaknesses of the program and provide findings to inform decisions and ongoing government policy.

The design innovation program under discussion has been implemented for five years and has been deployed in more than 100 companies. In addition to the economic benefits these programs may offer, this study will provide additional insights into organisational changes that have resulted from undertaking these programs. Because of the relative newness of design innovation within the entrepreneurship literature, the amount of systematic, research-based knowledge about firms engaged with this approach is limited. Therefore, in this paper we present a brief summary of literature that discusses corporate entrepreneurship and a detailed analysis of firms in business programs.

This paper investigates an area of growing interest, firm level entrepreneurship, where established enterprises generate increasing economic value following design innovation intervention. Using exploratory in-depth semi-structured interviews and detailed thematic analysis, this paper extends our current knowledge of the characteristics and activities of established enterprises engaging in strategic entrepreneurship as a result of design innovation intervention programs.

BACKGROUND

Entrepreneurship literature has identified the importance of the entrepreneurial orientation of the firm (Dess & Lumpkin, 2005) around notions of autonomy, innovativeness, proactiveness, competitive aggressiveness and risk-taking. Strategic entrepreneurship or innovating in pursuit of competitive advantage (Morris, Kuratko & Covin, 2008) can include simultaneous opportunity seeking and advantage seeking behaviours (Ireland, Hitt and Sirmon 2003) and usually emphasises an opportunity-driven mindset. Strategic

entrepreneurship has been described in terms of five possibilities: involving strategic renewal, sustained regeneration, domain redefinition, organisational rejuvenation and business model reconstruction (Morris et al., 2008: 88-93).

Opportunity recognition is an important concept in entrepreneurship research and is widely considered to be a key step in the entrepreneurial process. Opportunity recognition has been defined as pattern recognition, a cognitive process, which is strongly influenced by active search for opportunities, alertness to opportunities and prior knowledge (Baron, 2006). Baron (2006) also suggests that entrepreneurs can learn to recognize emerging business opportunities. Hsieh, Nickerson & Zenger (2009) contend that opportunity recognition relates to problem solving, and the exploration for solutions that can be either deliberate or indeliberate (Hsieh et al., 2009: 1272). There is general agreement that opportunity recognition is an active process (Lumpkin & Lichtenstein, 2005; Ucbasaran, Westhead, & Wright, 2009).

Design's contribution to firm performance. Design enhances the outcomes of numerous innovation activities, bringing benefits such as increased quality of goods and services, improved production flexibility and reduced material costs (Cox Review, 2005). Design is increasingly being viewed as a vital and important strategic business resource (Dell'Era, Marchesi and Verganti, 2010; Gemser and Leeders, 2000). Consequently companies worldwide look to design to help them innovate, differentiate and compete in the global marketplace. Design brings a different way of thinking and working, using constraints to generate novel solutions. The value of design is not just in new products or services, but through employing, skilfully managing and soundly implementing design throughout a company's business strategy (UK Design Council, 2004) – a design innovation approach.

Traditionally, the role design has played within companies has been confined to the manufacturing and production arena or as a styling afterthought. Design is increasingly being viewed as a vital and important strategic business resource (Dell'Era, Marchesi and Verganti, 2010) and consequently companies worldwide look to design to help them

innovate, differentiate and compete in the global marketplace. The importance of design to firm level innovation (Bruce & Bessant, 2002; Utterback et al. 2006; Walsh, 1996) has been documented. *"Design is crucial to innovation in that it is the domain of creativity where ideas are devised but also where the 'coupling' occurs between technical possibilities and market demands or opportunities"(Freeman, 1983, as cited in Walsh, 1996).*

The value design brings is a different way of thinking, doing things and tackling problems from outside the box. In practice design is key to greater productivity, whether by way of higher-value products and services, better processes, more effective marketing, simpler structures or better use of people's skills (Fleetwood, 2005). Design is no longer a niche market luxury. It is the most persuasive priority for solving problems, ensuring long term sustainability and gaining competitive advantages (Smart State Council, 2008).
Recent initiatives in the Australian context indicate that the importance of design to company performance is beginning to be recognised. The Victoria Government has launched a four-year strategy to grow Victoria's design sector, with the purpose to strengthen capabilities in the design sector, through design education and awareness in industry of design capabilities (Design Victoria, 2010). The new Victorian Design Action Plan aims to build on the strengths of the previous initiatives to create or increase economic, social and environmental value in Victoria. The core objective is to convert Victoria's design capability into competitive advantage for industry (Victorian Design Action Plan, 2010).

This study investigates linkages between a design innovation program and improved business performance within a small number of firms using interviews and secondary data. Semi structured interviews were conducted to obtain insights from firms on their experiences with design innovation programs and their outcomes. The focus of this study is to develop a narrative of activities and changes in the company since completing the program, around areas identified in the literature. The interviews seek information on: firm engagement with the program; business processes and outcomes; changes in business strategy; and the use of design as a strategy process.

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Program information: This design innovation program was established to "increase export earnings by assisting companies to grow in international markets, and to improve their financial performance by the strategic use of design". To achieve this goal, a range of services were offered to assist businesses integrate design into all aspects of their operations. An audit of the design innovation firms involved in this program conducted in 2008, found that the fifty highest performing companies are 3.5% ahead of reaching the targeted goal of an extra $500m in export revenue in five years, and seeing exports grow at 4.5 times GDP (Moultrie & Livesey, 2009). There is now some good evidence across five years of program that the results of their ambitious goals of improving export performance through design as a crucial value-add to manufacturing, tourism and other export-facing industries.

The goal of this program was for companies to generate more export sales by selling better-designed products and services. The design innovation program being investigated consists of practical support and assistance to help companies apply design principles across their business. It was argued that properly applied, "design can give you a sustainable competitive advantage, help you command a price premium, gain market share and even reduce production costs" (Fleetwood, 2005). Design here does not mean the aesthetic, or a finishing touch to make a product look better. This approach applies design thinking, using a collaborative and integrated approach to produce the very best products and services, where goods and services generate particular meaning for customers. "Companies that are truly design-led have developed (and protected) valuable intellectual property that cannot be easily taken up by a competitor, unpicked and replicated. That is the value of great design thinking" (Fleetwood, 2005).

METHOD

Research Design To research the area of design innovation in small and medium enterprises (SME's) we used Edmondson & McManus's (2007) advice regarding field research and internal consistency between the research question, prior work, research

design and theoretical contribution. We chose a research question that addresses issues of theoretical and practical significance to focus the study and narrow the topic area to a meaningful, manageable size, with a viable research project with a question that can be answered. Second we examined relevant literature, such as existing theoretical and empirical research papers that pertain to the topic of the current study, identifying unanswered questions, unexplored areas, relevant constructs, and areas of low agreement. Thirdly we identified the type of data to be collected, data collection tools and procedures, type of analysis planned.

An exploratory approach using semi-structured interviews is used to investigate two different cases of entrepreneurship and innovation. The cases are selected based on existing documentation of well-recognised innovations. Each case is documented via in-depth interviews and the research participants invited to participate in a structured interview. Interviews were of 60 to 90 minutes duration. The interviews were recorded and transcribed for accuracy. The interview data is analysed using qualitative data techniques including as pattern coding and data display (Miles & Huberman, 1994) to identify themes such as expectations, barriers, processes, and outcomes of entrepreneurship and innovation intervention program, with a particular focus on opportunity recognition.

Methodological fit, is a valued attribute of high-quality field research in organizations. "'Methodological fit' refers to the internal consistency among the elements of a research project; such as the research question, prior research and literature, the research design and the theoretical contribution" (Edmondson & Mc Manus, 2007: 1156). Selection of sites for collecting data involved choosing two firms in distinct industry sectors, for increased variation (Eisenhardt, 1989; Yin , 2003).

This paper is the first step in a research project that is seeking to make is to integrate prior streams of research to produce a new model, or refine understanding of a phenomenon. Congruent with this approach we conducted an open-ended inquiry, collecting initial open-ended data that need to be interpreted for meaning; using interviews, observations and collecting documents or other material from the field sites. We identified patterns in the responses and carried out content analysis of themes and coding for evidence of

constructs. We combined practical insights drawn from the findings to contribute to theory development (Edmondson & Mc Manus, 2007).

Sample Characteristics. The criteria for inclusion in the original design innovation program include the firm's ability to demonstrate the potential for design impact, a scale of operation likely for growth, export focus, potential scalability of operation, CEO and Board commitment and an open learning culture. These characteristics were hence the background characteristics of the firms we investigated and interviewed.

Justification of Case Selection. In order to gain insights from firms that engaged with the design innovation program, we choose two companies from different sectors, at different stages in their organisational life cycles. Both firms reported in this paper had been in existence for 60 years, they came from very different industry sectors and at different stages in the current business cycle. The first firm had recently undertaken a management buy-out and was on a path to regeneration and business model reconstruction, while the second firm was aware of needing strategic renewal and this was one of the drivers for their involvement with the design innovation program. Our interview questions with firms covered outcomes as well as aspirations, expectations, engagement and implementation and we asked firms to identify their expectations using open-ended semi-structured interviews.

RESULTS

A summary of each firm is presented separately. Using documents and interview data we develop a narrative of each firm, interspersing our summary of the interviewee's comments with actual text from the interviewees in italics. Analysis is largely thematic based on responses to questions or additional comments in the semi-structured interviews. A summary of characteristic of both firms is also presented. To maintain anonymity we

have given each firm an assumed name. The findings from two firms, XCO an aircraft development firm and YCO a communications firm, are discussed.

XCO manufactures transportation equipment and is focused on the industrial market. The firm was established 60 years ago and is strongly export market focused with more than 98% of products in international sales. Following a period of some uncertainty a management buyout took place and a new CEO was appointed in 2007. This change in leadership began a series of changes in the company including "*engagement with lean manufacturing, design management programs and manufacturing programs*". "*These programs brought some stability and direction to the company"*.

The changes which occurred in XCO after and during their engagement with the design innovation program include a more focused market strategy with better positioning of the company in its existing market and better targeting of capability in new markets; new organisational structure creating new positions with stronger links to customers; revised brand and marketing material and a change in the organisational culture from compliance to stronger customer focus. Each of the changes will be discussed separately.

XCO is a successful firm with "*a strong technical and engineering focus with investment in research and development"*. *X*CO's strong *"technical engineering focused and driven and high investment in R&D had placed them at a leading edge in their market"*. *X*CO was *focused on mass production*, *but was "not a sales culture. At the same time, the company also customised multiple aspects of the products for customers. X*CO claimed to be both *"compliance driven and often over-servicing customers"*.

XCO's product definitions were now developed from close interaction with customers under *strategic design briefs.* These briefs were shaped by a new *Fleet Manager Role (someone who listens to the customer and does not want to do R&D),* and new *Roving Regional Engineers – as part of service and strategy to sell product (keep planes flying and generating income).*

Changing the organisational culture. XCO believed that *"Getting the culture right was critical – being able to move from a compliance / technical engineering / customisation*

company to one which focused on key activities, knew it's position and had a strategy to strengthen this position".

XCO contend that innovation must come from the company culture. XCO state that the design program *helped shape ideas but not provide a final solution to fixing culture / strategy*. XCO maintain that the changes in their firm *cannot be attributed to one program,* but rather to their engagement with a number of programs, and new ways of working.

XCO knew *"the fundamentals of customer design, However the company understood they needed to get operations right before focusing on customer design, and that timing was critical"*. For XCO, "*Design Integration was a consultancy model, and it helped shape our ideas. Through this program the company developed the 'change'. The external program did not provide a solution*."

XCO consider that t*he term design is overused. X*CO were familiar with *customer centred design, but this was not their problem – this is why they went for design integration auditor*. XCO's "g*oal was not to design a better product, but to understand what they were designing". "I wouldn't say that "the design innovation program" has led to an increase in the use of external design agencies per se. We already had a relationship with a design agency and they helped implement our rebranding and collateral redesign".*

It's not as if we have just woken up to the benefits of 'design' (if you can use that word) and realised that there are people out there that can help us. We will continue to use a combination of external and internal resources – "the design innovation program" has given us the insight to pull those resources together in a coherent and consistent way across all parts of our business."

Challenges for XCO. XCO contends that the company required a "*Culture shift inside the organisation to move from compliance / engineering excellence to more customer focused"*. To achieve this change, *X*CO used "*the consultants' reputation, report and recommendations and focused on the champions inside company rather than making everyone happy"*.

YCO is a technology solutions business. YCO was a family business heritage with a 60 year history. YCO is proud of its technical excellence and its functional capability with a focus on incremental innovation had moved to shareholder ownership. YCO's aspirational goals are to *move from product focused radio communications business to more services and solutions focused communications business.*

"*Our aspirations are 'to become innovative to make a real difference to our customers'. Our focus has often been technical should have more insight into customers' needs. The design audit which led to a set of recommendations* that YCO investigated.

YCO contend that participating in the design innovation program was valuable through *external confirmation that the areas to look at were really the areas to look at*. YCO had a strong user perspective and a general feeling that change is needed; "*We had been treading water for about seven or eight years*".

YCO's had good technical development and success in their business sector, but to a large extent did not know who their customers were. Related to the technical excellence of the firm, YCO had some problems *with product development and deciding who is the customer? Who is the product for?* "*We had a reactive responsive approach to design and a pirate's approach to sales opportunities*"

"*Without structure, we chased opportunities*".

One of YCO's expectations in participation with the design program was the recognition of the retired founder and the firm senior management that the company was flat and stale and that change was needed. The need for change and desire for change became one of the drivers for new ways of working.

YCO was open to the opportunity of engaging with external advisors and "subsidised brand development". YCO described their business as *stable with functional and technical expertise, yet opportunistic to take advantage of programs on offer*"; "*if cool we should do that*". YCO described the design program as a "*support net rather than a driver*" that assisted the company to set out a program of goals, objectives. *Reflecting on*

the organisation's vision, mission, current strategy, and design philosophy was a useful step in progressing YCO's focus.

Organisational culture change. YCO commented on the importance of changing the culture of the company. One of the outcomes of engagement with the design innovation program was a cultural shift in understanding of innovation and brand; the importance of everybody's role, and the essential of a clear marketing message and position. Previously for YCO, *innovation was a function or a department that was not integrated into the company business*. By structuring around three vertical markets, from products to clear solutions focused, YCO now know who their customers are in each segment.

When YCO began its involvement with the design program, it already had an understanding of design and design's contribution to styling and product development as well as to delivering value to customers. YCO argued that restructuring their product/service combination around three vertical channels lead to more focus and depth of expertise. Further, YCO stated that "engagement with the design program changed their understanding of design within the company. Previously "*design was a department where they made external housings (industrial design). It is now seen as a companywide process to deliver value and make a difference to customers*.

Outcomes from design innovation. YCO contends that the design innovation program did not drive the changes that were made but should be considered as supporting the change. *Design innovation program was one of many activities which included reading papers, mentoring (did not realise there was one program). Design program was like a consultancy as it provided external confirmation of known challenges*. The team articulated and helped prioritise activities, but at a high level. At times, YCO *felt the (design innovation) program focused too much on understanding end user.*

YCO thought that all the changes in their company cannot be attributed only to their involvement with the design innovation program, .and at times YCO thought the focus on product design may have limited the potential benefits of the program. YCO identified some clear benefits such as better understanding of branding. *The company has moved*

from understating of brand as a logo to representing the values of company at all customer touch points.

YCO contend that *leadership and culture is critical –innovation needs to start from this point. The company has a flat culture and it was not clear of direction from senior management. Over past few years these are the activities that they have focused on*. YCO did not feel organisational structure was important rather that "*the key is to empower all staff to make change through culture".*

YCO liked the flexibility of choosing which consultants to work with. This firm *has a history of working with external companies and will continue this practice.* However YCO claim *their expectations of such firms have increased since undertaking the design program.*

Change management program. YCO contends that *their involvement in the design program led to a cultural shift in thinking about the company and the services it provided*. Following the engagement and learning with the design innovation program, YCO implemented a significant change management program in their company, which focused on *the empowerment of employees at every level*. *This change process enabled people to step up. This multi-level change process began at the individual, then team and then whole organisation (in process)".*

DISCUSSION

Both firms have strong technological competence and good performance in their separate industries. Both firms are open to the opportunity of working on their business, and the opportunity to reflect on the strengths and weaknesses of their business as a way to look for improvements. Both firms welcomed external advisors to work with them, and the subsidised government assistance as a chance to gain some new perspectives. Both firms mentioned that such support was only one part in a longer involvement with programs.

The firms had different approaches to opportunities. For example XCO claimed that in the past they were too responsive to customer demands and responded to too many

diverse demands and needed to be more selective about what were opportunities. One outcome from involvement with innovation programs was a clearer understanding of the value proposition they could offer and the subsequent targeting of their capability to customers who were within their target markets. This focused approach lead to developing even stronger competence in a well-defined geographical arena and to seek out opportunities in this market. In terms of opportunity recognition, XCO were now clearer about which opportunities to respond to and how to create new opportunities for their firm and became more focused in terms of developing its strategic advantage.

YCO was already successful in their core industry and had recognised the need for 'strategic renewal', to improve and change their business in strategic ways, and focused on segmenting their market into different channels. According to some statements, participating in the program changed the previously limited understanding of 'design' to a more holistic perception and led to a more customer centric approach in all of their interactions with customers and the market. One of the outcomes YCO discussed was the involvement of all the staff in improving the business. YCO stated they would continue to use non-financial targets to measure their performance in the marketplace.

Other outcomes from involvement with the design innovation program are the ongoing relationship with the provider of programs, and their continued willingness to engage with other 'improvement' programs and ongoing involvement in a network of CEO's with similar interests.

SUMMARY OBSERVATIONS FROM FIRMS

- Both firms saw the design innovation program part of a suite of services that is offered by government. A single intervention could not be linked to specific company changes.
- Both firms found 'design' as a term to be is too limiting. Both firms found that the design audit and focusing on design philosophy helped to move their understanding of design from a product to customer focused activity, real value / challenge is highlighting the organisational culture shift in doing this.

- The design innovation program is seen as a partner rather than service provider. The external consultants stay external once intervention is completed.
- Both firms valued their involvement with the program and the opportunity to obtain assistance with subsidised design services such as branding.
- Both companies are aware of challenges. They saw the design innovation not as revealing something new, but as helping to articulate and prioritise challenges and actions. It helped show the need for a revised vision, but the company had to do the hard work around the culture, which was supported by program team.
- For both firms, the first stage in engaging with the design program was getting a revised company strategy / position from a technical to solutions focus, with a clear understanding of customers. Design was not seen as driver to do this, however it was seen as reinforcing the message once position is articulated.
- Both firms believed their understanding of the value of brand was enhanced.
- Role of design was valued to grow market segments through customer engagement and ensuring fit to strategy.
- Both companies that participated in the program have demonstrated economic growth, but these performance outcomes cannot be attributed specifically to a single program.

CONCLUSIONS

In this exploratory research we investigated successful firms that had engaged in programs involving design innovation as a factor in their business improvement. These firms met relatively stringent criteria to participate in the design innovation program, and would seem to be likely candidates to benefit from closer audit and challenge.

Both firms engaged in better analysis of their strategic intent, both in identifying the nature of their business and their current and potential customers. This focus shaped their awareness of what opportunities to respond to, which opportunities to ignore and which opportunities they might need to create or where their future business might be found (Baron, 2006). Some of these opportunities were developed by active problem solving for themselves or their customers, sometimes purposefully and sometimes apparently

serendipitously, supporting Hsieh et al.'s (2009) previous findings. Both firms engaged in multiple programs that lead to active involvement with opportunity recognition (Lumpkin & Lichtenstein, 2005; Ucbasaran, Westhead, & Wright, 2009).

Both firms demonstrated an entrepreneurial orientation in their engagement with government subsidized programs, including design innovation in terms of proactiveness innovativeness and competitive aggressiveness. Both undertook strategic entrepreneurship or innovating in pursuit of competitive advantage, seeking both opportunities and ways to improve their competitive advantage (Ireland, Hitt & Sirmon 2003). YCO described the processes of strategic renewal while XCO substantially redefined its domain of geographic operation and a new business model.

These findings are the preliminary results from the study of two firms that had been involved in design innovation program, which was one of a suite of government-subsidised programs to improve business effectiveness. This study is the first step in defining and developing an understanding of firms and the outcomes from involvement in a design innovation program. Further investigation of more diverse firms which participated in this design innovation program with further fine-grained analysis is predicted to develop a more nuanced picture of this important cohort. Furthermore, we seek to develop some theoretical implications and provide practical advice for governments regarding design innovation programs.

This exploratory study has some recognised limitations related to the size of the sample and the choice of firms, which had participated in government programs around notions of design innovation. The study is an early investigation of some important phenomena that have previously received attention in specialist studies of award winning firms (Whyte, Salter & Gann, 2005), but with few exceptions (Mutanen, 2008), have not been studied in any detail on a larger scale.

Whilst acknowledging the preliminary nature of these findings, this study can provide feedback on the interview protocol and suggestions for refinement. The study also presents some early indicators from initial analysis, suggests areas for fine-tuning the current project as well as suggestions for further research.

IMPLICATIONS FOR THEORY AND PRACTICE

Studies of corporate entrepreneurship and its contributions to firm's survival and prosperity are often linked to large companies such as IBM and Proctor and Gamble. Yet medium and small sized firms also undertake processes to stimulate their business to become more entrepreneurial and focused on opportunities, to better target their products and services, processes and positioning in markets to improve business performance. Research on the business practices and organizational responses of effective small firms in hostile environments showed that an organic structure and a more entrepreneurial strategic posture are some of the factors which contribute to high performance (Covin & Slevin, 1989). To date much research on corporate entrepreneurship and strategic renewal has focused on large firms, and the similarities and differences in approaches towards corporate entrepreneurship between large companies and SMEs have yet to be explored.

These preliminary findings from a small study support the patterns of corporate entrepreneurship already well articulated with larger firms. Small and medium enterprises are also open to opportunities, need to recognise and respond to positive initiatives, create different pathways, and evaluate their success. These changes may be within an existing market or through the creation of potential new markets. Further studies of programs or initiatives that encourage entrepreneurship and opportunity recognition are anticipated.

FUTURE RESEARCH

Findings from this pilot study will be used to inform a larger longitudinal study of Australian small and medium companies that undertake design innovation programs. The better the outcomes from design innovation programs are understood the more will our research have important conclusions and implications for small and medium enterprises that are considering participating in programs designed to encourage entrepreneurship and innovation. The findings will also have implications for the designers of intervention

programs, intermediaries involved in the application of these programs and policy developers.

Regarding methodological challenges, research needs to clarify whether respondents in the self-reporting interviews underestimated the potential influence of the governmental intervention by the design innovation program. A bias could be likely given observations from previous research. Such a bias would be based on self-confidence and hindsight of respondents as they did not neglect the effect of the program but probably down played it a little: On the one hand fundamental changes in the understanding of 'design' have been stated by both companies, and on the other hand overall developments within the companies were made responsible for those achievements whilst participating in the design program.

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