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Self-regulated learning, team learning and project performance in entrepreneurship education: Learning in a lean startup environment

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ABSTRACT

Contemporary entrepreneurship education (EE) is often based around a team-based challenge such as creating a new venture or solving a startup problem. A creative and professional solution to such a challenge requires individual and team efforts. At the level of the individual student, self-regulated learning (SRL) is proposed as an effective way to learn in entrepreneurial projects. At the level of a student team, team learning and psychological safety are hypothesized to contribute to group performance. Yet, there is little evidence to support these claims.

I seek to add to the literature by demonstrating the effects of SRL, team learning, and psychological safety on various assessment types in the context of an entrepreneurship class. Data is collected from 194 students in 41 groups. Analysis is performed with hierarchical linear modeling. The results suggest that SRL is positively related to assessments at the individual level. Team learning and psychological safety are positively related to assessments at the group level. The results inform educators, students, and entrepreneurs about effective learning strategies.

1. Introduction

Entrepreneurship education (henceforth: EE) is an effective way to increase the supply of entrepreneurs in terms of quality and quantity (Martin et al., 2013). The popularity of EE is reflected in the large and growing number of institutes of higher education that provide EE (West et al., 2009), and in the large and growing interest in EE research (Grichnik and Harms, 2007). EE prepares students for a job market that is likely to be complex and uncertain and may contain spells of self-employment (Duval-Couetil, 2013). As research recognized the importance of technology-based entrepreneurship as the driver of dynamic capitalism (Kirchhoff, 1994) and force behind dynamic developments for example in nanotechnology (Walsh, 2003; Walsh, 2004) or pharmaceuticals (Tierney et al., 2013; Walsh et al., 2014), EE for technology entrepreneurship becomes even more relevant. Here the challenge is to prepare future leaders in entrepreneurship, innovation, and management of technology with a set of knowledge, skills and attitudes that enable them to address global challenges (Groen and Walsh, 2013). While the literature has identified common bodies of knowledge for TE (Yanez et al., 2010), didactics for technology-based entrepreneurship are still debated.

This paper is positioned at this didactics debate in that it deals with performance effects of different learning methods for technology-based entrepreneurship classes (Byrne et al., 2014). It addresses the significant trend in EE from a classroom-centered education to experiential learning (Cooper et al., 2004; Pittaway and Cope, 2007) in which students are exposed to a large extent to a real-life entrepreneurship context. Many learning methods are group-based (Pittaway and Cope, 2007), which allows not only for team learning (henceforth: TL), but also reflects the realities of new venture teams (Wu et al., 2009). An example of group-based experiential EE is the Lean LaunchPad initiative that applies the principles of customer development (Blank and Dorf, 2012) and Lean Startup (Ries, 2011) to technology-based startup projects. Such a course design has been adopted by the US National Science

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Foundation (Blank and Engel, 2013), top global universities and in EE in higher education in general (Högsdal, 2013).

One can assume that group-based experiential learning is a core learning strategy not only for EE, but also reflects the way "real" entrepreneurs as well as innovation professionals (Lynn et al., 1996) develop their business. For example, on the practical level we see an increasing amount of startups that are created using the lean startup approach. On the theoretical side, we see that early customer integration in the entrepreneurial process can be an example of the "socio-cognitive dynamics of entrepreneurial ideation" (Gemmell et al., 2012 p. 1053). If this is so, the question of effective group-based experiential learning in EE extends beyond the classroom towards new ventures (Levie and Autio, 2008) and innovation management.

As group-based experiential learning is a predominant learning context in EE and new ventures, the question arises under what conditions learners learn most effectively. This paper addresses this question by inquiring into the degree to which individual learning or team learning impacts on the achievement of learning outcomes in the classroom setting. A gap in research on entrepreneurial learning as well as in research on self-regulated learning Table 1 is in bringing together the individual side of SRL and the social side of team learning in one analysis. The research question is about the relative importance of SRL and team learning in group-based EE. The results can assist students and entrepreneurs to find effective learning strategies, and teachers and coaches to design effective didactical approaches for their classes. The findings may be extended to encompass the application to early-stage entrepreneurs.

2. Theory

2.1. Group-based experiential learning in lean startup

Lean startup (henceforth: LS) is a collection of tools and techniques that can be employed by entrepreneurs to build their ventures faster and at lower cost. It is based on the idea that entrepreneurs should make their implicit assumptions about how their venture works and how the market works explicit. These explicit assumptions can be put to empirical tests in the "real world". The goal of these tests is to de/validate these assumptions and to get a better understanding of how a new venture can "really" work. In what is called the build–measure–learn loop, which is modeled after the empirical cycle, entrepreneurs are performing research about the "success factors" of their venture by testing their assumptions. In doing so, LS is a method for entrepreneurial learning, with learning defined as a "relatively permanent change in knowledge or skill produced by experience" (Weiss, 1990, p. 172). More precisely, it is an example of experiential learning in that entrepreneurs learn while experimenting in a real-life setting. In new venture teams, LS becomes an example of group-based experiential learning.

Innovation and technology management scholars may know the lean startup approach under the names of "disciplined entrepreneurship" (Sull, 2004), "lean startup" (Blank, 2013), "hypothesis-driven entrepreneurship" (Eisenmann et al., 2011), and "probe and learn" (Lynn et al., 1996). In essence, these approaches emphasize early customer contact, reflected experimentation, and speed of learning in a technological context. This extends the applicability of lean startup from new ventures to mature companies, for example to reduce fuzziness at the front end of innovations (Stevens, 2014).

LS is not only used as an approach that is applied by more and more entrepreneurs worldwide (Blank, 2013), but it also becomes a framework entrepreneurship education (Blank and Engel, 2013). Classes based on LS are structured around the "build–measure–learn" loop in that students have to assess the nature of a customer problem, build a demo, test customer responses to that demo, and modify the demo according to the results of the customer assessment. In a more extended class design, all or most aspects of a business model canvas (Osterwalder and Pigneur, 2010) or a lean canvas (Maurya, 2012) are analyzed empirically. LS as group-based experiential learning is a setting in which students gain knowledge and skills about entrepreneurship in a context that is modeled rather closely to what real entrepreneurs need to know and do.

Assessment practices in EE in general and LS classes in particular include combinations of (*) summative assessment of a students' success at a certain point in time vs. formative assessment with real-time feedback (Duval-Couetil, 2013), (*) indirect assessment of perceived mastery vs. direct assessment based on outcomes such as tests or portfolios (Duval-Couetil, 2013), at (*) the individual level or at the group level. Both educators who want their students to learn as well as students who want to achieve high assessments may be interested in learning strategies that lead to high assessment performance in addition to personally meaningful learning. In this paper, learning strategies that may be associated with (*) individual and direct assessment of knowledge about entrepreneurship (the typical exam) and with (*) group-based formative assessment of mastery of skills (the typical group project with feedback) are assessed.

Table 1
Measurement of sub-scales for self-regulated learning.

		Cronbach α	Inter-scale correlations				
			1	2	3	4	5
1	Planning	.685					
2	Self-monitoring	.795	.282**				
3	Evaluation	.815	.371**	.582**			
4	Reflection	.781	.382**	.421**	.406**		
5	Effort	.827	.411**	.340**	.370**	.411**	
6	Self-efficacy	.726	.231**	.398**	.447**	.284**	.284**

** $p < .01$.