

Entrepreneurial Learning as an Effectual Process

Abstract

Purpose – The purpose of the present paper is to address how entrepreneurial learning may be understood as an effectual process in the early phase of venture creation.

Design/methodology/approach – Previous research is used to develop a conceptual frame of reference, which is further developed through a longitudinal qualitative case-study of five new venture teams. Conceptualising these teams' learning as sequences of events over a one-year period provides rich insight from real-life processes.

Findings – A conceptual model of how entrepreneurial learning may be understood as an effectual process is presented. The interactions and interdependencies between nine process characteristics along three main dimensions in the process; Activity, Multiple Actors and Context-dependent, demonstrate how the process tie together as a whole.

Research limitations/implications – The present paper argues for further cross-fertilisation of entrepreneurial learning and effectuation research and showcases how studies of entrepreneurial learning may contribute to organisational learning in entrepreneurial ventures. The conceptualisation of characteristics and dimensions aims to support future process studies by suggesting a framework for analysing process events in longitudinal studies.

Originality/value – Previous research has already established how activities are central to entrepreneurial learning and emphasised that what constitutes the two dimensions of multiple actors and context-dependence is important. The present paper contributes to entrepreneurial learning with an enhanced understanding of why and how the three dimensions are important as well as interdependent and mutually interactive. The present paper also contributes to organisational learning by extending the understanding of learning in emerging entrepreneurial organisations.

1. Introduction

Continuous learning is essential to any organisation's performance (cf. Chou and Ramser, 2019). The concept of *organisational learning* (OL) has been fruitful to understand how organisations in many forms and phases develop (Örtenblad, 2018). OL research often regards established organisations' types and levels of learning (Argote, 1999; Morland *et al.*, 2019). In contrast, the present paper regards the learning processes of emerging organisations where a new venture team *is* the organisation (Kamm *et al.*, 1990; Dutta and Crossan, 2005; Tryba, 2017). The learning of the new venture team may be addressed as *entrepreneurial learning* (EL), since EL offers a way to understand OL in the context of entrepreneurship (Wang and Chugh, 2014). The present paper takes a process view of EL to increase its utility in understanding entrepreneurship as continuously developing action in the emergence of a new organisation (Brockman, 2013; McMullen and Dimov, 2013; Toutain *et al.*, 2017).

The EL process has been conceptualised as a flow of entrepreneurial action that involves learning during venture creation (Nogueira and Alsos, 2018). Entrepreneurial action has especially been related to taking action under conditions of uncertainty (McMullen and Shepherd, 2006), and previous research on EL has referred to effectuation (Sarasvathy, 2001) as a fruitful perspective for understanding how entrepreneurial action and learning co-develop, especially in the early phases of new venture creation (Politis, 2008; Politis *et al.*, 2012; Fisher, 2012; Wang and Chugh, 2014). Examples from previous research include the use of effectuation to understand sources for EL (Berends *et al.*, 2016), EL through experimentation

(Vasconcelos Gomes *et al.*, 2018) and learning under conditions of uncertainty (Morris *et al.*, 2012). The contributions mentioned above have thus demonstrated the potential of effectuation to aid a variety of perspectives on EL, although research has not yet addressed how effectuation may enhance our understanding of EL as a process. A further understanding of how effectuation contributes to EL is important to establish a common ground for future process studies on EL; thus, the present paper asks the following research question: *How may entrepreneurial learning be understood as an effectual process in the early phases of venture creation?* The research question involves how EL as an effectual process may be characterised and which events in the venture creation process correspond to these characteristics.

The present paper contributes to EL research by providing insight into how and why multiple actors and context-dependence are important for the EL process in the early phases of venture creation. Thus, the present paper also contributes to – and extends the applicability of – OL in emerging organisations where actions are taken in uncertainty. In the next section, previous research is used to develop a conceptual frame of reference that informs a longitudinal qualitative study of five new venture teams in the very early phases of venture creation. Studying these teams' learning as sequences of events over a one-year period provides new insights into EL. The findings propose a structured conceptualisation of the EL process that contributes to EL and OL; this is the focus of the discussion and conclusions sections.

2. Frame of reference

Scholars have viewed the EL process as a series of 'learning events' in order to better understand and structure the process (Cope, 2003; Lindh and Thorgren, 2016). Entrepreneurs are exposed to – and act upon – learning events during the venture creation process (Heinrichs, 2016), causing them to engage in reflective processes of perceiving, acting and generating meaning based on their experiences (Cope and Watts, 2000; Rae, 2013). Learning events also trigger learning that informs new actions by the involved actors (Cope, 2003; Taylor and Thorpe, 2004; Pittaway and Thorpe, 2012), suggesting that learning events are essential for how action continuously develops throughout the entrepreneurial process. As a process study, the present paper focuses on the series of events that constitute the EL process, introduces effectuation and examines why it is relevant to understanding the events in the EL process. Then, a review of characteristics used to describe EL and effectual processes in the literature is presented, which informs the empirical process study. The process characteristics are highlighted in italics in order to guide the reader toward the synthesis of characteristics contained in Table 1.

Entrepreneurial effectuation (Sarasvathy, 2001) is seen as a paradigm shift in how scholars understand the entrepreneurial process (Shirokova *et al.*, 2017). Effectuation has been widely applied to entrepreneurial processes (Reymen *et al.*, 2015), and within the scope of the present paper, effectuation provides a way to understand how entrepreneurs act upon process events. At its core, effectuation is a decision-making logic that can be contrasted with causation (Sarasvathy, 2003); it offers an alternative to causal prediction in uncertain situations, such as the abovementioned process events. Effectuation thus provides researchers with an understanding of the decision-making that informs entrepreneurial action. Effectuation addresses uncertainty in several ways. One is controlling the future to the greatest possible extent through considering affordable loss (Wiltbank *et al.*, 2006; Wiltbank and Sarasvathy, 2010). Effectuation is also about making available resources valuable (Wiltbank and Sarasvathy, 2010) instead of just purely focusing on acquiring valuable resources. Since resources are not necessarily in entrepreneurs' possession but may exist in their networks (Sarasvathy, 2001), it is vital to know where they are and how they can be mobilised – in other

words, who has what and who knows how – as well as knowing how to establish relationships to leverage networked resources. Effectual processes are therefore about leveraging entrepreneurs' available means in the venture creation process (Wiltbank *et al.*, 2006; Perry *et al.*, 2012). In short, while both causation and effectuation describe entrepreneurial action, the two represent different types of action in terms of approaches to the uncertainty involved in the events of the entrepreneurial learning process.

2.1 Characterising the processes

Entrepreneurial action has been and still is central to studies of the EL process (Toutain *et al.*, 2017). Several scholars have emphasised how a new venture offers a learning situation or context for learning (Deakins and Freel, 1998; Rae, 2000; Pittaway and Cope, 2007). Cope (2005, p. 374) describes EL as 'learning experienced by entrepreneurs during the creation and development of a small enterprise'. EL also impacts the same process since, for example, Rae (2000, p. 151) claims that it 'involves some form of change which causes or enables the individual to do things differently'. Effectuation do also regard how entrepreneurs decide – and implicitly act – in the process. Both EL and effectual processes may thus be characterised as *action-oriented*, as researchers specifically stated in their recent contributions to EL processes (Passaro *et al.*, 2017; Secundo *et al.*, 2017) and effectual processes (Vargo and Lusch, 2014; Daniel *et al.*, 2015). While studies of EL processes emphasise *experiential* learning from action, effectual processes have been characterised by *experimental* action (cf. Yusuf and Sloan, 2015; Deligianni *et al.*, 2017). Although undeniably distinct, *experiential* and *experimental* may also be seen as two sides of the same coin. Effectuation encourages experimentation that may lead to experiential learning, hinting that the two characteristics are nevertheless closely related. In addition, entrepreneurial action has been characterised as *creative* action both in EL processes (Summatavet and Raudsaar, 2015; Passaro *et al.*, 2017; Secundo *et al.*, 2017) and in effectual processes (Daniel *et al.*, 2015; Urban and Heydenrych, 2015). Also common to both processes is that action facilitates *reflections* in both EL processes (Hietanen and Järvi, 2015; Hägg and Kurczewska, 2016; Secundo *et al.*, 2017) and effectual processes (Chandler *et al.*, 2011). There are further characteristics that have been used solely for EL processes. They resemble the action-oriented characteristic and include *active* (Hietanen and Järvi, 2015) and *proactive*, connected with a notion of 'learning by doing' (Karataş-Özkan, 2011). Overall, these characteristics provide different ways to describe the 'activity' that is at the core of both EL and effectual processes.

Studies of EL have often focused on individuals' learning (Wang and Chugh, 2014), but recent contributions emphasise that EL processes extend beyond the single individual to the team and organisational levels (Lans *et al.*, 2008; Karataş-Özkan, 2011; El-Awad *et al.*, 2017) as well as to networks and alliances (Jiang *et al.*, 2016; Cantino *et al.*, 2017; Secundo *et al.*, 2017). Thus, the inclusion of other actors in addition to the individual entrepreneur also characterise the EL process. Scholars have characterised EL processes as transferable through *interactions* and *shared* between individuals or groups (Seuneke *et al.*, 2013), which is the result of *collective* or *social* efforts (Seuneke and Bock, 2015; Secundo *et al.*, 2017). While characteristics regarding different levels are not so articulated in research about effectual processes, effectual processes are nevertheless characterised as extending beyond the individual through *collaborative* action (Vargo and Lusch, 2014), which involves (*social*) *interaction*, for example, in *networks* (Fischer and Reuber, 2011; Nielsen and Lassen, 2012; Song *et al.*, 2017). Although EL and effectual processes differ in some of the characteristics used for how they extend beyond the individual, both processes are characterised as involving 'multiple actors' in several ways.

In addition to the activity-related characteristics and the multiple actors involved in both EL and effectual processes, the two processes are also characterised as not isolated from – but rather dependent upon – their surroundings. Scholars have characterised EL processes as *contextual* (Seuneke and Bock, 2015; Summatavet and Raudsaar, 2015; Cantino *et al.*, 2017) and thereby also *dynamic* (El-Awad *et al.*, 2017; Secundo *et al.*, 2017), as the learning process is continuously impacted by its surroundings; the process is also *adaptive* to the context (Cantino *et al.*, 2017). There are also similarities between EL and effectual processes in this regard, as effectual processes emphasise that entrepreneurs adopt a *flexible* and *adaptive* approach to uncertainty. Furthermore, research on effectual processes characterises entrepreneurial action as *emerging* – rather than deliberate – due to upcoming *situations* and from *context* factors (Karri and Goel, 2008; Chandler *et al.*, 2011; Nielsen and Lassen, 2012; Daniel *et al.*, 2015; Urban and Heydenrych, 2015). Thus, there exists a set of characteristics of EL and effectual processes that can be described as ‘context-dependent’.

2.2 Synthesis and structuring of characteristics

The characteristics reviewed above underpin that there exist a multitude of similarities and some differences in how scholars have characterised EL processes on the one hand and effectual processes on the other hand. The synthesis that follows in Table 1 builds on common characteristics of EL and effectual processes. As already summarised at the end of the three preceding paragraphs, the characteristics enable three dimensions to be determined: the activity (what), the multiple actors involved (who) and the dependence on contextual factors (when/where). Table 1 structures the process characteristics found along the three characteristics, and as noted, multiple similar characteristics are merged into one where appropriate.

[INSERT TABLE 1 HERE]

The overview in Table 1 represents a synthesis of what previous research has already found, and that the commonalities in characteristics of EL and effectual processes are substantial. However, it is yet to be addressed how these characteristics may correspond to specific events in the entrepreneurial process (Mcmullen and Dimov, 2013; Wang and Chugh, 2014) and – more specifically to the empirical data analysed here – critical events in real-life early-phase ventures. This will be addressed through the empirical part of the present paper, the methodology of which is presented in the next section.

3. Method

To undertake a process study covering a number of sequential events in the processes, a longitudinal study is needed (cf. McMullen and Dimov, 2013). Also, to reach a deep understanding of the processes and the involved events, a multiple case study methodology was chosen as the best means of gaining insight to develop a conceptualisation in interaction with theory (cf. Eisenhardt, 1989; Yin, 2009). Scholars have recently suggested longitudinal case studies to be advantageous for EL processes (Toutain *et al.*, 2017), and the case study methodology used here follows guidelines provided by Eisenhardt (1989) and Yin (2009), starting from the conceptual frame of reference developed above and following an iterative process of alternation between theory and the analysis of empirical findings.

3.1 Case selection: Venture creation processes

Empirical data were collected in a longitudinal case study of five early-phase ventures. To enable a cross-case analysis, five similar student-driven projects were selected; that is, the entrepreneurs came from similar backgrounds and experienced the venture creation process in

the same environment with access to similar resources, leading to minimal variability between the cases (Eisenhardt, 1989). The selection also required some measurable development of the new ventures (e.g. use of prototypes) to capture the richest possible data. The five ventures were as follows: 1) *StudentMatch*, which is an app-based service that matches students to work together on course assignments; 2) *DilemmaShare*, which is an app-based social platform where users share dilemmas with other users; 3) *PictureDraw*, also an app-based social platform, with which users draw graphics on pictures shared by other users; 4) *MultiGame*, which is a multi-player online computer game; and 5) *StockMaster*, which is a two-sided online sharing platform for stock market analysts. All five ventures were part of an extracurricular entrepreneurship initiative (cf. Pittaway *et al.*, 2015; Ndou *et al.*, 2016) providing support for new ventures at a Norwegian university. This allowed, to a certain degree, the isolation of surrounding factors that could influence the entrepreneurial processes in different ways.

3.2 Data collection

Data were collected using 24 semi-structured interviews with the founders of the five student-driven ventures, and to enable data triangulation, their coaches from the extracurricular initiative. Interviews were conducted with the founders and their coaches at three points in time over a twelve-month period. The three data points addressed the EL process in terms of actions taken up to that point during the venture creation process. The questions asked related to challenging situations, reflections on prior actions, the current status of the new venture and the way forward. In addition, interviews at the first data point captured background information about the new ventures as a baseline for their learning processes. Interviews at data point one lasted for about one hour; they lasted for about half an hour at data points two and three. During the study, four of the five new ventures were discontinued (all except MultiGame). Nevertheless, the entrepreneurs were still asked to reflect on the process to gain more insights about their learning. Thus, the study addressed how learning occurs both in new ventures that grow and become ‘successful’ and in those that ‘fail’. All the interviews were recorded and transcribed by the author.

3.3 Data analysis: Critical incident approach

The EL processes were analysed by referencing process events (as introduced as the learning events in section 2). This enabled the processes to be described by a specific set of events for analysis using the conceptual frame of reference in Table 1. Data from each transcribed interview were coded using NVivo 11 software, with this tool used throughout the analysis divided by the following sequential steps. First, the researcher identified 27 specific events in the venture creation processes that the entrepreneurs either recalled directly or revealed implicitly through descriptions of the processes. These events are presented in Table 2. Second, all the events were coded using the characteristics provided in Table 1 – an event could be coded using one or several characteristics. Third, based on the coded data, the characteristics were represented through a total of 110 coded examples from the five venture creation processes. The results from this analysis are presented in the next section along with the findings based on analysing characteristics within each of the three dimensions.

4. Results and analysis

4.1 The processes as sequences of events

In this sub-section, the five processes are presented through the 27 learning events in Table 2. The table represents the first step in the analysis process; the results are presented in sub-section 4.2.

[INSERT TABLE 2 HERE]

4.2 Analysis and discussion of process characteristics

All five processes involved several characteristics from the conceptual frame of reference in Table 1. None of the three dimensions (activity, multiple actors, context-dependence) appeared to be over-represented in any of the processes; this section concerns the analysis of characteristics along each dimension. The essential findings are presented in Table 3 below.

4.2.1 Dimension: Activity

Recalling Table 1, the activity dimension includes the following four process characteristics: action-oriented, experimental–experiential, creative and reflective. In StudentMatch and StockMaster, the action-orientation in the processes was about building (e.g. prototypes) and being proactive in recruitment and market research. For example, StockMaster often recruited and involved external experts to help solve challenges. In contrast, DilemmaShare and MultiGame were more characterised by being experimental and experiential than the previous two ventures; they experimented with potential users and entrepreneurs in their networks through market studies and actions to improve teamwork. The experimental–experiential processes are more iterative in nature, testing assumptions in the environment by, for example, presenting a draft product. The action-oriented processes represent bigger steps for the ventures, such as involving new actors or building a full version of the product. PictureDraw was characterised by a combination of action-oriented and experimental–experiential characteristics; it combined prototype building with several low-effort market surveys.

Although combined as one characteristic in the conceptual frame of reference, the empirical data illustrate how experimental action and experiential learning do not always occur together in the processes. For example, MultiGame based their experiential learning process on a combination of experiments performed at conferences. While action-oriented and experimental–experiential characteristics are pronounced in the processes, the creative characteristic is less articulated, and where it is found, it always co-occurs with action-orientation: In this case, PictureDraw and StockMaster took creative actions to develop the ventures’ products. Thus, the findings suggest that the creative characteristic merges with the action-oriented characteristic. The reflective characteristic, which occurred in all the cases but StudentMatch, relates to how entrepreneurs reflect on past or current actions; this is line with Lindh and Thorgren (2016). The characteristic is distinct from – but interrelated with – action-orientation and experimentation. Action-orientation often reveals itself through some kind of experimentation: For several events, this resulted in reflections or ‘take-aways’ that influenced subsequent actions (i.e. experiential learning) (Rae, 2000; Politis, 2008).

4.2.2 Dimension: Multiple actors

Recalling Table 1, the multiple actors dimension includes the following four process characteristics: interactive, networked, social and collective. With the exception of StockMaster, all the processes were characterised by collective action involving the entire team. In this sense, the processes were characterised by a collective approach, which tends to co-occur with the interactive characteristic, such as when the team of entrepreneurs in StudentMatch and MultiGame as a collective effort interacted with their coaches or potential users. These interactions also occur in teams’ use of networks for recruitment or market research (e.g. StockMaster). The team might also interact with potential users and partners such as interest organisations (or, as in the case of StockMaster, a lawyer). Networks were central especially for MultiGame and StockMaster, as knowledge and expertise were almost purely extracted from networked relationships. Furthermore, networked and interactive actions are

sometimes performed in social settings, such as when MultiGame’s software developers attended social events to learn from others.

4.2.3 Dimension: Context-dependent

Recalling Table 1, the context-dependent dimension includes the following three process characteristics: contextual, dynamic and adaptive. In almost all instances, the five processes were characterised as contextual. Uncertainty or unexpected/unfavourable situations influenced the processes – as expected from prior knowledge. Prominent examples include issues of team performance and uncertainty about the way forward for product or firm development. While the importance of uncertainty and the situation is likely to occur, as the present paper uses critical events for the analysis of processes, the two should, based on the empirical findings, perhaps be highlighted more than just within the conceptual frame of reference in Table 1. The contextual character of the processes indicates that entrepreneurs often develop by being dynamic and flexible due to imposed contextual restrictions (e.g. StockMaster and its legal situation). Another example concerns how team recruitment and motivation proved difficult because of the dependence on students without salaries and the limited access to other resources, such as when StudentMatch built its first version of its app. To lessen these restrictions, the teams had to be flexible in their actions and adapt to the means available to them or to emerging opportunities. The teams also had to adapt to contextual factors through external inputs (e.g. market research) and impacts (e.g. regulations). The empirical data demonstrate how the dynamic and adaptive characteristics differ from each other, where, for example, DilemmaShare was flexible in its software development approach, and StockMaster had to adapt to a financial and legal situation. Moreover, the team was often flexible in their approach even when they had to adapt to specific influencing factors outside their immediate control. This suggests that dynamic and adaptive characteristics may merge into one characteristic.

[INSERT TABLE 3 HERE]

5. Discussion

Sections 4.2.1–4.2.3 highlighted how the characteristics along each dimension are manifested in real-life early-stage venture creation processes, with the essential findings presented in Table 3. While the interactions between characteristics within the three dimensions are described above (keeping in mind that there are also interactions between characteristics across the dimensions). For example, the collective team efforts and (social and networked) interactions are often action-oriented or experimental–experiential in the five processes. Furthermore, action and experimentation are part of the dynamic and adaptive process, and multiple actors are involved. In the empirical data, each characteristic from one dimension interacts with characteristics from the other two dimensions. The dimensions may therefore be regarded as interdependent. The notion that EL is a complex and context-dependent process (cf. Toutain *et al.*, 2017) is supported by the number of interactions and interdependencies between characteristics identified in the present paper. While elements of these findings are also covered by previous research, the interactions and interdependencies between the activity, multiple actors and the context demonstrate how the elements of the process tie together as a whole.

The findings in this paper underpin the significant commonalities between EL and effectual processes and provide support for existing studies that argue for the relevance between EL and effectuation in different ways (e.g. Berends *et al.*, 2016; Vasconcelos Gomes *et al.*, 2018) as well as future studies in the field. The findings further support the notion that EL processes are dynamic and adaptive, extending beyond the individual (El-Awad *et al.*, 2017) and involving

reflection together with action and experimentation (Hägg and Kurczewska, 2016). Regarding action in the process, the findings suggest differentiating between radical and more iterative actions in the process events to further understand the action through which learning occurs.

6. Conclusions and implications

This paper explored how entrepreneurial learning may be understood as an effectual process in the early phase of venture creation. The findings suggest that EL may be understood as an effectual process by use of three dimensions; activity, multiple actors and context-dependent. Previous EL research had already established how activity is central to EL and emphasised that what constitutes the two dimensions of multiple actors and context-dependence is important. The present paper contributes to EL with an enhanced understanding of why and how the three dimensions are important as well as interdependent and mutually interactive. Understanding EL as an effectual process has provided insight into how entrepreneurs approach process events through collective actions, social and networked interactions as well as with dynamic and adaptive action depending on the context. The present paper also contributes to OL by extending the understanding of learning in the early phases of venture creation, where the separation between learning levels (cf. Morland *et al.*, 2019) is small and the organisation is very much dependent on externals for its development. By relating entrepreneurs' actions to process characteristics, the present paper provides insight into practices and mechanisms involved in the learning process in organisations, as requested by recent contributions to the field (Kunttu and Neuvo, 2019).

The present paper argues for further cross-fertilisation of EL and effectuation research and showcases how studies of EL may contribute to OL in entrepreneurial ventures. Specifically, the conceptualisation of characteristics and dimensions aims to facilitate analysis of future process studies by suggesting a framework for analysing process events and thus handle the extensive amount of information available from longitudinal studies. As the empirical study presented here is based on early-phase new-venture teams, the conceptualisation is relevant to early-phase team-learning processes. Regarding limitations, the empirical data build on a limited set of venture creation processes within the same environment. It is probable that the processes studied would be different from venture creation processes in another environment if they were compared. Thus, the findings could have been different if different events and entrepreneurial actions were emphasised. However, aiming to isolate surrounding factors is also a strength of the present paper. The contribution from highlighting multiple actors and context-dependence as important for EL processes would likely have been maintained even in a different environment. Nevertheless, further studies in other environments are highly encouraged.

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Table 1: Entrepreneurial learning as an effectual process – Synthesis of characteristics

Process Characteristics	Entr. Learning	Effectuation	Merged Characteristics (see notes for explanations)	Conceptual Framework Characteristics	Dimension
Action-oriented	X	X	→	Action-oriented	Activity (what)
Active	X	X	Active, action and proactive as synonyms for ‘action-oriented’ in the present context		
Action	X	-			
Proactive	X	-			
Learning by doing	X	-	Entrepreneurial learning based on action as ‘doing’ (Karataş-Özkan, 2011; Seuneke <i>et al.</i> , 2013).		
Experiential	X	X	Experiential and experimental are combined as a single construct because experimental action is part of the experiential learning process and because experiential learning (and reflection) form part of active experimentation (cf. Cope, 2003).	Experimental–Experiential	
Experimental	-	X			
Creative	X	X	→	Creative	
Reflective	X	X	→	Reflective	
Interactive	X	X	→	Interactive*	Multiple Actors (who)
Collaborative	-	X	Collaborative is an ‘exchange’ as a form of collective effort (Vargo and Lusch, 2014) in value creation. Collaborative is oriented more toward a common objective and is treated here as a sub-type of collective effort.		
Social interaction	-	X	Social interaction describes the social and interactive characteristics of effectual processes (Fischer and Reuber, 2011).		
Social	X	-	→		
Shared	X	-	Shared contextual learning processes as a way of learning in social relationships (Seuneke <i>et al.</i> , 2013)	Social*	
Networked	X	-	→	Networked	
Collective	X	-	→	Collective	
Team-level	X	-	Team-level learning as a type of collective learning (Karataş-Özkan, 2011)		
Collaborative	-	X	Collaborative and ‘exchange’ as forms of collective effort (Vargo and Lusch, 2014) in value creation. Collaborative is oriented more toward a common objective and is treated here as a sub-type of collective effort.		
Contextual	X	-	→	Contextual	Context-Dependent (when/where)
Situated	-	X	‘Situated’ refers to how a specific situation and environment influence the development of entrepreneurs’ decision-making (Song <i>et al.</i> , 2017); this is similar to how other research has used the terms ‘contextual’ or ‘context-dependent’.		
Uncertainty	-	X	Uncertainty as an important (perhaps the most important) contextual characteristic for effectual action (cf. Sarasvathy, 2001)		
Dynamic	X	X	→	Dynamic	
Flexible	-	X	‘Flexible’ refers to the ability to dynamically adapt to the entrepreneurial context (e.g. ‘allow the business to evolve as opportunities emerge’; Chandler <i>et al.</i> , 2011, p. 382).		
Emergent	-	X	‘Emergent’ refers to the ‘non-predictive’ nature of effectual processes, yielding a dynamic process based on emerging opportunities (Urban and Heydenrych, 2015; Deligianni <i>et al.</i> , 2017).		
Adaptive	X	X	→	Adaptive	

Note: 'X' means that the characteristic is found in previous research on EL and/or effectual processes. '→' means that the specific characteristic is used as is, while the merged characteristic comes with short explanations. Social interaction has been split into two characteristics (*). Dimensions in the right column are explained in the text above.

Table 2: Venture creation processes as a series of learning events

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6
StudentMatch	Uncertainty about patents and shares. Advised to first develop concept. Team then conducted survey-based market research.	Identified the need for software developer. Attended social matchmaking event. Recruited three team members.	Coach stressed importance of market verification. Built prototype using off-the-shelf solutions.	Team performance deficits. Initiated social evenings with team. Founders shared issues with the team.	Team performance deficits (again). In-team discussions about the issue. Founders stressed the importance of progress.	-
DilemmaShare	Team struggled to program themselves. Own competence overrated. Recruited programmer through network.	Pre-set goals not achieved, leading to lack of motivation. Initiated social team activities on coach's advice.	External factor forced product changes. Entrepreneur had to accept delay and reschedule. Change in plans.	Team invited to pitch for a national politician. Asked coach about pitching experiences and prepared through simulation.	Invitation to collaborate with a large telecom actor. Prepared conceptual illustrations of the app for the telecom actor.	Team performance deficits. Effort to recruit additional team members failed. Project halted.
PictureDraw	Uncertainty about interest in potential app. Advised to conduct market survey. Survey conducted through social media. Started to build app.	Absence of clear product vision prior to presentation. Initiated workshop motivated by coach, but progress ceased.	Design student joined the team. Needed to redo the app. Initiated new workshop. Built first version of app with main functions.	Technical team members ceased to contribute or communicate with the team. Tried unsuccessfully to recruit programmers through networks.	-	-
MultiGame	Lack of experience in presenting for fundraising. Asked coach and networks. Collected presentation experiences.	Lack of knowledge about the development process. Participated in conference to seek recommendations on how to improve the process.	Technical design issues. No knowledge of possible solutions. Searched for start-ups that have resolved the same issues. Used network and discovered its value.	Technical challenges from lack of coordinated development. Conducted market research re. simplifying the game and received a positive response. Identified a need for more coordination.	Received soft funding. Invited to a conference and discovered by networking that the target user was other than expected. Focused efforts on target user via market research.	Uncertainty about how to approach angel investor competition. Founders involved entire team in discussions. Discovered how to conduct problem solving in the team.
StockMaster	Founders scammed by external consultant. Received help from a local lawyer. Read about similar cases. Decided to recruit core competencies to the team.	Identified need for someone to take charge of technical development. Used student network to find relevant groups of software developers.	Lack of experience in attracting investors. Used existing networks to contact industry experts. Brought experts on board, resulting in more structure.	Needed money to pay salaries during summer. Received poor offer from incubator. Sharing re. unattractive offer established contact with other investors. Closed satisfying deal with investor.	Discovered legal challenges close to the planned launch date. Found a solution with support of interest organisation. Identified need to increase size of next investment round.	Investor was expected to professionalise and progress the business. Commenced process of recruiting experienced co-founder. Recruitment process failed. Project was halted.

Table 3: Representation of process characteristics as actions in the early-phase venture creation process

Dimension	Process Characteristic	Action in the Venture Creation Process
<i>Activity</i>	Action-oriented	Taking bigger and more radical steps and decisions in the process: building and prototyping, being proactive in approaching external actors and resources and recruiting people to the venture. Includes creative actions (e.g. design workshops).
	Experimental–Experiential	Taking smaller and iterative steps in the process: testing market response to product ideas and prototypes and performing market surveys.
	Reflective	Interrelated with and builds upon action-oriented and experimental–experiential characteristics.
<i>Multiple Actors</i>	Interactive	Externals interacting in the process (e.g. users, coaches, partners). Actors taking a core part in the process.
	Networked	Interactions that are with actors and resources accessed through networks. Actors taking a more distanced role in the process.
	Social	Informal social interactions that may also be networked.
	Collective	The collective effort of the entrepreneurial team in the venture creation process.
<i>Context-Dependent</i>	Contextual	Uncertainty and unexpected situations in the process, to which the team may adapt.
	Dynamic–Adaptive	Flexibility in the process (e.g. based on available resources, emerging opportunities, inputs from network), which may involve adapting to external impacts (e.g. customer requirements and regulations/law).