

Cognitive Exploration Strategies and Collective Decision-Making in Entrepreneurial Business Modelling

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Abstract

Our Business Model (BM) teaching approach helps students to understand three essential dimensions of cognitive exploration strategies and to experience negotiation strategies in groups for designing a first BM. Didactically, it follows Kolb's Experiential Learning Cycle, including individual paper and case study preparations as well as collective discussions and decision-making.

Keywords: cognition, exploration strategies, entrepreneurial business modelling

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Introduction

Uncertainty is a constituting characteristic of entrepreneurial processes. Especially in the early stages of a new venture, entrepreneurs have endless possibilities with unpredictable consequences (Malmström & Johansson, 2017). One crucial phase in this process concerns decision-making about what mechanisms should be used for exploiting an opportunity (Shepherd, Williams, & Patzelt, 2015). These exploitation mechanisms base on founders' mental business models (BM), i.e., belief structures of reasons why as well as procedures how various actors engage in focal business interactions (cf. Doz & Kosonen, 2010).¹ Possible configurations of these structures are manifold, yet (in particular novice) entrepreneurs are additionally challenged as they commonly have limited resources prohibiting prolonged experimentation (Sosna, Treviño-Rodríguez, & Velamuri, 2010). Further, they cannot rely on prior entrepreneurial experiences and experienced partner networks that could aid in decision-making for a promising first BM. Thus, entrepreneurs need to strongly rely on their cognition (Sosna et al., 2010). Given these challenges, we aim to teach students what cognitive exploration strategies exist, how these strategies are related to BM innovation or imitation, and how collective decisions emerge in teams (cf. Rydehell & Isaksson, 2016).

Cognitive exploration strategies are individual strategies of how information is gathered and interpreted for finding solutions and decision-making. In our BM class, students learn and experience the impact of three dimensions of cognitive exploration strategies on BMs: strategic orientation, analogical or combinatory problem solving, and intuitive or factual reasoning (cf. Henike, 2019). To teach the impact of these dimensions on the BM development process, we use a combination of individual learning, inquiry-guided class discussions, individual expeditionary learning for one specific case, and group discussions of this case following Kolb's and Kolb's "Experiential Learning Cycle" (2005). This learning cycle helps students to learn the essential BM concepts. It also helps to reflect on how their behaviour, in terms of cognitive exploration strategies as well as

group negotiations, impact BM decisions (cf. Hogan & Warrenfeltz, 2003).

Our BM teaching approach is part of a three-month advanced master class on "Innovation Management" taught in English at the University of Potsdam, Germany.² The class regularly consists of 50 students from business administration and management of information systems majoring in innovation management and entrepreneurship. Each week, we concentrate on one specific theme of innovation management taught in a two-hour lecture and two-hour exercise. For every lecture, we provide mandatory readings and related questions. Case studies for individual and group preparations supplement exercises. Exercise groups regularly consist of four to five students. Given this setting, we teach the impacts of cognitive exploration strategies and group negotiations on BM innovation in one week in the middle of a semester.

In the next sections, we describe in more detail our teaching approach and learning methods, the objectives and procedure of our BM teaching approach, and required materials. In the end, we reflect on our experiences in regards to student evaluations and success in achieving our teaching objectives. We finish with a short discussion emphasising how teachers can modify our approach to other learning objectives or teaching conditions.

Teaching Approach and Methods

Our BM teaching approach is inspired by Kolb's and Kolb's "Experiential Learning Cycle" (2005). The learning cycle requires high self-motivation and practical experiences for achieving long-term learning outcomes. The learning process includes constant conflictual movements between reflection and action, existing and new knowledge, as well as implicit understanding and the ability to comprehensibly explicate this understanding (Kolb & Kolb, 2005). Teachers support individual learning processes by providing feedback to students' beliefs, ideas, and ways of thinking. They create a setting where the use of different methods respect the individual differences in learning (Kolb & Kolb, 2005).

¹ We differentiate between mental business models and implemented business logics or exploitation mechanisms as this differentiation helps to better discuss related cognitive or implementation challenges.

² For inspiration, we provide our full teaching materials in the online appendix to this article.

Consequently, our teaching approach uses a combination of four methods.

First, our teaching approach starts with individual learning. In this stage, we provide students with academic articles so that they make sense of most common definitions and concepts on their own. Own preparation allows students to tap into new themes at their own pace and based on their existing knowledge. Second, we use the classroom for inquiry-based learning. Inquiry-based learning is an approach that motivates students to think and openly articulate their opinions based on questions posed (Bell, Urhahne, Schanze, & Ploetzner, 2010). By collecting varying opinions and moderating discussions, teachers motivate students to recognise conceptual differences almost autonomously. Discussions require students to explain what they have already learned in their preparation. At the same time, teachers' and fellow students' questions show how much they have already understood abstract concepts aiming to close the knowing-doing gap (cf. Pfeffer & Sutton, 2000). Third, we ask our students to apply this knowledge to specific contexts. In this phase of expeditionary learning, students better understand the usefulness and limitations of theoretical concepts. At the same time, they are motivated to go on an individual expedition and to find their own solutions to problems (Outward Bound, 1998). In the fourth stage, students discuss in groups the solutions from their learning expedition. This exchange of individual experiences fosters collective learning and reflection (Loewenstein, Thompson, & Gentner, 2003). In sum, our learning cycle helps students

to understand concepts, their applicability, and how different behaviours can result in different outcomes (cf. Hogan & Warrenfeltz, 2003). Figure 1 summarises our teaching approach, aspired learning cycle, and four methods used.

BM Teaching

In our class, we focus on one specific kind of BM innovation. This kind of BM innovation is the design of a first BM in an entrepreneurial context (Ahokangas & Myllykoski, 2014; Massa & Tucci, 2014). We use the four different phases of the learning cycle to teach the following objectives:

- how entrepreneurial BM design challenges are different from existing BM reconfiguration challenges,
- what cognitive exploration strategies exist,
- how they impact decisions to design a first BM, and
- how negotiation strategies unfold in the process of collective decision-making

Stage 1: Individual BM learning

For proper preparation, we start our BM week by prompting students to read "A Critical Assessment of Business Model Research" (Massa, Tucci, & Afuah, 2017). This review article introduces students to the varying perspectives existing in BM research, cognitive and implementation challenges, and reflects why there is increasing practical and theoretical interest for BMs since the beginning of the Information Age.

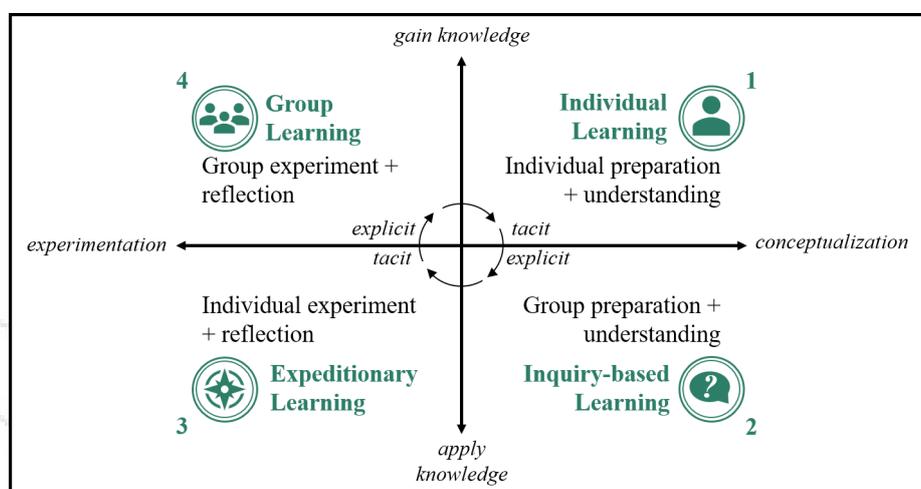


Figure 1: Teaching approach

Accordingly, we ask our students to concentrate on the following questions:

- What are definitional/conceptual differences (related to BMs) discussed in the article?
- Why are BMs important from a practical and theoretical perspective?
- Why and when are BMs sources for innovation?
- What external and internal factors do challenge firms' BMs in the 21st century?

Stage 2: Inquiry-based BM learning

In the lecture, we start with a brief history of quotes from famous researchers to emphasise that Schumpeter, Drucker, or Porter have discussed the fundamental idea behind BMs decades ago (cf. Casadesus-Masanell & Zhu, 2013). We contrast these quotes with recent examples like Alibaba or Uber to start discussing what has changed in the 21st century. At that point, we move to a discussion with students of what BMs are and whether they are attributes of individuals or entities like firms, universities, et cetera. For greater clarity, we introduce a differentiation between a mental BM, i.e., abstraction from reality or beliefs (cf. Doz & Kosonen, 2010), and an implemented business logic. This differentiation helps in the discussion to reflect upon cognitive (e.g., number of BM alternatives, inability to calculate consequences, Massa & Tucci, 2014) and implementation challenges (e.g., higher customer power, increased fluidity in firm interactions, partner selection). In sum, proper preparation and class discussion teach students that the challenges of designing a first BM for a new venture are different from the challenges of reconfiguring existing BMs in incumbent firms or adding a new BM to an existing portfolio of BMs (cf. Massa & Tucci, 2014). Students learn that central challenges are the definition of an appropriate value proposition, creation and capture mechanism (Teece, 2010). Further, they learn that both, copying existing BMs or designing new BMs, have proven to be reliable sources for designing a first BM (Casadesus-Masanell & Zhu, 2013)—at the same time, increasing the difficulty for decision-making.

Stage 3: Expeditionary BM learning

After the lecture, we ask the students to apply their knowledge to a real case. They must design a first BM for an existing service that has no specific value proposition and value capture mechanism yet. The service is

called Errorfarealerts and provides information about online error fares of flights. An algorithm crawls the Internet for these error fares and informs registered people by e-mail free of charge (cf. an extended description in the supplementary materials). A possible error fare could be that a flight only costs \$59 instead of \$590.

As we want students to collect additional information about the service, industry, other BMs, we invite them into a computer lab. Further, we provide a word processing program for taking notes. The time limit for the in-class completion of this individual assignment is 60 minutes. Afterwards, students have an additional week to rethink the task before they must submit reflection reports.

The central task for students is to comprehensively document all steps taken during their processes of developing a BM for Errorfarealerts. To support documentation, we ask students to answer the following questions/requirements within their reflection reports:

- Be as precise as possible with your description and give reasons for decisions that you have made during the process. Reflection report should be around three pages long.
- What were your first thoughts and steps when starting with the task?
- Did you consider different business models during the process? If so, which ones did you consider for the task, and why did you consider them?
- Which, in your opinion, is the most appropriate business model for Errorfarealerts and why?

Students can earn with their reports at a maximum six points that add to their final grades (for the whole class 100 points are the maximum). This requirement additionally motivates students to make accurate descriptions. We make these questions and requirements available before our computer lab session via an online-learning platform (Moodle).

At the beginning of our computer lab session, we introduce students to the case of Errorfarealerts. We present the service to the whole class via a short video (Errorfarealerts, 2016). Afterwards, students can individually look for further explanations on their homepage

(Errorfarealerts, 2018). They can also use the Internet to look for additional information that helps them to design an appropriate value proposition and value capture mechanism. During their expeditions, students will encounter several tensions at the interface of technological, competitive, legislative, and ethical issues (cf. Thursby, Fuller, & Thursby, 2009). For instance, students need to decide on their own, whether it is ethical to make a profit based on others' mistakes.

Stage 4: BM learning in groups

The individual expeditions and reflections serve as an introduction for our main teaching objective, i.e., understanding what cognitive exploration strategies exist and how they impact BM decisions. In the group exercise—that takes two hours, we ask students to exchange the reflection reports with their group members. We ask group members to read the reflection reports and mark text passages according to the three dimensions of cognitive strategies that we introduce before. In the end, students will understand how different approaches in each dimension have impacted their group members' BM decisions. The three dimensions consist of the following aspects:

1. Strategic Orientation (Gatignon & Xuereb, 1997): beliefs about whether competitive, customer or technological orientation is the driving force for BM designs:
 - focus on competitive similarity or differentiation
 - focus on customer convenience or inconvenience
 - focus on internal technological potential or fit the external environment
2. Problem-solving (Gazzaniga, Heatherton, & Halpern, 2015): the process of generating a solution based on:
 - similar content or context analogies
 - adding or changing elements of existing patterns (conceptual combination)
3. Reasoning (Gazzaniga et al., 2015): point of judging to derive a conclusion based on:
 - intuitive proof (own feelings or imagination)
 - factual proof (own knowledge, external statistics or comments)

By reading the reflection reports, group members will recognise a great variety in possible value propositions and value capture mechanisms for Errorfarealerts' BM.

Some students may recommend imitating BMs from travel agencies or to expand the BM to other kinds of online fares like shopping. Other students may recommend cooperating with flight providers to reduce their failure rates. The group discussions will reveal that these differences are mainly related to different strategic orientations. Focussing strongly on the customer will lead to BMs that are free of charge for customers and subsidised by advertisements or partner provisions. However, focussing on what customers do not like may encourage students to reject advertisements. Focussing strongly on the competition leads to imitations or strengthens considerations of how to be different from competitors. Another possibility is to focus on the technology itself. Accordingly, students will consider the legislative situation or imitability of the technology. Students may argue that imitation of the algorithm is easy or that error fares only appear randomly. That is why these students will recommend targeting airline companies and help them to correct these error fares.

As the suitability of the different BM solutions is unknown, students will also learn that the strategies to generate solutions and reasons to recommend a BM differ from student to student. Some students will only feel safe in decision-making when they have outweighed different alternatives and collected different facts. Others will only feel confident after imagining possible consequences in the future or considering currently famous examples like Spotify. This variance will spur intense discussions in the groups about the BM that the group will finally recommend. These intense discussions animate students to think about negotiation strategies so that each group can recommend one BM. These negotiation strategies could be the joint development of a BM integrating aspects from all group members, solution enforcement due to existent group roles (e.g., the group leader makes the final decision), or no final decision resulting in severe group conflicts. These negotiation activities will show students how important the sharing of fundamental values and definition of group roles is for entrepreneurial teams. In the last 20 minutes of the exercise, one group presents their solution and discusses with the other groups what BM alternatives are possible, what cognitive exploration strategies they have used, and how differences in these strategies affected the other groups' final decisions.

Teaching subject	Teaching objective	
	concepts	application
individual	<p>1. <i>individual preparation</i></p> <ul style="list-style-type: none"> • When/Where? before the lecture • What? 4 questions raised • Material? Massa et al. (2017) 	<p>3. <i>individual expedition</i></p> <ul style="list-style-type: none"> • When/Where? computer lab or homework (1 week in total) • What? individual BM design + reflection report • Material? case description + access to additional information sources
group	<p>2. <i>class discussion</i></p> <ul style="list-style-type: none"> • When/Where? in class, Tuesday (week 1, two h) • What? BM innovation challenges, central BM elements • Material? lecture slides + moderated class discussion 	<p>4. <i>group negotiation</i></p> <ul style="list-style-type: none"> • When/Where? in class, Wednesday (week 2, 1h) • What? collective solution + discussion • Material? individual group discussions + final class discussion

Table 1: Summary of BM Teaching Approach

In sum, this BM teaching approach puts students in a real-life situation and increases their understanding of how to search for different BM designs bridging doing and knowing (Pfeffer & Sutton, 2000). At the same time, it shows how difficult it is to make decisions in uncertain situations. Table 1 summarises our BM teaching approach and the material needed.

Student Evaluations and Success of BM Teaching Approach

Student evaluations and personal feedbacks on our BM teaching approach are extraordinarily positive. In general, students widely appreciate the situation of being confronted with a real-life challenge and the possibility to discuss their solutions with others. Furthermore, as we combine conceptual issues with practical applications, students better understand the contributions and limitations of concepts (e.g., what possibilities do we have to create a value proposition?). For the specific BM case, most students enjoy working on this case as they quickly understand the service's purpose and immediately see personal learning outcomes. At the same time, the case requires students to reflect on their position as a potential customer or business owner leading to different decisions. From time to time, students are also amazed when they read others' solutions recognising the immense possibilities.

Overall, the students get a good overview of the different cognitive exploration strategies and understand them quickly. At the same time, however, we also see

that the more possibilities are presented, the uncertainty among students increases whether they have made the right BM decision. That is why students like to discuss their solutions with others because they often need to find additional support for their BMs when they do not feel very confident.

We have made excellent experiences with our BM teaching approach and would recommend this approach for settings with a short time span (1 week) and classes with up to 50 students. Beyond the teaching of thematic BM issues, the concept helps students to improve their cognitive flexibility and their teamwork competencies. They need to switch between conceptual ideas, case-specific practical concerns and the benefits as well as costs of different BM alternatives. It helps them to acknowledge the benefits of reflecting on their beliefs and building lines of reasonable argumentation. This also has positive implications for the group process. Students learn to effectively communicate within groups, understand other students' lines of argumentation, and how to reach consensus.

Limitations and Adaptability

Limitations of this teaching approach may be the workload involved as students need to spend much time on individual preparation, writing reflection reports, and collecting information. Furthermore, there is no overall right solution for what BM will be the best solution for the case of Errorfarealerts. This fact may frustrate some students; however, the clear objective of this concept is

to train students to deal with uncertainty and to understand how decisions emerge. Moreover, our concept focusses specifically on cognitive challenges and neglects implementation challenges. That means that, although students have cognitively developed an appropriate BM, we do not dive further into challenges of executing this BM like negotiating with partners and investors, raising financial resources, or interacting with customers. We also do not specifically address social BMs.

We have also applied the case study in other settings with less time for teaching and with different groups of students. Therefore, we will shortly describe how our teaching approach could be modified. First, when time is limited to a single two-hour session, the case could be introduced to a whole class asking students to think about single BM dimensions spontaneously. This question will help to uncover varying possibilities and to discuss further the problems of creating linkages between dimensions and their complex interdependencies (cf. Massa, Viscusi, & Tucci, 2018). Second, mostly in executive teaching, the case could be used as an inspiration to reflect upon the BMs of their own companies. Challenges could be discussed in how this case provides a

pattern for innovating the own BM or what challenges would arise if an existing company implements this BM. Third, this entrepreneurial case could be contrasted with a case of an incumbent company to discuss different challenges of both situations (e.g., how decisions in the past constraints future BM decisions). Fourth, visual BM tools like the BM Canvas (Osterwalder & Pigneur, 2010) or BM pattern cards (Gassmann, Frankenberger, & Csik, 2014) could be used to support students in thinking and communicating BM solutions. In group discussions, the focus could shift to discuss the strengths and weaknesses of visual BM tools.

Conclusion

Overall, we are very satisfied with the learning outcomes of our students and, equally important, students also acknowledge the positive effects of this concept. We recommend this BM teaching approach to teachers and students interested in the fields of entrepreneurship, strategy, and innovation management as well as in the subjects of cognitive challenges, cognitive exploration strategies, and dynamics of group discussions.

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