Journal of Business Models

2021

Vol. 9 - No. 3

Journal of Business Models (2021), Vol. 9, No.3
Editorial staff: Christina Bidmon, Anna B. Holm, Mette Rasmussen

Graphics:

Font: Klavika

ISBN: 978-87-7112-126-1
ISSN: 2246-2465

Published by:

Aalborg University Press
Skjernvej 4A, 2nd floor
9220 Aalborg
Denmark
Phone: (+45) 99 40 71 40
aauf@forlag.aau.dk
www.forlag.aau.dk

... IN THIS ISSUE

Journal of Business Models (2021), Vol. 9, No. 3, pp. 1-7

JOBM
Journal of Business Models

Teaching Business Models: Approaches and Success Criteria

Christina M. Bidmon
Copernicus Institute of Sustainable Development
Utrecht University

Anna B. Holm
Department of Management
Aarhus School of Business and Social Sciences

Guest Editors

Introduction

Teaching business models (BM) and business model innovation (BMI) in universities and business schools has become a common practice. Academia has acknowledged that despite the very normative nature of the concept, business model thinking unites and synergistically binds the very fundamental decisions about a business, i.e., how to create, deliver and capture value. Naturally, programmes in entrepreneurship, strategy and innovation have widely developed and adopted BM and BMI curricula, and educators have invested a great deal of time and effort in designing courses and supportive tools. However, their valuable experiences and insights into what works well in classrooms are difficult to share through the traditional academic channels. To facilitate knowledge exchange, we initiated and organised a series of teaching-related workshops, which then turned into a regular Teaching Forum at the annual Business Model Conference[1] organised by the Business Model Community. We experience that the topic of teaching business models is one that sparks debate and curiosity in the community and attracts great attention at the conference. Teaching business models is by no means an easy task; it requires the establishment of a connection between consumption and production, the physical aspects of producing and delivering a product as well the more subtle dynamics of understanding customer needs and willingness-to-pay (Charles Baden-Fuller in Holm et al., 2019).

The success of the Teaching Forum has also created a need to record and further disseminate the valuable knowledge of teaching BMs and BMI. This is how the idea of a special issue on teaching BMs arose. The

[1] See http://www.businessmodelconference.com

Please cite this paper as: Bidmon, C. M. and Holm, A. B. (2021), Teaching Business Models: Approaches snd Success Criteria, Vol. 9, No. 3, pp. 1-7

Acknowledgements: The uncertainty around work, teaching and personal health created by the COVID-19 pandemic put extra strain on authors, reviewers, as well as the editorial team and the journal management. We are therefore grateful to everyone involved; without their continuous work and perseverance in extraordinarily difficult times this special issue on teaching business models would not exist.

DOI: https://doi.org/10.5278/jbm.v9i3.6911
ISSN 2246-2465

first call for papers was issued in late 2018 and quickly caught attention of the community. We received well over thirty submissions from educators all over the world who were eager to share their approaches, insights, and tools. Deeply humbled and impressed by the authors' openness as well as the usefulness of their contributions, we decided to split the special issue into two volumes to accommodate bigger number of papers. Ultimately, we selected 19 prospective papers that each present hands-on guidance from educators, for educators. Volume 1 was published in 2019 and included 12 papers.

When working on the second volume, the COVID-19 pandemic rendered many in-class approaches and tools irrelevant for an unknown time. Therefore, the release of Volume 2 was postponed until educators return to classrooms. However, if anything, the COVID-19 pandemic has demonstrated that the discussion of novel and innovative teaching approaches is very much alive. Educators all over the world set out to develop and implement engaging learning methods for teaching students online. Many of the contributions in the special issue address this need; they present digital platforms, elaborate on the principles of hybrid learning strategies or give advice on creating MOOCs (Massive Open Online Courses). While the authors created these approaches in pre-pandemic times, making them accessible to a broader audience now seems to be more relevant than ever. In so far, our aspiration for this special issue remains as it started: It is our hope that this special issue on teaching business models will not only fuel the debate on innovative teaching approaches in contemporary business education, but also be of practical use for young teachers who need inspiration on their first course designs, help experienced teachers to improve their teaching as well as inspire coaches and accelerator units that try to help founders and corporate entrepreneurs to master the art of business modelling (Holm et al., 2019).

With this brief introductory paper, we pursue three main objectives: (i) to provide an overview of the content of the 19 papers included in the entire special issue, (ii) to reflect on commonalities and 'success criteria' becoming apparent across the approaches authors present, and (iii) to present the seven papers included in Volume 2.

The content of the Special Issue on Teaching Business Models

Some of the papers in the special issue present an entire course, others present a specific tool or a course component. Some focus on large audiences, others on teaching executive students or practitioners. What all papers have in common though is that they provide information such as course schedules, exercises, and instructions. Figure 1 provides an index that can guide the reader to relevant papers.

The teaching approaches exhibit several similarities. This leads us to speculate that there are formats and techniques especially relevant in the context of teaching BMs.

Three Ingredients for a Successful Business Model Course

Perusing the 19 approaches presented in the special issue, we observe commonalities in the formats and techniques that educators use to teach business models. So, what makes a successful business modelling course? Based on the papers included in Volume 1 and Volume 2, we have distilled three ingredients for success in BM and BMI teaching.

Experiential Learning

Experiential learning is a very salient feature of the teaching approaches presented in this special issue. Experiential learning refers to learning through reflection on doing (Kolb, 1984). It is often contrasted with academic learning, which relates to more abstract and classroom-based techniques of knowledge transfer. In contrast, experiential learning seeks to engage a learner in a concrete experience. Experiential learning components that the authors in this special issue have included in their teaching range from real-life cases over digital simulations to board games. For instance, Massiera (2021) presents a sophisticated structure that allows to scout and facilitate projects that bring together local entrepreneurs with student groups to work on live challenges. Others discuss historic or fictitious cases in the classroom, and simulations are also frequently used to involve learners in a concrete experience related to business modelling.

Gamification - the introduction of game elements into a non-game situation – is a commonly used

OVERVIEW OF PAPERS' CONTENT

Special Issue Teaching Business Models

	VOLUME	BM DESIGN	BM EVALUATION	IN-CLASS	ONLINE	COURSE SCHEDULE	LEARNING OBJECTIVES	EXERCISES & ASSIGNMENTS	SUPPORTIIVE TOOLS	EXAM & GRADING
Bitetti	1	✓		✓	✓	✓	✓	✓		✓
De Reuver et al.	1	✓	✓		✓	✓				
Henike & Hölzle	1	✓		✓		✓	✓	✓		
Jonker & Faber	1	✓		✓	✓	✓				✓
Lehmann & Bidmon	2		✓	✓			✓	✓	✓	
Maffei & Boffa	2	✓	✓	✓		✓	✓	✓		
Margolina & Bohnsack	1	✓	✓	✓	✓	✓	✓	✓	✓	✓
Massiera	2	✓	✓	✓	✓	✓	✓	✓		✓
Mosig et al.	2	✓		✓		✓		✓	✓	
Müller et al.	1	✓		✓	✓	✓		✓		
Rumble	1	✓		✓			✓	✓	✓	
Sort & Brondum	2	✓		✓		✓		✓	✓	
Sort & Holst	1		✓	✓	✓	✓		✓	✓	
Stenkjær et al.	2	✓		✓		✓		✓		
Spaniol et al.	1	✓	✓	✓		✓	✓	✓		
Stadtländer et al.	2	✓		✓		✓	✓	✓		
Szopinski	1	✓	✓	✓	✓	✓	✓	✓		
Thomsen et al.	1	✓		✓			✓	✓	✓	
Yrjölä	1	✓		✓		✓	✓	✓	✓	

*categorization indicates relative importance paper pays to aspect compared to others

DIGITAL PLATFORMS
Margolina & Bohnsack
Massiera
Sort & Holst
Stadtländer et al.
Szopinski

VIDEOS & MOOCs
De Reuver et al.
Jonker & Faber
Margolina & Bohnsack
Müller et al.

USE OF LIVE CASES
Jonker & Faber
Massiera
Rohrbeck et al.
Thomsen et al.

GAMIFIED APPROACHES
Lehmann & Bidmon
Mosig et al.
Rumble
Sort & Holst
Thomsen et al.

MBAs & PRACTITIONERS
De Reuver et al.
Mosig et al.
Müller et al.
Rohrbeck et al.

LARGE AUDIENCES
De Reuver et al.
Jonker & Faber
Massiera
Szopinski

Figure 1.

technique by the authors in this special issue to facilitate experiential learning. For instance, Rumble (2019) presents the 'start-up jungle' as a sand table approach that requires learners to make decisions and think through various scenarios while modelling their way through the business landscape. Thomsen et al. (2019) let students work with booster cards, Mosig et al. (2021) use LEGO Serious Play, and Stenkjær et al. (2019) dedicate their entire paper to the use of digital gamification in the context of business modelling.

Moreover, authors find creative ways to foster reflection in learners. Reflection is also a crucial part of the experiential learning process, and like experiential learning itself, it can be facilitated or independent (Kolb, 1984; Veine et al., 2020). Bitetti (2019) has students write a course blog and learning diary to reflect on their experiences. Other authors make the reflection on different frameworks and modelling languages an integral part of their course design (e.g., Henike & Hölzle, 2019; Stadtländer et al., 2021) and thereby tackle the challenging question how to teach about the cognitive processes involved in business modelling.

Social Learning

Social learning refers to people learning in a social context (Bandura, 1977), and social learning theory states that acquisition of social competence happens exclusively or primarily in a social group. 18 out of 19 papers included in the special issue have group work as a central design principle of their course or teaching approach. Even authors presenting a MOOC that has generated over 70,000 participants (De Reuver et al., 2019) integrate forum discussions and peer reviews in the online interaction between participants. A frequent form of collaboration is the assignment of learners to smaller groups, such as entrepreneurial student teams, which work together on the creation and/or implementation of a business model (e.g., Spaniol et al., 2019; Margolina & Bohnsack, 2019; Lehmann & Bidmon, 2021). At times, the format of collaboration is intensive such as in hackathons or bootcamps (Jonker & Faber, 2019).

What is striking is that, even in large courses, educators find ways to introduce elements of collaboration and interaction between learners, often via the new possibilities offered by digital technologies. For instance, Szopinski (2019) explains the integration of video-based peer-feedback and its grading for the use in large classroom settings (200+ students). Furthermore,

multiple authors present formats and techniques to involve practitioners, either permanently or at certain points, in their courses so that students can observe the reception of their ideas and extract knowledge (e.g., Jonker & Faber, 2019; Massiera, 2021; Sort & Brøndum, 2021; Stenkjær et al., 2021). Importantly, many authors also provide valuable tips and tricks on the challenges of facilitating and grading elements of peer feedback (Sort & Holst, 2019; Szopinski, 2019) or performance evaluations by practitioners and case companies (e.g., Massiera, 2021).

Guided Learning

Guided learning is a term we use to refer to the strong facilitation and intense interaction between educator and student. Strong facilitation was a final commonality we observed across the approaches included in the special issue. In their learnings and reflections, authors unanimously agree that teaching students about business models, especially in experiential formats, requires frequent exchange and sparring between lecturers and students. For instance, et al. (2021) describe how they involve multiple lecturers in their course to enable an intense sparring of the students in small groups. Spaniol et al. (2019) explain the benefits of having individual feedback moments between student group and lecturer in addition to peer feedback. Many authors present smart ways to transfer academic learning to the self-study of learners to free-up time in class for sparring and discussion (e.g., Bitetti, 2019; Margolina & Bohnsack, 2019). This, however, does not mean that strong facilitation and guidance solely relate to student-teacher interaction. The games and digital learning formats presented in this special issue are highly scripted, meaning they provide learners with clear instructions for how to play (Thomsen et al., 2019; Rumble, 2019), perform calculations (Lehmann & Bidmon, 2021), or have digital guides help learners to model a business model step-by-step on an online platform (Margolina & Bohnsack, 2019).

Papers in Volume 2

The seven papers included in Volume 2 present a range of innovative teaching formats. Like the papers included in Volume 1, they go beyond the traditional lecture format and provide creative techniques to incorporate blended or gamified elements. Moreover, several of these papers target specific audiences such as learners particularly interested in business modelling in sustainability-related or engineering contexts.

In the paper "*Teaching Business Models through Student Consulting Projects*", Philippe Massiera presents an educational programme that connects 200 to 250 bachelor students with local entrepreneurs for a period of five weeks. Over this timeframe, students help these entrepreneurs to validate their business model. The paper provides in-depth insights into the organisation of the consulting process including information on selecting the entrepreneurial projects, preparing students to enter the companies or the coordination of the student-practitioner-teacher interaction over the course of projects.

In their paper "*On the Back of a Beer Coaster – Simple Estimates for Costs and Revenues in Business Modelling*", Christian Lehmann and Christina Bidmon present a simple method to get students at any level in touch with the financial aspects to modelling a business. The 'Business Coaster' they offer is a playful, non-threatening way that allows learners to perform simple estimates for the costs and revenues of a business model. The authors provide a sample calculation and practical tips as well as rules-of-thumb that instructors can use to support learners when working with the Coaster.

In the article '*Experiences from a Decade: A Universal Approach to Business Model Teaching*', Jesper C. Sort and Kristian Brøndum present their universal five-step approach to developing business model competencies. The approach is based on the teaching principles of case-based teaching, learning-by-doing and problem-based learning. It provides the participants with the ability to apply the tools/theories/frameworks theoretically as well as practically. The authors assure that the approach has proven successful in a variety of settings across disciplines and can be used as a general guide to teaching BMs in an engaging way (Sort & Brøndum, 2021).

In the paper from "*Invention to Innovation: teaching business models to manufacturing researchers*", Antonio Maffei and Eleonora Boffa present an interesting structure to teach doctoral students enrolled in production engineering programmes about business models and equip them with business modelling competencies. They do not only provide lots of practical information

on the learning goals, course structure and readings in their course, but they also reflect on the unique needs of this rather production- than consumption-oriented audience. Thereby, they provide valuable insights how to educate future business leaders and academics who know how transform invention into innovation.

In their article *'Developing impactful entrepreneurial teaching using a business model framework'*,Kenneth Stenkjær, Kristian Brøndum, Jesper C. Sort and Morten Lund present their insights from a course on new venture creation. The course is designed to support students in the process of searching for a repeatable and scalable business model and its careful market validation. The authors observe that the course strengthens students' entrepreneurial competencies. However, they also point at some limitations in applying the Business Model Canvas (Osterwalder & Pigneur, 2010) and Lean Start-up methodology (Blank, 2013) in contexts that require a high degree of creativity. Therefore, the course was enhanced with creativity training to stimulate the flow of ideas and develop students' creative competencies (Stenkjær, Brøndum, Sort & Lund, 2021).

In the paper "*Teaching Sustainable Business Models - A Modeling-Driven Approach*", Maren Stadtländer, Thorsten Schoormann and Ralf Knackstedt describe how they use experimentation with different modelling languages to make learners reflect on the suitability of these languages in the context of sustainability. Using problem-based group assignments, they make students experience where customizations and adjustments are needed when trying to model a business that does not only understand 'value' in economic terms. Moreover, the course they describe offers interesting insights into the repertoire of frameworks and languages available to instructors who teach business modelling.

Finally, Tim Mosig, Wafa Said Mosleh and Claudia Lehmann present a business model course for executives in the context of smart cities. The course they describe in their paper '*Designing Smart Cities: A Participatory Approach to Business Model Teaching*' relies on the Scandinavian participatory design approach (Sanders & Stappers, 2008). As part of the learning process, course participants complete six different stages, and the article describes the details of those six stages. The authors explain how the participatory design approach makes participants engage in the given tasks playfully, and how it encouraged the exchange of different perspectives and supported learning as a social activity (Mosig, Mosleh & Lehmann, 2021).

We thank all the contributors, reviewers and journal editors for their trust and good collaboration. Enjoy the special issue, and happy business model teaching!

References

Bandura, A. (1977), *Social Learning Theory,* Prentice-Hall, Oxford, UK.

Bitetti, L. (2019), Activate business model learning through flipped classroom and backward design, *Journal of Business Models*, Vol. 7, No. 3, pp. 100-110.

Blank, S. (2013), Why the lean start-up changes everything, *Harvard Business Review*, Vol. 91, No. 5, pp. 64-73.

De Reuver, M., Cligge, M. & Haaker, T. (2019), Online courses on business model innovation for practitioners in SMEs, *Journal of Business Models,* Vol. 7, No. 3, pp. 12-23.

Henike, T. & Hölzle, K. (2019), Cognitive exploration strategies and collective decision-making in entrepreneurial business modelling, *Journal of Business Models*, Vol. 7, No. 3, pp. 67-76.

Holm, A., Bidmon, C. M., Henike, T., Bosbach, K.E. & Baden-Fuller, C. (2019), Teaching business models: Introduction to the special issue, *Journal of Business Models*, Vol. 7, No. 3, pp. 1-11.

Jonker, J. & Faber, N. (2019), Insights from teaching sustainable business models using a MOOC and a hackathon, *Journal of Business Models,* Vol. 7, No. 3, pp. 57-66.

Kolb, D. (1984), *Experiential Learning: Experience as the Source of Learning and Development*, Prentice Hall, Englewood Cliffs, NJ.

Lehmann, C. & Bidmon, C. M. (2021), On the back of a beer coaster – simple estimates for costs and revenues in business modelling, *Journal of Business Models,* THIS ISSUE

Maffei, A. & Boffa, E. (2021), Invention to innovation: Teaching business models to manufacturing researchers, *Journal of Business Models,* THIS ISSUE

Margolina, A. & Bohnsack, R. (2019), Teaching business models via blended-Learning, *Journal of Business Models,* Vol. 7, No. 3, pp. 24-37.

Massiera, P. (2021), Teaching business models through student consulting projects, *Journal of Business Models,* THIS ISSUE

Mosig, T., Mosleh, W.S., & Lehmann, C. (2021), Designing smart cities: A participatory approach to business model teaching, *Journal of Business Models,* THIS ISSUE

Müller, C., Poandl, E. M. & Glinik, M. (2019), Developing a viable business model for start-ups at the Gruendungsgarage, *Journal of Business Models,* Vol. 7, No. 3, pp. 47-56.

Osterwalder, A. & Pigneur, Y. (2010), *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*, Wiley, Hoboken, NJ.

Rumble, R. (2019), The startup jungle: Four-dimensional business modelling, *Journal of Business Models,* Vol. 7, No. 3, pp. 119-130.

Sanders, E.B.-N. & Stappers, P.J. (2008), Co-creation and the new landscapes of design, *CoDesign*, Vol. 4, No. 1, pp. 5–18.

Sort, J. C. & Brøndum, K. (2021), Experiences from a decade: A universal approach to business model teaching, *Journal of Business Models,* THIS ISSUE

Sort, J. C. & Holst, P. M. (2019), Using digital gamification in the context of business models, *Journal of Business Models,* Vol. 7, No. 3, pp. 38-46.

Stenkjær, K., Brøndum, K., Sort, J.C. & Lund, M. (2021) Developing impactful entrepreneurial teaching using a business model framework*, Journal of Business Models,* THIS ISSUE

Spaniol, M., Bidmon, C. M., Holm, A. B. & Rohrbeck, R. (2019), Five strategic foresight tools to enhance business model innovation teaching, *Journal of Business Models,* Vol. 7, No. 3, pp. 77-88.

Stadtländer, M., Schoormann, T. & Knackstedt, R. (2021), Teaching sustainable business models - a modeling-driven approach*, Journal of Business Models,* THIS ISSUE

Szopinski, D. (2019), Squaring the circle: Business model teaching in large classroom settings, *Journal of Business Models,* Vol. 7, No. 3, pp. 89-99.

Thomsen, P., Sort, J. C. & Brøndum, K. (2019), Booster cards: A practical tool for unlocking business model innovation, *Journal of Business Models*, Vol. 7, No. 3, pp. 131-142.

Veine, S., Kalvig Anderson, M., Haugland Andersen, N., Espenes, T.C., Bredesen Søyland, T., Wallin, P. & Reams, J. (2020), Reflection as a core student learning activity in higher education - Insights from nearly two decades of academic development, *International Journal for Academic Development*, Vol. 25, No. 2, pp. 147-161.

Yrjölä, M. (2019), Teaching value propositions as part of the business model, *Journal of Business Models,* Vol. 7, No. 3, pp. 111-118.

JOBM
Journal of Business Models

On the Back of A Beer Coaster – Simple Estimates for Costs and Revenues in Business Modelling

Christian Lehmann[1]
Christina M. Bidmon[2]

1 Department of Economics and Informatics, Hanover University of Applied Sciences, Hanover, Germany, christian.lehmann@hs-hannover.de
2 Copernicus Institute of Sustainable Development, Utrecht University, c.m.bidmon@uu.nl

Abstract

Validating the profit formula of a business idea is a difficult task for students and entrepreneurs alike. With the "Business Coaster" we present a simple and playful tool that helps students to get in touch with numbers and design the value capture side of a business model.

"A few measures that are directly related to the basic business model are better than a plethora of measures that produce a lack of focus and confusion about what is important and what is not" (Pfeffer and Sutton, 1999: 260).

Introduction

How a firm monetises the value it creates is one of the essential questions a business model needs to answer (Baden-Fuller and Mangematin, 2013: 419). Yet questions about the "profit formula" (Johnson et al., 2008: 62) behind a business idea are often the hardest to answer for students and entrepreneurs alike.

Alongside value creation and value delivery, value capture constitutes a key element in most business model definitions (e.g., Teece, 2010: 173; Baden-Fuller and Mangematin, 2013: 421). Accordingly, frameworks and canvases that aim at depicting the underlying value architecture of a business model often require information on costs and revenues (Trimi and

Keywords: Business model, financial planning, teaching entrepreneurship

Please cite this paper as: Lehmann, C. and Bidmon, C. M. (2021), On the Back of A Beer Coaster – Simple Estimates for Costs and Revenues in Business Modelling, Vol. 9, No. 3, pp. 8-16

Acknowledgements: We would like to thank two anonymous reviewers for their excellent comments and suggestions.

DOI: https://doi.org/10.5278/jbm.v9i3.2801
ISSN 2246-2465

Berbegal-Mirabent, 2012). For example, in the widely used Business Model Canvas (BMC) "cost structure" and "revenue streams" are two of the nine building blocks (Osterwalder and Pigneur, 2009: 14). Yet when teaching business models, the focus often lies on ideating the value proposition or brainstorming about potential customer groups, not on financial planning. In our classes, we have found that students can find the transition from the "upper part" of the BMC to the "bottom part" with costs and revenues quite challenging. Bound to the semantic structures of the canvas, they struggle with the switch from qualitative to quantitative blocks. Often, they fill in a few words on revenue and cost items, but hesitate to quantify them. If they put numbers, these numbers differ substantially in their quality, address different units, or refer to different points in time. Thus, the financial viability of the new or improved business model often remains unclear.

Whereas tools such as the BMC or the Lean Canvas arguably do not aim to develop fully-fledged business cases, a neglect of the financial part of teaching business models is problematic for several reasons. First, the profit formula is one of the central elements of validating any business idea. Alongside desirability (customer pain point) and feasibility (technology-market-fit), the validation of the financial viability is essential and of primary concern to stakeholders. Second, students taking a class on business modelling often expect that they will not only learn how to develop new business ideas, but also how to commercialise and monetise them. In fact, any student leaving the classroom without an idea of how to take the next steps to assess the financial viability of a business model is at risk of judging business modelling to be a "tiger without teeth", i.e. a helpful tool for the ideation stage only.

For teachers, the dilemma lies in finding a compromise between a meaningful, fast introduction to the financial part of a business model and integrating a comprehensive lecture on entrepreneurial finance. Existing tools such as the BMC, or extensions of the BMC with a financial focus (for an example based on 15 KPIs cf. Jackson et al., 2015) mainly offer templates to quickly establish the major costs and revenues underlying a business model. At the other end of the spectrum are comprehensive tools for running calculations such as profit-loss-statements (P&L), cash-flow analyses, and business plans. What is missing is something in between: A tool with the same level of abstraction and playfulness as the BMC that still allows some basic estimates of major cost and revenue drivers to be carried out. To fill this gap, we developed a simplified profit and loss estimation, the *Business Coaster*. It can literally be put on the back of a beer coaster (hence the name) and constitutes an easy, engaging way for students to validate the financial viability of their business idea. In the following, we explain the pedagogic rationale behind the Business Coaster, illustrate its application, and give some practical advice for teachers on how to use it.

Introducing the Business Coaster

Pedagogic rationale

The idea of the Business Coaster emerged from three, interrelated challenges we observed while teaching business modelling and entrepreneurship to undergraduates in engineering and economics for more than five years. First, students lack orientation on how to start generating estimates on costs and revenues. Usually, they have no prior experience in setting prices, negotiating commissions, or employing people. Loose guiding questions such as "*What are the major cost drivers of the business?*" provided by frameworks such as the BMC are of only limited help and do not provide an explicit link between revenues and costs that allows their interaction to be assessed (Jackson et al., 2015: 103). As a result, even students with some background in entrepreneurial finance can have a hard time figuring out how to start validating the financial viability of their idea. Second, the switch to numbers can lead to anxiety and stress in students. Being asked to form hypotheses and make assumptions can create the sensation of having to make choices in spite of the many uncertainties about other variables in the business model. Such decisional conflict can be uncomfortable, especially when facing time constraints, (e.g. Pratt and Huettel, 2008). In our classes, we often observed defensive avoidance ("*I cannot fill that in.*") or procrastination ("*I cannot fill that in - yet*") when students were tasked to start working on the bottom part of the BMC.

Third, we observed that it is hard for students to grasp what level of detail is necessary for initial calculations.

Often, they lack pragmatism and do not dare to make a few informed assumptions on core variables. Obviously, it is an overwhelming task to generate forecasts on future financing and cash flow requirements, long-term profit prospects, demands of operating lead times, marketing expenses, and pricing. But to come up with a very first validation of a business case most of this is not needed. A few point estimates are sufficient to get an initial feeling for the financial viability of an idea.

The pedagogic rationale behind developing the Business Coaster was to counteract this triple challenge of working with numbers, and find a simple and even engaging way to validate the profit formula of a business model. Specifically, the tool was developed to provide students with (i) a simple starting point for how to proceed with validating costs and revenues, (ii) a playful, non-threatening way to work with numbers, and (iii) orientation on the essential first estimates to be included. In the following, we introduce the Business Coaster's structure and illustrate its application with an example.

The Business Coaster

Financially, every business idea has to answer two questions. The first is about profitability: "*Is this idea worth pursuing?*" A new idea should only be realised if the supposed revenues exceed the planned costs. A *profit formula* (Johnson et al., 2008: 62) contains a revenue model including pricing, the cost structure of the business, and the margin. The second question is: "*Can I afford to realise the idea?*" This question addresses the issue of investment needs and liquidity. An idea might be profitable but one might run out of cash before enjoying its profits due to high upfront investments or running costs before break-even. Profitability clearly is a necessary condition for a start-up, liquidity is a sufficient condition. Therefore, initial calculations on the viability of an idea should focus on profitability.

The most well-established instrument to illustrate profitability is a profit-loss statement (or P&L). A P&L presents the revenues and costs incurred during a specific period. We reduced the traditional P&L to 11 lines representing the core values of a business. To display this reduced P&L, we wanted to find a simple and playful format that fostered creativity and facilitated

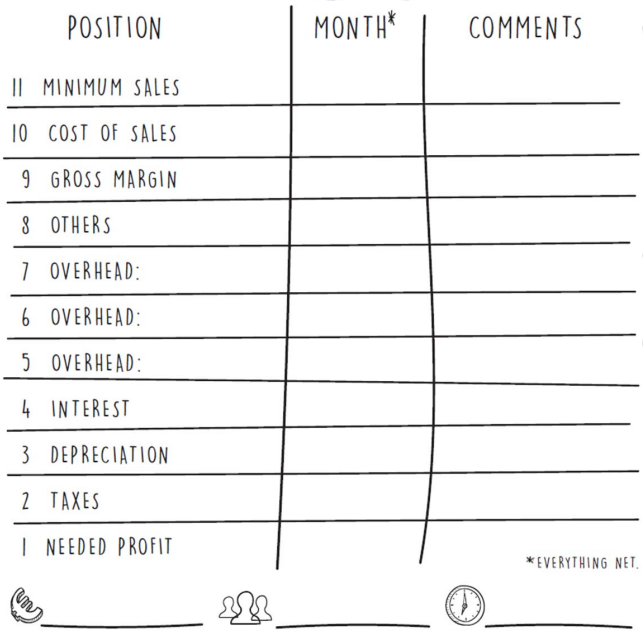


Figure 1: The Business Coaster

"leaving the comfort of the usual" (Van der Meij et al., 2017: 58). We also wanted to avoid the impression that initial calculations require a lot of effort and extensive Excel spreadsheets. Ultimately, we decided to put the reduced P&L on a beer coaster, indicating that first calculations can literally be run on the back of a coaster. The "Business Coaster" is depicted in Figure 1.

The simplified P&L includes eleven items, ranging from minimum sales (#11) at the top to profits (#1) at the bottom. It asks students to provide numbers on a monthly basis and includes a column for comments, in which they are encouraged to note down the assumptions that underlie their estimates. The three icons at the very bottom represent the average price of a product, the number of customers needed, and the necessary amount of working time. They allow an initial and intuitive judgement of a business case's financial viability to be made.

Calculations on the Business Coaster can be approached either top-down, working from sales to profits, or bottom-up, working from profits to sales. In class, we experienced that students were often overwhelmed when starting a P&L from the top by estimating sales. Reverse planning proved to be more effective. The Business Coaster works best as discovery-driven planning: *"Instead of starting with estimates of revenues*

and working down the income statement to derive profits, you start at the bottom line with profits […]. You then work your plan up to what the necessary revenues are" (McGrath and MacMillan, 1999: 5).

We urge students to start their calculation with an *average month in the second business year.* A monthly base is chosen instead of an annual perspective because it is closer to real life and corresponds with estimates that students perform in their personal life. The application of an average month further helps to reduce seasonality effects. The second year is chosen, because high expenditures to manage market entry and lower initial income may blur the financials of the first year. In the following, we explain the Business Coaster with the help of a one-product start-up.

Application example: The Colibry case

Cristina, an Italian beauty expert, invented the Colibry, a small and hand-driven hair-removal device. It uses the ancient technique of threading and makes it applicable for everybody through a safe and ergonomic design. When accurately applied, threading is far more effective than other techniques and causes only little harm to the skin. A typical customer for the Colibry is a woman in her mid-twenties, who cares about both her appearance and health. Cristina, who works as aesthetician, will get help from two friends, Nadja (BA in economics) and Peter (experienced mechanic).

Cristina found a producer nearby. She assumes to purchase an initial set of 1 000 pieces. Cristina and her friends will assemble the final product in their studio by adding threads and packaging it nicely. Cristina forecasts that the purchasing costs for the Colibry, the threads, a lovely bag, and a printed manual will be 20.00 Euros (net) per unit. This is half of the selling price of 48.00 Euros (40.00 Euros net with VAT of 20 percent). Cristina also assumes that the easiest way to start a business is to sell directly to customers via an own website (colibry.it). Customers pay upfront. Cristina does the invoicing and organises the logistics. For each order, 30 minutes will be required for assembling and order processing. To start the business, a website is needed, a trademark has to be registered, and a designer will have to provide a prototype and a CAD file for the producer. Overall, Cristina plans an investment of 24 000 Euros prior to starting the business. She also assumes that the average working life of the investment is four years. The money comes from Cristina and her grandmother. External funding is not needed.

Cristina applies the Business Coaster to calculate the needed minimum sales assuming regular running expenses and a profit sufficient to cover her living costs. Because she calculates as an entrepreneur, every number is stated net, without VAT. Figure 2 depicts a possible calculation for the Colibry case.

Starting with line #1 Cristina takes a profit of zero (break-even point). Eventually, she adds her own costs of living (2 000 Euros) and the expected expenses for social security (1 000 Euros). The resulting 3 000 Euros in line #1 represents the (needed) profit after taxes. To calculate taxes in line #2, the assumed tax ratio of 33% is added to the profit after taxes, resulting in income taxes of 1 500 Euros. The value for the depreciation (or amortisation in case of intangible goods) in line #3 is calculated by dividing the upfront investments of 24 000 Euros by their average working life of four years (48 months). Cristina does not pay any interest (line #4).

The three most important overheads (personnel, marketing, and rent) are added in lines #5, #6, and #7. Cristina plans to rent a small studio (rent and service charges of 2 000 Euros per month). Marketing expenditures are about 2 500 Euros per month, mainly for online advertising. As Nadja and Peter will be employed full-time, Cristina has negotiated a wage of 2 500 Euros for each of them, adding the employer's cost of

POSITION	MONTH*	COMMENTS
11 MINIMUM SALES	42 000	sales to reach needed profit
10 COST OF SALES (50%)	21 000	parts, packaging, logistics
9 GROSS MARGIN	21 000	sum of everything below
8 OTHERS	4 000	33% of (5+6+7)
7 OVERHEAD: personnel	7 500	wages and social security (2 pers.)
6 OVERHEAD: marketing	2 500	ads, social media
5 OVERHEAD: rent	2 000	studio, office, stock
4 INTEREST	0	savings
3 DEPRECIATION	500	investments/Ø working life
2 TAXES	1 500	tax ratio of 33%
1 NEEDED PROFIT	3 000	living expenses and social security

*EVERYTHING NET.

40.00 (net) 42/day 21h/day

Figure 2: Solution for the Colibry case

social security of 50%. All other overheads (line #8) are stated as a percentage of the three most important fixed costs (e.g. communication or insurance). Cristina assumes this to be 33 percent. Eventually, this allows for calculating the gross margin in line #9. It comes to 21 000 Euros per month (net).

Next, Cristina needs to calculate her variable costs in line #10. These might be external costs of production and/or cost of sales. As the Colibry is sold directly via her own website, there are no sales commissions but costs of production are assumed to be 20.00 Euros for each Colibry (device, threads, bag, and manual). To obtain the gross margin (in percent), the variable costs are divided by the net selling price. With a gross profit margin of 50 percent and the gross margin of 21 000 Euros in line #9 Cristina eventually calculates her minimum sales (line #11). A monthly turnover of 42 000 Euros (net) is needed to cover all operational costs and to yield a profit to finance Cristina's living expenses.

With average sales of 42 000 Euros per month (net), Cristina gets an initial indication of the financial viability of her idea. She can now take this viability check further. Assuming 25 working days per month, she will have to sell 42 Colibries per working day. To sell those 42 pieces, Cristina and her friends have a workload of 21 hours or 7h per person and working day. Assuming that order processing realistically only accounts for one part of the entire workload and the team also has to spend time on marketing and administration, Cristina and her friends would probably have to work far more than eight hours per day.

The Business Coaster ultimately does not judge the financial viability of the Colibry case, but it helps Cristina to get initial insights about it and pose questions to verify her assumptions such as (1) "*Is it realistic to sell 42 Colibries per day in the nearer future?*", or (2) "*Is it feasible to spend significantly more than eight hours every working day?*" If Cristina responds positively to those questions, she might proceed.

Key Insights and Discussion

We see the core benefit of the Business Coaster in the fact that students get a better and more realistic idea of the financial viability of a business model. The simplified P&L statement helps students to make implicit assumptions explicit, and to assess their consequences. In class, we experienced that even novices in entrepreneurship instantly became curious and were not afraid to perform initial calculations on daily sales and the workload needed. Of course, there are also limitations to the Business Coaster. In the following, we reflect on when to use it and how to deal with some pitfalls and challenges inherent in business modelling.

When to use the Business Coaster

Business modelling proceeds in various stages. Canvases are instruments for the first iterations, business plans evolve prior to market engagement. As we judge the Business Coaster to be a good companion of a canvas, it serves best for the first or early iterations of a business model. At that stage, it makes most sense to apply it in its simplest form: no profit (break-even), no taxes and no investment. In other words, the lines on taxes, depreciation and interest (#2-4) may be ignored at first. Lines #5-11 keep the focus on the operational profitability (or earnings before interest, taxes, depreciation, and amortisation, short: EBITDA). They yield the numbers that are essential for initial presentations of the business model to outside parties.

How to deal with iterations and changing assumptions

The development of a business model is an iterative trial-and-error process (Chesbrough, 2010; Sosna et al., 2010). Cristina may figure out that the variable costs increase when she sells via Amazon. She will get a better access to the market, but she has to pay for it (for example, as of 2019, Amazon charges 15 percent per sale in Western Europe). Insights on customers' willingness to pay may lead to changes in the sales price of the Colibry. Or Cristina might decide to outsource the assembly of the Colibry to the producer, paying more whilst being relieved from time-consuming and low-skilled work. In short, there are many scenarios that would change the initial calculation on the Business Coaster. Rather than a drawback, we consider it an enormous advantage that students can use the Business Coaster to ascertain the financial consequences of different assumptions based on an initial calculation. In class, we urge students to document the most critical assumptions they make. Mostly, those are (1) prices related to minimum sales, (2) variable costs,

Line	Variable	Value	Rule of thumb
10	Cost of sales	0%-5% 15% 50%	Take up to 5% for digital products you sell by yourself. Take 15 % as sales commission if a third party brings you a client. Take 50% for products when you do not know yet how much production will cost. Also take 50% when you sell in another party's store.
8	Others (overhead)	33%	Take 33% of additional overheads (e.g. insurance, maintenance, communication).
4	Interest	10%	Start-ups are risky, so plan for a 10% interest rate.
2	Taxes	33%	Calculate 33% of your profit for income taxes.

Table 1: Rules of thumb for different variables on the Business Coaster

notably purchase prices and sales commissions; and (3) wages or marketing costs. Students should then verify their assumptions and adjust them, if need be. Table 1 depicts some rules of thumb we developed during our practice with the Business Coaster, which might be helpful for teachers and facilitators.

If the curriculum allows it, the introduction of the Business Coaster can also be coupled to some more explanations on how to generate estimates. For example, we found it helpful to introduce students to top-down and bottom-up ways of estimating (from a population to a sample, or vice versa), combining different estimates via weighted averages, or creating simple rating systems that allow qualitative information to be transferred into quantitative information (e.g., "strong increase"=50%, and so on).

How to deal with complex business models

The Colibry case is an example for a "simple" business model since it is a one-product business with direct sales and the product is not very complex. Other business models might be more sophisticated. For example, Cristina might sell a slightly different product for men. She might also begin to generate revenues from ads on her website or start to sell via wholesalers. Complex business models with different revenue streams are harder to map out on the Business Coaster. To consider a second product or a second sales channel, students might use the second column, normally reserved for comments. Generally, we recommend students to initially focus on the *central mechanism to capture value.* The first version of the Business Coaster should depict the core profit formula. Subsequently, one or two extensions such as a second revenue stream, another sales channel, or different product categories can be considered. For businesses with a wider range of products such as stores or restaurants, prices might be aggregated and stated as average expenditure per customer or as customer value (per month). Customer value may also replace the price for consumables or repurchased goods. In a business to business-context with much higher volumes per customer and order (e.g. 1, 000 Colibries per drugstore) the average price per order should be stated. For platform businesses, one may state the different streams of income (e.g. subscription fees and advertising revenues) in different columns.

Limits of applying the Business Coaster

The Business Coaster helps to answer the first question about a business model's profitability: *"Is my idea worth pursuing?"* But a profitable business idea is not necessarily a good one. If upfront investments demand high funding, an idea may be too costly to be realised. The issue of liquidity clearly is the second major point in assessing a venture's financial viability. The coaster is not suited to do this; it only provides insights about profitability.

The Business Coaster also does not replace a complete P&L statement or a more comprehensive calculation of expenses and costs such as claims or liabilities. Furthermore, the monthly view as a point in time calculation does not allow the mapping of changes over time, such as the development of stocks or seasonal effects. To encounter all expenditures and their changes over time, a more complex spreadsheet is needed.

It may also be misleading to apply the coaster to businesses seeking to become standard in their niche. Those businesses (e. g. Amazon for online shopping or Uber for individual transportation) are not profitable in the short- and mid-term, but aim to increase their customer base and market share in the long run.

Conclusion

We conceive entrepreneurship to be the ability to turn financially viable ideas into action. The business model is at the heart of this process. It describes the process of value creation, delivery, and capture. Canvases provide immense help in early stages of the business modelling process, but they have a structural problem with numbers due to their descriptive rather than analytical nature (Knott, 2006). Integrating simplified elements of financial planning, such as the Business Coaster, in business model teaching enables students to check the financial viability of their idea. Combined with discovery-driven planning (or bottom-up planning) the simplified P&L statement focuses on a few, but meaningful numbers (e.g. sales per day). In a playful manner, a tool like the Business Coaster helps students to better understand the profit formula and the financial mechanisms behind a business model. Easily combined with common frameworks such as the BMC, the Business Coaster is a powerful tool to facilitate the switch from words to numbers. It provides data for early pitch decks and helps students to take the first steps in the direction of a more comprehensive business plan.

Overall, we found that the Business Coaster is very useful to calculate operating profits for business model ideas at different points in time (or development stages). Its shape and symbolic simplicity demonstrably help students in entrepreneurship classes to get an initial sense of the financial viability of their ideas. Furthermore, the process of generating estimates for the eleven items on the Business Coaster sensitises them to the critical assumptions and potential scenarios of capturing value from a business model.

References

Baden-Fuller, C., & Mangematin, V. (2013), Business models: A challenging agenda, *Strategic Organization,* Vol. 11, No. 4, pp. 418-427.

Chesbrough, H. (2010), Business model innovation: Opportunities and barriers, *Long Range Planning,* Vol. 43, No. 2-3, pp. 354–363.

Jackson, W. T., Scott, D. J., & Schwagler, N. (2015), Using the business model canvas as a methods approach to teaching entrepreneurial finance, *Journal of Entrepreneurship Education,* Vol. 18, No. 2, pp. 99 -111.

Johnson, M., Christensen, C., & Kagermann, H. (2008), Reinventing your business model, *Harvard Business Review,* Vol. 86, No. 12, pp. 57-68.

Knott, P. (2006), A typology of strategy tool applications, *Management Decision*, Vol. 44, No. 8, pp. 1090-1105.

McGrath, R., & MacMillan I. C. (1999), *Discovery Driven Planning: Turning Conventional Planning on its Head,* Deep-Canyon, available at: https://www.fast-bridge.net/wp-content/uploads/resources/Discovery_Driven_Planning.pdf (accessed 2019-11-08).

Osterwalder, A., & Pigneur, Y. (2010), *Business model generation: a handbook for visionaries, game changers, and challengers,* John Wiley & Sons, Hoboken, NJ.

Pfeffer, J., & Sutton, R. I. (1999), *The knowing-doing gap: How smart companies turn knowledge into action,* Harvard Business Press, Boston, MA.

Pratt, M. L., & Huettel, S. A. (2008), Risky business: The neuroeconomics of decision making under uncertainty, *Nature Neuroscience*, Vol. 11, No. 4, pp. 398-403.

Sosna, M., Trevinyo-Rodríguez, R.N., & Velamuri, S.R. (2010), Business Model Innovation through Trial-and-Error Learning: The Naturhouse Case, *Long Range Planning*, Vol. 43, No. 2-3, pp. 383-407.

Teece, D. J. (2010), Business models, business strategy and innovation, *Long Range Planning,* Vol. 43, No. 2-3, pp.172-194.

Trimi, S., & Berbegal-Mirabent, J. (2012), Business model innovation in entrepreneurship, *International Entrepreneurship and Management Journal,* Vol. 8, No. 4, pp. 449-465.

Van der Meij, M., Broerse, J. E. W. & Kupper, F. (2017), Conceptualizing playfulness for reflection processes in responsible research and innovation contexts: a narrative literature review, *Journal of Responsible Innovation,* Vol. 4, No. 1, pp. 43-63.

About the Authors

Christian Lehmann is associate professor for entrepreneurship at Hanover University of Applied Sciences. He also manages NEXSTER, the entrepreneurship centre of his university. After graduating from Free University of Berlin he worked in some start-ups and as consultant. He holds a PhD from the University of Bayreuth. Christian's research interests are business model innovation, teaching entrepreneurship, and social businesses.

Christina M. Bidmon is a postdoctoral researcher at Católica Lisbon School of Business and Economics, where she works in the Business Model Design Lab. Her research interests include the emergence of novelty in incumbent organizations, sustainability-driven innovation, and business modelling. Christina holds a PhD from Aarhus School of Business and Social Sciences, Denmark.

Journal of Business Models (2021), Vol. 9, No. 3, pp. 17-24

JOBM
Journal of Business Models

From Invention to Innovation: Teaching Business Models to Manufacturing Researchers

Antonio Maffei[1,*], Eleonora Boffa[1]

Abstract

The competence and skills required to bring technological advancements to the market are increasingly perceived as a key element in the engineering researchers' toolbox. Nevertheless, business modelling is rarely taught in technical engineering programs. This paper presents the design and implementation of a course called "Business Driven Production Development" for manufacturing PhD students at KTH Royal Institute of Technology in Stockholm, Sweden.

Introduction

When describing the *innovation process* as the successful *application* of an *invention,* a common assumption is that the role of engineers is one of mere inventors. Engineering work is perceived as a short-term oriented process that translates requirement specifications into new designs. Accordingly, most engineering programs include tools and methods that equip students to solve a clearly defined problem. Although partially valid, this conception must be expanded to account for the important role that engineers have in multidisciplinary research efforts that solve broader challenges such as sustainable development or system design.

This work considers the three possible application patterns of new technology in the domain of production technology: The first pattern is a *pull* mechanism based on current problems emerging in industrial environments. This mechanism is named "*invention loop*" as the focus of the researcher is on solving the given problem in order to improve an already existing application. The other two patterns are *push* mechanisms where the focal invention is addressing a specific industry challenge but without an immediate application on current shop floors. The difference between these two patterns lies in the way technology tackles

Keywords: doctoral education, manufacturing, business models.

Please cite this paper as: Maffei, A. and Boffa, E. (2021), From Invention to Innovation: Teaching Business Models to Manufacturing Researchers, Journal of Business Models Vol. 9, No. 3, pp. 17-24

1 Department of Production Engineering. KTH Royal Institute of Technology, Stockholm, Sweden
*corresponding author: maffei@kth.se, +46 8 790 78 71, Brinellvägen 68 – 10044 Stockholm, Sweden

Acknowledgment : The development of this course and related research has been supported by the XPRES initiative for eXcellence in Production RESearch (https://www.kth.se/itm/xpres).

DOI https://doi.org/10.5278/jbm.v9i3.2559

ISSN 2246-2465

the underlying challenge: When the invention is an improvement of existing practices, it is viable to refer to "*incremental innovation loops*". When, instead, the technological solution is completely different from current practices one refers to "*radical innovation loops*" (Ettlie, Bridges and O'keefe, 1984; Dewar and Dutton, 1986). Technical engineering programs are traditionally good at preparing learners for the invention and incremental innovation loop. However, they often fall short of providing a wider picture that can support future engineers in coming up with radical innovation.

Business Model (BM) knowledge is an important element here because it helps to describe and account for the multiple, non-technical elements connected to the application of a technology. As radical innovation usually offers higher potential benefit for industries, it becomes important for higher educational institutions in the technical field to address this educational requirement and provide graduate students with knowledge about the full spectrum how technical results can be applied. Among engineers, especially researchers are in need of such knowledge because agencies and companies that provide funds for research increasingly stress the importance of producing results that serve to tackle societal challenges rather than day to day problems.

In view of the above, the department of production engineering at KTH Royal Institute of Technology in Stockholm (KTH) has taken the initiative, back in 2015, to redesign an old educational unit from 2001 named *Business Driven Production Development*. This course, open to all doctoral students, is based on the modern embodiment of the concept of BM and its pivotal role in the innovation process. The aim of the course is to equip future engineers with the basic knowledge to understand the nature of technical research, and trigger reflection about positioning their interests and contributions accordingly.

Approach

The name of the new educational unit (or course), Business-driven production development, is inspired by *business-driven development:* a meta-methodology for developing IT solutions that directly satisfy business requirements. The principle in business-driven development is to adopt a model-driven approach that starts with business strategy, requirements, and goals to subsequently transform these requirements into IT solutions by aligning the business and IT layers. This allows the IT system to automatically follow the business evolution. This course aims at establishing Business driven production development (BDPD) as a systematic approach to aligning the business layer with the production layer. In the production context, this means designing and deploying manufacturing equipment and processes according to the requirements coming from relevant business areas and not only considering the traditional objective of delivering a functional product. As such, the manufacturing system becomes a strategic asset to pursue sustainable, long-term growth. In practice, this translates into designing a manufacturing strategy through the analysis of all the elements of a firm's BM and their influence on the production requirements. This is then synthetized in specific production solutions that match current and future needs of the firm's internal organization, market, network, and supply chain.

In order to fulfil this purpose the course has been developed using the Constructive Alignment approach (CA) (Biggs and Tang, 2011), around a set of three Intended Learning Outcomes (ILO). At the end of the course, the learners should be able to:

- ILO1. Position technological research activities in either the "invention loop", "incremental innovation loop" or "radical innovation loop" and highlight the character of engineering research as "technology push" or "application pull" effort.
- ILO2. Reflect on the complex nature of BMs and discuss the need to use the correct epistemological approach, positivism vs. interpretivism, for different components.
- ILO3. Reflect on a possible pattern to successful application of the given technology: design a BM that could support such a process by choosing one of the methods suggested in the course.

In Constructive Alignment the verbs suggested in the ILO are an important input to defining suitable Teaching and Learning Activities (TLA) and Assessment Tasks (AT). With reference to the well-known Blooms Taxonomy (Bloom *et al.*, 1956), we aligned ILO, TLA, and AT in the BDPD course. Table 1 summarizes the course design.

ILO	Teaching and Learning Activities	Assessment Task
1	• Lectures based on flipped classroom scheme, • Tutorial and example for the suggested tools, • Group discussions based on relevant literature suggested by the course coordinator and presented by the students.	• Formative: Presentation of one selected piece of literature (one for each student), • Personal essay positioning own work in relation to new knowledge.
2	• Lectures, • Group discussion based on relevant literature suggested by the course coordinator.	• Formative: Group work (whole class): Mind map of main concepts in BMs with indication of preferred research approach.
3	• Group discussion based on relevant literature suggested and presented by the students.	• Scientific paper, possibly to be submitted to a conference, regarding the applicability aspect of own research.

Table 1: Summary of BDPD Course design

The achievement of the ILOs requires students to work in two consecutive phases: (1) acquiring and consolidating specific domain knowledge, and (2) reflecting on the own work from this new perspective. Consequently, the course is structured in two parts: Part 1 provides the theoretical background. It aims at promoting a systematic thinking about BM design that "is of crucial importance to generate viable BMs for new technologies", as shown by experience in (Snihur, Lamine and Wright, 2018, page 9). Part 2 then features practical examples and self-reflection. This is a part where students are asked to construct their knowledge with guidance from the teacher and it is specifically designed for the field of manufacturing.

The following Table 2 summarizes the course's practical implementation:

Part 1 Duration: 2.5 months Reference ILO: ILO1	Total no. of meetings: 4, roughly one every third week. Duration of each meeting: 3 hours Content of the meetings: • Lectures • Student´s presentation of suggested literature (see table 1): also valid as formative assessment • Tutorial • Group discussion on literature Assessment: the positioning essay has two cycles of feedback, firstly done by peers and secondly by course leader
Part 2 Duration: 2.5 months Reference ILO: ILO2 and ILO3	Total no. of meetings: 6, roughly one every second week. Duration of each meeting: 3 hours Content of the meetings: • Lectures based on suggested literature • Group work: drawing of a mind map with main concepts in BMs and the related research approach; also valid as formative assessment • Student´s presentation of identified literature • Group discussion on literature Assessment: the scientific paper has two cycles of feedback, the first done jointly by the students' main supervisor and course leader and the second as a result of a submission to a relevant conference in the field.

Table 2: Summary of BDPD Course implementation

With reference to Part 1, there are 4 areas where the students are required to develop new knowledge for establishing BDPD:

1. Innovation as composed by invention and successful application
   a. Incremental vs radical innovation
   b. Sustaining vs disruptive innovation
2. Application of technology as a BM design exercise
3. History, definition, components and current methods to work with BMs
4. BM as a complex concept with unforeseeable results

These areas are addressed in 4 separate, yet related meetings. In all these meetings the most important constructs are presented and discussed with the students using a flipped classroom approach. The learners are required to read literature before class. Every week, the students read a few suggested papers and write a single-page analysis as input for the discussion. One of the learners is selected to present the literature to the class during the following meeting as a means to start the discussion. The course leader has two roles: (1) contextualizing the discussion with specific short lectures where necessary, and (2) moderating the discussion to ensure all important concepts are covered. The literature list used in this phase is available upon request.

The students "construct" their knowledge by maintaining an active role during the learning process. They are required to present the literature assigned for their peers as well as work with the proposed tool CANVAS (Osterwalder *et al.*, 2010), and the integrated BM framework (Wirtz *et al.*, 2016; Wirtz and Daiser, 2017). As a result of this process, students should be able to place their research within the newly established body of knowledge and document it with an essay that is shared with colleagues and the course leader.

Part 2 of the BDPD course consists of showing the students applications of this new knowledge in their field and stimulate them to reflect on how it impacts their work. This requires a brief introduction to the philosophical approach to scientific studies known as interpretivism, which is executed through the usual flipped classroom scheme based on specifically designed course handouts and lectures. After that, the learners are required to look at existing literature in their field to highlight good and bad examples of how other researchers in their area have dealt with the applicability of research results. The results of such literature reviews are then presented and discussed in class: this allows learners to discuss differences and similarities between applications of different technologies. The identification of such patterns is fundamental for an effective learning process and may lead students to derive their own, personal methodology.

At this point, students are able to produce a personal contribution related to the applicability of their own research results. The final assessment for the course is thus based on an original conference paper in which the student analyzes his/her own specific research results and positions them in an integrated BM context, which discusses how to come from invention to innovation. The paper is reviewed internally and approved by the course responsible, in addition to normal reviews from the scientific committee of the conference selected. The paper is a useful addition to the PhD dissertation of the students and can be included as supplementary reading in the impact section. For this reason, the course often also requires active involvement of the doctoral student´s main supervisor.

Key Insight

The course was run for the first time in 2017 with a group of 6 PhD students. It was not a new course but an update of a course with the same name run at KTH since 2001, which had been based solely on literature analysis and subsequent discussions. This old course focused only on the applicability of research results: Every week, the course responsible had picked a recently published scientific article or book chapter on the process of bringing a novel technology to the market. The sole ILO of this course could be formulated as follows: *Describe and discuss the main trends of current leading edge literature in the domain of application of new production technology.* The experience in this course was relevant to endow the student with background and learning of requirements, as formulated in the ILO presented above. At the time of writing this paper, the new course has been run only once. Yet, student reactions have been positive, especially on the

content learned and the insights acquired for the own research work.

Compared to the final part of the course, the first weeks have been quite slow as the students had to step out of their scientific *comfort zone*: This is probably due to the fact that the learners start to see actual benefits for their work only after they have acquired the main concept in part 1 of the course. It was also observed that technical students often lack the economic background that enables them to contextualize the concepts underpinning BM related knowledge. Experience from this course illustrates the importance of integrating these theoretical foundations in the learning process. The following concepts have emerged as challenging and therefore require attention and deeper explanation from the course leader:

- Relation between capital and labor: Definition and examples of labor- and capital-intensive technologies were an important element to clarify that the concept of a BM is linked to market opportunities while the overall firm strategy must account for the environment. A formal introduction through a lecture that covers the relevant literature is advisable to help students understand the impact of minimum salary and import tariffs on manufacturing firms, as well as the importance of having national suppliers of manufacturing technology.
- Game theory: Zero-sum and non-zero-sum games are useful to illustrate the impact on networks when one actors adopts a new technological solution. This is particularly important when talking about value creation. Manufacturing is central in the value creation chain and often the introduction of innovative technology must be evaluated including strategic elements that go beyond costs and technical feasibility. A lecture introducing game theory and a workshop based on case studies is advisable. Also examples from realistic situations are particularly useful here. Examples can, for instance, be that (a) a superior manufacturing technology is not adopted for strategic reasons; (b) a product mix is not optimized to keep market segments that are not profitable but strategically important, and (c) obvious product design improvement are not implemented due to conflicts between production and other functions inside the firm.
- Incentives and Scarcity. Manufacturing can generate value for a firm beyond the simple product realization, yet students needed deep explanations on how this can be achieved. We learned that it is useful to show examples of how manufacturing technology can bring a sustainable competitive advantage to the focal firm. Furthermore, a series of example where the lack of a specific material or tool or a cheap new source of energy can trigger new BMs seems helpful to stress that value does not only lie in new ideas from design or a new need from marketing, because this seemed to be a bias of many students.

One of the challenges in this course has also been that the doctoral students enrolled in manufacturing programs have very different backgrounds. There were mechanical, electrical, management, and industrial engineers among them. This had an impact on the students' capability to follow the lectures. To prevent an uneven learning process among students we decided to change the planned traditional lectures into more interactive presentations including small verification moments, as well as encouraging the active involvement of the learners. One-minute papers[1] and Q&A sessions have been successfully integrated in the course.

In addition to that, this course represented the first time that many of the students were exposed to qualitative research methods and, in general, to a non-positivistic, or interpretivist, epistemology. One of the biggest challenges encountered was the bias that engineers usually have regarding such approaches (often labeled as *not real science)* and it was important to explain validity and the range of application of the presented methods. A suitable approach is to present situations in which, due to complexity of the object studied, it is impossible to obtain meaningful results with traditional scientific

[1] A one-minute paper is a common technique designed to get rapid feedback on whether the teacher´s main idea is correctly perceived by the students. In the basic format, students have 60 seconds to briefly write down on paper anonymous responses to provided questions that reflect a certain aspect of the today´s lecture. For instance, students may be asked to highlight the most important points learned during that lecture. The teacher collects the responses and assesses them.

method or engineering design processes. In this course, due to the background of the learners, examples include different perceptions of manufacturing related concepts such as quality, flexibility, industry 4.0, or manufacturing sustainability. Discussing these helped the students to appreciate how an agreement in these fields emerged, or is emerging through a complex process of assimilating different perspectives, debunking biases and establishing conventions. Other examples include lack of application of superior production technology due to "non-rational" reasons: lobbying, unbalanced bargaining power, loyalty to customer current requirement, or lack of information and competences.

Conclusion

Courses such as ours are filling a very relevant gap in the education of manufacturing engineers: A lack of awareness for the features and mechanics of the innovation process. This gap is common to many other applied research fields where the main focus is on the invention but not on how to bring it to the market. The course blueprint and the lesson learned can thus be a basis to introduce similar educational units in technical curricula. While part 1 of the course could rather easily be adapted to a different audience, part 2 would need to be tailored to the specific subject at hand.

Overall, students' feedback and teacher observations clearly point out that the course is received favorably and deemed an important complement to their education by students. For instance, two students seek to further develop the contribution they produced in the course and include it in their PhD. Particularly appreciated by all students was the presentation of research methodologies not traditionally included in the engineering research education. The participants agreed that it was a valuable addition to their skill set.

Finally, the feedback indicates that the major contribution to the knowledge of the learners after this course is an increased capability to critically appraise the engineering problem: The course triggered students to consider new creative approaches that are based on applicable and quantifiable reasoning, thus enhancing their understanding of the innovation process.

References

Biggs, J. and Tang, C. (2011) *Teaching for Quality Learning at University*. Open university press.

Bloom, B. S. *et al.* (1956) *Taxonomy of educational objectives: Handbook I: Cognitive domain.* 19th edn. New York: David McKay.

Dewar, R. D. and Dutton, J. E. (1986) 'The Adoption of Radical and Incremental Innovations : An Empirical Analysis Author', *Management science*, 32(11), pp. 1422–1433.

Ettlie, J. E., Bridges, W. P. and O'keefe, R. D. (1984) 'Organization Strategy and Structural Differences for Radical versus Incremental Innovation', *Management science*, 30(6), pp. 682–695.

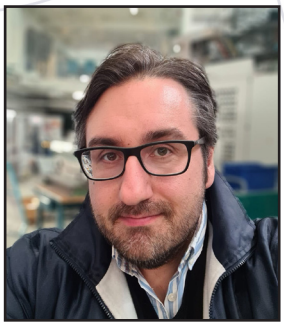
Osterwalder, A. *et al.* (2010) *Business Model Generation: a handbook for visionaries, game changer and challengers*. Wiley.

Snihur, Y., Lamine, W. and Wright, M. (2018) 'Educating engineers to develop new business models : Exploiting entrepreneurial opportunities in technology-based firms', *Technological Forecasting & Social Change*. Elsevier, 164, p. 119518. doi: 10.1016/j.techfore.2018.11.011.

Wirtz, B. W. *et al.* (2016) 'Business Models : Origin , Development and Future Research Perspectives', *Long Range Planning*, 49(1), pp. 36–54. doi: 10.1016/j.lrp.2015.04.001.

Wirtz, B. W. and Daiser, P. (2017) 'Business Model Innovation : An Integrative Conceptual Framework', *Journal of Business Models*, 5(1), pp. 14–34.

About the Authors



Antonio Maffei is an Associate Professor at the department of Production Engineering in KTH – The Royal institute for technology since 2019. His research interest includes Business Models for advanced automation technology, assembly technology and engineering education. He is a docent in Production Systems and Head of the research group called Digital Smart Production.

Eleonora Boffa is a doctoral student in the department of Production Engineering at KTH – The Royal institute for technology since 2018. Her research interest is Business Models within the manufacturing domain. She studied at Politecnico in Turin and took her bachelor's and master's degree in Management Engineering, 2014 and 2017 respectively.

JOBM
Journal of Business Models

Teaching Business Models Through Student Consulting Projects

Philippe Massiera[1]

Abstract

Purpose: This article aims to share practical insights regarding the changes implemented between 2016 and 2018 in a consulting programme implemented in a French business school that involves 200 to 250 bachelor's students on a yearly basis. For five weeks, students work as consultants assisting up to 40 local entrepreneurs with the objective to strengthen the coherence and value of their business model.

Design/Methodology/Approach: Single case study

Findings: Experiential approaches to teaching business models remain very demanding in terms of organization and follow-up. Based on our experience, we provide reflections about the pedagogical curriculum, useful tips for the enrolment of entrepreneurs and details about the evaluation process. We also highlight how the introduction of a business model development tool dramatically improved the overall consistency of the consulting project from both the pedagogical and managerial perspectives.

Originality/Value: Existing literature on consulting programmes predominantly focuses on consulting projects involving small businesses. When implemented with entrepreneurs, such out-of-the-classroom teaching approach is a fruitful but demanding avenue. By sharing our experiences, we expect to document helpful recommendations which could contribute to widen its adoption.

Keywords: Entrepreneurship education, Business model, Student consulting projects, Business Model development tool.

Please cite this paper as: Massiera, P. (2021), Teaching Business Models Through Student Consulting Projects, Vol. 9, No. 3, pp. 25-38

1 Université du Québec à Montréal

Acknowledgement: The author would like to thank the two anonymous reviewers as well as the editorial team for their helpful comments and suggestions.

DOI: https://doi.org/10.5278/jbm.v9i3.2580
ISSN 2246-2465

Introduction

In the field of entrepreneurship education, the increasing use of experiential assignments highlights the development of a *"learning by doing"* pedagogy (Kuratko et al., 2015). In contrast to pedagogies dedicated to *"learning to become an entrepreneur"* (e.g., business plan design exercises, simulations or creative projects), which are acknowledged for fostering the acquisition of business-model skills (Gedeon, 2014; Morris, 2014), business model consulting projects are dedicated to raising entrepreneurial attitudes among students (Bechard and Gregoire, 2005; Kenworthy-U'Ren et al., 2006). This out-of-the-classroom teaching approach is a fruitful but demanding avenue that requires better documentation. The existing literature predominantly focuses on consulting projects involving small businesses (Pittaway et al., 2007, Winke et al., 2013), which may explain why this innovative pedagogy is still not more widely implemented with entrepreneurs (Morris, 2014). To contribute to the literature, this article aims to share practical insights regarding the changes implemented between 2016 and 2018 in a consulting programme implemented in a French business school that involves 200 to 250 bachelor's students and up to 40 local entrepreneurs yearly. The paper is organized as follows. We start by presenting the objectives and specificities of the reproductive pedagogical approach, followed by the selection process and the organization of the consulting project. Finally, we share some reflections regarding its application and describe the main pitfalls, learning outcomes and avenues for improvement.

Pedagogical Approach

Context and objectives

Regularly ranked among the best French business schools in entrepreneurship, EDC Paris has nurtured a unique entrepreneurial DNA as evidence by 15 to 20% of the students creating their own companies (or taking over a family business) before or immediately after completing their master's degree. If the school primarily targets potential entrepreneurs and future managers (Kirby, 2004), the pedagogical curriculum is distinguished by the importance given to experiential learning and the emphasis given to the entrepreneurial phenomena. The highlight of this entrepreneurial culture is the implementation of a business model consulting project (Bechard and Gregoire, 2005; Kenworthy-U'Ren et al., 2006). Once a year, for five weeks at the end of their second year of the undergraduate programme (BSc/BA), 200 to 250 students work as consultants assisting local entrepreneurs with the objective to strengthen the coherence and value of their business model (Fletcher, 2018). Implemented *pro bono*, these consulting projects can be defined as a "*service-learning*" oriented pedagogy (Samwel Mwasalwiba, 2010) as they aim to respond *"to community-identified needs and opportunities"* (Kenworthy-U'Ren et al., 2006, p. 121). From a pedagogical perspective, this experiential assignment is primarily dedicated to raising an entrepreneurial attitude among the students and allowing the students to use their knowledge and skills related to the Business Model concept in real cases.

Scope of the consulting project

During the consulting project, students are placed in a situation in which they compare their ideas, thoughts and analyses with those of local entrepreneurs without the need to be involved in the entrepreneurial process. The knowledge and skills acquired by the undergraduate students can be valuable as they provide a more structured and academic approach to business problems than entrepreneurs (Heriot et al., 2008). The consulting projects specifically target entrepreneurs during the "integration phase" of their creation process (Frankenberger et al., 2013). This period effectively offers a perfect match between the entrepreneurs' expectations and the pedagogical objective, which is to allow students to use the knowledge, methods and tools they learned in their first two years of school. On the one hand, entrepreneurs must develop a business model that specifies all relevant aspects of their project in a holistic way to communicate and analyse the coherence of the strategic choices and economic sustainability of their projects. However, many entrepreneurs tend to underestimate the problems associated with the need for completeness and coherence, which frequently entails the overall legitimacy of the entrepreneurial project (Kuratko et al., 2017; Malmström, 2017; Shafer et al., 2005). On the other hand, students assist local entrepreneurs by identifying and addressing possible missing information or flawed assumptions that could undermine the overall credibility of the entrepreneurial project. However, the consulting project is not

Entrepreneurial process	IDEATION PHASE		INTEGRATION PHASE		
Consulting project audience	Out of scope		Scope of consulting project		Out of scope
Main objectives	Generating and selecting creative ideas regarding how to innovate the current business model		Developing a complete and consistent business model that holistically specifies all relevant aspects		Detailed formalization of the business plan
Entrepreneurs' main interests	Facilitation of the emergence of the idea	Selection of a business opportunity	Validation of the overall coherence of the business model	Validation of the overall viability of the project	Formalization of the industrial, marketing or financing strategy Validation of the tax strategy

Table 1: Scope of the consulting project

tailored to addressing the needs of entrepreneurs during the ideation phase or the later stage of the integration phase (described in the table below). The "learning by practice" approach adopted by the consulting project has limited value and interest during the ideation phase when entrepreneurs are still in a reflexive state attempting to identify a business opportunity by sorting through the multitude of ideas and projects they have contemplated. Consequently, students face original problems that are not defined a priori, leading to an endless display of options. At the opposite end of the continuum, the project does not target entrepreneurs who are already very advanced in the creation process because their expectations can often lead to a level of expertise that exceeds the knowledge and skills of undergraduate students at the end of their two-year programme.

Preliminary knowledge and business model development tool

Prior to the consulting project, students must complete a mandatory business model course. After being sensitized to the context of venture creation, the students are familiarized with the different stages of the entrepreneurial process and the individual specificities of an entrepreneur (e.g., profile, entrepreneurial orientation, entrepreneurial expertise and effectuation) before learning about the basic strategic and financial skills necessary to be able to properly design and assess a business model (Morris and Liguori, 2016). The curriculum was revamped in 2016 to improve the coordination between the strategic and financial contents. Using the business model "integrated framework" (Morrish et al., 2005), the learning goals and curriculum content were framed within two separate overlapping modules taught by two different teachers (see Table 2 below).

The business model curriculum is designed to prepare students to assume the role of an expert as they will have to manage the entrepreneur through skills and technique transference (Sadler 1998). However, considering the relative youthfulness and lack of consulting expertise of the students, a possible gap may arise between the expectations of the client and the work carried out by the students. Considering that the elaboration and validation of a business model represent a complex cognitive and rational process by nature, an online business model development software was introduced in 2016 to increase the ability of the students to reproduce and apply the knowledge and methods acquired during the Business Model course. After performing a comparative study, the choice was made to use the CCI business builder platform (see Annexe B). As illustrated in the figure below, this ready-to-use online tool provides many useful options related to the integration phase of the entrepreneurial process within a unique logical flow as follows:

- Several individual self-assessment grids related to the evaluation of an entrepreneur's attitude and intention,
- Two business model visualization tools for the analysis of the Lean Canva (Maurya, 2012) and the Business Model Canva (Osterwalder and Pigneur,

Modules	Learning goals	Curriculum content
Strategic module	Ability to assess the time, scope and size ambitions of the project	Strategy of the firm Value, vision and mission of the firm Identity and culture of the firm
	Ability to assess the demand and identify a specific clientele	Customer information and interface Customer segmentation and potential
	Ability to assess the competitive advantage	Market structure and competitor analysis Differentiation strategy Value proposition and customer benefits
	Ability to identify the source of the competitive advantage	Tangible resources/assets Capabilities/competencies Brands portfolio and firm reputation Customer relationship
	Ability to define how value is created	Process/activity organization Information flows Product/service flows Value network (suppliers)
Financial module	Ability to demonstrate how the business makes money	Sales forecasting Revenue/pricing strategy Design of the revenue stream Break-even analysis and cost forecasting Income statement Start-up capitalization and cash flow projection Initial balance sheet Investment plan

Table 2: Business model course: Modules, learning goals and curriculum content

2010) (see Szopinski et al., 2019 and Täuscher et al., 2017 for further information regarding the business model development and visualization tools), and

- A business plan management tool that includes several writing pads and computation modules that ease the presentation of the strategic and financial core components of a business plan.

Organization of the Consulting Process

The student consulting project minimally includes the following three key stages: the initiation phase involving the enrolment of entrepreneurs, the execution phase of the consulting mission and, finally, the evaluation phase (Heriot et al., 2008, Lycko and Galanakis, 2019).

Enrolment of entrepreneurs

Similar to all service-learning-oriented pedagogies, the quality of students' consulting projects depends on the motivation and willingness of all parties to collaborate, and a major challenge from the quantitative and qualitative perspectives is the enrolment of entrepreneurs, i.e., *"the clients"* (Heriot et al., 2008). To ensure enough time for the identification and recruitment of up to 40 projects, the selection starts five months in advance. This prospecting phase is most often carried out through direct and indirect promotional actions (e.g., through participation in entrepreneur fairs in Paris) and by establishing close relationships with local community partners likely to support entrepreneurs (e.g., accelerators and incubators). To ensure that their expectations match the scope of the business model consulting projects, a self-evaluation grid

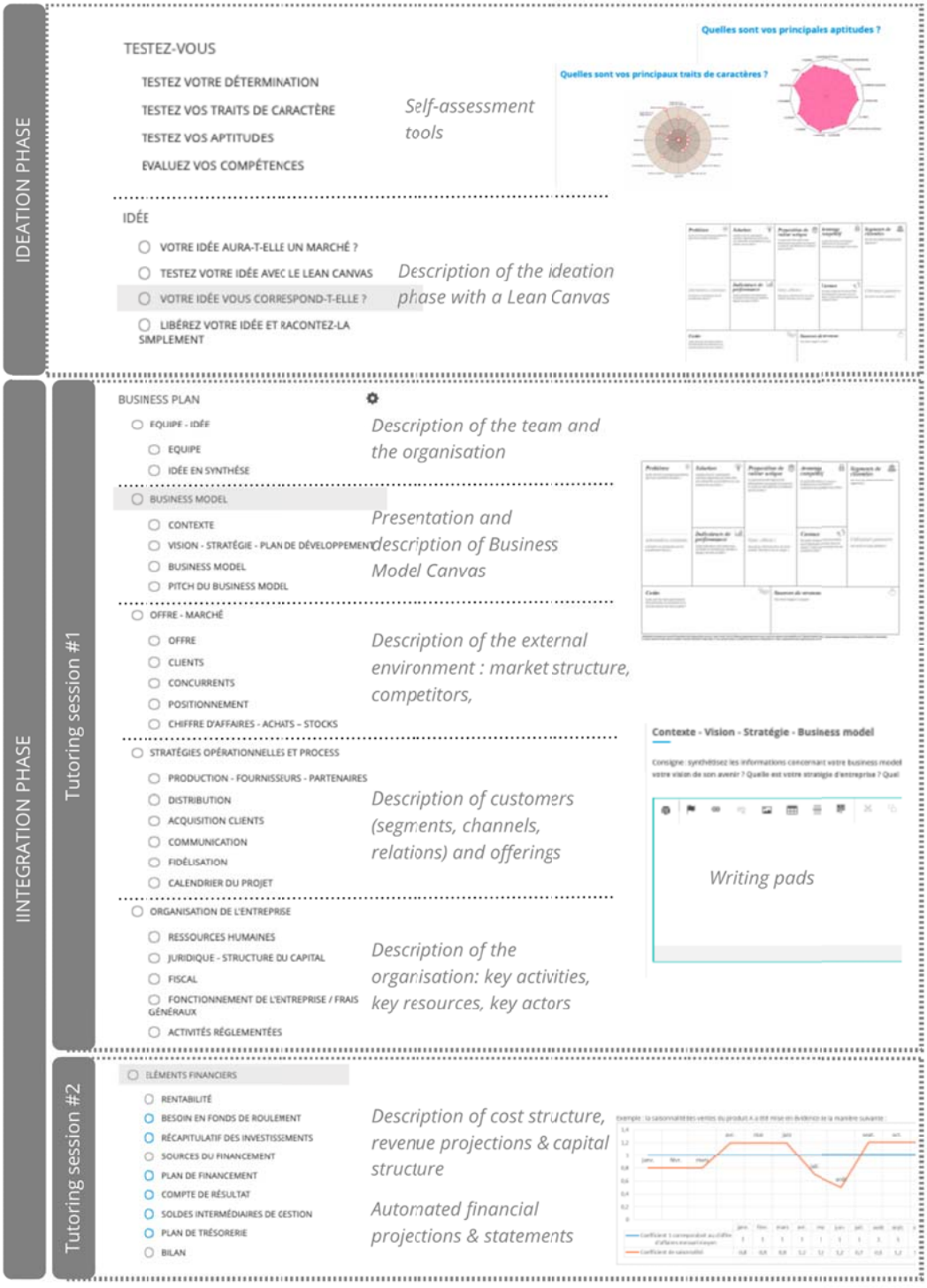


Figure 1: Screenshot of the CCI Business Builder development tool

was specifically developed for the staff in charge of contacting potential clients (see appendix B). First, entrepreneurs are invited to complete an application form in which they describe their projects and expectations regarding the coherence and viability of the project. Second, these applications are reviewed, and the applicants are personally contacted by the programme coordinator. The main issue is to ensure that the expectations of both parties are compatible, particularly regarding the difficult balance between the expectations of the entrepreneurs in terms of advice and deliverables and the educational expectations. If an agreement is found, the entrepreneurs receive a contract proposal which explains in detail the objectives,

timeframes and nature of the deliverables, obligations of the school in terms of confidentiality, etc. In return, the entrepreneur commits to sharing necessary information, including financial information, and dedicating enough time to the students. Two weeks before the start of the mission, all selected entrepreneurs are invited to attend a two-hour presentation delivered by the programme coordinator during which the objectives and schedule of the mission are presented and discussed (see Cook et al., 2005 for further guidance regarding this aspect).

Implementation of the consulting project

As described in Table 3, the consulting project process can be defined as a "*micro-one*" as it is performed within a relatively narrow timeframe (Heriot et al., 2008, Lycko and Galanakis, 2019).

The first week is dedicated to establishing a trusting relationship with the entrepreneur and developing a good understanding of the project. The week starts with a formal meeting between the entrepreneurs and the assigned team. The composition of the teams of 4 to 6 individuals is generally left to the free discretion of the students but cannot be changed once established. Within each team, one student is appointed as a coordinator to serve as the interface between the entrepreneur and the team and between the team and the school. Once this contact has been made, the teams are free to determine the frequency of meetings and their working method at their convenience. To foster their project management abilities, at the end of the week, each team must submit a report presenting the main issues to be addressed and the different milestones and deliverables scheduled for the remaining five weeks (🗗1).

During weeks 2 and 4, two follow-up one-hour tutoring sessions are organized under the supervision of two faculty instructors paired in complementarity to follow the progress of the project and assist the students with their strategic and financial assessment. As detailed by Cook et al. (2005), the instructor acts as a facilitator who helps the teams structure their analysis and eventually assists them in recalling the conceptual and methodological fundamentals discussed in class. The first session is dedicated to the identification of flawed assumptions regarding the strategic and marketing core dimensions of the business model and the time, scope and size ambitions of the project. The second session is dedicated to the identification of flawed assumptions related to the financial projections and assessment of the financial viability of the project. At the beginning of each tutoring session, the teams must electronically submit a working document summarizing (i) the progress of the work carried out to date, (ii) a work schedule describing the main steps to be taken, and (iii) a list of the questions to be addressed during the tutoring sessions (🗗2, 🗗3). During the entire consulting project, the teams are invited to use the business model development tool. As previously described, the platform provides many tools that are particularly relevant for project analysis, especially during the incubation phase. Through the platform, the teams and clients share a common repository to save information online. Like a checklist, the step-by-step analytical framework follows a logical sequence that eases the generation, dissemination and analysis of the information and co-production process of the final deliverables. For each core section of the business model/business plan analysis, the teams and clients can also access various videos and online tutorials.

Week 1 Initiation and reading			Week 2 Tutoring session 1	Week 3 Project analysis		Week 4 Tutoring session 2		Week 5 Conclusion
Initial meeting with entrepreneurs Gathering and analysing information Defining the problem	🗗 1	🗗 2	Strategic assessment: Competition Market acceptance Sales scenarios	Key success factors Operating cost Key partnership and resources	🗗 3	Financial assessment: Breakeven analysis Funding requirements	🗗 4	Oral presentation

Table 3: Timeline of the students' consulting projects

Project completion

At the end of the five-week mission, each team must submit a final written report of approximately sixty pages in length (🗗4) and present a final one-hour oral presentation. The students present their conclusions and recommendations for 20 minutes. Subsequently, 20 minutes are allocated for a Q&A session, 10 minutes are allocated for a jury deliberation (held behind closed doors) and 10 minutes are allocated for a final discussion during which the jury deliberations are presented. The jury comprises academic and non-academic representatives as follows: two teachers, including the instructor in charge of monitoring the strategic aspects, and at least one representative from the private sector. These representatives must have an entrepreneurial background and are most often enrolled among the alumni community. This bond of trust facilitates both the recruitment and confidentiality of the discussions. However, to avoid any conflicts of interest, the representatives must be recruited from a different industrial sector. Our experience demonstrates that their presence contributes to emphasizing managerial expectations in terms of content and presentation.

Evaluation

The final grading of the assignment, which represents the equivalent of approximately one hundred hours of personal work, is computed by summing four scores weighted as follows: 20% for the strategic and financial tutoring sessions (10% each), 10% for the final written report, 50% for the final oral presentation and 20% for the client's final evaluation. Formal rating grids were developed to standardize the evaluation process to the greatest extent possible.

After each tutoring session, the faculty instructor assesses the progress and quality of the consulting project and the attitude and behaviour of the students based on the following criteria:

- Quality of the summary sheet
- Listening skills
- Consistency of the analysis
- Project progress
- Relevance of the questions asked
- Compliance with the methodology
- Mastery of knowledge
- Team cohesion

If the evaluation of the final oral presentation is completed straightaway by the jury, the final written report is evaluated by the programme coordinator within two weeks. In both cases, particular attention is paid to the quality of the writing in terms of spelling and clarity, and the formal evaluation considers the following criteria:

- Robustness of the academic knowledge
- Ability to collect, synthesize and exploit information
- Project understanding and presentation (market and company)
- Consistency of the analyses
- Relevance of the recommendations

Considering the specificities and importance of the oral presentation, a specific grid was developed to evaluate the quality of the communication skills based on the following criteria:

- Timing compliance
- Listening and communication skills
- Team cohesion
- Verbal expression, conviction and argumentation

While the students are evaluated collectively, we agree with the recommendations by Teckchandani and Khanin (2014), who suggest using individual assessments. In our case, this individual evaluation occurs at the end of the final presentation. The students have the opportunity to suggest to the jury that additional points should be awarded to a specific member of the team in recognition of specific contributions.

Regarding the evaluation provided by the client, we strive to maintain a clear demarcation with respect to the academic evaluation. Prior to the presentation, the clients must provide their own specific rating form, which includes details regarding the following criteria:

Attitude and behaviour:

- Communication abilities
- Involvement and motivation
- Compliance with instructions
- Team spirit
- Organizational skills

Attitude:

- Analytical skills
- Synthesis capabilities
- Initiative - Curiosity
- Responsiveness and adaptability
- Project understanding

The entrepreneurs who attend the presentation are required to not interfere and remain neutral until this very last moment during which they are invited to conclude by giving an opinion and viewpoint of the work carried out by the students. This delimitation and the relative weight given to the client's assessment are the result of two intentions. First, the weight of the academic evaluations recalls that the consulting mission has a pedagogical purpose, and the quality of the consulting activities represent a secondary objective. Considering the various challenges involved in student consultancy projects, the intent was also to protect the students from the risk of an arbitrary assessment (Cook et al., 2005, Lycko and Galanakis, 2019).

Discussion

Pitfalls

This pedagogical approach to teaching business models offers students the opportunity to better understand what it means to start a business through a real case but remains very demanding in terms of organization and follow-up. Despite all efforts, from the pedagogical and organizational perspectives, it remains difficult to ensure that each entrepreneur experiences a certain level of satisfaction given the number of projects to be supervised, their heterogeneity in terms of maturity and industry specificities and non-rational and affective dimensions, which are intrinsic to the entrepreneurial orientation. As previously described, the volume of projects is important, and the standard deviation within the same cohort of projects can be significant regarding the maturation of the entrepreneurial process or the willingness of the entrepreneur to invest enough time and effort to work in cooperation with the students. Sometimes, the gap between the students' skills and industrial knowledge required and the heterogeneity within student teams in terms of understanding, abilities and behaviour make it difficult for students at this level of study to fully address the entrepreneur's expectations. Second, an important commitment in terms of time and effort is required from all constituencies, including the school, faculty instructors, students and especially the entrepreneurs (Cook et al., 2005). In this context, the competences and implications of the faculty instructors who are in charge of the tutoring sessions remain among the most important key success factors. Ensuring access to this very specific resource is even more difficult since in addition to the relative scarcity of entrepreneurship professors, the individual in charge of the tutoring session must be able to reconcile theory and practice and provide advice and recommendations without directly interfering with the relationships between the students and the entrepreneurs (Cook et al., 2005).

Lessons learned

Despite all these challenges, our experience demonstrates that the changes applied in 2016 contributed to achieving a better alignment between theory and practice and increased the overall consistency of the consulting project. First, the evolution of the business model curriculum has demonstrated that the selection and structuring of the subjects to be taught were important success factors (Samwel Mwasalwiba, 2010). Our experience particularly demonstrates that the use of the business model "*integrative framework*" proposed by Morrish et al., (2005) helped clarify the articulation between the strategic and financial modules. The structuring of the learning goals based on the six core components described in Table 2 greatly facilitated the learning process of the knowledge necessary for being able to assess the coherence of the project, particularly during the integration stage of the entrepreneurial process (Malmström, 2017; Shafer et al., 2005). Second, we found that the introduction of a business model development tool dramatically improved the overall consistency of the consulting project from both the pedagogical and managerial perspectives. From the academic perspective, our experience demonstrates that the use of a digital representation of the Lean Canva and the Business Model Canva fostered the adoption of a systemic thinking perspective (Olofsson and Farr, 2006) and helped the students approach the issues holistically (Heriot et al., 2008). We also noticed that the structuring of the analytic flow into a logical order and the possibility of deepening the details of each sub-section of

the core components of the business model (Malmström, 2017) allowed a faster and better alignment between the pedagogical objectives and the managerial expectations and a greater homogeneity among the deliveries. The implementation of the platform greatly eased intelligence generation and the collaboration and sharing of knowledge related to the core elements of a business model. Considering the challenges related to the generation of knowledge that is hetero-finalized jointly by the students and the entrepreneur (Bayad et al., 2010), the normative dimension of the platform facilitated the overall co-construction process between the teams and their clients and between the teams and the faculty instructor. The check-list approach helped the students uncover missing information or flawed assumptions prior to the tutoring sessions (Ebel et al., 2016; Szopinski et al., 2019) and facilitated the identification and explanation of the strategic inconsistencies prior to the two tutoring sessions. By homogenizing the reports and dissemination of information, the use of a common platform considerably helped the professors conducting the tutoring sessions follow up progress and take corrective action and the programme coordinator in the assessment of the final report. From the managerial perspective, the step-by-step analytical framework dramatically contributed to limiting the space for inventive and entrepreneurial approaches and limiting the tensions between the pedagogical objectives and managerial expectations. We discovered that the use of a business model development tool contributed to allowing a faster and better alignment between the pedagogical approach, which is *"data rich, rational and linear"*, and the pragmatism of the entrepreneurial orientation, which is more *"iterative, creative, action-focused data poor and even emotional"* (Morris, 2014, p. 8). Consistent with several authors who recalled the challenges related to the implementation of student team consulting projects (Cook et al., 2008, Heriot et al., 2008, Lycko and Galanakis, 2019), our experience suggests that the attention paid to the initial setup and the supervision through the use of a business model online tool are both crucial best practices.

Limitations

Our experience shows that at the end of the consulting project, the students have generally strengthened their skills in many areas. However, the assessment approach suffers from two main limitations. First, the assessment is performed collectively and does not assess the development of specific individual knowledge and competencies (Tardif, 2006). A proper evaluation of individual skills and competencies would involve a much more structured approach, including the ability to address the measurement process at an individual level before and after the consulting mission (Walia in Manimala et coll. 2017). Second, a deeper examination of the formal evaluation grids reveals a stronger focus on soft skills at the expense of hard skills. Indeed, most criteria aim to reflect the overall implication of the team and the following individual soft skills considered important in the entrepreneurial context: leadership and social skills, time management skills, critical thinking skills, assessment skills, problem-solving skills and communication skills, especially persuasion. In contrast, regarding hard skills, it appears that the evaluation process adopts a much broader perspective in an attempt to assess how students succeeded in adopting a rational perspective to properly assess the strategic and economic validity of the entrepreneurial project. The criteria used for the evaluation of the tutoring sessions and the formal grid used by the jury to assess the final presentation express judgements regarding the coherence and credibility of the deliveries and, to a lesser extent, the quality of the consultancy.

Conclusion

Teaching business models using a consulting-based pedagogical approach is a fruitful and demanding avenue in entrepreneurship education. The reflections of the pitfalls and limitations highlight the difficulties associated with such an approach and perhaps explain why it is still not widely used (Morris, 2014). However, such experiential pedagogy provides a very appropriate perspective for the diffusion of "*business model thinking*" (Hogan and Warrenfeltz, 2003) and contributes globally to decreasing the "*knowing-doing gap*" (Pfeffer and Sutton, 2000; Williams Middleton and Donnellon, 2014), and we humbly hope that this feedback of experience could help to widen its adoption.

Appendix A: Choice criteria and comparison of popular business model visualization tools

Name	Reference	BM viz. tools	Financial assess. tools	Languages	Web based	Free	Reference
CCI Business Builder	Chambre de Commerce et d'Industrie de Paris.	✓	✓	French	✓	✓	https://business-builder.cci.fr
Montpellier business plan	Montpellier Méditerranée Metropole (France).		✓	French		✓	http://www.montpellier-business-plan.com
Strategizer	A. Osterwalder (2010).	✓		English	✓	✓	https://strategyzer.com
GRP Story teller	T. Verstraete (2010).	✓		French	✓	✓	https://storyteller.grp-lab.com
Detoolbox	B. Aulet (2013).			English	✓		https://www.detoolbox.com

Appendix B: Selection grid

I would like to have an external perspective to be able to decide between several ideas	A
I would like to have a recommendation of the type of tax package to be implemented	E
I wish to detail and validate the assumptions and figures used to demonstrate the economic viability of my project	D
I would like to start a business, but I do not have a clear and precise idea	A
I would like to identify suppliers and write a cache of charges	E
I want to ensure that my business model is solid	C
I would like to ensure that I anticipated the resources needed to carry out my project	C
I would like to better understand the needs and expectations of the market	C
I would like to obtain a list of potential customers and take advantage of the mission to start prospecting	E
I would like to be helped in defining what I do, my job, and my market	C
I want students to suggest ideas and enjoy their creativity	A
I would like the students to help me write the entire business model	D
I would like to carry out and price my communication plan	E
I would like to validate my financing plan and prepare my file	D
I would like to validate that my selling price is accepted by my target customers	E
I want to check that my project is solid, have a fresh perspective, and check if the students derive the same conclusions as me	B
I would like to have a questionnaire made to validate the interest of customers for my product and/or the acceptance of the proposed selling price	E
I would like to better understand my competitors and their strengths/weaknesses	C
I have a project but many questions as follows: which product? for whom? through which means? for which profitability?	C
My project has a level of confidentiality and/or expertise that is not accessible to students	B

Analysis:

- Majority of "A" => The entrepreneur is in the pre-incubation phase.
- Majority of "B" => The entrepreneur is in a position of mistrust towards students.
- Majority of "C" => The entrepreneur is in the incubation phase - level 3.
- Majority of "D" => The entrepreneur is in the incubation phase - level 4.
- Majority of "E" => The particular expertise required by the entrepreneur does not match the objectives of the BM consulting project assignment.

REFERENCES

Aulet, B. (2013), *Disciplined Entrepreneurship: 24 Steps to a Successful Startup*, John Wiley & Sons, New Jersey.

Bayad, M., Gallais, M., Marlin, X. and Schmitt, C. (2010), "Entrepreneuriat et TPE: la problématique de l'accompagnement", *Management & Avenir*, Vol. 40 No. 10, pp. 119–140.

Bechard, J.-P. and Gregoire, D. (2005), "Entrepreneurship Education Research Revisited: The Case of Higher Education.", *Academy of Management Learning & Education*, Academy of Management, Vol. 4 No. 1, pp. 22–43.

Cook, R. G., and Belliveau, P. (2005), "The experiential student team consulting process". Dog Ear Publishing, Indianapolis.

Demil, B. and Lecocq, X. (2010), "Business Model Evolution: In Search of Dynamic Consistency", *Long Range Planning*, Elsevier Ltd, Vol. 43 No. 2-3, pp. 227–246.

Ebel, P., Bretschneider, U. and Leimeister, J.M. (2016), "Leveraging virtual business model innovation: A framework for designing business model development tools", edited by Hedman, J., Sarker, S. and Veit, D.*Information Systems Journal*, Vol. 26 No. 5, pp. 519–550.

Fletcher, D. (2018), "Prologue: Looking to the future: how can we further develop critical pedagogies in entrepreneurship education?" in Berglund, K. and Verduyn, K. (Eds.), *Revitalizing Entrepreneurship Education*, Routledge, pp. xvii–xxiv.

Frankenberger, K., Weiblen, T., Csik, M. and Gassmann, O. (2013), "The 4I-framework of business model innovation: a structured view on process phases and challenges", *International Journal of Product Development*, Vol. 18 No. 3/4, pp. 249–22.

Gedeon, S.A. (2014), "Application of best practices in university entrepreneurship education", *European Journal of Training and Development*, Vol. 38 No. 3, pp. 231–253.

Gilbert, P. and Lancestre, A. (2008), *Le Conseil en Management : Analyses Et Études De Cas*, Dunod, Paris.

Heriot, K. C., Cook, R. G., Simpson, L., and Parker, R. (2008), "The use of micro student consulting projects as an alternative to traditional field-based student consulting projects: An exploratory study", *Journal of Entrepreneurship Education*, Vol. *11* No 59, pp. 59-74.

Hogan, R. and Warrenfeltz, R. (2003), "Educating the Modern Manager", *Academy of Management Learning & Education*, Academy of Management Briarcliff Manor, NY 10510, Vol. 2 No. 1, pp. 74–84.

Kenworthy-U'Ren, A., Petri, A. and Taylor, M.L. (2006), "Components of Successful Service-Learning Programs: Notes from Barbara Holland, Director of the U.S. National Service-Learning Clearinghouse", *International Journal of Case Method Research Application*, Vol. 18 No. 2, pp. 120–129.

Kirby, D.A. (2004), "Entrepreneurship education: can business schools meet the challenge?", *Education + Training*, Vol. 46 No. 8/9, pp. 510–519.

Kuratko, D. F., Morris, M. H., and Schindehutte, M. (2015), "Understanding the dynamics of entrepreneurship through framework approaches", Small Business Economics, Vol. 45 No 1, pp. 1-13.

Kuratko, D.F., Fisher, G., Bloodgood, J.M. and Hornsby, J.S. (2017), "The paradox of new venture legitimation within an entrepreneurial ecosystem", *Small Business Economics*, Springer US, Vol. 49 No. 1, pp. 119–140.

Lycko, M., and Galanakis, K. (2019), "Student consultancy projects playbook: Learning outcomes and a framework for teaching practice in an international entrepreneurial context", The international Journal of Management Education, 100285 (In Press, Corrected Proof).

Malmström, M. (2017), "Practicing Business Model Management in New Ventures", *Journal of Business Models*, Vol. 5 No. 1, pp. 1–13.

Manimala, M.J. and Thomas, P. (2017), *Entrepreneurship Education: Experiments with Curriculum, Pedagogy and Target Groups*, Springer Nature Singapore Pte Ltd., Singapore.

Maurya, A. (2012), *Running Lean*, O'Reilly Media, Inc.

Morris, M.H. (2014), *Annals of Entrepreneurship Education and Pedagogy - 2014*, Edward Elgar Publishing Limited, Cheltenham, UK • Northampton, MA, USA.

Morris, M.H. and Liguori, E. (2016), *Annals of Entrepreneurship Education and Pedagogy - 2016*, Edward Elgar Publishing Limited, Cheltenham, UK • Northampton, MA, USA.

Morrish, S.C., Schindehutte, M. and Allen, J. (2005), "The entrepreneur's business model: toward a unified perspective", *Journal of Business Research*, Vol. 58 No. 6, pp. 726–735.

Olofsson, L. and Farr, R. (2006), "Business Model Tools and Definition - a Literature Review".

Osterwalder, A. and Pigneur, Y. (2010), *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*, John Wiley & Sons, Inc., Hoboken, New Jersey.

Pittaway, L., Cope, J. (2007), "Entrepreneurship Education: A Systematic Review of the Evidence", *International Small Business Journal* Vol. 25 No 5, pp. 479-510.

Pfeffer, J. and Sutton, R.I. (2000), *The Knowing-Doing Gap: How Smart Companies Turn Knowledge Into Action*, Harvard Business School Press, Boston, Massachusetts, United States.

Priem, R.L., Wenzel, M. and Koch, J. (2018), "Demand-side strategy and business models: Putting value creation for consumers center stage", *Long Range Planning*, Pergamon, Vol. 51 No. 1, pp. 22–31.

Sadler, P. (1998), *Management Consultancy: a Handbook of Best Practice*, 1st ed., Kogan Page Limited, London, UK.

Samwel Mwasalwiba, E. (2010), "Entrepreneurship education: a review of its objectives, teaching methods, and impact indicators", *Education + Training*, Vol. 52 No. 1, pp. 20–47.

Shafer, S.M., Smith, H.J. and Linder, J.C. (2005), "The power of business models", *Business Horizons*, Vol. 48 No. 3, pp. 199–207.

Szopinski, D., Schoormann, T., John, T., Knackstedt, R. and Kundisch, D. (2019), "Software tools for business model innovation: current state and future challenges", Electronic Markets, pp.1–26.

Tardif, J. (2006), *L'évaluation Des Compétences*, Les Éditions de la Chenelière, Montréal, Québec, Canada.

Täuscher, K. and Abdelkafi, N. (2017), "Visual tools for business model innovation: Recommendations from a cognitive perspective", *Creativity and Innovation Management*, Vol. 26 No. 2, pp. 160–174.

Teckchandani, A., and Khanin, D. (2014), "The Instructor's Role in the Student Consulting Process: Working with the Student Team", *Small Business Institute® Journal*, Vol. 10 No 1, pp. 11-24.

Williams Middleton, K. and Donnellon, A. (2014), "Personalizing Entrepreneurial Learning: A Pedagogy for Facilitating the Know Why", *Entrepreneurship Research Journal*, De Gruyter, Vol. 4 No. 2, pp. 167–204.

Winkel, D., Vanevenhoven, J., Drago, W. A., and Clements, C. (2013), "The structure and scope of entrepreneurship programs in higher education around the world", *Journal of Entrepreneurship Education*, Vol. 16 No 15. pp. 15-29.

About the Authors

Philippe Massiera After an initial managerial experience of about ten years, Philippe Massiera became professor of marketing and entrepreneurship in 2010. Holder of an MBA and a Master of Marketing, he graduated from Panthéon-Sorbonne University with a PhD in Management. In 2015 and was appointed head of the entrepreneurship department at EDC-Paris, in charge of redesigning the Master's degree in Entrepreneurship and Innovation within the Grande École program. In 2018, he moved in Canada. Associate professor at the École Supérieure de la Gestion of the Université du Québec à Montréal he teaches strategic marketing and entrepreneurial marketing.

JOBM
Journal of Business Models

Designing Smart Cities: A Participatory Approach to Business Model Teaching

Tim Mosig[1], Wafa Said Mosleh[2], and Claudia Lehmann[3]

Abstract

This paper presents the design and content of a business model course for executive education. The course is inspired by the Scandinavian participatory design approach, which invites cross-disciplinary and interactive engagement. It demonstrates how a situated learning experience enables a contextual process of inquiry among participants.

Introduction

In recent years, business models (BMs), which support articulating "how a business creates and delivers value to customers" (Teece, 2010, p. 173), have received increased attention in academia and practice (Zott *et al.*, 2011). This practical approach helps explain the underlying economic logic of how businesses can deliver value at a reasonable cost and, inspired by Osterwalder's (2004) BM canvas, how they can be developed and visualized in a structured way.

Although various BM ontologies and frameworks have provided a shared language for the description and visualization of BMs, its development still requires interdisciplinary knowledge from the fields of marketing (customer segmentation), strategic management (value propositions), and procurement and logistics (key resources). Furthermore, as models are simplified representations of reality (Stähler, 2002), BMs' multidimensionality (Evans *et al.*, 2017) and complexity increase as constant technological and socio-economic developments influence business and society. At the same time, globalization increases competitiveness, which requires businesses to remain responsive to the market. Hence, it is necessary for a business to continually question and reframe its BM (Osterwalder, 2004). While BMs were previously the joint affair of management and business experts, interdisciplinary

Keywords: Business Models, Participatory Design, Situated Learning

Please cite the paper as: Mosig, T., Mosleh, W. S., and Lehmann, C. (2021), Designing Smart Cities: A Participatory Approach to Business Model Teaching., Vol. 9, No. 3, pp. 39-49

1 HHL Leipzig Graduate School of Management – Center for Leading Innovation and Cooperation, tim.mosig@hhl.de
2 Department of Design and Communication – University of Southern Denmark/Danske Bank, wafamosleh@gmail.com
3 HHL Leipzig Graduate School of Management – LF Group Chair of Digital Innovation in Service Industries, claudia.lehmann@hhl.de

DIO: https://doi.org/10.5278/jbm.v9i3.2566
ISSN 2246-2465

efforts have increasingly proven to be crucial for the development and implementation of new ideas (Buur *et al.*, 2013). Thus, facilitating meaningful interdisciplinary conversations regarding BM development has, over the last decade, increasingly become a key concern for businesses. As a result, BMs have found their way into academic curriculums.

Teaching BMs with the purpose of bridging theory and practice requires us to think of learning as a situated practice that invites participation in activities (exploration, problem-solving, and reflection) that contribute to the development of successful BMs. The activities designed for the course presented in this paper are based on the understanding that learning is situated (Lave & Wenger, 2008) and thereby a contextual process of inquiry. Furthermore, in the spirit of Lave and Wenger's (2008) theory of communities of practice, such learning is not simply an individual experience, but something that emerges between participants. With this foundation, we emphasize that the teaching and learning of BMs cannot be defined as or limited to a cognitive activity. Instead, we understand learning as understanding in practice (Lave, 1997) and as a relational process that emerges as patterns of meaning in the evolving relationships between those involved (Stacey, 2005). Thus, with BM development involving various stakeholders, we emphasize that teaching and learning about it emerges through collaborative inquiry that embraces the participatory design (PD) approach presented as the foundation of our course design.

Developing BMs for smart cities

Based on the above-described challenges and opportunities, we developed a BM course for MBA students (as part of executive education) using a participatory format to explore the topic from an interdisciplinary perspective and facilitate interaction among participants throughout the course (Hains & Smith, 2012). The learning objectives are to:

1. Understand the components of a BM and describe and analyze different types of BM designs,
2. Strengthen their capacity to develop digital and technology-enabled BMs,
3. Gain the knowledge needed to use PD tools to work on new and innovative BMs, and
4. Recognize and reflect on the customer experience journey and apply relevant methods to explore customer needs.

The course was taught at a well-known business school in Europe and was run three times at different lengths: 1) part time across five consecutive days, 2) part time over two days, and 3) full time for one day. Altogether, the three courses involved 122 participants from different geographical locations in Europe.

To ensure a practice-oriented approach for teaching BMs, we chose to ground the course in the concept of smart cities. We contextualized the structure and content around the smart city topic, using the following definition:

> *A smart city is a well-defined geographical area, in which high technologies such as information and communication technology [ICT], logistics, energy production, and so on, cooperate to create benefits for citizens in terms of well-being, inclusion, and participation, environmental quality, [and] intelligent development.* (Dameri, 2013, p. 2549)

In addition to this definition, a smart city shows the following dimensions (Table 1).

Dimensions of a smart city	Related aspect of urban life
Smart economy	Industry
Smart people	Education
Smart governance	E-democracy
Smart mobility	Logistics & infrastructures
Smart environment	Efficiency & sustainability
Smart living	Security & quality

Table 1: Dimensions and related aspects of urban life in a smart city (Lombardi *et al.*, 2012)

The word *smart* is stressed in the course material. Each dimension of a smart city consists of numerous products and services (smart components) connected to one another. According to Kulakov *et al.* (2016), smart services utilize intelligent components, such as information, decision provision, and communication, to continuously acquire and apply knowledge. This helps adapt the services to customers' preferences and improves quality, reliability, and user experience.

In terms of products, smart cities have "the ability to communicate and interact with their environment and other smart products by using internet-based services [...] as well as the capability to react in real-time and their potential for dynamic reconfiguration" (Abramovici *et al.*, 2018, p. 734). Thus, a smart city relies on services and products that are interconnected and communicate with its environment. Due to the broad application of ICT solutions and the importance of them in the context of smart city development, it is possible to collect data that may contribute to a citizen-centered, sustainable, and value-creating smart city design.

Using the smart city concept for teaching and training BMs has proven advantageous, as it focuses on the benefits of citizens, implying that participants should take a customer-centric perspective. The customer focus is increasingly taken into account in businesses' strategic considerations. At the same time, a smart city needs to offer different services and facilities, grouped into functional districts (Lee & Lee, 2014), to its citizens, such as education and healthcare (Washburn & Sindhu, 2010). Therefore, each service and functional district requires different input factors, leads to particular outputs, and thereby adds value for the citizens in different ways (Albino *et al.*, 2015). Hence, we can compare the different functional districts of a smart city to businesses that offer various products and services, as both need to keep end customers in mind.

Based on the smart city topic, the MBA course was designed in six different stages, which participants needed to complete as part of their learning process about BM development. In the following sections, we present the methodological approach to the design and structure of the course and the details of those six stages.

Approach

The MBA course design is founded on the Scandinavian PD approach (Sanders & Stappers, 2008), of which the central component is to invite and facilitate participation in co-design processes. As PD represents a growing family of design practices that entails using a wide range of methods, it is difficult to describe it as simply one approach or as tools and techniques that may be applied regardless of the problem at hand (Brandt *et al.*, 2013). Instead, the activities must be strategically organized to serve a particular focus by remaining attentive to the complete experience that the participants will be engaged in. Thus, each activity needs to be coherently linked to the subsequent one to enable participation (Sanders & Stappers, 2008). Brandt *et al.* (2013) suggest the combination of activities that invite telling, making, and enacting to enable participants to influence future ways of living, learning, and being. This, in particular, is what the seminar program encourages through multiple modes of collaborative activity (see Figure 1). Together, these enable engagement of diverse groups (age, organizational hierarchy, functional and disciplinary backgrounds, and prior training) and support different stages of idea development (Sanders & Stappers, 2008).

Inviting participation through these methods encourage the exchange of different perspectives (Andersen & Mosleh, 2020) and professional disciplines in the group work (Burns *et al.*, 2006) and allow for new meaning to emerge. While the MBA course was designed based on a Scandinavian PD approach, participation emerges in the social interaction between participants and not necessarily due to the staging/facilitation of the activities (Mosleh & Larsen, 2020). Thus, participation in the workshop is not understood as an ideal of democratic engagement, which is mediated through specific methods, but rather as engagement that is encourages through the methods and which temporally unfolds in processes of social relating. The activities are an invitation to confront particular themes using particular methods, but the social interaction of participants is improvised, and the outcomes of such engagement are thereby unpredictable. Thus, participation cannot be staged or controlled through specific forms of engagement (Mosleh & Larsen, 2020), which generally challenges more traditional ways of understanding PD practices (Mattelmäki & Sleeswijk Visser, 2011).

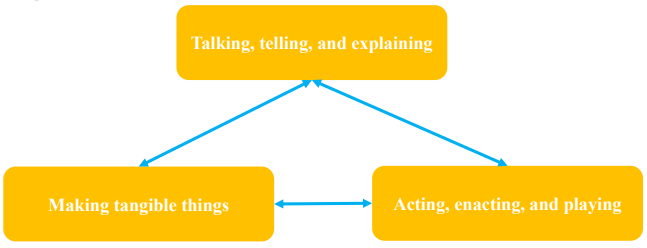


Figure 1: Framework of Practicing PD; own illustration, adapted from Sanders & Stappers (2008)

Methods applied in the Seminar		
	Method	**Comments on how method(s) affect(s) the business model**
Step 1 – Problems and Challenges	• Developing a short interview guide • Conducting semi-structured (customer) interviews • Analysis and discussion of findings • Developing a persona	• *to know who the customer is* • *to address real customer needs and not aspects assumed the customer wants get solved or addressed* • *to later on exactly know what the value is delivered to the customer and to articulate the value proposition(s) for the business model accordingly*
Step 2 – Diverge and Converge	• 6-3-5-method • Group discussions • Iterative process structures of getting feedback and refining ideas as it is also done in Design Thinking	• *to explore as many (business) opportunities as possible arising from customer needs identified before* • *to then choose the options addressing the customer need best* • *to define the activities/products/ services representing the activities*
Step 3 – Connectivity and Sustainability	• Brainstorming • Group discussions	• *to define key resources, partners, and output factors of the business model*
Step 4 – Experience Creation	• Customer Experience Journey • Prototyping with craft materials • Group discussions	• *to create the processes connecting all aspects defined so far for the business model* • *to see what kind of processes make most sense also considering the customer perspective*
Step 5 – Construction I	• Prototyping using: ° LEGO® SERIOUS® PLAY Methodology ° Other craft materials • Group discussions	• *to test the business models, processes, and workflows*
Step 6 – Construction II	• Prototyping using: ° LEGO® SERIOUS® PLAY Methodology ° Other craft materials • Group discussions	• *to implement the business (model) and connecting with external partners*

Table 2: Comprehensive overview of the methods applied throughout the seminar

The application of the described PD approach is realized in the design and structure of the course, where participants are invited to engage with the following six themes: 1) *Problems & Challenges*, 2) *Divergence & Convergence*, 3) *Connectivity & Sustainability*, 4) *Experience Creation*, 5) *Construction I*, and 6) *Construction II*. Notably, these themes involved a variety of methods, such as the LEGO®SERIOUS®PLAY[1] methodology, customer experience journey, and persona development. A comprehensive overview of the methods involved and how they contribute to the understanding of BMs is provided in Table 2. Additionally, in the following paragraphs, the themes, how they are addressed using the different methods, and how they may contribute to the teaching of BMs are delineated.

Before commencing the activities, participants received a brief kick-off lecture on the topic of smart cities. The lecture related to current events and/or economic, technological, or social challenges that are known to influence a company's BM.

Stage 1. Problems and Challenges

The participants were divided into groups of three to five and each assigned to one particular district, e.g., *retail*, *culture and education*, *mobility*, and *health*. The

[1] https://www.lego.com/en-us/seriousplay/trademark-guidelines

groups were asked to develop products, services, and processes to satisfy citizens' needs and solve challenges central to the smart city concept. They also developed the corresponding BM for these districts throughout the duration of the course.

During the first stage, the groups were asked to develop a short semi-structured interview guide (Blomberg & Burrell, 2012) to help them explore the existing challenges and needs of users/citizens in the context of the particular district. Here, the district was viewed as a real-life business situation that the customer establishes contact with. Subsequently, the interview was conducted with either the general public in the streets or some of the other course participants. During the interviews, participants gathered relevant details about the needs, challenges, and reasons as to why those needs are important to the customers/citizens. Finally, they discussed the collected insights and summarized their findings. This led to the development of a persona—a stereotypical person—that they wanted to develop their solutions for in the following stages. In some cases, two personas were developed if the needs and challenges were too diverse to fit into one. Effectively, the goal was to empathize with the customer/citizen and identify real needs that can be addressed and resolved by the BM. In this manner, customer centricity was taken into account.

Stage 2. Divergence and Convergence

During the second stage, participants underwent a process of *divergence and convergence*. The objective was to generate as many ideas as possible within a short time and then to narrow them down to two to three ideas. Each idea needed to be a service or product capable of addressing the previously identified customer need(s). The participants started by applying what we call the 6-3-5 method: six participants in a group passed three ideas around to receive feedback five times. In our case, based on the number of participants, the groups chose the same number of challenges from a set of problems that they identified during the *Problems and Challenges* stage. Each participant was assigned one challenge (a previously identified customer need). To address this challenge, participants were asked to explore three distinct (potentially "smart") services or products. Those ideas were then passed around to other participants within the group for feedback, which, in this case, was mainly a remark on how to develop the idea further. This method was adapted according to the number of participants in each group.

Having circulated the ideas mentioned earlier, each participant came to know all the proposals made by others. In a group discussion, they reflected upon the various ideas and finally agreed on one approach per challenge. In some cases, several ideas were combined. Through the subsequent discussions, participants then delineated the proposals and presented a clear, actionable solution for each challenge chosen. At the end of the discussion, the group agreed upon one product or service they wanted to work with. This needed to be a well-defined solution that clearly explicated how it can help meet a need/resolve a customer's challenge and thereby contribute to value creation in a smart urban environment. Effective and efficient communication was essential as the learning inside the individual participant was shared among all participants within the group via social interplay.

Stage 3. Connectivity and Sustainability

In this stage, participants engaged in addressing value propositions, delivering, and capturing, thereby dealing with the core aspects of a BM. Additionally, they were invited to consider key partners, resources, and channels. As each group addressed more than one customer need for their chosen district, all groups were required to ensure coherence in the value propositions of their proposals so that they were prepared for the subsequent step.

During the *Connectivity and Sustainability* stage, participants considered the underlying value propositions of their proposals (i.e., the services or products). At this point, it was important to determine the different value propositions coherently so that they could narrate a reasoned story to the customer/citizen as to why these offerings are best suited to address a particular need. Accordingly, participants decided how the value was to be delivered to the customer/citizen.

Participants needed to delve deeper into their solution proposals and determine the necessary input and output factors. They discussed the necessary means to realize the solution in terms of key resources and partners and what the outcome of the solution may be. Meanwhile, participants also needed to consider

how to deal with output factors and the number/type of districts they could connect to achieve sustainability. Effectively, participants also dealt with the question of how the value should be captured. Hence, each group developed key elements of a new BM.

Regarding input factors, particular data could become necessary to realize and deliver the service(s) or product(s). However, the data may have already been generated in another district or at another citizen touchpoint. Therefore, at a later stage, participants would need to identify connection points with other districts. In this current stage, they only needed to remain attentive to the circumstances and potential challenges to delivering the solution.

Stage 4. Experience Creation

In this stage, participants approached the first physical artifacts. All considerations they had made, along with their interim results, were now weaved into a story. The participants were asked to design a customer experience journey including all services or products, their related value propositions, and channels in addition to the identified input and output factors. The customer experience journey supported the participants' thinking about how the solutions they developed for their persona might help improve the life of this persona as a citizen in a smart city. Additional questions that needed clarification included how the persona may feel while experiencing the services or products and a mechanism to determine the value propositions. Here, empathy was an important competence to achieve convincing results. The participants needed to clarify the persona's experiences while utilizing their developed services or products using a prototype of a storyboard. The storyboards could be sketched on paper or physicalized through the use of crafting materials. Thus, storytelling became important for the imagination of a personal experience. Working with paper and other tangible materials enabled participants to discuss their ideas and visualize the customer experience journey to pinpoint how their services and products are interconnected and may help them further develop the journey.

Stage 5. Construction I

The fifth stage of the BM development encouraged collaboration within the group to support a deeper level of understanding, explore relationships between different parts of the BM, and discuss their proposed solutions. To make it easier to incorporate changes in their proposed solutions, we integrated LEGO®SERIOUS®PLAY materials alongside other supplies and items that can be assembled and disassembled so that participants can explore the best possible physical representation of their solution.

The predominant focus of this stage was to create a physical prototype. For this purpose, the LEGO®SERIOUS®PLAY methodology was used to build a tangible structure of a conceptual, intangible idea that the participants could discuss, show to others, and further develop in the remaining part of the MBA course (Gudiksen, 2015). The participants were thus asked to construct their smart city district. They illustrated the customer experience journey, extended by constructing facilities, exhibiting incoming and outgoing connections to or from other potential districts, and converting their ideas/solutions for the services or products into a physical representation. Hence, this step further solidified the understanding of the relationship between different facets of the BM and clarified how value is delivered and captured in a customer/citizen-oriented manner according to the value propositions. In doing this, participants may have discovered potential challenges to realizing the ideas, which then also needed to be addressed. At the end of this stage, each group presented their prototype and briefly explained the meaning of the different objects and items embedded in it.

Stage 6. Construction II

The last stage aimed to help participants understand the complexity of the world we live in and that a district in a smart city or a business is just a small part of a much larger ecosystem. This ecosystem only works successfully if all the different parts it consists of are aligned with each other.

Once all groups presented their prototypes, they began engaging with one another. The task at hand in *Construction II* entailed discussion between all groups to imagine a potential setup of a holistic smart city by integrating all the districts constructed by the individual groups. Thus, the prototypes of each district needed to be connected (e.g., via infrastructure and items that signify data flow and exchange between

different districts and throughout the entire city). Again, the LEGO®SERIOUS®PLAY methodology and materials were integrated. Participants considered the input and output factors from which synergy effects might potentially arise. This also meant reconsidering how value is delivered and captured within and across the districts. In the end, the groups presented their overall prototype and explained the setup of all parts of the BM.

Key Insights

The tasks of the six stages were demanding. However, the interactive PD approach helped with structuring and inviting participants to playfully engage in the given tasks. Effectively, the different methods used enabled the facilitator to touch upon various aspects of a BM without having to name them specifically. However, the relation to BMs needed to be made for a sustainable learning outcome. In particular, the participants' reflections at the end of the course established the most important learning, as they, in a situated manner, drew connections between the activities and BM development.

During the courses, several points proved to be important for the best possible outcome. Firstly, the inspirational kick-off lecture should not be too long or specific to avoid participant bias during a later stage. Secondly, each stage should be explained individually and then be carefully carried out by the groups. After each stage, a reflection should take place to elicit a clearer meaning of the steps followed and understand how the tasks align with different aspects of BMs. We found that providing all instructions at once led to irritation and frustration among participants, which in turn adversely affected the desired outcome. Thirdly, most support and additional explanations need to be provided during Stage 3, *Connectivity and Sustainability*. The underlying reason seems to be about the level of abstraction of what a value proposition is and how the transition between the proposed solutions and the value proposition may be.

Lastly, to improve the learning outcome and make it more sustainable, it was helpful to document the interim results and prototypes of each step through photography. The photos can be integrated into the presentation slide deck and forwarded to the participants for documentation purposes.

Reflecting on the limitations of the course design, we found that the number of participants in each cohort should not exceed 40 to ensure that the facilitator is able to provide all groups with sufficient support. Additionally, the quality of the course is dependent on the material and equipment available. In particular, the prototyping material needs to be suitable for the topic at hand to enable the participants to craft meaningful, tangible artifacts. The final point that should be considered is time, with some activities utilizing a fast ideation process to develop as many idea proposals as possible while others demanded sufficient time to think about a particular topic or initiate discussions with other group members. Our findings show that to meet the expectations of well-elaborated and meaningful outcomes and a sustainable learning process, the course should not be scheduled for just one day but should instead last between three to five days.

Discussion and Conclusion

The coherent organization of the PD activities enabled all participants to engage (Sanders & Stappers, 2008) and supported them in imagining future ways of living, learning, and being (Brandt *et al.*, 2013). Within the groups, this combination of activities invited the exchange of different viewpoints (Andersen & Mosleh, 2020), enabling a collaborative and contextual process of inquiry, leading to the emergence of new ideas and meaning. The social interplay between participants supported a situated experience that emphasized learning as a relational process. This structure and content are advantageous for the teaching of BMs, as it gives space for collaborative sense making and activity rather than the sole agenda of completing a BM canvas. The participatory nature of the course helped participants achieve the learning goals in a way that did not limit them to a cognitive activity, as they together simulated and experienced the BM by experimenting with different future scenarios and possibilities using tangible objects, allowing for flexibility and change.

Effectively, this course combines a rich set of different methods adopting elements of design thinking, project-based learning, customer experience journeys,

personas, the LEGO®SERIOUS®PLAY methodology, and an array of other PD techniques. Collectively, these methods provided sustainable learning outcomes for the participants by dealing with the topic of BMs in a detailed yet hands-on manner that supported them developing the content by themselves. Additionally, they were equipped with methodological knowledge to adapt and re-apply in different contexts and to other topics, expanding the value derived from the course. Our findings show that participants were happy with the learning experience, particularly the playful and participatory way of deriving and applying knowledge, which encourages us to develop the design and content further. In the future, we will apply the structure and content of the course to other topics as well, particularly within the field of digitization, using other themes are such as smart homes and buildings, e-/smart government, and advanced manufacturing.

In conclusion, teaching BM in a way that supports a situated learning experience is a challenge, but we found that integrating a PD approach proved helpful, as it enabled participants to collaboratively undergo a contextual process of inquiry and imagine future ways of living in smart cities. The PD approach likewise encouraged the exchange of different perspectives and supported our idea of learning being a social activity rather than a cognitive one. This paper thereby highlighted that teaching and learning about BMs is a collaborative inquiry, which is invited and supported by the strategic organization of PD methods.

References

Abramovici M., Savarino P., Göbel J. C., Adwernat S., Gebus P., 2018. Systematization of Virtual Product Twin Models in the Context of Smart Product Reconfiguration during the Product Use Phase. *Procedia CIRP*, *69*: 734–739.

Albino V., Berardi U., Dangelico R. M., 2015. Smart Cities: Definitions, Dimensions, Performance, and Initiatives. *Journal of Urban Technology*, *22* (1): 3–21.

Andersen P. V. K., Mosleh W. S., 2020. Conflicts in Co-Design: Engaging with Tangible Artifacts in Multi-Stakeholder Collaboration. *CoDesign: International Journal of CoCreation in Design and the Arts*, 1–20.

Blomberg J., Burrell M., 2012. An Ethnographic Approach to Design. In J. A. Jacko (Ed.), *The Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies, and Emerging Applications* (3rd ed., pp. 1025–1052). London: LEA.

Brandt E., Binder T., Sanders E. B.-N., 2013. Tools and Techniques: Ways to Engage Telling, Making, and Enacting. In J. Simonsen & T. Robertson (Eds.), *Routledge International Handbook of Participatory Design* (pp. 145–181). London: Routledge.

Burns C., Cottam H., Vanstone C., Winhall J., 2006. *Transformation Design* (Red Paper 02). London: Design Council.

Buur J., Ankenbrand B., Mitchell R., 2013. Participatory Business Modelling. *CoDesign*, *9* (1): 55–71.

Dameri R. P., 2013. Searching for Smart City Definition: A Comprehensive Proposal. *International Journal of Computers and Technology, 11* (5): 2544–2551.

Evans S., Vladimirova D., Holgado M., van Fossen K., Yang M., Silva E. A., Barlow C. Y., 2017. Business Model Innovation for Sustainability: Towards a Unified Perspective for Creation of Sustainable Business Models. *Business Strategy and the Environment*, *26* (5): 597–608.

Gudiksen S., 2015. Business Model Design Games: Rules and Procedures to Challenge Assumptions and Elicit Surprises. *Creativity and Innovation Management*, *24* (2): 307–322.

Hains B. J., Smith B., 2012. Student-Centered Course Design: Empowering Students to Become Self-Directed Learners. *Journal of Experiential Education*, *35* (2): 357–374.

Kulakov K. A., Petrina O. B., Korzun D. G., Varfolomeyev A. G., 2016. Towards an Understanding of Smart Service: The Case Study for Cultural Heritage e-Tourism. In S. I. Balandin (Ed.), *Proceedings of the 18th Conference of Open Innovations Association FRUCT and Seminar on Information Security and Protection of Information Technology: St. Petersburg, Russia, 18-22 April 2016* (pp. 145–152). Piscataway, NJ: IEEE.

Lave J., 1997. The Culture of Acquisition and the Practice of Understanding. In J. W. Stigler (Ed.), *Cultural Psychology: Essays on Comparative Human Development* (pp. 309–327). Cambridge: Cambridge University Press.

Lave J., Wenger E., 2008. *Situated Learning: Legitimate Peripheral Participation* (18th print). *Learning in Doing*. Cambridge: Cambridge University Press.

Lee J., Lee H., 2014. Developing and Validating a Citizen-Centric Typology for Smart City Services. *Government Information Quarterly*, *31* (1): 93-105.

Lombardi P., Giordano S., Farouh H., Yousef W., 2012. Modelling the Smart City Performance. *Innovation: The European Journal of Social Science Research*, *25* (2): 137–149.

Mattelmäki T., Sleeswijk Visser F., 2011. Lost in Co-x: Interpretations of Co-Design and Co-Creation. In N. Roozenburg, L.-L. Chen, & P. J. Stappers (Eds.), *Proceedings of the IASDR 2011, the 4th World Conference on Design Research*. Delft, The Netherlands: International Association of Societies of Design Research (IASDR).

Mosleh W. S., Larsen H., 2020. Exploring the Complexity of Participation. *CoDesign*, 1–19.

Osterwalder A., 2004. *The Business Model Ontology: A Proposition in a Design Science Approach* (Dissertation). Lausanne, Switzerland: University of Lausanne.

Sanders E. B.-N., Stappers, P. J., 2008. Co-Creation and the New Landscapes of Design. *CoDesign*, *4* (1): 5–18.

Stacey R., 2005. *Complex Responsive Processes in Organizations: Learning and Knowledge Creation.* Abingdon, Oxon: Taylor and Francis.

Stähler P., 2002. Business Models as a Unit of Analysis for Strategizing. *Proceedings of 1st International Workshop on Business Models*, *Lausanne, Switzerland*. Retrieved from http://www.business-model-innovation.com/english/definitions.html

Teece D. J., 2010. Business Models, Business Strategy and Innovation. *Long Range Planning*, *43* (2-3): 172–194.

Washburn D., Sindhu U., 2010. Helping CIOs Understand "Smart City" Initiatives. Retrieved from http://www.uwforum.org/upload/board/forrester_help_cios_smart_city.pdf

Zott C., Amit R., Massa L., 2011. The Business Model: Recent Developments and Future Research. *Journal of Management*, *37* (4): 1019–1042.

About the Authors

Tim Mosig, M.Sc., is a research associate at the Center for Leading Innovation and Cooperation, a competence center of the HHL Leipzig Graduate School of Management. There, he conducts research on a variety of German and European innovation projects. Additionally, he teaches and provides workshops to international MBA classes dealing with numerous aspects related to digitization. For his PhD, he is working in the field of data-driven business model innovation.

Dr. Wafa Said Mosleh is a post-doc at the University of Southern Denmark. She holds a PhD in participatory innovation and has undertaken research and consultancy work within larger organizations, such as LEGO and Lufthansa Systems. With a background in product design and an interest in the analytical nature of field research, Mosleh combines practices of design and anthropology to better understand organizational innovation processes from the experiences of local interaction. During her PhD, she was involved in developing and delivering education modules on design thinking and innovation for industry practitioners as well as graduate students.

Prof. Dr. Claudia Lehmann is a professor of the LF Group Chair for Digital Innovation in Service Industries at HHL Leipzig Graduate School of Management. Since 2015, she has also been executive director of the Center for Leading Innovation and Cooperation (CLIC), a competence center of the HHL Leipzig Graduate School of Management. Professor Lehmann coordinates numerous German and European innovation projects and designs customized innovation strategies with her team and a broad network of institutions and experts.

Journal of Business Models (2021), Vol. 9, No. 3, pp. 50-59

JOBM
Journal of Business Models

Experiences from a Decade: A Universal Approach to Business Model Teaching

Jesper C. Sort and Kristian Brøndum

Business Design Lab, Aalborg University Business School

Abstract

There are many different approaches to teaching business models. This paper presents a universal five-step approach developed from an ongoing longitudinal action research project to uncover best-practice in educating and developing business model competencies. The approach is based on the teaching principles of case-based teaching, learning-by-doing and problem-based learning.

Introduction

One of the most famous references used when teaching business models (BMs) is "Business Model Generation" (BMG) by Osterwalder and Pigneur (2010) and especially the framework Business Model Canvas (BMC). Even though the book is rather intuitive and more application-focused than most traditional textbooks, it offers little information about how to teach the subject to students or practitioners. We have, not surprisingly, experienced that if the subject of BMs is taught in a traditional lecture format, it can become somewhat "dry" or boring. Nevertheless, a traditional lecture format is a convenient and time-efficient 'go-to-solution' for first-time teachers, as they lack guidance and instructional resources for lesson planning (e.g. Goodwin, 2012). This paper – therefore – offers an approach and useful guide for inexperienced teachers to design a BM course for the first time. Furthermore, this paper offers insights on how to create an engaging and enrichening teaching session for participants, which could be an inspiration for veteran teachers to redesign or test new things in their BM course(s).

Keywords: Teaching, business models, business model canvas

Please cite this paper as: Jesper C. Sort, J. C. and Brøndum, K. (2021), Experiences from a Decade: A Universal Approach to Business Model Teaching, Vol. 9, No. 3, pp. 50-59

Acknowledgements: We want to thank all our colleagues in the business model community and the Business Design Lab, for endless discussions on teaching business models as well as inputs to this paper and helping to refine the approach.

DOI: https://doi.org/10.5278/jbm.v9i3.2558
ISSN: 2246-2465

There are many ways of teaching BMs to both practitioners and students (hereafter labelled "participants"), for instance, blended learning (Margolina and Bohnsack, 2019), gamification (Sort and Holst, 2019), and flipped classroom (Bitetti, 2019). This paper will build upon three different – but complementary – didactics: case-based teaching, learning-by-doing, and problem-based learning (PBL). In the following, these didactics will briefly be introduced. Later, we will explain the differences and complementarities of the didactics enabled in our universal approach in the "Approach" section.

Pedagogical approaches using cases or case-based teaching have been advocated by scholars to enhance the individual's learning process (Schank, 1990; Leake, 1996). Schank (1990) emphasises this by stating "Good teaching is good story telling" (p. 232) or in other words: case-based teaching should create an excellent narrative which enables the participant to engage in the setting and the topic.

Researchers, as well as psychologists, agree that rehearsal and learning-by-doing stimulate successful learning (Hogan and Warrenfeltz, 2003; Ann Haefner and Zembal-Saul, 2004). Some of the main features of learning-by-doing are propositional knowledge produced within academia and knowledge validated through practical work (Gibbons *et al.*, 1994).

Likewise, more and more universities are adopting characteristics of PBL (De Graaf and Kolmos, 2003; Savin-Baden, 2014). PBL is an instructional participant-centred approach that empowers participants to "conduct research, integrate theory and practice, and apply knowledge and skills to develop a viable solution to a defined problem" (Savery, 2015, p. 9). PBL can be performed in many constellations and modes of knowledge (see further Savin-Baden, 2014). De Graff and Kolmos (2003) argue that these features in PBL lead to higher motivation and harder work from the participants as well as improving learning capabilities at a higher complexity level.

Based on the abovementioned research on teaching, we initiated an ongoing longitudinal action research project to uncover best practice in terms of educating and developing BM competencies. This initiative includes a business development project on network-based BMs with more than 100 companies involved, a research project on BMs as a communicating tool (see Sort and Nielsen, 2018), along with experiences from teaching BMs in different settings and contexts over the last decade. Furthermore, we have had scholarly discussions with colleagues from the BM community as well as Alexander Osterwalder and Yves Pigneur, the renowned authors of the book 'Business Model Generation' (2010). This action research project has led to the development of what we refer to as "a universal approach to teaching business models".

We have developed and refined our approach during the years and will continue to develop it further. The approach has been used both in teaching contexts as well as professional settings. Results show that participants afterwards have a profound knowledge and application skill on how to use BMs and the BMC as a language for discussion, analysis and innovation.

Our approach has been applied with university students ranging from first-year bachelor students to master students in their final year and from a vast range of different study directions such as Art, Business Administration, Management Accounting, International Business, Engineering, Medicine, and Innovation Management. Furthermore, the approach has been applied successfully in different geographical settings, such as Denmark, China, Italy, and Germany. The approach has also worked well with practitioners from small- and medium-sized enterprises as well as large corporations in various industries. This validation from a large variety of both students and practitioners is why we dare calling our approach universal and a "best practice".

Approach

The universal approach described in this paper will focus on how the widely accepted framework Business Model Canvas (BMC) can be taught. The approach and didactics apply to most topics and frameworks related to BMs such as the Value Proposition Canvas, the Lean Start-Up Canvas, and the BM Environment Map. However, due to the confinements of the short paper format, we focus on the one topic that we believe most teachers can relate to, namely BMC.

Our approach builds upon the notions of case-based teaching, learning-by-doing, and PBL, which would also reflect the expectations towards the participants in the learning objective after a teaching session. Case-based teaching relies on examples or cases to enhance the participants understanding of the topic. The cases typically include pre-made materials and clear-cut outcomes. As such, the participants get a more practical approach and more profound learning by understanding the different context where the topics can be applied (see Schank, 1990). Taking this a step further, introducing learning-by-doing fosters hands-on experience for the participants to further enable and stimulate successful learning (Ann Haefner and Zembal-Saul, 2004). Finally, adopting PBL in a more open-ended approach where a limited amount of information is provided and the outcomes to the scenarios or problems are nonconclusive. As a result, the participants learn how to think critically, be able to define a problem, and work towards a solution on their own (Savin-Baden, 2014).

The rationale of these three pedagogical learning approaches is found in our belief that participants should leave a teaching session with the ability to understand, reflect and apply a given theory, framework or tool. Towards this aim, the three pedagogical approaches enable each other; case-based teaching offers both understanding and context learning, followed by learning-by-doing that offers the participants a setting and ability to apply the tool. Lastly, PBL enables the participants to think critically and find new and interesting problems on their own and work towards a solution which in this case could be the development of a new innovative BM, suggestions for BM design changes or similar.

The following steps comprise the universal BM teaching approach:

1. Identify the audience's pre-understanding
2. Traditional lecture on the topic: BMC in lecturing context
3. Case-based examples: one or multiple cases explained in plenary
4. Learning-by-doing: knowledge application
5. Facilitate self-directed learning with PBL

Depending on the course specifics and the time available, each step (except for the first) can be conducted as a teaching session on its own (usually 60 minutes) but can also be merged into one extended session.

Step one - Identify the audience's pre-understanding

The first step is related to knowing the audience and their existing knowledge about the topic. A good starting point is to get the participants to think about their understanding of the topic BMC and discuss it in pairs or larger groups. Following this brief session, the teacher should ask the participants to share their understanding with the rest of the class.

Some teachers might know the knowledge level of the audience in advance (for example if the session is part of a teaching series). If this is the case, this step can be done by the teacher in advance without setting time aside for discussion. However, if the teacher does not know the audience (for example, if it is a single independent teaching session or part of a university-industry program with a company), this initial step is essential to identify the optimal emphasis and time allocation for the following steps. Besides, having a pre-understanding about the audience plays a vital role in achieving the "zone of proximal development", i.e. situations where the teacher combines the right level of competence of the participants to the right level of challenge in the teaching (see further Wass and Golding, 2014).

Example: It is essential not only to ask if the participants have read the syllabus - in our example the book by Osterwalder and Pigneur (2010) – but also if they have a genuine understanding of the topic. Participants usually think they know much about BMs and the BMC from a quick read through the book. However, quite often, their knowledge or understanding is very superficial. Hence, questions concerning the notions of value and how BMs are different from strategy could be valuable follow-up questions to get a feeling of their actual level. Moreover, if the groups share their understanding, the teacher can listen in and get a good grasp of the competence level.

Step two - Traditional lecture on the topic: BMC in lecturing context

The second step is what most would refer to as the traditional or conventional lecture. The teacher will explain the principles of the topic regarding theories

and methods. In this context, the lecture will typically involve an explanation of how the BMC works, including strength and weakness. Also, the teacher could explain the development of the BMC and framing it in the broader field of BM research. An explanation of each building block should be presented, including what the specific block entails and the concepts or questions affiliated with each BMC building block. During this traditional lecture, the teacher could also start to make use of the case-based pedagogics, but this should be confined to relatively simple cases on a narrative or archetype level.

Example: Dependent on the level of the prior knowledge of the participants, the first part of this lecture could be explaining how BM research is related to other subjects (such as marketing and strategy) but also how it is different. A natural part of this general introduction would also be to focus on value creation, delivery and capture towards customers. In this context, we often use narratives on well-known companies and their successful BM transitions. For example, the story of how Xerox became successful after changing revenue model (see Chesbrough and Rosenbloom, 2002) or how Nespresso fruitfully adjusted their customer segment and revenue model (see Matzler *et al*., 2013). Some of the strengths and limitations of the BMC could also be explained. Examples of strengths are the intuitive design and its use as a common framework for analysing businesses, while the latter could be the in-side-out perspective and the missing focus on competitors, for instance. It is also critical to assure that the participants understand how value differentiates from technology, products and services as well as why value is such an essential part of understanding customers and their decisions.

Step three - Case-based examples: one or multiple cases explained in plenary

In the third step, the session shifts into case-based teaching by using cases related to the participants' prior knowledge or educational direction. When teaching the BMC, it makes sense to use one or several examples from the curriculum. However, local cases (geographically or industry-wise) could equally be used to enhance the engagement by the participants.

The use of a BM case allows the participants to achieve an in-depth understanding than solely theoretical learning attained in step 2. The profound understanding is achieved through introducing a case where the teacher demonstrates practical application of the theory in context; for instance, mapping the BMC for a company. The teacher should explain why this BM case is exciting and unique before, during and after the walk-through. These are essential aspects to convey an excellent narrative which, from our experience, will enhance the learning of the participants. The teacher can, after a thorough explanation of one case, choose to do shorter narratives about other noteworthy BM cases that fit the course curriculum or learning points.

Example: When cases (and especially the first one) are applied, the teacher should use sufficient examples when explaining each building block. For instance, we often use Gillette as the first case since most people know and relate to this case (see e.g. Osterwalder & Pigneur, 2010, p. 105). Firstly, we go through the theoretical considerations of the building block "customer segments" to clarify the underlying aspects of that building block. Secondly, we demonstrate how the case can be applied to that particular building block - in this example by explaining who the actual customers of Gillette are. This process of theoretically explaining and practically demonstrating using the case is performed for the remaining building blocks.

To achieve another level of abstraction in the teaching, the teacher could illustrate how the case might have a certain BM pattern embedded. For example, by highlighting the specific building block connections that drive this BM pattern[1]. In the Gillette case, this would involve an explanation on how their close partnership with the retailers enables them to get the best spots in the shop in return for marketing efforts. This, in turn, enables Gillette to keep their brand value towards the customers as well as their revenue model, which is based on selling relatively cheap handles and making high profits on the razor-heads continuously[2], hence the "Razor & Blades" pattern (e.g. Osterwalder & Pigneur, 2010).

[1] For an extensive overview of different BM patterns, please see Gassmann et al. (2014).

[2] The Gillette case works in almost all contexts, as most people have somehow engaged with Gillette; i.e. people have either used a Gillette razor (or similar), seen their commercials or been at a retailer where they are sold. However, we have experienced that cultural differences can affect this case, especially in countries where hair removal is not a common thing.

Step four – Learning-by-doing: knowledge application

While the second and third step should give the participants an understanding of the topic and the BMC framework, the fourth step starts the learning-by-doing process and is also somewhat oriented towards PBL.

The idea behind step four is to apply both case-based teaching as well as learning-by-doing and still facilitating the process in a structured and teacher-led manner. Structured, in this context, refers to the fact that the teacher is still controlling the process and guides the participants. This is done by briefly introducing the participants to a new BM (typically at the archetype level). Like described in step three, this can be a well-known international case, or it could be a more local one. The important part is that the participants have engaged with the case company (experience with buying or using the company's offering) or considerable prior knowledge about the case. The participants now have to map out the BM using a set of predefined answers that should be placed into the appropriate BMC building blocks, see figure 1 and 2. We usually use an A4 or A3 print-out of the BMC.

When the allocated time runs out, the teacher can either go through the right answers directly (if in lack of time) or invite the participants to reveal their answers one building block at a time to increase the discussions and thereby the learning. If the latter approach is chosen, the teacher can reflect upon the answers revealed before presenting the "correct" solution in the end. As such, this step requires the teacher to be well-informed about the specific case. This step leaves most participants with both a great understanding of the BMC framework as well as the ability to use it properly. Furthermore, this step can advantageously be done in smaller groups; first, the mapping in groups of two and afterwards, in groups of four, each group present their final BMC and elaborate on the rationale behind their "answers". If there are variations in their answers (which there usually are), these are an excellent starting point for further discussions, eventually increasing the learning aspect.

Example: We conduct a "Jeopardy-style" exercise with a "cheat sheet", which gives the participants all the right answers, but they will still have to determine where the answers fit in the BMC. The answers can be stickers, puzzle pieces or other forms of tiles (see figure 1 and 2). At this point, the teacher should function as a facilitator, to whom the participants can ask questions if they do not understand some of the answers

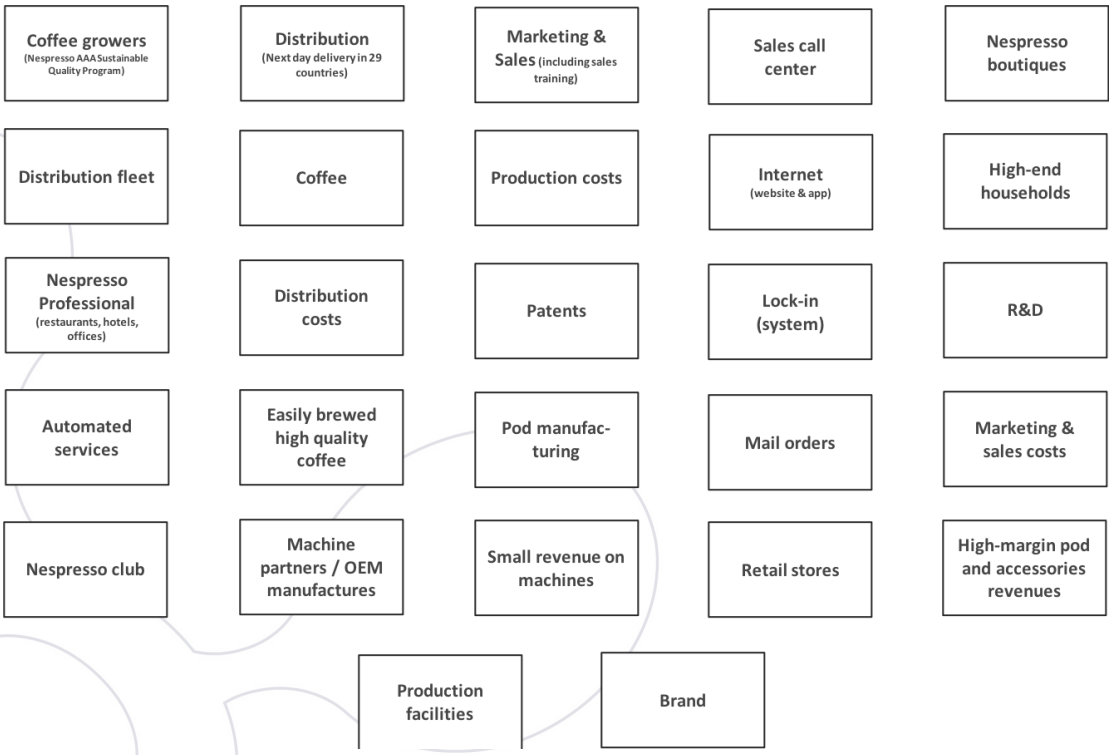


Figure 1: Nespresso "cheat sheet" inspired by Pigneur (2017)

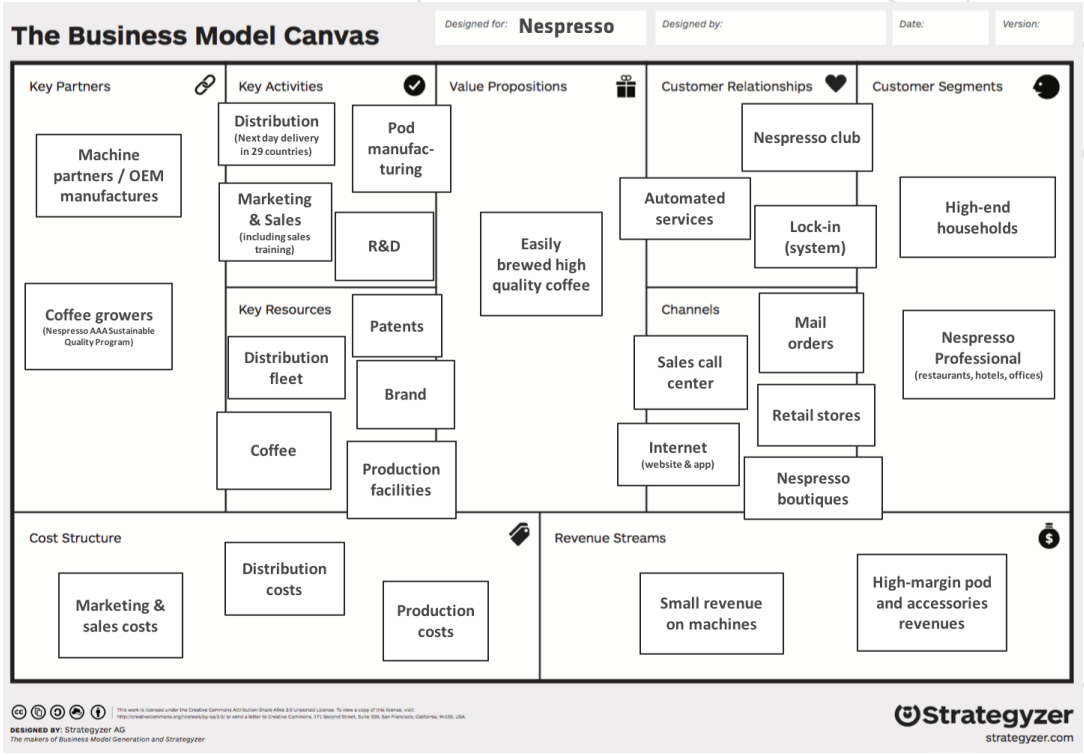


Figure 2: Nespresso BMC using "cheat sheet"

on the cheat sheet. As seen in figure 1 and 2, we have used Nespresso as an example as most participants have an appropriate level of knowledge about the Nespresso brand and operations. We have also successfully applied Tesla, Apple and Airbnb as well as similar large and well-known (local) companies as cases for this learning-by-doing exercise.

Step five - Facilitate self-directed learning with PBL

The fifth and final step is stimulating the participants to apply their knowledge on their own through the PBL pedagogics. The participants are - therefore - required to work independently on a problem or scenario with limited information and no clear-cut outcomes. For example, participants could be given the task to identify the BM for an undisclosed case company using the BMC.

This step should start with the introduction of the, until now, undisclosed case company. The case can be presented in any manner found suitable by the teacher, as long as the presentation do not give away too much information. The important part is to let the participants use their obtained theoretical knowledge, apply it on their own (individually or in groups) and enhance the learning-by-doing aspect in the approach by utilizing self-directed learning. The teacher should, therefore, be involved merely as a facilitator at this point (advise and encourage participants) and not provide the path to resolve the problem.

The final step can be concluded in multiple ways depending on the teacher and the course. Nevertheless, the participants usually do a plenary presentation of the mapped BMC (or in front of an opponent group) to get feedback as there is no absolute solution in this step. Step 5 could also be the actual exam, as it – according to our experience – assesses the participant's abilities to apply their understanding, think critically and develop a solution.

Example: We have used videos, e.g. Zimmerman (2015), written case company descriptions, free search on the Internet (by the participants themselves) as well as inviting actual companies inside the classroom to do a live presentation in this step. The most crucial part is that the participants – individually – can collect enough information to start mapping the BMC but also have room to apply their critical thinking; for instance, to figure out what are the *key resources* and not just routine resources in this particular BM. Hence, we will typically

have participants working in groups to foster this critical thinking. At the end of the session, we often conclude with having the participants present in front of an opponent group to increase knowledge sharing. Furthermore, the participants will see how other groups have solved the task, again a crucial point in PBL.

Key Insights and Discussion

The first attempts of implementing this approach can take a fair amount of time for the teacher, as cases and narratives have to be prepared to make sure the case-based teaching will show its effect. However, we do believe it is time well spent, as the participants show enhanced learning and application abilities compared to doing a traditional lecture about BMs and/or the BMC. At least the evaluation of the teaching sessions we have done throughout the years have indicated this. Also, direct feedback from the participants and examiners of oral and written exams have supported this. The participants demonstrate a higher level of learning and ability when compared to participants where we have used just traditional lectures or similar approaches. For teachers, the preparation time can be reduced significantly, though, by using the examples and cases from this paper.

Our universal approach has applicability across different themes and study directions. Within BM teaching settings, we have used the same approach to invent or improve new BMs ("To-be" BMs, cf. the terminology in Osterwalder & Pigneur, 2010), value proposition designs (Osterwalder & Pigneur, 2014) as well as the BM Environment Map (Osterwalder & Pigneur, 2010). As previously described, the five-step approach is applicable to most teachers in most contexts. However, we do have some further recommendations and insights regarding the use of cases, using scenarios, and the audience.

Choosing and using cases

The teacher will need to develop or read up on some (from a teaching point of view) compelling cases as the quality of the narratives in step two and BM cases in step three are dependent on the teacher exclusively. So, the teacher needs to make sure the BM cases fit the course and the setting. Some years ago, we experienced how the use of cases can go wrong. During a BM course at a Chinese university, we used the cases we usually would apply at European educational institutions. However, these cases were not applicable in a Chinese context as we experienced that some of the classic textbook examples (e.g. Google, Facebook and Uber) are somewhat unknown to Chinese students. Furthermore, we once tried to apply "for-profit" company cases in a session primarily consisting of "non-profit" organisation participants at a university-industry program. The participants left with some understanding of the BMC framework; nonetheless, it could have been much stronger if the cases were more related to the participants existing knowledge and everyday work environment.

In general, when the universal approach is used with practitioners, it is a good idea to use cases that are familiar to their organisational environment. For example, if it is a B2B company, participants would exhibit a better understanding of B2B cases rather than B2C cases – and vice versa. Similarly, if it is a smaller organisation, participants would better understand and relate to domestic-based cases than large international corporations. From our experience, if the participants do not understand the general logic of the BM cases, step three, four and five are likely to fail.

It should also be noted that the cases introduced in step five should not give direct answers to the participants. The introduction to a case in step five should be on a general level and not include information like "our customer segments are …" or "our value proposition is …". For example, using a YouTube video about Airbnb's business model, where all the BMC building blocks are slavishly covered, will counteract step five's aim of getting the participants to apply their knowledge if the answers are given like in step four.

The use of live cases

As previously mentioned, the approach is also very applicable to include live-case cases, i.e. inviting an organisation (of any type, size and age) to do a presentation. The guest speaker should, however, be noticed about which topics he/she should include in the presentation. If not all parts of the BM are indirectly touched upon during the presentation, the teacher could choose to do a small round of Q&A's, either by him-/herself or let the participants pitch in as well to uncover missing pieces. The general approach will remain the same, and

the company case will typically be introduced in step five. The teacher can, during the other steps, prepare narratives or BM cases that are somewhat related to the live case. According to our experience, this inspires the participants in the subsequent steps; still, the first narratives and BM cases do not have to be related to the live case to reach a good result.

Using scenarios

The fifth step can also entail a variety of setups, where the teacher presents different scenarios or design constructs. The lecturer can, for instance, say that the case is restricted to a B2B setting only or decide that only a specific channel type can be used to reach the customers. We have found that scenarios challenge the participants in new ways and may generate new insights on how the BMC functions in a specific setting. Furthermore, in the fifth step, the teacher could introduce a specific customer segment or value proposition and have the participants brainstorm on how to design a BMC with these requirements.

Knowledge level of participants

The approach can and should be modified as needed (or dictated) by time constraints and the pre-existing knowledge of the participants. If the participants show a general high understanding of the topic, the teacher can choose to spend less time on step two and three before going into step four and five. Moreover, if the application of theories is not essential to the program (this holds for some practical university-industry activities) or is part of an advanced course, the teacher can choose only to apply step four and five.

It should be noted that jumping directly to step four or five might prove counterproductive, as trying to let participants develop skills on their own have shown some difficulties. Studies (e.g. Kirschner *et al*., 2006) have revealed that minimal guidance during the initial learning stages does not show a positive outcome of the learning.

Conclusion

The universal approach to teaching BMs presented in this paper has proven successful in a variety of settings across disciplines and countries. It has been refined during the last decade and can be used as a guide to teaching BMs in an engaging and enrichening way, which can be quite beneficial to new teachers within the BM field. Likewise, our approach can serve as an inspiration to experienced teachers who are seeking new insights. Even though some of the steps can be somewhat time-consuming for the teacher, the preparation time will be reduced significantly, if the examples and cases presented in this paper are used.

The five-step approach combines PBL, learning-by-doing and case-based teaching, which provides the participants with a deep understanding and ability to apply the tools/theories/frameworks theoretically as well as practically. The participants (and the teacher) are highly engaged and usually find that times flies. Furthermore, the teaching sessions are given high ratings when evaluated. In conclusion, we hope this approach can inspire inexperienced as well as veteran teachers to enrich and evolve their teaching sessions both to heighten the motivation and competencies of the participants.

References

Ann Haefner, L., & Zembal-Saul, C. (2004), Learning by doing? Prospective elementary teachers' developing understandings of scientific inquiry and science teaching and learning, *International Journal of Science Education*, Vol. 26, No. 13, pp. 1653-1674.

Bitetti, L. (2019), Activate Business Model Learning Through Flipped Classroom and Backward Design, *Journal of Business Models*, Vol. 7, No. 3, pp. 100-110.

Chesbrough, H., & Rosenbloom, R. S. (2002), The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies, *Industrial and corporate change*, Vol. 11, No. 3, pp. 529-555.

Gassmann, O., Frankenberger, K., & Csik, M. (2014), *The business model navigator: 55 models that will revolutionise your business,* Pearson, UK.

De Graaf, E., & Kolmos, A. (2003), Characteristics of problem-based learning, *International Journal of Engineering Education*, Vol. 19, No. 5, pp. 657-662.

Gibbons, M., Limoges, C., Nowotny, H., Schwarzman, S., Scott, P., & Trow, M. (1994), *The new production of knowledge: The dynamics of science and research in contemporary societies*, SAGE, London, UK.

Goodwin, B. (2012), Research says new teachers face three common challenges, *Educational Leadership*, Vol. 69, No. 8, pp. 84-85.

Hogan R., Warrenfeltz R., (2003), Educating the Modern Manager, *Academy of Management Learning & Education*, Vol. 2, No. 1, pp. 74-84.

Kirschner, P. A., Sweller, J., & Clark, R. E. (2006), Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching, *Educational psychologist*, Vol. 41, No. 2, pp. 75-86.

Leake, D. B. (1996), *Case-Based Reasoning: Experiences, lessons and future directions*, AAAI Press/MIT press, Cambridge, MA.

Margolina, A. & Bohnsack, R. (2019), Teaching Business Models via Blended-Learning, *Journal of Business Models,* Vol. 7, No. 3, pp. 24-37.

Matzler, K., Bailom, F., Friedrich von den Eichen, S., & Kohler, T. (2013), Business model innovation: coffee triumphs for Nespresso, *Journal of Business Strategy*, Vol. 34, No. 2, pp. 30-37.

Savery, J. R. (2006), Overview of problem-based learning: definition and distinctions, the interdisciplinary, *Journal of Problem-based learning*. Vol 1, No. 1, pp. 9-20.

Savin-Baden, M. (2014), Using Problem-based Learning: New Constellations for the 21st Century, *The Journal on Excellence in College Teaching*, Vol. 25, No. 3&4, pp. 197-219.

Schank, R. C. (1990), Case-Based Teaching: Four Experiences in Educational Software Design, *Interactive Learning Environments*, Vol. 1, No. 4, pp. 231-253.

Sort, J. C. & Holst, P. M. (2019), Using Digital Gamification in the Context of Business Models, *Journal of Business Models,* Vol. 7, No. 3, pp. 38-46.

Sort, J. & Nielsen, C. (2018), Using the business model canvas to improve investment processes, *Journal of Research in Marketing and Entrepreneurship*, Vol. 20, No. 1, pp. 10-33.

Osterwalder, A., & Pigneur, Y. (2010), *Business model generation: a handbook for visionaries, game changers, and challengers*. John Wiley & Sons, Hoboken, NJ.

Osterwalder, A., Pigneur, Y., Bernarda, G., & Smith, A. (2014), *Value proposition design: How to create products and services customers want*, John Wiley & Sons, Hoboken, NJ.

Pigneur, Y. (2017), "*Business model innovation: a challenge in existing companies"*, keynote presented at the 1st Business Model Conference, 18-19 May, Venice, Italy.

Wass, R., & Golding, C. (2014), Sharpening a tool for teaching: the zone of proximal development, *Teaching in Higher Education*, Vol. 19, No. 6, pp. 671-684.

Zimmerman, M. [MaRS Startup Toolkit]. (2015, November 17). Examining Nespresso's Business Model [Video file] from 00:00 till minute 07:56. Retrieved from: https://www.youtube.com/watch?v=nCKGW5C9AJQ (accessed December 13, 2018).

JOBM
Journal of Business Models

Developing Impactful Entrepreneurial Teaching Using A Business Model Framework

Kenneth Lundholm Stenkjær[1], Kristian Brøndum[2], Jesper Sort[3] and Morten Lund[4]

Abstract

This paper provides insights regarding the development, structure and results of the entrepreneurial course "New Venture Creation". The course engages with the Business Model Canvas and the Lean Start-up Methodology but modified to encompass a Higher Educational Institution's demands, which has shown positive results among students, external stakeholders, and incubators.

Introduction

Entrepreneurship is considered one of the most important topics at universities worldwide (Robinson and Heynes, 1991). There are many reasons for including entrepreneurship teaching in the study curriculum (Hindle, 2007). These reasons include students obtaining skills, such as communication, fostering new ideas and collaboration, which are highly valued by employers (Al-Atabi and DeBoer, 2014). Entrepreneurship teaching can enhance entrepreneurial skills, such as handling novel situations, working with others, perseverance in situations of failure, idea generation and many others, but developing these skills requires effort and support (Nadelson *et al*., 2018). Research has shown that such skills can be developed through instruction (Mansfield *et al*., 1978); i.e., it is possible to teach entrepreneurial skills (Rodov and Truong, 2015).

In recent years, entrepreneurship teaching has evolved from a business plan-centric understanding (start-ups as smaller versions of a large company) towards a business model-centric understanding (start-ups need new management tools for search and discovery) (Blank *et al.,* 2014). At Aalborg University (AAU) in Denmark, the course "New Venture Creation" (NVC) aims to teach entrepreneurial skills using a business model (BM) framework in a practical and applicable manner. The course builds on the foundation of the Lean Start-up Methodology, as first developed by Ries (2011), and follows the step-by-step guide for building a great

Keywords: Teaching; Entrepreneurship; Business Models

Please cite this paper as: Stenkjær, K.L., Brøndum, K., Sort, J., and Lund, M. (2021), Developing Impactful Entrepreneurial Teaching Using A Business Model Framework., Vol. 9, No. 3, pp. 60-69

1–4 Aalborg University Business School

Acknowledgment : We want to thank all our colleagues at the Business Design Lab and supervisors and lecturers at the New Venture Creation course for their input to the development of the course.

ISSN: 2246-2465
DOI: https://doi.org/10.5278/jbm.v9i3.2581

company by Blank and Dorf (2012). This guide structures the entrepreneurial process around the Business Model Canvas (BMC) developed by Osterwalder and Pigneur (2010). Together with the Lean LaunchPad (Blank *et al.*, 2014), these ideas and frameworks have provided a starting point for the NVC course, which has been continuously modified over time based on new learnings and understandings.

NVC is a semester-long cross-university 30 ECTS elective course at master's level, offered to students following various study programs from all AAU faculties: humanities, social sciences, engineering and medicine. The course has become one of the main pathways for new entrepreneurs entering the AAU Incubator programs. Moreover, external stakeholders - such as investors, entrepreneurial consultants and innovators from established companies - reviewing the course have recognised that it is developing sound and validated business ideas and entrepreneurial talents worth investing in. Some of the student projects developed through the course turn into businesses that make their first sales already during the course and others after the course is finished, meaning there are concrete entrepreneurial outcomes.

This paper synthesises over seven years' experience of initiating, developing and teaching the course and provides the insights and results in the following sections. After the general approach is described, some of the key insights are highlighted. Finally, some pros and cons will be discussed and concluded in the final section.

Approach

The NVC course is based on the understanding that a start-up is "a temporary organisation in search for a scalable, repeatable, and profitable business model" (Blank and Dorf, 2012, p. 24) that moves quickly from failure to failure while adapting, testing new iterations, improving initial ideas and learning from customers. The course is designed to support students in the process of searching for a repeatable and scalable business model related to an idea or opportunity that originates from a problem. The ambition is that the students go through the entrepreneurial process of starting a company by developing a business model through careful market validation during the semester-long course.

The course has developed further from its original sole focus on Blank and Dorf's (2012) "how-to guide", to include other important aspects, such as problem generation, team formation and creativity, which happens before to the structured approach proposed by Blank & Dorf (2012). The reason for this change is that most similar educational hands-on entrepreneurship courses, for example "The Lean LaunchPad" (for students) and "I-Corps™" (for companies) (Blank *et al.*, 2014), only enrol teams that already have a start-up idea, while the NVC course allow all students interested in entrepreneurship to register. Also, the development of the course has led to springboard sessions and learning reports to align with university requirements, which will be explained in more detail below.

The NVC course has the following structure: first, an introductory three-week boot-camp provides the students with an entrepreneurial and creative toolbox as well as supports the subsequent team formation process. Subsequently, the course follows a 10-week business model process concurrent with a customer development process (see Blank and Dorf, 2012). The overview of the structure and class flow are presented in Table 1 and Figure 1 below. Table 1 presents an overview of the themes during the NVC course, while Figure 1 illustrates the weeks' structure.

In Figure 1, the blue areas are marked as the days the students need to be in class or at supervision. It is highlighted that in the boot-camp weeks, the students should attend the class every day (coloured

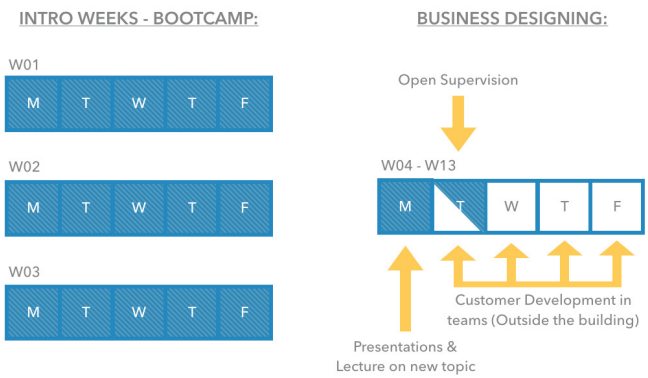


Figure 1:

Focus	Week no.	Theme
Introduction	1-3	Boot-camp
Business Designing	4	Customer Segments: understanding customers, customer profiles, customer archetypes, identifying customer pains/gains
	5	Value Proposition: how to design a compelling value proposition, product & service features, gain creators, pain relievers
	6	Product-Market Fit: prototyping, minimum viable product, creating a fit between customers and the value proposition
	7	Channels: channel-customer fit, channel economics
	8	Customer relationships: how to get, keep, and grow customers
	9	Revenue streams: revenue model strategy, pricing tactics, customer feature and price sensitivity
	10	Key Activities / Key Resources / Partners: partner-resource/activity fit, company architecture, most important resources and activities
	11	Cost Structure / Operational Plan, Fundraising: financial forecasts, budgeting, fundraising
	12	Pitch training
	13	Springboard (external evaluation)
Reporting	14-19	Learning report

Table 1: Overview of the themes for each week

blue). Following the initial three weeks, the students give presentations each Monday as well as attend a lecture on the new topic (the topic being the theme described in Table 1). Furthermore, they set aside time for a supervision meeting each Tuesday. In contrast, the rest of the week is reserved for the students to do customer development by "getting out of the building" and start talking to potential customers, thus getting evidence from the market related to their entrepreneurial endeavour. The term customer can include all types of stakeholders such as customers, users, channel partners, suppliers, domain experts, and sometimes also competitors.

From week two, students are required to identify and talk to the first potential customers, called early evangelists (Blank, 2020). From week four, the students need to validate business model assumptions by interviewing[1] 10–20 potential customers a week. The interaction with customers ensures market engagement and improves BM experimentation, as suggested by Zaleqska-Kurek *et al*. (2016). Assignments related to the BM-themed lectures, the idea development and the customer feedback obtained during the week are presented during the Monday presentations.

Boot-camp weeks

The first boot-camp week is dedicated to teaching the students about the key concepts of the course, which includes entrepreneurship theory, introduction to Lean Start-up Methodology, BMs, the BMC, as well as methods such as (customer) interviews. These sessions are usually structured as traditional class lectures with small workshops to discuss and apply some of the aspects of cases. The Lean Start-up Methodology sessions follow the first chapters of the book by Blank and Dorf (2012), and the BM/BMC lectures follow the Osterwalder and Pigneur (2010) book but modified with new (local) cases and problem-based learning (see Sort and Brøndum, 2021, for examples of this). The first week's aim is for the students to understand how the course is structured, especially because it is very different from most other teaching environments where students are trained to find "correct answers" and where failure is frowned upon (Beghetto, 2010). At the NVC course, failure is a requirement and seen as a valuable learning experience.

[1] Interviews are the standard method in this course because we want the students to really understand the problem by talking to the people experiencing the problem ("the customers"). Later in the process, the students can use questionnaires to test their assumptions at a larger scale.

In the second boot-camp week, creativity is the focal point. Inspired by Parnes (1992), Amabile (1988) creativity theory, process methods and training are introduced. While the general introduction into creativity theory is important from a theoretical perspective, this week is also about hands-on approaches. As many students do not have a business idea or problem to work on from the beginning of the course, the second week allows them to generate ideas and identify problems worth solving in a creative manner.

At the end of the second week, the students should have developed a portfolio of different problems that could be interesting to explore further. In the third week, students vote for the problems they find most original and promising. This selection process keeps the motivation as high as possible, as students are allowed to follow their own interests, which is also suggested by Amabile (1988) and Aulet (2013). Working with a smaller portfolio of problems, the students go through a facilitated process to select a problem to focus on for the rest of the course and form teams.

Entrepreneurial teams are one of the cornerstones of NVC, as studies have shown team-based start-ups tend to be more successful (Aulet, 2013). We facilitate this process and encourage the students to form groups with team members from different study areas so they have a diverse set of theory, experience and background. After team mobilisation, the third boot-camp week involves further lectures and workshops on framing their chosen problem in a BMC and finding and interviewing their first potential customers.

Weeks 4–13

The fourth week marks the beginning of the course structure illustrated on the right in Figure 1. The week begins with a 10-minute presentation from each student team, followed by 10 minutes of feedback from the supervisor and fellow students. Afterwards, a lecture provides a new BM theme for the teams to focus their attention on in the following days. These lectures consist of conventional teaching combined with workshop-based teaching, where the students get to apply some of the theories and frameworks on their project. The combination of lectures and workshops has shown to give the students a great understanding of the theme they need to investigate further that week and speeds up the learning curve as the lecturer is available to support the process during the workshop. The rest of the week is dedicated to team-based customer development activities outside the classroom (interviewing ten or more potential customers) and supervision meetings (if needed).

Weeks 5–11 follow the same structure as week four, with student presentations, a lecture and workshop, supervision, and team-based customer development. However, as shown in Table 1, week 10 focuses on multiple BM themes related to the infrastructure of the business idea. We have merged these themes into one because students find it hard to distinguish between key resources, key activities and key partners across separate weeks, as they are interconnected. Week six also deviates from the BMC building blocks and focuses on the fit between customer segments and the value proposition. Here, we elaborate on some of the key aspects of the Lean Start-up Methodology, including minimum viable products (MVPs), prototyping and feature testing with customers, which we have found warrant further attention. At the end of week 11, the student teams have gone through all of the building blocks in the BMC and simultaneously developed a comprehensive and validated business prospect through the customer development process.

During each week, the students have practiced their presentation skills, but in week 12, we change the perspective from "lesson learned" presentations (cf. Blank & Dorf, 2012) to actual "business pitching". This change of perspective is done for several reasons but predominately because the students have to pitch to an external "springboard" in week 13, where the pitch should be convincing, to the point and persuasive. At this point, most students are ready to talk to potential investors and other stakeholders, so a good business pitch is essential. The week is thus dedicated to creating, refining and rehearsing the "perfect" pitch.

Week 13 marks the official end of the "business designing" part of the course and initiates the "validation" part of the course. The validation phase typically includes more than 100 customer interviews, although often, the number is closer to 200. In this phase, the students are also allowed to do questionnaires to test their business hypotheses on a larger scale.

The concluding "pitch day" is normally structured with two consecutive rounds of pitches. Every team is expected to do a pitch in front of an internal evaluation board, consisting of the involved supervisors and lecturers. The internal evaluation ends with the supervisors picking the teams that have "qualified" for the afternoon session. The later round of pitches is done in front of a board of external evaluators, called external springboard, consisting of one or two business angels or private investors, one or two corporate investors (typically from large companies in the region) and one representative from the AAU incubator programs. The external stakeholders provide feedback to each team after their pitch, followed by a round of Q&A's. In the end, the external springboard selects the "best performing team" based on an evaluation form developed by the faculty[2].

Following week 13, the students have to write a learning report, which they hand in at the end of the course. We require a written learning report because most universities cannot (and probably should not) base an examination and grade on an entrepreneurial endeavour's success or failure, particularly as 9 out of 10 startups fail within five years (Chakrabarti, 2017).

The learning report consists of a theoretical and method section, where the students have to identify and describe the main theories and methods applied. Following this, the students have to reflect on the three major changes during the process known as "pivots" (cf. Ries, 2011; Blank and Dorf, 2012; Blank *et al.*, 2014). The learning report gives the students an opportunity to reflect on the empirics they have collected during the customer development process, what they learned from the pivots they experienced, how they progressed in terms of the BM development as well as learning process, based on theory and empirics. In the next part of the report, the students have to assess their final business model and its viability using the terms from Lean Start-up Methodology (not to evaluate the economic potential, but their learnings and ability to apply the theory). Finally, the students have to discuss and make conclusions on their significant learnings and how they will continue after the course both on a business and personal level.

The role of the teacher, supervisor and externals

Different people engage with the students in different roles during the course. The teacher's primary responsibility is to give the lectures, which means running class each day in the boot-camp weeks and every Monday in weeks 4–13 (see Figure 1). The general ambition is that the teachers give a traditional lecture and facilitate workshops with the students where they apply the new insights they learn from the lectures. Since application of knowledge is one of the main foci in this course, the workshops are valuable to help and enable the students.

Key Insights

Separation of business pitch and learning report is a must

The NVC course has evolved over the last seven years. One of the main issues with practice-oriented entrepreneurship courses is the conflict between creating hands-on learning and starting a viable business while still fulfilling traditional universities' requirements regarding theorizing, applying methodology, examination, and evaluation. During the first iterations of the course, the students were required to write a report explaining the business idea and their learning experiences. Students were often confused about why the oral examination was mostly related to theory, method and learning outcomes rather than the business they spent so much time developing during the course. The separation of the business pitch and learning report was intended to address this confusion and better align with the university's requirements, which has proven successful in the latest feedback we have received from the students.

External stakeholders and springboards are valuable

Including an external springboard as part of the concluding "pitch day" is an exciting way for the students to get further inspiration from others than their supervisors and lecturers. Moreover, the students typically enjoy this opportunity to pitch in front of real investors and high-ranking executives. Both the students

[2] In the last few years, the evaluation criteria has been the following: 25% innovation (uniqueness, need, business idea, pain), 25% verification (value, research, market, cure), 25% business (business concept, proof of …, team, profit), and 25% convince (desire, potential, strategy, persuasion).

and the course, in general, have received very positive feedback from the external stakeholders. The Head of Innovation at Aalborg University has stated that "*The NVC course is providing some of the best entrepreneurs into our innovation programs with the students having strong concepts and very developed entrepreneurial competencies.*" The involved investors attribute this to; firstly, they have been impressed by the high number of validations and BM experiments each team has done and, secondly, the student's insights towards their potential BM. Over the years, we have found that inviting external stakeholders into the course has provided several valuable outcomes and, indeed, worked as a launch pad for the students. Not only have students ended up being employed by some of the investors. Several teams have secured early-stage funding for their entrepreneurial concept and some of the involved investors have invited teams into their professional network for further development of the idea.

Students change perception

At the beginning of the course, the main barrier for students is the customer development part, where the students have to validate the market by interviewing potential customers, partners, suppliers, and domain experts each week. Most students are somewhat fearful of this requirement from the outset and try to figure out ways to avoid it. By the end of the course, it is quite interesting that the customer development process is evaluated very positively by the students, as they come to appreciate the skills they have developed by interacting with potential customers each week. In post-evaluations of the course and after talking to many of the previous enrolled students after some years, students state that these skills have helped them in their final courses and onwards. For example, in the application process for their first job and in their everyday professional life as an employee.

The BMC has limitations – flexibility and creativity is needed

To a large extent, the course flow (from week 4 to 11) follows the building blocks of the BMC as described by Osterwalder and Pigneur (2010). Structuring the course around the building blocks of the BMC has some obvious strengths, as it is a very generic framework and "easy-to-use" tool. On the other hand, the genericness of the BMC is also a drawback. We found that flexibility is needed depending on the different settings of the student projects. Furthermore, we found that using the BMC together with the Lean Start-up Methodology limits creativity due to the prescribed structure and analytical model. This is in line with the criticism raised in the study by Bocken & Snihur (2020). As such, we will shortly address how the NVC course has addressed some of these considerations in the below.

First of all, the BMC is generally developed to analyse and innovate existing BMs, not BM for start-ups. Blank & Dorf (2012) made some changes to the original canvas to facilitate this. For example, early evangelists and customer archetypes are the focus in the customer segments building block; the channel building block is about finding the right product-channel fit; the customer relationship building block focuses on how to get, keep, and grow customers; the revenue streams building block also includes pricing tactics. Even with these small iterations, we found that the BMC still does not fit all start-up ideas. Some of our social enterprise or non-profit teams has ended up using the "Social Business Model Canvas" and teams wanting to start a platform business sometimes use "The Platform Business Model Canvas" as their reference framework during the course. These other frameworks can bring more value for some teams, but the teaching flow still follows the BMC for practical reasons.

Furthermore, we introduce the creativity training during the bootcamp weeks to stimulate the creative flow and develop the students' creative competencies. We have done this to counterweight some of the criticism of the Lean Start-up Methodology being too structured and hindering creativity (e.g., Bocken & Snihur, 2020). From our experience, introducing creativity training has been a success, as the students reflect on their use of creativity as part of their learning report and how this complements their customer discovery iterations with new insights. For example, the students use some of the creativity techniques to get new ideas on how to use customer feedback to improve their entrepreneurial idea, how to approach customers in a creative way, how to persuade customers more, and how to create the best way of testing a hypothesis as part of the customer discovery.

Supervisors should be flexible and change roles

From a teaching perspective, it is essential that the supervisors also allow room for failure and accept that these "errors" will actually turn into new learnings, which will enhance the students' understanding and process. We have found that the supervisors should play the role of "process" supervisors in the first 13 weeks, with a strong focus on business development aspects, guiding the students in new (original) directions and pushing them outside their comfort zone. Supervision meetings in these weeks are more focused on co-creation activities than traditional supervision. During the co-creation, it would be natural for the supervisor to follow-up on the theories and methods leading to the business development, so the supervisor indirectly helps the students reflect upon their process, which is an integral part of the co-creation activity. In the final weeks (14–19) of the course, the supervisor's role changes into a more "normal" academic supervision role, where the focus is on the written report. Even though the supervision approach is different, we have seen that the more we push and encourage the students during supervision meetings, the better the performance.

Strive for interdisciplinarity

Our experiences have also shown that the best performing teams (both on the business and learning part) are multidisciplinary teams. By having a different set of competencies, the student teams see problems and opportunities from various perspectives, which enhances the end-result. However, this also poses the greatest challenge for an interdisciplinary, cross-university course like NVC; it requires a flexible university structure. Students should be allowed to realise their ambition by participating in courses relevant to their future careers and courses that motivate them. Nevertheless, many universities reproduce what is termed "silo-thinking" (Jeal, 2014), where information, economy and students are kept within each faculty without the possibility to attend cross-disciplinary courses. Hopefully, universities, faculties and departments can see the potential and impact made by a course like NVC and start opening up the silo-thinking for the better of the students.

Discussion and Conclusion

Following students both during and after the course has shown us that a hands-on entrepreneurial course, like NVC, strengthens students' skills by enabling them to start their own businesses and become attractive employees for companies. In line with the findings by Al-Atabi and DeBoer (2014), the students attending the NVC course have been appraised during the business pitch for their strong communication skills and companies that have hired NVC graduates have reported back about the high innovativeness of these students. In general, the students with the entrepreneurial abilities provided by this course perform well in the talks we conduct with them and industry stakeholders continuously. Furthermore, the students have - both on a personal and professional level - learned how to adjust and overcome problems and find solutions to challenges faced both as an entrepreneur but also if employed in established companies, which should also be the advantage of such entrepreneurial skills, according to Nadelson *et al*. (2018).

A limitation of this approach is connected to the theoretical limitations found in the Lean Start-up Methodology. Questions remain whether this is most applicable to the domain of the existing market/new product quadrant of the Ansoff Matrix (Ansoff, 1957) and the existing product/new market quadrant. Further, the Lean Start-up Methodology shows some weaknesses when applied in the existing market/existing product quadrant and especially in the new market/new product quadrant. These concerns are mostly derived on a theoretical level where market knowledge equals full information. Our experience, however, shows that students often have limited knowledge about the existing market and products. Therefore, the approach is still applicable and entrepreneurial teams have found viable solutions in most quadrants over the years.

Creating and developing entrepreneurial teaching and a course like NVC has been an exciting journey. Initially, based on the Lean Start-up Methodology, this course has transformed into a versatile course that fits the HEI requirements. The structure of blended presentations, lectures, workshops, external activities, and

reflection through the final report, provides students with skills applicable in different educational and professional pathways.

We have applied the basic ideas explained in this paper in different settings. We have turned the whole course into a high-intense two-week process, equivalent to 3 ECTS. This short process has no written assignments, and the expectations regarding the number of customer interviews to be performed are lower than at the 30-ECTS version. Still, the students show a noticeable improvement in entrepreneurial skills from just two weeks of lectures, learning-by-doing, and presentations.

References

Al-Atabi, M., & DeBoer, J. (2014), Teaching entrepreneurship using massive open online course (MOOC), *Technovation*, Vol. 34. No. 4, pp. 261-264.

Amabile, T. M. (1988), A model of creativity and innovation in organizations. *Research in organizational behavior*, Vol. 10, pp. 123-167

Ansoff, H. I. (1957), Strategies for diversification, *Harvard Business Review*, Vol. 35, No. 5, pp. 113-124.

Aulet, B. (2013), *Disciplined entrepreneurship: 24 steps to a successful startup*, John Wiley & Sons.

Beghetto R. A. (2010), Creativity in the Classroom, in Kaufman, J. C., & Sternberg, R. J. (eds.), *The Cambridge Handbook of Creativity*, Cambridge University Press, pp. 447-464.

Blank, S. (2020), *The four steps to the epiphany: Successful strategies for products that win*, John Wiley & Sons.

Blank, S., & Dorf, B. (2012), *The startup owner's manual: The step-by-step guide for building a great company*, BookBaby.

Blank, S., Engel, J., & Hornthal, J. (2014), *Lean LaunchPad: Evidence-Based Entrepreneurship Educators Guide*.

Bocken, N., & Snihur, Y. (2020). Lean Startup and the business model: Experi- menting for novelty and impact. *Long Range Planning*, 53(4), pp. 1-9

Chakrabarti, R. (2017), "#9 Out of 10 Start-ups Fail. Here's Why!" Available at: https://www.entrepreneur.com/article/295798 (accessed 12 December 2018).

Hindle, K. (2007), Teaching entrepreneurship at university: from the wrong building to the right philosophy, in Fayolle, A. (Ed.), *Handbook of research in entrepreneurship education, being competitive and successful*, Edward Elgar Publishing, Cheltenham, UK, pp. 104-126.

Jeal, Y. (2014), Strategic alignment at the University of Manchester Library: Ambitions, transitions, and new values, *New Review of Academic Librarianship*, Vol. 20, No. 3, pp. 278-295.

Mansfield, R. S., Busse, T. V., & Krepelka, E. J. (1978), The effectiveness of creativity training, *Review of Educational Research*, Vol. 48, No. 4, pp. 517-536.

Nadelson, L. S., Palmer, A. D. N., Benton, T., Basnet, R., Bissonnette, M., Cantwell, L., ... & Lanci, S. (2018), Developing Next Generation of Innovators: Teaching Entrepreneurial Mindset Elements across Disciplines, *International Journal of Higher Education*, Vol. 7, No. 5, pp. 114-126.

Parnes, S. J. (1992), *A source book for creative problem solving*, Creative Behavior Foundation, Buffalo.

Ries, E. (2011), *The lean startup: How today's entrepreneurs use continuous innovation to create radically successful businesses*, Crown Books.

Robinson, P., & Haynes, M. (1991), Entrepreneurship education in America's major Universities, *Entrepreneurship Theory and Practice*, Vol. 15, No. 3, pp. 41-52.

Rodov, F., & Truong, S. (2015), "Why schools should teach entrepreneurship", available at: https://www.entrepreneur.com/article/245038 (accessed 16 July 2018).

Sort, J. C., & Brøndum, K. (2021), Experiences from a Decade: A Universal Approach to Business Model Teaching, *Journal of Business Models*, Online First (2021), pp. i-x.

Zalewska-Kurek, K., Kandemir, S., Englis, B. G., & Englis, P. D. (2016), Development of market-driven business models in the IT industry. How firms experiment with their business models? *Journal of Business Models*, Vol. 4, No 3. pp. 48-67.

Journal of Business Models (2021), Vol. 9, No. 3, pp. 70-79

JOBM
Journal of Business Models

Teaching Sustainable Business Models– A Modeling-Driven Approach

Maren Stadtländer[1], Thorsten Schoormann[2], and Ralf Knackstedt[3]

Abstract

We report on lessons learned from a master-level university course teaching the development of sustainability-oriented business models by emphasizing the modeling perspective. Our approach combines traditional lectures with experiential learning-based elements such as small group exercises, case studies, and in-class reflection to foster students' factual knowledge and practical skills.

Introduction

"The greatest threat to our planet is the belief that someone else will save it."

–Robert Swan (author, conservationist)

New business models enable the old way of doing things to be replaced, and thus open opportunities for better solutions (Magretta, 2002). In pursuing to address one of the most fundamental challenges of today's society, contributing to sustainable development (Brundtland *et al.*, 1987), novel or improved business models play an important role because they have the power to capture "economic value while maintaining or regenerating natural, social, and economic capital" (Schaltegger *et al.*, 2016, p. 6).

In order to boost the development of more sustainable business models, organizations typically face challenges concerning how to arrive at creative ideas and how to translate ideas into specific models (Chesbrough, 2010). Therefore, "structure and guidance to frame and focus thought" (Eppler *et al.*, 2011, p. 1324) are required. Since "visual thinking is indispensable to working with business models" (Osterwalder and Pigneur, 2010, p. 148), it has been determined as the main tool for developing business models (Täuscher and Abdelkafi, 2017). Following this, numerous business model modeling languages (BMMLs) (John *et al.*, 2017) are have been proposed that structure business models through pictorial, mathematical, or symbolic

Keywords: Business Model Development, Business Model Modeling, Sustainability

Please cite this paper as: Stadtländer, M., Schoormann, T., and Knackstedt, R. (2021), Teaching Sustainable Business Models– A Modeling-Driven Approach., Vol. 9, No. 3, pp. 70-79

1-3 Department of Information Systems and Enterprise Modelling, University of Hildesheim, Universitätsplatz 1, 31141 Hildesheim, Germany, maren.stadtlaender@uni-hildesheim.de; thorsten.schoormann@uni-hildesheim.de; ralf.knackstedt@uni-hildesheim.de

Acknowledgment : Funding was provided by the *European Regional Development Fund* and the *Investitions- und Förderbank* ("SmartHybrid; ID: ZW 6-85003451) and the *Niedersächsisches Ministerium für Wissenschaft und Kultur* ("Qualität Plus"; ID: 27-73724/15-4).

ISSN: 2246-2465
DOI: https://doi.org/10.5278/jbm.v9i3.5736

forms (Massa *et al.*, 2017)—including the quasi-standard from Osterwalder and Pigneur (2010), the *Business Model Canvas*. Even though those modeling languages are well-applied, they do not necessarily focus on sustainability (Bocken *et al.*, 2015), which is however important to foster the design of more sustainable businesses that, for instance, establish closed-loop production or replace 'fire and forget' models (Lüdeke-Freund *et al.*, 2017). To overcome this, modeling languages and the represented business model components need to be reframed (Breuer *et al.*, 2018) and adapted (Schoormann *et al.*, 2016) to the specific context of sustainability.

In this teaching approach, we build upon the idea of reframing and adapting modeling languages for business models and confront students with a variety of established and (still) evolving languages. We encouraged them to critically examine the languages' suitability during the analysis and development of new business models. In doing this, students reflect on positive and negative aspects of business models by taking into account a model-driven perspective in which they continuously adapt modeling languages to specific use cases. Thereby, the following key challenge is addressed: *How to use modeling languages for enabling students to critically reflect sustainability in business models?*

This paper describes a teaching approach and lessons learned from its multiple iterations in a master-level university course with students from diverse disciplines such as Information Systems, Environmental Preservation, and Organizational Pedagogy. In addition to traditional lecture-styles, the didactic underpinning draws on elements of *experiential learning* (Kolb, 1984) including case discussions, collaborative projects, and presentations of results in the form of pitches. Through alternating phases of traditional lecture styles with input from teachers, working in small groups (reflection-in-action), and discussing results within the entire course (reflection-on-action), this teaching approach seeks to leverage the *learning-by-doing* effect (Schön, 1983). Accordingly, this paper shows that teaching modeling languages supports students in developing, analyzing, and communicating sustainability-oriented aspects of business models. In this spirit, we hope to increase the students' ability and understanding to act more sustainably (e.g., as potential decision-makers in companies or start-ups and consumers) and to complement the landscape of available courses on business models with a sustainability-oriented modeling lens. For lecturers, we provide a course design including tools and formats as well as recommendations for implementing them.

Approach

Educational Objectives and Didactic Approach

The purpose of this teaching approach is to enable students to systematically analyze and improve existing business models in terms of sustainability as well as to develop and implement completely new ideas for more sustainable business models. Therefore, we aim to build *factual* (e.g., specific business cases) and *methodic* (e.g., modeling languages) knowledge. This knowledge is then applied to collaboratively solve realistic problems through representing, analyzing, and discussing sustainability in real-life business model cases (e.g., from domains such as circular economy, fashion, and sharing economy); thereby drawing from experiential learning (Kolb, 1984), for example, by conducting group exercises (i.e., gaining concrete experiences) and in-class reflections.

To meet the overall purpose, the present teaching approach focuses on achieving the following learning outcomes—defined according to *Bloom's taxonomy of educational objectives* (Bloom *et al.*, 1956): students will be able to (1.1, factual) *understand* the origins of sustainable development and theoretical backgrounds taught in the course, (1.2, methodic) *apply* general strategies and patterns for contributing to sustainability, (2.1, factual) *understand* the origins and the concept of business models, (2.2, methodic) *apply* modeling languages taught in the course to *create* and *evaluate* business models, (2.3, factual) *remember* selected use cases of sustainable business models, (3.1, methodic) *evaluate* and *analyze* the suitability of certain modeling languages in representing sustainability-oriented aspects, (3.2, methodic) *apply* and *create* adaptions of modeling languages.

General Course Structure and Overview of Weekly Lecture Sessions

Table 1 gives an overview of the weekly sessions, assignments, and formats employed.

Next, the course structure is described in more detail, particularly highlighting aspects related to the course's modeling focus. To meet the challenge of teaching the topic to an interdisciplinary group, shared knowledge is built at the beginning of the course, for example, by introducing definitions of business models (**Session 2**), selected models of sustainability and strategies for taking sustainable action (**Sessions 3–4**), as well as a practice case, here in the context of the sharing economy provided by a local startup (*Use Case A*, **Session 5**). Since the course focuses on modeling, students were first instructed in the *Business Model Canvas* (Osterwalder and Pigneur, 2010), which was selected due to being relatively easy to learn and well-established in research and practice (**Session 2**). Afterwards, the students were motivated to critically reflect the abilities and limitations of the Business Model Canvas and other available modeling languages for adequately representing and analyzing a business model's economic, ecological, and social sustainability. Additionally, we introduced common customizations for representing sustainability in the original canvas including (Figure 1), for instance, adding new business model components for environmental impacts (see Schoormann *et al.*, 2016 for an overview), and presented the sustainability-oriented *Triple-layered Canvas*

Weekly session		Students will learn/do...	Learning Outcome	Format
01	Introduction	• Introduction and motivation for the course.	–	Lecture
02	Business models	• Common business model definitions. • Business model modeling languages (BMML) and how they can be applied/adapted.	Understand	Lecture; in-class reflection
03-04	Sustainability	• Origin of sustainable development. • Sustainable entrepreneurship. • Theoretical background (e.g., Stakeholder theory).	Understand	Lecture; in-class reflection
05	Use Case A–Introduction	• Introduction to a practical use case.	Remember	In-class discussion
06	Sustainability in business model development	• (Software supported) Customization of BMMLs to incorporate sustainability. • Theoretical/conceptual approaches to foster sustainability in business models (e.g., patterns).	Evaluate; analyze	Lecture; in-class reflection
07	Use Case A–Design	• Group exercise: represent Use Case A's business model with special consideration on sustainability.	Apply; create	Collaborative exercise; in-class reflection
08	Use Case B–Introduction and Ideation	• Basic principles of Design Thinking. • Business model development using Design Thinking.	Apply; create	Collaborative project
09	Use Case B–Design	• Development and visualization of a new (sustainable) business model.	Apply; create	Collaborative project
10-11	Use Case B–Communication	• Presentation and discussion of business models. • Analysis of the business model's (ecological, economic, social) sustainability.	Apply; create	Collaborative project; presentation; in-class reflection
12	Written exam	• Reflection on approaches for considering sustainability in business model development approaches (e.g., in BMMLs).	Evaluate; analyze; apply; create	Individual exam

Table 1: Overview of Course Design

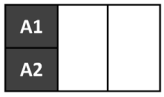
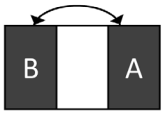
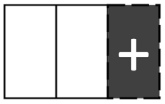
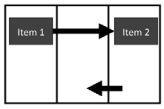
Modifying the content of a component	**Dividing components**	**Modifying the spatial arrangement**	**Adding components**	**Linking elements/ components**
				
e.g., listing 'value creation partners' (anyone who benefits from the business model) instead of customers	*e.g., dividing the value proposition to distinguish between economic, ecological and social value generated*	*e.g., positioning cost structure and revenue streams under ecological and social components to highlight the importance of sustainability-related aspects*	*e.g., adding new components for describing ecological risks and benefits*	*e.g., linking harmful resources with their related ecological risks*

Figure 1: Overview of Customizations and Exemplary Application in a Canvas-based Approach

(Joyce and Paquin, 2016) (**Session 6**). We hereby allowed students to reflect existing approaches as well as design approaches of their own. In doing this, the plurality of different approaches is emphasized and a need for reframing and adapting approaches to a specific context such as sustainability is stressed (Breuer *et al.*, 2018).

This methodic knowledge of applying and adapting modeling languages for business models and their sustainability-oriented aspects was employed in two group assignments. For the first assignment (**Session 7**), the students modeled *Use Case A* with the Business Model Canvas and integrated various aspects of sustainability using customizations introduced in previous sessions, such as adding new components for ecological and social costs. Students thereby applied their knowledge of business model modeling, and practiced critical thinking by selecting appropriate customizations. Figure 2 illustrates the consolidated and anonymized sharing business model as well as selected customizations, particularly in the form of additional canvas components (displayed here using a custom software prototype developed in our department).

Students then spent three weeks working on a *problem-based group* assignment to develop and pitch their own business model (*Use Case B*; resulting in three online platforms for sharing tools, appliances, or services, as well as an online agency equipping temporary workers with the knowledge to become multiplicators for ecological sustainability) (**Sessions 8–11**). Here, modeling business models served two purposes. First, each group applied a variety of sustainability-oriented customizations to collect suggestions of how to implement their business idea not only to generate financial success, but also act environmentally and socially conscious and assess the potential business model's impact. Simultaneously, the students were empowered to make informed choices of suitable approaches including, but not limited to, the previously practiced modeling languages and customizations, and presented their methodical approach to their peers. Therefore, students are enabled to more easily navigate the variety of available approaches and extend them where necessary to design sustainability-conscious business models. Second, each group used the visualized model in their presentations to pitch their business idea. The visualization thereby becomes a *boundary object* (Star and Griesemer, 1989) for communicating the idea to peers and lecturers, allowing for a structured discussion and collaborative assessment of the business model and its potential impacts.

Since not all students are comfortable with teaching styles that require them to take responsibility for their own learning individually or in groups with their peers (Hoveskog *et al.*, 2018) and at times show reluctance to work collaboratively or participate in open

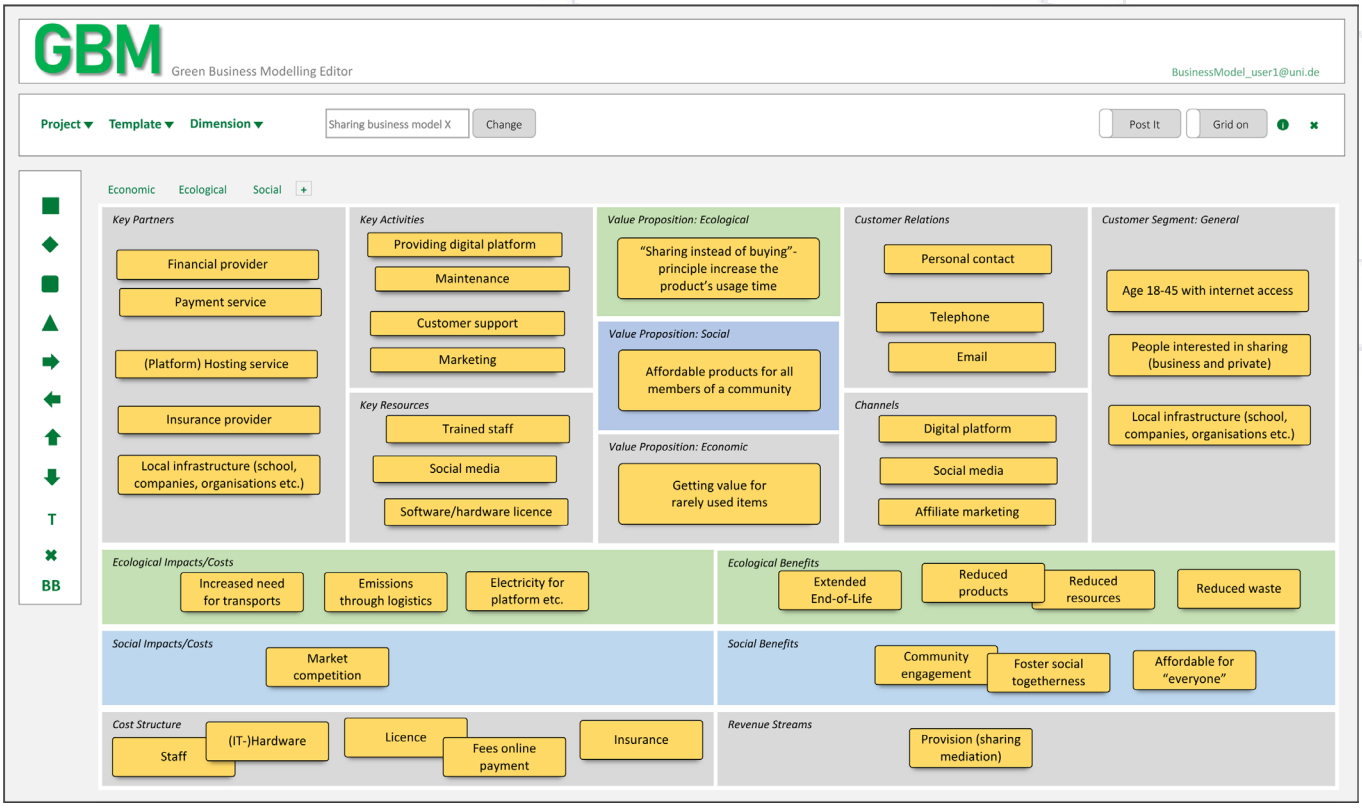


Figure 2: Demonstration of the Practical Use Case for Sharing Business Models

in-class discussions, we selected an individually written exam for the course assessment. In this exam, students applied their knowledge to create and represent another business model, and to critically discuss, select, and implement (modeling) languages for disclosing sustainability-relevant aspects (**Session 12**).

Key Insights

In order to verify the usefulness of the presented course, we (1) analyzed a standardized questionnaire given out by the university's quality management allowing to obtain data using open and closed questions (e.g., regarding the course environment and the students' effort to pass the course). The questionnaire was completed by fifteen students in the last iteration. Moreover, we (2) conducted a focus group, a "moderated discussion among six to twelve people who discuss a topic" (Tremblay *et al.*, 2010, p. 600). For this, we carried out a voluntary, 90-minute workshop with nine students that participated in the course, transcribed the verbal protocols recorded, and carved out observations with two researchers.

In performing this evaluation, we were able to observe general changes of awareness for sustainability-related issues, including tentative changes in behavior through participating in the course (e.g., "*I try to buy products that have less packaging*"; "*I started to look where [the water brand I drink] actually comes from*"; "*I have joined some second-hand apps.*").

Referring to the modeling-driven focus, four main observations emerged that should be taken into account by lectures intending to adapt or design a similar course (Table 2).

(1) Modeling language customizations. Most importantly, we found that modeling languages and component-based customizations for sustainability taught in the lectures were recognized as helpful for considering more than only financial aspects of a business model (e.g., "*[...] the established canvas can be adapted like by adding new blocks for ecological and social impacts, which leverages the consideration of further aspects.*"). Students also emphasized that visualizing the business models helped them to systematically compare and integrate different perspectives of sustainability

(e.g., "*The goal of modeling was to not only consider the economic but also the social and ecological perspective [which helps to] deliberately analyze trade-offs*.") as well as to consider the manifold sustainability-related stakeholders and perspectives on a business model (e.g., "*I was encouraged to critically reflect things like by using modeling languages for business models and their sustainability-oriented customizations. These foster me to consider not only economic goals but also ecological and social ones [...]*"). However, some students criticized that the in-class discussions of the project presentations (Session 11) should have a stronger focus on discussing and comparing the modeling customizations used by each group. This highlights that teachers need to provide students with various opportunities for applying and practicing their methodical knowledge throughout the entire course, for example, by preparing guiding questions for the project presentations (e.g., "*Apply and justify suitable customizations for modeling and analyzing a given business model regarding its sustainability*").

(2) Collaborative modeling. Efforts towards sustainability force different stakeholders to collaborate to reach a variety of often conflicting goals. Equally, diverse points of view are beneficial when tackling multi-perspective challenges of sustainability. Our observations underline the importance of allowing the students to work collaboratively on case studies (e.g., "*It was beneficial to work intensively in small groups. [...] we had to consider many stakeholders, and this helped reflecting about them*."). To facilitate this, students need to be equipped with both abilities for and experience of solving (practical) problems in heterogeneous teams. Lecturers therefore need to provide an environment that fosters students to communicate and debate their different perspectives, experiences, and beliefs, for example, by conducting team building exercises, establishing constructive conversational rules, and encouraging peer feedback.

(3) Real use cases. We have observed that students often struggle with applying knowledge to real-world problems which is, however, necessary to translate knowledge into action (e.g., "*We have learnt how to model [sustainability solutions], but have seldomly tested feasibility [in real life].*"). Consequently, students should be taught about real-life problems early on, for instance, by inviting external organizations and industry partners to report on their business models, and students should be enabled to apply modeling languages to real use cases. Doing this, they build problem-solving skills, are motivated, and assess the usefulness of modeling languages in different practical scenarios.

(4) Interdisciplinary groups. Due to the interdisciplinary composition of the course, some students may struggle at first with the modeling lens (the degree of

Observation	Lessons learned and exemplary recommendations
(1) Modeling language customizations	Introduce and compare a variety of modeling approaches for business models. Reflect on the capability of available approaches to contribute to sustainability (e.g., customizations). Encourage the adaptation and extension of existing and development of novel modeling approaches to account for sustainability aspects.
(2) Collaborative modeling	Provide the students with a structure, environment, and discussion culture to communicate and debate different perspectives, experiences, and beliefs. Conduct exercises in small groups. Implement team building exercises, peer feedback, and conversational rules.
(3) Real use cases	Introduce real-life problems early on, for instance, by inviting external organizations and industry partners to report on their business models. Enable students to apply methods, (software) tools, and best practices to real cases (e.g., from industry partner).
(4) Interdisciplinary groups	Identify and close gaps in fundamental knowledge and skills required in the early stages of the course. Provide introductory lectures or additional tutorials.

Table 2: Summary of Observations and Preliminary Recommendations

the course's prerequisites was perceived as rather high) or miss the link between the factual and methodic knowledge (e.g., "*with an isolation [of the modeling languages] from the model content, it becomes clear that the goal is not to develop an innovative business model, but to use the methods and discuss why we did what*"). Closing gaps in basic skills required for the course through introductory sessions (see Sessions 1–4) therefore is necessary. Modeling languages should be chosen considering common languages, suitability for the context, and with the group composition in mind. They need to be introduced in appropriate detail.

Discussion and Conclusion

In this article, we have reported on a teaching approach that builds upon experiential learning and takes into account the modeling aspect of business models in particular. Thereby, we aimed at empowering students to reflect on sustainability in business models (i.e., factual knowledge) as well as on the modeling languages themselves (i.e., methodic knowledge). We complement available courses, both with and without emphasis on sustainability (e.g., Bitetti, 2019; Karlusch *et al.*, 2018; Szopinski, 2019), by primarily applying a modeling lens on business models.

Although our insights are anchored in a specific field of application, namely a master-level university course taught face-to-face in a classroom, we believe that the course design is applicable also to other settings, which we will justify in the following. First, the course primarily targets Information Systems students who usually are already experienced in the use of modeling languages (e.g., for business processes). However, since the course is part of a university-wide certificate–*Education and Sustainability*–we also gained experience with teaching students from other programs such as Environmental Preservation and Organizational Pedagogy. We argue that our course design sufficiently takes interdisciplinary groups into account by closing knowledge gaps and selecting modeling approaches that are easy to comprehend even without previous experience, and thus is transferable to other group compositions in higher education. Second, the course is geared towards master-level students who are usually practiced with critical reflection and analysis. Nevertheless, we believe that by focusing on factual knowledge and case study modeling (e.g., modeling and analyzing multiple case studies) and/or adding guided tutorial sessions, the course could also be adapted towards the needs of bachelor-level students. Third, our course is not necessarily restricted to an in-classroom setting. Due to the existence of supporting software tools (see Szopinski *et al.*, 2019) which allow for spatially and temporally independent modeling, our course can also be applied in a hybrid or entirely virtual setting. Finally, the group size in the past fluctuated between 22 and 46 participants, which is comparable to other courses at this university. In line with large-scale courses with a similar theme (e.g., Szopinski, 2019), we believe that the course can be scaled up and down without any or with only slight adaptions to the design (e.g., a different exam setting or using peer feedback). However, the group size must allow for collaborative work in small groups (e.g., 3-6 students), and scaling up can lead to an increased workload for academic staff.

Even though we present a promising teaching approach, our study is not free of limitations. The selection of modeling languages applied within our course was based on individual decisions, and thus has restrictions. Furthermore, due to the time limitation of our course, further research is demanded that, for example, explores whether the course addresses the *value-action gap* (Kollmuss and Agyeman, 2002), or how specific tools, didactic methods, or content covered relate to theories such as *self-efficacy* (i.e., the expectation of a person that they are able to successfully perform an action; Bandura, 1977).

Overall, this article describes the design of a particularly modeling-driven course on analyzing sustainability in existing models, as well as developing more sustainable ones. Thereby we aim at complementing the emerging landscape of courses on business models. We hope that by highlighting observations from evaluating one iteration of the course design (2019), discussing positive outcomes, challenges, and recommendations, and discussing transferability, our experiences will aid lecturers interested in developing or adapting courses of their own.

References

Bandura, A. (1977), "Self-efficacy: Toward a unifying theory of behavioral change", Psychological Review, Vol. 84 No. 2, pp. 191–215.

Bitetti, L. (2019), "Activate Business Model Learning Through Flipped Classroom and Backward Design", Journal of Business Models, Vol. 7 No. 3, pp. 47–57.

Bloom, B.S., Engelhart, M.D., Furst, E.J., Hill, W.H. and Krathwohl, D.R. (1956), Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain, David McKay Company, New York, USA.

Bocken, N.M.P., Rana, P., Short, S.W. (2015), "Value mapping for sustainable business thinking", Journal of Industrial and Production Engineering, Vol. 32 No. 1, pp. 67–81.

Breuer, H., Fichter, K., Lüdeke-Freund, F. and Tiemann, I. (2018), "Sustainability-oriented business model development: principles, criteria and tools", International Journal of Entrepreneurial Venturing, Vol. 10 No. 2, pp. 256–286.

Brundtland, G.H., Khalid, M., Agnelli, S., Al-Athel, S. and Chidzero, B. (1987), Our common future, Oxford, England.

Chesbrough, H. (2010), "Business Model Innovation Opportunities and Barriers", Long Range Planning, Vol. 43 No. 2, pp. 354–363.

Eppler, M.J., Hoffman, F. and Bresciani, S. (2011), "New Business Models Through Collaborative Idea Generation", International Journal of Innovation Management, Vol. 15 No. 6, pp. 1323–1341.

Hoveskog, M., Halila, F., Mattsson, M., Upward, A. and Karlsson, N. (2018), "Education for Sustainable Development: Business Modelling for Flourishing", Journal of Cleaner Production, Vol. 172, pp. 4383–4396.

John, T., Kundisch, D. and Szopinski, D. (2017), "Languages for Modeling Business Models: A Critical Review and Future Research Directions", in *Proceedings of the Thirty-eighth International Conference on Information Systems, Seoul, Korea*, pp. 4070–4091.

Joyce, A. and Paquin, R.L. (2016), "The triple layered business model canvas: A tool to design more sustainable business models", Journal of Cleaner Production, Vol. 135, pp. 1474–1486.

Karlusch, A., Sachsenhofer, W. and Reinsberger, K. (2018), "Educating for the development of sustainable business models: Designing and delivering a course to foster creativity", Journal of Cleaner Production, Vol. 179, 169–179.

Kolb, D.A. (1984), Experiential learning: experience as the source of learning and development, Prentice Hall, Englewood Cliffs, New Jersey, USA.

Kollmuss, A. and Agyeman, J. (2002), "Mind the Gap: Why do people act environmentally and what are the barriers to pro-environmental behavior?", Environmental Education Research, Vol. 8 No. 3, pp. 239–260.

Lüdeke-Freund, F., Freudenreich, B., Schaltegger, S., Saviuc, I. and Stock, M. (2017), "Sustainability-Oriented Business Model Assessment–A Conceptual Foundation", in Carayannis, E.G. and Sindakis, S. (Eds.), Analytics, Innovation, and Excellence-Driven Enterprise Sustainability, Palgrave Macmillan, pp. 169–206.

Magretta, J. (2002), "Why Business Models Matter", Harvard Business Review, Vol. 80 No. 5, pp. 86–92.

Massa, L., Tucci, C.L. and Afua, A. (2017), "A Critical Assessment of Business Model Research", The Academy of Management Annals, Vol. 11 No. 1, pp. 73–104.

Osterwalder, A. and Pigneur, Y. (2010), Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers, Wiley.

Schaltegger, S., Hansen, E.G. and Lüdeke-Freund, F. (2016), "Business Models for Sustainability: Origins, Present Research, and Future Avenues", Organization & Environment, Vol. 29 No. 1, pp. 3–10.

Schön, D.A. (1983), The reflective practitioner: How professionals think in action, Basic Books.

Schoormann, T., Behrens, D., Kolek, E. and Knackstedt, R. (2016), "Sustainability in Business Models–A Literature-Review-Based Design-Science-Oriented Research Agenda", in *Proceedings of the Twenty-fourth European Conference on Information Systems, Istanbul, Turkey*.

Star, S.L. and Griesemer, J.R. (1989), "Institutional Ecology, 'Transitions' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39", Social Studies of Science, Vol. 19 No. 4, pp. 387–420.

Szopinski, D. (2019), "Squaring the Circle: Business Model Teaching in Large Classroom Settings", Journal of Business Models, Vol. 7 No. 3, pp. 90–100.

Szopinski, D., Schoormann, T., John, T., Knackstedt, R. and Kundisch, D. (2019), "Software tools for business model innovation: Current state and future challenges", Electronic Markets, pp. 1–26.

Tremblay, M.C., Hevner, A.R. and Berndt, D.J. (2010), "Focus groups for artifact refinement and evaluation in design research", Communications of the Association for Information Systems, Vol. 26 No. 27, pp. 599–618.

About the Authors

Maren Stadtländer is a research assistant at the University of Hildesheim. Research interests involve approaches for teaching the development and analysis of sustainability-oriented business models to students and organizations as well as innovative digital solutions for increasing student learning outcomes and satisfaction.

Thorsten Schoormann is a post-doctoral research assistant at the University of Hildesheim, department of Enterprise Modelling and Information Systems. His research interests include business models, business process models, and supporting software-based tools (e.g., business model development tools) that contribute to economic, ecological, and social sustainability.

Ralf Knackstedt is a Full Professor of Information Systems and Enterprise Modeling at the University of Hildesheim. His research areas include reference modeling, product-service systems, conceptual modeling, and business process management. He received his doctoral degree and habilitation at the University of Münster and worked at the European Center for Information Systems (ERCIS). His work has been published in academic journals such as Business Information Systems Engineering, IEEE Transactions on Engineering Management, Communications of the AIS, and Scandinavian Journal of Information Systems.

BUSINESS SCHOOL
AALBORG UNIVERSITY

BUSINESS
DESIGN
LAB