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Opening the Black Box of Startup Education

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Abstract. Teaching entrepreneurship and startups is a challenging task. Approaches using real or simulated entrepreneurship as a teaching method are also common in startup education. However, as educators and researchers, we typically only observe the outcomes of the startup journey between weekly lectures and other meetings, whereas the actions taken by the student teams can seldom be observed. This makes the process a black box. All valuable learnings, realizations, and big ideas happen in the students' minds, and little evidence exists to say what happened during the course. As a result, we are entirely missing out on the most critical elements of the learning process. To remedy this issue, we propose a new tool for startup education: The Startup Scratch Book. Based on extant literature and our experiences in the area, we have devised this novel approach to learning diaries in startup education. We discuss the specifics of this proposed approach in this paper.

Keywords: Startup, Software Startup, Entrepreneurship Education, Learning Diary, Methodology

1 Introduction

Software startups are an important economic force globally today. Startups are often associated with innovativeness and with success stories where a garage-based team grows its business into a global corporation. These types of stories have resulted in both research and industry interest towards startups. Researchers and companies alike have sought to understand what a ‘startup’ really is and what makes them different from other business organizations. Startups have been studied from various points of view, with one point of focus being how startups operate, resulting in approaches such as the Lean Startup Method [16] and Internal Startups [8].

In a similar fashion, this interest towards startups has also made its way into entrepreneurship education. Startup-specific courses can now be found in various disciplines. This also includes IT ones, given how technology-focused startups tend to be.

It seems to be common in startup education to utilize approaches that focus on learning by doing [2, 3]. This is hardly unheard of in entrepreneurship education in general, as many such course take approaches that focus on teaching students “for” entrepreneurship, preparing them to do so in practice, or “through” entrepreneurship

in a simulated or real manner [17]. These types of teaching approaches often result in courses that are not organized in the typical lectures (and exercises) into an exam manner. New types of assignments and grading criteria are needed to evaluate work happening in a real or simulated startup during the course [2, 3].

Research on startups thus far has sought to understand how startups work. This is also of interest from the point of view of education and educators. In courses focusing on learning “through” entrepreneurship, the educators are typically only able to observe the outcomes of the startup journey. Between lectures and other types of meetings, such as mentoring ones, the student teams typically work independently. This results in a situation where the work itself carried out by these teams becomes a black box where only the outcomes of the work can be observed.

In this paper, we propose a data collection tool for startup education, the Startup Scratch Book (SSB). The SSB is a novel approach that draws from the established learning diary approach used in education. We discuss what the tool is and how it could be used in startup education, as well as what potential benefits it could yield.

2 Theoretical Background

In this section, we discuss existing research relevant to this topic. In the first subsection, we discuss entrepreneurship education and startup education. In the second subsection we discuss the use learning diaries in education. In the third subsection, we discuss the Business Model Canvas, as it was used as a part of the research model.

2.1 Entrepreneurship Education and Startup Education

Startup education is often carried out in a manner that makes it a subset of entrepreneurship education, with the focus on the entrepreneurial point of view on startups. Though some entrepreneurship courses also discuss startups, courses focusing specifically on startup entrepreneurship are common. These courses are common in IT disciplines as well [2, 3], given how many startups focus on software or hardware. Even if a startup does not sell software, software is typically at the center of its business and plays a key role in delivering value (e.g. Uber delivers value through an app).

Sirelkhatim & Gangi [17], based on a literature review in the area, categorize entrepreneurship education into three categories: teaching 1) “about” entrepreneurship, 2) “for” entrepreneurship, and 3) “through” entrepreneurship. The first one refers to conventional teacher-centric education where the focus is on theory. The second and third refer to more practice-focused education, where teaching “for” entrepreneurship is about preparing students for entrepreneurship and teaching “through” entrepreneurship either real or simulated entrepreneurship during the course. This typology arguably applies to startup education as well. As Chanin et al. [2, 3] remark, startup education rather commonly utilizes teaching “through” (startup) entrepreneurship approaches. As are often associated with characteristics such as inexperienced team and lack of resources, they are arguably easier to found or simulate in an educational setting with students – and, in fact, many startups are founded by students.

Past studies, such as that of Rasmussen & Sørheim [14], have linked action-based entrepreneurship education (i.e. learning by doing, which can be likened to teaching “through” entrepreneurship) with an increased number of new businesses founded by course participants. If the aim is to foster entrepreneurship among students, such teaching approaches may be preferable to traditional lecture-based ones.

2.2 Learning Diaries in Education

Learning diaries are widely used tools in education. In a course utilizing learning diaries, the students write down their learning experiences into this diary, e.g. one entry per lecture. Rather than simply writing down what was discussed in a lecture, students are encouraged to reflect on the learning experience, thinking about it critically and evaluating the implications of what they have learned. Indeed, learning diaries focus on developing the reflection and critical thinking skills of the students [13]. Learning diaries have been found in past studies to increase the metacognitive skills and attitude of students, their time management skills [4], as well as their engagement and motivation, and to help them better understand their learning processes [12].

For educators, learning diaries function as a way of grading students, as well as a way of tracking what the students are learning. In larger courses, they can be resource-intensive to evaluate, however, given the amount of textual content in each diary [6]. Typical assessment criteria for learning diaries include: (1) length, (2) presentation and legibility, (3) number or regularity of entries, (4) clarity and quality of observation, (5) evidence of speculation, (6) evidence of willingness to revise ideas, (7) honesty and self-assessment, (8) thoroughness of reflection and self-awareness, (9) depth and detail of reflective accounts, (10) evidence of creative thinking, (11) evidence of critical thinking, (12) a deep approach to the subject matter, (13) representation of cognitive skills, (14) relationship of the entries in the journal to any relevant coursework, theories etc., (15) match of the content and outcomes of journal work to course objectives, learning outcomes for the journal or purposes that the journal is intended to fulfill, and (16) questions that arise from the reflective processes and on which to reflect further [10].

2.3 Business Model Canvas

The Business Model Canvas (BMC) [11] was used as one framework in the Startup Scratch Book as discussed in the following section. The BMC takes on the form of one sheet of paper (hence canvas). This sheet is then split into boxes (See Figure 1 in the next section), each of which contains one element of a business model. The user of the canvas fills it out to get a better picture of their current or hypothetical future business idea. The BMC has become particularly popular among startups where filling out a lengthy business plan, especially early on, can quickly become fruitless work when the approach changes following a so-called pivot.

3 Model for the Startup Scratch Book

The Startup Scratch Book (SSB) is summarized into a model describing its key elements in Fig. 1 below. The SSB combines elements of traditional learning diaries and scrap books. While they contain reflection in the form of text written specifically for the SSB, the SSBs also focus on recording the learning process through various other types of data. These data can be anything from sketches to notes to survey data.

The model for the SSB (Fig. 1) consists of two layers. On the first layer are four building blocks (relevance, depth, reflection, and presentation), while on the second layer is the content of the scratch book, where the Business Model Canvas is used as a framework. Each building block contains sub-elements which also function as assessment criteria. These are discussed in detail in the following subsections.

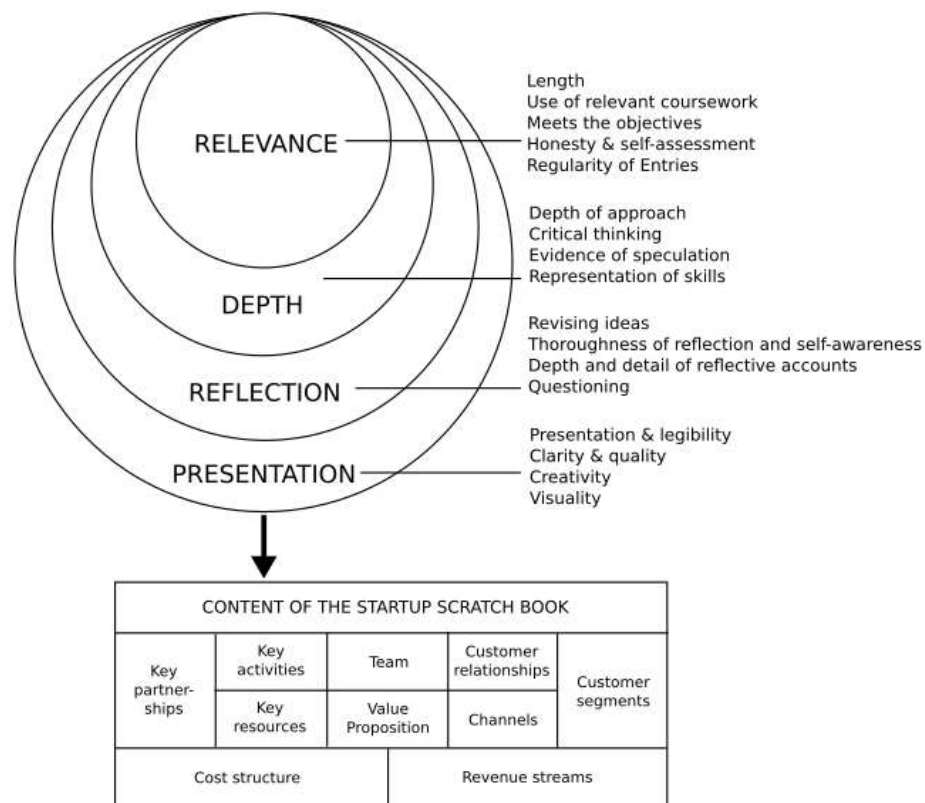


Fig. 1. Model for the Startup Scratch Book.

Aside from its educational goals, the purpose of an SSB is to record as much of the work done in a startup as possible. An SSB contains all the material of a startup from user surveys and the data collected via said surveys to pitch decks and sketches. It

provides a large and varied set of data to anyone interested in studying startups, especially in educational settings.

3.1 Relevance

Relevance is the foundation of the scratch book. It is judged based on five criteria. First, the length of the SSB is defined in course requirements (e.g. 100 pages). Secondly, the use of relevant coursework refers to the use of academic literature, frameworks etc. that have been discussed during the lectures or in the course requirements. Thirdly, the SSB should meet any other objectives defined for it.

The fourth criterion, honesty & self-assessment, can be difficult to evaluate objectively. As Maloney et al. [9] discuss in relation to learning diaries, both physical and psychological factors can result in dishonest reflection. To tackle these challenges, it is important to discuss the SSB and its role thoroughly with the students. Honesty is evaluated primarily through the regularity of the entries and how the reflection is carried out. To this end, the fifth and final attribute of relevance, regularity of entries, is evaluated based on how the SSB proceeds chronologically.

3.2 Depth

Depth refers to how in-depth the text goes and how accurate the descriptions are. Moon [10] discuss the depth and detail of the reflection as one evaluation criterion for learning diaries, and it is used as such here. In evaluating depth in SSBs, the presence of critical thinking and any related speculation, and the depth of thought and reflection are focused on. Finally, discussing skills known beforehand or learned during the course and how they were used in the startup process is one factor in evaluating depth, although not mandatory.

3.3 Reflection

Reflection is also a separate building block of its own. Moon [10] argue that reflection is of high quality when it is analytical or integrative and links factors and perspectives. Revising ideas refers to the process being visible in the text, and that ideas and their implementations are revised as the startup progresses. Thoroughness, here, refers to the reflection being visible in the text and it being many-sided and comprehensive. Questioning is about showing in the text that the ideas and sources are questioned in some way when considered worth questioning.

3.4 Presentation

Presentation includes criteria related to the visual aspects of the work as well as its layout. Legibility includes citing any source materials correctly and the text being honest. Clarity and quality are typical assessment criteria in learning diaries [10] and they are used here as well; the content should be understandable and of good quality.

Creativity refers to displaying creativity in the ideas depicted in the SSB and their implementation, as well as the layout of the SSB itself. Visuality refers to the visual presentation of the SSB, such as pictures, tables, and any other visual elements and how they are represented.

3.5 Content

The content required in the SSBs should be defined in the course requirements. Aside from other SSB content, it includes the content of the business model canvas. All of the building blocks of the BMC should be covered in an SSB. In addition to the traditional building blocks of BMC, the SSB should also include the team perspective, the potential inclusion of which we have discussed in another paper (see [7]).

4 How to Use the Startup Scratch Book?

The Startup Scratch Book (SSB) is a tool for entrepreneurship courses, and specifically startup entrepreneurship ones, that utilize a learning “through” entrepreneurship approach (as described by Sirelkhatim & Gangi [17]). I.e., for courses that teach through real or simulated entrepreneurship. It is a novel approach to utilizing learning diaries in startup education. Aside from functioning as a learning diary, it is a way of recording the startup journey during such courses. Indeed, rather than focusing exclusively on content manually written for the learning diary, the SSB also includes different types of documents created during the startup journey (e.g. notes, sketches...)

To this end, aside from being intended to provide the benefits of learning diaries to the students, the SSB is a data collection method for gathering rich data while also serving as a way of tracking the work done by the student teams in the course. Any weekly or other course deliverables are included into the SSB, such as a filled BMC, or data from customer surveys. For students, this serves as a way of showing the work they have done during the course. For teachers (and researchers), this also provides a closer look into the startup journey in the form of a rich set of data that can be adjusted based on research needs.

In evaluating the SSBs, the model we discussed in the previous section is to be used (summary in Fig. 1) There are five building blocks to be evaluated and each of these is discussed in detail in the previous section. In our course, we have defined the minimum length for the SSBs to be 100 pages. This can be adjusted based on what kind of data one wishes to include into the SSBs. In our example use case, we left it up to the students to include whatever they wanted to past the required content.

Due to the proposed length of the SSBs (100+ pages, team effort), we encourage those using the SSBs to monitor the progress of the teams. If regular updates are made, this is ultimately not a daunting amount of data, given that the SSB does *not* consist exclusively of traditional learning diary content in the form of written reflection. Nonetheless, it is arguably a daunting task to produce an SSB a week or a day before the deadline, and as such the teams should be working on it regularly – as is the case with any learning diary.

5 Discussion and Conclusions

Based on extant literature from various areas of research, such as lean startup methodologies [16], the Business Model Canvas [11], startup [2, 3] and entrepreneurship education [17], and learning diaries (e.g. [10]), we propose a novel approach to learning diaries in startup education: the Software Startup Scratchbook. We have discussed the theoretical foundation of this tool in detail in Section 3, and how it could be used in practice in Section 4. The SSB is a tool that could help capture the overall learning process of creating a new business, including the challenges associated with it. It also serves as a tool for reflecting on the process and what has been learned during it.

Indeed, aside from being a data collection method, the SSB is still an educational tool. Our motto for SSB is that “If it is not recorded in the book, it does not exist.” We hypothesize that the students become mindful of their cognitive processes, actions, and material they read and discover, the customers they talk to, and everything that happens in their startup process over the several weeks of the course. Thus, the effects of the SSB should be better when compared to traditional learning diary outcomes. I.e., as traditional learning diaries have been argued to do [4, 12], using the SSB could help students develop their metacognitive skills and attitude, time management skills, and/or their engagement and motivation, and/or help the better understand their learning process. However, this is pending empirical validation.

Aside from educational goals, the SSB functions as a data collection method that produces a large amount of rich data. Given the breadth of data provided by the SSB, it can serve as a primary or supporting data source for various types of studies. On the other hand, one key challenge in using learning diaries is trust [5, 9]. A lack of trust can stem from physical and psychological limitations [9]. E.g. a student might be afraid of receiving a lower grade due to being critical about the course.

However, in this paper, we have only presented a *proposal* for this tool, and described how it could be used in practice. We have, thus far, utilized it in practice ourselves in a Lean Startup course at the University of Jyväskylä. We have developed the tool iteratively, listening to student feedback and using existing literature to improve it. Yet, it is still pending formal, scientific empirical validation in terms of its learning outcomes and how it functions in practice. While we plan to do so ourselves in the future, those interested in the SSB as a potential data collection approach are encouraged to do so as well. To this end, future studies on the SSB should seek to either improve the SSB model further, or to look at how SSBs could be utilized as primary or supporting data in startup research. So far, we submitted the SSB to the 6th Teaching Innovation & Entrepreneurship Excellence competition, and it can now be found in the book [15] featuring all the finalists.

Finally, though SSB could certainly be used outside the educational context as well, producing one can be time-consuming. For a course deliverable that decides a major portion of the grade of a project-based course, resource-intensiveness is to be expected. On the other hand, convincing startup practitioners to produce SSBs for research purposes is likely to be a challenging task.

References

1. Abrahamsson, P., Suoranta, M., Lahti, S., Kemell, K-K.: The Startup Scratch Book Changes the Way We Teach, Research and Learn in Startup Education. In: Remenyi, D. (eds.) 6th Teaching Innovation & Entrepreneurship Excellence Awards 2020 - An Anthology of Case Histories. Academic Conferences International, Reading, United Kingdom (2020).
2. Chanin, R., Khanna, D., Kemell, K. K., Wang, X., Sales, A., Prikladnicki, R., Abrahamsson, P.: Software startup education around the world: a preliminary analysis. In CEUR workshop proceedings (No. 2305). RWTH Aachen University (2018).
3. Chanin, R., Sales, A., Pompermaier, L., & Prikladnicki, R.: A systematic mapping study on software startups education. In Proceedings of the 22nd International Conference on Evaluation and Assessment in Software Engineering 2018, 163-168 (2018).
4. Dignath-van Ewijk, C., Fabriz, S., Buttner, G.: Fostering self-regulated learning among students by means of an electronic learning diary: A training experiment. *Journal of Cognitive Education and Psychology* 14(1), 77–97 (2015).
5. English, L. M.: Ethical Concerns Relating to Journal Writing. *New directions for adult and continuing education*, 90, 27-35 (2001).
6. Hyppönen, O., Lindén, S.: Opettajan käsikirja: opintojaksojen rakenteet, opetusmenetelmät ja arviointi (2009).
7. Kemell, K-K., Elonen, A., Suoranta, M., Nguyen-Duc, A., Garbajosa, J., Chanin, R., Melegati, J., Rafiq, U., Aldaej, A., Assyne, N., Sales, A., Hyrynsalmi, S., Risku, J., Edison, H., Abrahamsson, P.: Business Model Canvas Should Pay More Attention to the Software Startup Team. In Proceedings of the 46th Euromicro Conference on Software Engineering and Advanced Applications (SEAA/DSD) (2020).
8. Kemell, K-K., Risku, J., Strandjord, K., Nguyen-Duc, A., Wang, X., Abrahamsson, P.: Internal Software Startups – A Multiple Case Study on Practices, Methods, and Success Factors. In Proceedings of the 46th Euromicro Conference on Software Engineering and Advanced Applications (SEAA) (2020).
9. Maloney, S., Tai, J. H. M., Lo, K., Molloy, E., Ilic, D.: Honesty in critically reflective essays: an analysis of student practice. *Advances in health sciences education* 18(4) (2013).
10. Moon, J. A.: *Learning journals: A handbook for reflective practice and professional development*. Routledge (2006).
11. Osterwalder, A., Pigneur, Y.: *Business model generation: a handbook for visionaries, game changers, and challengers*. Joh Wiley & Sons (2010).
12. Park, C.: Engaging students in the learning process: The learning journal. *Journal of Geography in Higher Education*, 27(2), 183-199 (2003).
13. Pavlovich, K., Collins, E., Jones, G.: Developing students' skills in reflective practice: Design and assessment. *Journal of Management Education* 33(1), 37-58 (2009).
14. Rasmussen, E. A., Sørheim, R.: Action-based entrepreneurship education. *Technovation* 26(2), 185-194 (2006).
15. Remenyi, D.: Innovation in Teaching of Research Methodology Excellence Awards 2020: An Anthology of Case Histories. Acpiil (2020).
16. Ries, E.: *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses*. Crown Business (2011).
17. Sirelkhatim, F., Gangi, Y.: Entrepreneurship education: A systematic literature review of curricula contents and teaching methods. *Cogent Business & Management* 2(1) (2015).