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Software Startup Education: Gamifying Growth Hacking

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ABSTRACT

Startups seek to create highly scalable business models. For startups, growth is thus vital. Growth hacking is a marketing strategy advocated by various startup practitioner experts. It focuses on using low cost practices while utilizing existing platforms in creative ways to gain more users for the service. Though topics related to growth hacking such as marketing on a general level have been extensively studied in the past, growth hacking as a practitioner-born topic has not seen much interest among the academia. To both spark interest in growth hacking, and to facilitate teaching growth hacking in the academia, we present two board games intended to serve as an engaging introduction to growth hacking for students.

1 INTRODUCTION

Though most companies are concerned with growth, for startups growth is often far more vital than it is for more mature organizations. In fact, some definitions incorporate a highly scalable business model as one characteristic of what a startup is and how it differs from traditional, smaller business organizations [19]. Especially software startups often aim for multinational, if not global, saturation.

Strategies for growth are various. In terms of growing through user or customer acquisition, *marketing* is a key activity. Marketing strategies are numerous, ranging from e.g. digital viral marketing to traditional forms of display advertising done through television advertisements. As startups operate under a notable lack of resources, especially financially, and especially early on in their life cycles, this usually limits their marketing options.

Growth hacking is a marketing strategy [11] that focuses on low cost practices and using existing platforms in creative way and is thus well-suited for startups in this sense. Currently, growth hacking has seen little interest in the academia thus far, even if software startups are keenly studied by academics [19]. Indeed, it has been considered by some an “Internet-Born Digital Marketing Buzzword” [11].

Though marketing is a long-standing area of research in economic disciplines, and search engine optimization (SEO) and other areas of research closely related to growth hacking have been extensively studied in the field of information technology, growth hacking has not been directly studied. Yet, as it is gaining increasing traction out on the field, those studying startup entrepreneurship and especially software startups should at least be aware of growth hacking as a construct. Moreover, growth hacking practices can be of interest to those teaching startups and working in startup ecosystems.

The aim of this paper is twofold: to bring attention to growth hacking as a potential area of research, as well as to facilitate teaching growth hacking. In terms of the latter goal, we present two educational growth hacking board games in this paper. These games were developed as a part of a course on growth hacking and are based on a multi-vocal literature review. Together, they serve as an introduction to the topic while also teaching various actionable growth hacking practices.

The rest of the paper is organized as follows. The next section discusses growth hacking as a construct and in practice through both practitioner and academic literature on the topic. In the third section, we discuss the course design of the course during which the games were developed. Then, in the fourth section, we present the two board games, before concluding the paper in the fifth and final section where we also discuss the games and the course.

2 GROWTH HACKING

The construct *growth hacking* was popularized by practitioner expert Sean Ellis [9] in his blog about startup marketing¹. It has remained a construct primarily used by practitioners and has seen little traction in the academia. However, various topics closely related to growth hacking, such as marketing in general and different SEO techniques have been studied in both IT and economic disciplines.

Growth hacking is a marketing strategy [11]. As the name implies, it is about using various growth hacking techniques or practices to “hack” the growth of a company, often a startup. In practice, growth hacking is technology-oriented and relies on using technical practices, with one of the main tasks of a so-called growth hacker in fact being (software) development [11]. This, Herttua et al. [11] underline, is one of the main differences between growth hacking and other marketing strategies such as viral marketing or guerilla marketing.

In academic literature thus far, the following characteristics have been associated with growth hacking [9, 11]:

- Use of data in the form of metrics
- Changing the service based on data
- Low cost practices
- “Pulling” users to the service as opposed to
- “pushing” the service to them
- Using existing platforms in creative ways
- A/B testing

As a technical form of marketing, growth hacking combines marketing, statistics, and development. A growth hacker would need to have the skills required to make changes to the software service based on the data he collects. While this could be accomplished by a team of individuals, each versed in one of the required skills, the startup focus of this construct typically focuses on growth hacking carried out by a single “growth hacker” in an organization. This is related to the lack of resources associated with startups: hiring a team to do the job of one expert is not feasible for a startup.

Practitioners typically approach growth hacking through various growth hacking practices that they refer to as techniques or simply growth hacks ([10, 16-17]). Practices that are considered growth hacking practices by

¹ <http://www.startup-marketing.com>

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practitioners are numerous (e.g. [10]). They range from social media practices such as following individuals or organizations in hopes of gaining followers in return, to sales-related practices such as offering free software trials or downselling upon subscription cancellation. These practices are seldom exclusive and can be combined and experimented with at will by software startups.

A famous example of growth hacking in practice is the story of Hotmail. To tackle their growth issues early on, Hotmail implemented the signature text “PS. I Love You. Get your free e-mail at Hotmail” into all e-mails sent from their service. Having tried various other forms of marketing, this proved to be far more effective. Following the campaign, Hotmail quickly grew from a few thousand to a few million users and sold its service to Microsoft. In this fashion, growth hackers aim to “hack” growth by both being creative with existing platforms and using low cost practices to drive growth.

3 COURSE DESIGN

The board games presented in this paper were created during the course “TJTS5792 Advanced Lean Startups” in the University of Jyväskylä. The games were developed by two teams of Information Systems (IS) students, under the supervision of the teaching staff of the course. For creating the board games, we conducted a multi-vocal literature review on growth hacking prior to the start of the course. As we discovered that the construct had not seen much traction in the academia at the time of writing, the review ultimately focused on practitioner literature.

Because this is an educational paper, we will also go over the course design on a more general level in this section. The first subsection covers the multi-vocal literature review and the creation of the board games, while in the second subsection we discuss the course design.

3.1 Multi-Vocal Literature Review

In order to discover relevant practitioner literature, we conducted a set of Google searches, and utilized book review site reviews. The search string used was “growth hacking book”.

As these board games were produced as a part of a university course, we limited ourselves to book material only as far as practitioner literature was concerned. This choice was made to provide the students with clear reading materials, one book per student. Furthermore, gray literature such as blogs and non-peer-reviewed online articles were not included into this review, as we wanted to ensure, to some extent, the quality of the reading materials. Though a published book is no indication of correct facts, books do go through quality control practices, highly varied as they may be.

First, the context of the word match was examined: how was the construct “growth hacking” used? Was it simply mentioned in passing, or were growth hacking themes actually discussed? Secondly, the relevance of the contents of the book was further evaluated based on the table of contents. Did the book discuss growth hacking themes, i.e. user acquisition by means that could be considered growth hacking?

After the content screening, a quality appraisal process was conducted using public book reviews. For each resulting book, either Good Reads or Amazon Reviews were used to conduct a second quality appraisal. Only

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books rated 3.8 or higher on a scale of 0 to 5 were included into the list of books to be reviewed. Once the books had been selected, they were included in the course readings.

3.2 Overall Course Design

The course in question was a five-week-long software startup course focusing on growth hacking. Each week, there was a lecture and the students were given an assignment to be completed for the next one. A summary of the course can be found below in Table 1.

In order to create the board games, the students were first tasked with reading one book each after the first lecture. After reading the book, each student was to teach its contents to the other students through a presentation. Following the presentations, the students split into two teams. Each team was to create a board game on growth hacking, in one week. They were not given explicit guidelines on how to categorize the growth hacking practices, or what to focus on. Rather, they were tasked with creating a game they felt taught growth hacking to its players, focusing on matters they felt were important.

Table 1. Course Outline Summary.

Week	Tasks
1	Lecture. Each student assigned one book to read for the next session and to summarize it through a presentation.
2	Lecture. Presentations. Students split into two teams to create two board games on growth hacking.
3	Brief lecture. Board games played. Course participants, including mentors, split into pairs to create educational videos on growth hacking.
4	Lecture. The same pairs from the previous week instructed to create more videos and to prepare a plan for utilizing the practices they had studied.
5	Lecture. Practices utilized in a real setting. The participants presented their growth hacking practice(s) and lessons learned in the course ending event.

On this note, using student created content is not a novel discourse in the field of scientific education. It has increased in the recent years due to Wiki-technologies [22]. Moreover, our recent empirical, scientifically reported experiences from student created board games in SE education have also been positive [13].

After the student teams had created the board games, the games were played during the third week of the course. Afterwards, the games were revised based on the feedback obtained from the gaming session. Then, based on the learnings from both the books and the games, the students were to utilize the growth hacking skills and practices in a real-life setting. As a fail-safe learning environment for this purpose, we established an educational brand, #60edu, for the students to hack the growth of.

The idea of #60edu is simple. As the name already implies to some extent, #60edu is about creating educational videos on various topics that are approximately 60 seconds long. The hard limit was considered 90 seconds. The goal of this idea to teach both the students and the potential viewers. In order to teach something in mere 60 seconds, the students making the video need to have a solid understanding of what is essential about the topic. If it is a topic they have already studied, making such a video forces them to revise it, reinforcing the learning. This is a concept we plan to utilize in the future as an alternative to e.g. writing short essays.

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Thus, after the third lecture, the students were to produce #60edu videos of the topics they had been working on. Once they had produced the videos for the fourth week's lecture, they were to utilize the practices. In order to do so, they were to market the #60edu channel, videos, and the concept using the growth hacking practices they had learned.

For the final week, the students were free to choose a category of growth hacking practices (of the weight discussed in 4.1) to utilize. During the week, they were free to utilize different practices from their category of choice, or at least a minimum of one practice. In this fashion, they were able to get familiar with the tools and platforms required e.g. to carry out display advertising. At the end of the final week, each student prepared a presentation for the course's ending event². In their presentations, they were to teach the audience the growth hacking practice(s) they had utilized and discuss any lessons learned while doing so.

4 GROWTH HACKING BOARD GAMES

In order to teach growth hacking in a fun and engaging way, we have developed two board games focused on growth hacking and various growth hacking techniques recommended by practitioners (references [1-8, 10, 12, 15-18, 20-21]). Aside from providing an overview of the categories of growth hacking techniques, the board games also offer practical examples of the use of individual growth hacking practices. Both of the games can be downloaded from FigShare, the link to which is in the final section.

4.1 Growthopoly

Growthopoly is a Monopoly-inspired board game on growth hacking. In Growthopoly, the players compete against each other with the objective of gaining 5000 followers, and the player to reach that milestone first is the winner.

At the beginning of the game, each player is assigned a player character. Each character specializes in one of eight areas of specialty in growth hacking: (1) Search Engine Optimization, (2) Email Marketing, (3) Social Media Marketing, (4) Public Relations, (5) Product Development, (6) Display Advertising, (7) Content Marketing, and (8) Search Engine Marketing. This character is used as a game marker for moving on the board. In addition to the character, each player chooses a marker for displaying their number of followers in the middle of the board.

At the start of each turn, the player whose turn it is rolls a die and advances that many spaces on the game board. The board contains six types of spaces:

- *Growth hacking skill space.* Whenever a player lands on a growth hacking skill space, the player may pay game money to study that skill for a number of turns: one turn for level one, two for level two, and three for level three skills. When the player has learned the skill, they gain the number of followers on the space.
- *Bonus space.* Upon arriving in a bonus space, the player draws a bonus card. Bonus cards are always positive and grant either money, followers, or both.
- *Trade fair space.* In this space, the player may pay a certain sum of money to gain a number of followers.
- *Problem & Solution (prob & solve) space.* The player draws a card, which may be either a problem or a solution. Solution cards are used to tackle problems and may be stored for later use, while problems cause immediate, negative effects when drawn unless countered with a solution. Players may trade solutions.

² a recording of which is found on YouTube via <http://bit.ly/gh-final-event-recording>

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- *The Slush space.* The player spends a maximum of three turns at Slush. At the start of each turn, the player rolls a die to determine whether they stay or leave Slush.
- *The Start space.* Upon arriving in (or simply passing by) the start space after looping around the game board once, the player gains customers and game money

By learning the different growth hacking techniques for their characters and by landing on the various spaces, players can gain more followers and/or more money. If a player lands on a growth hacking skill already learned (owned) by another player, the owner gains the amount of followers listed on the space. If the player lands on the growth hacking skill that is also their player character's specialty, they get twice the amount of followers and learning the skill takes one turn less than specified.

The game is intended to serve as a general introduction to growth hacking. It teaches the players about various types of growth hacking (e.g. Search Engine Optimization). It does not contain much educative content as far as micro-level growth hacking techniques go, however. The other game, discussed in the following sub-section, on the other hand focuses specifically on growth hacking techniques or practices by presenting singular practices one at a time.

4.2 The Game of Growth

In the Game of Growth, the players form a team that is intended to emulate a startup organization. Rather than competing against each other, the team then aims to win the game together as a team. The goal is to get 5000 followers for the team's hypothetical software service.

Before beginning, the players choose the type of the startup: tech, service, or entertainment. The team then starts the game with 5000 dollars. Using the 5000 dollars, the players have 10 turns to reach 5000 followers. Each turn represents one week. Each turn has three phases, each of which is denoted by drawing a different type of card.

(1) First, at the start of the turn, the team draws an event card. The event card applies special rules for that turn (e.g. hiring is cheaper). (2) Then, the team draws three hack cards. Hack cards contain ways to increase the number of followers of the service. For example, a hack card may require the team to pay a few hundred dollars for a chance to gain a few hundred followers by rolling the die favorably. The team may either use or ignore the hack cards, but they are all discarded at the end of the turn either way. (3) Thirdly, the team reveals an employee card at the end of the turn. The team then either hires or refuses to hire the employee, concluding the turn. Any employees hired by the team will have to be paid a salary at the start of each turn until the end of the game, or until fired. The employees offer various ways for the team to gain more followers.

The game then continues until (1) ten turns have passed, (2) the team has reached the 5000 followers, or (3) the team runs out of money. The game is lost if the ten turns pass without the team reaching the required 5000 followers, or if the team runs out of money before reaching the milestone.

The educational value of the game stems primarily from the hack cards. Each hack card contains descriptions of individual practices associated with growth hacking. The cards cover practices such as asking internet celebrities to promote your service, or sending personalized emails to targeted prospects ("cold emailing") as a very early-stage startup looking to gain its first users or customers. I.e. the game takes a more micro-level approach to teaching growth hacking by approaching it from a practical point of view through tangible, real-world practices

5 DISCUSSION & CONCLUSIONS

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In this paper, we have discussed the importance of growth for startups, primarily through the practitioner-oriented construct of growth hacking. To tackle the problem of teaching growth hacking to students, we have presented educative two board games. Both board games can be found online³.

The first board game, Growthopoly, offers an overview of growth hacking by categorizing various growth hacking practices into eight categories (e.g. Search Engine Optimization). The second game, the Game of Growth, offers more micro-level insights into growth hacking by focusing on individual growth hacking practices. Together, these games can serve as a fun way of teaching growth hacking to individuals new to the topic. However, as the games were not empirically validated beyond trial use, we cannot make claims about their efficiency for teaching growth hacking. However, the trial sessions were engaging, fun, and informative, which offers a promising starting point for using the games in software startup education.

Furthermore, in using games for educational purposes, adverse learning can be a potential issue. Games ultimately have to simplify phenomena due to various restrictions arising from game mechanics. For example, an adverse learning from the Game of Growth may be that hiring people is not beneficial because you have to pay them. In the game, employees have a rather small influence on whether or not the game can be won, and thus the game notably downplays the value of additional employees in an organization. I.e. the players need to be critical in differentiating between game mechanics and educational content.

Aside from the board games, we underline the educational value of having had the students utilize the growth hacking practices in a real setting. This became apparent in the lessons learned discussed by the students in the course end event. For example, the group focusing on display advertising learned that: (1) if the platform sells display advertising by view count, views by bots also eat up the count. (2) Therefore, limiting ads to certain geographic locations can help not only to reach the right audience, but also to avoid bots. (3) When advertising e.g. a YouTube channel, it can be beneficial to have the traffic pass through a re-direct link in order to collect more data about the incoming traffic.

Although the study materials did cover various Dos and Don'ts for the practices, many of the lessons learned were topics not discussed in the literature. By actually utilizing the practices, the students were able to learn not only about the practices but also about the tools used to carry them out in practice.

Finally, we feel that growth hacking as an area of research should be of interest to those studying startups. While it is a construct currently utilized nearly exclusively by practitioners, it is important that the academia remain aware of the language used on the field even if growth hacking as a construct ultimately does not gain traction among scholars. In this vein, we suggest that future research focus on understanding how startups carry out growth hacking in practice. Extant research has explored the definition of growth hacking [11], while practitioner literature (e.g. [10]) lists extensive amounts of singular growth hacking practices for practitioners to utilize. We also plan to continue our research in understanding which metrics could help software startup practitioners hack growth [14].

REFERENCES

- [1] J. Berger (2013). *Contagious - Why Things Catch On*. Simon & Schuster.
- [2] J. Berger (2014). *How Ideas Spread*. The Teaching Company.
- [3] J. Berger (2016). *The Hidden Forces that Shape Behavior*. Simon & Schuster.
- [4] S. Covel (2018). *Marketing Your Startup - The Inc. Guide to Getting Customers, Gaining Traction, and Growing Your Business*. AMACOM.

³ <http://bit.ly/gh-board-games>

This is the author's version of the paper. The definitive version was published in *IWSiB 2019 Proceedings of the 2nd ACM SIGSOFT International Workshop on Software-Intensive Business: Start-ups, Platforms, and Ecosystems*. Pages 25-30. <https://dl.acm.org/citation.cfm?id=3340481.3342734>

- [5] S. Ellis and M. Brown (2017). Hacking Growth: How Today's Fastest-Growing Companies Drive Breakout Success, Crown Business, 320p.
- [6] N. Eyal and R. Hoover (2014). Hooked - How to Build Habit-Forming Products.
- [7] R. Fong and C. Riddersen (2017): Growth Hacking: Silicon Valley's Best Kept Secret. Lioncrest Publishing.
- [8] J. Fried and D. Heinemeier-Hansson (2010). Rework. Crown Business.
- [9] M. Geru, E. Rusu and A. Capatina: Growth hacking practices in a start-up: a case study on thecon.ro. In Proceedings of the 2014 International Conference on Risk in Contemporary Economy (2014).
- [10] A. Happy (2016). How I create Growth Hacking Plans for startups for \$10,000: + TOP 300 growth hacks you can put into practice right away. CreateSpace Independent Publishing Platform, 524p.
- [11] T. Herttua, E. Jakob, S. Nave, R. Gupta and M.P. Zylka: Growth Hacking: Exploring the Meaning of an Internet-Born Digital Marketing Buzzword. Designing Networks for Innovation and Improvisation, pp. 151-161 (2016).
- [12] R. Holiday (2013). Growth Hacker Marketing - A Primer on the Future of PR, Marketing and Advertising. Portfolio.
- [13] KK. Kemell, J. Risku, A. Evensen, P. Abrahamsson, A.M. Dahl, L.H. Grytten, A. Jedryszek, P. Rostrup and A. Nguyen-Duc (2018). Gamifying the Escape from the Engineering Method Prison - An Innovative Board Game to Teach the Essence Theory to Future Project Managers and Software Engineers. In Proceedings of the 2018 IEEE International Conference on Engineering, Technology and Innovation (ICE/ITMC). DOI: dx.doi.org/10.1109/ICE.2018.8436340.
- [14] KK. Kemell, X. Wang, A. Ngueyn-Duc, J. Grendus, T. Tuunanen and P. Abrahamsson (2018). 100+ Metrics for Software Startups - A Multi-Vocal Literature Review. In proceedings of the 1st Software-intensive Business Workshop on Start-ups, Platforms and Ecosystems (SiBW 2018), Espoo, December 3rd, 2018.
- [15] J. Linkner (2017). Hacking Innovation. The New Growth Model from the Sinister World of Hackers. Fastpencil Publishing, 269p.
- [16] S. Patel and R. Wormley. 100 Days of Growth Book - 100 Actionable Tips to Grow Your Startup Faster. E-Book.
- [17] R. Peters (2014). Growth Hacking Techniques, Disruptive Technology - How 40 Companies Made It BIG - Online Growth Hacker Marketing Strategy, Blep Publishing, 140p.
- [18] S. Snow (2014). Smartcuts - How Hackers, Innovators, and Icons Accelerate Success. HarperBusiness.
- [19] M. Unterkalmsteiner (2016). Software Startups – A Research Agenda. e-Informatica Software Engineering Journal, 10(1), 89-123.
- [20] R. Walsh (2009). The Web Startup Success Guide. Apress.
- [21] W. Weinberg and J. Mares (2014). Traction - a Startup Guide to Getting Customers. S-curves Publishing.
- [22] S. Wheeler, P. Yeomans and D. Wheeler (2008). The good, the bad, and the wiki: Evaluating student-generated content for collaborative learning. British journal of educational technology, 39(6), 987-995.