



## **Introducing the Berkeley Method of Entrepreneurship - a Game-Based Teaching Approach**

### **Ikhlq Sidhu, University of California, Berkeley**

Ikhlq Sidhu is the Chief Scientist and Founding Director of UC Berkeley's Center for Entrepreneurship & Technology. Prof. Sidhu also developed and founded the Fung Institute for Engineering Leadership. He received the IEOR Emerging Area Professor Award from his department at Berkeley. He has been granted over 60 US Patents in networking technology, IP telephony, and mobile computing. He was awarded 3Com Corporation's "Inventor of the Year" in 1999. Dr. Sidhu also serves as a Senior Fellow of the Applied Innovation Institute and as a Venture Advisor at Onset Ventures, a leading Silicon Valley investment firm.

### **Mr. Ken Singer, CET, College of Engineering UC Berkeley**

Ken is a serial entrepreneur, technology executive, university lecturer, and director and advisor to numerous startups, universities and governments throughout Europe and the Americas. He currently serves as managing director at the Center for Entrepreneurship & Technology at UC Berkeley, USA. Ken is on the board of several startups and continues to advise and invest in some of the most promising mobile companies in the Silicon Valley and Europe.

### **Dr. Charlotta Johnsson, Lund University**

Charlotta Johnsson holds a position as Associate Professor at Lund University, Sweden where she also serves as the Program Director for the master program Technology Management. Charlotta Johnsson has PhD in Automatic Control from Lund University, Sweden. She was a Visiting Scholar at the Center for Entrepreneurship & Technology and the Fung Institute for Engineering Leadership, at UC Berkeley in 2013-2014. Her research interests include; technology management and innovations, entrepreneurship, automation, operations management, and pedagogy. She is also teaching and advising students in undergraduate, graduate and industrial programs.

### **Dr. Mari Suoranta, University of Jyväskylä, Finland**

Mari Suoranta is an Assistant Professor of Marketing in the School of Business and Economics at University of Jyväskylä, Finland, where she also serves as a Program Director for the International Business and Entrepreneurship Master's Program. 2008, 2010-2011 and 2013-2014 she has been a Visiting Scholar and Fulbright Senior Fellow at the Center for Entrepreneurship & Technology and the Fung Institute for Engineering Leadership, at UC Berkeley. Her current research interests include entrepreneurial and start-up marketing, venture growth, and interdisciplinary management education.

# **Introducing the Berkeley Method of Entrepreneurship -A Game-Based Teaching Approach**

## **Introduction**

Entrepreneurship matters. In modern open economies, entrepreneurship is one of the key aspects for economic growth and is often thought of as the act of commercializing on an innovation. Teaching and learning entrepreneurship is therefore of importance and schools, colleges and universities can play an important role by including entrepreneurship and innovation in their curricula. Governments and universities worldwide are pushing for education programs that produce more “entrepreneurial engineers” who are “bilingual” in the sense that they possess dual managerial and technical competencies<sup>14</sup>.

The Berkeley Method of Entrepreneurship (BMoE) is a holistic teaching and learning approach that enables engineers to be more entrepreneurial. It encompasses three main elements: infrastructure, mindset and tactics. Infrastructure and tactics are covered in most entrepreneurial curricula, whereas only few curricula explicitly include the mindset perspective. The Berkeley Method of Entrepreneurship is based on the hypothesis that the mindset of an entrepreneur can be characterized by a set of behavioral patterns<sup>7</sup> and that an inductive game-based teaching approach is a successful vehicle for introducing and re-enforcing these. The game-based teaching approach lets the students explore his/her current mindset and compare it with that of successful entrepreneurs. The paper presents the Berkeley Method of Entrepreneurship, the pedagogical and psychological theories on which it is based, the set of behavioral patterns and the game-based teaching approach that is used. The method is still under development and further research (e.g. longitudinal studies) is planned.

## **Teaching and Learning Entrepreneurship**

Generally speaking, teaching is interpreted as the act of helping someone to learn. The didactic triangle is a model aimed at analyzing and describing the entire teaching and learning situation<sup>9</sup>. Three main components are involved: the student, the teacher and the subject. In recent years, the discussion has shifted from being focused on teaching, i.e. “how to present and transfer knowledge from a teacher to someone else” to learning i.e., “how information and knowledge provided is perceived by the receiver”. This means that the focus has shifted from a teacher-student-transfer focus in which the subject is only the transported goods, to the student-subject-relation focus in which the teacher is only the medium used<sup>8</sup>, as visualized in Figure 1.

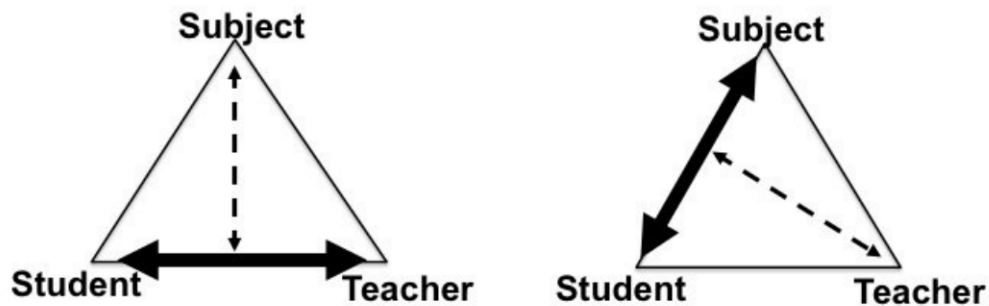


Figure 1: An interpretation of the didactic triangle showing a shift from the teacher-student-transfer focus (left) to the student-subject-relation focus (right).

The teacher-student-transfer focus (left in Figure 1) is also referred to as deductive teaching, whereas the student-subject-relation focus (right in Figure 1) is referred to as inductive learning<sup>12</sup>.

- Deductive: In a deductive classroom, the teacher conducts lessons by introducing and explaining concepts to students, and then expecting students to complete tasks to practice the concepts. The students should demonstrate that they have understood the concepts by repeating what the teacher just told or did.
- Inductive: In an inductive classroom, the teacher presents or exposes the students to examples that show how the concept is used. The intent is for students to “notice”, by reflecting around the examples, how the concept works. The students should demonstrate that they have understood by re-inventing the concepts based on their own experience.

Deductive teaching methods are suitable to use in subjects where facts and raw knowledge is of most importance, whereas an inductive teaching approach is suitable to use when skills and attitudes are in focus. When it comes to teaching and learning entrepreneurship there are several aspects, apart from facts and raw knowledge that are of importance. Political economist Robert Reich considers leadership, management ability, and team-building to be essential qualities of an entrepreneur<sup>11</sup>. Other researchers state that common skills and attitudes of entrepreneurs are: ability to bear risk<sup>10,1</sup>, coping with true uncertainty, and possessing an extrovert behavior, i.e. an outgoing, talkative, energetic behavior<sup>10</sup>. Since skills and attitudes of entrepreneurs are equally important as facts and raw knowledge, and since skills and attitudes are “owned” by the students, the relation between the student and the entrepreneurship-subject becomes essential, the school and teachers are only a mean for the student to reflect upon his or her skills and attitudes (compare Figure 1, right side) and an inductive learning approach is therefore most suitable.

An example of an inductive learning approach is game-based learning, something that has received increased attention lately<sup>14</sup>. It has been driven by clear successes in military and industrial training as well as by emerging research into the cognitive benefits of game plays. Developers and researchers are working in various areas of game-based learning, including games that are goal-oriented, social game environments, non-digital games that are easy to

construct and play, games developed expressly for education, and commercial games that lend themselves to refining team and group skills. More complex approaches like role-playing, collaborative problem solving, and other forms of simulated experiences have broad applicability across a wide range of disciplines, and are beginning to be explored in more classrooms<sup>6</sup>.

### **Berkeley Method of Entrepreneurship**

At University of California Berkeley, CA, a new method for teaching and learning entrepreneurship is under development<sup>5,6,8</sup>. The pedagogy is focused around learning rather than teaching (compare figure 1) and the students are pushed to proactively develop their own understanding rather than waiting for someone to teach them what they need to know. The students are trained to frame problems and find ways to solve them and then reflect on what they've learned from the process. The method has already been used in practice at different occasions: boot camps, courses for undergraduate and graduate students, Global Venture Lab Conferences for academia and industry, and research activities.

The method under development is referred to as Berkeley Method of Entrepreneurship, see Figure2, and includes:

- Tactics: Teaching effectiveness of strategy, tactics and execution e.g. opportunity recognition, pivots, MVP, raising funds, tools, frameworks, etc.
- Infrastructure: Assuring infrastructure and supporting, safe and effective environment e.g. diverse networks, ability to connect, facilities, services, clarity of rules of engagement, and mentors.
- Mindset: Exposure to issues related to culture, social psychology, and mindset. The psychology of being an entrepreneur e.g. trusting, risk assessment, communication, overcoming social barriers, rejection therapy, fail training, is covered.



*Figure 2: A model (under development) representing the Berkeley Method of Entrepreneurship.*

Tactics and infrastructure are covered in most traditional courses, entrepreneurship courses as well as other courses, whereas mindset is often not explicitly included in courses today, however research about education and mindset is ongoing in psychology<sup>2</sup>. In traditional courses the students are given access to good infrastructure and supporting environment. The aim is to facilitate the students to study, search for information, share documents etc. The infrastructure also contains clarity of rules; the students should know what is expected from them in the learning situation. In traditional courses the students are also taught about the tactics associated to the subject. In entrepreneurship courses, the tactics could be knowledge about e.g. opportunity recognition, how to raise funds or how to use certain tools and frameworks. However, what is often omitted in traditional courses or entrepreneurship courses as well, is an explicit work with mindset. The BMoE aims at training students to become entrepreneurs and therefore exposes the students to the entrepreneurial mindset. This is done by using an inductive game-based teaching approach.

The BMoE is based on a two-folded hypothesis:

1. the mindset of an entrepreneur can be described as a list of behavioral patterns, and
2. an inductive game based teaching approach is a successful vehicle to introduce and re-enforce behavioral patterns to students.

### **Behavioral Patterns Characterizing an Entrepreneur**

The mindset of successful entrepreneurs has been studied and a proposal describing their most dominant characteristics is given through ten behavioral patterns. The proposal is based on extensive interaction with entrepreneurs in the Silicon Valley area, and on literature review<sup>7</sup>. A distinct set of behavioral patterns is identified and listed in Table 1. If everyone in a community acts like this, there will be a vibrant entrepreneurial culture. The behavioral patterns are further explained and references provided in<sup>13</sup>.

It is important to note that this is an ongoing research, which implies that the ten behavioral patterns should be interpreted as best current status. It cannot be excluded that more patterns will be added, or current patterns modified/removed.

<i>Nb</i>	<i>Behaviour</i>
1	<i>Pay It Forward</i> “Agree that you will get help from others, and pay it forward.”
2	<i>Story Telling</i> “Realize a something new by induction, and then learn to communicate the story with a new language.”
3	<i>Friend or Foe</i> “If you can’t tell: Learn to trust others without expecting anything in return.”

4	<p><i>Seek Fairness</i></p> <p><i>“Make deals that seek fairness (in positive sum transactions), not advantage (in zero sum transactions).”</i></p>
5	<p><i>Plan to Fail</i></p> <p><i>“It is necessary to be Wrong sometimes. Plan to Experiment. Plan to Fail. (Fail Fast) Analyze, adapt and repeat. The smarter you think you are, the harder this is going to be.”</i></p>
6	<p><i>Diversify</i></p> <p><i>“Diversify your networks. Connect to people you would not normally, then go and listen. Open up. And connect them to others.”</i></p>
7	<p><i>Role Model</i></p> <p><i>“Be a role model for other entrepreneurs and innovators.”</i></p>
8	<p><i>Believe</i></p> <p><i>“Believe that you can change the world.”</i></p>
9	<p><i>Good Enough</i></p> <p><i>“Perfection is no good but good enough is perfect.”</i></p>
10	<p><i>Collaboration</i></p> <p><i>“Individual to form team, and competitors to become partners”</i></p>

*Table 1: Ten behavioral patterns characterizing and entrepreneur.*

### **The Game-Based Teaching Approach**

The Berkeley Method of Entrepreneurship includes behavioral training as well as reflections on mindset. For this, an inductive game-based teaching approach is used. Various games, referred to as the Berkeley Method of Entrepreneurship Games, have been developed. A game can be defined as a structured playing, usually undertaken for enjoyment and sometimes used as an educational tool<sup>3</sup>. Or a game may be described as an “artificial situation” in which players engage in an artificial conflict against one another or all together against other forces. Games are regulated by rules, which may take the form of procedures, controls, obstacles, or penalties<sup>14</sup>. Furthermore, four key components of games are: goals, rules, challenges, and interaction. For the Berkeley Method of Entrepreneurship games this implies:

- Goals: a preset objective, aligned with the teaching objective,
- Rules: limitations on how to achieve the goals,
- Challenge: possibly competition, use of skills, etc. to reinforce behavior,
- Interaction: a setting for players to interact and communicate and even enjoy the process.

The idea is to let the games invoke a certain behavior or mindset of the student, e.g. Story Telling (behavior-2) or Good Enough (behavior-9). After the game, the students should reflect about his/her own behavior and compare it with that of successful entrepreneurs. The result of

the reflection can be either an ignition for the student (confirming that he/she wants to become an entrepreneur), an extinguisher (confirming that the student does not want to be an entrepreneur) or a wake-up call (ok, I need to learn more about this mindset).

A multi-behavior game “Scavenger game”: The Scavenger game has been used in educational activities given by University of California Berkeley, CA<sup>13</sup>. In this game, each team had 5 members, two of them were placed in a control room and 3 of them were part of the field-group. The field-group and group in the control room could only communicate via voice using a simple phone (no sms, texts, emails, videos etc). The group in the control room had no access to internet. A five-liner instruction was given to the group in the control room, these instructions had to be communicated to the field team whose task was to find a location and take a picture of it. The field group that provided the group in the control room with a correct picture first, was the winning team. The task seems easy, if it was not for the fact that the 5 lines of instructions were given in a different language (e.g. Chinese, Russian, illustrations, Korean and Finnish). In this game an important behavior for the group in the control room was to be a Story Teller (able to communicate the shapes of the letters in the instructions), and for the field group to be able to demonstrate Collaboration skills, e.g. each student working on the translation of one instruction. Furthermore, the teams had to appreciate Diversity in the people they encounter in order to have someone to help them with translation. As soon as they thought they knew a location that fulfills the instructions, they should go there and take a picture of it, a picture that is Good Enough to represent the location. After completing the game, the students were asked to reflect about their own contributions, what behavior they felt comfortable with, and which they needed to practice more. The students also reflected about the strategies used by the different teams and their respective advantages and disadvantages.

## **Conclusions**

Entrepreneurship is an essential ingredient for economic development for any country. Schools, colleges and universities can help fostering and accelerate the formation of successful entrepreneurs by including entrepreneurship in their curricula, as done by many schools, colleges and universities today. Most entrepreneurial curricula include the two traditional elements of infrastructure and tactics, however, only few curricula explicitly include the mindset perspective.

The Berkeley Method of Entrepreneurship is based on the hypothesis that the mindset of successful entrepreneurs can be characterized by a distinct set of behavioral patterns and that an inductive game-based teaching approach is the best vehicle to introduce and re-enforce those to students. A list of ten behavioral patterns that captures the mindset of successful entrepreneurs is presented and a game-based teaching approach is used to let the students explore his/her current mindset and compare it with that of entrepreneurs. The result can be an ignition for the student (yes, I want to be an entrepreneur), an extinguisher for the student (no, entrepreneurship is not for me) or a wake-up call (ok, I need to learn more about this mindset).

The Berkeley Method of Entrepreneurship is a holistic and student-centered teaching and learning approach that is hypothesized to enable engineers to be more entrepreneurial. It

encompasses three main elements: infrastructure, mindset and tactics. It is already being used in engineering entrepreneurship education at University of California Berkeley, CA and the first feedback from students and instructors is positive. However, the method is still under development and further research (e.g. longitudinal studies) is planned.

## References

1. Drucker P.F. (1999). *Innovation and Entrepreneurship*. New York: HarperCollins.
2. Dweck C. (2006). *Mindset: the new psychology of success*. New York: Random House.
3. Game (2014). Wikipedia [www.wikipedia.org](http://www.wikipedia.org), as per 2014-01-07.
4. Games in Education (2013). [gamesined.wikispaces.com](http://gamesined.wikispaces.com), as per 2013-11-27.
5. Global Venture Lab (2013). <http://funginstitute.berkeley.edu/programs-center-entrepreneurship-and-technology-cet/venture-network>, as per 2013-12-12.
6. Global Venture Lab Network Inaugural Summit (2010). Report, Published on homepage of Fung Institute: <http://funginstitute.berkeley.edu/publications>, as per 2013-12-04.
7. Hwang and Horowitz (2012). *The Rainforest: the Secret to Building the Next Silicon Valley*. Los Altos Hills: Regenwald.
8. Johnsson C., Yang Q, Nilsson C.-H., Jun J, Larsson A., Warell A. (2014). "Fostering Automatic Control students to become innovators", In proceedings of 19th World Congress International Federation of Automatic Control (IFAC), South Africa, September 2014.
9. Kansanen, P. (1999). Teaching as Teaching-Studying- Learning Interaction. *Scandinavian Journal of Educational Research*, 43(1), 81 - 89.
10. Knight F. H. (2002). *Risk, Uncertainty and Profit*. Beard Books.
11. Muljadi P. (2011). *Entrepreneurship. A group of ideas around entrepreneurship*. PDF generated by the open source mwlib toolkit See <http://code.pediapress.com/> for more information. PDF generated Dec 14, 2011.
12. Prince M. and Felder R. (2006). Inductive teaching and learning methods: Definitions, comparisons and research bases. *Journal of Engineering Education*, 95(2):123–138.
13. Sidhu I., Singer K., Suoranta M., Johnsson C. (2014). Introducing Berkeley Method of Entrepreneurship, Internal report nr 20140326 (preliminary version), Center for Entrepreneurship and Technology, University of California, Berkeley, CA.
14. Verzat C., Byrne J., and Fayolle A. (2009). Tangling with spaghetti: Pedagogical lessons from games. *Academy of Management Learning & Education*, 8(3): 356-369.