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# Check the temperature. Rapid assessment of common ground in startup teams

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**Abstract.** *This research in progress aims at identifying a set of design guidelines to perform rapid diagnostic of common ground among participants of a startup team and their coach. Previous studies have shown that teams with high common ground are more efficient. Nonetheless, no existing tool can rapidly monitor its progression and visualize it in a simple way to allow the coach to perform team diagnostic. In this paper we present a prototype, which monitors the evolution of joint objectives and joint resources among team members and that represents the updated path of a startup team in less than five minutes. Empirical data collected at a startup weekend shows that it is possible (a) to rapidly monitor the evolution of common ground within the team, (b) to intervene whenever the joint commitment of participants gets too low and (c) positively affect the performance of a startup team.*

**Keywords:** collaboration engineering, entrepreneurship education, common ground, startup coaching

## 1 Introduction

*"You've got to be a thermostat rather than a thermometer. A thermostat shapes the climate of opinion; a thermometer just reflects it."* (Cornel West)

This article proposes a set of design guidelines to build a device that supports entrepreneurs and experts in the field of entrepreneurial education. A new stream of research highlights the possibility to quickly assess the dynamic of a project team and to increase the quality of its supervision [1]. Nonetheless, there are not clear specifications to design a device for startup coaches to perform rapid diagnostic and to suggest a course of action. Henceforth, we define *entrepreneurship education* as "the transfer and facilitation of knowledge and skills on how, by whom

and with what effect the opportunities to create future products and services are discovered, evaluated and exploited" [2]. Moreover, we focus on the task of a coach, who helps a startup begin its entrepreneurial adventure, and we refer to the notion of *mentoring* as "the establishment of a supportive relationship to a novice entrepreneur (mentee), thanks to the support of an experienced entrepreneur (mentor), allowing it to develop as a person" [3]. Indeed, the entrepreneur interacts with a large set of other agents, some of which belong to the initial team that created the enterprise. Henceforth, we refer to the notion of *collaboration engineering*, which can be defined as "an approach to designing collaborative work systems for high-value tasks, and transferring them to practitioners to execute for themselves without ongoing support from collaboration experts" [4]. In that sense, the mentor of a startup might be asked to act as a collaborator engineer, and to describe the outcome of such activity, we define *common ground* as "a collection of mutual knowledge, mutual beliefs, and mutual assumptions" [5], which is known to influence the performance of project teams [6].
In this study, we seek for a diagnostic tool that (a) allows monitoring the development of common ground in a startup as a sign of team performance -that is a *thermometer*- and (b) enables proactive control in different shapes -that is, a *thermostat.* Hence, our research question is: *how can we design an artifact to rapidly assess the evolution of common ground within a startup team?*
The rest of the article is organized as it follows. In the next section we will briefly introduce the constructs that allow us to answer our research question. In section three, we present our theoretical model and in section four we illustrate how we designed and developed our device. Section five illustrates the results of an empirical test and section six discusses the limitations of our study and future works.

## 2 Literature review

Our research spans across three topics: (a) entrepreneurship education, (b) collaboration engineering, and (c) team common ground.
*Entrepreneurship education* increases the skills needed to create a successful startup, and the issue at hand now is not whether we can learn entrepreneurship, but how it can be taught to students [7]. Nonetheless, expert entrepreneurs follow a set of principles, which appear to be almost the opposite of what young entrepreneurs do. Indeed, one could

conclude that causation starts from objectives and moves towards means, whereas effectuation starts from available resources and defines its objectives. Nowadays, there is no device that allows to rapidly identify if a team is following a causal or a effectual path.
*Collaboration engineering* (CE) metrics and so-called ThinkLets [4], which are collaboration pattern to increase team performance, have been induced from practical experience and need to be further tested in an experimental context. Previous studies have been trying to empirically assess the effectiveness of collaboration engineering over team performance [8], but additional research on the empirical effects of ThinkLets is still required [9].
High *common ground* is known to increase team performance [10]. Previous research have proposed a design theory to supports real-time assessment of common ground, by using four variables[1]: (a) Joint objectives: what the participants intend to do together; (b) Joint Resources: what the participants need, to play their part; (c) Joint commitment: What participants expect each other to do; (d) Joint risks: What could prevent participants from playing their part.

## 3 Theoretical model

We aim at designing a tool for proactive monitoring of the evolution of common ground among team members. That should allow the coach to perform diagnostics and to take informed decisions about the best way to help the team grow. We also believe that entrepreneurs could use the tool to perform a self-assessment. Nonetheless, the software is not designed to take decisions, while replacing a trained coach.
Our theoretical model has three *constructs*, which are derived from the theory of common ground and that are measured by a survey: (1) joint understanding, (2) joint resources, and (3) joint commitment. Each constructs is operationalized by less than four questions and it is measured by 5-point Likert scales. In the end we obtain less than ten questions in the survey, to allow data collection among team members in less than 5 minutes. Our *kernel theory* is the extension of the notion of common ground, which was proposed by Mastrogiacomo et al. [1]. The notion of joint objectives resonates with the concept of project-based conditions. The notion of joint resources recalls the concept of company resources. The notion of joint commitment can be associated to the notion of mutual trust described by Das and Teng [11]. Since we wanted

to test the effects of our artefact on startup coaches, we set a constraint concerning the time needed for data collection (5 minutes) and we predicted that a startup team with an empowered coach will learn faster and will progress more than a normal startup team. Accordingly, assuming that there is no difference between the supported teams and the control teams, we can derive two hypotheses: the use of our device by a coach will affect (H1) the *performance* and (H2) the *progression* of the startup team, which is getting coached.

## 4 Methodology

To develop our prototype, we have followed the guidelines of Peffers et al. [12]. The problem associated with startup coaching was already identified, but no device was allowing rapid diagnostic. Hence we defined two objectives for our solution: (a) data collection in less than 5 minutes, and (b) simple visualization to let the coach decide how to support each startup team. We iteratively developed, tested and evaluated our prototype three times. We initially developed a dynamic graph to understand how a coach was mentoring a team. Then, we included a new dynamic chart with detailed information about each team member, which the coach was not able to collect. Finally, we developed a dynamic graph to assess the intervention of each coach. In the rest of the paper we describe how we collect and analyze data.

**Data collection.** The Google Form has nine questions. The first question allows identifying the participant, whereas the remaining eight questions assess concern the team common ground.

**Table 1.** Operationalization of constructs

| Construct | Items |
|---|---|
| Joint Objectives: We all understood what we intended to do together about... | JO1... design and functionality of our product/service |
| | JO2... the development of a distinctive image with from our competitors |
| | JO3... a narrow, clearly defined market segment |
| Joint resources: Every team member had sufficient resources in terms of... | JR1 …Time |
| | JR2 ... Competences |
| | JR3 ... Useful contacts in our network (coaches, sponsors, partners) |
| Joint Commitment: We were clear about the commitment of each member and ... | JC1… Everyone was motivated by our goals |
| | JC2 …Everyone felt he/she can contribute to our goals |

**Data analysis.** Figure describes the columns of the five tabs in our Google Sheet. There are two tabs to set up the parameters (list of teams and assignment of participants to teams). One tab dynamically collects participants' answers from the Google Form and coverts the timestamp into a time cluster by using the formula MONTH *10000+DAY*100+ HOUR. One tab contains a pivot table, which dynamically returns the perception of joint objectives, joint resources and joint commitment of each participant at a given time. One tab contains a pivot table, which dynamically returns the average of teams perceptions.

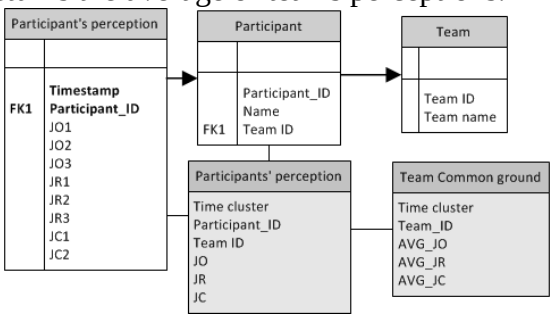



**Fig. 1.** Relationships among the five tabs of our Google Sheet

**Data visualization.** We use Google motion chart to show the evolution of the common ground. We can obtain three dynamic graphs: (a) the perception of each team member, (b) the perception of the team and (c) the perception of the team and the team coach. In each dynamic graph, the X axis of the first graph represents the average of team members' Joint Objectives at time t, the Y axis represents the average of team members' Joint Resources at time t, whereas the bubble size represents the variance of JO. Figure 2 shows how a team starts with a low amount of Joint Objectives and Joint resources (point 1, in the bottom left corner), increases its amount of JO (points 2 and 3), and it finally increases its amount of JR (points 4 and 5). Each point is associated to a set of data collected at a specific time.

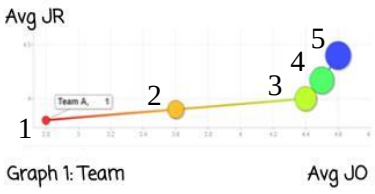



**Fig. 2.** The two axes (JO and JR) and representation of the evolution of team common ground

## 5 Evaluation

We tested our artefact at a startup weekend (startupweekeend.org), which offers the opportunity for teams to create a startup in 54 hours and allows performing experimental studies in an ideal situation: (a) all teams are in the same location and they are given the same amount of time; (b) sessions with the assigned coach are done via face-to-face conversations; (c) all teams have access to the same set of entrepreneurship techniques; (d) participants come from professional and academic environment, and they don't know each other before the event; (e) all teams are evaluated at the end by one commission, which uses a predefined set of criteria to assess them.




**Fig. 3.** Data collection protocol with pre- and post-tests

**Data collection.** We collected survey data from randomized participants and coaches, after each coach intervention. In the end, we followed six teams, whose members were asked to complete our questionnaire up to four times. As shown in




, we also conducted a pre-test and a post-test: (a) Friday night we collected the opinions of the crowd, and (b) Sunday afternoon we assisted to the discussion among jury members. Table 2 shows the ID of each team, the ID of the coach, the use of our device, the results of the crowd votes and the jury votes.

**Table 2.** Initial scores and results from the jury of the selected teams

| ID | Coach ID | Support ? | Pre-test | Post-test |
|---|---|---|---|---|
| 1 | Y | No | 16 | 0 |
| 2 | G | No | 11 | 62 |
| 3 | T | No | 10 | 63 |
| 4 | Y | Yes | 10 | 85 |
| 5 | G | Yes | 10 | 95 |

| | | | | |
|---|---|---|---|---|
| 6 | T | Yes | 16 | 103 |

**Data analysis.** To test whether the two data samples are independent we conducted a Mann-Whitney-Wilcoxon Test by using R software. The results shows that there is no difference between the control group and the observed group at the beginning (p=0.81), the difference in terms of final performance between the two groups is statistically significant (p=0.10) and the difference in terms of progression between the two teams is statistically significant (p=0.07). Therefore, the null hypothesis is rejected and **H1 and H2 are accepted**.

**Exemple of support for coach's intervention**. Figure 4 shows how we supported the intervention of a coach. After two iterations (t=200) we noticed that the perceptions of the coach and the team were diverging. By looking at the graph illustrating the participants' perceptions, we noticed that the team leader was losing faith in the joint resources (the other colored bubbles represent the perceptions of the other team members). Hence, we advised the coach to intervene by putting the team in contacts with potential customers. After the intervention, the leader was confident again and the team ended up conceiving the product, which was the most voted by the public.

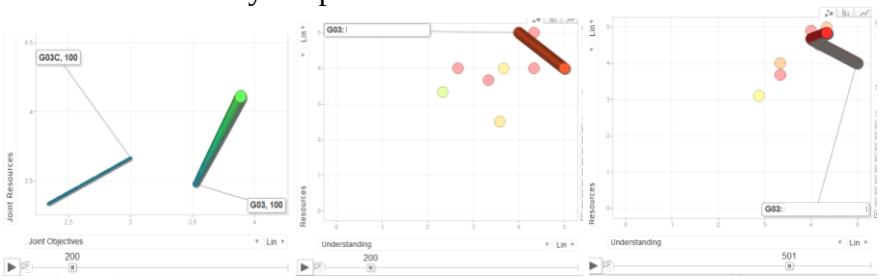



**Fig. 4.** Assessment of coach and team perception (a), analysis of participant perception before the intervention of the coach (b) and after the intervention of the coach (c)

## 6 Discussions and Conclusions

In this study, we seek for a diagnostic tool that (a) allows monitoring the development of common ground in a startup as a sign of team performance –referred here as a *thermometer*- and (b) enables proactive control in different shapes –referred here as a *thermostat.* We extend previous works on collaboration engineering to support entrepreneurial education. Preliminary results open new research opportunities regard-

ing the rapid diagnostic of startup teams and the ability to build patterns, which can be used afterwards to teach students how to become expert entrepreneurs. Nonetheless, this article qualifies as a preliminary analysis to prepare a new research study, which will be done on a larger scale. Indeed, a rigorous measurement model should be necessary to make sure that the question items accurately measure the constructs. Another important limitation concerns the fourth dimension of the theory of Mastrogiacomo et al.[1], which is missing in our model. Analysis of preliminary data has shown that this dimension behaves in a different way, but we are currently assessing whether we can consider the joint risks as a form of search for consensus among team members with different risk attitudes.

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## 7 References

1. Mastrogiacomo, S., Missonier, S., Bonazzi, R.: Talk Before It's Too Late: Reconsidering the Role of Conversation in Information Systems Project Management. J. Manag. Inf. Syst. 31, 47–78 (2014).
2. Shane, S., Venkataraman, S.: The promise of entrepreneurship as a field of research. Acad. Manage. Rev. 25, 217–226 (2000).
3. St-Jean, E., Audet, J.: The effect of mentor intervention style in novice entrepreneur mentoring relationships. Mentor. Tutoring Partnersh. Learn. 21, 96–119 (2013).
4. Briggs, R.O., De Vreede, G.-J., Nunamaker Jr, J.F.: Collaboration engineering with ThinkLets to pursue sustained success with group support systems. J. Manag. Inf. Syst. 19, 31–64 (2003).
5. Clark, H.H.: Using language. Cambridge university press Cambridge (1996).
6. Aral, S., Brynjolfsson, E., Van Alstyne, M.W.: Antecedents and Consequences of Mutual Knowledge in Teams. Available SSRN 1299260. (2008).
7. Kuratko, D.F.: The emergence of entrepreneurship education: Development, trends, and challenges. Entrep. Theory Pract. 29, 577–598 (2005).
8. Hoegl, M., Gemuenden, H.G.: Teamwork quality and the success of innovative projects: A theoretical concept and empirical evidence. Organ. Sci. 12, 435–449 (2001).
9. Seeber, I., Maier, R., Weber, B., De Vreede, G.-J., De Vreede, T., Alothaim, A.: Brainstorming is Just the Beginning: Effects of Convergence Techniques on Satisfaction, Perceived Usefulness of Moderation, and Shared Understanding in Teams. In: System Sciences (HICSS), 2015 48th Hawaii International Conference on. pp. 581–590. IEEE (2015).
10. Aral, S., Brynjolfsson, E., Van Alstyne, M.W.: Antecedents and Consequences of Mutual Knowledge in Teams. Available SSRN 1299260. (2008).
11. Das, T.K., Teng, B.-S.: Trust, control, and risk in strategic alliances: An integrated framework. Organ. Stud. 22, 251–283 (2001).
12. Peffers, K., Tuunanen, T., Rothenberger, M.A., Chatterjee, S.: A design science research methodology for information systems research. J. Manag. Inf. Syst. 24, 45–77 (2007).