

An exploration on the effectiveness of face-to-face and virtual meetings in educational projects dealing with impact innovation

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ABSTRACT

Which is the most effective format for meetings in a project dealing with impact innovation? This paper presents the results of a survey amongst 42 business school students experiencing face-to-face or virtual meetings during their MBA classes. Qualitative interviews and a personality test clarify the results. A significant majority of students rated face-to-face meetings as more effective for the ideation phase of the projects, which contains predominantly brainstorming. The results show no clear tendency for the phase of research and preparation for the final assignment as well as for a written report. For presentations, the majority considers face-to-face meetings as more effective.

Keywords: Online; face-to-face; meetings; effectiveness; impact innovation.

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INTRODUCTION

Over the past two decades, interest in creativity and innovation has grown exponentially, with research showing that both are important for the organizational performance (Anderson et al., 2014). Innovation has always been considered as one of the fundamentals of our economies: from the invention of the wheel to the first industrial revolution, aviation, internet, and artificial intelligence; innovation powers change, progress, opportunity, and hope. In today's world, still reeling from the coronavirus disease 2019 (COVID-19) pandemic and searching for new, stronger, more inclusive, and more sustainable pathways, policies to promote innovation are more relevant than ever (Dima, 2021). Many nations, regions, states, and universities have adopted policies to stimulate innovation through entrepreneurship, combining the two, thereby simultaneously assisting economic growth (Autio et al., 2014; Habib et al., 2020). Therefore, it is important to introduce the concept of impact innovation – sometimes referred to as radical innovation – in business schools for aspiring entrepreneurs (Crumpton, 2012).

The COVID-19 pandemic is one of the most important recent challenges faced by organizations and governments in this century. It has triggered health concerns as well as an historically unprecedented social and economic crisis. This has resulted in a variety of changes for humanity in many areas and induced an acceleration of digitalization practices. This digitalization had a huge influence on

education and working: the pandemic has forced learning and working activities to migrate online at an unprecedented rate, including activities that were traditionally considered effective only if carried out in person, especially in innovative projects (Stecula & Wolniak, 2022). Companies and educational systems around the world have been forced to choose online distance working and learning. The consequences of this change are discussed broadly in many different areas, such as psychology, communication and economics. (Holton, 2001; DeRosa et al., 2007; Jarle Gressgård, 2011; Hardwick et al., 2012; Grözinger et al., 2020; Ploj-Virtič et al., 2021). While the pandemic is slowly transforming into an endemic situation, hybrid approaches are rising. That is, although face-to-face meetings (f2f) are now possible again, in some cases companies and schools still use virtual ways of working and teaching. Although many efforts exist to gather and provide information about differences in remote work and co-located activities, the overall knowledge base is not sufficient because the studies conducted lack adequate definitions of the evaluation criteria, statistical analysis or have been published before the pandemic (Kearns, 2016; Reiter-Palmon et al., 2021; Ploj-Virtič et al., 2021; Ungureanu et al., 2018; Utriainen, 2017; Colombari et al., 2021).

This study focuses on examining the response of business school students to this new situation, and how the format affects the effectiveness. In this context, the definition of effectiveness is the output-related satisfaction of the students. It is clearly separated from



efficiency, which is defined as the time-based perception of meetings.

In addition, this study aims to supply a systematic, multi-perspective, and comparative insight into the state of a business school education covering France, Germany, and Italy. Further examination of the relationship between the students' assessment of online and f2f meetings regarding the effectiveness will contribute to the understanding of the development process in innovative projects. It could also help instructional designers and business school developers communicate more effectively with faculty clients on pedagogical issues in both areas and improve their successful delivery strategies. Moreover, the students facing this education will much likely become involved in impact innovation topics in their future career. Based on this, this study conducts a purpose-built survey whose results are useful to instructional designers and developers in exploring which instructional approach is most suitable for them: online, traditional face-to-face, or hybrid.

THEORETICAL BACKGROUND

Prior to the COVID-19 pandemic, employees in the United States spent 5 % of their working time at home; when the pandemic hit, roughly half of the employees have been forced to work remotely (Barrero, 2021). Barrero et al. argue that this shift will last even after the pandemic has changed into an endemic situation (Barrero, 2021). The impact of COVID-19 has forced working and learning activities to migrate online at an unprecedented rate. This has certainly prompted organizations to change their practices and undertake strategic planning to successfully achieve a positive outcome such as reduced travel time, reduced real estate cost for offices and a business opportunity to market a more sustainable future. Consequently, innovation-minded teams must also grapple with this new environment, whereby ideas are generated via virtual brainstorming, shared, delivered, and projects are presented.

Although an extensive and detailed literature exists regarding the structural process of innovation (Pittaway et al., 2004), research on how modern teams initiate innovation by integrating traditional methodologies with an online approach is comparatively scarce. In conducting virtual innovation in an era of social restraint, the main key performance indicators under scrutiny are productivity, creative process, and team building (Tseng & Yeh, 2013).

According to literature, group brainstorming is less effective for generating large numbers of ideas compared to individual brainstorming, but enhances cognitive stimulation (Dugosh et al., 2000). Some research reveals the benefits of virtual brainstorming in terms of creativity, idea generation, and integration among group members by balancing cultural diversity, including optimists and pessimists, extroverts and introverts, and closing the gap

between primary and secondary role members. This is mainly due to the multitude of tools in digital environments such as shared documents (Reiter-Palmon et al., 2021). Individuals admit to feeling confused and overwhelmed by technological collaboration, which affects team spirit and cohesion, especially for long-term projects. Productivity seems to be affected by virtual brainstorming, leading to a performance loss correlated with project duration (Gallupe et al., 1991). Face-to-face innovation teams, on the other hand, are invigorated and stimulated by sharing ideas, interaction, and emotional connection.

This study focuses on the innovation aspect, which is to be differentiated from creativity work. Defining the concepts of creativity and innovation becomes crucial for establishing the processes, achieving the results in the workplace, and improving the status quo. In fact, innovation and creativity are the results of attempts to develop and introduce novel and improved ways to fulfil objectives.

Creativity is represented by the generation of ideas, while innovation refers to the subsequent step of implementing ideas into better procedures, practices or products. The former can be considered the first stage of innovation as it focuses on the promotion and generation of the initial idea, while the latter focuses on its implementation and analysis (Anderson, 2014).

Both creativity and innovation can occur at the individual, work team, and organizational level or combinations, but will invariably result in identifiable benefits (Anderson, 2014; Autio, 2014).

METHOD AND DATA

This study is based on a quantitative and qualitative research using a survey amongst 42 participants and three participants, respectively. The participants are students of the business school "Collège des Ingénieurs (CDI)". The CDI is exclusively for graduates of renowned universities in engineering and natural sciences in Europe. Students attend classes in the fields of innovation, finance, leadership, strategy, and marketing among others in order to obtain the degree "Master of Business Administration (MBA)". Like the majority of educational institutions worldwide, the CDI had shifted its classes to an online format during the COVID-19 pandemic. Because students and professors are therefore introduced to either online or f2f formats of education, both formats are now implemented in the curriculum. Hence, students starting in September 2021, January 2022, and May 2022 have experienced both online and f2f classes. This makes them able to evaluate both formats with regard to different criteria. This study focuses on effectiveness. For the survey used, the participants were therefore briefed in the following specific distinction: effectiveness is related to productivity, efficiency is related to duration of meetings.

Three classes dealing with impact innovation and two classes dealing with either strategy or marketing form the subject of the survey. The classes about strategy and marketing serve as control variable in order to investigate if the assessment of the effectiveness is subject-related or generally applicable. All of the classes are based on group work and are divided into three phases: idea/finding (phase 1), research/preparation (phase 2), and

pitching/writing (phase 3). While there is mainly brainstorming involved in phase 1, phase 2 consists of topic-related research and preparation of either a presentation or written report for phase 3. Fig. 1 clarifies this structure.

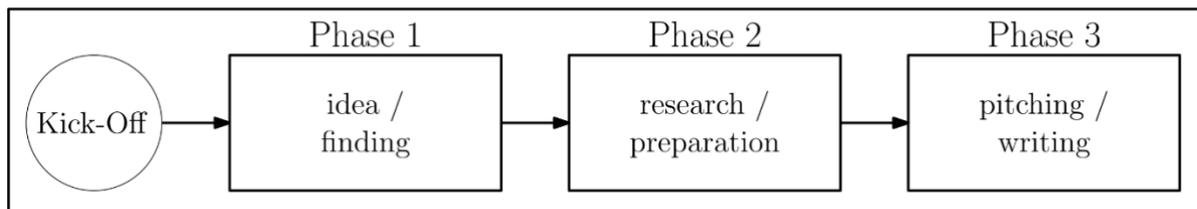


Fig. 1. Structure of the classes.

The class “Innovation Camp” has been split in two sections with a case study on trending topics and industry-relevant topics suggested and supervised by a big German multinational conglomerate corporation. Contrary to the others, this class contained both an assignment in form of a presentation and a written report.

After a separate recapitulation of each class and in which format it has been experienced, the survey has asked the following question for each phase in each class:

“Based on your experience so far, what is the most effective format for the work packages in this specific phase of the class?”

There have been three possible answers: face-to-face, virtual, and neutral. The supplementary material holds the survey in detail. For the evaluation of the responses, a statistical binomial test either accepts or rejects the following hypothesis: *“The majority of participants considers the f2f format as more effective.”* The significance level chosen is at 5%. Additionally, the participants have performed the “Big Five Personality Test” based on Goldberg (Goldberg, 1992) in advance of the survey. The Big Five model is considered the most reliable resource for assessing personalities in organizations (Raja & Johns, 2014). With all of these results given, the analysis of the responses and the psychological assessment of the Big Five is possible. The qualitative part deals with the specific reasons behind the students’ answers.

RESULTS

Fig. 2 shows the summarized distribution of the responses of the survey. The supplementary material contains the key statements of the qualitative interviews. Table 1 clarifies the statistical significance of the responses regarding the hypothesis.

The results are as follows: for phase 1 – which included brainstorming predominantly – the majority of participants rate the f2f format as more effective for every class except ‘Strategic Dilemmas’. The binomial test verifies the significance of this result. When the three students interviewed for the qualitative investigation were asked about the reason for rating f2f as more effective, all of them have stated that they assess interpersonal communication as crucial during this phase. According to them, virtual meetings limit the possibilities of communicating via gesture and facial expressions and it’s easier for introvert people to take themselves out of the discussion. One student interviewed states that this self-made exclusion of some team members increases effectiveness because it decreases the necessity of negotiation and compromises regarding the results.

One of the students interviewed has chosen a neutral position in the question about the effectiveness in the class ‘Strategic Dilemmas’ and explains this with the following reason: compared to the classes about impact innovation, this class has had a narrower task with limited solution space. For marketing, the student has perceived the possible solution space as bigger and therefore has rated f2f as the more effective format for phase 1 in alignment with the explanation given above. The students have not rated f2f as the more effective format for phase 2 for any class with a significant majority. The qualitative part reveals the reasons behind the rating distribution: One student has stated that the effectiveness of phase 2 depends on the format of the previous phase. If this one has happened f2f, the grade of familiarization with the topic and the team is advanced enough to make a virtual format for phase 2 more effective. But in case of a virtual phase 1, the effectiveness of a virtual phase 2 is limited by these processes. Another student explains that a f2f phase 2 is more effective because it increases the pressure given by the supervisor or lecturer because in a virtual format it is easier to be distracted by multitasking. In phase 3, the result is clear: for presentations, the majority of the students rate a f2f format more effective while this

is not the case for writing assessments. The binomial test confirms the significance of this result. The qualitative interviews reveal that the interaction of the audience during presentations is perceived as pleasant for the speaker and ensures the transfer of the information presented. The students interviewed agree that audience's level of attention is higher in f2f because multitasking is seen as a lack of respect towards the speaker. In an online format, inattention is incomparably more inconspicuous. From a speaker's point of view, one student rated virtual as more effective because the slides presented appear directly in the speaker's view with no need for eye contact with the audience. For writing, one of the students interviewed rates virtual as more effective because digital working methods like working in the same document enable more effective results.

The supplementary material holds the results of the Big Five personality test regarding the factor I (extroversion). The vast majority of the participants is rated as extrovert with a chosen minimum threshold value of 75. The extroversion level is interesting for two aspects: first, if the majority of extrovert students rates f2f as more effective for phase 1 in 'Strategic Dilemmas' and second, if they do so for phase 2 of any class. For both

statements, the binomial test rejects this hypothesis for any class. For 'Strategic Dilemmas' and phase 1, the p-values of the threshold chosen at 50, 67 and 75 are $1.8 \cdot 10^{-1}$, $1.6 \cdot 10^{-1}$, and $1.3 \cdot 10^{-1}$, respectively. For the binomial tests of phase 2, the supplementary material holds the specific p-values.

Table 1. Results of the binomial test regarding the hypothesis: "The majority of participants considers the f2f format as more effective." p-values given in brackets.

	Phase 1	Phase 2	Phase 3	
			pitching	writing
Impact Innovation	accepted ($2.8 \cdot 10^{-8}$)	rejected ($9.2 \cdot 10^{-1}$)	accepted ($3.4 \cdot 10^{-1}$)	-
Strategic Dilemmas	rejected ($2.4 \cdot 10^{-1}$)	rejected ($4.4 \cdot 10^{-1}$)	-	rejected ($>9.9 \cdot 10^{-1}$)
Innovation Camp	accepted ($2.2 \cdot 10^{-7}$)	rejected ($5.6 \cdot 10^{-1}$)	accepted ($3.5 \cdot 10^{-5}$)	rejected ($>9.9 \cdot 10^{-8}$)
Innovation Camp + company	accepted ($3.4 \cdot 10^{-5}$)	rejected ($>9.9 \cdot 10^{-1}$)	accepted ($1.4 \cdot 10^{-6}$)	-
Marketing	accepted ($4.7 \cdot 10^{-4}$)	rejected ($2.2 \cdot 10^{-1}$)	accepted ($2.2 \cdot 10^{-2}$)	-

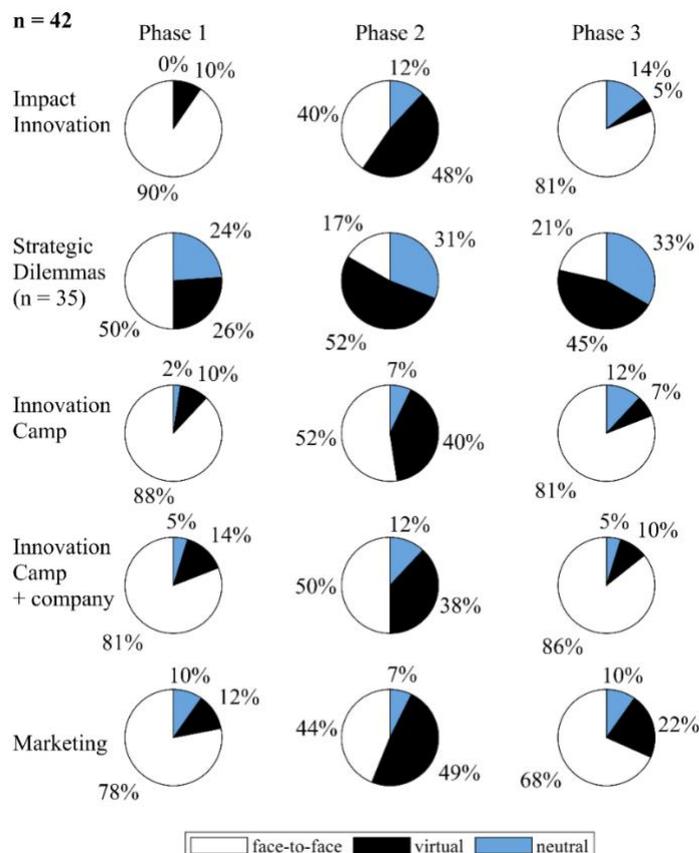


Fig. 2. Formats considered as more effective by CDI students. Numbers rounded. For Innovation Camp, phase 3 depicts the presentation part. For the written report, the distribution is as follows: face-to-face 29%; virtual 57%; neutral 14%.

DISCUSSION AND CONCLUSIONS

The results partly confirm and partly contradict the relevant literature. Ungureanu et al. say the initial state of a team task is imprinted with the need of proximity, which explains the rating of f2f formats as being more effective by the students in phase 1 (Ungureanu et al., 2018). Tseng and Yeh observed that it's more difficult to gain teamwork trust if the first meetings in a project take place online (Tseng & Yeh, 2013). Lojeski et al. confirmed this (Lojeski et al., 2006). It is likely that these perceptions influence the students' responses regarding the effectiveness of the format of phase 1. It has also to be considered that the students are shuffled in different teams for each class. As a consequence, some team members have already known each other but others haven't. This might influence the rating of effectiveness. Additionally, it cannot be excluded that the students have been biased by rating regarding their perception of efficiency instead of effectiveness although the survey has included a sharp definition. The qualitative interviews revealed that some of the students have evaluated the effectiveness of phase 3 from a speaker's and some from a listener's point of view. Another statement revealed that the assessment of the effectiveness in phase 1 has been driven by personal preference in dependency of the own status inside the group. That is, that this student rates virtual meetings as more effective if he considers himself as the group leader but prefers f2f meetings if this is not the case. However, the fact that students have experienced both formats for the different classes decreases a possible confirmation bias. Therefore, it is unlikely that students rate the experienced format as more effective. The results show that for phase 1 the f2f format is considered as more effective also for classes which have taken place online. The assessment for Strategic Dilemmas could be due to three major reasons that do not account for the rest of the classes: Strategic Dilemmas followed a more structured task that involved less brainstorming; the group members have already known each other from previous classes; the professor had already taught the class Impact Innovation in the f2f and online format. Therefore, the students might not have felt the need for a physical kick-off session as this has been the case for the other classes.

The key findings of this study summarize as follows:

- If the first phase of a project contains predominantly brainstorming and discussions, the students rate the f2f formats as more effective. Reasons for that are interpersonal teambuilding processes and a higher availability of communication channels such as gesture and mimic. This perception decreases with a decreasing proportion of brainstorming, with a clear preference in classes dealing with impact innovation.

- For the preparation phase, there is no significant result for either f2f or virtual meetings. Even considering only extrovert people, the f2f format reaches no majority.
- If the project closes with a presentation, the students rate the f2f as more effective. This is caused by the assumption of a more effective transfer of the information presented if there is a local interaction between speaker and audience. If the project closes with a written report, there is no clear preference.
- The threshold test of the extroversion value of the Big Five personality test showed no clear correlation to the students' assessment regarding the effectiveness of f2f and online formats.

These results propose the following structure for projects dealing with impact innovation in an educational or working environment: The idea/finding phase takes place in a f2f format, especially if the team members do not yet know each other. For phase 2, the format is not relevant for effectiveness and can therefore be chosen according to the institutions' circumstances with an eye on traveling effort, availability of offices, and technical equipment. If the project ends with a presentation, phase 3 takes place in the f2f format. For a written report, the situation is the same as for phase 2. This proposal is also suitable for projects without an innovative content considering that the preference of f2f formats decrease with a lower proportion of brainstorming activities.

This study is limited to the sample size and students of the business school interviewed. It is therefore highly recommended to increase the scope of this study and validate it through additional experiments performed in innovative environments, e.g. observing workshops located at CERN IdeaSquare and online. Nevertheless, the findings of this study give an important hint about the perceptions of future innovators.

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