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How to Assess a Creativity Session

L. Coustillac [1,2,3,✉], F. Bazzaro [2], J. Lobbé [1] and Y. Meyer [3,4]

[1] Faurecia Clean Mobility, France, [2] Université Bourgogne Franche-Comté, France, [3] Université de Technologie de Compiègne, France, [4] Université Savoie Mont Blanc, France

✉ lili.coustillac@forvia.com

Abstract

To renew their innovation and creativity practices, companies are now equipping themselves with new specific places: innovation laboratories. These laboratories support project teams during creativity sessions to generate ideas. In order to improve these practices, it is necessary to be able to assess and compare the different sessions organised. By joining the Clean Mobility Lab of Faurecia, we were able to analyse, observe and participate in creativity sessions. This immersion allowed us to develop an assessment grid of forty-eight indicators covering the entire creativity process.

Keywords: design creativity, innovation, evaluation, innovation laboratories

1. Introduction

In order to remain competitive, companies must be innovative and regularly offer new products, services, processes, etc. To do so, companies no longer wonder if they should innovate but rather how to do it. (Prajogo and Ahmed 2006). They "seek to renew their methods of innovation and creation" (Merindol et al. 2016) by no longer only suggesting innovations concerning technical and technological factors but also innovations in uses and environmental matters (Boly 2008). This notion of innovation can be understood as a process, as can the action of innovating, or as a result, the innovative object. From this perspective, Schumpeter defines innovation as an invention which finds its market, and results in a successful initial commercial transaction. (Schumpeter 1939). In order to refine and enrich this definition, it is possible to analyse innovation from different points of view: its nature, its degree and its lever. (Lacom, Bazzaro, and Sagot 2017). The Organisation for Economic Cooperation and Development (OECD) defines four different types of innovation: innovation in the product in its characteristics or uses, innovation in the process and in the associated production methods, innovation in marketing methods or finally innovation in organisation and practices (OECD 2005).

It is also possible to define degrees of innovation (O'Connor 1998; Garcia and Calantone 2002) that correspond to the level of novelty. Two to five distinct degrees are proposed according to the authors (Kleinschmidt and Cooper 1991; Balachandra and Friar 1997; Garcia and Calantone 2002) ranging from imitative innovation which corresponds to the expansion of the range, to radical innovation which consists in the introduction of a new product on a non-existing market.

Finally, innovation can also be characterized by the lever adopted (Ministers 2006; Buisine, Boisadan, and Richir 2017). Price-driven innovation aims to lower costs. Technology-oriented innovation seeks to improve the performance of a product at a technological level. Innovation focused on uses aims to meet the expectations and needs of the users of the solutions offered. Recently, sustainable innovation (Metz et al. 2016), which consists of innovating by taking environmental impacts into account, is also considered as a lever for innovation. From these

different qualifications of innovation, we can therefore retain three indicators: its nature, its degree, and its lever.

This issue of innovation leads to the deployment of new practices and new tools in an industrial context. (Baregheh, Rowley, and Sambrook 2009). One of the tools offered is the establishment of new places, dedicated to innovation, inspired by the maker movement such as FabLabs, Living labs, Hackerspaces, Makerspaces, etc. (Merindol et al. 2016; Bosqué 2016). These new spaces constitute a place and an approach carried by various stakeholders, with a view to renewing the procedures involved in innovation and creation by implementing open, collaborative and iterative processes, giving rise to a physical or virtual materialisation. (Merindol et al. 2016). Their objectives are to put uses back at the heart of the innovation process, to focus the process on users and their needs, to breathe new life into the exploratory and innovative processes of companies, to enhance practical skills, and adapt to a context of deindustrialisation (Merindol et al. 2016; Laborde 2017). To achieve these objectives, innovation laboratories are based on three main cornerstones: a space characterised by a specific architecture, layout and decor that influence the behaviour of its occupants. (Russell and Ward 1982); a team consisting of a variety of heterogeneous stakeholders such as researchers, engineers (Duarte et al. 2019) as well as experts in creativity and prototyping methods and tools, and finally methods designed to facilitate and support the articulation of creative ideas and group work (Magadley and Birdi 2009).

These new practices are based in particular on creativity methods and tools. Creativity is seen as the ability to generate new ideas that are tailored to the context in which they originate (T. Amabile 1996; Bonnardel 2009; Lubart et al. 2015; Sternberg 1994). This definition highlights two essential factors for creativity: originality and effectiveness (Runco and Jaeger 2012). A wide range of creativity processes are provided with different stages (Graham Wallas 1926; Gelb 2018; T. Amabile 1996). However, in each of the proposed processes, three stages systematically return: preparation, ideation and implementation (Figure 1).

Figure 1. The three main stages of the creativity process

The preparation phase during which the problem is posed, formulated and studied is followed by an ideation phase, where ideas are generated by following a phase of divergence and then convergence (Brown 2009), finishing with an implementation phase. The ideas generated and retained in the ideation phase thus return to the project teams. According to Csikszentmihalyi, the process can only take place through interaction. Creativity is not an individual activity (Csikszentmihalyi 1996). it must be possible to build upon the ideas of others in order to stimulate the creativity of all the participants (Paulus, Dzindolet, and Kohn 2012). Since the activity is shared by several people, it is referred to as a co-creativity session. (Sanders and Stappers 2008; Lobbé, Bazzaro, and Sagot 2018). The ideas generated during these sessions to respond to the identified issue in hand can be assessed on the basis of four criteria: novelty, variety, quality and quantity (Shah, Smith, and Vargas-Hernandez 2003; Nelson et al. 2009). Novelty is the number of unusual or unexpected ideas generated. An idea is considered new when it leaves the design space. Variety corresponds to the space of solutions explored: the more similar the ideas, the lower the variety. Quality is used to see whether the criteria defined by the requestor of the session during the preparation phase are met. Finally, quantity corresponds to the total number of ideas generated. However, a co-creativity session cannot be reduced to just the results that are generated. It is also based on a group work dynamic orchestrated by a facilitator (Takouachet, Legardeur, and Lizarralde 2014; Csikszentmihalyi 1996; Paulus, Dzindolet, and Kohn 2012). However, the literature shows us that little work has been done on assessing the process as a whole. (Sufi et al. 2018; Carroll et al. 2009). Innovation thus involves new practices, and in particular the development and implementation of new methods and new creativity tools based on the practices of innovation places such as FabLabs. This observation raises the issue of qualifying and quantifying the impacts of the introduction of these new methods and these new tools on innovation, creativity, etc.

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As part of our research, we propose to build a grid of indicators to observe both the ideas generated during a co-creativity session: their novelty, their variety, their quality and their quantity, but also the overall co-creativity process which takes place upstream and downstream of a session, from the preparation of the session to the implementation of the ideas. First, we present the methodology used to build the indicator grid, then we will present our indicator grid before discussing our results.

2. Methodology

The methodology for constructing the indicator grid is based on an iterative design process in three phases: analysis of the existing situation and participant observations of creativity sessions; design of the grid and, finally, its assessment. These three phases are represented in Figure 2.

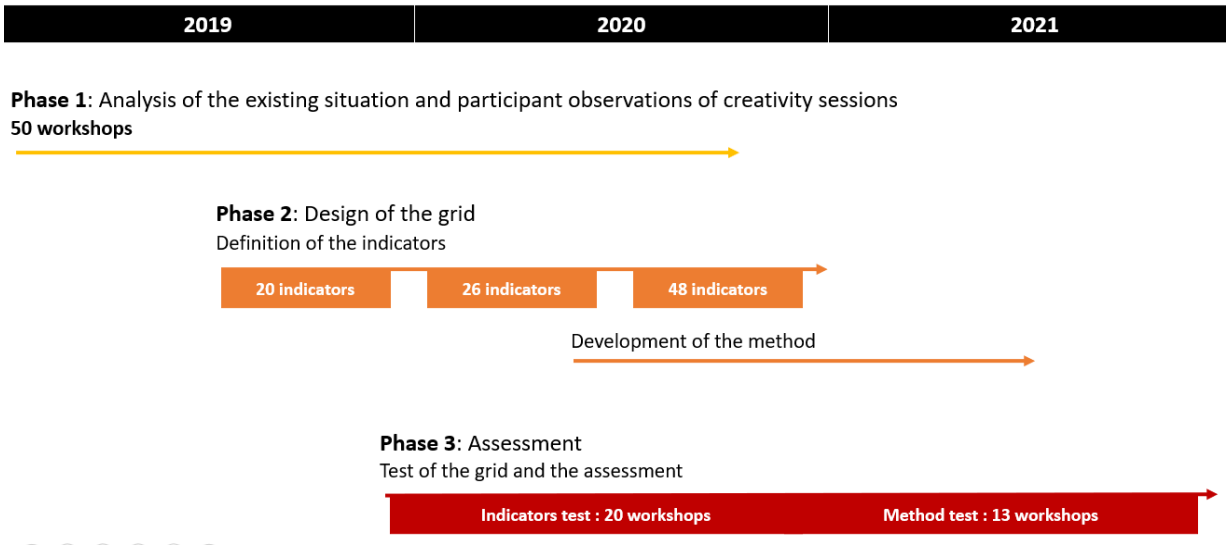

Figure 2. Representation of the three design phases of the observation methodology for co-creativity sessions

Our field for analysis, design and assessment is an industrial innovation laboratory, the Clean Mobility LAB, the innovation laboratory of Faurecia Clean Mobility, the world leader in sustainable mobility for high-power cars, trucks and engines.

We successively detail these three phases of our process of designing an indicator grid. The first phase of analysis of the existing situation and of participant observation lasted 6 months and consisted in an in-depth analysis of the literature in the field and a total immersion in the laboratory. During this phase, we were able to observe and participate in 50 co-creativity sessions, dealing with various issues. Participation in these sessions allowed us to identify four different profiles present during a co-creativity session (Table 1). The second 18-month phase allowed us to design and define indicators and observation tools for the associated co-creativity sessions. The third 23-month phase was used to assess and test the resulting method. These two phases were the subject of several iterations. As a result, we initially defined 20 indicators whose relevance we were able to test for 10 months and 20 co-creativity sessions, forming the assessment phase. As a result of this test, we added new indicators, trying to be more exhaustive. These six new indicators were tested again over 13 sessions. This new test phase brought to light the lack of indicators to assess the session itself and the group dynamic, the use of the tools offered, etc. In the end, we obtained 48 indicators. In order to input these various indicators, we developed a data collection tool. This tool was tested during different sessions in order to be improved. The latest version of the tool, presented in this document, was tested over seven internal sessions, organised by the innovation laboratory in which we were immersed, and an external session, organised by another innovation laboratory which invited us to participate and test our tool during a co-creativity session.

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Table 1. Profiles of participants in a co-creativity session

Facilitator, expert in creativity	Technical leader
The facilitator, an expert in creativity, co-facilitates the session with the technical leader. The facilitator prepares and organises the session by constructing and proposing tools, methods, and creativity activities (Takouachet, Legardeur, and Lizarralde 2014).	The technical leader, requester and co-facilitator of the session, provides the technical knowledge, seeking support in the search for solutions.
Creativity, design, and mock-up experts	Participants
Experts in creativity, design and prototyping methods and tools to support the facilitator throughout the session.	The participants, selected by the technical leader and the facilitator for their skills on the subject, or on the contrary for their "naivety", only participate in the co-creativity session. Their role is to generate ideas.

3. Suggested indicators

The methodology presented allowed us to propose a grid of indicators expressed in generic terms. This choice of vocabulary allows the grid to be used in different socio-economic contexts. We detail these indicators in this section by following the three stages of the creativity process.

3.1. Preparation phase

3.1.1. Information specific to the context and organisation of the project (here, linked to FAURECIA's project organisation)

- Project history to indicate if the session is a continuation of previous sessions.
- Stage of the innovation process at which the project is located.
- Number of meetings before the session between the technical leader and the facilitator
- Language in which the session is organised.

3.1.2. Issues and objectives of the session

- Problem of the co-creativity session defined by the technical leader and the facilitator.
- The objectives to be reached at the end of the session defined by the technical leader allow the facilitator to choose the activities, methods and creativity tools to set up for the session.
- Keywords, defined by the facilitator, to index and archive the project.

3.1.3. Typology of innovation

- Nature of innovation (Schumpeter, 1939; Garcia and Calantone, 2002): product, process, marketing and organisation.
- Degree of innovation (O'Connor, 1998; Garcia and Calantone, 2002). In agreement with, we retain two degrees of innovation: incremental and radical. Incremental innovation corresponds to the continuous improvement of existing products, and radical innovation to the creation of new products.
- Innovation lever (Nordic Council of Ministers, 2006; Buisine et al., 2017, Metz, Burek, Hultgren, Kogan, & Schwartz, 2016): prices, technology, uses and sustainability. After one year of observation and twenty sessions analysed, not having a session with the price lever, we decided not to keep it.

3.1.4. Tools and methods

- Number and name of technical tools to be prepared defined by the facilitator and prepared by the technical leader such as a benchmark, an analysis of patents, an analysis of the anteriority

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of the project, a summary presentation of the project. The tools are defined during preparation meetings depending on the problem, objectives and organisational constraints.

- Number and name of creativity tools to prepare defined and prepared by the facilitator and creativity experts such as mood boards (Bouchard 1999; Lucero Vera 2009; Martin and Hanington 2013), models, persona (Pruitt and Adlin 2006; Nielsen 2011; Martin and Hanington 2013; Barré, Buisine, and Aoussat 2018), etc.
- New tools never built before by creativity experts. Some sessions are based on existing tools, while others require the creation of new tools: new mood board, new User Journey Map.
- Number of activities to be carried out during the session estimated by the facilitator.

3.1.5. Preparation time

- Preparation time for design experts, in hours.
- Preparation time for prototyping experts, i.e. the time spent making mock-up, in hours.
- Preparation time for creativity experts, taking into account the different meetings and tool design, in hours.

3.2. Ideation phase

3.2.1. Planning and organisation

- Session format, (Takouachet, Legardeur, and Lizarralde 2014) face-to-face, remote or in hybrid mode.
- Total number of participants in the session.
- Duration of the co-creativity session, in hours.
- Number of activities actually carried out with regard to the provisional schedule.

3.2.2. Group dynamic

The overall involvement of participants during the session is observed by several indicators which allow us to obtain an overall involvement score:

- Number of participants arriving late, (TM Amabile 1988).
- Number of participants who are not fully focused on the session (who carry out several activities at the same time or completely interrupt their participation by taking part in another meeting, for example).
- Number of participants intervening, asking questions, making remarks, (Csikszentmihalyi 1996) or building on ideas, during the presentation of ideas
- Number of participants consulting documents produced during the session, including ideas generated by other participants (Paulus, Dzindolet, and Kohn 2012).

3.2.3. Session Facilitation

Session facilitation is observed using several binary indicators depending on whether or not the following events occur for the facilitator:

- Managing an unforeseen event by the facilitator during the session (Ackermann 1996)
- Number of relaunch by the facilitator of the work of the group which is declining in creativity and dynamism (Ackermann 1996) using gestures (clapping hands for example), actions (giving sweets, putting on music, etc.) or words with stimulating phrases.
- Number of modification of the time planned for an activity in order to adapt the initial schedule to the dynamics of the session.
- Number of update by and between the facilitator and the technical leader, (Ackermann 1996) in order to regularly review the progress and the proper conduct of the meeting.
- Technical leader taking the role of facilitator. After having observed a large number of co-creativity sessions, we realised that on certain activities, even during certain entire sessions,

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the technical leader took on the role of the facilitator. In this case, the facilitator steps aside and lets the technical leader take the lead. Facilitators resume their role if necessary.

3.2.4. Tools

- Experts present: creativity, mock-up, design etc.
- Experts actually requested by participants and number of requests.
- Number of participants consulting the creativity tools available during the session.
- Number of participants consulting the technical tools available provided by the technical leader.
- Number of participant handling or not of the proposed technical or creativity tools (Minvielle, Lauquin, and Wathelet 2019).

3.3. Implementation phase

3.3.1. Short-term results - end of session

- Number of creations which came out of the session, whether mindmaps, Users Journeys Maps, etc.

In the case of sessions with idea generation, we count the following traces (Derrida 2014):

- Number of written or drawn ideas / creations generated during the divergence phase.
- Number of written or drawn ideas / creations developed during the convergence phase.
- Number of written or drawn ideas / creations assessed if this step is proposed during the session.
- Number of potential written or drawn ideas / creations submitted to legal counsel for patent filing.
- Creation of a model or not during the session.
- Number of other traces produced in different formats: digital documents or scenes produced during the session.

3.3.2. Post-session working time

- Production time of the summary report for the session in hours.
- Production time of the ideas illustrated in the report by the design experts in hours.
- Time for the production of models or prototypes after the co-creativity sessions by prototyping experts in hours.

3.3.3. Long-term results - 1 month after the session

- Number of ideas actually submitted to legal counsel for patent filing.
- Number of ideas giving rise to experimentation.
- Number of patents filed.

4. Discussion / Conclusion

The multiplication of places for innovation such as innovation laboratories in companies or FabLabs in civil society challenges the creativity methods and tools used in these places with specific practices. (Lallement 2015; Anderson 2017). Before challenging the creativity methods and tools, optimising them and deploying new ones, it appears essential to be able to qualify and quantify the preparation, progress and results of a creativity session. For this purpose, we have built a grid of indicators. This grid was built using an agile, iterative design approach based on participant observations (Gold 1958; Bourdieu 2003).

The various works on creativity sessions have often focused on the profiles of participants (Csikszentmihalyi 1996; Mostert 2007; Coursey et al. 2018), the methods used to facilitate the sessions (Cruickshank and Evans 2011; Freitag Granholt and Martensen 2021; Mosely, Wright, and

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Wrigley 2018; Aguirre, Agudelo, and Romm 2017), the social dynamics during the session (Mullen and Copper 1994; Langfred 1998; Marques Santos, Uitdewilligen, and Margarida Passos 2015), assessment of the ideas generated during the sessions (Shah, Smith, and Vargas-Hernandez 2003; Nelson et al. 2009), etc. The proposed grid includes all of these factors. It also proposes to position the creativity session in an innovation process and therefore to study the upstream phases of preparation, and the downstream phases of implementation, of the session over several weeks. This grid will allow us to observe the difference between the forecast results (activities, planning, tools, etc.) and the actual results, the dynamics of the group, participant involvement and motivation during the session, the use of the various tools made available and implemented, as well as the results of the session in the short term, directly at the end of the session and in the longer term.

This global approach to all the issues related to a creativity session allows us to arrive at a rich and diversified grid of indicators.

In order to validate the relevance of the grid and the feasibility of filling it in, we were able to test it during thirteen creativity sessions. Being developed in an industrial setting, we first sought to validate its generic nature by testing it during a session organised by a university innovation laboratory. During this university session, we were also able to test the grid in the case of co-facilitation. Two facilitators having hosted the session simultaneously, we tested another facilitation method and proposed various adaptations of the indicators. These tests enabled us to refine our indicators and reformulate them so that they can be adapted to different contexts. The grid was also filled in for sessions with different formats. Of these sessions, six took place face-to-face, six in hybrid mode and one by videoconference. Using these different formats we were able to see the difficulty of filling in the grid in the case of remote sessions where the observation of certain indicators is limited or even impossible. In this case, adaptation of the grid is necessary in order to fill it in properly.

The different sessions also differed in terms of typology, enabling us to observe ten product-oriented sessions, two organisation-oriented sessions as well as one process-oriented session. Of these sessions, six were used as a lever for innovation in order to meet user expectations, and the other seven sessions were driven by technological improvement.

These first tests allowed us to validate the filling of our tool with different profiles of creativity sessions, whether in terms of duration, the number of participants, the typology of the project studied or the socio-economic contexts in which it was used. They also highlighted a limitation of our tool for observing sessions in remote mode. This is because group dynamics and tool use cannot be fully observed by our indicators. The continuous display of information on the same screen for all prevents us from identifying the ideas addressed or observed by the participants. Activities carried out in parallel to the session are also difficult to observe etc. These conclusions are in line with the work of (Ziegler, Diehl, and Zijlstra 2000) on the specific characteristics of remote creativity practices. It clearly appears, therefore, that the proposed indicator grid, even if it constitutes a first working basis for sessions in hybrid mode or fully remote, must be reworked to adapt to the specific characteristics of the facilitation methods and procedures used.

Today, using these different tests, we have been to analyse and use the results of the observation of five sessions. These first results have allowed us to highlight the first correlations between certain indicators. At the Clean Mobility LAB, we have different types of creativity tools available. We have tools that can be viewed by participants throughout the session, which are displayed and left available to participants, and forced generation tools, in the form of a serious games during which the participants consult the tools and generate ideas for a given time. The grid allowed us to note that, during face-to-face sessions, where we used forced generation tools, the teams developed the greatest number of ideas during the development phase. This result does not apply for remote sessions where we noticed a much lower rate of participant involvement. This is because the number of participants who interrupted their participation, who arrived late or who carried out several activities at the same time actually increased.

The next steps in the validation of this grid are to test the following criteria, the clarity of the criteria by having other people test the completion of the grid, the adaptility of the grid and the exhaustiveness of the indicators.

The particular focus for our research work now is on the development of a new tool allowing those involved in the creativity session to integrate environmental constraints and values into the design of

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their product as of the upstream phases of the design process. This indicator grid should allow us to validate the relevance of the proposed tool by considering the qualitative and quantitative changes in the indicators between different sessions depending on the facilitation tools made available.

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